UNCLASSIFIED

## AD NUMBER

AD869885

## NEW LIMITATION CHANGE

TO

Approved for public release, distribution unlimited

FROM

Distribution authorized to U.S. Gov't. agencies and their contractors; Administrative/Operational Use; May 1970. Other requests shall be referred to Director, Air Force Aero Propulsion Lab., Wright-Patterson AFB, OH 45433.

## AUTHORITY

AFAPL ltr, 12 Apr 1972

THIS PAGE IS UNCLASSIFIED

AFAPL-TR-70-10
VOLUME II

AD 869885

# EVALUATION STUDY OF THE OXIDATION-CORROSION CHARACTERISTICS OF AIRCRAFT TURBINE ENGINE LUBRICANTS

J. P. Cuellar
B. B. Baber

Southwest Research Institute

AD No. ____
DDC FILE COPY

TECHNICAL REPORT AFAPL-TR-70-10, VOLUME II

May 1970

This document is subject to special export controls and each transmittal to foreign nationals may be made only with prior approval of the Fuel, Lubrication, and Hazards Division (APF), Air Force Aero Propulsion Laboratory, Wright-Patterson Air Force Base, Ohio.

Air Force Aero Propulsion Laboratory
Air Force Systems Command
Wright-Patterson Air Force Base, Ohio

DDC
JUN 9 1970

234

# REPRODUCTION QUALITY NOTICE

This document is the best quality available. The copy furnished to DTIC contained pages that may have the following quality problems:

- Pages smaller or larger than normal.
- Pages with background color or light colored printing.
- Pages with small type or poor printing; and or
- Pages with continuous tone material or color photographs.

Due to various output media available these conditions may or may not cause poor legibility in the microfiche or hardcopy output you receive.

☐ If this block is checked, the copy furnished to DTIC contained pages with color printing, that when reproduced in Black and White, may change detail of the original copy.

This document contains
blank pages that were
not filmed

ACCESSION for
CFSTI WHITE SECTION
DDC BUFF SECTION
UNANNOUNCED
JUSTIFICATION
BY
DISTRIBUTION/AVAILABILITY CODES
DIST. AVAIL. and/or SPECIAL
2

## NOTICE

When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Copies of this report should not be returned unless return is required by security considerations contractual obligations, or notice on a specific document.

AFAPL-TR-70-10
VOLUME II

# EVALUATION STUDY OF THE OXIDATION-CORROSION CHARACTERISTICS OF AIRCRAFT TURBINE ENGINE LUBRICANTS

J. P. Cuellar
B. B. Baber

This document is subject to special export controls and each transmittal to foreign nationals may be made only with prior approval of the Fuel, Lubrication, and Hazards Division (APF), Air Force Aero Propulsion Laboratory, Wright-Patterson Air Force Base, Ohio.

## FOREWORD

This report was prepared by Southwest Research Institute, 8500 Culebra Road, San Antonio, Texas, under Contract F33615-69-C-1295, Project No. 3048. The work was administered by the Lubrication Branch, Air Force Aero Propulsion Laboratory (AFAPL), Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. The project engineers were Messrs. G. A. Beane, L. J. DeBrohun, and H. A. Smith (APFL).

This report covers one phase of work performed under the subject contract. This report was submitted by the authors in January 1970.

This technical report has been reviewed and is approved.

H. F. JONES
Chief, Lubrication Branch,
Fuel, Lubrication, and
Hazards Division
Air Force Aero Propulsion
Laboratory

# ABSTRACT

Volume II of this report contains a compilation of the individual test data sheets for all tests reported in Volume I. The data sheets are presented in the order of test number.

This abstract is subject to special export controls and each transmittal to foreign nationals may be made only with prior approval of the Fuel, Lubrication, and Hazards Division (APF), Air Force Aero Propulsion Laboratory, Wright-Patterson Air Force Base, Ohio.

TEST NO. 127-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-60-8 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No. mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.12 | – | 4.20 | 0.18 | – | | | |
| 16 hr | 18.89 | 17.2 | 4.80 | 0.45 | 42.1 | | | |
| 24 hr | 21.74 | 34.9 | 5.34 | 0.59 | 63.0 | | | |
| 40 hr | 41.29 | 156 | 8.71 | 1.13 | 96.6 | | | |
| 48 hr | 79.03 | 390 | 14.29 | 1.67 | 101.3 | 60 | 1.14 | 9.66 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | +0.06 |
| | Steel | +0.08 |
| | Cu | −0.08 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | L pink |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Insufficient sample.

TEST NO. 127-2. RESULTS OF NONREFLUX OXIDATION CORROSION TEST ON O 60-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 12.13 | | 3.17 | 0.19 | | | | |
| 16 hr | 13.47 | 11.0 | 3.48 | 0.65 | 31.2 | | | |
| 24 hr | 13.72 | 13.1 | 3.52 | 0.72 | 46.5 | | | |
| 40 hr | 14.52 | 19.7 | 3.63 | 0.93 | 73.8 | | | |
| 48 hr | 15.19 | 25.2 | 3.65 | 1.10 | 85.0 | 50 | 2.33 | 11.21 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.22 |
| | Ti | +0.22 |
| | Ag | +0.24 |
| | Steel | +0.28 |
| | Cu | +0.22 |
| | Mg | +0.26 |
| Metal discoloration, deposits, pitting, or etching: | Al | M carbon |
| | Ti | M carbon |
| | Ag | M carbon |
| | Steel | M carbon |
| | Cu | M carbon |
| | Mg | M carbon |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 4.0 |
| Tube deposits: | Below oil level | L carbon |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 127-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-61-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.67 | | 4.11 | 0.39 | | | | |
| 16 hr | 17.38 | 10.9 | 4.47 | 0.91 | 35.2 | | | |
| 24 hr | 18.50 | 18.1 | 4.75 | 0.91 | 51.2 | | | |
| 40 hr | 22.93 | 46.3 | 5.70 | 0.91 | 78.7 | | | |
| 48 hr | 29.59 | 88.4 | 7.09 | 1.17 | 88.8 | 60 | 2.29 | 10.98 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.08 |
| | Ti | +0.02 |
| | Ag | +0.02 |
| | Steel | +0.47 |
| | Cu | +0.26 |
| | Mg | +0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L green |
| | Ag | Brown |
| | Steel | L green |
| | Cu | L carbon |
| | Mg | L carbon |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 127-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-62-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.51 | - | 3.84 | 0.02 | | | | |
| 16 hr | 17.46 | 12.6 | 4.15 | 0.58 | 18.6 | | | |
| 24 hr | 18.95 | 22.2 | 4.40 | 0.67 | 32.5 | | | |
| 40 hr | 23.40 | 50.9 | 5.42 | 0.94 | 52.9 | | | |
| 48 hr | 26.72 | 72.3 | 5.64 | 1.21 | 57.6 | 42 | 1.62 | 9.09 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | -0.18 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 127-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-62-4 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.01 | | 3.93 | 0.11 | – | | | |
| 16 hr | 16.46 | 9.7 | 4.26 | 0.84 | 34.2 | | | |
| 24 hr | 17.33 | 15.5 | 4.45 | 0.90 | 50.5 | | | |
| 40 hr | 21.78 | 45.1 | 5.43 | 1.26 | 81.1 | | | |
| 48 hr | 32.04 | 113 | 7.63 | 1.95 | 92.5 | 55 | 1.69 | 10.98 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | +0.02 |
| | Ag | +0.06 |
| | Steel | +0.06 |
| | Cu | −0.02 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L pink |
| | Ti | Tan |
| | Ag | L pink |
| | Steel | Green |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Insufficient sample.

TEST NO. 127-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-62-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.79 | | 4.70 | 0.24 | | | | |
| 16 hr | 17.99 | 1.1 | 5.07 | 0.75 | 33.6 | | | |
| 24 hr | 21.12 | 18.7 | 5.42 | 0.82 | 49.2 | | | |
| 40 hr | 26.21 | 47.3 | 6.49 | 1.25 | 78.3 | | | |
| 48 hr | 38.79 | 118 | 7.43 | 22.4 | 82.9 | 57 | 2.68 | 10.67 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.25 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | No change |
| | Steel | L green |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 137-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TFST ON O-62-13 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 16.00 | – | 4.24 | 0.25 | -- | | | |
| 16 hr | 17.80 | 11.2 | 4.60 | 0.76 | 38.2 | | | |
| 24 hr | 19.24 | 20.2 | 4.94 | 0.79 | 54.7 | | | |
| 40 hr | 25.36 | 58.5 | 6.25 | 1.10 | 83.8 | | | |
| 48 hr | 38.97 | 144 | 9.11 | 1.54 | 93.0 | 57 | 1.91 | 10.83 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.16 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L blue |
| | Ag | Tan |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 137-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-62-16 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 16.84 | – | 4.45 | 0.22 | – | | | |
| 16 hr | 18.82 | 11.8 | 4.85 | 0.76 | 38.0 | | | |
| 24 hr | 20.31 | 20.6 | 5.18 | 0.82 | 53.9 | | | |
| 40 hr | 25.69 | 52.6 | 6.31 | 1.10 | 82.8 | | | |
| 48 hr | 28.58 | 69.7 | 6.11 | 13.96 | 94.8 | 57 | 1.37 | 10.60 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.02 |
| | Steel | +0.04 |
| | Cu | −0.16 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L blue |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 137-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-63-8 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.77 | – | 3.50 | 0.15 | – | | | |
| 16 hr | 14.79 | 7.4 | 3.65 | 0.43 | 21.2 | | | |
| 24 hr | 15.14 | 9.9 | 3.72 | 0.51 | 30.4 | | | |
| 40 hr | 15.99 | 16.1 | 3.86 | 0.59 | 47.0 | | | |
| 48 hr | 16.49 | 19.8 | 4.01 | 0.50 | 54.0 | 35 | 1.71 | 11.42 |

**Metal Specimen Data**

| Weight change, mg/cm²: | | |
|---|---|---|
| | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | −0.04 |
| | Steel | −0.04 |
| | Cu | −0.62 |
| | Mg | −0.12 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | H pitting |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 137-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-63-16 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.47 | – | 4.34 | 0.29 | – | | | |
| 16 hr | 19.01 | 15.4 | 4.92 | 0.65 | 37.7 | | | |
| 24 hr | 21.30 | 29.3 | 5.36 | 0.65 | 54.3 | | | |
| 40 hr | 30.09 | 82.7 | 7.26 | 0.93 | 81.6 | | | |
| 48 hr | 44.47 | 170 | 10.24 | 1.14 | 89.1 | 56 | 1.75 | 9.90 |

**Metal Specimen Data**

| Weight change, mg/cm²: | | |
|---|---|---|
| | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | −0.02 |
| | Cu | −0.02 |
| | Mg | +0.08 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | Blue |
| | Ag | No change |
| | Steel | Yellow |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 137-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.84 | – | 4.29 | 0.11 | – | | | |
| 16 hr | 18.31 | 8.7 | 4.56 | 0.86 | 22.8 | | | |
| 24 hr | 18.80 | 11.6 | 4.69 | 0.96 | 31.7 | | | |
| 40 hr | 20.20 | 20.0 | 4.96 | 1.45 | 47.9 | | | |
| 48 hr | 21.42 | 27.2 | 5.22 | 1.69 | 55.0 | 36 | 3.11 | 11.21 |

**Metal Specimen Data**

| Weight change, mg/cm²: | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.10 |
| | Mg | −0.02 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | Gray |
| | Ti | Blue |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | L brown |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 143-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-61-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.67 | – | 4.11 | 0.39 | – | | | |
| 16 hr | 17.54 | 11.9 | 4.50 | 0.87 | 38.0 | | | |
| 24 hr | 18.85 | 20.3 | 4.80 | 0.89 | 55.1 | | | |
| 40 hr | 24.34 | 55.3 | 5.99 | 0.89 | 82.0 | | | |
| 48 hr | 34.21 | 118 | 8.19 | 1.38 | 90.5 | 54 | 2.03 | 11.08 |

**Metal Specimen Data**

| Weight change, mg/cm²: | | |
|---|---|---|
| | Al | +0.04 |
| | Ti | +0.06 |
| | Ag | +0.24 |
| | Steel | +0.02 |
| | Cu | +0.26 |
| | Mg | +0.12 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | L brown |
| | Ti | L green |
| | Ag | Brown |
| | Steel | Green-red |
| | Cu | L carbon |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 143-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-62-4 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 15.01 | – | 3.93 | 0.11 | – | | | |
| 16 hr | 16.48 | 9.8 | 4.24 | 0.88 | 34.9 | | | |
| 24 hr | 17.41 | 16.0 | 4.47 | 0.82 | 51.9 | | | |
| 40 hr | 21.73 | 44.8 | 4.52 | 0.99 | 84.1 | | | |
| 48 hr | 30.22 | 101 | 7.36 | 1.45 | 96.6 | 58 | 1.68 | 11.06 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.02 |
| | Ag | +0.04 |
| | Steel | +0.06 |
| | Cu | -0.04 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pink |
| | Ti | Pink |
| | Ag | L pink |
| | Steel | Green |
| | Cu | Orange |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Insufficient sample.

TEST NO. 143-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-62-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 17.79 | – | 4.70 | 0.24 | – | | | |
| 16 hr | 20.02 | 12.5 | 5.15 | 0.86 | 36.6 | | | |
| 24 hr | 21.89 | 23.0 | 5.57 | 0.84 | 53.5 | | | |
| 40 hr | 28.96 | 62.8 | 7.19 | 1.18 | 83.1 | | | |
| 48 hr | 40.68 | 129 | 9.59 | 1.78 | 93.0 | 58 | 2.02 | 11.01 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | -0.02 |
| | Ag | +0.06 |
| | Steel | 0.00 |
| | Cu | -0.10 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L pink |
| | Ti | Purple |
| | Ag | No change |
| | Steel | Green |
| | Cu | L yellow |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 143-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-12 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 13.79 | – | 3.52 | 0.25 | – | | | |
| 16 hr | 14.71 | 6.7 | 3.70 | 0.88 | 16.0 | | | |
| 24 hr | 15.39 | 11.6 | 3.98 | 0.86 | 22.9 | | | |
| 40 hr | 15.95 | 15.7 | 4.04 | 1.11 | 35.5 | | | |
| 48 hr | 15.78 | 14.4 | 3.86 | 1.27 | 41.0 | 31 | 2.85 | 11.95 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.26 |
| | Ti | +0.36 |
| | Ag | +0.24 |
| | Steel | +0.28 |
| | Cu | −0.16 |
| | Mg | +0.30 |
| Metal discoloration, deposits, pitting, or etching: | Al | L carbon |
| | Ti | L carbon |
| | Ag | L carbon |
| | Steel | L carbon |
| | Cu | M carbon |
| | Mg | L carbon |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 1.6 |
| Tube deposits: | Below oil level | L carbon |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 143-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 27.50 | – | 5.08 | 0.07 | – | | | |
| 16 hr | 29.54 | 7.4 | 5.35 | 0.19 | 4.5 | | | |
| 24 hr | 30.64 | 11.4 | 5.45 | 0.25 | 6.1 | | | |
| 40 hr | 31.48 | 14.5 | 5.61 | 0.33 | 8.9 | | | |
| 48 hr | 32.65 | 18.7 | 5.72 | 0.38 | 10.1 | 15 | 3.33 | 21.54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | 0.00 |
| | Ag | +0.06 |
| | Steel | +0.04 |
| | Cu | −0.10 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Purple |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 149-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-21 AT 425°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.56 | – | 3.55 | 0.07 | | | | |
| 18 hr | 21.23 | 36.4 | 4.32 | 3.93 | 42.3 | 24 | 14.23 | 13.86 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.06 |
| | Ag | +0.02 |
| | Steel | +0.02 |
| | S. S. | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Blue |
| | S. S. | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 425 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 149-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-22 AT 425°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 18.28 | – | 4.09 | 0.17 | | | | |
| 18 hr | 19.46 | 6.5 | 4.28 | 0.57 | 38.9 | 22 | 6.09 | 14.87 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | −0.04 |
| | Steel | +0.04 |
| | S. S. | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | S. S. | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 425 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 150-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-21 AT 450°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.56 | – | 3.55 | 0.07 | | | | |
| 18 hr | 806.7 | 5080 | 44.48 | 15.10 | 119.4 | 68 | 68.6 | 10.36 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.12 |
| | Steel | +0.02 |
| | S. S. | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Blue-green |
| | S. S. | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 450 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 150-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-22 AT 450°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 18.28 | – | 4.09 | 0.17 | | | | |
| 18 hr | 244.0 | 1235 | 20.46 | 9.99 | 112.9 | 65 | 61.3 | 10.84 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.08 |
| | S. S. | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | Brown |
| | Steel | Blue-green |
| | S. S. | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 450 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 163-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.51 | – | 3.84 | 0.02 | |
| [illegible] hr | 17.61 | 13.5 | 4.18 | 0.58 | |
| [illegible] hr | 19.15 | 24.0 | 4.45 | 0.63 | |
| [illegible] | 23.57 | 51.9 | 5.14 | 0.91 | |
| [illegible] | 26.83 | 73.0 | 5.65 | 1.12 | 43 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | +0.02 |
| | Steel | +0.04 |
| | Cu | –0.14 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Blue-brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 163-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.79 | – | 4.70 | 0.24 | |
| 16 hr | 19.65 | 10.5 | 5.08 | 0.79 | |
| 24 hr | 21.26 | 19.5 | 5.43 | 0.82 | |
| 40 hr | 26.77 | 50.5 | 6.63 | 1.13 | |
| 48 hr | 26.53 | 49.1 | 5.91 | 10.78 | 54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.20 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue-green |
| | Ag | L yellow |
| | Steel | Peacock |
| | Cu | Yellow-orange |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 163-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-16 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.84 | – | 4.45 | 0.22 | |
| 16 hr | 18.54 | 10.1 | 4.78 | 0.80 | |
| 24 hr | 19.83 | 17.8 | 5.07 | 0.81 | |
| 40 hr | 23.89 | 41.9 | 6.01 | 1.20 | |
| 48 hr | 35.35 | 110 | 6.94 | 21.9 | 57 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.10 |
| | Steel | +0.02 |
| | Cu | −0.59 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Blue-green |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | M pitting |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 163-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-63-16 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.47 | – | 4.34 | 0.29 | |
| 16 hr | 18.65 | 13.2 | 4.80 | 0.62 | |
| 24 hr | 20.73 | 25.9 | 5.24 | 0.67 | |
| 40 hr | 28.84 | 75.1 | 6.98 | 0.84 | |
| 48 hr | 41.65 | 153 | 9.67 | 1.17 | 55 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue-red |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 164-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-4 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.01 | – | 3.93 | 0.39 | |
| 16 hr | 16.43 | 9.5 | 4.24 | 0.86 | |
| 24 hr | 17.29 | 15.2 | 4.37 | 0.86 | |
| 40 hr | 20.80 | 38.6 | 5.23 | 0.91 | |
| 48 hr | 26.93 | 79.4 | 6.56 | 1.14 | 54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.04 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Green-blue |
| | Cu | Brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 164-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.79 | – | 4.70 | 0.24 | |
| 16 hr | 19.74 | 11.0 | 5.10 | 0.87 | |
| 24 hr | 21.36 | 20.1 | 5.46 | 0.88 | |
| 40 hr | 27.25 | 53.2 | 6.77 | 1.09 | |
| 48 hr | 28.11 | 58.0 | 6.56 | 5.01 | 54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.12 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L red-blue |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Yellow-brown |
| | Mg | L yellow-green |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 164-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.50 | | 5.08 | 0.07 | |
| 16 hr | 29.92 | 8.8 | 5.36 | 0.21 | |
| 24 hr | 30.72 | 11.7 | 5.45 | 0.24 | |
| 40 hr | 31.85 | 15.8 | 5.68 | 0.30 | |
| 48 hr | 32.59 | 18.5 | 5.70 | 0.31 | 16 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.04 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | -0.04 |
| | Cu | -0.06 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Purple |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 165-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-62-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.79 | | 4.70 | 0.24 | | | | |
| 16 hr | 19.97 | 12.3 | 5.15 | 0.74 | 37.0 | | | |
| 24 hr | 21.76 | 22.3 | 5.58 | 0.79 | 54.0 | | | |
| 40 hr | 29.28 | 64.6 | 7.19 | 1.19 | 84.0 | | | |
| 48 hr | 38.89 | 119 | 9.12 | 2.06 | 94.0 | 57 | 2.41 | 10.94 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | −0.02 |
| | Ag | +0.06 |
| | Steel | 0.00 |
| | Cu | −0.14 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L purple |
| | Ti | Dark purple |
| | Ag | Tan |
| | Steel | Blue-green |
| | Cu | Yellow-green |
| | Mg | L yellow-green |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 166-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.51 | – | 3.84 | 0.02 | |
| 16 hr | 17.54 | 13.1 | 4.16 | 0.53 | |
| 24 hr | 18.91 | 21.9 | 4.32 | 0.65 | |
| 40 hr | 23.26 | 50.0 | 5.10 | 0.91 | |
| 48 hr | 26.15 | 68.6 | 5.59 | 1.08 | 43 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.10 |
| | Ti | +0.10 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.00 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Purple |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 167-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-26 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.77 | – | 3.10 | 0.33 | |
| 16 hr | 16.38 | 28.3 | 3.63 | 0.26 | |
| 24 hr | 18 28 | 43.1 | 3.90 | 0.26 | |
| 40 hr | 22.76 | 78.2 | 4.47 | 0.34 | |
| 48 hr | 26.32 | 106 | 4.92 | 0.47 | 52 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.06 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | -0.04 |
| | Cu | -0.35 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Yellow-brown |
| | Cu | L pitting |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 168-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-26 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 12.77 | – | 3.10 | 0.33 | – | | | |
| 16 hr | 16.33 | 27.9 | 3.62 | 0.24 | 49.6 | | | |
| 24 hr | 18.21 | 42.6 | 3.88 | 0.29 | 65.7 | | | |
| 40 hr | 22.74 | 78.1 | 4.48 | 0.36 | 86.7 | | | |
| 48 hr | 26.70 | 109 | 4.97 | 0.41 | 92.3 | 54 | 1.37 | 9.39 |

**Metal Specimen Data**

| | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 | -0.06 |
| | Ti | 0.00 | -0.02 |
| | Ag | -0.06 | -0.06 |
| | Steel | 0.00 | -0.02 |
| | Cu | -0.28 | -0.36 |
| | Mg | +0.20 | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L tan | |
| | Ag | L yellow | |
| | Steel | Brown-yellow | |
| | Cu | Brown | |
| | Mg | Yellow | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 181-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.71 | – | 4.67 | 0.24 | – | | | |
| 16 hr | 19.57 | 10.5 | 5.08 | 0.70 | 39.1 | | | |
| 24 hr | 21.41 | 20.9 | 5.47 | 0.88 | 56.8 | | | |
| 40 hr | 23.07 | 30.3 | 5.29 | 10.12 | 88.2 | | | |
| 48 hr | 119.9 | 577 | 16.04 | 28.9 | 101.7 | 60 | 5.55 | 10.64 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.18 |
| | Ti | −0.12 |
| | Ag | −0.08 |
| | Steel | +0.02 |
| | Cu | −0.10 |
| | Mg | −0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue-green |
| | Ag | L yellow |
| | Steel | Peacock |
| | Cu | L brown |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 181-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-14 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | – | 4.67 | 0.24 | |
| 16 hr | 19.40 | 9.5 | 5.01 | 0.66 | |
| 24 hr | 20.88 | 17.9 | 5.36 | 0.84 | |
| 40 hr | 23.05 | 30.2 | 5.15 | 13.19 | |
| 48 hr | 97.83 | 452 | 14.01 | 30.7 | 58 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.10 |
| | Ti | −0.08 |
| | Ag | −0.04 |
| | Steel | +0.02 |
| | Cu | −0.04 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue-green |
| | Ag | L yellow |
| | Steel | Peacock |
| | Cu | L brown |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

(a) Insufficient sample.

TEST NO. 183-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.55 | | 4.61 | 0.21 | | | | |
| 16 hr | 19.68 | 12.1 | 5.06 | 0.72 | 38.6 | | | |
| 24 hr | 21.59 | 23.0 | 5.50 | 0.81 | 55.2 | | | |
| 40 hr | 29.19 | 66.3 | 7.10 | 1.23 | 83.0 | | | |
| 48 hr | 43.59 | 148 | 10.06 | 1.85 | 92.2 | 59 | 1.87 | 10.91 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.12 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown & green |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 183-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | | 4.61 | 0.21 | |
| 16 hr | 19.31 | 10.0 | 4.96 | 0.72 | |
| 24 hr | 20.92 | 19.2 | 5.33 | 0.79 | |
| 40 hr | 27.67 | 57.7 | 6.79 | 1.10 | |
| 48 hr | 40.21 | 129 | 9.40 | 1.68 | 54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.08 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L green & yellow |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 183-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.72 | -- | 4.67 | 0.25 | -- | | | |
| 16 hr | 17.49 | −1.3 | 4.15 | 0.57 | 37.7 | | | |
| 24 hr | 19.19 | +8.3 | 4.44 | 0.72 | 52.3 | | | |
| 40 hr | 24.38 | +37.6 | 5.29 | 1.02 | 72.2 | | | |
| 48 hr | 28.15 | +58.9 | 5.85 | 1.29 | 76.3 | 45 | 1.68 | 9.18 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.04 |
| | Steel | 0.00 |
| | Cu | −0.18 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown & green |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 183-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 16 hr | 19.09 | 7.7 | 4.91 | 0.71 | |
| 24 hr | 20.45 | 15.4 | 5.25 | 0.82 | |
| 40 hr | 25.52 | 44.0 | 6.32 | 1.08 | |
| 48 hr | 26.21 | 47.9 | 5.82 | 10.49 | |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.12 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown & blue |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L green & yellow |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 183-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | – | | | |
| 16 hr | 17.34 | 14.8 | 4.13 | 0.63 | 35.2 | | | |
| 24 hr | 18.92 | 25.2 | 4.39 | 0.73 | 48.9 | | | |
| 40 hr | 23.48 | 55.4 | 5.13 | 0.96 | 68.5 | | | |
| 48 hr | 26.54 | 75.6 | 5.62 | 1.25 | 73.1 | 45 | 1.82 | 9.12 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.04 |
| | Steel | 0.00 |
| | Cu | −0.16 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown & green |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 183-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | |
| 16 hr | 19.08 | 26.3 | 4.93 | 0.76 | |
| 24 hr | 20.36 | 34.7 | 5.22 | 0.82 | |
| 40 hr | 24.48 | 62.0 | 6.06 | 1.21 | |
| 48 hr | 41.36 | 174 | 7.61 | 26.4 | 54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.06 |
| | Steel | 0.00 |
| | Cu | −0.27 |
| | Mg | −0.73 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown & blue |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Orange |
| | Mg | Yellow & pitted |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 188-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-25 AT 425°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 28.76 | – | 5.36 | 0.00 | | | | |
| 18 hr | 33.21 | 15.5 | 5.87 | 1.05 | 17.4 | 11 | 6.81 | 19.57 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.04 |
| | S. S. | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | S. S. | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 425 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 188-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-15 AT 425°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 27.20 | – | 5.04 | 0.02 | | | | |
| 18 hr | 32.32 | 18.8 | 5.69 | 0.81 | 20.1 | 17 | 6.15 | 21.34 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | S. S. | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | S. S. | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 425 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 188-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-16 AT 425°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 26.69 | – | 5.13 | 0.20 | | | | |
| 18 hr | 59.32 | 122 | 8.35 | 6.80 | 30.9 | 20 | 83.1 | 11.17 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.10 |
| | Steel | 0.00 |
| | S. S. | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | S. S. | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 425 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 189-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-25 AT 450°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 28.76 | – | 5.36 | 0.00 | | | | |
| 18 hr | 805.2 | 2700 | 42.81 | 8.38 | 83.5 | 50 | 122.5 | 9.45 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | −0.06 |
| | Ag | −0.24 |
| | Steel | +0.08 |
| | S. S. | −0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Brown |
| | S. S. | Tan-green |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 450 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 189-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-15 AT 450°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 27 20 | – | 5.04 | 0.02 | | | | |
| 18 hr | 223.6 | 722 | 18.82 | 8.80 | 63.0 | 38 | 90.6 | 11.78 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.12 |
| | Steel | +0.02 |
| | S. S. | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L tan |
| | Steel | Blue |
| | S. S. | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 450 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 191-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-23 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.62 | - | 3.15 | 0.20 | |
| 16 hr | 17.02 | 34.9 | 3.85 | 0.32 | |
| 24 hr | 20.18 | 59.9 | 4.28 | 0.56 | |
| 40 hr | 27.72 | 120 | 5.25 | 0.85 | |
| 48 hr | 31.24 | 148 | 5.70 | 0.86 | 50 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.04 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Peacock |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 191-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-23 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 12.62 | - | 3.15 | 0.20 | - | | | |
| 16 hr | 17.34 | 37.4 | 3.87 | 0.32 | 53.0 | | | |
| 24 hr | 20.50 | 62.4 | 4.31 | 0.56 | 68.5 | | | |
| 40 hr | 27.44 | 117 | 5.21 | 0.81 | 79.4 | | | |
| 48 hr | 30.46 | 141 | 5.57 | 0.84 | 80.1 | 52 | 1.13 | 7.90 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.02 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Peacock |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 192-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.40 | – | 3.23 | 0.08 | |
| 16 hr | 15.31 | 14.3 | 3.53 | 0.22 | |
| 24 hr | 16.36 | 22.1 | 3.68 | 0.36 | |
| 40 hr | 19.06 | 42.2 | 4.07 | 0.61 | |
| 48 hr | 21.12 | 57.6 | 4.35 | 0.65 | 44 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.02 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue-brown |
| | Cu | Orange |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 192-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 13.40 | – | 3.23 | 0.08 | – | | | |
| 16 hr | 15.37 | 14.7 | 3.54 | 0.22 | 34.1 | | | |
| 24 hr | 16.42 | 22.5 | 3.68 | 0.36 | 47.3 | | | |
| 40 hr | 19.25 | 43.7 | 4.10 | 0.61 | 66.5 | | | |
| 48 hr | 21.30 | 59.0 | 4.39 | 0.65 | 72.0 | 43 | 1.23 | 10.25 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | +0.04 |
| | Mg | +0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue-brown |
| | Cu | Orange |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 195-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.74 | – | 3.65 | 0.18 | |
| 16 hr | 15.56 | 5.6 | 3.82 | 0.81 | |
| 24 hr | 15.94 | 8.1 | 3.88 | 0.96 | |
| 40 hr | 17.54 | 19.0 | 4.16 | 2.61 | |
| 48 hr | 19.24 | 30.5 | 4.45 | 3.28 | 34 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | -0.02 |
| | Ag | -0.39 |
| | Steel | 0.00 |
| | Cu | -22.9 |
| | Mg | +0.49 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | L brown |
| | Ag | L pitting |
| | Steel | Brown |
| | Cu | H etching |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 195-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-22 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.18 | – | 3.72 | 0.00 | |
| 16 hr | 15.93 | 4.9 | 3.84 | 0.26 | |
| 24 hr | 16.22 | 6.9 | 3.90 | 0.53 | |
| 40 hr | 16.96 | 11.7 | 4.00 | 1.08 | |
| 48 hr | 17.46 | 15.0 | 4.08 | 1.21 | 27 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | -0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.08 |
| | Mg | +0.26 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Orange |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 195-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-35 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.09 | – | 3.21 | 0.19 | |
| 16 hr | 18.49 | 41.3 | 4.04 | 0.42 | |
| 24 hr | 21.01 | 60.5 | 4.40 | 0.65 | |
| 40 hr | 25.08 | 91.6 | 4.88 | 0.81 | |
| 48 hr | 26.83 | 105 | 5.10 | 0.91 | 44 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | -0.02 |
| | Ag | -0.02 |
| | Steel | +0.02 |
| | Cu | -0.02 |
| | Mg | +0.22 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | Gold |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 195-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-6 AT 385°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis. cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.74 | – | 3.65 | 0.18 | – | | | |
| 16 hr | 15.59 | 5.8 | 3.86 | 0.77 | 15.5 | | | |
| 24 hr | 15.96 | 8.3 | 3.89 | 0.95 | 22.6 | | | |
| 40 hr | 17.64 | 26.5 | 4.17 | 2.68 | 37.3 | | | |
| 48 hr | 19.31 | 31.0 | 4.46 | 3.20 | 43.7 | 35 | 8.98 | 12.63 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.40 |
| | Steel | 0.00 |
| | Cu | -21.8 |
| | Mg | +0.51 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L pitting |
| | Steel | Brown |
| | Cu | H etching |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 195-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-22 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.18 | – | 3.72 | 0.00 | – | | | |
| 16 hr | 15.93 | 4.9 | 3.84 | 0.27 | 15.7 | | | |
| 24 hr | 16.23 | 6.9 | 3.90 | 0.56 | 22.7 | | | |
| 40 hr | 16.98 | 11.9 | 4.00 | 1.12 | 36.2 | | | |
| 48 hr | 17.48 | 15.2 | 4.08 | 1.23 | 41.9 | 27 | 2.95 | 12.70 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | +0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | Orange |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 195-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-35 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.09 | – | 3.21 | 0.19 | – | | | |
| 16 hr | 18.63 | 42.3 | 4.05 | 0.45 | 48.7 | | | |
| 24 hr | 20.96 | 60.1 | 4.36 | 0.68 | 59.9 | | | |
| 40 hr | 25.25 | 92.9 | 4.89 | 0.85 | 67.9 | | | |
| 48 hr | 27.22 | 108 | 5.12 | 0.92 | 68.9 | 44 | 1.40 | 7.51 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.04 |
| | Steel | +0.06 |
| | Cu | −0.08 |
| | Mg | +0.36 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | Gold |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 196-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-36 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 28.33 | – | 5.31 | 0.14 | |
| 16 hr | 30.34 | 7.1 | 5.60 | 0.21 | |
| 24 hr | 31.15 | 10.0 | 5.69 | 0.32 | |
| 40 hr | 32.44 | 14.5 | 5.85 | 0.42 | |
| 48 hr | 33.21 | 17.2 | 5.96 | 0.50 | 11 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.08 |
| | Mg | +0.81 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Orange-green |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 196-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-38 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.31 | – | 3.53 | 0.11 | |
| 16 hr | 16.08 | 12.4 | 3.82 | 0.10 | |
| 24 hr | 17.42 | 21.7 | 4.06 | 0.11 | |
| 40 hr | 21.20 | 48.1 | 4.64 | 0.18 | |
| 48 hr | 23.72 | 65.8 | 4.99 | 0.23 | 46 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.12 |
| | Mg | +0.75 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Orange-green |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 196-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-40 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.76 | – | 3.29 | 0.06 | |
| 16 hr | 15.97 | 16.1 | 3.66 | 0.24 | |
| 24 hr | 17.14 | 24.6 | 3.84 | 0.42 | |
| 40 hr | 20.17 | 46.6 | 4.24 | 0.59 | |
| 48 hr | 22.13 | 60.8 | 4.52 | 0.75 | 43 |

**Metal Specimen Data**

| Weight change, mg/cm²: | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | +0.04 |
| | Mg | +0.39 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Orange-green |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 196-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-36 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 28.33 | – | 5.31 | 0.14 | – | | | |
| 16 hr | 30.33 | 7.1 | 5.59 | 0.21 | 1.8 | | | |
| 24 hr | 31.15 | 10.0 | 5.69 | 0.31 | 2.7 | | | |
| 40 hr | 32.55 | 14.9 | 5.87 | 0.43 | 4.3 | | | |
| 48 hr | 33.36 | 17.8 | 5.99 | 0.45 | 4.9 | 12 | 3.53 | 19.63 |

**Metal Specimen Data**

| Weight change, mg/cm²: | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | –0.04 |
| | Mg | +0.59 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Orange-green |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 13[illegible] |
| Condensate return | No |

TEST NO. 196-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-38 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.31 | – | 3.53 | 0.11 | – | | | |
| 16 hr | 16.21 | 13.3 | 3.84 | 0.10 | 47.2 | | | |
| 24 hr | 17.62 | 23.1 | 4.08 | 0.11 | 52.0 | | | |
| 40 hr | 21.74 | 51.9 | 4.72 | 0.18 | 72.7 | | | |
| 48 hr | 24.60 | 71.9 | 5.14 | 0.20 | 77.3 | 46 | 0.70 | 9.53 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | −0.04 |
| Steel | −0.02 |
| Cu | −0.06 |
| Mg | +0.61 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L tan |
| Ag | No change |
| Steel | Blue |
| Cu | Orange-green |
| Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 196-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-40 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.76 | – | 3.29 | 0.06 | – | | | |
| 16 hr | 15.98 | 16.1 | 3.66 | 0.25 | 33.2 | | | |
| 24 hr | 17.24 | 25.3 | 3.85 | 0.38 | 45.9 | | | |
| 40 hr | 20.35 | 47.9 | 4.29 | 0.61 | 63.9 | | | |
| 48 hr | 22.64 | 64.5 | 4.58 | 0.67 | 68.4 | 43 | 1.21 | 9.97 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | −0.02 |
| Steel | 0.00 |
| Cu | +0.10 |
| Mg | +0.51 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L tan |
| Ag | No change |
| Steel | Blue-green |
| Cu | Dark gold |
| Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 197-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-684[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.1 | – | 4.13 | 0.15 | |
| 16 hr | 18.18 | 12.5 | 4.49 | 0.61 | |
| 24 hr | 19.74 | 22.2 | 4.80 | 0.68 | |
| 40 hr | 25.48 | 57.7 | 5.80 | 1.12 | |
| 48 hr | 31.63 | 95.7 | 6.84 | 1.50 | 51 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.16 |
| | Mg | +0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Yellow-green |
| | Mg | L tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

(a) Blend (1:1) of O-65-18 and O-65-21.

