THE NATIONAL SHIPBUILDING RESEARCH PROGRAM

Shipyard MACT Implementation Plan and Compliance Tools

U.S. DEPARTMENT OF THE NAVY
CARDEROCK DIVISION, NAVAL SURFACE WARFARE CENTER

in cooperation with
National Steel and Shipbuilding Company
San Diego, California
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Shipyard MACT Implementation Plan and Compliance Tools

U.S. DEPARTMENT OF THE NAVY
CARDE ROCK DIVISION,
NAVAL SURFACE WARFARE CENTER

in cooperation with
National Steel and Shipbuilding Company
San Diego, California
FINAL REPORT

SHIPYARD MACT IMPLEMENTATION PLAN AND COMPLIANCE TOOLS

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In Behalf Of
SNAME SPC PANEL SP-1
on
FACILITIES AND ENVIRONMENTAL EFFECTS

Under the
NATIONAL SHIPBUILDING RESEARCH PROGRAM

June 1996

Task N1-92-2, Subtask 12
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ONE:
PLAIN ENGLISH INTERPRETATION OF THE
SHIPOYARD MAXIMUM ACHIEVABLE
CONTROL TECHNOLOGY
EPA’s Maximum Achievable Control Technology
Rule for Shipyards:
A Plain English Interpretation

Prepared for

National Shipbuilding Research Program
Facilities and Environmental Effects Panel

Prepared by

Austin Environmental, Inc.

February 12, 1996

Revised
June 8, 1996
EPA’s Maximum Achievable Control Technology Rule for Shipyards: A Plain English Interpretation

Summary
The MACT standard for shipyards controls which coatings may be applied to a ship during construction or repairs. It does this by requiring the shipyard to use only coatings that meet, or are lower than, the coating VOC limits for marine coatings established in the MACT. These VOC limits apply to all marine coating operations in the shipyard, no matter who conducts the work: shipyard personnel, subcontractor or ship’s force. The VOC limits apply to all marine coatings, whatever their origin: shipyard supplied, customer supplied or government furnished. If a coating does not meet the MACT standard, it is illegal for the shipyard to allow it to be applied to a ship while the ship is in the shipyard. Any time a marine coating operation is conducted within the physical boundaries of the shipyard it is subject to the MACT standards, and the shipyard is responsible for ensuring compliance.

A shipyard that is subject to the MACT standard also needs a Title V operating permit.

Details
Standards
The MACT establishes two standards, a material standard and a performance standard. The material standard establishes VOC limits for general use marine coatings and for twenty-two speciality categories of marine coatings.2 (An additional set of VOC limits, which allows for the application of higher VOC content coatings, is established for coatings applied during temperatures of 40°F or less.) Coatings may only be thinned up to their applicable VOC limit. If a coating exactly meets its VOC limit, VOC-containing thinners may not be added under any circumstances. If the coating contains less VOC than the established limit it may be thinned up to, but not exceeding the limit.

The performance standard requires all handling and transferring operations involving VOC-containing coatings, thinners and solvents to be conducted in a way that minimizes spills and releases of VOC. Additionally, containers of VOC-containing coatings, thinner and solvents must remain closed, except to add or remove material from them. The shipyard must establish procedures to ensure the performance standard is met, and must describe these procedures in a written Implementation Plan.

Compliance Options for the Material Standard
The MACT allows two basic, and two additional, alternatives to meet the VOC content Material Standard.

The basic options are:

a) Determine and certify that each “batch” of coating is compliant as-supplied and apply the coatings without thinning.
b) Determine and certify that each “batch” of coating is compliant after thinning with a

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2See Appendix One for a list of marine coating categories and their VOC limits.
A “batch” of coating means a manufacturer’s batch from a single production run. Each new type and batch of coating must be separately certified under this rule. Shipyards can rely on manufacturer certifications, or do their own testing. If the shipyard relies on the manufacturer’s certification and later testing determines a coating batch was noncompliant, the EPA will consider the shipyard to be the responsible party.