TEST NO. 197-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON ATL-584[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.16 | – | 4.13 | 0.15 | - | | | |
| 16 hr | 18.25 | 12.9 | 4.51 | 0.64 | 36.4 | | | |
| 24 hr | 20.07 | 24.2 | 4.84 | 0.71 | 51.1 | | | |
| 40 hr | 26.10 | 61.5 | 5.93 | 1.11 | 75.3 | | | |
| 48 hr | 32.05 | 98.3 | 6.92 | 1.49 | 80.8 | 54 | 1.82 | 10.06 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.14 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Yellow-green |
| | Mg | L tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:1) of O-65-18 and O-65-21.

TEST NO. 199-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1115[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.29 | – | 4.18 | 0.17 | – | | | |
| 16 hr | 18.32 | 12.5 | 4.53 | 0.63 | 35.8 | | | |
| 24 hr | 20.12 | 23.5 | 4.68 | 0.73 | 51.3 | | | |
| 40 hr | 26.36 | 61.8 | 5.99 | 1.17 | 72.5 | | | |
| 48 hr | 33.51 | 106 | 7.22 | 1.48 | 76.6 | 53 | 1.77 | 10.04 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | −0.02 |
| | Ag | 0.00 |
| | Steel | −0.02 |
| | Cu | −0.12 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Tan |
| | Steel | L blue |
| | Cu | L brown |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:1) of O-65-19 and O-65-21.

TEST NO. 199-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1116[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.66 | – | 3.96 | 0.12 | – | | | |
| 16 hr | 17.92 | 14.4 | 4.35 | 0.58 | 38.3 | | | |
| 24 hr | 19.66 | 25.5 | 4.65 | 0.67 | 54.6 | | | |
| 40 hr | 24.95 | 59.3 | 5.52 | 1.00 | 77.6 | | | |
| 48 hr | 29.21 | 86.5 | 6.22 | 1.34 | 83.6 | 50 | 1.69 | 9.57 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | −0.04 |
| | Ag | −0.02 |
| | Steel | −0.02 |
| | Cu | −0.08 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Tan |
| | Steel | L blue |
| | Cu | L brown |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:3) of O-65-19 and O-65-21.

TEST NO. 199-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1117[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.97 | – | 4.40 | 0.20 | – | | | |
| 16 hr | 18.74 | 10.4 | 4.72 | 0.68 | 37.2 | | | |
| 24 hr | 20.36 | 20.0 | 5.05 | 0.77 | 54.2 | | | |
| 40 hr | 25.90 | 52.6 | 6.10 | 1.32 | 81.7 | | | |
| 48 hr | 33.01 | 94.5 | 7.50 | 1.67 | 91.0 | 54 | 2.00 | 10.46 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | −0.06 |
| | Ag | 0.00 |
| | Steel | −0.04 |
| | Cu | −0.12 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L blue |
| | Ag | Tan |
| | Steel | L blue |
| | Cu | L brown |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (3:1) of O-65-19 and O-65-21.

TEST NO. 199-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1118[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.28 | - | 3.84 | 0.09 | | | | |
| 16 hr | 17.84 | 16.8 | 4.25 | 0.56 | 38.2 | | | |
| 24 hr | 19.78 | 29.5 | 4.58 | 0.66 | 53.4 | | | |
| 40 hr | 25.10 | 64.3 | 5.46 | 1.04 | 71.5 | | | |
| 48 hr | 28.96 | 89.5 | 6.10 | 1.23 | 74.7 | 50 | 1.63 | 9.39 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | −0.08 |
| | Ag | −0.02 |
| | Steel | −0.04 |
| | Cu | −0.08 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Tan |
| | Steel | L blue |
| | Cu | L brown |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:9) of O-65-19 and O-65-21.

TEST NO. 199-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1119[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.41 | – | 4.55 | 0.23 | – | | | |
| 16 hr | 19.14 | 9.9 | 4.90 | 0.67 | 38.6 | | | |
| 24 hr | 20.97 | 20.4 | 5.27 | 0.79 | 55.8 | | | |
| 40 hr | 27.82 | 59.8 | 6.65 | 1.34 | 84.6 | | | |
| 48 hr | 40.12 | 130 | 9.10 | 2.00 | 93.5 | 55 | 2.02 | 10.70 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | −0.03 |
| | Ag | −0.04 |
| | Steel | −0.02 |
| | Cu | −0.16 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | Tan |
| | Steel | L blue |
| | Cu | L brown |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (9:1) of O-65-19 and O-65-21.

TEST NO. 200-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON 0-65-19 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | | | | |
| 16 hr | 19.62 | 10.7 | 5.04 | 0.69 | 36.8 | | | |
| 24 hr | 21.63 | 22.1 | 5.49 | 0.75 | 53.6 | | | |
| 40 hr | 29.80 | 68.2 | 7.24 | 1.20 | 80.0 | | | |
| 48 hr | 47.24 | 167 | 10.94 | 1.91 | 87.6 | 58 | 1.84 | 10.87 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | −0.08 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-purple |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Peacock |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 200-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | – | | | |
| 16 hr | 17.54 | 16.1 | 4.16 | 0.57 | 38.3 | | | |
| 24 hr | 19.33 | 27.9 | 4.46 | 0.62 | 53.9 | | | |
| 40 hr | 24.13 | 59.7 | 5.23 | 0.94 | 74.0 | | | |
| 48 hr | 27.44 | 81.6 | 5.73 | 1.21 | 78.7 | 47 | 1.85 | 9.05 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.12 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown-purple |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 200-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-60-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 12.13 | – | 3.17 | 0.11 | – | | | |
| 16 hr | 13.56 | 11.8 | 3.45 | 0.68 | 32.4 | | | |
| 24 hr | 13.90 | 14.6 | 3.47 | 0.68 | 46.5 | | | |
| 40 hr | 14.92 | 23.0 | 3.58 | 0.91 | 71.3 | | | |
| 48 hr | 15.16 | 25.0 | 3.76 | 0.98 | 82.1 | 50 | 2.36 | 11.11 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.02 |
| | Cu | +0.14 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L tan |
| | Ti | L tan |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Dark brown |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 4.0 |
| Tube deposits: | Below oil level | L carbon |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 200-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-60-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.13 | – | 3.17 | 0.11 | |
| 16 hr | 13.58 | 12.0 | 3.46 | 0.67 | |
| 24 hr | 13.98 | 15.3 | 3.55 | 0.68 | |
| 40 hr | 14.96 | 23.3 | 3.63 | 0.91 | |
| 48 hr | 15.89 | 31.0 | 3.86 | 1.00 | [illegible] |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.16 |
| | Mg | +0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | L tan |
| | Ti | L tan |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | D brown |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 2.8 |
| Tube deposits: | Below oil level | L carbon |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 201-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1126[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.21 | – | 4.14 | 0.16 | – | | | |
| 16 hr | 18.34 | 13.1 | 4.53 | 0.62 | 37.3 | | | |
| 24 hr | 20.05 | 23.7 | 4.86 | 0.68 | 52.8 | | | |
| 40 hr | 26.57 | 63.9 | 6.02 | 1.12 | 75.2 | | | |
| 48 hr | 33.06 | 104 | 7.25 | 1.47 | 79.4 | 53 | 1.77 | 10.05 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.02 |
| | Steel | +0.04 |
| | Cu | −0.12 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L tan |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:1) of O-65-18 and O-65-21.

TEST NO. 201-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1127[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.62 | – | 3.95 | 0.12 | – | | | |
| 16 hr | 17.91 | 14.7 | 4.33 | 0.61 | 38.6 | | | |
| 24 hr | 19.63 | 25.7 | 4.64 | 0.66 | 54.9 | | | |
| 40 hr | 24.92 | 59.5 | 5.54 | 0.98 | 78.7 | | | |
| 48 hr | 29.18 | 86.8 | 6.29 | 1.31 | 84.7 | 49 | 1.71 | 9.53 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | -0.02 |
| Ti | -0.04 |
| Ag | -0.04 |
| Steel | +0.02 |
| Cu | -0.04 |
| Mg | +0.04 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | Tan |
| Ag | L tan |
| Steel | Blue |
| Cu | Gold |
| Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:3) of O-65-18 and O-65-21.

TEST NO. 201-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1128[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.86 | – | 4.37 | 0.20 | – | | | |
| 16 hr | 18.64 | 10.6 | 4.69 | 0.65 | 37.0 | | | |
| 24 hr | 20.15 | 19.5 | 5.00 | 0.71 | 53.8 | | | |
| 40 hr | 24.45 | 45.0 | 5.74 | 1.93 | 82.7 | | | |
| 48 hr | 56.00 | 232 | 9.28 | 18.64 | 96.2 | 60 | 4.46 | 10.16 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | -0.02 |
| Ti | -0.06 |
| Ag | -0.02 |
| Steel | +0.02 |
| Cu | -0.12 |
| Mg | -0.20 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | Blue |
| Ag | Tan |
| Steel | L green |
| Cu | Rose |
| Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (3:1) of O-65-18 and O-65-21.

TEST NO. 201-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1129[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.31 | – | 3.84 | 0.09 | – | | | |
| 16 hr | 17.86 | 16.7 | 4.28 | 0.58 | 38.8 | | | |
| 24 hr | 19.79 | 29.3 | 4.60 | 0.66 | 53.8 | | | |
| 40 hr | 25.35 | 65.6 | 5.50 | 0.98 | 73.1 | | | |
| 48 hr | 29.40 | 92.0 | 6.13 | 1.29 | 76.2 | 51 | 1.60 | 9.41 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.02 |
| | Ti | -0.06 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.08 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L tan |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:9) of O-65-18 and O-65-21.

TEST NO. 201-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1130[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.30 | - | 4.50 | 0.22 | – | | | |
| 16 hr | 19.16 | 10.8 | 4.90 | 0.67 | 38.8 | | | |
| 24 hr | 20.69 | 19.6 | 5.23 | 0.71 | 55.8 | | | |
| 40 hr | 23.63 | 36.6 | 5.27 | 9.18 | 87.2 | | | |
| 48 hr | 104.8 | 506 | 14.12 | 23.5 | 99.6 | 59 | 5.19 | 10.43 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.02 |
| | Ti | -0.06 |
| | Ag | -0.08 |
| | Steel | +0.02 |
| | Cu | -0.28 |
| | Mg | -1.42 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L blue |
| | Ag | L tan |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | H pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (9:1) of O-65-18 and O-65-21.

TEST NO. 201-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.55 | | 4.61 | 0.21 | – | | | |
| 16 hr | 19.31 | 10.0 | 4.98 | 0.73 | 36.5 | | | |
| 24 hr | 20.97 | 19.5 | 5.35 | 0.75 | 53.1 | | | |
| 40 hr | 27.92 | 59.1 | 6.80 | 1.12 | 83.4 | | | |
| 48 hr | 31.61 | 80.1 | 6.60 | 14.44 | 95.5 | 56 | 2.64 | 10.85 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.02 |
| Ti | -0.06 |
| Ag | -0.04 |
| Steel | 0.00 |
| Cu | -0.06 |
| Mg | +0.14 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L blue |
| Ag | Tan |
| Steel | Blue |
| Cu | Gold |
| Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 202-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-556 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.98 | | 3.63 | 1.66 | |
| 16 hr | 15.20 | 8.7 | 3.89 | 1.41 | |
| 24 hr | 16.05 | 14.8 | 4.08 | 1.27 | |
| 40 hr | 22.38 | 60.1 | 4.98 | 13.04 | |
| 48 hr | 116.1 | 730 | 16.09 | 27.0 | 59 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | -0.04 |
| Ti | -0.02 |
| Ag | +0.02 |
| Steel | 0.00 |
| Cu | -0.24 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | Brown-purple |
| Ag | L yellow |
| Steel | Blue-green |
| Cu | L etching |
| Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 202-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-561 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.43 | – | 3.77 | 0.75 | |
| 16 hr | 15.77 | 9.3 | 4.03 | 0.82 | |
| 24 hr | 16.78 | 16.3 | 4.24 | 0.99 | |
| 40 hr | 96.90 | 572 | 13.31 | 35.6 | |
| 48 hr | Gelled | – | – | 39.2 | 64 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.02 |
| | Ti | -0.04 |
| | Ag | +0.04 |
| | Steel | 0.00 |
| | Cu | -1.08 |
| | Mg | -0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-purple |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | M etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 202-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | – | 4.61 | 0.21 | |
| 16 hr | 19.12 | 8.9 | 4.93 | 0.67 | |
| 24 hr | 20.66 | 17.7 | 5.28 | 0.73 | |
| 40 hr | 24.84 | 41.5 | 6.11 | 1.47 | |
| 48 hr | 57.39 | 227 | 9.56 | 28.0 | 57 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.04 |
| | Ti | -0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | -0.20 |
| | Mg | -0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Tan-purple |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Brown |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 202-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.55 | – | 4.61 | 0.21 | – | | | |
| 16 hr | 19.56 | 11.5 | 5.03 | 0.65 | 38.8 | | | |
| 24 hr | 21.56 | 22.8 | 5.48 | 0.73 | 56.1 | | | |
| 40 hr | 30.35 | 72.9 | 7.37 | 1.14 | 85.3 | | | |
| 48 hr | 48.68 | 177 | 11.10 | 1.66 | 94.1 | 59 | 1.72 | 10.89 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.04 |
| | Ti | 0.00 |
| | Ag | +0.04 |
| | Steel | 0.00 |
| | Cu | -0.12 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown-green |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 203-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1115[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.29 | | 4.18 | 0.17 | | | | |
| 16 hr | 17.83 | 9.5 | 4.46 | 0.52 | 28.0 | | | |
| 24 hr | 19.13 | 17.4 | 4.70 | 0.61 | 40.3 | | | |
| 40 hr | 23.17 | 42.4 | 5.46 | 0.79 | 59.3 | | | |
| 48 hr | 26.98 | 65.6 | 6.18 | 0.95 | 64.8 | 45 | 1.59 | 9.91 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.06 |
| | Steel | +0.02 |
| | Cu | -0.10 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | L yellow |
| | Mg | Green-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:1) of O-65-19 and O-65-21.

TEST NO. 203-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1116[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.66 | – | 3.96 | 0.12 | – | | | |
| 16 hr | 17.40 | 11.1 | 4.26 | 0.50 | 29.9 | | | |
| 24 hr | 18.64 | 19.0 | 4.47 | 0.58 | 42.7 | | | |
| 40 hr | 22.18 | 41.6 | 5.10 | 0.75 | 63.7 | | | |
| 48 hr | 25.07 | 60.1 | 5.62 | 0.85 | 70.7 | 41 | 1.61 | 9.45 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | +0.08 |
| | Steel | +0.02 |
| | Cu | −0.12 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Green-brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:3) of O-65-19 and O-65-21.

TEST NO. 203-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1117[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.97 | – | 4.40 | 0.20 | – | | | |
| 16 hr | 18.24 | 7.5 | 4.66 | 0.56 | 28.6 | | | |
| 24 hr | 19.37 | 14.1 | 4.86 | 0.63 | 41.9 | | | |
| 40 hr | 22.94 | 35.2 | 5.58 | 0.80 | 65.7 | | | |
| 48 hr | 26.58 | 56.6 | 6.30 | 0.93 | 75.1 | 44 | 1.72 | 10.27 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.04 |
| | Steel | +0.02 |
| | Cu | −0.14 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | L yellow |
| | Mg | Green-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (3:1) of O-65-19 and O-65-21.

TEST NO. 203-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1118[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.28 | – | 3.84 | 0.09 | – | | | |
| 16 hr | 17.23 | 12.8 | 4.17 | 0.49 | 29.4 | | | |
| 24 hr | 18.58 | 21.6 | 4.40 | 0.53 | 41.4 | | | |
| 40 hr | 22.51 | 47.3 | 5.07 | 0.70 | 59.1 | | | |
| 48 hr | 25.57 | 67.3 | 5.57 | 0.80 | 63.3 | 44 | 1.54 | 9.27 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.02 |
| Ti | +0.02 |
| Ag | +0.04 |
| Steel | +0.02 |
| Cu | −0.14 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | L brown |
| Ag | Yellow |
| Steel | Blue |
| Cu | L yellow |
| Mg | Green-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:9) of O-65-19 and O-65-21.

TEST NO. 203-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1119[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.41 | – | 4.55 | 0.23 | | | | |
| 16 hr | 18.75 | 7.7 | 4.82 | 0.58 | 30.5 | | | |
| 24 hr | 20.06 | 15.2 | 5.10 | 0.64 | 44.0 | | | |
| 40 hr | 24.58 | 41.2 | 6.06 | 0.80 | 68.0 | | | |
| 48 hr | 30.44 | 74.8 | 7.28 | 0.95 | 77.1 | 46 | 1.59 | 10.53 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.02 |
| Ti | 0.00 |
| Ag | +0.04 |
| Steel | 0.00 |
| Cu | −0.14 |
| Mg | +0.02 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | Brown |
| Ag | Yellow |
| Steel | Blue |
| Cu | Yellow |
| Mg | Green-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (9:1) of O-65-19 and O-65-21.

TEST NO. 203-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | – | | | |
| 16 hr | 19.03 | 7.4 | 4.91 | 0.61 | 28.5 | | | |
| 24 hr | 20.23 | 14.2 | 5.19 | 0.69 | 41.4 | | | |
| 40 hr | 24.58 | 38.7 | 6.16 | 0.81 | 64.9 | | | |
| 48 hr | 29.18 | 64.7 | 7.21 | 0.94 | 74.4 | 45 | 1.59 | 10.68 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | +0.06 |
| | Steel | +0.04 |
| | Cu | −0.14 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Yellow |
| | Mg | Green-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 204-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1126[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.21 | | 4.14 | 0.16 | | | | |
| 16 hr | 17.81 | 9.9 | 4.44 | 0.53 | 29.0 | | | |
| 24 hr | 19.09 | 17.8 | 4.69 | 0.58 | 41.0 | | | |
| 40 hr | 23.43 | 44.5 | 5.51 | 0.77 | 59.8 | | | |
| 48 hr | 27.65 | 70.6 | 6.30 | 0.97 | 64.9 | 46 | 1.48 | 9.87 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.12 |
| | Ag | +0.02 |
| | Steel | +0.06 |
| | Cu | 0.10 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Green-brown |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:1) of O-65-18 and O-65-21.

TEST NO. 204-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1127[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.62 | – | 3.95 | 0.12 | – | | | |
| 16 hr | 17.45 | 11.7 | 4.25 | 0.52 | 30.9 | | | |
| 24 hr | 18.69 | 19.7 | 4.48 | 0.57 | 43.8 | | | |
| 40 hr | 22.41 | 43.5 | 5.13 | 0.72 | 64.5 | | | |
| 48 hr | 25.54 | 63.5 | 5.68 | 0.95 | 71.0 | 44 | 1.54 | 9.54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | +0.04 |
| | Steel | +0.10 |
| | Cu | -0.04 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Green-brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:3) of O-65-18 and O-65-21.

TEST NO. 204-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1128[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.86 | - | 4.37 | 0.20 | – | | | |
| 16 hr | 18.19 | 7.9 | 4.61 | 0.56 | 29.4 | | | |
| 24 hr | 19.36 | 14.8 | 4.85 | 0.60 | 42.5 | | | |
| 40 hr | 23.27 | 38.0 | 5.64 | 0.79 | 66.9 | | | |
| 48 hr | 26.98 | 60.0 | 6.37 | 0.99 | 76.0 | 46 | 1.65 | 10.29 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | +0.14 |
| | Cu | -0.10 |
| | Mg | +0.18 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (3:1) of O-65-18 and O-65-21.

TEST NO. 204-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1129[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 15.31 | – | 3.84 | 0.09 | – | | | |
| 16 hr | 17.50 | 14.3 | 4.19 | 0.47 | 30.3 | | | |
| 24 hr | 18.87 | 23.3 | 4.43 | 0.54 | 42.2 | | | |
| 40 hr | 22.75 | 48.6 | 5.08 | 0.71 | 59.8 | | | |
| 48 hr | 25.79 | 68.5 | 5.57 | 0.86 | 67.6 | 43 | 1.53 | 9.28 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.04 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.06 |
| | Cu | -0.12 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Green-brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:9) of O-65-18 and O-65-21.

TEST NO. 204-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON J-1130[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 17.30 | | 4.50 | 0.22 | | | | |
| 16 hr | 18.70 | 8.1 | 4.79 | 0.57 | 31.3 | | | |
| 24 hr | 19.97 | 15.4 | 5.07 | 0.63 | 45.0 | | | |
| 40 hr | 24.89 | 43.9 | 6.12 | 0.78 | 69.8 | | | |
| 48 hr | 31.06 | 79.5 | 7.41 | 0.96 | 79.1 | 47 | 1.40 | 10.56 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.06 |
| | Ti | +0.02 |
| | Ag | +0.14 |
| | Steel | +0.02 |
| | Cu | -0.04 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Green-brown |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (9:1) of O-65-18 and O-65-21.

TEST NO. 204-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.55 | -- | 4.61 | 0.21 | -- | | | |
| 16 hr | 18.88 | 7.6 | 4.87 | 0.61 | 28.8 | | | |
| 24 hr | 20.11 | 14.6 | 5.16 | 0.63 | 41.9 | | | |
| 40 hr | 24.49 | 39.5 | 6.15 | 0.77 | 66.3 | | | |
| 48 hr | 29.34 | 67.2 | 7.19 | 0.90 | 76.1 | 46 | 1.48 | 10.70 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.04 |
| | Ti | +0.06 |
| | Ag | +0.04 |
| | Steel | +0.04 |
| | Cu | -0.04 |
| | Mg | +0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Green-brown |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 205-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON K-1004[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.06 | -- | 4.12 | 0.17 | -- | | | |
| 16 hr | 17.61 | 9.7 | 4.39 | 0.51 | 28.0 | | | |
| 24 hr | 18.81 | 17.1 | 4.62 | 0.65 | 40.0 | | | |
| 40 hr | 22.69 | 41.3 | 5.35 | 0.83 | 59.5 | | | |
| 48 hr | 26.62 | 65.8 | 6.05 | 0.98 | 64.9 | 45 | 1.55 | 9.95 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | -0.02 |
| | Cu | -0.12 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L tan |
| | Ti | L brown |
| | Ag | L tan |
| | Steel | Blue |
| | Cu | L green |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:1) of O-65-19 and O-65-25.

TEST NO. 205-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON K-1005[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.38 | – | 3.88 | 0.12 | – | | | |
| 16 hr | 17.07 | 11.0 | 4.17 | 0.47 | 30.9 | | | |
| 24 hr | 18.23 | 18.5 | 4.36 | 0.56 | 44.0 | | | |
| 40 hr | 21.68 | 41.0 | 4.99 | 0.75 | 65.3 | | | |
| 48 hr | 24.53 | 59.5 | 5.47 | 0.91 | 72.3 | 43 | 1.51 | 9.41 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.12 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L tan |
| | Ti | L brown |
| | Ag | L tan |
| | Steel | Blue |
| | Cu | L brown |
| | Mg | L pink |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:3) of O-65-19 and O-65-25.

TEST NO. 205-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON K-1006[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.87 | – | 4.38 | 0.20 | – | | | |
| 16 hr | 18.11 | 7.4 | 4.62 | 0.56 | 29.2 | | | |
| 24 hr | 19.33 | 14.6 | 4.85 | 0.66 | 42.4 | | | |
| 40 hr | 23.10 | 36.9 | 5.52 | 0.88 | 66.4 | | | |
| 48 hr | 27.10 | 60.6 | 6.39 | 1.05 | 75.6 | 45 | 1.68 | 10.27 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.12 |
| | Mg | +0.02 |
| Metal discoloration, deposits pitting, or etching: | Al | L tan |
| | Ti | L brown |
| | Ag | Tan |
| | Steel | Blue |
| | Cu | L green |
| | Mg | L pink |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (3:1) of O-65-19 and O-65-25.

TEST NO. 205-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON K-1007[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.95 | – | 3.78 | 0.09 | – | | | |
| 16 hr | 16.78 | 12.2 | 4.05 | 0.45 | 29.4 | | | |
| 24 hr | 18.02 | 20.5 | 4.27 | 0.52 | 41.5 | | | |
| 40 hr | 21.69 | 45.1 | 4.88 | 0.73 | 59.1 | | | |
| 48 hr | 24.50 | 63.9 | 5.38 | 0.91 | 63.3 | 43 | 1.43 | 9.28 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.10 |
| | Mg | -0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Tan |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (1:9) of O-65-19 and O-65-25.

TEST NO. 205-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON K-1008[a] AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.38 | – | 4.54 | 0.23 | – | | | |
| 16 hr | 18.76 | 7.9 | 4.81 | 0.58 | 30.3 | | | |
| 24 hr | 20.04 | 15.3 | 5.09 | 0.66 | 43.8 | | | |
| 40 hr | 24.71 | 42.2 | 6.09 | 0.86 | 68.6 | | | |
| 48 hr | 30.09 | 73.1 | 7.27 | 1.07 | 78.3 | 47 | 1.74 | 10.54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.04 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L tan |
| | Ti | Brown |
| | Ag | L tan |
| | Steel | Blue |
| | Cu | L green |
| | Mg | L pink |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Blend (9:1) of O-65-19 and O-65-25.

TEST NO. 205-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | – | | | |
| 16 hr | 16.99 | 12.4 | 4.07 | 0.48 | 29.4 | | | |
| 24 hr | 18.18 | 20.3 | 4.27 | 0.55 | 41.0 | | | |
| 40 hr | 21.57 | 42.8 | 4.86 | 0.76 | 58.8 | | | |
| 48 hr | 24.11 | 59.6 | 5.24 | 0.88 | 64.1 | 40 | 1.57 | 9.01 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | +0.02 |
| Steel | 0.00 |
| Cu | -0.08 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | L tan |
| Steel | Blue |
| Cu | Brown |
| Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 207-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-25 AT 375°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.71 | – | 3.67 | 0.07 | – | | | |
| 16 hr | 16.35 | 11.2 | 3.93 | 0.46 | 27.0 | | | |
| 24 hr | 17.41 | 18.4 | 4.13 | 0.59 | 38.5 | | | |
| 40 hr | 20.68 | 40.6 | 4.64 | 0.76 | 56.5 | | | |
| 48 hr | 23.06 | 56.8 | 5.02 | 0.94 | 61.6 | 39 | 1.54 | 9.03 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | 0.00 |
| Steel | 0.00 |
| Cu | -0.02 |
| Mg | -0.04 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | Brown |
| Ag | Yellow |
| Steel | Blue |
| Cu | Orange & brown |
| Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 375 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 208-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-25 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.71 | – | 3.67 | 0.07 | |
| 16 hr | 16.81 | 14.3 | 4.00 | 0.56 | |
| 24 hr | 18.33 | 24.6 | 4.26 | 0.67 | |
| 40 hr | 23.05 | 56.7 | 5.01 | 1.05 | |
| 48 hr | 26.32 | 78.9 | 5.50 | 1.33 | 47 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | -0.18 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown-green |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 208-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.40 | – | 3.23 | 0.08 | |
| 16 hr | 15.33 | 14.4 | 3.54 | 0.25 | |
| 24 hr | 16.44 | 22.7 | 3.71 | 0.43 | |
| 40 hr | 19.41 | 44.9 | 4.13 | 0.69 | |
| 48 hr | 21.72 | 62.1 | 4.44 | 0.74 | 44 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | 0.00 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Brown-blue |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 208-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-25 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.71 | – | 3.67 | 0.07 | – | | | |
| 16 hr | 17.04 | 15.8 | 4.04 | 0.57 | 37.3 | | | |
| 24 hr | 18.60 | 26.4 | 4.29 | 0.68 | 51.4 | | | |
| 40 hr | 23.28 | 58.3 | 5.03 | 1.05 | 70.0 | | | |
| 48 hr | 26.14 | 77.7 | 5.47 | 1.30 | 73.2 | 48 | 1.68 | 9.24 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.20 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown-green |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 208-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.40 | – | 3.23 | 0.08 | – | | | |
| 16 hr | 15.45 | 15.3 | 3.56 | 0.25 | 37.3 | | | |
| 24 hr | 16.69 | 24.6 | 3.74 | 0.43 | 52.4 | | | |
| 40 hr | 20.23 | 51.0 | 4.26 | 0.69 | 74.5 | | | |
| 48 hr | 23.02 | 71.8 | 4.60 | 0.74 | 80.0 | 47 | 1.07 | 10.32 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.02 |
| | Cu | −0.02 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow |
| | Ag | L yellow |
| | Steel | Brown-blue |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 210-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | – | 4.67 | 0.24 | |
| 48 hr | 17.36 | −2.0 | 4.54 | 0.84 | |
| 96 hr | 17.36 | −2.0 | 4.53 | 1.10 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.08 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | Green-pink |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 96+ hr |
| 100°F vis | 96+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 210-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | | 4.61 | 0.21 | |
| 48 hr | 17.34 | −1.2 | 4.51 | 0.84 | |
| 96 hr | 17.27 | −1.6 | 4.50 | 1.10 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.10 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | Pink-brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 96+ hr |
| 100°F vis | 96+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 210-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 48 hr | 17.45 | −1.5 | 4.55 | 0.86 | |
| 96 hr | 17.38 | −1.9 | 4.52 | 1.13 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.04 |
| | Cu | −0.10 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | Pink-brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 96+ hr |
| 100°F vis | 96+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 210-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | |
| 48 hr | 15.43 | +2.1 | 3.81 | 0.70 | |
| 96 hr | 15.56 | +3.0 | 3.80 | 0.91 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.02 |
| | Cu | −0.16 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | Brown-purple |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 96+ hr |
| 100°F vis | 96+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 210-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON [illegible]

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis cs/210°F | Neut. No., mg KOH/g | [illegible] wt % |
|---|---|---|---|---|---|
| Initial | 14.71 | | 3.67 | 0.07 | |
| 48 hr | 14.94 | +1.6 | 3.68 | 0.71 | |
| 96 hr | 14.95 | +1.6 | 3.67 | 1.01 | 2 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | Sludge in oil: | 200-mesh filter | None |
| | Ti | 0.00 | | Centrifuge, vol % | Trace |
| | Ag | +0.02 | | | |
| | Steel | +0.02 | Tube deposits: | Below oil level | None |
| | Cu | −0.16 | | At and above oil level | L var |
| | Mg | +0.02 | | | |
| | | | **Breakpoint Data** | | |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | Neut. no. | 96+ hr | |
| | Ti | L brown | 100°F vis | 96+ hr | |
| | Ag | L yellow | | | |
| | Steel | Purple | **Test Conditions** | | |
| | Cu | Purple-brown | | | |
| | Mg | L yellow | Sample temperature, °F | 347 | |
| | | | Sample volume, ml | 200 | |
| | | | Air rate, liter/hr | 10 | |
| | | | Condensate return | Yes | |

TEST NO. 211-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | | 4.67 | 0.24 | |
| 96 hr | 17.52 | −1.1 | 4.59 | 1.10 | |
| 144 hr | 17.48 | −1.3 | 4.56 | 1.29 | 5 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | Sludge in oil: | 200-mesh filter | None |
| | Ti | 0.00 | | Centrifuge, vol % | Trace |
| | Ag | 0.00 | | | |
| | Steel | 0.00 | Tube deposits: | Below oil level | L var |
| | Cu | −0.16 | | At and above oil level | None |
| | Mg | +0.04 | | | |
| | | | **Breakpoint Data** | | |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | Neut. no. | 144+ hr | |
| | Ti | Tan-blue | 100°F vis | 144+ hr | |
| | Ag | L yellow | | | |
| | Steel | Blue | **Test Conditions** | | |
| | Cu | Green-brown | | | |
| | Mg | L yellow | Sample temperature, °F | 347 | |
| | | | Sample volume, ml | 200 | |
| | | | Air rate, liter/hr | 10 | |
| | | | Condensate return | Yes | |

TEST NO. 211-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | | 4.61 | 0.21 | |
| 96 hr | 17.24 | -1.8 | 4.47 | 1.13 | |
| 144 hr | 17.18 | -2.1 | 4.47 | 1.25 | 2 |

| Metal Specimen Data | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.18 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown-green |
| | Mg | L yellow |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Breakpoint Data | |
|---|---|
| Neut. no. | 144+ hr |
| 100°F vis | 144+ hr |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 211-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | | 4.67 | 0.25 | |
| 96 hr | 17.43 | -1.6 | 4.53 | 1.12 | |
| 144 hr | 17.36 | -2.0 | 4.51 | 1.31 | 3 |

| Metal Specimen Data | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | -0.14 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-blue |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown-green |
| | Mg | Green-yellow |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Breakpoint Data | |
|---|---|
| Neut. no. | 144+ hr |
| 100°F vis | 144+ hr |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 211-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-25 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | | 3.76 | 0.07 | |
| 96 hr | 15.45 | 2.3 | 3.80 | 0.90 | |
| 144 hr | 15.45 | 2.3 | 3.79 | 1.01 | 3 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | Sludge in oil: | 200-mesh filter | None |
| | Ti | −0.02 | | Centrifuge, vol % | Trace |
| | Ag | 0.00 | | | |
| | Steel | +0.02 | Tube deposits: | Below oil level | None |
| | Cu | −0.18 | | At and above oil level | L. var |
| | Mg | −0.12 | | | |
| | | | Breakpoint Data | | |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | Neut. no. | 144+ hr | |
| | Ti | Brown | 100°F vis | 144+ hr | |
| | Ag | L yellow | | | |
| | Steel | Blue | Test Conditions | | |
| | Cu | Brown-green | | | |
| | Mg | No change | Sample temperature, °F | 347 | |
| | | | Sample volume, ml | 200 | |
| | | | Air rate, liter/hr | 10 | |
| | | | Condensate return | Yes | |