The record keeping and reporting requirements for both basic options are similar. The volumes and types of coating used must be recorded, along with certifications and any test results. When thinning is allowed, data on the type and volume of thinner used with any batch of coating must also be recorded and used in calculations to determine compliance.

The shipyard is required to determine compliance monthly. Twice a year, the shipyard must demonstrate compliance via a report to EPA based on its testing and record keeping.

A third compliance option is conceptually more complex, but may allow for simplified record keeping at some shipyards. Under this “group” option the shipyard would set thinning ratios for several coatings that are thinned with a common thinner, and label the coating containers accordingly. It would then track the use of all coatings in that group, and the use of the common thinner, to determine compliance. This option does not allow coatings in a group to be above the MACT VOC standard so long as things average out at the end of the month: each coating as applied must still meet VOC limits for its coating category.

The fourth compliance option is to use VOC control equipment to prevent the release of HAPs to the air. This option requires EPA approval of a specific plan detailing the process and equipment the shipyard would use to destroy or capture the coating VOCS.

The Performance Standard
Container integrity and material handling procedures must be specified in the shipyard’s Implementation Plan, which the shipyard must prepare. This Plan will describe the procedures necessary to ensure conformance with the MACT containers and procedures performance standard. The shipyard must certify that containers of VOC containing paints, thinners and solvents are in good condition and do not leak. The shipyard is required to determine compliance on a container by container basis. Twice a year, the shipyard must provide a report to EPA based on its Implementation Plan records.

Record Keeping
To both determine and demonstrate compliance with the MACT, shipyards must keep records on all their usage of marine coatings, thinners and solvents. These usage records have to compiled monthly, for the shipyard to determine compliance. Daily records of the paint and thinner usage of each shipyard and subcontractor crew will provide the best data record although daily record keeping is not required by the

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³Only a single designated thinner can be used with each batch of coating each month.
⁴Note that the specific performance elements of an approved MACT Implementation Plan could become federally enforceable permit requirements in the shipyard’s Title V operating permit, in the same manner that Best Management Practices are enforceable permit requirements of a NPDES permit.
Only the monthly compliance determination records need be retained in the shipyard’s records. Daily coating and thinner logs may be discarded after the monthly compliance determination has been made. Records necessary to demonstrate compliance, (test results, VOC content certifications, calculations of allowable thinning solvent usage and actual paint and thinner solvent usage by month) must be retained by the shipyard for at least five years.

**Related Requirements**

Some states (including California and Louisiana) and the U.S. Navy have marine coating rules or specifications that are similar to the specifications in this EPA rule. The EPA rule does not replace or change these other requirements, or affect when they apply to a shipyard all applicable limits must be met.

State rules that apply to coatings used in a shipyard that are not “marine coatings” are also still applicable.

**Executions**

This rule exempts sealed aerosol cans, and marine coatings used in very low volumes. Noncompliant coatings may be used if annual use of each such coating is less than 200 liters (53 gallons) per coating, and the combined annual use of all exempted low volume coatings is less than 1,000 liters (264 gallons).

**Deadlines and Due Date**

The MACT standard became effective on 12/15/95. Each shipyard that it is subject to the MACT standard must submit a notification to the EPA with the shipyard’s proposed implementation plan, within 180 days of the effective date (6/13/96). This deadline was later extended six months, thus delaying the deadline for notification to 12/14/96. The shipyard was to have been in full compliance with the standard no later than 12/15/96, however this deadline was also extended by the EPA to 12/15/97 (two years from the effective date). The shipyard must submit its first compliance report to the EPA by 6/15/97 and every six months after the date of its first compliance report.

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1 If a violation is discovered when the shipyard makes its monthly compliance determination, unless the shipyard has records that limit the duration of the violation the EPA will consider the violation to have lasted the entire month.

2 See attached MACT milestone chart.

3 The extension of the notification and compliance deadlines had been approved by the EPA, but not yet published in the Federal Register at the date this document was revised.
**APPENDIX I. VOLATILE ORGANIC HAP (VOHAP) LIMITS FOR MARINE COATINGS**

<table>
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<tr>
<th>Coating Category</th>
<th>VOHAP limits&lt;sup&gt;ab&lt;/sup&gt;</th>
<th>grams/liter coating (minus water and compounds)</th>
<th>t ≥ 2.45°C</th>
<th>t &lt;4.5°C&lt;sup&gt;c&lt;/sup&gt;</th>
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<tbody>
<tr>
<td>General use</td>
<td></td>
<td>340</td>
<td>571</td>
<td>728</td>
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<tr>
<td>Specialty</td>
<td></td>
<td>--</td>
<td>-</td>
<td>--</td>
</tr>
<tr>
<td>Air flask</td>
<td></td>
<td>340</td>
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<td>728</td>
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<tr>
<td>Antenna</td>
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<td>530</td>
<td>1,439</td>
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<td>Antifouulant</td>
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<td>765</td>
<td>971</td>
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<tr>
<td>Heat resistant</td>
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<td>420</td>
<td>841</td>
<td>1,069</td>
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<tr>
<td>High-gloss</td>
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<td>420</td>
<td>841</td>
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<tr>
<td>High-temperature</td>
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<td>Inorganic zinc high-build</td>
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<td>Military exterior</td>
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<td>550</td>
<td>1,597</td>
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<td>Nonskid</td>
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<tr>
<td>Nuclear</td>
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<td>Undersea weapons systems</td>
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<tr>
<td>Weld-through precon. primer</td>
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<td>650</td>
<td>2,885</td>
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The limits are expressed in two sets of equivalent units. Either set of limits may be used for the compliance procedure described in §63.785(c)(1), but only the limits expressed in units of g/L solids (nonvolatile) shall be used for the compliance procedures described §63.785(c)(2)-(4).

VOC (including exempt compounds listed as HAP) shall be used as a surrogate for VOHAP for those compliance procedures described §63.785 (c)(1)-(3).

To convert from g/L to lb/gal, multiply by (3.785 L/gal) (1/453.6 lb/gal) or 1/120. For compliance purposes, metric units define the standards.

VOHAP limits expressed in units of mass of VOHAP per volume of solids were derived from the VOHAP limits expressed in units of mass of VOHAP per volume of coating assuming the coatings contain no water or exempt compounds and that the volumes of all components within a coating are additive.

These limits apply during cold-weather time periods, as defined in §63.782. Cold-weather allowances are not given to coatings in categories that permit over a 40 percent VOHAP content by volume. Such coatings are subject to the same limits regardless of weather conditions.
### Plain English Interpretation of EPA’s Maximum Achievable Control Technology Rule for Shipyards: Major Compliance Milestones

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SHIPYARD MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY

Questions and Answers

Why is the EPA regulating surface coating operations in shipyards?

The EPA is required to establish Maximum Achievable Control Technologies (“MACT”) for many types of industries that have the potential to emit hazardous air pollutants (“HAP”) in amounts equal to or greater than 10 tons per year of any single HAP, or 25 tons per year of combined HAPs. Marine coatings contain a variety of HAPs as solvents, which are released to the air during outdoor paint operations.

How do I know if the MACTs are applicable to my shipyard?

The 10/25 tons per year thresholds of HAP emission is based on all sources of HAP within the shipyard, not just coating operations. However, marine coating operations will typically account for 90 to 95% of HAP emissions in any shipyard. (The only exception should be in shipyards building Fiberglas or composite material ships. In this case Fiberglas or composite lay up operations would comprise a significant, or majority share of the HAP emissions.) As a rule of thumb, if the shipyard has an actual, or potential marine coating usage of 20,000 gallons per year, the shipyard is a “major source” and is subject to the MACT standard.

The rule specifically exempts shipyards using less than 1,000 liters (264 gallons) of marine coatings annually, regardless of other HAP emissions.

What if the shipyard’s actual or “Potential” HAP emissions drop below the MACT threshold sometime in the future?

The MACT rule requires that if a shipyard is subject to the MACT on the effective date of this standard or thereafter, it will always be subject to the MACT (once in, always in).