TEST NO. 211-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-25 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.71 | | 3.67 | 0.07 | |
| 96 hr | 15.13 | 2.9 | 3.71 | 0.84 | |
| 144 hr | 15.17 | 3.1 | 3.70 | 0.96 | 4 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | Sludge in oil: | 200-mesh filter | None |
| | Ti | 0.00 | | Centrifuge, vol % | Trace |
| | Ag | 0.00 | | | |
| | Steel | +0.02 | Tube deposits: | Below oil level | None |
| | Cu | −0.18 | | At and above oil level | L. var |
| | Mg | −0.14 | | | |
| | | | Breakpoint Data | | |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | Neut. no. | 144+ hr | |
| | Ti | Brown | 100°F vis | 144+ hr | |
| | Ag | L yellow | | | |
| | Steel | Blue | Test Conditions | | |
| | Cu | Brown pink | | | |
| | Mg | No change | Sample temperature, °F | 347 | |
| | | | Sample volume, ml | 200 | |
| | | | Air rate, liter/hr | 10 | |
| | | | Condensate return | Yes | |

TEST NO. 212-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | | 4.67 | 0.24 | |
| 144 hr | 17.49 | −1.2 | 4.56 | 1.30 | |
| 192 hr | 17.31 | −2.3 | 4.51 | 1.56 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | −0.12 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L. blue |
| | Ag | Tan |
| | Steel | Blue-green |
| | Cu | L. green |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200 mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 192+ hr |
| 100°F vis | 192+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 212-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | | 4.67 | 0.24 | |
| 144 hr | 17.38 | −1.9 | 4.54 | 1.37 | |
| 192 hr | 17.25 | −2.6 | 4.49 | 1.54 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | 0.00 |
| | Steel | +0.06 |
| | Cu | −0.12 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | Tan |
| | Steel | Blue-green |
| | Cu | L. green |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 192+ hr |
| 100°F vis | 192+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 212-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | | 4.61 | 0.21 | |
| 144 hr | 17.40 | −0.9 | 4.53 | 1.35 | |
| 192 hr | 17.27 | −1.6 | 4.50 | 1.50 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | −0.02 |
| | Ag | −0.02 |
| | Steel | +0.04 |
| | Cu | −0.20 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Tan |
| | Steel | Blue |
| | Cu | Rose-green |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 192+ hr |
| 100°F vis | 192+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 212-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | — | 4.67 | 0.25 | |
| 144 hr | 17.33 | −2.2 | 4.51 | 1.34 | |
| 192 hr | 17.17 | −3.1 | 4.47 | 1.60 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.04 |
| | Steel | +0.02 |
| | Cu | −0.14 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Tan |
| | Steel | Blue |
| | Cu | Rose-green |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 192+ hr |
| 100°F vis | 192+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 212-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | | 3.76 | 0.07 | |
| 144 hr | 15.55 | +2.9 | 3.83 | 1.10 | |
| 192 hr | 15.69 | +3.7 | 3.82 | 1.17 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.14 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Rose-brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 192+ hr |
| 100°F vis | 192+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 212-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-25 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.71 | | 3.67 | 0.07 | |
| 144 hr | 14.92 | +1.4 | 3.66 | 1.22 | |
| 192 hr | 14.91 | +1.4 | 3.66 | 1.26 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.16 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Rose-brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 192+ hr |
| 100°F vis | 192+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 213-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-33 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 18.12 | - | 4.09 | 0.14 | |
| 16 hr | 18.7[illegible] | 3.3 | 4.15 | 0.19 | |
| 24 hr | 18.99 | 4.8 | 4.18 | 0.32 | |
| 40 hr | 19.46 | 7.4 | 4.25 | 0.37 | |
| 48 hr | 19.93 | 10.0 | 4.32 | 0.37 | 24 |

**Metal Specimen Data**

| Weight change, mg/cm$^2$: | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.16 |
| | Mg | 0.00 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 213-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-37 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.37 | - | 3.43 | 0.34 | |
| 16 hr | 60.42 | [illegible] | 8.30 | 11.37 | |
| 24 hr | 249.9 | [illegible] | 15.02 | 18.98 | |
| 40 hr | 2722 | 19,000 | 136.8 | 24.3 | |
| 48 hr | Gelled | – | – | – | 49 |

**Metal Specimen Data**

| Weight change, mg/cm$^2$: | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -5.70 |
| | Mg | +0.02 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | H etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 213-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-1 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.92 | | 3.19 | 0.27 | |
| 16 hr | 18.00 | 39.3 | 3.94 | 0.44 | |
| 24 hr | 20.23 | 56.6 | 4.27 | 0.71 | |
| 40 hr | 23.99 | 85.7 | 4.75 | 0.85 | |
| 48 hr | 25.54 | 97.7 | 4.97 | 0.86 | 45 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.02 |
| | Cu | -0.10 |
| | Mg | 0.04 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 213-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-37 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 18.12 | | 4.09 | 0.14 | | | | |
| 16 hr | 18.68 | 3.1 | 4.14 | 0.18 | [illegible] | | | |
| 24 hr | 19.01 | 4.9 | 4.20 | 0.32 | 18.2 | | | |
| 40 hr | 19.45 | 7.3 | 4.25 | 0.37 | 28.[illegible] | | | |
| 48 hr | 19.91 | 9.9 | 4.35 | 0.38 | 33.2 | 24 | 2.52 | 14.94 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | 0.12 |
| | Mg | 0.02 |

| Metal discoloration, deposits, pitting, or etching | | |
|---|---|---|
| | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 213-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-37 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.37 | | 3.43 | 0.34 | | | | |
| 16 hr | 63.62 | 343 | 8.57 | 12.23 | 42.6 | | | |
| 24 hr | 159.6 | 1 011 | 15.78 | 16.83 | 52.3 | | | |
| 40 hr | 3831 | 26,[illegible]60 | 148.8 | 24.3 | 58.5 | | | |
| 48 hr | Gelled | – | – | – | 58.9 | 51 | 72.9 | 7.89 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -5.40 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | H etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 213-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-1 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No. mg KOH/g | Overhead Wt, g | Oil Los., wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 12.92 | – | 3.19 | 0.27 | | | | |
| 16 hr | 18.02 | 39.5 | 3.96 | 0.42 | 48.4 | | | |
| 24 hr | 20.26 | 56.8 | 4.26 | 0.70 | 59.5 | | | |
| 40 hr | 23.98 | 85.6 | 4.76 | 0.84 | 67.3 | | | |
| 48 hr | 25.57 | 97.9 | 4.97 | 0.84 | 68.4 | 44 | 1.37 | 7.58 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | 0.06 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 214-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-9 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.61 | | 4.11 | 0.27 | |
| 16 hr | 17.60 | 12.7 | 4.50 | 0.73 | |
| 24 hr | 19.21 | 23.1 | 4.84 | 0.84 | |
| 40 hr | 30.06 | 92.6 | 6.97 | 1.31 | |
| 48 hr | 175.6 | 1025 | 28.70 | 3.29 | 61 |

| Metal Specimen Data | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.06 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | L yellow |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | 1 var |
| | At and above oil level | 1 var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

(a) Insufficient sample.

TEST NO. 214-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.84 | | 3.33 | 0.05 | |
| 16 hr | 15.70 | 13.4 | 3.65 | 0.42 | |
| 24 hr | 16.79 | 21.3 | 3.78 | 0.62 | |
| 40 hr | 20.32 | 46.8 | 4.28 | 0.84 | |
| 48 hr | 23.92 | 72.8 | 4.76 | 0.94 | 44 |

| Metal Specimen Data | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.02 |
| | Ti | 0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.02 |
| | Mg | 0.02 |
| Metal discoloration, deposits, pitting or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Yellow-orange |
| | Mg | No change |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 214-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.32 | | 4.31 | 0.14 | |
| 16 hr | 18.27 | 11.9 | 4.67 | 0.67 | |
| 24 hr | 19.83 | 21.5 | 5.03 | 0.78 | |
| 40 hr | 28.62 | 75.4 | 6.78 | 1.13 | |
| 48 hr | 52.69 | 22.5 | 11.18 | 1.76 | 60 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.06 |
| Ti | -0.04 |
| Ag | +0.02 |
| Steel | +0.02 |
| Cu | -0.06 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | L brown |
| Ag | L yellow |
| Steel | Blue |
| Cu | Brown |
| Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 214-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-39 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.61 | | 4.11 | 0.27 | | | | |
| 16 hr | 17.49 | 12.0 | 4.48 | 0.73 | 40.8 | | | |
| 24 hr | 18.97 | 21.5 | 4.80 | 0.84 | 59.8 | | | |
| 40 hr | 27.18 | 74.1 | 6.39 | 1.28 | 93.3 | | | |
| 48 hr | 52.73 | 238 | 11.06 | 1.99 | 104.5 | 62 | 1.64 | 10.58 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | 0.00 |
| Steel | 0.00 |
| Cu | 0.06 |
| Mg | +0.02 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | L brown |
| Ag | L yellow |
| Steel | Blue |
| Cu | Brown |
| Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Insufficient sample.

TEST NO. 214-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.84 | - | 3.33 | 0.05 | - | | | |
| 16 hr | 15.84 | 14.5 | 3.65 | 0.44 | 32.4 | | | |
| 24 hr | 17.05 | 23.2 | 3.83 | 0.66 | 45.8 | | | |
| 40 hr | 21.37 | 54.4 | 4.42 | 0.88 | 67.9 | | | |
| 48 hr | 26.67 | 92.7 | 5.10 | 0.96 | 74.4 | 47 | 1.59 | 10.51 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | -0.04 |
| Ti | 0.00 |
| Ag | +0.02 |
| Steel | 0.00 |
| Cu | -0.04 |
| Mg | -0.04 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | Tan |
| Ag | L yellow |
| Steel | Blue |
| Cu | Yellow-orange |
| Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 214-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.32 | - | 4.31 | 0.14 | - | | | |
| 16 hr | 18.17 | 11.3 | 4.66 | 0.68 | 36.7 | | | |
| 24 hr | 19.72 | 20.8 | 5.02 | 0.79 | 53.9 | | | |
| 40 hr | 28.32 | 73.5 | 6.72 | 1.12 | 85.1 | | | |
| 48 hr | 50.47 | 209 | 10.85 | 1.68 | 96.2 | 58 | 1.46 | 10.53 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.08 |
| Ti | +0.02 |
| Ag | +0.02 |
| Steel | 0.00 |
| Cu | -0.02 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | L brown |
| Ag | L yellow |
| Steel | Blue |
| Cu | Brown |
| Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 222-1. RESULTS OF REFLUX OXIDATION CORROSION TEST ON O-65-20 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.75 | | 4.68 | 0.26 | |
| 16 hr | 19.35 | 9.0 | 5.02 | 0.77 | |
| 24 hr | 21.05 | 18.6 | 5.37 | 0.92 | |
| 40 hr | 27.35 | 54.1 | 6.77 | 1.27 | |
| 48 hr | 39.43 | 122 | 9.22 | 1.80 | 56 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.02 |
| Ti | 0.00 |
| Ag | +0.02 |
| Steel | 0.00 |
| Cu | -0.06 |
| Mg | +0.10 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | Purple-brown |
| Ag | L pink |
| Steel | Blue-green |
| Cu | Orange-green |
| Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

(a) Insufficient sample.

TEST NO. 222-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-65-20 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 17.75 | | 4.68 | 0.26 | | | | |
| 16 hr | 19.43 | 9.5 | 5.00 | 0.78 | 38.4 | | | |
| 24 hr | 21.16 | 19.2 | 5.39 | 0.92 | 55.7 | | | |
| 40 hr | 28.25 | 59.2 | 6.93 | 1.27 | 84.8 | | | |
| 48 hr | 43.37 | 144 | 10.07 | 1.77 | 94.9 | 57 | 1.75 | 10.90 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.02 |
| Ti | +0.02 |
| Ag | 0.00 |
| Steel | +0.02 |
| Cu | -0.06 |
| Mg | +0.10 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | Purple-brown |
| Ag | L pink |
| Steel | Blue-green |
| Cu | Orange-green |
| Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Insufficient sample

TEST NO. 223-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | – | 4.63 | 0.24 | |
| 16 hr | 17.11 | −3.4 | 4.50 | 1.17 | |
| 24 hr | 16.97 | −4.2 | 4.42 | 1.46 | |
| 40 hr | 15.90 | −10.2 | 4.07 | 4.20 | |
| 48 hr | 16.82 | −5.0 | 4.07 | 13.07 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.43 |
| | Mg | −0.83 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | Orange-brown |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 31 hr |
| 100°F vis | 45 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 223-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | – | 4.61 | 0.21 | |
| 16 hr | 17.06 | −2.8 | 4.48 | 1.19 | |
| 24 hr | 16.94 | −3.5 | 4.40 | 1.42 | |
| 40 hr | 16.49 | −6.0 | 4.27 | 2.03 | |
| 48 hr | 15.99 | −8.9 | 3.97 | 8.84 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.34 |
| | Mg | −0.18 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Purple |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Orange-brown |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 223-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | | 4.67 | 0.25 | |
| 16 hr | 17.04 | −3.8 | 4.44 | 1.17 | |
| 24 hr | 16.95 | −4.3 | 4.37 | 1.40 | |
| 40 hr | 16.54 | −6.7 | 4.28 | 2.12 | |
| 48 hr | 15.82 | −10.7 | 3.98 | 8.02 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.20 |
| | Mg | +6.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Purple |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Orange-brown |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 39 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 223-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | | 3.76 | 0.07 | |
| 16 hr | 15.26 | +1.0 | 3.75 | 1.02 | |
| 24 hr | 15.26 | +1.0 | 3.74 | 1.21 | |
| 40 hr | 15.08 | −0.2 | 3.70 | 1.49 | |
| 48 hr | 15.14 | +0.2 | 3.75 | 1.63 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.14 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Purple-green |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 223-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-25 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.71 | | 3.67 | 0.07 | |
| 16 hr | 14.64 | −0.5 | 3.65 | 0.92 | |
| 24 hr | 14.81 | +0.7 | 3.65 | 1.16 | |
| 40 hr | 14.75 | +0.3 | 3.64 | 1.38 | |
| 48 hr | 14.81 | +0.7 | 3.61 | 1.62 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | +0.02 |
| | Cu | −0.16 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Purple-green |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 223-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.40 | | 3.23 | 0.08 | |
| 16 hr | 14.14 | 5.5 | 3.35 | 0.42 | |
| 24 hr | 14.29 | 6.6 | 3.36 | 0.59 | |
| 40 hr | 14.51 | 8.3 | 3.42 | 0.83 | |
| 48 hr | 14.64 | 9.3 | 3.44 | 0.93 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | +0.14 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 224-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | - | 4.67 | 0.24 | |
| 16 hr | 17.46 | -1.4 | 4.55 | 1.03 | |
| 24 hr | 17.40 | -1.8 | 4.53 | 1.20 | |
| 40 hr | 17.24 | -2.7 | 4.49 | 1.47 | |
| 48 hr | 17.13 | -3.3 | 4.46 | 1.63 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | - |
| | Ti | - |
| | Ag | - |
| | Steel | - |
| | Cu | -0.04 |
| | Mg | +0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | - |
| | Ti | - |
| | Ag | - |
| | Steel | - |
| | Cu | Yellow |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 224-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | | 4.67 | 0.24 | |
| 16 hr | 19.51 | 10.2 | 5.03 | 0.73 | |
| 24 hr | 21.17 | 19.5 | 5.42 | 0.74 | |
| 40 hr | 32.50 | 83.5 | 6.07 | 23.2 | |
| 48 hr | 879.6 | 4866 | 59.26 | 22.3 | 58 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | |
| | Ti | |
| | Ag | |
| | Steel | |
| | Cu | 11.3 |
| | Mg | -9.5 |
| Metal discoloration, deposits, pitting, or etching: | Al | |
| | Ti | |
| | Ag | |
| | Steel | |
| | Cu | H pitting |
| | Mg | H pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 224-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | - | 4.61 | 0.21 | |
| 16 hr | 17.30 | -1.4 | 4.52 | 1.00 | |
| 24 hr | 17.24 | -1.8 | 4.51 | 1.19 | |
| 40 hr | 17.06 | -2.8 | 4.44 | 1.53 | |
| 48 hr | 15.92 | -9.3 | 4.08 | 3.83 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | - |
| | Ti | - |
| | Ag | - |
| | Steel | - |
| | Cu | -0.47 |
| | Mg | -0.24 |
| Metal discoloration, deposits, pitting, or etching: | Al | - |
| | Ti | |
| | Ag | - |
| | Steel | - |
| | Cu | Yellow |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 42 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 224-4 RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | | 4.61 | 0.21 | |
| 16 hr | 19.50 | 11.1 | 5.03 | 0.71 | |
| 24 hr | 21.26 | 21.1 | 5.44 | 0.73 | |
| 40 hr | 28.79 | 64.0 | 7.12 | 1.03 | |
| 48 hr | 42.61 | 143 | 10.12 | 1.13 | 54 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | |
| | Ti | |
| | Ag | |
| | Steel | |
| | Cu | +0.22 |
| | Mg | +0.22 |
| Metal discoloration, deposits, pitting, or etching: | Al | |
| | Ti | |
| | Ag | |
| | Steel | |
| | Cu | Yellow |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 120 |
| Condensate return | Yes |

(a) Insufficient sample.

TEST NO. 224-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.84 | | 3.33 | 0.05 | |
| 16 hr | 14.50 | 4.8 | 3.44 | 0.53 | |
| 24 hr | 14.68 | 6.1 | 3.49 | 0.78 | |
| 40 hr | 14.91 | 7.7 | 3.51 | 1.03 | |
| 48 hr | 15.07 | 8.9 | 3.53 | 1.14 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | 0.00 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 224-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.41 | | 4.30 | 0.16 | |
| 16 hr | 16.03 | −2.2 | 4.18 | 0.21 | |
| 24 hr | 15.96 | −2.7 | 4.17 | 0.27 | |
| 40 hr | 15.64 | −4.7 | 3.82 | 7.29 | |
| 48 hr | 18.59 | +13.3 | 4.21 | 13.57 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.00 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 31 hr |
| 100°F vis | 41 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 225-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.41 | | 4.30 | 0.16 | |
| 16 hr | 16.38 | -0.2 | 4.28 | 0.09 | |
| 24 hr | 16.49 | +0.5 | 4.34 | 0.12 | |
| 40 hr | 40.00 | +144 | 6.90 | 29.9 | |
| 48 hr | 120.6 | +635 | 14.25 | 45.2 | 44 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.06 |
| | Steel | 0.00 |
| | Cu | -0.22 |
| | Mg | -0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-purple |
| | Ag | Gray |
| | Steel | Blue-green |
| | Cu | L etching |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | Yes |

TEST NO. 225-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.41 | | 4.30 | 0.16 | | | | |
| 16 hr | 16.41 | 0.0 | 4.28 | 0.10 | 15.4 | | | |
| 24 hr | 16.59 | 1.1 | 4.33 | 0.12 | 23.0 | | | |
| 40 hr | 47.33 | 188 | 7.67 | 33.9 | 53.6 | | | |
| 48 hr | 144.4 | 780 | 15.79 | 47.9 | 63.5 | 45 | 29.2 | 8.97 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.06 |
| | Steel | 0.00 |
| | Cu | 0.30 |
| | Mg | 0.30 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-purple |
| | Ag | Gray |
| | Steel | Blue-green |
| | Cu | L etching |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 226-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.50 | | 5.05 | 0.09 | |
| 16 hr | 29.82 | 8.4 | 5.31 | 0.21 | |
| 24 hr | 30.41 | 10.6 | 5.41 | 0.28 | |
| 40 hr | 31.10 | 13.1 | 5.48 | 0.37 | |
| 48 hr | 31.54 | 14.7 | 5.54 | 0.41 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.04 |
| | Cu | 0.00 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Orange-rose |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 226-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-12 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.76 | – | 3.52 | 0.37 | |
| 16 hr | 15.03 | 9.2 | 3.73 | 1.25 | |
| 24 hr | 15.14 | 10.0 | 3.75 | 1.44 | |
| 40 hr | 14.90 | 8.3 | 3.71 | 1.85 | |
| 48 hr | 14.73 | 7.0 | 3.69 | 2.10 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.10 |
| | Ti | +0.20 |
| | Ag | +0.12 |
| | Steel | +0.14 |
| | Cu | +0.02 |
| | Mg | +0.18 |
| Metal discoloration, deposits, pitting, or etching | Al | Dark brown |
| | Ti | Brown |
| | Ag | Dark brown |
| | Steel | Dark brown-blue |
| | Cu | Dark brown-orange |
| | Mg | Dark brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 226-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-18 AT 385°F

| | Vis cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.76 | | 4.29 | 0.12 | |
| 16 hr | 17.04 | +1.6 | 4.29 | 1.39 | |
| 24 hr | 17.02 | +1.6 | 4.27 | 1.71 | |
| 40 hr | 16.73 | −1.8 | 4.19 | 2.38 | |
| 48 hr | 16.41 | −2.1 | 4.05 | 5.13 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.02 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | L blue |
| | Ag | No change |
| | Steel | L green-blue |
| | Cu | Orange |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no | 40 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 226-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-40 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.69 | | 3.30 | 0.11 | |
| 16 hr | 14.47 | 5.7 | 3.42 | 0.34 | |
| 24 hr | 14.62 | 6.8 | 3.46 | 0.50 | |
| 40 hr | 14.85 | 8.5 | 3.49 | 0.73 | |
| 48 hr | 14.97 | 9.3 | 3.51 | 0.93 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm². | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | +0.02 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Brown-blue |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 226-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-9 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.89 | – | 3.34 | 0.06 | |
| 16 hr | 14.60 | 5.1 | 3.45 | 0.56 | |
| 24 hr | 14.77 | 6.3 | 3.49 | 0.72 | |
| 40 hr | 15.02 | 8.1 | 3.52 | 1.01 | |
| 48 hr | 15.15 | 9.1 | 3.54 | 1.14 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.00 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 226-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-26 AT 385°F

| | V cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.75 | – | 3.10 | 0.35 | |
| 16 hr | 13.49 | 5.8 | 3.22 | 0.40 | |
| 24 hr | 13.74 | 7.8 | 3.27 | 0.46 | |
| 40 hr | 14.04 | 10.1 | 3.31 | 0.47 | |
| 48 hr | 14.15 | 11.0 | 3.35 | 0.52 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Brown-yellow |
| | Cu | Brown |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 227-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-23 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.62 | – | 3.15 | 0.20 | |
| 16 hr | 13.28 | 5.2 | 3.26 | 0.57 | |
| 24 hr | 13.48 | 6.8 | 3.31 | 0.70 | |
| 40 hr | 13.71 | 8.6 | 3.35 | 1.08 | |
| 48 hr | 13.74 | 8.9 | 3.35 | 1.18 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.06 |
| | Mg | +0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Peacock |
| | Cu | Brown-orange |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 227-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-37 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.37 | – | 3.43 | 0.34 | |
| 16 hr | 16.57 | 15.3 | 3.73 | 3.09 | |
| 24 hr | 18.67 | 29.9 | 4.02 | 5.64 | |
| 40 hr | 23.33 | 62.4 | 4.72 | 9.75 | |
| 48 hr | 26.38 | 83.6 | 5.26 | 10.20 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −3.24 |
| | Mg | −25.9 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | H etching |
| | Mg | H pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 6 hr |
| 100°F vis | 8 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 227-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-16 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.84 | – | 4.45 | 0.22 | |
| 16 hr | 16.60 | −1.4 | 4.32 | 1.26 | |
| 24 hr | 16.29 | −3.3 | 4.29 | 1.40 | |
| 40 hr | 16.08 | −4.5 | 4.19 | 2.27 | |
| 48 hr | 15.36 | −8.8 | 3.91 | 6.42 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | +0.02 |
| | Steel | +0.02 |
| | Cu | 0.00 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Purple |
| | Ag | L brown |
| | Steel | Blue-green |
| | Cu | Brown-purple |
| | Mg | Yellow-green |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 227-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-35 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.08 | – | 3.21 | 0.19 | |
| 16 hr | 13.89 | 6.1 | 3.34 | 0.53 | |
| 24 hr | 14.13 | 7.9 | 3.38 | 0.85 | |
| 40 hr | 14.40 | 10.0 | 3.40 | 1.21 | |
| 48 hr | 14.48 | 10.6 | 3.43 | 1.41 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | +0.06 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue-brown |
| | Cu | Orange-green |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 227-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-61-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.67 | | 4.11 | 0.39 | |
| 16 hr | 15.74 | +0.4 | 4.11 | 1.45 | |
| 24 hr | 15.69 | +0.1 | 4.10 | 1.63 | |
| 40 hr | 15.44 | −1.5 | 4.00 | 2.33 | |
| 48 hr | 15.09 | −3.7 | 3.80 | 8.39 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | 0.00 |
| | Ag | +0.06 |
| | Steel | 0.00 |
| | Cu | −0.08 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | Peacock |
| | Ti | Yellow-tan |
| | Ag | Brown |
| | Steel | Peacock |
| | Cu | Brown |
| | Mg | Yellow-purple |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 39 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 227-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-63-16 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.47 | | 4.34 | 0.29 | |
| 16 hr | 16.29 | −1.1 | 4.26 | 0.89 | |
| 24 hr | 16.31 | −1.0 | 4.24 | 1.20 | |
| 40 hr | 16.02 | −2.7 | 4.18 | 1.58 | |
| 48 hr | 15.81 | −4.0 | 4.12 | 1.99 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Tan-blue |
| | Ag | L brown |
| | Steel | Blue-yellow |
| | Cu | Orange-brown |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 230-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-60-8 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.12 | – | 4.20 | 0.18 | |
| 16 hr | 16.18 | +0.4 | 4.21 | 0.79 | |
| 24 hr | 16.04 | −0.5 | 4.17 | 1.03 | |
| 40 hr | 15.70 | −2.6 | 3.95 | 5.90 | |
| 48 hr | 17.16 | +6.5 | 4.14 | 13.91 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.79 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Purple |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | M etching |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 28 hr |
| 100°F vis | 44 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 230-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-60-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.13 | – | 3.17 | 0.19 | |
| 16 hr | 13.00 | 7.2 | 3.34 | 1.05 | |
| 24 hr | 13.20 | 8.8 | 3.36 | 1.31 | |
| 40 hr | 12.98 | 7.0 | 3.33 | 1.88 | |
| 48 hr | 12.85 | 5.9 | 3.30 | 2.13 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.06 |
| | Ag | +0.06 |
| | Steel | +0.08 |
| | Cu | −0.28 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Tan-brown |
| | Ag | L brown |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | 0.9 g |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | H carbon |
| | At and above oil level | L carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 230-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.51 | – | 3.84 | 0.02 | |
| 16 hr | 15.76 | +1.6 | 3.84 | 0.76 | |
| 24 hr | 15.72 | +1.4 | 3.84 | 1.00 | |
| 40 hr | 15.57 | +0.4 | 3.85 | 1.37 | |
| 48 hr | 15.50 | −0.1 | 3.77 | 1.54 | .2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | −0.14 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-purple |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Purple-brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 230-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-4 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.01 | – | 3.93 | 0.11 | |
| 16 hr | 15.28 | 1.8 | 3.96 | 1.53 | |
| 24 hr | 15.23 | 1.5 | 3.94 | 1.62 | |
| 40 hr | 15.13 | 0.8 | 3.92 | 1.77 | |
| 48 hr | 15.09 | 0.5 | 3.82 | 1.91 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.10 |
| | Mg | −0.77 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L tan |
| | Ag | Yellow |
| | Steel | Purple-blue |
| | Cu | Brown-green |
| | Mg | H pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 230-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.79 | – | 4.70 | 0.24 | |
| 16 hr | 17.40 | -2.2 | 4.53 | 1.26 | |
| 24 hr | 17.26 | -3.0 | 4.49 | 1.51 | |
| 40 hr | 16.78 | -5.7 | 4.37 | 2.19 | |
| 48 hr | 15.72 | -11.6 | 4.02 | 5.30 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | -0.22 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Purple-brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 230-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-7 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.42 | – | 4.19 | 0.01 | |
| 16 hr | 17.60 | +1.0 | 4.19 | 0.68 | |
| 24 hr | 17.56 | +0.8 | 4.18 | 0.85 | |
| 40 hr | 17.38 | -0.2 | 4.14 | 1.12 | |
| 48 hr | 17.28 | -0.8 | 4.12 | 1.26 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | +0.18 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Purple-brown |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 232-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-7 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.42 | – | 4.19 | 0.01 | |
| 16 hr | 17.59 | +1.0 | 4.20 | 0.61 | |
| 24 hr | 17.59 | +1.0 | 4.19 | 0.74 | |
| 40 hr | 17.44 | +0.1 | 4.14 | 0.98 | |
| 48 hr | 17.38 | −0.2 | 4.13 | 1.13 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.16 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Green-brown |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 232-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-13 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.00 | – | 4.24 | 0.25 | |
| 16 hr | 15.74 | −1.6 | 4.13 | 1.28 | |
| 24 hr | 15.62 | −2.4 | 4.12 | 1.46 | |
| 40 hr | 15.34 | −4.1 | 4.03 | 2.05 | |
| 48 hr | 15.12 | −5.5 | 3.95 | 2.86 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.22 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Purple-tan |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | L pitting |
| | Mg | Yellow-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no | 46 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 232-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-63-1 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.48 | - | 4.64 | 0.23 | |
| 16 hr | 17.24 | −1.4 | 4.50 | 0.84 | |
| 24 hr | 17.17 | −1.8 | 4.49 | 1.04 | |
| 40 hr | 16.72 | −4.3 | 4.37 | 1.63 | |
| 48 hr | 15.76 | −9.8 | 4.09 | 3.78 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.08 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Purple-tan |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Brown-orange |
| | Mg | Yellow-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 232-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-63-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.26 | - | 4.31 | 0.22 | |
| 16 hr | 16.11 | −0.9 | 4.25 | 0.92 | |
| 24 hr | 16.07 | −1.2 | 4.22 | 1.10 | |
| 40 hr | 15.70 | −3.4 | 4.12 | 1.60 | |
| 48 hr | 15.06 | −7.4 | 3.91 | 3.90 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.06 |
| | Mg | −0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Purple-tan |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Brown-orange |
| | Mg | Yellow-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 43 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 232-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-63-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.24 | – | 4.09 | 0.24 | |
| 16 hr | 15.28 | +0.3 | 3.99 | 1.24 | |
| 24 hr | 15.25 | +0.1 | 3.97 | 1.40 | |
| 40 hr | 14.95 | −1.9 | 3.90 | 2.09 | |
| 48 hr | 15.64 | +2.6 | 3.84 | 12.43 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.47 |
| | Mg | −0.67 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Blue-green |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | L etching |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 232-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-63-8 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.77 | | 3.50 | 0.15 | |
| 16 hr | 14.51 | 5.4 | 3.63 | 0.88 | |
| 24 hr | 14.57 | 5.8 | 3.63 | 1.07 | |
| 40 hr | 14.60 | 6.0 | 3.64 | 1.45 | |
| 48 hr | 14.71 | 6.8 | 3.65 | 1.63 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.0[illegible] |
| | Steel | -0.02 |
| | Cu | −0.49 |
| | Mg | −0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L blue |
| | Ti | Purple-tan |
| | Ag | L yellow |
| | Steel | Blue-purple |
| | Cu | L etching |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 1.4 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 237-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON F-1041 AT 600°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 432.2 | 21.9 | 14.13 | 0.08 | |
| 24 hr | 515.7 | 45.5 | 15.27 | 0.19 | |
| 40 hr | 851.0 | 140 | 19.38 | 0.31 | |
| 48 hr | 1231.5 | 247 | 23.16 | 0.34 | 8 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | 0.00 |
| | Ti | 0.00 | 0.00 |
| | Ag | 0.00 | -0.02 |
| | Steel | +0.02 | -0.08 |
| | S. S. | 0.00 | 0.00 |
| | Cu | – | – |
| | Mg | – | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | Blue-green | |
| | Ag | L brown | |
| | Steel | Dark gray | |
| | S. S. | Blue-green | |
| | Cu | – | |
| | Mg | – | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | Very L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 600 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

TEST NO. 237-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON F-1041 AT 600°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 415.6 | 17.2 | 13.92 | 0.07 | |
| 24 hr | 460.6 | 29.9 | 14.52 | 0.09 | |
| 40 hr | 556.2 | 56.9 | 15.86 | 0.13 | |
| 48 hr | 617.6 | 74.2 | 16.65 | 0.16 | 10 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 | -0.02 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.08 | -0.16 |
| | Steel | +0.02 | -0.12 |
| | S. S. | 0.00 | 0.00 |
| | Cu | +0.20 | -0.95 |
| | Mg | +0.57 | +0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L brown | |
| | Ag | L brown | |
| | Steel | Dark gray | |
| | S. S. | Brown-purple | |
| | Cu | Dark brown | |
| | Mg | Gray | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | Very L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 600 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

TEST NO. 237-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON K-1051 AT 600°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 390.6 | – | 13.33 | 0.00 | |
| 16 hr | 482.2 | 23.5 | 14.65 | 0.06 | |
| 24 hr | 534.2 | 36.8 | 15.28 | 0.07 | |
| 40 hr | 650.5 | 66.5 | 16.67 | 0.11 | |
| 48 hr | 725.1 | 85.6 | 17.59 | 0.13 | 7 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 | −0.04 |
| | Ti | 0.00 | −0.02 |
| | Ag | −0.06 | −0.14 |
| | Steel | +0.04 | −0.16 |
| | S. S. | 0.00 | −0.02 |
| | Cu | +0.43 | +0.04 |
| | Mg | +1.24 | +0.39 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L brown | |
| | Ag | L brown | |
| | Steel | Dark gray | |
| | S. S. | Brown-purple | |
| | Cu | Dark brown | |
| | Mg | Purple | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | Very L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 600 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

TEST NO. 237-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-10 AT 600°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 348.0 | – | 12.90 | 0.00 | |
| 16 hr | 377.2 | 8.4 | 13.32 | 0.06 | |
| 24 hr | 382.7 | 10.0 | 13.43 | 0.05 | |
| 40 hr | 389.6 | 12.0 | 13.51 | 0.03 | |
| 48 hr | 396.6 | 14.0 | 13.63 | 0.05 | 8 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | −0.02 |
| | Ti | 0.00 | −0.02 |
| | Ag | 0.00 | 0.00 |
| | Steel | +0.04 | 0.00 |
| | S. S. | 0.00 | 0.00 |
| | Cu | – | – |
| | Mg | – | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L brown | |
| | Ag | L yellow | |
| | Steel | Dark gray | |
| | S. S. | L brown | |
| | Cu | – | |
| | Mg | – | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | Very L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 600 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

TEST NO. 237-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-26 AT 600°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 274.5 | – | 26.32 | (a) | |
| 16 hr | 282.9 | 3.1 | 26.83 | – | |
| 24 hr | 286.9 | 4.5 | 27.19 | – | |
| 40 hr | 295.9 | 7.8 | 28.01 | – | |
| 48 hr | 330.0 | 20.2 | 28.43 | – | 12 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.12 | +0.04 |
| | Ti | -1.26 | -1.91 |
| | Ag | 0.51 | -0.51 |
| | Steel | +0.93 | -1.09 |
| | S. S. | +0.08 | +0.04 |
| | Cu | – | – |
| | Mg | – | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L gray | |
| | Ti | M etching | |
| | Ag | L pitting | |
| | Steel | Dark gray | |
| | S. S. | Dark gray | |
| | Cu | – | |
| | Mg | – | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | Thin |
| | At and above oil level | White sludge |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 600 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

(a) Sample insoluble in titration solvent.