My shipyard is not subject to the MACT now, but we may expand operations in the future. What must we do when we expand?

When the shipyard’s potential to emit based on its maximum operational capacity, exceeds the 10/25 tons per year of HAPs threshold, the shipyard must notify the EPA that it has become subject to the MACT and implement the MACT standards. An application for a “Title V” operating permit, or for a modification to an existing permit, would also be required.

What operations in the shipyard does the MACT control?

The MACT standard controls what marine coatings can be applied to a ship, while the ship is located within the physical boundaries of the shipyard. Only coatings that meet the MACT VOC limits for the coating usage category can be applied. Additionally, thinning of coatings is only allowed up to the VOC limits of the MACT. The shipyard must take measures to prevent spills and leaks of VOC containing

Assuming an average of 3.3 pounds VOC /gallon marine coating, 20,000 gallons of marine coating would contain 33 tons VOC.

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materials, such as paints, thinners and solvents, and reduce VOC emissions from leaking or unclosed containers, pots or pipes.

**Does the MACT apply to marine coatings used in spray booths equipped with VOC controls?**

Yes, unless a proposal for VOC controls has been approved by the EPA as a MACT substitute. However, the rule would not apply to coating use at the shipyard that was not part of “building repair, repainting, converting or alteration” of a ship.

**What does the shipyard have to do to comply with the MACT?**

As described above, the shipyard must provide an initial notification develop an Implementation Plan, certify batches of coating and thinners, keep records, and make reports. The rule does not impose additional “how to” requirements, e.g., for training staff.

**Does the MACT apply to subcontractors or ship’s force engaged in surface coating operations while the ship is in the shipyard?**

Yes. The MACT standard applies to all marine coating operations occurring within the physical boundaries of the shipyards, no matter who is conducting them.

**What if a coating is customer or government furnished?**

The MACT standard applies to all marine coating operations conducted in the shipyard, no matter who supplies the coating. If the coating cannot be certified as in compliance as-supplied or as-applied, it cannot legally be used within the shipyard.

**Does the MACT apply to our shipyard painters if they are working on a ship outside the yard?**

No. The MACT only regulates marine coating operations within shipyards that are subject to the standard.

**Could our customers go to a competitor shipyard that is not subject to the MACT standard and have “noncompliant” coatings applied to their ships?**

Yes. The MACT standard does not regulate shipyards that have actual or potential HAP emissions below the 10/25 tons per year thresholds. If your competitor shipyard does not exceed the thresholds it may apply any coating available, subject to any state or local VOC regulations.

**Does the MACT apply to both private and public shipyards?**

Yes. The MACT makes no distinction between government owned or privately owed shipyards.

**What do our painters have to know and do for the shipyard to stay in compliance with the MACT?**

In most cases, painters will need to know whether a coating can be used at all or for a specific purpose (if it is a specialty coating), whether each coating can be thinned the thinner designated for use with each
coating (for that month), and how much of the designated thinner can be added to each coating at temperatures above and below 40 degrees Fahrenheit.

Painters must also know how to keep necessary records, and may need to know how and when to inspect coating containers and transfer systems under the written Implementation Plan.

If a shipyard chooses to take advantage of the exemptions that are available for low volume use of noncompliant coatings, there is likely be an additional burden on painters to identify these coatings, to keep additional records, and to verify that usage limits have not already been exceeded before a job using such coatings begins.

**What can happen if the shipyard knows it is subject to the MACT standard but doesn’t notify the EPA or implement the MACT requirements?**

A shipyard that is subject to the MACT cannot legally operate after the effective date of the standard unless it is in compliance with the standard. Moreover, a shipyard subject to the MACT that does not file a timely and complete Title V permit application could be shut down until a Title V permit is actually obtained. Facility closure is a drastic penalty, but it is a real risk for a shipyard that was aware of but ignored these programs.

The Clean Air Act also provides for very substantial monetary penalties for noncompliance. Civil penalties can be as large $25,000 per violation per day. Criminal fines and imprisonment are also possible where violations of a MACT are knowing.