TEST NO. 238-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON F-1041 AT 650°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | | 12.88 | 0.00 | |
| 16 hr | 1795 | 406 | 26.71 | 0.38 | |
| 24 hr | (a) | – | 54.58 | 0.48 | |
| 40 hr | (a) | – | 1556 | 0.70 | 19 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 | 0.00 |
| | Ti | 0.00 | 0.00 |
| | Ag | +0.71 | +0.30 |
| | Steel | +0.12 | -1.25 |
| | S. S. | +0.08 | 0.00 |
| | Cu | – | – |
| | Mg | – | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown | |
| | Ti | Blue | |
| | Ag | Brown | |
| | Steel | Brown | |
| | S. S. | Peacock | |
| | Cu | – | |
| | Mg | – | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil. | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 650 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

(a) Sample too thick for analysis–test terminated at 40 hr.

TEST NO. 238-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON F-1041 AT 650°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | - | 12.88 | 0.00 | |
| 16 hr | 1103 | 211 | 21.46 | 0.15 | |
| 24 hr | (a) | -- | 30.61 | 0.19 | |
| 40 hr | (a) | -- | 96.36 | 0.33 | 7 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | 0.00 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.32 | -0.32 |
| | Steel | +0.12 | -4.70 |
| | S. S. | +0.04 | 0.00 |
| | Cu | 0.00 | -1.42 |
| | Mg | +0.26 | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | Purple | |
| | Ag | L pitting | |
| | Steel | Brown | |
| | S. S. | Blue-brown | |
| | Cu | Orange-brown | |
| | Mg | Brown | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 650 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

(a) Sample too thick for analysis – test terminated at 40 hr.

TEST NO. 238-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-10 AT 650°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 348.0 | | 12.90 | 0.00 | |
| 16 hr | 404.6 | 16.3 | 13.71 | 0.00 | |
| 24 hr | 426.6 | 22.6 | 14.06 | 0.00 | |
| 40 hr | 474.8 | 36.4 | 14.71 | 0.02 | |
| 48 hr | 506.6 | 45.6 | 15.13 | 0.05 | 6 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | 0.00 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.12 | -0.12 |
| | Steel | +0.12 | -1.64 |
| | S. S. | +0.02 | 0.00 |
| | Cu | | |
| | Mg | | |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L brown | |
| | Ag | Yellow | |
| | Steel | L blue | |
| | S. S. | L brown | |
| | Cu | | |
| | Mg | -- | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 650 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

TEST NO. 238-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-10 AT 650°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 348.0 | – | 12.90 | 0.00 | |
| 16 hr | 405.6 | 16.6 | 13.73 | 0.02 | |
| 24 hr | 426.9 | 22.7 | 14.05 | 0.02 | |
| 40 hr | 472.2 | 35.7 | 14.69 | 0.04 | |
| 48 hr | 502.8 | 44.5 | 15.14 | 0.06 | 12 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | 0.00 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.10 | -0.10 |
| | Steel | +0.14 | -0.59 |
| | S. S. | +0.02 | 0.00 |
| | Cu | +0.08 | -0.31 |
| | Mg | +0.22 | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L brown | |
| | Ag | Yellow | |
| | Steel | L blue | |
| | S. S. | L brown | |
| | Cu | Orange-brown | |
| | Mg | Brown | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 650 |
| Sample volume, ml | 250 |
| Air rate, liter/hr | 20 |
| Condensate return | No |

TEST NO. 241-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.66 | – | 4.65 | 0.26 | |
| 7 days | 17.47 | -1.1 | 4.55 | 1.47 | |
| 14 days | 32.17 | +82.2 | 6.44 | 43.5 | |
| 21 days | – | – | – | 72.6 | |
| 26 days | – | – | – | – | 30[a] |

| Metal Specimen Data | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | +0.06 |
| | Cu | -1.80 |
| | Mg | -0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Brown-purple |
| | Ag | Yellow-purple |
| | Steel | Blue-purple |
| | Cu | Etched |
| | Mg | Large pit |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | (a) |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | Yellowish-white crystals |

| Breakpoint Data | |
|---|---|
| Neut. no. | 5 days |
| 100°F vis | 8 days |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

No oil makeup for samples taken.

(a) Test terminated after 21 days–sample solidified.

TEST NO. 241-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.66 | – | 4.65 | 0.26 | |
| 7 days | 17.41 | −1.4 | 4.53 | 1.44 | |
| 14 days | 15.78 | −10.6 | 4.01 | 6.11 | |
| 21 days | 12,185 | +68,898 | 278 | 60.6 | |
| 26 days | (a) | – | – | 61.9 | 21 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −1.87 |
| | Mg | −1.91 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Brown-purple |
| | Ag | Yellow-purple |
| | Steel | Blue-purple |
| | Cu | Etched |
| | Mg | Large pits |

(a) Solidified sample.

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | (a) |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | Yellowish-white crystals |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 6 days |
| 100°F vis | 17 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 241-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 7 days | 17.34 | −2.1 | 4.52 | 1.41 | |
| 14 days | 16.64 | −6.1 | 4.35 | 2.00 | |
| 21 days | 64.96 | +267 | 11.38 | 44.1 | |
| 26 days | (a) | – | – | 54.1 | 20 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −2.86 |
| | Mg | −0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Blue-yellow |
| | Ag | Yellow |
| | Steel | Brown-yellow-blue |
| | Cu | Etched |
| | Mg | Small pit |

(a) Solidified sample.

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | Yellowish-white crystals |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14 days |
| 100°F vis | 15 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 241-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | |
| 7 days | 15.40 | 1.9 | 3.78 | 1.22 | |
| 14 days | 15.33 | 1.5 | 3.74 | 1.82 | |
| 21 days | 15.59 | 3.2 | 3.71 | 3.60 | |
| 26 days | 17.80 | 17.8 | 4.05 | 9.78 | 11 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.22 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L pale blue |
| | Ti | Blue-green |
| | Ag | L tan |
| | Steel | L pale green |
| | Cu | Brownish-red |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 18 days |
| 100°F vis | 23 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 241-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.40 | – | 3.23 | 0.08 | |
| 7 days | 14.75 | 10.1 | 3.45 | 0.54 | |
| 14 days | 15.11 | 12.8 | 3.52 | 0.73 | |
| 21 days | 15.45 | 15.3 | 3.57 | 0.80 | |
| 26 days | 15.59 | 16.3 | 3.59 | 0.85 | 12 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.22 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L tan |
| | Steel | Brown-purple |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 241-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-25 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.64 | -- | 3.31 | 0.10 | |
| 7 days | 16.35 | 19.9 | 3.73 | 1.10 | |
| 14 days | 17.23 | 26.3 | 3.78 | 1.66 | |
| 21 days | 20.36 | 49.3 | 4.33 | 4.54 | |
| 26 days | 23.39 | 71.5 | 4.79 | 5.69 | 12 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -1.20 |
| | Steel | 0.00 |
| | Cu | -69.9 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | Charcoal gray |
| | Steel | Blue |
| | Cu | H etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14 days |
| 100°F vis | 16 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 248-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | -- | 4.61 | 0.21 | |
| 7 days | 17.48 | -0.4 | 4.57 | 1.41 | |
| 14 days | 16.92 | -3.6 | 4.45 | 2.22 | |
| 21 days | 19.79 | +12.8 | 4.52 | 25.4 | |
| 26 days | (a) | -- | 52.74 | 53.0 | 21 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | -0.10 |
| | Steel | +0.04 |
| | Cu | -0.51 |
| | Mg | -0.95 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L green |
| | Ag | Yellow |
| | Steel | Brown-green |
| | Cu | L etching |
| | Mg | Large pits |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | None |
| | White crystalline deposits in condenser | |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14 days |
| 100°F vis | 16 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample semisolid.

TEST NO. 248-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-18 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.55 | – | 4.61 | 0.21 | |
| 7 days | 17.35 | -1.1 | 4.54 | 1.28 | |
| 14 days | 16.97 | -3.3 | 4.40 | 2.24 | |
| 21 days | 16.32 | -7.0 | 4.02 | 13.35 | |
| 26 days | (a) | – | 77.88 | 53.4 | 17 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | -0.04 |
| | Steel | +0.02 |
| | Cu | -1.16 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L green |
| | Ag | Yellow |
| | Steel | Brown-green |
| | Cu | Etched |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | (a) |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 17 days |
| 100°F vis | 23 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample semisolid.

TEST NO. 248-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 7 days | 17.46 | -1.5 | 4.55 | 1.37 | |
| 14 days | 16.78 | -5.3 | 4.38 | 2.46 | |
| 21 days | 18.93 | +6.8 | 4.39 | 23.7 | |
| 26 days | (a) | – | 88.56 | 52.4 | 19 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | -0.08 |
| | Steel | +0.02 |
| | Cu | -2.27 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L yellow-blue |
| | Ag | Yellow |
| | Steel | Brown-green |
| | Cu | Etched |
| | Mg | L yellow-green |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | None |
| | White crystalline deposits in condenser | |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 13 days |
| 100°F vis | 19 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample semisolidified.

TEST NO. 248-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | -- | 3.76 | 0.07 | |
| 7 days | 15.49 | 2.5 | 3.82 | 0.96 | |
| 14 days | 15.37 | 1.7 | 3.79 | 1.75 | |
| 21 days | 15.48 | 2.4 | 2.76 | 2.10 | |
| 26 days | 15.56 | 3.0 | 3.80 | 2.38 | 9 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | +0.02 |
| | Cu | -- |
| | Mg | - |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Pale blue |
| | Ag | Tan |
| | Steel | Brown-green |
| | Cu | -- |
| | Mg | - |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | M & H var |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 248-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-25 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.64 | | 3.31 | 0.10 | |
| 7 days | 15.83 | 16.1 | 3.65 | 1.47 | |
| 14 days | 18.60 | 36.7 | 4.09 | 3.35 | |
| 21 days | 22.94 | 68.2 | 4.74 | 6.73 | |
| 26 days | 25.47 | 86.7 | 5.11 | 7.87 | 12 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −1.72 |
| | Steel | 0.00 |
| | Cu | −112 |
| | Mg | - |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | Brown |
| | Steel | Blue |
| | Cu | Etched |
| | Mg | - |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 11 days |
| 100°F vis | 9 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 243-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-25 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.64 | – | 3.31 | 0.10 | |
| 7 days | 15.27 | 12.0 | 3.56 | 1.16 | |
| 14 days | 15.81 | 15.9 | 3.69 | 1.91 | |
| 21 days | 16.14 | 18.3 | 3.73 | 2.10 | |
| 26 days | 16.17 | 18.5 | 3.71 | 1.91 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.57 |
| | Steel | +0.02 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | Blue |
| | Steel | Blue |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 253-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-25 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.64 | – | 3.31 | 0.10 | |
| 16 hr | 14.85 | 8.9 | 3.49 | 1.52 | |
| 24 hr | 15.15 | 11.1 | 3.54 | 1.66 | |
| 40 hr | 15.63 | 14.6 | 3.62 | 2.17 | |
| 48 hr | 15.99 | 17.2 | 3.68 | 2.73 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −1.74 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Brown |
| | Steel | Blue-purple |
| | Cu | L brown-orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 253-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.40 | – | 3.57 | 0.21 | |
| 16 hr | 14.38 | −0.1 | 3.52 | 0.45 | |
| 24 hr | 14.41 | +0.1 | 3.52 | 0.57 | |
| 40 hr | 14.37 | −0.2 | 3.50 | 0.82 | |
| 48 hr | 14.41 | +0.1 | 3.50 | 0.94 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.02 |
| | Mg | −0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Green-blue |
| | Cu | L brown-orange |
| | Mg | White |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 253-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.77 | – | 3.13 | 0.24 | |
| 16 hr | 13.47 | 5.5 | 3.24 | 0.63 | |
| 24 hr | 13.64 | 6.8 | 3.27 | 0.84 | |
| 40 hr | 13.79 | 8.0 | 3.30 | 1.22 | |
| 48 hr | 13.90 | 8.8 | 3.31 | 1.36 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.06 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Purple-blue |
| | Cu | Brown-orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 253-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-25 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.64 | – | 3.31 | 0.10 | – | | | |
| 16 hr | 20.71 | 51.8 | 4.33 | 1.36 | 48.5 | | | |
| 24 hr | 24.15 | 77.1 | 4.77 | 1.59 | 59.7 | | | |
| 40 hr | 31.30 | 129 | 5.64 | 1.90 | 67.7 | | | |
| 48 hr | 35.02 | 157 | 6.11 | 2.09 | 68.5 | 51 | 4.49 | 7.66 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | 0.00 |
| Steel | 0.00 |
| Cu | -0.53 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | Brown |
| Steel | Blue-purple |
| Cu | L brown-orange |
| Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 253-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-2 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.40 | – | 3.57 | 0.21 | – | | | |
| 16 hr | 15.52 | 7.8 | 3.74 | 0.28 | 29.9 | | | |
| 24 hr | 16.39 | 13.8 | 3.86 | 0.34 | 42.2 | | | |
| 40 hr | 18.18 | 26.2 | 4.16 | 0.55 | 61.1 | | | |
| 48 hr | 19.36 | 34.4 | 4.36 | 0.63 | 67.0 | 40 | 1.33 | 10.11 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | 0.00 |
| Steel | 0.00 |
| Cu | -0.10 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | L yellow |
| Steel | Blue |
| Cu | Pink-orange |
| Mg | White |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 253-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 12.77 | – | 3.13 | 0.24 | – | | | |
| 16 hr | 15.87 | 24.3 | 3.60 | 0.40 | 38.7 | | | |
| 24 hr | 16.86 | 32.0 | 3.75 | 0.59 | 47.9 | | | |
| 40 hr | 18.70 | 46.4 | 4.00 | 0.90 | 60.9 | | | |
| 48 hr | 19.73 | 54.5 | 4.18 | 1.05 | 64.6 | 42 | 2.10 | 8.62 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | 0.00 |
| Steel | 0.00 |
| Cu | -0.04 |
| Mg | +0.26 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | L yellow |
| Steel | Green-blue |
| Cu | Brown-orange |
| Mg | Gray deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 255-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-12 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.79 | – | 3.52 | 0.25 | – | | | |
| 16 hr | 15.37 | 11.5 | 3.81 | 1.26 | 17.2 | | | |
| 24 hr | 15.57 | 12.9 | 3.84 | 1.31 | 24.5 | | | |
| 40 hr | 15.74 | 14.1 | 3.88 | 1.35 | 37.9 | | | |
| 48 hr | 15.75 | 14.2 | 3.85 | 1.48 | 44.3 | 30 | 4.29 | 12.01 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.18 |
| Ti | +0.14 |
| Ag | +0.20 |
| Steel | +0.20 |
| Cu | -0.01 |
| Mg | +0.26 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | Brown |
| Ti | Brown |
| Ag | Brown |
| Steel | Brown |
| Cu | Brown-orange |
| Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 2.8 |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 255-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-64-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 16.84 | – | 4.29 | 0.11 | – | | | |
| 16 hr | 18.24 | 8.3 | 4.56 | 1.19 | 23.2 | | | |
| 24 hr | 18.79 | 11.6 | 4.68 | 1.37 | 32.8 | | | |
| 40 hr | 20.21 | 20.2 | 4.98 | 1.80 | 50.1 | | | |
| 48 hr | 21.42 | 27.2 | 5.21 | 2.58 | 57.9 | 35 | 4.24 | 11.23 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | −0.02 |
| Ag | 0.00 |
| Steel | +0.02 |
| Cu | −0.04 |
| Mg | −0.04 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | Blue |
| Ag | No change |
| Steel | Blue-green |
| Cu | Brown |
| Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 255-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | – | 4.67 | 0.24 | |
| 16 hr | 17.12 | −3.3 | 4.46 | 1.60 | |
| 24 hr | 17.04 | −3.8 | 4.44 | 1.92 | |
| 40 hr | 16.48 | −6.0 | 4.30 | 2.52 | |
| 48 hr | 16.25 | −8.2 | 4.01 | 11.90 | 4 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | −0.02 |
| Steel | 0.00 |
| Cu | −0.28 |
| Mg | −0.24 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L blue |
| Ag | L pink-yellow |
| Steel | Blue-green |
| Cu | Brown-orange |
| Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 4[illegible] hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 255-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-20 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.75 | – | 4.68 | 0.26 | |
| 16 hr | 17.04 | -4.0 | 4.44 | 1.62 | |
| 24 hr | 16.89 | -4.8 | 4.39 | 1.94 | |
| 40 hr | 16.37 | -7.8 | 4.25 | 2.58 | |
| 48 hr | 15.80 | -11.0 | 3.94 | 10.47 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.34 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Purple |
| | Ag | L pink-yellow |
| | Steel | Blue-green |
| | Cu | Brown-orange |
| | Mg | L pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | H var & carbon |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 255-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-5 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.04 | – | 3.75 | 0.05 | |
| 16 hr | 14.92 | -0.8 | 3.68 | 1.23 | |
| 24 hr | 14.91 | -0.9 | 3.67 | 1.53 | |
| 40 hr | 14.79 | -1.7 | 3.63 | 1.56 | |
| 48 hr | 14.70 | -2.3 | 3.62 | 1.84 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.12 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown-orange |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 255-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-5 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acidity, mg KOH/g | Vis, cs/100°F |
| Initial | 15.04 | - | 3.75 | 0.05 | | | | |
| 16 hr | 16.96 | 12.8 | 4.05 | 1.12 | 33.9 | | | |
| 24 hr | 18.34 | 21.9 | 4.28 | 1.12 | 47.8 | | | |
| 40 hr | 22.62 | 50.4 | 4.96 | 1.29 | 67.8 | | | |
| 48 hr | 25.64 | 70.5 | 5.44 | 1.53 | 72.5 | 45 | 1.53 | 9.08 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.18 |
| | Mg | +0.55 |
| Metal discoloration, deposits, pitting, or etching: | Al | L. yellow |
| | Ti | L. brown |
| | Ag | L. yellow |
| | Steel | Blue |
| | Cu | Brown-green |
| | Mg | Gray deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 261-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.40 | | 3.23 | 0.08 | |
| 7 days | 14.75 | 10.1 | 3.46 | 0.62 | |
| 14 days | 15.24 | 13.7 | 3.53 | 0.83 | |
| 21 days | 15.64 | 16.7 | 3.61 | 0.94 | |
| 26 days | 15.81 | 18.0 | 3.62 | 0.91 | 15 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.08 |
| | Steel | +0.04 |
| | Cu | +0.18 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L. brown |
| | Ag | No change |
| | Steel | Red-brown |
| | Cu | Red-brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 261-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | |
| 7 days | 15.42 | 2.1 | 3.79 | 1.32 | |
| 14 days | 15.46 | 2.3 | 3.80 | 1.97 | |
| 21 days | 15.60 | 3.2 | 3.77 | 2.28 | |
| 26 days | 15.82 | 4.7 | 3.81 | 2.46 | 11 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | –0.02 |
| | Ag | –0.02 |
| | Steel | 0.00 |
| | Cu | –0.22 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L pale blue |
| | Ti | Blue |
| | Ag | L orange & yellow |
| | Steel | Pale green |
| | Cu | Purple, brown & orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 261-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-25 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.64 | | 3.31 | 0.10 | |
| 7 days | 15.34 | 12.5 | 3.59 | 1.30 | |
| 14 days | 15.88 | 16.4 | 3.66 | 1.57 | |
| 21 days | 16.18 | 18.6 | 3.71 | 1.64 | |
| 26 days | 16.22 | 18.9 | 3.72 | 1.65 | 30 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | –0.51 |
| | Steel | 0.00 |
| | Cu | +0.04 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L etching |
| | Steel | Blue |
| | Cu | Yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 261-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 7 days | 17.69 | −0.2 | 4.63 | 1.28 | |
| 14 days | 17.29 | −2.4 | 4.51 | 1.76 | |
| 21 days | 16.89 | −4.7 | 4.41 | 2.27 | |
| 26 days | 16.87 | −4.8 | 4.40 | 2.32 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | −0.10 |
| | Steel | +0.02 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L pale blue |
| | Ti | Blue |
| | Ag | Brown |
| | Steel | Blue, green, & yellow |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 261-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 7 days | 17.80 | +0.5 | 4.66 | 1.27 | |
| 14 days | 17.38 | −1.9 | 4.56 | 1.75 | |
| 21 days | 17.06 | −3.7 | 4.46 | 2.03 | |
| 26 days | 16.99 | −4.1 | 4.44 | 2.33 | 10 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | −0.02 |
| | Ag | −0.08 |
| | Steel | 0.00 |
| | Cu | +0.08 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L pale blue |
| | Ti | Blue |
| | Ag | Brown |
| | Steel | Blue, green, & brown |
| | Cu | Yellow |
| | Mg | Gray, yellow, & pink |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 261-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.50 | | 5.08 | 0.07 | |
| 7 days | 31.24 | 13.6 | 5.50 | 0.34 | |
| 14 days | 32.05 | 16.5 | 5.60 | 0.38 | |
| 21 days | 32.68 | 18.8 | 5.68 | 0.46 | |
| 26 days | 32.87 | 19.5 | 5.71 | 0.51 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.08 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | +0.75 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue, green, & yellow |
| | Cu | Yellow & orange |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 268-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-8 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.24 | – | 3.26 | 0.23 | |
| 16 hr | 14.29 | 7.9 | 3.44 | 1.02 | |
| 24 hr | 14.42 | 8.9 | 3.46 | 1.19 | |
| 40 hr | 14.71 | 11.1 | 3.51 | 1.44 | |
| 48 hr | 14.82 | 11.9 | 3.53 | 1.57 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | −0.02 |
| | Cu | −0.24 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Purple-blue |
| | Cu | L etching |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 268-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | – | 3.69 | 0.04 | |
| 16 hr | 15.04 | +1.1 | 3.74 | 0.72 | |
| 24 hr | 15.01 | +0.9 | 3.70 | 0.85 | |
| 40 hr | 14.85 | −0.1 | 3.67 | 1.08 | |
| 48 hr | 14.79 | −0.5 | 3.66 | 1.36 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.15 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown-purple-green |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 268-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | – | 3.21 | 0.05 | |
| 16 hr | 13.96 | 5.3 | 3.33 | 0.48 | |
| 24 hr | 14.15 | 6.7 | 3.36 | 0.63 | |
| 40 hr | 14.32 | 8.0 | 3.41 | 0.94 | |
| 48 hr | 14.49 | 9.3 | 3.42 | 1.11 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | −0.02 |
| | Cu | −0.04 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Yellow-orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 268-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-8 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.24 | - | 3.26 | 0.23 | – | | | |
| 16 hr | 15.44 | 6.6 | 3.65 | 0.80 | 39.5 | | | |
| 24 hr | 16.60 | 25.4 | 3.85 | 0.92 | 55.1 | | | |
| 40 hr | 20.53 | 55.0 | 4.47 | 1.30 | 77.4 | | | |
| 48 hr | 25.29 | 91.0 | 5.16 | 1.56 | 83.1 | 54 | 1.92 | 10.76 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.41 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Purple-blue |
| | Cu | L etching |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 268-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 14.87 | – | 3.69 | 0.04 | – | | | |
| 16 hr | 17.13 | 15.2 | 4.10 | 0.52 | 37.4 | | | |
| 24 hr | 18.82 | 26.6 | 4.39 | 0.58 | 52.3 | | | |
| 40 hr | 23.52 | 58.2 | 5.15 | 0.85 | 72.3 | | | |
| 48 hr | 26.92 | 81.0 | 5.69 | 1.11 | 76.3 | 47 | 1.33 | 9.17 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.19 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Purple-dark brown |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | Very L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 268-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.26 | – | 3.21 | 0.05 | – | | | |
| 16 hr | 16.22 | 22.3 | 3.67 | 0.38 | 42.8 | | | |
| 24 hr | 18.50 | 39.5 | 3.99 | 0.52 | 60.2 | | | |
| 40 hr | 27.13 | 105 | 5.10 | 0.82 | 82.4 | | | |
| 48 hr | 35.64 | 169 | 6.05 | 0.88 | 85.6 | 53 | 1.33 | 9.28 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | -0.02 |
| | Cu | 0.00 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Orange-yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 269-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-4 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 29.19 | – | 5.41 | 0.10 | |
| 16 hr | 31.11 | 6.6 | 5.63 | 0.41 | |
| 24 hr | 31.57 | 8.2 | 5.69 | 0.45 | |
| 40 hr | 32.22 | 10.4 | 5.75 | 0.53 | |
| 48 hr | 32.69 | 12.0 | 5.81 | 0.57 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | -0.41 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue-purple |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 269-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-5 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.63 | – | 3.30 | 0.22 | |
| 16 hr | 14.37 | 5.4 | 3.41 | 0.49 | |
| 24 hr | 14.57 | 6.9 | 3.45 | 0.67 | |
| 40 hr | 14.71 | 7.9 | 3.46 | 0.93 | |
| 48 hr | 14.87 | 9.1 | 3.49 | 1.09 | 0 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.08 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | Yellow |
| | Steel | Purple-blue |
| | Cu | Orange-brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 269-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-7 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.34 | – | 4.58 | 0.26 | |
| 16 hr | 16.99 | −2.0 | 4.45 | 0.91 | |
| 24 hr | 16.84 | −2.9 | 4.41 | 1.12 | |
| 40 hr | 16.19 | −6.6 | 4.24 | 1.85 | |
| 48 hr | 15.32 | −11.6 | 3.90 | 6.65 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.02 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Tan |
| | Ti | Brown-purple |
| | Ag | Pink-yellow |
| | Steel | Blue-green |
| | Cu | Orange-pink-green |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits. | Below oil level | L var |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 39 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 269-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-4 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 29.19 | – | 5.41 | 0.10 | – | | | |
| 16 hr | 31.83 | 9.0 | 5.71 | 0.31 | 0.9 | | | |
| 24 hr | 32.52 | 11.4 | 5.80 | 0.42 | 1.3 | | | |
| 40 hr | 33.75 | 15.6 | 5.94 | 0.53 | 2.2 | | | |
| 48 hr | 34.69 | 18.8 | 6.05 | 0.62 | 2.5 | 10 | 10.70 | 20.49 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.71 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue-purple |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 269-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-5 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.63 | – | 3.30 | 0.22 | – | | | |
| 16 hr | 15.70 | 15.2 | 3.61 | 0.31 | 33.6 | | | |
| 24 hr | 16.90 | 24.0 | 3.84 | 0.44 | 46.4 | | | |
| 40 hr | 19.99 | 46.7 | 4.36 | 0.73 | 64.2 | | | |
| 48 hr | 27.51 | 65.1 | 4.59 | 0.80 | 67.9 | 47 | 1.56 | 10.36 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.06 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | Yellow |
| | Steel | Brown-purple |
| | Cu | Orange-pink |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 269-6. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-7 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.34 | – | 4.58 | 0.26 | | | | |
| 16 hr | 19.32 | 11.4 | 5.02 | 0.67 | 37.4 | | | |
| 24 hr | 21.08 | 21.6 | 5.43 | 0.73 | 54.8 | | | |
| 40 hr | 29.23 | 68.6 | 7.21 | 1.16 | 86.9 | | | |
| 48 hr | 47.31 | 173 | 10.97 | 1.68 | 97.1 | 59 | 1.59 | 10.82 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.02 |
| | Cu | +0.06 |
| | Mg | +0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | Tan |
| | Ti | Brown |
| | Ag | Pink-yellow |
| | Steel | Blue-green |
| | Cu | Orange, pink & green |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 271-1. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON ATL-652 AT 425°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.65 | – | 3.54 | 0.19 | | | | |
| 18 hr | 31.13 | 98.9 | 5.50 | 5.97 | 73.2 | 40 | 17.46 | 11.19 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | S. S. | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue-green |
| | S. S. | Purple |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.6 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 425 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 271-2. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON ATL-652 AT 425°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 15.65 | | 3.54 | 0.19 | | | | |
| 18 hr | 33.70 | 115 | 5.78 | 7.21 | 75.3 | 42 | 15.54 | 11.56 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | S. S. | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue-green |
| | S. S. | Purple |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.6 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 425 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 272-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | | 12.88 | 0.00 | |
| 16 hr | 472.8 | 33.4 | 14.70 | 0.18 | |
| 24 hr | 605.8 | 70.9 | 16.52 | 0.22 | |
| 40 hr | 1171 | 230 | 22.47 | 0.35 | |
| 48 hr | 1666 | 370 | 27.00 | 0.42 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | +0.08 |
| | Steel | +0.08 |
| | Cu | 0.59 |
| | Mg | +0.43 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Red-brown |
| | Ag | White-brown |
| | Steel | Gray |
| | Cu | Orange-gray |
| | Mg | Gray-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 272-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | | 4.07 | 0.00 | |
| 16 hr | 27.31 | 12.8 | 4.38 | 0.13 | |
| 24 hr | 27.62 | 14.0 | 4.42 | 0.06 | |
| 40 hr | 28.58 | 18.0 | 4.51 | 0.07 | |
| 48 hr | 28.48 | 17.6 | 4.51 | 0.04 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | +0.20 |
| | Ti | +0.22 |
| | Ag | 0.00 |
| | Steel | +0.43 |
| | Cu | -5.60 |
| | Mg | +1.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown spots |
| | Ti | Tan-purple |
| | Ag | L brown |
| | Steel | Tan |
| | Cu | Etching and pitting |
| | Mg | D gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | L carbo |
| | At and above oil level | L carbo |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 272-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 16 hr | 388.9 | 8.8 | 13.48 | 0.08 | |
| 24 hr | 394.9 | 10.4 | 13.58 | 0.04 | |
| 40 hr | 406.2 | 13.6 | 13.77 | 0.04 | |
| 48 hr | 413.5 | 15.6 | 13.87 | 0.07 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | -0.02 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.08 |
| | Cu | -0.06 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-brown |
| | Ag | Yellow |
| | Steel | Green-purple |
| | Cu | Orange-brown |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | Very L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 272-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 460.6 | 29.9 | 14.54 | 0.17 | |
| 24 hr | 574.3 | 62.0 | 16.06 | 0.23 | |
| 40 hr | 981.3 | 177 | 20.64 | 0.26 | |
| 48 hr | 1311 | 270 | 23.83 | 0.38 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | −0.34 |
| | Steel | +0.08 |
| | Cu | −1.07 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Red-brown |
| | Ag | White |
| | Steel | Gray |
| | Cu | Orange-green |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 272-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.00 | |
| 16 hr | 27.11 | 11.9 | 4.37 | 0.10 | |
| 24 hr | 27.51 | 13.6 | 4.40 | 0.07 | |
| 40 hr | 28.44 | 17.4 | 4.49 | 0.05 | |
| 48 hr | 28.45 | 17.5 | 4.50 | 0.08 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.24 |
| | Ti | +0.20 |
| | Ag | 0.00 |
| | Steel | +0.36 |
| | Cu | −6.25 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown spots |
| | Ti | Brown-purple |
| | Ag | L brown |
| | Steel | Tan |
| | Cu | Etching and pitting |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | L carbon |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 272-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 387.4 | 8.3 | 13.44 | 0.08 | |
| 24 hr | 394.6 | 10.3 | 13.59 | 0.08 | |
| 40 hr | 406.8 | 13.8 | 13.77 | 0.08 | |
| 48 hr | 412.6 | 15.4 | 13.88 | 0.06 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | -0.06 |
| | Cu | -0.16 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-brown |
| | Ag | Yellow |
| | Steel | Green-purple |
| | Cu | Orange-brown |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | Very L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 272-7. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 404.7 | 14.2 | 13.69 | 0.02 | |
| 24 hr | 454.3 | 28.2 | 14.37 | 0.02 | |
| 40 hr | (a) | – | – | – | 78 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm₂: | Al | +0.02 |
| | Ti | +0.06 |
| | Ag | 0.00 |
| | Steel | +0.10 |
| | S. S. | +0.02 |
| | Cu | +0.14 |
| Metal discoloration, deposits pitting, or etching: | Al | Gray |
| | Ti | Yellow-brown |
| | Ag | L brown-white |
| | Steel | Gray |
| | S. S. | Tan-pink |
| | Cu | Dark gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Sample test cell dry at 40 hours.

TEST NO. 272-8. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 16 hr | 399.9 | 11.8 | 13.60 | 0.09 | |
| 24 hr | 440.6 | 23.2 | 14.24 | 0.10 | |
| 40 hr | (a) | | | | 77 |

**Metal Specimen Data**

| Weight change, mg/cm² | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | +0.06 |
| | Ag | 0.00 |
| | Steel | +0.12 |
| | S. S. | +0.02 |
| | Cu | +0.10 |

| Metal discoloration, deposits pitting, or etching: | | |
|---|---|---|
| | Al | L yellow |
| | Ti | Yellow-brown |
| | Ag | Yellow |
| | Steel | Brown-green-purple |
| | S. S. | L brown-purple-pink |
| | Cu | Orange-gray-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Sample test cell dry at 40 hours.