**What does the shipyard have to do if it discovers it has violated the MACT standard during coating operations?**

Any detected violations should be promptly corrected, and must be reported. However, the MACT standard does not require that detected violations be reported until the next semiannual report by the facility is due. Title V permits implementing the MACT at specific sites may impose additional reporting requirements.

The shipyard should consider whether to report detected violations more promptly, on a voluntary basis. In some cases this may result in lower penalties than might otherwise be assessed.

If there is any indication that violations were knowing or willful, or that they endangered human health and safety or the environment, legal counsel should be consulted.

**What should the shipyard do if it discovers a subcontractor or ship’s force has violated the MACT standard while conducting coating operations?**

These violations should be promptly corrected and any steps necessary to prevent future violations should be taken. The shipyard will be responsible for such violations, and will need to report them as for violations caused by shipyard personnel. Consideration should be given to accelerated voluntary reporting.
Legal counsel should be consulted whenever there is a possible conflict, in an enforcement context, between the interests of the shipyard and the interests of ship’s force or subcontractor personnel responsible for a violation.

*My paint formulations are already controlled by a state regulation, or in my state permit. Does this matter?*

Federally enforceable limits on paint formulations can legally be taken into account in determining whether a facility’s potential to emit triggers the MACT. A temporary EPA policy also allows state limits that are not federally enforceable to be taken into account by EPA in the same way. Therefore, limits in state regulations and permits will affect EPA’s views on whether the MACT and Title V apply at a facility.

Where the MACT does apply, its standards (Plus any more stringent state standards or permit limits) must be met.
TWO:
MODEL SHIPYARD
IMPLEMENTATION PLAN
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1. COATING COMPLIANCE PROCEDURES

AOK Shipyards intends to implement the following option(s) in compliance with 40 CFR §63:

- Option 1 - No thinning solvent added
- Option 2 - Thinning solvent added, Coating-by-coating compliance
- Option 3 - Thinning solvent added, Thinner group compliance
- Option 4 - Alternative test method (i.e., other than Method 24)

Our approach to ensure MACT compliance is to integrate the additional requirements into existing work practices and to assign responsibilities to the appropriate organizational level in the company. Fig. 1-1 presents across reference matrix identifying organizational elements and their involvement in MACT implementation.

Fig. 1-1
Organizations Performing MACT Compliance Activities

<table>
<thead>
<tr>
<th>MACT Compliance Activity</th>
<th>Initial Review</th>
<th>Receipt of Coatings</th>
<th>Certification</th>
<th>Dilution</th>
<th>Inspection</th>
<th>Mixing</th>
<th>Application</th>
<th>Reporting</th>
<th>Records</th>
<th>Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option(s)</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
<td>All</td>
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</table>

<table>
<thead>
<tr>
<th>Organization</th>
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<tr>
<td>Receiving</td>
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<td></td>
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<tr>
<td>Environmental</td>
<td></td>
<td>X</td>
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<tr>
<td>Paint Dept.</td>
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<td>X</td>
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</tr>
<tr>
<td>Paint Crew</td>
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</tr>
</tbody>
</table>
1.0 COATING IDENTIFICATION AND CERTIFICATION (ALL OPTIONS)

1.0.1 Coating Identification

Coating identification will be made in conjunction with the existing normal business activities required for the receipt of goods within the facility. Specifically, the warehouseman, receiving clerk, paint foreman, or other designated person will be responsible for determination of the coating category and VOHAP limit of each batch of coating received into the facility. This will be accomplished using information gathered from the company purchase order, bills of lading, and/or coating container labels. This information will be recorded on Form 1, Coating Compliance Certification.

[This activity meets the requirements of 40 CFR §63.785(a)(1) and -(2)]

1.0.2 VOC or VOHAP Content Above Limit

For its specific coating category, any batch of coating with an identified VOC or VOHAP content above the limit shown in the form will be rejected and returned to the supplier, customer, or government.

[This activity meets the requirements of 40 CFR §63.783(a)]

Identification codes for the categories prescribed in 40 CFR §63.783 are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>General use</td>
</tr>
<tr>
<td>S1</td>
<td>Air flask</td>
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<tr>
<td>S2</td>
<td>Antenna</td>
</tr>
<tr>
<td>S3</td>
<td>Antifoulant</td>
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<tr>
<td>S4</td>
<td>Heat resistant</td>
</tr>
<tr>
<td>S5</td>
<td>High-gloss</td>
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<tr>
<td>S6</td>
<td>High-temperature</td>
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<td>S7</td>
<td>Inorganic zinc high-build</td>
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<tr>
<td>S8</td>
<td>Military exterior</td>
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<tr>
<td>S9</td>
<td>Mist</td>
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<tr>
<td>S10</td>
<td>Navigational aids</td>
</tr>
<tr>
<td>S11</td>
<td>Nonskid</td>
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<tr>
<td>S12</td>
<td>Nuclear</td>
</tr>
<tr>
<td>S13</td>
<td>organic zinc</td>
</tr>
<tr>
<td>S14</td>
<td>Pretreatment wash primer</td>
</tr>
<tr>
<td>S15</td>
<td>Repair / maintenance of thermoplastics</td>
</tr>
<tr>
<td>S16</td>
<td>Rubber camouflage</td>
</tr>
<tr>
<td>S17</td>
<td>Sealant for thermal spray aburdmum</td>
</tr>
<tr>
<td>S18</td>
<td>Special marking</td>
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<tr>
<td>S19</td>
<td>Specialty interior</td>
</tr>
<tr>
<td>S20</td>
<td>Tack coat</td>
</tr>
<tr>
<td>S21</td>
<td>Undersea weapons systems</td>
</tr>
<tr>
<td>S22</td>
<td>Weld-through precon. primer</td>
</tr>
</tbody>
</table>

Forms are located in Appendix A, Forms.
1.0.3 Unknown VOC Content
The Purchasing Supervisor will be notified if the VOC content of any batch of coating cannot be identified. At his discretion, The Purchasing Supervisor may reject the batch and return it to the supplier, customer, or government; or, provisionally accept the batch pending further analysis using Method 24. If Method 24 tests are performed, the test results will be recorded on Frm 4, Method 24 Test Results Log.

[This activity meets the requirements of 40 CFR §63.783(a) and §63.788(b)(2)(vi)]

1.0.4 Container Inspection
We plan to use direct inspection of every equipment item (e.g., container, drum, vessel, vat, tank, pipe, etc.) involved in coating application to determine its integrity (see Section 3.2, Self Inspection). As applied to coating identification and certification, this involves at least receiving personnel, the Paint Shop Foreman, the Paint Crew Lead Men, and the Environmental personnel.

[This activity meets the requirements of 40 CFR §63.783(b)]

The warehouseman, receiving clerk, paint foreman, or other designated person will be responsible for inspecting the containers as received and completing Form 3 for the receiving activity. Leaking containers or equipment will be identified and handled according to company spill handling procedures. The paint shop personnel will reinspect containers delivered for each day’s activities, and inspect paint mixing, handling, and application equipment items. Any discrepancies will be reported to the Paint Shop Foreman, who will alert the spill response teams and/or maintenance crews to take appropriate action.

We will document these findings on Form 3, Container Compliance Form, which will serve as a permanent record of ongoing inspections.

[This activity meets the requirements of 40 CFR §63.788(b)(2)(vi)]

1.1 OPTION 1 and OPTION 4

1.1.1 Certification
The Paint Department foreman, leadman, or supervisor will certify VOC (VOHAP) content “as-applied” prior to application of the work site using **Form 1, Coating Compliance Certification.** This form will be returned to the Paint Department clerk, foreman, or supervisor at the end of the work shift.