TEST NO. 273-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | | 12.88 | 0.00 | |
| 16 hr | 1,043 | 194 | 20.98 | 0.33 | |
| 24 hr | 2,331 | 558 | 30.50 | 0.30 | |
| 40 hr | 18,745 | 5188 | 79.46 | 0.45 | |
| 48 hr | (a) | | 171.4 | 0.30 | 2 |

**Metal Specimen Data**

| Weight change, mg/cm² | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.55 |
| | Steel | 0.00 |
| | Cu | -1.10 |
| | Mg | +1.48 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | L yellow |
| | Ti | Blue |
| | Ag | L etching |
| | Steel | Black |
| | Cu | Brown-orange |
| | Mg | Dark gray spots |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample semisolidified at 100°F

TEST NO. 273-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | | 4.07 | 0.00 | |
| 16 hr | 29.52 | 21.9 | 4.57 | 0.01 | |
| 24 hr | 30.97 | 27.9 | 4.69 | 0.05 | |
| 40 hr | 34.16 | 41.0 | 4.99 | 0.07 | |
| 48 hr | 35.19 | 45.3 | 5.09 | 0.10 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.10 |
| | Ti | 0.00 |
| | Ag | -1.42 |
| | Steel | +0.10 |
| | Cu | -7.60 |
| | Mg | +0.53 |
| Metal discoloration, deposits, pitting, or etching: | Al | L tan |
| | Ti | Brown-blue |
| | Ag | L etching |
| | Steel | Green-purple |
| | Cu | M etching |
| | Mg | Dark gray deposits |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var & carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 273-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 16 hr | 411.8 | 15.2 | 13.81 | 0.06 | |
| 24 hr | 426.7 | 19.3 | 14.01 | 0.02 | |
| 40 hr | 464.7 | 29.9 | 14.58 | 0.03 | |
| 48 hr | 486.1 | 35.9 | 14.92 | 0.02 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | 0.00 |
| | Ag | -0.10 |
| | Steel | 0.06 |
| | Cu | +0.16 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Pale blue |
| | Cu | Black spots |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | Very L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 273-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | | 12.88 | 0.00 | |
| 16 hr | 1,050 | 196 | 21.04 | 0.26 | |
| 24 hr | 2,109 | 495 | 29.30 | 0.25 | |
| 40 hr | 15,096 | 4158 | 70.54 | 0.40 | |
| 48 hr | (a) | | 140.3 | 0.76 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | -0.02 |
| | Ag | -0.65 |
| | Steel | +1.06 |
| | Cu | -0.89 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Blue-green |
| | Ag | White |
| | Steel | Black deposits |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample semisolidified at 100°F

TEST NO. 273-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | | 4.07 | 0.00 | |
| 16 hr | 29.49 | 21.8 | 4.58 | 0.03 | |
| 24 hr | 30.83 | 27.3 | 4.71 | 0.05 | |
| 40 hr | 34.55 | 42.7 | 5.02 | 0.08 | |
| 48 hr | 35.86 | 48.1 | 5.14 | 0.08 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.10 |
| | Ti | 0.00 |
| | Ag | -2.21 |
| | Steel | +0.10 |
| | Cu | -9.57 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-purple |
| | Ag | L etching |
| | Steel | Green-purple |
| | Cu | M etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var & L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 273-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 16 hr | 406.0 | 13.5 | 13.71 | 0.02 | |
| 24 hr | 426.4 | 19.2 | 14.01 | 0.04 | |
| 40 hr | 464.1 | 29.8 | 14.56 | 0.05 | |
| 48 hr | 482.7 | 35.0 | 14.85 | 0.08 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.10 |
| | Steel | +0.04 |
| | Cu | +0.12 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Pale blue |
| | Cu | Black deposits |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 273-7. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON F-1041 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | | 12.88 | 0.00 | |
| 16 hr | 519.3 | 46.5 | 15.27 | 0.01 | |
| 24 hr | (a) | | | | 85 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.10 |
| | Ti | +0.04 |
| | Ag | 0.04 |
| | Steel | +0.02 |
| | S. S | 0.04 |
| | Cu | +0.10 |
| Metal discoloration, deposits pitting, or etching: | Al | L gray |
| | Ti | Brown-yellow |
| | Ag | L brown |
| | Steel | Black |
| | S. S. | L tan |
| | Cu | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Test cell dry at 24 hour sampling period

TEST NO. 273-8. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 16 hr | 445.8 | 24.7 | 14.33 | 0.04 | |
| 24 hr | (a) | | | | 75 |

**Metal Specimen Data**

| Weight change, mg/cm² | | |
|---|---|---|
| | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | −0.04 |
| | S. S. | −0.06 |
| | Cu | −0.14 |

| Metal discoloration, deposits pitting, or etching: | | |
|---|---|---|
| | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Pale blue |
| | S. S. | L pink |
| | Cu | Black-orange-purple |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Test cell dry at 24-hour sampling period.

TEST NO. 275-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-10 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.32 | | 4.61 | 0.26 | |
| 16 hr | 16.71 | −3.3 | 4.38 | 1.00 | |
| 24 hr | 16.56 | −4.4 | 4.34 | 1.14 | |
| 40 hr | 15.31 | −11.6 | 3.87 | 5.52 | |
| 48 hr | 16.36 | −5.5 | 3.98 | 13.20 | 8 |

**Metal Specimen Data**

| Weight change, mg/cm² | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.02 |
| | Steel | +0.02 |
| | Cu | −0.34 |
| | Mg | −1.40 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | Yellow |
| | Ti | Brown |
| | Ag | Yellow-pink |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | H etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26 hr |
| 100°F vis | 45 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 275-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-13 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.47 | – | 3.22 | 0.10 | |
| 16 hr | 14.06 | 4.4 | 3.32 | 0.26 | |
| 24 hr | 14.38 | 6.8 | 3.36 | 0.37 | |
| 40 hr | 14.65 | 8.8 | 3.41 | 0.60 | |
| 48 hr | 14.77 | 9.7 | 3.45 | 0.75 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.30 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Gray-orange |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 275-3. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-66-9 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.90 | | 3.34 | 0.06 | | | | |
| 16 hr | 15.80 | 13.7 | 3.64 | 0.42 | 30.7 | | | |
| 24 hr | 16.89 | 21.5 | 3.82 | 0.64 | 43.5 | | | |
| 40 hr | 20.62 | 48.3 | 4.32 | 0.88 | 65.0 | | | |
| 48 hr | 24.66 | 77.4 | 4.87 | 0.96 | 72.4 | 44 | 1.73 | 10.42 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.06 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Orange-pink |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 275-4. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-10 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 17.32 | | 4.61 | 0.26 | | | | |
| 16 hr | 19.27 | 11.3 | 4.98 | 0.73 | 40.2 | | | |
| 24 hr | 21.23 | 22.6 | 5.44 | 0.81 | 58.2 | | | |
| 40 hr | 31.94 | 84.4 | 7.73 | 1.30 | 89.4 | | | |
| 48 hr | 68.97 | 298 | 15.49 | 2.39 | 97.7 | 61 | 1.68 | 10.82 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | +0.36 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Brown |
| | Ag | Yellow-pink |
| | Steel | Blue |
| | Cu | L brown-green |
| | Mg | Gray deposits |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

(a) Insufficient sample.

TEST NO. 275-5. RESULTS OF NONREFLUX OXIDATION-CORROSION TEST ON O-67-13 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Overhead Wt, g | Oil Loss, wt % | Overhead Sample Acidity, mg KOH/g | Overhead Sample Vis, cs/100°F |
|---|---|---|---|---|---|---|---|---|
| Initial | 13.47 | | 3.22 | 0.10 | | | | |
| 16 hr | 14.93 | 10.8 | 3.45 | 0.20 | 30.9 | | | |
| 24 hr | 15.44 | 14.5 | 3.67 | 0.25 | 45.5 | | | |
| 40 hr | 18.08 | 34.2 | 3.93 | 0.30 | 67.6 | | | |
| 48 hr | 20.16 | 49.7 | 4.24 | 0.42 | 75.4 | 46 | 1.22 | 11.18 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.14 |
| | Mg | +0.46 |
| Metal discoloration, deposits, pitting, or etching. | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | L brown-pink |
| | Mg | Gray deposits |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil | 200-mesh filter | None |
| | Centrifuge, vol | Trace |
| Tube deposits | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 130 |
| Condensate return | No |

TEST NO. 277-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-720 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | | 3.39 | 0.38 | |
| 7 days | 13.70 | 3.3 | 3.48 | 1.21 | |
| 14 days | 14.98 | 13.0 | 3.63 | 7.58 | |
| 21 days | 83.41 | 529 | 12.71 | 52.4 | |
| 26 days | (a) | | 700.7 | 51.6 | 21 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | +0.02 |
| | Cu | −1.07 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Blue-green |
| | Ag | Yellow |
| | Steel | Yellow-green |
| | Cu | Etching & pitting |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 6 days |
| 100°F vis | 13 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample semisolidified.

TEST NO. 277-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-753 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.73 | | 3.48 | 0.23 | |
| 7 days | 14.34 | 4.4 | 3.[illegible]1 | 0.98 | |
| 14 days | 14.51 | 5.7 | 3.55 | 1.31 | |
| 21 days | 14.62 | 6.5 | 3.55 | 1.60 | |
| 26 days | 14.71 | 7.1 | 3.56 | 1.73 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.06 |
| | Steel | 0.00 |
| | Cu | −0.24 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching | Al | Pink |
| | Ti | Purple |
| | Ag | Pink blue |
| | Steel | Blue green |
| | Cu | L pitting |
| | Mg | Brown green stain |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 260 days |
| 100°F vis | 260 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 277-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON [illegible]

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.02 | | 3.50 | 3.57 | |
| 7 days | 14.61 | 4.2 | 3.57 | 2.96 | |
| 14 days | 14.91 | 6.3 | 3.63 | 3.21 | |
| 21 days | 15.27 | 8.9 | 3.68 | 2.89 | |
| 26 days | 15.50 | 10.6 | 3.74 | 3.12 | 9 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.39 |
| | Mg | −0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pink |
| | Ti | Maroon |
| | Ag | Pink-blue |
| | Steel | L green |
| | Cu | L etching |
| | Mg | L pink |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | Very L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 277-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-9 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.90 | | 3.34 | 0.06 | |
| 7 days | 15.12 | 8.8 | 3.54 | 0.64 | |
| 14 days | 15.49 | 11.4 | 3.58 | 0.77 | |
| 21 days | 15.74 | 13.2 | 3.63 | 0.81 | |
| 26 days | 15.72 | 13.1 | 3.63 | 0.85 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.14 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Bright orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200 mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 277-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | | 3.69 | 0.04 | |
| 7 days | 15.26 | 2.6 | 3.76 | 0.88 | |
| 14 days | 15.23 | 2.4 | 3.74 | 1.25 | |
| 21 days | 15.38 | 3.4 | 3.76 | 1.47 | |
| 26 days | 15.62 | 5.0 | 3.78 | 1.55 | 14 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.06 |
| | Steel | +0.02 |
| | Cu | −0.16 |
| | Mg | +0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pale blue |
| | Ti | Blue |
| | Ag | Pink-blue |
| | Steel | L green |
| | Cu | Brown |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 277-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-11 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | | 3.21 | 0.05 | |
| 7 days | 14.37 | 8.4 | 3.33 | 0.67 | |
| 14 days | 14.73 | 11.1 | 3.45 | 0.82 | |
| 21 days | 14.97 | 12.9 | 3.46 | 0.83 | |
| 26 days | 15.01 | 13.2 | 3.46 | 0.85 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.10 |
| | Steel | +0.02 |
| | Cu | −0.08 |
| | Mg | +0.59 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Bright yellow |
| | Mg | Gray deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 280-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON E-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | | 12.88 | 0.00 | |
| 72 hr | 6702 | 1790 | 53.59 | 1.13 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | −0.28 |
| | Steel | +0.17 |
| | Cu | +0.99 |
| | Mg | +0.14 |
| Metal discoloration, deposits pitting, or etching: | Al | L brown-yellow |
| | Ti | Blue |
| | Ag | L etching |
| | Steel | Charcoal |
| | Cu | Black coating |
| | Mg | L brown-yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H var & carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 280-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 72 hr | 426.7 | 19.3 | 14.09 | 0.03 | |
| 120 hr | 466.2 | 30.4 | 14.47 | 0.13 | |
| 168 hr | 514.7 | 43.9 | 15.34 | 0.13 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.06 |
| | Steel | +0.02 |
| | Cu | +0.19 |
| | Mg | +0.02 |
| Metal discoloration, deposits pitting, or etching: | Al | L yellow |
| | Ti | L yellow-brown |
| | Ag | L yellow |
| | Steel | Pale blue-gray |
| | Cu | Black coating |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 280-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON 64-29 AT 608°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No. mg KOH/g | Oil Loss wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | | 4.07 | 0.00 | |
| 72 hr | 31.36 | 29.5 | 4.73 | 0.07 | |
| 120 hr | 35.65 | 47.2 | 5.05 | 0.10 | |
| 168 hr | 40.79 | 68.4 | 5.50 | 0.13 | 3 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.12 |
| Ti | 0.00 |
| Ag | −4.26 |
| Steel | +0.04 |
| Cu | −23.3 |
| Mg | +0.75 |

Metal discoloration, deposits pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | Blue-tan |
| Ag | M etching & brown coating |
| Steel | Purple-brown |
| Cu | M etching & pitting |
| Mg | Dark gray coating |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 280-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | | 12.88 | 0.00 | |
| 72 hr | 4700 | 1226 | 44.48 | 0.33 | 7 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.04 |
| Ti | +0.06 |
| Ag | +0.28 |
| Steel | +0.18 |
| Cu | +1.95 |
| Mg | |

Metal discoloration, deposits pitting, or etching:

| | |
|---|---|
| Al | L brown-yellow |
| Ti | Blue |
| Ag | Very L brown coating |
| Steel | Charcoal deposits |
| Cu | Black coating |
| Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H var & carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 280-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 72 hr | 426.1 | 19.2 | 14.04 | 0.10 | |
| 120 hr | 464.6 | 29.9 | 14.48 | 0.16 | |
| 168 hr | 513.8 | 43.7 | 15.27 | 0.18 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | +0.02 |
| | Cu | −0.41 |
| | Mg | – |
| Metal discoloration, deposits pitting, or etching: | Al | L yellow |
| | Ti | L yellow-brown |
| | Ag | L yellow |
| | Steel | Pale blue-gray |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 280-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.00 | |
| 72 hr | 30.93 | 27.7 | 4.67 | 0.10 | |
| 120 hr | 37.64 | 55.4 | 5.19 | 0.15 | |
| 168 hr | 48.39 | 99.8 | 5.91 | 0.16 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.12 |
| | Ti | 0.00 |
| | Ag | −6.33 |
| | Steel | +0.08 |
| | Cu | −1.87 |
| | Mg | |
| Metal discoloration, deposits pitting, or etching: | Al | L brown-yellow |
| | Ti | Yellow-blue |
| | Ag | M etching & brown coating |
| | Steel | Purple-brown |
| | Cu | M etching & pitting |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 283-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.66 | - | 4.65 | 0.26 | |
| 7 days | 17.60 | −0.3 | 4.56 | 1.48 | |
| 14 days | 16.97 | −3.9 | 4.48 | 2.26 | |
| 21 days | 29.46 | +66.8 | 6.08 | 38.6 | |
| 26 days | - | - | | 50.5 | 24 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.06 |
| | Ti | +0.06 |
| | Ag | +0.04 |
| | Steel | +0.04 |
| | Cu | −2.56 |
| | Mg | −0.77 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow-L brown |
| | Ti | Yellow-brown |
| | Ag | Yellow-L brown |
| | Steel | Purple-brown |
| | Cu | H etching |
| | Mg | Large pits |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | H carbon & var |
| | At and above oil level | H carbon & var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 17 days |
| 100°F vis | 14 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 283-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | - | 4.67 | 0.25 | |
| 7 days | 17.51 | −1.2 | 4.56 | 1.60 | |
| 14 days | 15.80 | −10.8 | 4.06 | 4.99 | |
| 21 days | | | | 46.8 | |
| 26 days | - | | | 48.3 | 24 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.08 |
| | Ti | +0.06 |
| | Ag | +0.10 |
| | Steel | +0.02 |
| | Cu | −4.99 |
| | Mg | −0.97 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow-L brown |
| | Ti | Yellow-brown |
| | Ag | Yellow-L brown |
| | Steel | Purple-brown |
| | Cu | H etching |
| | Mg | Large pits |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | |
| | Centrifuge, vol % | - |
| Tube deposits: | Below oil level | H carbon & var |
| | At and above oil level | H carbon & var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 5 days |
| 100°F vis | 14 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 283-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | – | 3.69 | 0.04 | |
| 7 days | 15.28 | 2.8 | 3.71 | 1.05 | |
| 14 days | 15.42 | 3.7 | 3.69 | 1.28 | |
| 21 days | 15.54 | 4.5 | 3.76 | 1.44 | |
| 26 days | 15.60 | 4.9 | 3.76 | 1.39 | 12 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.22 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pale blue |
| | Ti | Blue |
| | Ag | Brown-blue |
| | Steel | Pale green |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 283-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-769 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.04 | – | 3.75 | 0.04 | |
| 7 days | 15.16 | 0.8 | 3.76 | 1.04 | |
| 14 days | 15.16 | 0.8 | 3.73 | 1.27 | |
| 21 days | 15.28 | 1.6 | 3.74 | 1.41 | |
| 26 days | 15.36 | 2.1 | 3.76 | 1.54 | 9 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.06 |
| | Ag | -0.06 |
| | Steel | +0.02 |
| | Cu | -0.14 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pale blue |
| | Ti | Blue |
| | Ag | Brown-blue |
| | Steel | Pale green |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | Very L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 283-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-770 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.03 | | 3.75 | 0.04 | |
| 7 days | 15.22 | 1.3 | 3.78 | 1.00 | |
| 14 days | 15.49 | 3.1 | 3.74 | 1.26 | |
| 21 days | 15.65 | 4.1 | 3.79 | 1.34 | |
| 26 days | 15.67 | 4.3 | 3.81 | 1.35 | 12 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.10 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pale blue |
| | Ti | Blue |
| | Ag | Brown-blue |
| | Steel | Pale green |
| | Cu | Brown |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | Very L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 283-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-771 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.01 | | 3.74 | 0.04 | |
| 7 days | 15.18 | 1.1 | 3.77 | 1.08 | |
| 14 days | 15.03 | 0.1 | 3.71 | 1.28 | |
| 21 days | 15.21 | 1.3 | 3.69 | 1.42 | |
| 26 days | 15.26 | 1.7 | 3.75 | 1.45 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.06 |
| | Ag | −0.04 |
| | Steel | 0.00 |
| | Cu | −0.10 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pale blue |
| | Ti | Blue |
| | Ag | Brown-blue |
| | Steel | Pale green |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | Very H var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 284-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.50 | – | 5.08 | 0.07 | |
| 16 hr | 31.81 | 15.7 | 5.55 | 0.95 | |
| 24 hr | 32.78 | 19.2 | 5.67 | 1.19 | |
| 40 hr | 34.94 | 27.1 | 5.96 | 2.32 | |
| 48 hr | 37.83 | 37.6 | 5.99 | 4.54 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.62 |
| | Ti | 0.00 |
| | Ag | -0.04 |
| | Steel | 0.00 |
| | Cu | -0.10 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Very L brown |
| | Ag | L yellow |
| | Steel | Green-blue |
| | Cu | Orange-yellow |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 284-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-36 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 28.33 | – | 5.31 | 0.14 | |
| 16 hr | 31.80 | 12.2 | 5.74 | 0.95 | |
| 24 hr | 32.52 | 14.8 | 5.84 | 1.11 | |
| 40 hr | 33.97 | 19.9 | 6.02 | 1.58 | |
| 48 hr | 35.08 | 23.8 | 6.15 | 2.80 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.32 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Very L brown |
| | Ag | L yellow |
| | Steel | Dark green-blue |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 284-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-4 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 29.19 | | 5.41 | 0.10 | |
| 16 hr | 32.45 | 11.2 | 5.67 | 0.93 | |
| 24 hr | 33.50 | 14.8 | 5.87 | 1.31 | |
| 40 hr | 38.94 | 33.4 | 6.44 | 4.47 | |
| 48 hr | 42.49 | 45.6 | 6.83 | 7.46 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.04 |
| | Steel | 0.00 |
| | Cu | -0.47 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Very L brown |
| | Ag | No change |
| | Steel | Pale blue |
| | Cu | Very L etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 290-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-61-17 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No. mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.69 | | 3.57 | 0.04 | |
| 16 hr | 17.66 | 12.6 | 3.85 | 0.84 | |
| 24 hr | 17.96 | 14.5 | 3.91 | 1.12 | |
| 40 hr | 18.95 | 20.8 | 4.05 | 2.11 | |
| 48 hr | 19.92 | 27.0 | 4.21 | 5.19 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.04 |
| | Steel | 0.00 |
| | Cu | -0.36 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L yellow-brown |
| | Ag | L yellow |
| | Steel | Blue-purple |
| | Cu | L etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | Very L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 290-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-25 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.59 | – | 3.51 | 0.06 | |
| 16 hr | 17.03 | 9.2 | 3.74 | 1.14 | |
| 24 hr | 18.34 | 17.6 | 3.82 | 2.58 | |
| 40 hr | 22.39 | 43.6 | 4.49 | 9.03 | |
| 48 hr | 24.89 | 59.7 | 4.85 | 11.61 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.06 |
| | Steel | 0.00 |
| | Cu | -1.38 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L yellow-brown |
| | Ag | L yellow |
| | Steel | Brown-blue |
| | Cu | M etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 290-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-33 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 18.12 | – | 4.09 | 0.14 | |
| 16 hr | 18.97 | 4.7 | 4.08 | 2.21 | |
| 24 hr | 19.97 | 10.2 | 4.21 | 2.54 | |
| 40 hr | 22.31 | 23.1 | 4.53 | 3.48 | |
| 48 hr | 24.60 | 35.8 | 4.84 | 7.52 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.02 |
| | Ag | +0.04 |
| | Steel | 0.00 |
| | Cu | -19.2 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow-brown |
| | Ag | White |
| | Steel | Pale green-blue |
| | Cu | M etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 290-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-401 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 26.30 | – | 5.13 | 0.11 | |
| 16 hr | 33.45 | 27.2 | 6.04 | 1.95 | |
| 24 hr | 37.22 | 41.5 | 6.48 | 2.36 | |
| 40 hr | 46.62 | 77.3 | 7.57 | 3.03 | |
| 48 hr | 53.18 | 102 | 8.29 | 5.02 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -5.17 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 290-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-402 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 46.84 | – | 8.25 | 0.12 | |
| 16 hr | 53.12 | 13.4 | 8.74 | 1.56 | |
| 24 hr | 57.50 | 22.8 | 9.20 | 2.24 | |
| 40 hr | 69.34 | 48.0 | 10.45 | 2.81 | |
| 48 hr | 76.30 | 62.9 | 11.17 | 4.26 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | -8.03 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue |
| | Cu | M etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 291-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-4 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 29.19 | | 5.41 | 0.10 | |
| 16 hr | 31.00 | 6.2 | 5.61 | 0.40 | |
| 24 hr | 31.51 | 7.9 | 5.67 | 0.44 | |
| 40 hr | 32.27 | 10.6 | 5.76 | 0.51 | |
| 48 hr | 32.56 | 11.5 | 5.69 | 0.53 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.30 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | No change |
| | Steel | Purple |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 291-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.38 | | 3.32 | 0.03 | |
| 16 hr | 14.01 | 4.7 | 3.41 | 0.20 | |
| 24 hr | 14.27 | 6.7 | 3.44 | 0.36 | |
| 40 hr | 14.66 | 9.6 | 3.52 | 0.77 | |
| 48 hr | 14.72 | 10.0 | 3.55 | 1.11 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Orange-pink |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 291-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-8 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.24 | - | 3.26 | 0.23 | |
| 16 hr | 14.25 | 7.6 | 3.44 | 1.02 | |
| 24 hr | 14.41 | 8.8 | 3.47 | 1.19 | |
| 40 hr | 14.71 | 11.0 | 3.52 | 1.39 | |
| 48 hr | 14.81 | 11.9 | 3.53 | 1.50 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.12 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | L brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 291-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-13 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.47 | - | 3.22 | 0.10 | |
| 16 hr | 13.98 | 3.8 | 3.33 | 0.22 | |
| 24 hr | 14.27 | 5.9 | 3.37 | 0.34 | |
| 40 hr | 14.68 | 9.0 | 3.42 | 0.50 | |
| 48 hr | 14.77 | 9.7 | 3.45 | 0.59 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | -0.22 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L blue |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 291-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-769 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.04 | – | 3.75 | 0.04 | |
| 16 hr | 14.98 | −0.4 | 3.69 | 0.68 | |
| 24 hr | 14.98 | −0.4 | 3.71 | 0.85 | |
| 40 hr | 14.99 | −0.3 | 3.68 | 1.08 | |
| 48 hr | 14.93 | −0.7 | 3.67 | 1.20 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.10 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Peacock |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 291-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-770 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.03 | – | 3.75 | 0.04 | |
| 16 hr | 14.88 | −1.0 | 3.70 | 0.75 | |
| 24 hr | 14.99 | −0.3 | 3.71 | 0.91 | |
| 40 hr | 14.85 | −1.2 | 3.68 | 1.10 | |
| 48 hr | 14.84 | −1.3 | 3.66 | 1.26 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.10 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Peacock |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 291-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-771 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.01 | | 3.74 | 0.04 | |
| 16 hr | 15.08 | +0.5 | 3.73 | 0.70 | |
| 24 hr | 15.02 | +0.1 | 3.72 | 0.79 | |
| 40 hr | 14.97 | -0.3 | 3.64 | 1.03 | |
| 48 hr | 14.94 | -0.5 | 3.67 | 1.23 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.10 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Pink-brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 293-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-60-18 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.13 | — | 3.17 | 0.19 | |
| 7 days | 12.72 | 4.9 | 3.28 | 1.21 | |
| 14 days | 12.74 | 5.0 | 3.29 | 1.82 | |
| 21 days | 12.82 | 5.7 | 3.30 | 2.23 | |
| 26 days | 12.78 | 5.4 | 3.29 | 2.29 | 13 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +3.85 |
| | Ti | +2.35 |
| | Ag | +1.74 |
| | Steel | +2.31 |
| | Cu | +0.24 |
| | Mg | +2.23 |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown-black deposit |
| | Ti | Brown-black deposit |
| | Ag | Brown-black deposit |
| | Steel | Brown-black deposit |
| | Cu | Black-orange deposit |
| | Mg | Brown-black deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 293-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-12 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.79 | - | 3.52 | 0.25 | |
| 7 days | 14.68 | 6.4 | 3.68 | 1.46 | |
| 14 days | 14.58 | 5.7 | 3.67 | 2.13 | |
| 21 days | 14.62 | 6.0 | 3.68 | 2.55 | |
| 26 days | 14.60 | 5.9 | 3.65 | 2.78 | 9 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +3.06 |
| | Ti | +1.79 |
| | Ag | +1.16 |
| | Steel | +1.68 |
| | Cu | +0.30 |
| | Mg | +1.85 |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown-black deposit |
| | Ti | Brown-black deposit |
| | Ag | Brown-black deposit |
| | Steel | Brown-black deposit |
| | Cu | Brown-black deposit, L pitting |
| | Mg | Brown-black deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 293-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-18 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss wt % |
|---|---|---|---|---|---|
| Initial | 16.84 | - | 4.29 | 0.11 | |
| 7 days | 17.31 | 2.8 | 4.35 | 1.76 | |
| 14 days | 17.08 | 1.4 | 4.26 | 3.23 | |
| 21 days | 16.94 | 0.6 | 4.19 | 5.05 | |
| 26 days | 17.08 | 1.4 | 4.22 | 5.45 | 13 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.08 |
| | Ti | 0.00 |
| | Ag | −0.14 |
| | Steel | +0.06 |
| | Cu | 0.00 |
| | Mg | −0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Yellow |
| | Ag | Yellow |
| | Steel | Brown-yellow |
| | Cu | Black-orange |
| | Mg | Yellow-tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14 days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 293-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-11 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.41 | – | 4.30 | 0.16 | |
| 7 days | 15.93 | −2.9 | 4.18 | 0.28 | |
| 14 days | 45.77 | +179 | 7.58 | 37.3 | |
| 21 days | 161.2 | +982 | 17.33 | 53.6 | |
| 26 days | solid | – | | – | 27 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.02 |
| Ti | +0.02 |
| Ag | −0.10 |
| Steel | +0.02 |
| Cu | −1.54 |
| Mg | −11.5 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | Yellow-tan |
| Ti | Yellow-brown |
| Ag | L yellow |
| Steel | Green-purple-blue |
| Cu | L etching & pitting |
| Mg | H pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 10 days |
| 100°F vis | 10 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 293-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-769 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.04 | – | 3.75 | 0.04 | |
| 7 days | 15.28 | 1.6 | 3.77 | 0.79 | |
| 14 days | 15.35 | 2.1 | 3.76 | 1.20 | |
| 21 days | 15.60 | 3.7 | 3.82 | 1.68 | |
| 26 days | 15.66 | 4.1 | 3.80 | 1.54 | 13 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | −0.04 |
| Ag | −0.06 |
| Steel | 0.00 |
| Cu | −0.20 |
| Mg | −0.08 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | Pale blue |
| Ti | Blue |
| Ag | Purple |
| Steel | Blue-green |
| Cu | Very L etching |
| Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 293-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON K-1054[a] AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.29 | – | 4.18 | 0.16 | |
| 7 days | 16.24 | −0.3 | 4.11 | 1.26 | |
| 14 days | 15.98 | −1.9 | 4.02 | 1.93 | |
| 21 days | 15.74 | −3.4 | 3.92 | 3.35 | |
| 26 days | 16.23 | −0.4 | 3.91 | 9.39 | 9 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.04 |
| | Steel | −0.04 |
| | Cu | −0.34 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pale blue |
| | Ti | Pale green |
| | Ag | Yellow |
| | Steel | L green |
| | Cu | L etching |
| | Mg | L yellow-green |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 19 days |
| 100°F vis | 26 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1) of O-65-19 and O-65-21.

TEST NO. 294-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.50 | – | 5.08 | 0.07 | |
| 7 days | 31.22 | 13.5 | 5.51 | 0.30 | |
| 14 days | 32.10 | 16.7 | 5.62 | 0.33 | |
| 21 days | 32.74 | 19.1 | 5.69 | 0.42 | |
| 26 days | 32.93 | 19.7 | 5.71 | 0.42 | 10 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.08 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Green-blue |
| | Cu | Yellow-orange-purple |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 294-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-7 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.34 | – | 4.58 | 0.26 | |
| 7 days | 16.95 | −2.2 | 4.46 | 1.13 | |
| 14 days | 16.27 | −6.2 | 4.27 | 1.95 | |
| 21 days | 19.45 | +12.2 | 4.49 | 25.0 | |
| 26 days | (a) | – | – | – | 19 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −2.58 |
| | Mg | −0.59 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Yellow |
| | Ag | Yellow |
| | Steel | Brown-purple |
| | Cu | H etching |
| | Mg | Yellow-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14 days |
| 100°F vis | 16 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample soldified at 26 days.

TEST NO. 294-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-8 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.24 | – | 3.26 | 0.23 | |
| 7 days | 14.77 | 11.6 | 3.53 | 1.22 | |
| 14 days | 15.16 | 14.5 | 3.61 | 1.46 | |
| 21 days | 15.49 | 17.0 | 3.67 | 1.82 | |
| 26 days | 15.56 | 17.5 | 3.68 | 1.84 | 11 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.10 |
| | Steel | 0.00 |
| | Cu | −0.57 |
| | Mg | −0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 294-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-11 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | | 3.21 | 0.05 | |
| 7 days | 14.42 | 8.7 | 3.41 | 0.62 | |
| 14 days | 14.81 | 11.7 | 3.58 | 0.71 | |
| 21 days | 15.13 | 14.1 | 3.51 | 0.83 | |
| 26 days | 15.17 | 14.4 | 3.53 | 0.90 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.10 |
| | Steel | 0.00 |
| | Cu | -0.08 |
| | Mg | -0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Brown-yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 294-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-13 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.47 | - | 3.22 | 0.10 | |
| 7 days | 14.84 | 10.2 | 3.46 | 0.30 | |
| 14 days | 15.36 | 14.0 | 3.57 | 0.19 | |
| 21 days | 16.44 | 22.0 | 3.71 | 0.47 | |
| 26 days | 17.00 | 26.2 | 3.80 | 0.55 | 14 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.08 |
| | Steel | 0.00 |
| | Cu | -6.01 |
| | Mg | -0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue |
| | Cu | M etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 294-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-20 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.48 | – | 3.25 | 0.21 | |
| 7 days | 14.80 | 9.8 | 3.49 | 0.47 | |
| 14 days | 15.27 | 13.3 | 3.56 | 0.49 | |
| 21 days | 15.64 | 16.0 | 3.62 | 0.49 | |
| 26 days | 15.86 | 17.7 | 3.65 | 0.56 | 10 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.10 |
| | Steel | 0.00 |
| | Cu | −0.47 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown-purple |
| | Ag | L brown |
| | Steel | Blue-green-purple |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 295-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-19 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.49 | | 3.21 | 0.12 | |
| 16 hr | 12.90 | 3.3 | 3.28 | 0.68 | |
| 24 hr | 13.08 | 4.7 | 3.32 | 1.13 | |
| 40 hr | 13.32 | 6.6 | 3.35 | 2.06 | |
| 48 hr | 13.43 | 7.5 | 3.38 | 2.30 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.02 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Blue-green-purple |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 295-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-20 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.48 | – | 3.25 | 0.21 | |
| 16 hr | 14.26 | 5.8 | 3.38 | 0.39 | |
| 24 hr | 14.48 | 7.4 | 3.41 | 0.53 | |
| 40 hr | 14.67 | 8.8 | 3.44 | 0.73 | |
| 48 hr | 14.76 | 9.5 | 3.46 | 0.85 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | 0.00 |
| | Steel | +0.06 |
| | Cu | −0.06 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L tan |
| | Steel | Blue-green |
| | Cu | Brown-orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 295-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-21 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.92 | – | 3.15 | 0.14 | |
| 16 hr | 13.59 | 5.2 | 3.25 | 0.35 | |
| 24 hr | 13.82 | 7.0 | 3.29 | 0.54 | |
| 40 hr | 14.05 | 8.7 | 3.33 | 0.84 | |
| 48 hr | 14.10 | 9.1 | 3.35 | 0.92 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue-purple |
| | Cu | Yellow-orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 295-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON L-1129[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.96 | - | 3.74 | 0.05 | |
| 16 hr | 14.95 | −0.1 | 3.71 | 0.70 | |
| 24 hr | 15.00 | +0.3 | 3.72 | 0.80 | |
| 40 hr | 14.85 | −0.7 | 3.68 | 1.12 | |
| 48 hr | 14.80 | −1.1 | 3.66 | 1.28 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.14 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow-brown |
| | Steel | Blue |
| | Cu | Brown-purple |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1) of ATL-769 and ATL-771.

TEST NO. 295-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON L-1136[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.05 | -- | 4.13 | 0.17 | |
| 16 hr | 15.92 | −0.8 | 4.05 | 0.79 | |
| 24 hr | 15.78 | −1.7 | 4.03 | 0.89 | |
| 40 hr | 15.47 | −3.6 | 3.94 | 1.40 | |
| 48 hr | 15.15 | −5.6 | 3.84 | 2.04 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.08 |
| | Mg | −0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown-purple |
| | Mg | L gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 47 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1) of O-67-7 and O-67-9.

TEST NO. 296-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-60-18 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.12 | – | 3.19 | 0.20 | |
| 24 hr | 13.03 | 7.5 | 3.37 | 1.74 | |
| 40 hr | 13.01 | 7.3 | 3.33 | 2.54 | |
| 48 hr | 13.10 | 8.1 | 3.34 | 3.11 | |
| 64 hr | 15.74 | 29.9 | 3.74 | 15.73 | |
| 72 hr | 18.14 | 49.7 | 4.10 | 21.6 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.83 |
| | Ti | +0.37 |
| | Ag | +0.32 |
| | Steel | +0.34 |
| | Cu | −0.39 |
| | Mg | +0.32 |
| Metal discoloration, deposits, pitting, or etching: | Al | Dark brown deposit |
| | Ti | Dark brown deposit |
| | Ag | Dark brown deposit |
| | Steel | Dark brown deposit |
| | Cu | L pitting |
| | Mg | Dark brown deposit M pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 53 hr |
| 100°F vis | 54 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 296-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-12 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.79 | – | 3.52 | 0.25 | |
| 24 hr | 14.54 | 5.4 | 3.77 | 1.95 | |
| 40 hr | 14.69 | 6.5 | 3.68 | 2.52 | |
| 48 hr | 14.95 | 8.4 | 3.73 | 2.83 | |
| 64 hr | 14.95 | 8.4 | 3.72 | 4.07 | |
| 72 hr | 15.30 | 10.9 | 3.76 | 7.56 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.61 |
| | Ti | +0.37 |
| | Ag | +0.26 |
| | Steel | +0.30 |
| | Cu | −0.14 |
| | Mg | +0.36 |
| Metal discoloration, deposits, pitting, or etching: | Al | Dark brown deposit |
| | Ti | Dark brown deposit |
| | Ag | Dark brown deposit |
| | Steel | Dark brown deposit |
| | Cu | Black-orange |
| | Mg | Dark brown deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 60 hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 296-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-18 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.84 | – | 4.29 | 0.11 | |
| 24 hr | 16.96 | +0.7 | 4.24 | 2.04 | |
| 40 hr | 16.54 | −1.8 | 4.07 | 6.63 | |
| 48 hr | 17.65 | +4.8 | 4.22 | 11.66 | |
| 64 hr | 21.54 | +27.9 | 4.80 | 19.95 | |
| 72 hr | 24.56 | +45.8 | 5.36 | 23.4 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | +0.08 |
| | Cu | −1.22 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Yellow-green |
| | Ag | Yellow-green |
| | Steel | Brown-blue-purple |
| | Cu | L etching |
| | Mg | Yellow-brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 18 hr |
| 100°F vis | 43 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 296-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-24 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | – | 4.67 | 0.24 | |
| 24 hr | 16.87 | −4.7 | 4.38 | 1.80 | |
| 40 hr | 16.89 | −4.6 | 4.06 | 12.02 | |
| 48 hr | 18.47 | +4.3 | 4.32 | 16.73 | |
| 64 hr | 50.68 | +186 | 8.27 | 22.9 | |
| 72 hr | 273.6 | +1445 | 43.78 | 24.4 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | −1.74 |
| | Mg | −33.1 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Pale blue-brown |
| | Ag | L yellow |
| | Steel | Brown-blue |
| | Cu | L etching |
| | Mg | H etching & pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 30 hr |
| 100°F vis | 41 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 296-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 24 hr | 16.74 | −5.5 | 4.33 | 1.85 | |
| 40 hr | 15.71 | −11.3 | 3.99 | 6.89 | |
| 48 hr | 16.22 | −8.5 | 3.98 | 11.44 | |
| 64 hr | 18.54 | +4.6 | 4.45 | 18.65 | |
| 72 hr | 23.33 | +31.7 | 5.47 | 19.89 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −13.3 |
| | Mg | −1.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Pale blue |
| | Ag | L yellow |
| | Steel | Brown-blue-green |
| | Cu | M etching |
| | Mg | M etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 28 hr |
| 100°F vis | 56 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 297-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | |
| 24 hr | 15.25 | +0.9 | 3.75 | 1.49 | |
| 40 hr | 15.12 | +0.1 | 3.69 | 1.93 | |
| 48 hr | 14.98 | −0.9 | 3.63 | 2.41 | |
| 64 hr | 17.57 | +16.3 | 3.97 | 11.11 | |
| 72 hr | 19.72 | +30.5 | 4.29 | 16.22 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | −0.22 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue-purple |
| | Ag | Yellow |
| | Steel | Pale green |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 49 hr |
| 100°F vis | 54 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 297-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-11 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.41 | – | 4.30 | 0.16 | |
| 24 hr | 14.67 | -10.6 | 3.78 | 1.22 | |
| 40 hr | 17.18 | +4.7 | 4.01 | 10.45 | |
| 48 hr | 19.13 | +16.6 | 4.31 | 14.10 | |
| 64 hr | 23.95 | +45.9 | 4.99 | 20.0 | |
| 72 hr | 26.58 | +62.0 | 5.37 | 23.8 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | -0.22 |
| | Mg | -1.99 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Blue-purple |
| | Ag | Yellow |
| | Steel | Pale green |
| | Cu | L etching |
| | Mg | H etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 24 hr |
| 100°F vis | 30 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 297-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-20 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.48 | – | 3.25 | 0.21 | |
| 24 hr | 14.53 | 7.8 | 3.42 | 0.69 | |
| 40 hr | 14.72 | 9.2 | 3.45 | 0.85 | |
| 48 hr | 14.80 | 9.8 | 3.47 | 0.94 | |
| 64 hr | 15.07 | 11.8 | 3.51 | 1.20 | |
| 72 hr | 15.21 | 12.8 | 3.53 | 1.37 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | -0.02 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 297-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON K-1054[a] AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.29 | -- | 4.18 | 0.16 | |
| 24 hr | 15.93 | -2.2 | 4.05 | 1.59 | |
| 40 hr | 15.37 | -5.6 | 3.84 | 3.03 | |
| 48 hr | 15.69 | -3.7 | 3.85 | 8.39 | |
| 64 hr | 18.89 | +16.0 | 4.31 | 17.65 | |
| 72 hr | 21.04 | +29.2 | 4.65 | 21.8 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -1.08 |
| | Mg | -0.30 |
| Metal discoloration, deposits, pitting, or etching: | Al | Pale blue |
| | Ti | Blue |
| | Ag | Yellow |
| | Steel | L green |
| | Cu | M etching |
| | Mg | M etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 36 hr |
| 100°F vis | 52 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1) of O-65-19 and O-65-21.

TEST NO. 298-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-7727 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.67 | – | 3.30 | 0.16 | |
| 16 hr | 14.34 | 4.9 | 3.40 | 0.38 | |
| 24 hr | 14.48 | 5.9 | 3.43 | 0.46 | |
| 40 hr | 14.69 | 7.5 | 3.47 | 0.62 | |
| 48 hr | 14.82 | 8.4 | 3.49 | 0.83 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | -0.02 |
| | Ag | -0.04 |
| | Steel | -0.02 |
| | Cu | -0.12 |
| | Mg | -0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L tan |
| | Steel | Blue-purple |
| | Cu | Brown-orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.0 | |
| 16 hr | 27.07 | 11.6 | 4.37 | 0.10 | |
| 24 hr | 27.45 | 13.3 | 4.44 | 0.03 | |
| 40 hr | 28.48 | 17.6 | 4.51 | 0.04 | |
| 48 hr | 28.18 | 16.4 | 4.51 | 0.04 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.24 |
| | Ti | +0.12 |
| | Ag | -0.08 |
| | Steel | +0.34 |
| | Cu | -6.08 |
| | Mg | +0.79 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow-gray |
| | Ti | Gray-brown |
| | Ag | L brown-white |
| | Steel | Gray deposit |
| | Cu | H etching and pitting |
| | Mg | Brown deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.3 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.00 | |
| 16 hr | 27.14 | 12.1 | 4.37 | 0.08 | |
| 24 hr | 27.62 | 14.0 | 4.41 | 0.02 | |
| 40 hr | 28.52 | 17.8 | 4.46 | 0.06 | |
| 48 hr | 28.31 | 16.9 | 4.52 | 0.04 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.22 |
| | Ti | +0.14 |
| | Ag | -0.08 |
| | Steel | +0.36 |
| | Cu | -6.37 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Gray-brown |
| | Ag | Brown-white |
| | Steel | M etching |
| | Cu | M etching & H pitting |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.00 | |
| 16 hr | 27.17 | 12.2 | 4.37 | 0.10 | |
| 24 hr | 33.45 | 38.1 | 4.84 | 0.04 | |
| 40 hr | 34.62 | 42.9 | 4.95 | 0.08 | |
| 48 hr | 34.49 | 42.4 | 4.95 | 0.07 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.34 |
| | Ti | +0.16 |
| | Ag | +0.34 |
| | Steel | +0.45 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Gray-brown |
| | Ag | M etching & brown deposit |
| | Steel | M etching |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 477.0 | 34.5 | 14.40 | 0.08 | |
| 24 hr | 571.4 | 61.2 | 16.10 | 0.13 | |
| 40 hr | 973.1 | 174 | 20.68 | 0.29 | |
| 48 hr | 1308 | 269 | 23.87 | 0.22 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | -0.02 |
| | Ag | -0.34 |
| | Steel | +0.10 |
| | Cu | -1.00 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Brown |
| | Ag | M etching |
| | Steel | Brown |
| | Cu | M etching |
| | Mg | Yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 495.6 | 39.8 | 15.09 | 0.13 | |
| 24 hr | 686.9 | 93.8 | 17.52 | 0.25 | |
| 40 hr | 1423 | 301 | 24.86 | 0.40 | |
| 48 hr | 2131 | 501 | 30.23 | 0.49 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.16 |
| | Ti | +0.02 |
| | Ag | −0.37 |
| | Steel | +0.08 |
| | Cu | −0.81 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Brown |
| | Ag | L etching |
| | Steel | Black |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 461.4 | 30.1 | 14.51 | 0.16 | |
| 24 hr | 648.8 | 83.0 | 17.08 | 0.31 | |
| 40 hr | 1950 | 450 | 29.04 | 0.54 | |
| 48 hr | 4295 | 1111 | 40.08 | 0.63 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.08 |
| | Ti | +0.02 |
| | Ag | +0.34 |
| | Steel | +0.10 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow |
| | Ti | Blue-purple-yellow |
| | Ag | Brown deposit |
| | Steel | Black |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 391.1 | 9.4 | 13.52 | 0.03 | |
| 24 hr | 396.3 | 10.8 | 13.65 | 0.02 | |
| 40 hr | 409.5 | 14.5 | 13.81 | 0.03 | |
| 48 hr | 411.6 | 15.1 | 13.90 | 0.03 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.08 |
| | Ti | +0.10 |
| | Ag | −0.12 |
| | Steel | −0.02 |
| | Cu | −0.06 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Blue-purple |
| | Cu | Orange-brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-8. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 389.7 | 9.0 | 13.53 | 0.03 | |
| 24 hr | 396.1 | 10.8 | 13.70 | 0.00 | |
| 40 hr | 408.2 | 14.1 | 13.84 | 0.02 | |
| 48 hr | 411.4 | 15.0 | 13.91 | 0.02 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | −0.04 |
| | Ag | −0.10 |
| | Steel | +0.02 |
| | Cu | −0.14 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Blue-purple |
| | Cu | Orange-brown |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 300-9. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 389.7 | 9.0 | 13.55 | 0.03 | |
| 24 hr | 396.8 | 11.0 | 13.64 | 0.00 | |
| 40 hr | 407.9 | 14.1 | 13.88 | 0.02 | |
| 48 hr | 411.2 | 15.0 | 13.92 | 0.03 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | -0.04 |
| | Ag | -0.10 |
| | Steel | 0.00 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Blue-purple |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 302-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.00 | |
| 16 hr | 29.50 | 21.8 | 4.61 | 0.05 | |
| 24 hr | 31.00 | 28.0 | 4.75 | 0.04 | |
| 40 hr | 34.19 | 41.2 | 5.03 | 0.03 | |
| 48 hr | 33.59 | 38.7 | 5.01 | 0.03 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.28 |
| | Ti | +0.08 |
| | Ag | -0.36 |
| | Steel | +0.63 |
| | Cu | -6.19 |
| | Mg | +1.01 |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow deposit |
| | Ti | Brown |
| | Ag | L etching |
| | Steel | Gray deposit |
| | Cu | H pitting & L etching |
| | Mg | Gray deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 302-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.00 | |
| 16 hr | 28.95 | 19.5 | 4.57 | 0.03 | |
| 24 hr | 30.59 | 26.3 | 4.71 | 0.06 | |
| 40 hr | 33.38 | 37.8 | 4.97 | 0.05 | |
| 48 hr | 33.54 | 38.5 | 5.00 | 0.03 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.36 |
| | Ti | +0.12 |
| | Ag | −0.49 |
| | Steel | +0.61 |
| | Cu | −5.70 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Yellow deposit |
| | Ti | Brown |
| | Ag | L etching |
| | Steel | Gray deposit |
| | Cu | H pitting & L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 302-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT [illegible]

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | [illegible] Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | – | 4.07 | 0.00 | |
| 16 hr | 29.04 | 19.9 | 4.55 | 0.05 | |
| 24 hr | 30.65 | 26.5 | 4.69 | 0.05 | |
| 40 hr | 33.71 | 39.2 | 4.96 | 0.07 | |
| 48 hr | 33.90 | 40.0 | 4.99 | 0.07 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.34 |
| | Ti | +0.22 |
| | Ag | −0.26 |
| | Steel | +0.85 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Brown deposit |
| | Ag | L etching |
| | Steel | Brown deposit |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 302-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 413.4 | 15.6 | 13.87 | 0.02 | |
| 24 hr | 431.2 | 20.6 | 14.13 | 0.03 | |
| 40 hr | 471.3 | 31.8 | 14.68 | 0.03 | |
| 48 hr | 492.8 | 37.8 | 14.97 | 0.00 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.08 |
| | Ti | −0.06 |
| | Ag | −0.08 |
| | Steel | +0.06 |
| | Cu | +0.10 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Pale blue |
| | Cu | H var |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 302-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 411.8 | 15.2 | 13.87 | 0.01 | |
| 24 hr | 430.5 | 20.4 | 14.08 | 0.02 | |
| 40 hr | 471.5 | 31.9 | 14.68 | 0.03 | |
| 48 hr | 491.2 | 37.4 | 14.99 | 0.00 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | +0.04 |
| | Ag | −0.12 |
| | Steel | +0.10 |
| | Cu | +0.12 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Pale blue |
| | Cu | H var |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 302-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 414.9 | 16.0 | 13.94 | 0.04 | |
| 24 hr | 434.8 | 21.6 | 14.18 | 0.03 | |
| 40 hr | 481.6 | 34.7 | 14.84 | 0.03 | |
| 48 hr | 510.2 | 42.7 | 15.26 | 0.06 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.04 |
| | Ti | -0.04 |
| | Ag | -0.08 |
| | Steel | +0.06 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Brown-yellow |
| | Ag | Yellow |
| | Steel | Pale blue |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 303-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ALO-716-P625893 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.50 | | 3.61 | 3.29 | |
| 16 hr | 14.87 | 2.6 | 3.69 | 3.96 | |
| 24 hr | 14.97 | 3.2 | 3.69 | 3.70 | |
| 40 hr | 15.07 | 3.9 | 3.73 | 4.15 | |
| 48 hr | 15.82 | 9.1 | 3.82 | 8.39 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.08 |
| | Ti | +0.04 |
| | Ag | +0.04 |
| | Steel | +0.02 |
| | Cu | -0.43 |
| | Mg | -0.45 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-tan |
| | Ag | L yellow |
| | Steel | L blue-yellow |
| | Cu | L etching |
| | Mg | L etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.6 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 37 hr |
| 100°F vis | 46 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 303-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ALO-7-7-P628985 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.91 | – | 3.47 | 1.57 | |
| 16 hr | 14.37 | 3.3 | 3.53 | 2.29 | |
| 24 hr | 14.47 | 4.0 | 3.55 | 2.35 | |
| 40 hr | 14.62 | 5.1 | 3.58 | 2.57 | |
| 48 hr | 14.79 | 6.3 | 3.61 | 3.75 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | +0.04 |
| | Ag | +0.04 |
| | Steel | −0.02 |
| | Cu | −0.45 |
| | Mg | −0.18 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow-tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L tan |
| | Mg | L etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 46 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 303-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ALO-718-F622807 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.33 | – | 3.48 | 0.68 | |
| 16 hr | 13.47 | 1.1 | 3.50 | 1.40 | |
| 24 hr | 13.61 | 2.1 | 3.52 | 1.67 | |
| 40 hr | 16.12 | 20.9 | 3.89 | 14.35 | |
| 48 hr | 18.07 | 35.6 | 4.21 | 21.1 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | +0.04 |
| | Ag | +0.04 |
| | Steel | +0.04 |
| | Cu | −1.18 |
| | Mg | −0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 28 hr |
| 100°F vis | 30 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 304-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 680°F[a]

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | - | 4.07 | 0.00 | |
| 16 hr | 34.36 | 41.9 | 5.07 | 0.02 | |
| 24 hr | 41.98 | 73.3 | 5.62 | 0.02 | |
| 40 hr | 57.77 | 138 | 6.61 | 0.04 | |
| 48 hr | 62.13 | 156 | 6.93 | 0.01 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.18 |
| | Ti | +0.16 |
| | Ag | −0.97 |
| | Steel | +0.77 |
| | Cu | −5.50 |
| | Mg | +1.22 |
| Metal discoloration, deposits, pitting, or etching: | Al | Green |
| | Ti | Gray |
| | Ag | M etching |
| | Steel | Gray deposit |
| | Cu | H pitting & L etching |
| | Mg | Black deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 680 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample temperature dropped to 670°F at 16 hr and held thereafter due to violent refluxing.

TEST NO. 304-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 680°F[a]

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | - | 4.07 | 0.00 | |
| 16 hr | 33.17 | 37.0 | 4.99 | 0.03 | |
| 24 hr | 35.97 | 48.5 | 5.[illegible] | 0.03 | |
| 40 hr | 43.39 | 79.2 | 5.76 | 0.02 | |
| 48 hr | 45.24 | 86.8 | 5.90 | 0.01 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.24 |
| | Ti | +0.10 |
| | Ag | −0.75 |
| | Steel | +0.69 |
| | Cu | −5.34 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | Green deposit |
| | Ti | Gray |
| | Ag | M etching |
| | Steel | Gray deposit |
| | Cu | H pitting & L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 680 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample temperature dropped to 670°F at 16 hr and held thereafter due to violent refluxing.

TEST NO. 304-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 680°F[a]

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.22 | | 4.07 | 0.00 | |
| 16 hr | 33.47 | 38.2 | 4.90 | 0.06 | |
| 24 hr | 36.36 | 50.1 | 5.19 | 0.05 | |
| 40 hr | 50.38 | 108 | 6.16 | 0.06 | |
| 48 hr | 54.13 | 124 | 6.43 | 0.03 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.28 |
| | Ti | +0.12 |
| | Ag | -0.77 |
| | Steel | +0.77 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Gray-green deposit |
| | Ti | Gray |
| | Ag | M etching |
| | Steel | Gray deposit |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | L carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 680 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample temperature dropped to 670°F at 16 hr and held thereafter due to violent refluxing.

TEST NO. 304-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 680°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 493.3 | 38.0 | 14.92 | 0.01 | |
| 24 hr | 589.8 | 64.9 | 16.12 | 0.03 | |
| 40 hr | 1016 | 184 | 20.46 | 0.08 | |
| 48 hr | 1438 | 302 | 23.67 | 0.10 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | -0.02 |
| | Ag | -0.14 |
| | Steel | +0.06 |
| | Cu | -0.12 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | No change |
| | Mg | Red-black |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 680 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NC 304-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 680°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 499.9 | 39.8 | 15.01 | 0.01 | |
| 24 hr | 600.2 | 67.8 | 16.21 | 0.02 | |
| 40 hr | 1023 | 186 | 20.35 | 0.02 | |
| 48 hr | 1395 | 290 | 23.27 | 0.09 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | −0.06 |
| | Ag | −0.18 |
| | Steel | +0.10 |
| | Cu | −0.24 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.3 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 680 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 304-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 680°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 527.2 | 47.4 | 15.39 | 0.00 | |
| 24 hr | 704.3 | 97.0 | 17.43 | 0.06 | |
| 40 hr | 1850 | 417 | 26.80 | 0.16 | |
| 48 hr | 3896 | 989 | 36.13 | 0.19 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | −0.02 |
| | Ag | −0.16 |
| | Steel | 0.08 |
| | Cu | – |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | – |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 680 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 305-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-14 AT 365°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.71 | – | 4.67 | 0.24 | |
| 7 days | 23.19 | 30.9 | 5.05 | 32.2 | |
| 8 days | 93.69 | 429 | 15.36 | 34.0 | |
| 9 days | 312.3 | 1663 | 36.48 | 33.3 | 13 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.08 |
| | Ag | +0.02 |
| | Steel | +0.08 |
| | Cu | −0.53 |
| | Mg | −0.32 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-green |
| | Ag | Yellow |
| | Steel | Red-green |
| | Cu | L pitting & M etching |
| | Mg | M pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | H var & L carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | <7 days |
| 100°F vis | 1 day |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 365 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 305-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-19 AT 365°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.72 | – | 4.67 | 0.25 | |
| 7 days | 19.32 | 9.0 | 4.46 | 23.0 | |
| 8 days | 24.82 | 40.1 | 5.61 | 27.0 | |
| 9 days | 113.3 | 539 | 15.45 | 25.3 | |
| 10 days | 113.2 | 539 | 19.94 | 22.7 | |
| 11 days | 81.99 | 563 | 17.98 | 20.4 | 14 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −1.62 |
| | Mg | −0.41 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow-green |
| | Ag | Yellow |
| | Steel | Yellow |
| | Cu | M pitting |
| | Mg | L pitting & M etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M & H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | <7 days |
| 100°F vis | 4 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 365 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 305-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-7 AT 365°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.34 | – | 4.58 | 0.26 | |
| 7 days | 19.52 | 12.6 | 4.48 | 23.5 | |
| 8 days | 31.72 | 82.9 | 6.79 | 32.0 | |
| 9 days | 330.8 | 1808 | 27.81 | 34.6 | |
| 10 days | 238.4 | 1275 | 29.50 | 32.4 | 16 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | +0.08 |
| | Ag | −0.10 |
| | Steel | 0.00 |
| | Cu | −0.97 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L green |
| | Ti | Green |
| | Ag | Yellow |
| | Steel | L red |
| | Cu | L pitting & M etching |
| | Mg | L tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | – |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M & H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | <7 days |
| 100°F vis | 4 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 365 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 305-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 365°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | – | 3.69 | 0.04 | |
| 7 days | 14.88 | 0.1 | 3.63 | 2.40 | |
| 8 days | 14.94 | 0.5 | 3.66 | 2.31 | |
| 9 days | 15.08 | 1.4 | 3.69 | 2.18 | |
| 10 days | 15.12 | 1.7 | 3.67 | 2.04 | |
| 11 days | 15.08 | 1.4 | 3.69 | 1.80 | |
| 14 days | 15.13 | 1.7 | 3.68 | 1.72 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | +0.04 |
| | Ag | −0.04 |
| | Steel | −0.02 |
| | Cu | −0.24 |
| | Mg | −0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | L orange |
| | Steel | Green |
| | Cu | M etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14+ days |
| 100°F vis | 14+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 365 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 305-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-11 AT 365°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | – | 3.21 | 0.05 | |
| 7 days | 14.84 | 11.9 | 3.47 | 0.99 | |
| 8 days | 14.75 | 11.2 | 3.46 | 0.83 | |
| 9 days | 14.69 | 10.8 | 3.45 | 0.86 | |
| 10 days | 14.65 | 10.5 | 3.44 | 0.86 | |
| 11 days | 14.57 | 9.9 | 3.45 | 0.87 | |
| 14 days | 14.82 | 11.8 | 3.47 | 1.03 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.04 |
| | Ti | 0.00 |
| | Ag | −0.06 |
| | Steel | −0.02 |
| | Cu | −0.02 |
| | Mg | +0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Green |
| | Cu | Yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14+ days |
| 100°F vis | 14+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 365 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 305-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-20 AT 365°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.48 | – | 3.25 | 0.21 | |
| 7 days | 15.13 | 12.2 | 3.52 | 0.92 | |
| 8 days | 15.07 | 11.8 | 3.52 | 0.76 | |
| 9 days | 15.04 | 11.6 | 3.51 | 0.74 | |
| 10 days | 15.06 | 11.7 | 3.51 | 0.71 | |
| 11 days | 14.98 | 11.1 | 3.50 | 0.71 | |
| 14 days | 15.24 | 13.1 | 3.54 | 0.78 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.02 |
| | Ag | −0.06 |
| | Steel | −0.04 |
| | Cu | −3.33 |
| | Mg | +0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Tan |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | L etching & H pitting |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 14+ days |
| 100°F vis | 14+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 365 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 306-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 498.7 | 40.7 | 15.06 | 0.24 | |
| 24 hr | 674.8 | 90.4 | 17.35 | 0.30 | |
| 40 hr | 1413 | 299 | 24.70 | 0.48 | |
| 48 hr | 2167 | 511 | 30.32 | 0.49 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | -0.04 |
| | Ag | -0.28 |
| | Steel | +0.16 |
| | Cu | -0.24 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow |
| | Ag | L etching |
| | Steel | Black |
| | Cu | L pitting |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 306-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 481.1 | 35.7 | 14.86 | 0.22 | |
| 24 hr | 638.2 | 80.0 | 16.95 | 0.83 | |
| 40 hr | 1261 | 256 | 23.80 | 0.48 | |
| 48 hr | 1974 | 457 | 29.01 | 0.50 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | -0.06 |
| | Ag | -0.30 |
| | Steel | +0.20 |
| | Cu | +1.08 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Yellow |
| | Ag | L etching |
| | Steel | Black deposit |
| | Cu | L pitting & gray deposit |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 306-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 389.0 | 8.8 | 13.53 | 0.03 | |
| 24 hr | 395.5 | 10.6 | 13.64 | 0.00 | |
| 40 hr | 408.7 | 14.3 | 13.82 | 0.00 | |
| 48 hr | 415.4 | 16.2 | 13.92 | 0.03 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.06 |
| | Steel | +0.06 |
| | Cu | +1.38 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | Gray deposit |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 306-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 390.0 | 9.1 | 13.48 | 0.02 | |
| 24 hr | 396.8 | 11.0 | 13.60 | 0.11 | |
| 40 hr | 409.8 | 14.6 | 13.70 | 0.00 | |
| 48 hr | 415.8 | 16.3 | 13.90 | 0.04 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.06 |
| | Steel | 0.00 |
| | Cu | +1.81 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | Gray deposit |
| | Mg | Tan |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 307-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-19 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.49 | – | 3.21 | 0.12 | |
| 16 hr | 12.95 | 3.7 | 3.29 | 0.85 | |
| 24 hr | 13.11 | 5.0 | 3.32 | 1.37 | |
| 40 hr | 13.34 | 6.8 | 3.37 | 2.08 | |
| 48 hr | 13.47 | 7.8 | 3.40 | 2.56 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | +0.04 |
| | Steel | −0.04 |
| | Cu | +1.44 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | No change |
| | Ag | L yellow |
| | Steel | Yellow-green |
| | Cu | Orange deposit |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 307-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-20 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.48 | - | 3.25 | 0.21 | |
| 16 hr | 14.28 | 5.9 | 3.37 | 0.42 | |
| 24 hr | 14.43 | 7.0 | 3.40 | 0.56 | |
| 40 hr | 14.63 | 8.5 | 3.44 | 0.80 | |
| 48 hr | 14.73 | 9.3 | 3.46 | 0.91 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | +0.04 |
| | Ti | +0.06 |
| | Ag | +0.04 |
| | Steel | −0.04 |
| | Cu | +1.50 |
| | Mg | −0.08 |
| Metal discoloration, deposits, pitting, or etching. | Al | No change |
| | Ti | L tan |
| | Ag | L brown |
| | Steel | Blue |
| | Cu | Tan deposit |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 307-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-24 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.04 | – | 3.47 | 0.24 | |
| 16 hr | 13.18 | 1.1 | 3.44 | 1.46 | |
| 24 hr | 13.22 | 1.4 | 3.43 | 1.54 | |
| 40 hr | 13.22 | 1.4 | 3.44 | 2.19 | |
| 48 hr | 13.28 | 1.8 | 3.45 | 2.50 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.06 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | +3.23 |
| | Cu | +1.76 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | No change |
| | Ag | L brown |
| | Steel | L tan deposit |
| | Cu | Black deposit |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 307-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-68-1 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.29 | – | 3.21 | 0.00 | |
| 16 hr | 13.81 | 3.9 | 3.30 | 0.21 | |
| 24 hr | 14.06 | 5.8 | 3.34 | 0.39 | |
| 40 hr | 14.25 | 7.2 | 3.37 | 0.66 | |
| 48 hr | 14.38 | 8.2 | 3.39 | 0.79 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.08 |
| | Ti | +0.06 |
| | Ag | −0.02 |
| | Steel | +2.82 |
| | Cu | +2.29 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L yellow |
| | Steel | Purple deposit |
| | Cu | Orange deposit |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 308-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-805 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.62 | – | 3.76 | 0.41 | |
| 16 hr | 15.06 | 3.0 | 3.83 | 1.65 | |
| 24 hr | 15.16 | 3.7 | 3.83 | 1.96 | |
| 40 hr | 15.26 | 4.4 | 3.84 | 2.82 | |
| 48 hr | 15.46 | 5.7 | 3.89 | 3.99 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | −0.06 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | +1.44 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L yellow |
| | Ag | Yellow |
| | Steel | Green |
| | Cu | Brown deposit |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 1.0 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 45 hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 308-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-806 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.27 | – | 3.54 | 0.45 | |
| 16 hr | 14.55 | 2.0 | 3.59 | 1.03 | |
| 24 hr | 14.58 | 2.2 | 3.60 | 1.39 | |
| 40 hr | 14.87 | 4.2 | 3.60 | 2.74 | |
| 48 hr | 16.31 | 14.3 | 3.83 | 9.00 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | 0.00 |
| | Cu | −0.08 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 36 hr |
| 100°F vis | 42 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 308-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-807 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.78 | – | 3.59 | 0.34 | |
| 16 hr | 14.04 | 1.9 | 3.63 | 1.19 | |
| 24 hr | 14.00 | 1.6 | 3.60 | 1.43 | |
| 40 hr | 15.21 | 10.4 | 3.78 | 9.41 | |
| 48 hr | 16.66 | 20.9 | 4.01 | 15.79 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | 0.00 |
| | Cu | −0.75 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | M pitting |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 28 hr |
| 100°F vis | 38 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 308-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-808 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.38 | – | 3.39 | 0.39 | |
| 16 hr | 13.69 | 2.3 | 3.42 | 0.98 | |
| 24 hr | 13.76 | 2.8 | 3.44 | 1.12 | |
| 40 hr | 13.88 | 3.7 | 3.46 | 1.74 | |
| 48 hr | 15.19 | 13.5 | 3.65 | 7.68 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.06 |
| | Steel | +0.02 |
| | Cu | +1.89 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown deposit |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 43 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 308-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-809 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.37 | – | 3.35 | 0.36 | |
| 16 hr | 13.69 | 2.4 | 3.41 | 0.99 | |
| 24 hr | 13.76 | 2.9 | 3.43 | 1.13 | |
| 40 hr | 13.91 | 4.0 | 3.45 | 1.67 | |
| 48 hr | 15.19 | 13.6 | 3.64 | 7.05 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | +0.06 |
| | Cu | +2.47 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | Brown deposit |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 43 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 308-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-810 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.89 | – | 3.65 | 0.32 | |
| 16 hr | 14.08 | 1.4 | 3.67 | 0.98 | |
| 24 hr | 14.13 | 1.7 | 3.66 | 1.16 | |
| 40 hr | 15.10 | 8.7 | 3.79 | 9.21 | |
| 48 hr | 16.39 | 18.0 | 3.98 | 15.87 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | 0.00 |
| | Ag | −0.08 |
| | Steel | +0.12 |
| | Cu | −0.83 |
| | Mg | −0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | M pitting |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 30 hr |
| 100°F vis | 40 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 308-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-7725 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.67 | - | 3.54 | 0.50 | |
| 16 hr | 13.87 | 1.5 | 3.56 | 1.00 | |
| 24 hr | 14.24 | 4.2 | 3.58 | 3.34 | |
| 40 hr | 17.69 | 29.4 | 4.12 | 16.86 | |
| 48 hr | 19.79 | 44.8 | 4.46 | 22.5 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.04 |
| | Ti | 0.00 |
| | Ag | -0.04 |
| | Steel | +0.04 |
| | Cu | -1.97 |
| | Mg | -0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | M pitting & L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 17 hr |
| 100°F vis | 28 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 309-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | - | 12.88 | 0.00 | |
| 16 hr | 1,173 | 231 | 22.09 | 0.19 | |
| 24 hr | 2,788 | 686 | 32.94 | 0.40 | |
| 40 hr | 26,106 | 7,264 | 93.80 | 0.40 | |
| 48 hr | 147,438 | 41,490 | 220.0 | 0.38 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | -0.47 |
| | Steel | +0.16 |
| | Cu | -0.34 |
| | Mg | +0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | L etching |
| | Steel | Black |
| | Cu | L etching |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | - |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 309-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 1,085 | 206 | 21.26 | 0.25 | |
| 24 hr | 2,346 | 562 | 38.38 | 0.24 | |
| 40 hr | 15,175 | 4,181 | 73.04 | 0.32 | |
| 48 hr | 58,334 | 16,355 | 142.0 | 0.35 | 4 |

**Metal Specimen Data**

| Weight change, mg/cm² | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.67 |
| | Steel | +0.20 |
| | Cu | -0.83 |
| | Mg | -0.22 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | Blue |
| | Ag | L etching |
| | Steel | Black deposit |
| | Cu | L pitting & etching |
| | Mg | L etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | – |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 309-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 16 hr | 412.3 | 15.3 | 13.84 | 0.04 | |
| 24 hr | 430.0 | 20.2 | 14.09 | 0.02 | |
| 40 hr | 463.5 | 29.6 | 14.53 | 0.04 | |
| 48 hr | 482.4 | 34.9 | 14.87 | 0.00 | 4 |

**Metal Specimen Data**

| Weight change, mg/cm² | | |
|---|---|---|
| | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.14 |
| | Steel | +0.16 |
| | Cu | +0.24 |
| | Mg | +0.04 |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | L brown |
| | Ag | Yellow |
| | Steel | Gray |
| | Cu | Black deposit |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 309-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 412.2 | 15.3 | 13.84 | 0.04 | |
| 24 hr | 430.4 | 20.4 | 14.08 | 0.07 | |
| 40 hr | 466.0 | 30.3 | 14.55 | 0.02 | |
| 48 hr | 486.0 | 35.9 | 14.88 | 0.01 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | -0.08 |
| | Steel | +0.20 |
| | Cu | +0.16 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | Yellow. |
| | Steel | Gray deposit |
| | Cu | Black |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 309-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON M-1041[a] AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss wt % |
|---|---|---|---|---|---|
| Initial | 71.34 | – | 6.88 | 0.09 | |
| 16 hr | 98.64 | 38.3 | 8.03 | 0.07 | |
| 24 hr | 112.1 | 57.1 | 8.54 | 0.12 | |
| 40 hr | 145.5 | 104 | 9.66 | 0.18 | |
| 48 hr | 164.1 | 130 | 10.23 | 0.14 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | +0.04 |
| | Ti | +0.02 |
| | Ag | -0.26 |
| | Steel | -0.45 |
| | Cu | -4.42 |
| | Mg | -0.37 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L etching |
| | Steel | L etching |
| | Cu | M pitting & L etching |
| | Mg | L etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.8 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1) of O-64-20 and O-67-1.

TEST 310-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON M-1041[a] AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 71.34 | | 6.88 | 0.09 | |
| 16 hr | 80.87 | 13.4 | 7.27 | 0.00 | |
| 24 hr | 82.90 | 16.2 | 7.34 | 0.02 | |
| 40 hr | 85.30 | 19.6 | 7.47 | 0.03 | |
| 48 hr | 86.50 | 21.2 | 7.53 | 0.02 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | -0.02 |
| | Ag | -0.34 |
| | Steel | -0.16 |
| | Cu | -4.85 |
| | Mg | -0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Yellow |
| | Ag | L pitting |
| | Steel | Black |
| | Cu | L pitting & H etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1) of O-64-20 and O-67-1.