[This activity satisfies the requirements of 40 CFR §63.785(c)(1)(I)]

Additionally, the volume of coating applied during the shift will be recorded by the paint crew foreman at the end of the work shift using Form 2, Paint Crew Usage Form. Likewise, this form will be returned to the Paint Department clerk, foreman, or supervisor at the end of the work shift for recording in Form 5, **Paint and Thinner Usage Log.**

### 1.1.2 Notification

The Paint Department clerk, foreman, or company Environmental manager will maintain MACT compliance by notification of painters of the designated thinners by use of labels. **Form 6, “NO Thinning” Label,** will be used for this purpose. Alternatively, when use of labels is not practical or warranted, paint department gang box meetings, held prior to each work shift, will be used to notify painters that no thinning is allowed.

[This activity satisfies the requirements of 40 CFR §63.785(c)(1)(ii)]

### 1.2 OPTION 2, OPTION 3 and OPTION 4

#### 1.2.1 Calculation of Thinning Ratios

The Paint Department clerk, foreman, or environmental manager will maintain MACT compliance by preparing required information on marine coatings to ensure compliance with MACT standards, including

(I) VOC Data Sheets, and

(ii) Thinning Ratio Calculations

The **VOC Data Sheet, will be used to record the properties of marine coatings or thinners “As-Supplied.” Note that this form accounts for exempt compounds and cure volatiles omitted from the VOC Data Sheet when the MACT was published, but necessary to complete the calculations. The VOC Data Sheet and attachments are provided as Appendix B.**
Thinning ratio calculations will be completed before the application of each batch, using the equation 1, as provided in the MACT:

\[
R = \frac{(V_s)(\text{VOHAP limit}) - m_{\text{VOC}}}{D^h} \tag{Eqn (1)}
\]

where:

- \( R \) = Maximum allowable thinning ratio for a given batch (L thinner/L coating as supplied);
- \( V_s \) = Volume fraction of solids in the batch as supplied (L solids/L coating as supplied);
- \( \text{VOHAP limit} \) = Maximum allowable as-applied VOHAP content of the coating (g VOHAP/L solids);
- \( m_{\text{VOC}} \) = VOC content of the batch as supplied. [g VOC (including cure volatiles and exempt compounds on the HAP list)/L coating (including water and exempt compounds) as supplied];
- \( D^h \) = Density of the thinner (g/L).
FOR OPTION 4:

\[ R = \frac{(V_s)(\text{VOHAP limit}) - m_{\text{VOHAP}}}{D_{th(\text{VOHAP})}} \]  \hspace{1cm} \text{Eqn (1)}

where:

- \( R \) = Maximum allowable thinning ratio for a given batch (L thinner/L coating as supplied);
- \( V_s \) = Volume fraction of solids in the batch as supplied (L solids/L coating as supplied);
- \( \text{VOHAP limit} \) = Maximum allowable as-applied VOHAP content of the coating (g VOHAP / L solids);
- \( m_{\text{VOHAP}} \) = VOHAP content of the batch as supplied. [g VOHAP (including cure volatiles and exempt compounds on the HAP list) / L coating (including water and exempt compounds) as supplied];
- \( D_{th(\text{VOHAP})} \) = Average density of the VOHAP thinner(S) (g/L).

Thinning Ratio Calculation Sheets for both Options 2 and 3, and Option 4 are provided in Appendix B.

Note: If \( V_s \) is not supplied directly by the coating manufacturer, \( V_s \) both Option 2 and Option 3, and Option 4 calculations will be determined using equation 2 as given by the MACT:

\[ V_s = 1 - \frac{m_{\text{volatiles}}}{D_{\text{avg}}} \]  \hspace{1cm} \text{Eqn.}

where:

- \( m_{\text{volatiles}} \) = Total volatiles in the batch, including VOC, water, and exempt compounds (g/L coating), and
- \( D_{\text{avg}} \) = Average density of volatiles in the batch (g/L).
1.2.2 Notification
The Paint Department clerk, foreman, or company Environmental manager will maintain MACT compliance by notification of painters of the designated thinners by use of labels. **Form 7, “Maximum Allowable Thinning Ratio” Label, will** be used for this purpose. Alternatively, when use of labels is not practical or warranted, paint department gang box meetings, held before each work shift, will be used to notify painters that no thinning is allowed.