TEST NO. 312-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.41 | – | 5.04 | 0.10 | |
| 24 hr | 30.75 | 12.2 | 5.43 | 0.52 | |
| 40 hr | 31.36 | 14.4 | 5.52 | 0.67 | |
| 48 hr | 31.68 | 15.6 | 5.55 | 0.54 | |
| 64 hr | 32.23 | 17.6 | 5.65 | 0.59 | |
| 72 hr | 32.51 | 18.6 | 5.65 | 0.55 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.04 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Blue-red |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 312-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-3 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.77 | – | 3.13 | 0.24 | |
| 24 hr | 13.70 | 7.3 | 3.27 | 1.28 | |
| 40 hr | 13.93 | 9.1 | 3.31 | 1.28 | |
| 48 hr | 14.02 | 9.8 | 3.32 | 1.19 | |
| 64 hr | 14.19 | 11.1 | 3.36 | 1.38 | |
| 72 hr | 14.24 | 11.5 | 3.36 | 1.81 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | +0.10 |
| | Mg | −0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 312-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-7 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 17.34 | – | 4.58 | 0.26 | |
| 24 hr | 16.50 | −4.8 | 4.32 | 1.76 | |
| 40 hr | 15.65 | −9.8 | 3.90 | 10.19 | |
| 48 hr | 17.17 | −1.0 | 4.10 | 16.02 | |
| 64 hr | 24.83 | +43.1 | 5.57 | 26.2 | |
| 72 hr | 162.1 | +835 | 37.50 | 31.0 | 10 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −3.65 |
| | Mg | −14.4 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L green |
| | Ag | Yellow |
| | Steel | Green |
| | Cu | M etching |
| | Mg | H pitting & etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var & L carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 19 hr |
| 100°F vis | 41 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 312-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | – | 3.69 | 0.04 | |
| 24 hr | 14.82 | −0.3 | 3.66 | 1.37 | |
| 40 hr | 14.65 | −1.5 | 3.63 | 1.63 | |
| 48 hr | 14.59 | −1.9 | 3.58 | 2.74 | |
| 64 hr | 17.47 | +17.5 | 3.97 | 12.28 | |
| 72 hr | 19.57 | +31.6 | 4.29 | 16.98 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | +0.04 |
| | Ag | −0.06 |
| | Steel | −0.04 |
| | Cu | −0.47 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Purple |
| | Ag | Yellow |
| | Steel | Blue |
| | Cu | L pitting |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M & H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 44 hr |
| 100°F vis | 53 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 312-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-11 AT 329°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | – | 3.21 | 0.05 | |
| 24 hr | 14.24 | 7.4 | 3.36 | 0.95 | |
| 40 hr | 14.48 | 9.2 | 3.42 | 1.23 | |
| 48 hr | 14.61 | 10.2 | 3.41 | 1.31 | |
| 64 hr | 14.88 | 12.2 | 3.48 | 1.48 | |
| 72 hr | 15.01 | 13.2 | 3.50 | 1.84 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | -0.02 |
| | Steel | 0.00 |
| | Cu | -0.02 |
| | Mg | -0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | No change |
| | Steel | Green |
| | Cu | Yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 312-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-21 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.92 | – | 3.15 | 0.14 | |
| 24 hr | 13.96 | 8.0 | 3.32 | 0.80 | |
| 40 hr | 14.13 | 9.4 | 3.33 | 1.28 | |
| 48 hr | 14.24 | 10.2 | 3.36 | 1.55 | |
| 64 hr | 14.41 | 11.5 | 3.38 | 1.25 | |
| 72 hr | 14.49 | 12.2 | 3.41 | 1.57 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.08 |
| | Ag | −0.04 |
| | Steel | 0.00 |
| | Cu | −0.06 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | No change |
| | Steel | Blue-green |
| | Cu | Yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 312-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-24 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.04 | – | 3.47 | 0.24 | |
| 24 hr | 13.22 | 1.4 | 3.44 | 2.27 | |
| 40 hr | 13.29 | 1.9 | 3.44 | 2.87 | |
| 48 hr | 13.70 | 5.1 | 3.47 | 6.34 | |
| 64 hr | 17.74 | 36.0 | 4.06 | 23.9 | |
| 72 hr | 20.82 | 59.7 | 4.51 | 33.3 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | −0.06 |
| | Ag | −0.10 |
| | Steel | 0.00 |
| | Cu | −0.30 |
| | Mg | −3.83 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L brown |
| | Steel | Purple |
| | Cu | L etching |
| | Mg | M pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 40 hr |
| 100°F vis | 53 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 312-8. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-68-1 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.29 | – | 3.21 | 0.00 | |
| 24 hr | 14.17 | 6.6 | 3.36 | 0.62 | |
| 40 hr | 14.43 | 8.5 | 3.39 | 0.80 | |
| 48 hr | 14.54 | 9.4 | 3.41 | 0.83 | |
| 64 hr | 14.71 | 10.7 | 3.44 | 0.99 | |
| 72 hr | 14.78 | 11.2 | 3.45 | 1.29 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | −0.02 |
| | Ag | −0.04 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Purple-yellow |
| | Cu | Red-green |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 313-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-20 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 24.27 | | 4.08 | 0.10 | |
| 72 hr | 30.93 | 27.4 | 4.71 | 0.11 | |
| 120 hr | 35.95 | 48.1 | 5.11 | 0.09 | |
| 168 hr | 40.37 | 66.3 | 5.43 | 0.09 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.14 |
| | Ti | +0.06 |
| | Ag | −5.38 |
| | Steel | −0.06 |
| | Cu | −27.4 |
| | Mg | |
| Metal discoloration, deposits pitting, or etching: | Al | Brown |
| | Ti | L yellow-blue |
| | Ag | M etching |
| | Steel | Green-red |
| | Cu | H etching & pitting |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 314-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.41 | | 5.04 | 0.10 | |
| 24 hr | 31.11 | 13.5 | 5.48 | 0.63 | |
| 40 hr | 32.01 | 16.8 | 5.58 | 0.63 | |
| 48 hr | 32.35 | 18.0 | 5.62 | 0.71 | |
| 64 hr | 33.11 | 20.8 | 5.72 | 0.74 | |
| 72 hr | 33.52 | 22.3 | 5.76 | 1.01 | 4 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | 0.00 |
| Ag | +0.04 |
| Steel | +0.06 |
| Cu | 0.00 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | L yellow |
| Steel | Blue-green |
| Cu | Orange |
| Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 314-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-12 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.79 | | 3.52 | 0.25 | |
| 24 hr | 14.88 | 7.9 | 3.71 | 2.74 | |
| 40 hr | 14.95 | 8.4 | 3.72 | 3.60 | |
| 48 hr | 15.22 | 10.4 | 3.77 | 5.13 | |
| 64 hr | 18.59 | 34.8 | 4.18 | 15.91 | |
| 72 hr | 21.21 | 53.8 | 4.63 | 20.5 | 4 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | +0.63 |
| Ti | +0.41 |
| Ag | +0.36 |
| Steel | +0.37 |
| Cu | −0.67 |
| Mg | +0.41 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | Black-brown deposit |
| Ti | Black-brown deposit |
| Ag | Black-brown deposit |
| Steel | Black-brown deposit |
| Cu | L etching |
| Mg | Black-brown deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | H var |
| | At and above oil level | H var & L carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 41 hr |
| 100°F vis | 52 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 314-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | – | 3.76 | 0.07 | |
| 24 hr | 15.11 | 0.0 | 3.69 | 1.95 | |
| 40 hr | 15.72 | 4.0 | 3.68 | 7.55 | |
| 48 hr | 17.41 | 15.2 | 3.91 | 10.98 | |
| 64 hr | 22.10 | 46.3 | 4.66 | 17.80 | |
| 72 hr | 24.95 | 65.1 | 5.08 | 21.7 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | −0.36 |
| | Mg | −0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | L yellow |
| | Steel | Green |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 18 hr |
| 100°F vis | 40 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TES[illegible] RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-3 AT 401°F

| | [illegible] F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 2.77 | – | 3.13 | 0.24 | |
| 24 hr | 13.82 | 8.2 | 3.30 | 1.35 | |
| 40 hr | 14.11 | 10.5 | 3.34 | 1.72 | |
| 48 hr | 14.25 | 11.6 | 3.36 | 1.73 | |
| 64 hr | 16.53 | 29.4 | 3.68 | 6.02 | |
| 72 hr | 19.12 | 49.7 | 4.02 | 10.58 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.04 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.08 |
| | Cu | +0.06 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | No change |
| | Ag | L yellow |
| | Steel | Brown |
| | Cu | Orange-brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 56 hr |
| 100°F vis | 56 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 314-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | – | 3.69 | 0.4 | |
| 24 hr | 14.75 | −0.8 | 3.63 | 1.68 | |
| 40 hr | 15.44 | +3.8 | 3.65 | 7.58 | |
| 48 hr | 17.24 | +15.9 | 3.93 | 12.57 | |
| 64 hr | 22.57 | +51.8 | 4.74 | 19.08 | |
| 72 hr | 25.87 | +74.0 | 5.26 | 22.6 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | −0.59 |
| | Mg | −0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | L yellow |
| | Steel | Green |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L & M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 33 hr |
| 100°F vis | 40 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 314-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-11 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | – | 3.21 | 0.05 | |
| 24 hr | 14.42 | 8.7 | 3.38 | 1.32 | |
| 40 hr | 14.77 | 11.4 | 3.45 | 1.32 | |
| 48 hr | 15.02 | 13.3 | 3.49 | 2.12 | |
| 64 hr | 19.84 | 49.6 | 4.13 | 9.46 | |
| 72 hr | 22.90 | 72.7 | 4.53 | 11.88 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | −0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | No change |
| | Ag | L yellow |
| | Steel | Yellow |
| | Cu | Yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 46 hr |
| 100°F vis | 54 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 314-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-20 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.48 | – | 3.25 | 0.21 | |
| 24 hr | 14.69 | 9.0 | 3.39 | 1.01 | |
| 40 hr | 15.00 | 11.3 | 3.49 | 1.59 | |
| 48 hr | 15.22 | 12.9 | 3.49 | 1.64 | |
| 64 hr | 16.58 | 23.0 | 3.70 | 4.47 | |
| 72 hr | 18.61 | 38.1 | 4.00 | 9.03 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.04 |
| | Steel | +0.04 |
| | Cu | −0.18 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 55 hr |
| 100°F vis | 61 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 314-8. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-68-1 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.29 | – | 3.21 | 0.00 | |
| 24 hr | 14.41 | 8.4 | 3.37 | 0.84 | |
| 40 hr | 14.66 | 10.3 | 3.43 | 1.26 | |
| 48 hr | 14.83 | 11.6 | 3.45 | 1.44 | |
| 64 hr | 15.23 | 14.6 | 3.51 | 1.77 | |
| 72 hr | 15.84 | 19.2 | 3.60 | 3.61 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.06 |
| | Steel | +0.12 |
| | Cu | −0.10 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Red-yellow |
| | Cu | Red-green |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 65 hr |
| 100°F vis | 71 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 315-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON M-1051[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.81 | -- | 3.38 | 0.08 | |
| 16 hr | 14.29 | 3.5 | 3.47 | 0.42 | |
| 24 hr | 14.41 | 4.3 | 3.47 | 0.52 | |
| 40 hr | 14.51 | 5.1 | 3.49 | 0.69 | |
| 48 hr | 14.55 | 5.4 | 3.50 | 0.85 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | -0.04 |
| | Mg | -0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Yellow-orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1:1) of O-67-9, O-67-11, and O-67-20.

TEST NO. 315-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON M-1052[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No. mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.58 | -- | 3.41 | 0.16 | |
| 16 hr | 14.02 | 3.2 | 3.46 | 0.49 | |
| 24 hr | 14.06 | 3.5 | 3.44 | 0.70 | |
| 40 hr | 14.20 | 4.6 | 3.47 | 1.17 | |
| 48 hr | 14.24 | 4.9 | 3.45 | 1.46 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.18 |
| | Mg | -0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | L brown |
| | Steel | Purple |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits. | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1:1:1) of O-67-9, O-67-11, O-67-20, and O-67-24.

TEST NO. 315-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON M-1053[a] AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.71 | – | 3.34 | 0.12 | |
| 16 hr | 14.28 | 4.2 | 3.44 | 0.32 | |
| 24 hr | 14.36 | 4.7 | 3.44 | 0.43 | |
| 40 hr | 14.50 | 5.8 | 3.39 | 0.62 | |
| 48 hr | 14.57 | 6.3 | 3.47 | 0.82 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | -0.02 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | -0.10 |
| | Mg | -0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L tan |
| | Ag | No change |
| | Steel | Blue |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1:1:1) of O-67-9, O-67-11, O-67-20, and O-68-1.

TEST NO. 316-1. RESULT OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 644°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 1,023 | 189 | 21.10 | 0.16 | |
| 24 hr | 2,179 | 515 | 28.95 | 0.26 | |
| 40 hr | 12,468 | 3517 | 66.55 | (a) | |
| 48 hr | Semisolid | – | 121.1 | 0.34 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | -0.04 |
| | Ag | -0.67 |
| | Steel | +0.02 |
| | Cu | -1.52 |
| | Mg | -0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | L etching |
| | Steel | Black |
| | Cu | L etching |
| | Mg | Gray |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 644 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Sample lost in handling.

TEST NO. 317-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-62-25 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.56 | – | 3.52 | 0.06 | |
| 16 hr | 17.03 | 9.4 | 3.74 | 1.18 | |
| 24 hr | 18.40 | 18.3 | 3.88 | 2.81 | |
| 40 hr | 22.57 | 45.1 | 4.51 | 7.20 | |
| 48 hr | 25.36 | 63.0 | 4.89 | 11.60 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.12 |
| | Ti | +0.08 |
| | Ag | +0.08 |
| | Steel | +0.02 |
| | Cu | -1.05 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Yellow-green |
| | Cu | L pitting |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 317-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-61-17 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.69 | | 3.57 | 0.04 | |
| 16 hr | 17.62 | 12.3 | 3.84 | 0.83 | |
| 24 hr | 18.00 | 14.7 | 3.89 | 0.99 | |
| 40 hr | 18.84 | 20.1 | 4.01 | 2.13 | |
| 48 hr | 19.87 | 26.6 | 4.17 | 4.93 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.06 |
| | Ti | 0.00 |
| | Ag | +0.18 |
| | Steel | +0.18 |
| | Cu | -0.24 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L pitting |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 317-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-33 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss wt % |
|---|---|---|---|---|---|
| Initial | 18.12 | | 4.09 | 0.14 | |
| 16 hr | 19.01 | 4.9 | 4.09 | 2.18 | |
| 24 hr | 19.96 | 10.2 | 4.20 | 3.03 | |
| 40 hr | 23.27 | 28.4 | 4.64 | 5.97 | |
| 48 hr | 26.28 | 45.0 | 5.06 | 10.00 | 15 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.16 |
| | Ti | +0.08 |
| | Ag | +0.24 |
| | Steel | +0.16 |
| | Cu | -13.5 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L gray deposit |
| | Steel | Blue-green |
| | Cu | L pitting & H etching |
| | Mg | - |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 317-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-1 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs 210°F | Neut. No. mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 25.48 | | 5.06 | 0.14 | |
| 16 hr | 33.21 | 30.3 | 6.01 | 1.99 | |
| 24 hr | 36.99 | 45.2 | 6.46 | 2.14 | |
| 40 hr | 48.02 | 88.5 | 7.75 | 3.67 | |
| 48 hr | 56.40 | 121 | 8.69 | 5.54 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.18 |
| | Ti | 0.04 |
| | Ag | +0.14 |
| | Steel | +0.16 |
| | Cu | -6.25 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue |
| | Cu | L etching & pitting |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L & M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 317-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.50 | -- | 5.08 | 0.07 | |
| 16 hr | 31.47 | 14.4 | 5.54 | 0.94 | |
| 24 hr | 32.44 | 18.0 | 5.65 | 1.29 | |
| 40 hr | 34.74 | 26.3 | 5.90 | 2.40 | |
| 48 hr | 36.49 | 32.7 | 6.10 | 4.28 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.14 |
| | Ti | -0.06 |
| | Ag | +0.16 |
| | Steel | +0.12 |
| | Cu | -0.14 |
| | Mg | - |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Green |
| | Cu | Orange |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 317-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-7 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 74.74 | -- | 6.03 | 0.25 | |
| 16 hr | 91.97 | 23.1 | 6.79 | 0.90 | |
| 24 hr | 101.1 | 35.3 | 7.09 | 0.99 | |
| 40 hr | 137.8 | 84.4 | 8.77 | 2.25 | |
| 48 hr | 231.4 | 210 | 10.87 | 3.86 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.06 |
| | Ti | +0.12 |
| | Ag | +0.16 |
| | Steel | +0.14 |
| | Cu | -5.54 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue |
| | Cu | L pitting & etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 317-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-13 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 28.43 | - | 5.32 | 0.28 | |
| 16 hr | 31.00 | 9.0 | 5.68 | 0.51 | |
| 24 hr | 31.89 | 12.2 | 5.78 | 0.83 | |
| 40 hr | 34.73 | 22.2 | 6.13 | 3.07 | |
| 48 hr | 36.38 | 28.0 | 6.33 | 7.51 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.12 |
| | Ag | -0.10 |
| | Steel | +0.12 |
| | Cu | -2.17 |
| | Mg | - |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L green |
| | Ag | Brown |
| | Steel | Blue-green |
| | Cu | M etching |
| | Mg | - |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 317-8. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-16 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 26.69 | | 5.13 | 0.20 | |
| 16 hr | 30.53 | 14.4 | 5.57 | 1.48 | |
| 24 hr | 31.46 | 17.9 | 5.69 | 1.87 | |
| 40 hr | 33.72 | 26.3 | 5.95 | 3.23 | |
| 48 hr | 35.30 | 32.30 | 6.14 | 5.80 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.08 |
| | Ag | +0.16 |
| | Steel | +0.08 |
| | Cu | +0.10 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching | Al | No change |
| | Ti | L brown |
| | Ag | L brown |
| | Steel | Yellow-green |
| | Cu | Orange |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 318-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-719 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.38 | | 4.00 | 5.86 | |
| 16 hr | 16.58 | 1.2 | 4.02 | 5.98 | |
| 24 hr | 16.59 | 1.3 | 4.04 | 7.05 | |
| 40 hr | 18.12 | 10.6 | 4.19 | 14.81 | |
| 48 hr | 19.64 | 19.9 | 4.41 | 19.54 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.14 |
| | Ti | +0.08 |
| | Ag | +0.14 |
| | Steel | +0.18 |
| | Cu | −0.75 |
| | Mg | +0.18 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | Yellow-brown |
| | Ag | L yellow |
| | Steel | Purple |
| | Cu | L pitting |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 20 hr |
| 100°F vis | 36 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 318-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-720 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.26 | | 3.39 | 0.38 | |
| 16 hr | 13.53 | 2.0 | 3.43 | 0.84 | |
| 24 hr | 13.56 | 2.3 | 3.44 | 1.10 | |
| 40 hr | 14.78 | 11.5 | 3.62 | 7.16 | |
| 48 hr | 16.60 | 25.2 | 3.90 | 14.08 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm². | Al | +0.16 |
| | Ti | +0.16 |
| | Ag | +0.08 |
| | Steel | 0.00 |
| | Cu | −0.51 |
| | Mg | +0.16 |
| Metal discoloration, deposits, pitting, or etching | Al | L brown |
| | Ti | Yellow-brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no | 29 hr |
| 100°F vis | 38 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 318-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-753 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No. mg KOH/g | Oil Loss, wt |
|---|---|---|---|---|---|
| Initial | 14.02 | | 3.50 | 3.57 | |
| 16 hr | 14.38 | 2.6 | 3.52 | 2.95 | |
| 24 hr | 14.52 | 3.6 | 3.54 | 3.13 | |
| 40 hr | 14.64 | 4.4 | 3.57 | 3.48 | |
| 48 hr | 14.70 | 4.9 | 3.57 | 3.44 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | +0.18 |
| | Ti | +0.16 |
| | Ag | +0.10 |
| | Steel | +0.06 |
| | Cu | −0.18 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | Yellow-brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 318-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-753 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.73 | | 3.48 | 0.23 | |
| 16 hr | 14.14 | 3.0 | 3.48 | 0.71 | |
| 24 hr | 14.17 | 3.2 | 3.48 | 0.95 | |
| 40 hr | 14.24 | 3.7 | 3.46 | 1.33 | |
| 48 hr | 14.25 | 3.8 | 3.50 | 1.39 | 1 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | +0.16 |
| | Ti | +0.12 |
| | Ag | +0.16 |
| | Steel | +0.12 |
| | Cu | −0.20 |
| | Mg | +0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | Yellow-brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 319-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-16 AT 428°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 28.33 | | 5.31 | 0.14 | |
| 16 hr | 31.52 | 11.3 | 5.75 | 0.93 | |
| 24 hr | 32.30 | 14.0 | 5.85 | 1.16 | |
| 40 hr | 33.75 | 19.1 | 6.03 | 2.09 | |
| 48 hr | 34.84 | 23.0 | 6.15 | 2.51 | 5 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 | Sludge in oil: | 200-mesh filter | None |
| | Ti | 0.00 | | Centrifuge, vol % | None |
| | Ag | +0.06 | | | |
| | Steel | 0.02 | Tube deposits: | Below oil level | None |
| | Cu | -0.20 | | At and above oil level | L & M var |
| | Mg | | | | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | **Test Conditions** | | |
| | Ti | L brown | Sample temperature, °F | 428 | |
| | Ag | L brown | Sample volume, ml | 200 | |
| | Steel | Green | Air rate, liter/hr | 10 | |
| | Cu | L etching | Condensate return | Yes | |
| | Mg | | | | |

TEST NO. 319-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-14 AT 428°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 26.21 | | 4.95 | 0.00 | |
| 16 hr | 29.76 | 13.5 | 5.51 | 1.23 | |
| 24 hr | 30.76 | 17.4 | 5.64 | 1.75 | |
| 40 hr | 33.51 | 27.9 | 5.97 | 4.37 | |
| 48 hr | 35.35 | 34.9 | 6.15 | 6.09 | 5 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 | Sludge in oil: | 200-mesh filter | None |
| | Ti | 0.04 | | Centrifuge, vol % | None |
| | Ag | +0.05 | | | |
| | Steel | 0.04 | Tube deposits: | Below oil level | None |
| | Cu | 0.37 | | At and above oil level | L var |
| | Mg | | | | |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown | **Test Conditions** | | |
| | Ti | L brown | Sample temperature, °F | 428 | |
| | Ag | L brown | Sample volume, ml | 200 | |
| | Steel | L purple | Air rate, liter/hr | 10 | |
| | Cu | L etching | Condensate return | Yes | |
| | Mg | | | | |

TEST NO. 319-3. RESULTS OF REFLUX OXIDATION CORROSION TEST ON O-66-15 AT 428°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss wt % |
|---|---|---|---|---|---|
| Initial | 28.61 | | 5.36 | 0.14 | |
| 16 hr | 32.24 | 12.7 | 5.80 | 0.86 | |
| 24 hr | 33.03 | 15.4 | 5.90 | 1.07 | |
| 40 hr | 34.69 | 21.3 | 6.09 | 1.96 | |
| 48 hr | 36.00 | 25.8 | 6.23 | 2.29 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | -0.04 |
| | Ti | +0.04 |
| | Ag | +0.06 |
| | Steel | -0.02 |
| | Cu | -0.41 |
| | Mg | ... |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | L green |
| | Cu | L etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L & M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 319-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-16 AT 428°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 25.98 | | 5.02 | 0.01 | |
| 16 hr | 29.93 | 15.2 | 5.51 | 1.40 | |
| 24 hr | 31.05 | 19.5 | 5.65 | 1.81 | |
| 40 hr | 34.34 | 32.2 | 6.04 | 4.64 | |
| 48 hr | 37.00 | 42.4 | 6.35 | 6.62 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | +0.10 |
| | Ag | +0.06 |
| | Steel | 0.00 |
| | Cu | -0.61 |
| | Mg | |
| Metal discoloration deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Yellow-green |
| | Cu | L etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 319-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-4 AT 428°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 29.19 | | 5.51 | 0.10 | |
| 16 hr | 32.16 | 10.2 | 5.73 | 1.12 | |
| 24 hr | 33.12 | 13.5 | 5.83 | 3.04 | |
| 40 hr | 36.34 | 24.5 | 6.20 | 4.43 | |
| 48 hr | 39.06 | 33.8 | 6.47 | 8.11 | 3 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 | Sludge in oil: | 200-mesh filter | None |
| | Ti | +0.10 | | Centrifuge, vol % | None |
| | Ag | 0.06 | | | |
| | Steel | 0.00 | Tube deposits: | Below oil level | None |
| | Cu | 0.39 | | At and above oil level | L var |
| | Mg | | | | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | Test Conditions | | |
| | Ti | L brown | Sample temperature, °F | | 428 |
| | Ag | No change | Sample volume, ml | | 200 |
| | Steel | Blue | Air rate, liter/hr | | 10 |
| | Cu | L etching | Condensate return | | Yes |
| | Mg | | | | |

TEST NO. 319-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-405 AT 428°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 34.45 | | 6.31 | 0.09 | |
| 16 hr | 36.85 | 7.0 | 6.45 | 0.63 | |
| 24 hr | 36.96 | 7.3 | 6.43 | 1.14 | |
| 40 hr | 37.45 | 8.7 | 6.44 | 2.03 | |
| 48 hr | 37.84 | 9.8 | 6.47 | 3.20 | 4 |

| Metal Specimen Data | | | Test Cell Data | | |
|---|---|---|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 | Sludge in oil: | 200-mesh filter | Trace |
| | Ti | +0.10 | | Centrifuge, vol % | None |
| | Ag | 0.00 | | | |
| | Steel | 0.00 | Tube deposits: | Below oil level | L var |
| | Cu | 0.22 | | At and above oil level | L var |
| | Mg | | | | |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown | Test Conditions | | |
| | Ti | Brown | Sample temperature, °F | | 428 |
| | Ag | L brown | Sample volume, ml | | 200 |
| | Steel | Yellow-green | Air rate, liter/hr | | 10 |
| | Cu | L pitting | Condensate return | | Yes |
| | Mg | | | | |

TEST NO. 319-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1005 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 41.84 | | 6.75 | 0.11 | |
| 16 hr | 45.38 | 8.5 | 7.21 | 0.35 | |
| 24 hr | 46.29 | 10.6 | 7.29 | 0.47 | |
| 40 hr | 48.65 | 16.3 | 7.52 | 0.51 | |
| 48 hr | 50.11 | 19.8 | 7.65 | 1.07 | 8 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | 0.02 |
| | Ti | +0.06 |
| | Ag | +0.04 |
| | Steel | −0.12 |
| | Cu | −1.91 |
| | Mg | |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | L brown |
| | Ti | L brown |
| | Ag | L brown |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None' |
| | Centrifuge, vol % | 1.5 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 319-8. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-63-1002 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 46.75 | | 8.18 | 0.16 | |
| 16 hr | 52.82 | 13.0 | 8.70 | 1.72 | |
| 24 hr | 57.52 | 23.0 | 9.19 | 2.77 | |
| 40 hr | 69.57 | 48.8 | 10.48 | 3.36 | |
| 48 hr | 77.86 | 66.5 | 11.36 | 4.50 | 7 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | −0.04 |
| | Ti | +0.04 |
| | Ag | 0.02 |
| | Steel | 0.04 |
| | Cu | 8.68 |
| | Mg | |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Blue |
| | Cu | M pitting |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 320-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-1 AT 464°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 25.48 | | 5.06 | 0.14 | |
| 16 hr | 34.13 | 33.9 | 6.14 | 2.47 | |
| 24 hr | 39.53 | 55.1 | 6.81 | 3.63 | |
| 40 hr | 64.62 | 154 | 9.67 | 6.85 | |
| 48 hr | 104.1 | 309 | 13.65 | 7.93 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.06 |
| | Steel | 0.12 |
| | Cu | 7.26 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | No change |
| | Steel | Green |
| | Cu | L etching & M pitting |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 464 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 320-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-17 AT 464°F

| | Vis. cs/100°F | 100°F Vis Increase, % | Vis. cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 28.37 | | 5.29 | 0.33 | |
| 16 hr | 33.21 | 17.1 | 5.91 | 0.94 | |
| 24 hr | 34.90 | 23.0 | 6.12 | 1.27 | |
| 40 hr | 37.93 | 33.7 | 6.50 | 2.05 | |
| 48 hr | 39.31 | 38.6 | 6.69 | 3.18 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm² | Al | +0.16 |
| | Ti | +0.06 |
| | Ag | 0.02 |
| | Steel | +0.04 |
| | Cu | 0.34 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching. | Al | Brown |
| | Ti | Brown |
| | Ag | Yellow-orange |
| | Steel | Brown |
| | Cu | L etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 1.0 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 464 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 320-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1005 AT 464°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 41.84 | | 6.75 | 0.11 | |
| 16 hr | 62.19 | 48.6 | 9.38 | 1.61 | |
| 24 hr | 74.37 | 77.7 | 10.94 | 1.51 | |
| 40 hr | 109.4 | 161 | 15.18 | 1.22 | |
| 48 hr | 141.6 | 238 | 19.81 | 1.48 | 8 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | +0.02 |
| | Ti | -0.02 |
| | Ag | 0.00 |
| | Steel | -7.24 |
| | Cu | -0.85 |
| | Mg | |

| Metal discoloration, deposits pitting, or etching: | | |
|---|---|---|
| | Al | Black-brown |
| | Ti | L yellow |
| | Ag | Yellow-black |
| | Steel | L etching & M pitting |
| | Cu | L etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 6.8 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 464 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 320-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-63-1002 AT 464°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 46.75 | | 8.18 | 0.16 | |
| 16 hr | 56.40 | 20.6 | 9.09 | 2.46 | |
| 24 hr | 64.94 | 38.9 | 10.01 | 2.88 | |
| 40 hr | 96.46 | 106 | 13.38 | 4.93 | |
| 48 hr | 138.0 | 195 | 17.41 | 6.24 | 8 |

**Metal Specimen Data**

| Weight change, mg/cm² : | | |
|---|---|---|
| | Al | +0.04 |
| | Ti | -0.08 |
| | Ag | -0.06 |
| | Steel | 0.00 |
| | Cu | -8.22 |
| | Mg | – |

| Metal discoloration, deposits, pitting, or etching: | | |
|---|---|---|
| | Al | No change |
| | Ti | L yellow |
| | Ag | No change |
| | Steel | Green-brown |
| | Cu | L etching & M pitting |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 464 |
| Sample volume, ml | 200 |
| Air rate liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 321-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-17 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 28.37 | | 5.29 | 0.33 | |
| 72 hr | 36.70 | 29.4 | 6.36 | 1.02 | |
| 120 hr | 42.19 | 48.7 | 6.98 | 2.10 | |
| 168 hr | 66.97 | 136 | 10.15 | 5.05 | 11 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | -0.14 |
| | Steel | -0.02 |
| | Cu | -20.9 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L green |
| | Ag | L yellow |
| | Steel | Brown |
| | Cu | M etching & H pitting |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L & M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 321-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1005 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 41.84 | | 6.75 | 0.11 | |
| 72 hr | 55.66 | 33.0 | 8.25 | 0.48 | |
| 120 hr | 86.42 | 107 | 12.41 | 0.35 | |
| 168 hr | 88.68 | 112 | 12.53 | 0.45 | 18 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.06 |
| | Ti | 0.00 |
| | Ag | 0.04 |
| | Steel | -0.41 |
| | Cu | -7.73 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L brown |
| | Ag | Yellow-brown |
| | Steel | L pitting |
| | Cu | L pitting & M etching |
| | Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 1.6 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 322-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-17 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 28.37 | | 5.29 | 0.33 | |
| 16 hr | 32.00 | 12.8 | 5.76 | 0.64 | |
| 24 hr | 33.13 | 16.8 | 5.90 | 0.62 | |
| 40 hr | 34.52 | 21.7 | 6.09 | 0.64 | |
| 48 hr | 35.16 | 23.9 | 6.16 | 0.86 | 5 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | +0.02 |
| Ag | 0.00 |
| Steel | 0.04 |
| Cu | 0.55 |
| Mg | |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | L yellow |
| Ti | L brown |
| Ag | L yellow |
| Steel | Blue-purple |
| Cu | L pitting & etching |
| Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 322-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-63-1002 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 46.75 | | 8.18 | 0.16 | |
| 16 hr | 53.77 | 15.0 | 8.79 | 1.65 | |
| 24 hr | 58.88 | 25.9 | 9.35 | 2.06 | |
| 40 hr | 71.54 | 53.0 | 10.69 | 2.68 | |
| 48 hr | 80.84 | 72.9 | 11.63 | 3.80 | 6 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.04 |
| Ti | 0.00 |
| Ag | 0.00 |
| Steel | 0.06 |
| Cu | 8.34 |
| Mg | |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | No change |
| Steel | Blue |
| Cu | H pitting |
| Mg | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 323-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-814 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.45 | | 3.37 | 0.23 | |
| 16 hr | 14.21 | 5.7 | 3.49 | 0.28 | |
| 24 hr | 14.49 | 7.7 | 3.54 | 0.79 | |
| 40 hr | 16.61 | 23.5 | 3.84 | 7.19 | |
| 48 hr | 18.61 | 38.4 | 4.02 | 11.36 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm². | Al | 0.00 |
| | Ti | +0.06 |
| | Ag | −0.02 |
| | Steel | 0.00 |
| | Cu | −0.63 |
| | Mg | −0.08 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | White |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 25 hr |
| 100°F vis | 32 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 323-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-825 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.08 | | 3.56 | 4.26 | |
| 16 hr | 14.35 | 1.9 | 3.61 | 4.89 | |
| 24 hr | 14.47 | 2.8 | 3.63 | 5.39 | |
| 40 hr | 16.24 | 15.3 | 3.86 | 15.41 | |
| 48 hr | 17.69 | 25.6 | 4.18 | 20.4 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | −0.10 |
| | Steel | −0.04 |
| | Cu | −0.43 |
| | Mg | −0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | No change |
| | Ag | L yellow |
| | Steel | L brown |
| | Cu | L etching |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 25 hr |
| 100°F vis | 34 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 324-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-3 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.77 | | 3.13 | 0.24 | |
| 7 days | 14.02 | 9.8 | 3.35 | 0.68 | |
| 14 days | 14.48 | 13.4 | 3.40 | 0.79 | |
| 21 days | 14.77 | 15.7 | 3.45 | 0.67 | |
| 26 days | 14.86 | 16.4 | 3.48 | 0.74 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | −0.12 |
| | Steel | 0.00 |
| | Cu | +0.12 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | Brown |
| | Cu | Gold |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 324-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | | 3.69 | 0.04 | |
| 7 days | 15.19 | 2.2 | 3.75 | 0.88 | |
| 14 days | 15.07 | 1.3 | 3.71 | 1.23 | |
| 21 days | 15.09 | 1.5 | 3.71 | 1.50 | |
| 26 days | 15.72 | 5.7 | 3.96 | 2.25 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | −0.08 |
| | Steel | −0.02 |
| | Cu | −0.10 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | L blue |
| | Steel | L green |
| | Cu | Brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 324-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-21 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.92 | | 3.15 | 0.14 | |
| 7 days | 14.32 | 10.8 | 3.38 | 0.62 | |
| 14 days | 14.63 | 13.2 | 3.43 | 0.75 | |
| 21 days | 14.89 | 15.2 | 3.46 | 0.77 | |
| 26 days | 15.04 | 16.4 | 3.47 | 0.95 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.02 |
| | Ag | 0.00 |
| | Steel | −0.02 |
| | Cu | −0.02 |
| | Mg | −0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 324-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-24 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss wt % |
|---|---|---|---|---|---|
| Initial | 13.04 | | 3.47 | 0.24 | |
| 7 days | 13.29 | 1.9 | 3.47 | 1.65 | |
| 14 days | 13.31 | 2.1 | 3.44 | 2.64 | |
| 21 days | 19.08 | 46.3 | 4.26 | 27.6 | |
| 26 days | 36.08 | 177 | 6.48 | 60.3 | 15 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.08 |
| | Ag | −0.12 |
| | Steel | 0.00 |
| | Cu | −0.63 |
| | Mg | −5.38 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | L brown |
| | Cu | L etching |
| | Mg | H pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 13 days |
| 100°F vis | 17 days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 324-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-68-2 AT 347°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.29 | | 3.21 | 0.00 | |
| 7 days | 14.56 | 9.6 | 3.41 | 0.45 | |
| 14 days | 14.99 | 12.8 | 3.47 | 0.47 | |
| 21 days | 15.36 | 15.6 | 3.55 | 0.58 | |
| 26 days | 15.45 | 16.3 | 3.55 | 0.80 | 9 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | −0.02 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | +0.02 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Green |
| | Cu | Orange |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26+ days |
| 100°F vis | 26+ days |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 347 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 325-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-60-18 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.13 | | 3.17 | 0.19 | |
| 24 hr | 12.72 | 4.9 | 3.29 | 1.41 | |
| 40 hr | 12.74 | 5.0 | 3.32 | 1.94 | |
| 48 hr | 13.00 | 7.2 | 3.33 | 2.02 | |
| 64 hr | 13.05 | 7.6 | 3.33 | 3.08 | |
| 72 hr | 13.32 | 9.8 | 3.37 | 6.29 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.20 |
| | Ti | +0.26 |
| | Ag | +0.20 |
| | Steel | +0.22 |
| | Cu | −0.36 |
| | Mg | +0.22 |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Brown deposit |
| | Ag | Brown deposit |
| | Steel | Brown deposit |
| | Cu | L pitting |
| | Mg | Brown deposit |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.2 |
| Tube deposits: | Below oil level | L & M var |
| | At and above oil level | M & H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 61 hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 325-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-12 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.80 | - | 3.52 | 0.53 | |
| 24 hr | 14.64 | 6.1 | 3.66 | 1.59 | |
| 40 hr | 14.51 | 5.1 | 3.67 | 1.94 | |
| 48 hr | 14.82 | 7.4 | 3.70 | 2.13 | |
| 64 hr | 14.87 | 7.8 | 3.71 | 2.62 | |
| 72 hr | 14.69 | 6.4 | 3.67 | 3.07 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.26 |
| | Ti | +0.14 |
| | Ag | +0.16 |
| | Steel | +0.20 |
| | Cu | -0.04 |
| | Mg | +0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Brown |
| | Ag | Brown |
| | Steel | Brown deposit |
| | Cu | Brown |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.02 |
| Tube deposits: | Below oil level | M & H var |
| | At and above oil level | H var & L carbon |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 325-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-21 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 15.11 | | 3.76 | 0.07 | |
| 24 hr | 15.27 | 1.1 | 3.71 | 1.24 | |
| 40 hr | 15.16 | 0.3 | 3.70 | 1.44 | |
| 48 hr | 15.22 | 0.7 | 3.71 | 1.42 | |
| 64 hr | 15.69 | 3.8 | 3.67 | 5.64 | |
| 72 hr | 17.23 | 14.0 | 3.91 | 10.14 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | -0.02 |
| | Ti | -0.04 |
| | Ag | +0.04 |
| | Steel | +0.04 |
| | Cu | -0.20 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Purple-yellow |
| | Ag | L yellow |
| | Steel | Green |
| | Cu | L etching |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L & M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 56 hr |
| 100°F vis | 65 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 325-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-66-11 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.41 | – | 4.30 | 0.16 | |
| 24 hr | 15.90 | −3.1 | 4.15 | 0.29 | |
| 40 hr | 16.24 | −1.0 | 3.88 | 8.68 | |
| 48 hr | 18.82 | +14.7 | 4.25 | 12.28 | |
| 64 hr | 25.15 | +53.3 | 5.10 | 19.08 | |
| 72 hr | 28.74 | +75.1 | 5.61 | 23.3 | 8 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | −0.02 |
| | Ag | +0.06 |
| | Steel | −0.04 |
| | Cu | −0.26 |
| | Mg | −2.50 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L blue |
| | Ag | L yellow |
| | Steel | Green-yellow |
| | Cu | L etching |
| | Mg | L pitting & H etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 24 hr |
| 100°F vis | 40 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 325-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-3 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.77 | – | 3.13 | 0.24 | |
| 24 hr | 13.64 | 6.8 | 3.26 | 0.77 | |
| 40 hr | 13.83 | 8.3 | 3.30 | 0.98 | |
| 48 hr | 13.86 | 8.5 | 3.30 | 1.00 | |
| 64 hr | 14.08 | 10.3 | 3.32 | 1.20 | |
| 72 hr | 14.10 | 10.4 | 3.33 | 1.35 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | −0.06 |
| | Cu | +0.10 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Blue-green |
| | Cu | Gold |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 325-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-9 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.87 | – | 3.69 | 0.04 | |
| 24 hr | 14.96 | +0.6 | 3.70 | 0.97 | |
| 40 hr | 14.84 | –0.7 | 3.67 | 1.23 | |
| 48 hr | 14.77 | –0.7 | 3.55 | 1.30 | |
| 64 hr | 15.02 | +1.0 | 3.51 | 4.95 | |
| 72 hr | 16.82 | +13.1 | 3.85 | 10.90 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | –0.06 |
| | Ti | –0.04 |
| | Ag | +0.02 |
| | Steel | –0.02 |
| | Cu | –0.20 |
| | Mg | –0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | Purple |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L & M var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 55 hr |
| 100°F vis | 66 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 325-7. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-24 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.04 | | 3.47 | 0.24 | |
| 24 hr | 13.19 | 1.2 | 3.45 | 1.69 | |
| 40 hr | 13.24 | 1.5 | 3.45 | 2.03 | |
| 48 hr | 13.23 | 1.5 | 3.52 | 2.26 | |
| 64 hr | 13.88 | 6.4 | 3.52 | 6.50 | |
| 72 hr | 15.42 | 18.3 | 3.71 | 16.08 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | –0.02 |
| | Ti | –0.08 |
| | Ag | –0.02 |
| | Steel | –0.02 |
| | Cu | –0.12 |
| | Mg | –0.24 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L brown |
| | Steel | L yellow |
| | Cu | L brown |
| | Mg | M etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 5[illegible] hr |
| 100°F vis | 64 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 326-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-64-2 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 27.50 | – | 5.08 | 0.07 | |
| 24 hr | 30.71 | 11.7 | 5.43 | 0.38 | |
| 40 hr | 31.42 | 14.3 | 5.51 | 0.52 | |
| 48 hr | 31.68 | 15.2 | 5.54 | 0.68 | |
| 64 hr | 32.28 | 17.4 | 5.62 | 0.73 | |
| 72 hr | 32.60 | 18.5 | 5.66 | 0.63 | 4 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | +0.02 |
| Ag | −0.04 |
| Steel | +0.04 |
| Cu | −0.04 |
| Mg | 0.00 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | L yellow |
| Steel | Blue |
| Cu | Gold-pink |
| Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 326-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.40 | – | 3.23 | 0.08 | |
| 24 hr | 14.41 | 7.5 | 3.38 | 0.99 | |
| 40 hr | 14.74 | 10.0 | 3.45 | 1.22 | |
| 48 hr | 14.85 | 10.8 | 3.46 | 1.29 | |
| 64 hr | 15.16 | 13.1 | 3.51 | 1.46 | |
| 72 hr | 15.23 | 13.7 | 3.53 | 1.57 | 2 |

**Metal Specimen Data**

Weight change, mg/cm²:

| | |
|---|---|
| Al | 0.00 |
| Ti | −0.02 |
| Ag | −0.04 |
| Steel | +0.06 |
| Cu | +0.06 |
| Mg | −8.90 |

Metal discoloration, deposits, pitting, or etching:

| | |
|---|---|
| Al | No change |
| Ti | L brown |
| Ag | L brown |
| Steel | Red-green |
| Cu | Gold |
| Mg | H pitting & L etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 326-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-3 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.77 | – | 3.13 | 0.24 | |
| 24 hr | 13.65 | 6.9 | 3.26 | 0.94 | |
| 40 hr | 13.88 | 8.7 | 3.31 | 1.25 | |
| 48 hr | 13.97 | 9.4 | 3.32 | 1.60 | |
| 64 hr | 14.19 | 11.1 | 3.36 | 1.62 | |
| 72 hr | 14.21 | 11.3 | 3.38 | 1.80 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | −0.04 |
| | Steel | −0.02 |
| | Cu | +0.06 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 326-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-8 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.24 | – | 3.26 | 0.23 | |
| 24 hr | 13.22 | −0.2 | 3.34 | 1.79 | |
| 40 hr | 14.83 | +12.0 | 3.53 | 1.77 | |
| 48 hr | 14.95 | +12.9 | 3.54 | 2.11 | |
| 64 hr | 15.26 | +15.3 | 3.60 | 2.56 | |
| 72 hr | 15.67 | +18.4 | 3.65 | 3.44 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm$^2$: | Al | 0.00 |
| | Ti | +0.02 |
| | Ag | −0.02 |
| | Steel | −0.02 |
| | Cu | −0.28 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L pitting |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 70 hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 326-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-19 AT 392°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.49 | – | 3.21 | 0.12 | |
| 24 hr | 14.56 | 16.6 | 3.48 | 1.42 | |
| 40 hr | 13.48 | 7.9 | 3.39 | 2.94 | |
| 48 hr | 13.57 | 8.6 | 3.41 | 3.52 | |
| 64 hr | 13.81 | 10.6 | 3.44 | 3.87 | |
| 72 hr | 13.87 | 11.0 | 3.46 | 3.68 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | –0.02 |
| | Mg | +0.02 |
| Metal discol ation, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 392 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 327-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-60-18 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.13 | – | 3.17 | 0.19 | |
| 24 hr | 12.97 | 6.9 | 3.33 | 2.22 | |
| 40 hr | 13.38 | 10.3 | 3.38 | 5.95 | |
| 48 hr | 14.84 | 22.3 | 3.60 | 12.61 | |
| 64 hr | 19.74 | 62.7 | 4.36 | 24.6 | |
| 72 hr | 23.41 | 93.0 | 4.92 | 29.9 | 7 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.73 |
| | Ti | +0.34 |
| | Ag | +0.30 |
| | Steel | +0.36 |
| | Cu | –0.45 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Brown deposit |
| | Ag | Brown deposit |
| | Steel | Brown deposit |
| | Cu | L etching |
| | Mg | Brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | 0.1 |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | M & H var |
| | At and above oil level | M & H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 18 hr |
| 100°F vis | 41 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 327-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-31 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.40 | – | 3.23 | 0.08 | |
| 24 hr | 14.46 | 7.9 | 3.41 | 1.11 | |
| 40 hr | 14.89 | 11.1 | 3.48 | 1.28 | |
| 48 hr | 15.10 | 12.7 | 3.54 | 1.47 | |
| 64 hr | 15.42 | 15.1 | 3.55 | 1.84 | |
| 72 hr | 15.70 | 17.2 | 3.61 | 2.09 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | −0.04 |
| | Ag | +0.04 |
| | Steel | +0.04 |
| | Cu | −0.06 |
| | Mg | −12.1 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L brown |
| | Steel | Blue-green |
| | Cu | Gold |
| | Mg | H pitting & M etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 72+ hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 327-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-19 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.49 | – | 3.21 | 0.12 | |
| 24 hr | 13.34 | 6.8 | 3.36 | 2.56 | |
| 40 hr | 13.67 | 9.4 | 3.42 | 3.94 | |
| 48 hr | 13.80 | 10.5 | 3.44 | 4.27 | |
| 64 hr | 14.00 | 12.1 | 3.45 | 4.71 | |
| 72 hr | 14.19 | 13.6 | 3.50 | 5.33 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | −0.02 |
| | Ag | +0.06 |
| | Steel | 0.00 |
| | Cu | 0.00 |
| | Mg | −0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L brown |
| | Ag | L brown |
| | Steel | Purple-blue |
| | Cu | Gold |
| | Mg | L brown |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 71 hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 327-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-21 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 12.92 | - | 3.15 | 0.14 | |
| 24 hr | 14.01 | 8.4 | 3.33 | 1.11 | |
| 40 hr | 14.31 | 10.8 | 3.37 | 1.47 | |
| 48 hr | 14.44 | 11.8 | 3.40 | 1.51 | |
| 64 hr | 14.77 | 14.3 | 3.44 | 1.71 | |
| 72 hr | 15.01 | 16.2 | 3.48 | 2.33 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | −0.04 |
| | Cu | −0.08 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | No change |
| | Steel | L green |
| | Cu | L yellow |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 71 hr |
| 100°F vis | 72+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 327-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-24 AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.04 | - | 3.47 | [illegible].24 | |
| 24 hr | 13.13 | 0.7 | 3.43 | 2.87 | |
| 40 hr | 13.86 | 6.3 | 3.49 | 10.24 | |
| 48 hr | 15.39 | 18.0 | 3.72 | 15.99 | |
| 64 hr | 19.99 | 53.3 | 4.44 | 27.7 | |
| 72 hr | 24.22 | 85.7 | 5.16 | 34.6 | 10 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | −0.02 |
| | Ag | −0.08 |
| | Steel | −0.10 |
| | Cu | −0.36 |
| | Mg | −15.5 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L brown |
| | Steel | L purple |
| | Cu | L etching |
| | Mg | H pitting & etching |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 15 hr |
| 100°F vis | 40 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 327-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON L-1136[a] AT 401°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.04 | – | 4.13 | 0.16 | |
| 24 hr | 15.20 | −5.2 | 3.86 | 2.19 | |
| 40 hr | 17.01 | +6.0 | 3.97 | 13.65 | |
| 48 hr | 19.08 | +19.0 | 4.31 | 18.53 | |
| 64 hr | 25.07 | +56.3 | 5.27 | 26.1 | |
| 72 hr | 30.57 | +90.6 | 6.18 | 32.0 | 10 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.06 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | −0.02 |
| | Cu | −4.12 |
| | Mg | −5.52 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | Blue |
| | Ag | L yellow |
| | Steel | L green |
| | Cu | M pitting & L etching |
| | Mg | H pitting |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | Trace |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M & H var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 17 hr |
| 100°F vis | 34 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 401 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Blend (1:1) of O-67-7 and O-67-9.

TEST NO. 328-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1011 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.73 | – | 3.36 | 0.02 | |
| 72 hr | 16.32 | 10.8 | 3.62 | 1.68 | |
| 120 hr | 19.85 | 34.8 | 4.19 | 6.16 | |
| 168 hr | 38.33 | 160 | 7.50 | 14.33 | 11 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.79 |
| | Ti | +0.51 |
| | Ag | +0.39 |
| | Steel | +0.37 |
| | Cu | -0.41 |
| | Mg | -- |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Black deposit |
| | Ag | Brown deposit |
| | Steel | Black deposit |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 10.4 |
| Tube deposits: | Below oil level | H var & L carbon |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 328-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1011 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.73 | – | 3.36 | 0.02 | |
| 72 hr | 20.07 | 36.3 | 4.28 | 5.39 | |
| 120 hr | 40.34 | 174 | 7.52 | 15.61 | |
| 168 hr | (a) | – | (a) | 22.8 | 17 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.16 |
| | Ti | 0.00 |
| | Ag | +0.04 |
| | Steel | -0.06 |
| | Cu | -0.18 |
| | Mg | (b) |
| Metal discoloration, deposits, pitting, or etching. | Al | L brown |
| | Ti | No change |
| | Ag | L yellow |
| | Steel | Brown |
| | Cu | Brown |
| | Mg | (b) |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | (a) |
| | Centrifuge, vol % | (a) |
| Tube deposits: | Below oil level | M var |
| | At and above oil level | H carbon |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Semisolid; analysis not possible.
(b) Specimen desroyed.

TEST NO. 329-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1011 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.73 | – | 3.36 | 0.02 | |
| 16 hr | 15.14 | 2.8 | 3.43 | 0.47 | |
| 24 hr | 15.34 | 4.1 | 3.46 | 0.59 | |
| 40 hr | 15.82 | 7.4 | 3.55 | 0.84 | |
| 48 hr | 16.04 | 8.9 | 3.58 | 1.22 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | -0.06 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | -1.4 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching. | Al | No change |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | L & M var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO 329-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1012 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 26.86 | - | 5.33 | 0.37 | |
| 16 hr | 30.58 | 13.8 | 5.70 | 1.91 | |
| 24 hr | 32.03 | 19.2 | 5.88 | 28.1 | |
| 40 hr | 35.17 | 30.9 | 6.28 | 29.1 | |
| 48 hr | 37.52 | 39.7 | 6.57 | 37.6 | 5 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | −0.06 |
| | Ag | 0.00 |
| | Steel | +0.04 |
| | Cu | −7.67 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Green |
| | Cu | H etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.6 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M & H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 329-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-65-44 AT 428°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.17 | | 4.27 | 0.27 | |
| 16 hr | 15.18 | −6.1 | 3.90 | 4.35 | |
| 24 hr | 15.47 | −4.3 | 3.89 | 12.76 | |
| 40 hr | 21.12 | +30.6 | 5.09 | 14.76 | |
| 48 hr | 69.81 | +332 | 18.53 | 15.89 | 6 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | +0.08 |
| | Steel | +0.06 |
| | Cu | −5.48 |
| | Mg | |
| Metal discoloration, deposits, pitting, or etching: | Al | L brown |
| | Ti | Blue |
| | Ag | L brown |
| | Steel | Yellow |
| | Cu | H etching |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace[a] |
| | Centrifuge, vol % | 40.0 |
| Tube deposits: | Below oil level | L var |
| | At and above oil level | M & H var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 428 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

(a) Coagulated upon filtration.

TEST NO. 330-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON G-1033 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 351.6 | | 13.02 | 0.03 | |
| 16 hr | 475.2 | 35.2 | 14.76 | 0.25 | |
| 24 hr | 629.4 | 79.0 | 16.77 | 0.27 | |
| 40 hr | 1154 | 228 | 22.42 | 0.27 | |
| 48 hr | 1574 | 348 | 26.30 | 0.40 | 3 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 | +0.04 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.36 | -0.41 |
| | Steel | +0.02 | -0.06 |
| | Cu | -0.95 | -1.54 |
| | Mg | +0.04 | -0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | Black | |
| | Cu | L etching | |
| | Mg | No change | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 330-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON G-1033 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 351.6 | | 13.02 | 0.03 | |
| 16 hr | 471.5 | 34.1 | 14.69 | 0.28 | |
| 24 hr | 611.4 | 73.9 | 16.60 | 0.34 | |
| 40 hr | 1100 | 213 | 21.93 | 0.33 | |
| 48 hr | 1502 | 327 | 25.65 | 0.34 | 2 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.06 | +0.06 |
| | Ti | +0.04 | +0.04 |
| | Ag | +0.02 | -0.08 |
| | Steel | +0.02 | -0.04 |
| | Cu | -1.24 | -1.58 |
| | Mg | +0.06 | -0.12 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | Yellow-brown | |
| | Ag | Black | |
| | Steel | Black | |
| | Cu | L etching | |
| | Mg | L brown | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 330-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | -- | 12.88 | 0.00 | |
| 16 hr | 475.6 | 34.2 | 14.75 | 0.35 | |
| 24 hr | 597.3 | 68.5 | 16.38 | 0.34 | |
| 40 hr | 1062 | 200 | 21.52 | 0.34 | |
| 48 hr | 1460 | 312 | 25.29 | 0.31 | 3 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 | +0.04 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.36 | -0.36 |
| | Steel | 0.00 | -0.10 |
| | Cu | -1.03 | -1.60 |
| | Mg | +0.10 | -0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | Black | |
| | Cu | L etching | |
| | Mg | L brown | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L & M var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 330-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | -- | 12.88 | 0.00 | |
| 16 hr | 474.8 | 33.9 | 14.70 | 0.36 | |
| 24 hr | 626.8 | 76.8 | 16.72 | 0.34 | |
| 40 hr | 1128 | 218 | 22.08 | 0.31 | |
| 48 hr | 1558 | 339 | 26.17 | 0.53 | 3 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.06 | +0.06 |
| | Ti | +0.02 | +0.02 |
| | Ag | -0.36 | -0.47 |
| | Steel | +0.04 | -0.10 |
| | Cu | -0.99 | -1.54 |
| | Mg | +0.02 | -0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | Black | |
| | Cu | L pitting | |
| | Mg | L brown | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 330-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | | 13.02 | 0.01 | |
| 16 hr | 388.3 | 8.6 | 13.45 | 0.20 | |
| 24 hr | 395.9 | 10.7 | 13.60 | 0.20 | |
| 40 hr | 407.5 | 14.0 | 13.76 | 0.13 | |
| 48 hr | 411.9 | 15.2 | 13.87 | 0.12 | 3 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 | +0.04 |
| | Ti | +0.04 | +0.04 |
| | Ag | -0.06 | -0.10 |
| | Steel | 0.00 | -0.04 |
| | Cu | -0.04 | -0.37 |
| | Mg | -0.02 | -0.18 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | No change | |
| | Steel | Black | |
| | Cu | L pitting | |
| | Mg | No change | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 330-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 387.3 | 8.3 | 13.42 | 0.16 | |
| 24 hr | 394.6 | 10.3 | 13.56 | 0.10 | |
| 40 hr | 407.9 | 14.1 | 13.76 | 0.12 | |
| 48 hr | 411.8 | 15.2 | 13.86 | 0.12 | 2 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 | +0.02 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.06 | -0.06 |
| | Steel | +0.04 | 0.00 |
| | Cu | -0.10 | -0.47 |
| | Mg | -0.02 | -0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | No change | |
| | Steel | Black | |
| | Cu | L pitting | |
| | Mg | No change | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 331-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON G-1033 At 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 351.6 | – | 13.02 | 0.03 | |
| 16 hr | 473.1 | 34.6 | 14.75 | 0.11 | |
| 24 hr | 601.3 | 71.0 | 16.50 | 0.17 | |
| 40 hr | 1064 | 203 | 21.47 | 0.65 | |
| 48 hr | 1476 | 320 | 25.31 | 0.50 | 3 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 | -0.06 |
| | Ti | -0.04 | -0.08 |
| | Ag | -0.28 | -0.75 |
| | Steel | +0.04 | -0.12 |
| | Cu | -1.05 | -1.44 |
| | Mg | -0.02 | -0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | No change | |
| | Cu | L etching | |
| | Mg | Gray | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 331-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON G-1033 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 351.6 | – | 13.02 | 0.03 | |
| 16 hr | 475.8 | 35.3 | 14.77 | 0.07 | |
| 24 hr | 628.6 | 78.8 | 16.81 | 0.45 | |
| 40 hr | [illegible].95 | 240 | 22.72 | 0.67 | |
| 48 hr | 1699 | 383 | 27.12 | 0.66 | 2 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 | -0.06 |
| | Ti | +0.04 | 0.00 |
| | Ag | -0.22 | -0.69 |
| | Steel | +0.08 | -0.08 |
| | Cu | -1.20 | -1.52 |
| | Mg | +0.04 | -0.18 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | No change | |
| | Cu | L etching | |
| | Mg | No change | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 331-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 473.6 | 33.6 | 14.72 | 0.11 | |
| 24 hr | 609.4 | 71.9 | 16.56 | 0.50 | |
| 40 hr | 1080 | 205 | 21.86 | 0.48 | |
| 48 hr | 1545 | 336 | 25.90 | 0.53 | 3 |

**Metal Specimen Data**

| | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 | -0.10 |
| | Ti | +0.02 | -0.06 |
| | Ag | -0.18 | -0.77 |
| | Steel | +0.04 | -0.12 |
| | Cu | -1.18 | -1.46 |
| | Mg | -0.04 | -0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | No change | |
| | Cu | L etching | |
| | Mg | No change | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 331-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON F-1041 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 354.5 | – | 12.88 | 0.00 | |
| 16 hr | 474.9 | 34.0 | 14.70 | 0.08 | |
| 24 hr | 612.1 | 72.7 | 16.57 | 0.53 | |
| 40 hr | 1114 | 214 | 21.91 | 0.72 | |
| 48 hr | 1534 | 333 | 25.85 | 0.75 | 3 |

**Metal Specimen Data**

| | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 | -0.04 |
| | Ti | 0.00 | 0.00 |
| | Ag | -0.32 | -0.43 |
| | Steel | +0.02 | -0.14 |
| | Cu | -1.01 | -1.40 |
| | Mg | -0.06 | -0.14 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | No change | |
| | Cu | L etching | |
| | Mg | No change | |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 331-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 390.3 | 9.1 | 13.48 | 0.04 | |
| 24 hr | 396.0 | 10.7 | 13.60 | 0.13 | |
| 40 hr | 408.4 | 14.2 | 13.79 | 0.12 | |
| 48 hr | 412.3 | 15.3 | 13.87 | 0.13 | 2 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 | −0.04 |
| | Ti | 0.00 | −0.06 |
| | Ag | +0.04 | −0.26 |
| | Steel | −0.02 | −0.08 |
| | Cu | −0.20 | −0.53 |
| | Mg | −0.10 | −0.16 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | No change | |
| | Cu | L etching | |
| | Mg | No change | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 331-6. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-67-1 AT 608°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 357.6 | – | 13.02 | 0.01 | |
| 16 hr | 390.3 | 9.1 | 13.46 | 0.06 | |
| 24 hr | 395.0 | 10.5 | 13.58 | 0.19 | |
| 40 hr | 408.7 | 14.3 | 13.79 | 0.20 | |
| 48 hr | 412.8 | 15.4 | 13.85 | 0.14 | 3 |

| Metal Specimen Data | | Normal Cleaning | Electro-cleaning |
|---|---|---|---|
| Weight change, mg/cm²: | Al | −0.02 | −0.02 |
| | Ti | +0.04 | 0.00 |
| | Ag | +0.02 | −0.24 |
| | Steel | −0.02 | −0.08 |
| | Cu | −0.24 | −0.45 |
| | Mg | −0.06 | −0.10 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change | |
| | Ti | L yellow | |
| | Ag | L etching | |
| | Steel | No change | |
| | Cu | L etching | |
| | Mg | No change | |

| Test Cell Data | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

| Test Conditions | |
|---|---|
| Sample temperature, °F | 608 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 333-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON MLO-62-1011 AT 464°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.73 | – | 3.36 | 0.02 | |
| 16 hr | 15.35 | 4.2 | 3.45 | 1.13 | |
| 24 hr | 15.67 | 6.4 | 3.51 | 1.29 | |
| 40 hr | 16.58 | 12.6 | 3.64 | 2.31 | |
| 48 hr | 17.98 | 22.1 | 3.85 | 5.71 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.22 |
| | Ti | +0.16 |
| | Ag | +0.20 |
| | Steel | +0.18 |
| | Cu | +0.16 |
| | Mg | – |
| Metal discoloration, deposits, pitting, or etching: | Al | Brown deposit |
| | Ti | Brown |
| | Ag | Brown deposit |
| | Steel | Black |
| | Cu | Black |
| | Mg | – |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 1.0 |
| Tube deposits: | Below oil level | H var & L carbon |
| | At and above oil level | None |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 464 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 334-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-829 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.88 | – | 3.47 | 0.27 | |
| 16 hr | 14.19 | 2.2 | 3.52 | 0.81 | |
| 24 hr | 14.27 | 2.8 | 3.54 | 1.02 | |
| 40 hr | 14.33 | 3.2 | 3.55 | 1.47 | |
| 48 hr | 14.34 | 3.3 | 3.55 | 1.77 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.04 |
| | Ti | +0.04 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | –0.14 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 334-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-830 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.62 | – | 3.39 | 0.80 | |
| 16 hr | 13.95 | 2.4 | 3.46 | 1.07 | |
| 24 hr | 14.07 | 3.3 | 3.47 | 1.30 | |
| 40 hr | 14.94 | 9.7 | 3.63 | 3.61 | |
| 48 hr | 17.44 | 28.0 | 4.03 | 9.68 | 2 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | 0.00 |
| | Ag | −0.02 |
| | Steel | +0.02 |
| | Cu | −0.06 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | L yellow |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L brown |
| | Mg | L yellow |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 2.0 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 30 hr |
| 100°F vis | 40 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 334-3. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-831 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 14.52 | – | 3.48 | 0.28 | |
| 16 hr | 15.60 | 7.4 | 3.65 | 0.58 | |
| 24 hr | 15.66 | 7.9 | 3.67 | 0.78 | |
| 40 hr | 15.86 | 9.2 | 3.70 | 0.94 | |
| 48 hr | 15.60 | 7.4 | 3.71 | 1.01 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | 0.00 |
| | Ag | +0.02 |
| | Steel | 0.00 |
| | Cu | −0.08 |
| | Mg | +0.06 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L brown |
| | Steel | L blue |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.6 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 334-4. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-832 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.76 | – | 3.37 | 0.31 | |
| 16 hr | 14.53 | 5.6 | 3.49 | 0.50 | |
| 24 hr | 14.67 | 6.6 | 3.52 | 0.74 | |
| 40 hr | 14.88 | 8.1 | 3.55 | 0.83 | |
| 48 hr | 14.92 | 8.4 | 3.56 | 1.10 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | +0.02 |
| | Cu | 0.00 |
| | Mg | +0.02 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L brown |
| | Steel | Blue |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | Trace |
| | Centrifuge, vol % | 0.4 |
| Tube deposits: | Below oil level | None |
| | At and above oil level | L var |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 334-5. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-68-5 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 16.27 | – | 4.01 | 0.20 | |
| 16 hr | 16.79 | 3.2 | 4.06 | 0.42 | |
| 24 hr | 16.90 | 3.9 | 4.07 | 0.70 | |
| 40 hr | 16.99 | 4.4 | 4.05 | 0.77 | |
| 48 hr | 16.96 | 4.2 | 4.04 | 1.03 | 0 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | −0.06 |
| | Ti | 0.00 |
| | Ag | −0.14 |
| | Steel | 0.00 |
| | Cu | −0.04 |
| | Mg | +0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L yellow |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | Gold |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 335-1. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON O-68-6 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.10 | – | 3.19 | 0.29 | |
| 16 hr | 13.88 | 6.0 | 3.32 | 1.14 | |
| 24 hr | 14.13 | 7.9 | 3.36 | 1.39 | |
| 40 hr | 15.63 | 19.3 | 3.57 | 4.89 | |
| 48 hr | 17.63 | 34.6 | 3.85 | 9.43 | 4 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | 0.00 |
| | Ti | +0.04 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | –0.69 |
| | Mg | 0.04 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | Blue |
| | Cu | L pitting |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | None |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 26 hr |
| 100°F vis | 36 hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

TEST NO. 335-2. RESULTS OF REFLUX OXIDATION-CORROSION TEST ON ATL-833 AT 385°F

| | Vis, cs/100°F | 100°F Vis Increase, % | Vis, cs/210°F | Neut. No., mg KOH/g | Oil Loss, wt % |
|---|---|---|---|---|---|
| Initial | 13.53 | – | 3.48 | 2.22 | |
| 16 hr | 13.77 | 1.8 | 3.52 | 3.13 | |
| 24 hr | 13.88 | 2.6 | 3.54 | 3.55 | |
| 40 hr | 14.04 | 3.8 | 3.56 | 4.01 | |
| 48 hr | 14.10 | 4.2 | 3.56 | 4.35 | 3 |

**Metal Specimen Data**

| | | |
|---|---|---|
| Weight change, mg/cm²: | Al | +0.02 |
| | Ti | 0.00 |
| | Ag | 0.00 |
| | Steel | 0.00 |
| | Cu | –0.14 |
| | Mg | 0.00 |
| Metal discoloration, deposits, pitting, or etching: | Al | No change |
| | Ti | L brown |
| | Ag | L yellow |
| | Steel | L brown |
| | Cu | L brown |
| | Mg | No change |

**Test Cell Data**

| | | |
|---|---|---|
| Sludge in oil: | 200-mesh filter | None |
| | Centrifuge, vol % | None |
| Tube deposits: | Below oil level | None |
| | At and above oil level | |

**Breakpoint Data**

| | |
|---|---|
| Neut. no. | 48+ hr |
| 100°F vis | 48+ hr |

**Test Conditions**

| | |
|---|---|
| Sample temperature, °F | 385 |
| Sample volume, ml | 200 |
| Air rate, liter/hr | 10 |
| Condensate return | Yes |

UNCLASSIFIED
Security Classification

## DOCUMENT CONTROL DATA - R & D

*(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)*

1. ORIGINATING ACTIVITY *(Corporate author)*
Southwest Research Institute
8500 Culebra Road
San Antonio, Texas 78228

2a. REPORT SECURITY CLASSIFICATION
UNCLASSIFIED

2b. GROUP

3. REPORT TITLE
EVALUATION STUDY OF THE OXIDATION-CORROSION CHARACTERISTICS OF AIRCRAFT TURBINE ENGINE LUBRICANTS

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*
Phase Report, February 1, 1969 through December 15, 1969

5. AUTHOR(S) *(First name, middle initial, last name)*
J. P. Cuellar
B. B. Baber

6. REPORT DATE
May 1970

7a. TOTAL NO. OF PAGES
227

7b. NO. OF REFS
None

8a. CONTRACT OR GRANT NO.
F33615-69-C-1295

b. PROJECT NO.
3048

c.

d.

9a. ORIGINATOR'S REPORT NUMBER(S)
RS-546

9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)*
AFAPL-TR-70-10, Volume II

10. DISTRIBUTION STATEMENT
This document is subject to special export controls and each transmittal to foreign nationals may be made only with prior approval of the Fuel, Lubrication, and Hazards Division (APF), Air Force Aero Propulsion Laboratory, Wright-Patterson Air Force Base, Ohio.

11. SUPPLEMENTARY NOTES

12. SPONSORING MILITARY ACTIVITY
Air Force Aero Propulsion Laboratory
Air Force Systems Command
Wright-Patterson Air Force Base, Ohio

13. ABSTRACT

Volume II of this report contains a compilation of the individual test data sheets for all tests reported in ~~Volume I.~~ The data sheets are presented in the order of test number.

DD FORM 1 NOV 65 1473

UNCLASSIFIED
Security Classification

UNCLASSIFIED
Security Classification

| 14. KEY WORDS | LINK A ROLE | LINK A WT | LINK B ROLE | LINK B WT | LINK C ROLE | LINK C WT |
|---|---|---|---|---|---|---|
| Lubricants | | | | | | |
| Oxidation-Corrosion | | | | | | |
| Aircraft Turbine Engines | | | | | | |
| Test Methods | | | | | | |

UNCLASSIFIED
Security Classification