[This activity satisfies the requirements of 40 CFR §63.785(c)(2)(ii) and -(3)(ii)]

1.2.3 Paint Crew Daily Records
The paint crew foreman, leadman, or supervisor will be responsible for recording the ambient temperature, the actual volumes used for each coating, the total allowable thinner volume, and the actual volume of thinner used. This form will be returned to the Paint Department clerk, foreman, or supervisor at the end of the work shift for recording in **Form 5, Paint and Thinner Usage Log**.

[This activity meets the requirements of 40 CFR §63.785(c)(2)(iii), and -(3)(iii)]

1.2.4 Thinner Group Designation “By Use”
The coatings grouped with a particular thinner will be determined “by use,” i.e., if a thinner is used with a particular coating during the monthly reporting period, then that coating has been “designated” to that thinner group.

[This activity meets the requirements of 40 CFR §63.785(c)(3)(I)]
\subsection*{1.2.5 Determination of Compliance}

At the end of each calendar month, the Paint Department clerk will provide the master coating and thinner usage log to the designated responsible person, who will determine compliance for that period. MACT compliance determination under Options 2 and 3 will be completed for the previous month by the 15th day of each month. The data will be evaluated using Equation 3 of the Rule, as follows:

$$V_{th} = \sum_{i=1}^{n} (R \times V_b)_i + \sum_{i=1}^{n} (R_{\text{cold}} \times V_{b\text{-cold}})_i$$ \hspace{1cm} \text{Eqn.}$$

where

- $V_a =$ Total allowable volume of thinner for the previous month (L thinner);
- $V_b =$ Volume of each batch as supplied and before being thinned, used during non-cold-weather days of the previous month (L coating as supplied);
- $R_{\text{cold}} =$ Maximum allowable thinning ratio for each batch used during cold-weather days (L thinner/L coating as supplied);
- $V_{b\text{-cold}} =$ Volume of each batch as supplied and before being thinned, used during cold-weather days of the previous month (L coating as supplied);
- $I =$ Each batch of coating; and
- $n =$ Total number of batches of the coating.

[This activity meets the requirements of 40 CFR §63.785(c)(2)(iii), -(2)(iv), -(2)(v), -(2)(vi), (3)(iv), -(3)(v), -(3)(vi), and -(3)(vii).]

\section*{2. RECORD KEEPING PROCEDURES}

The Paint Department clerk, foreman, and environmental manager will maintain all MACT compliance RECORD KEEPING information, including the information listed below, as required for each Option used during the reporting period. Records will be maintained for five years. Reporting will be provided before the 60th day following completion of each 6-month period after the compliance date. (Note: Some RECORD KEEPING items are not reported.)
BASIC CHECKLIST

❑ Initial Notification Documentation *
❑ Approved Implementation Plan *
❑ Volume of Low-Usage -Exempt Coatings by Month
❑ Identification of coatings used, EPA categories, and VOHAP limits
❑ Certification of As-Supplied VOC Content for each Batch of Coating *
❑ Determination whether containers meet standard §63.783(b)(2)
❑ Results of Method 24 or other approved measurements on individual containers

OPTIONS

<table>
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<th>3 &amp; 4</th>
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</thead>
<tbody>
<tr>
<td>Certification of As-Applied VOC content by Batch *</td>
<td></td>
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<tr>
<td>Volume of each coating applied</td>
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<td></td>
<td>x</td>
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<tr>
<td>Thinner Density and Vol Fraction Solids for each Batch *</td>
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<td></td>
</tr>
<tr>
<td>Maximum Allowable Thinner Ratio for each Batch</td>
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<td>x</td>
<td></td>
</tr>
<tr>
<td>Volume Used of each Batch, (As-Supplied)</td>
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<td>x</td>
<td></td>
</tr>
<tr>
<td>Cold weather dates and times</td>
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<td>Total Allowable Volume of thinner</td>
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<td>x</td>
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</tr>
<tr>
<td>Actual Volume of thinner</td>
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<td></td>
<td>x</td>
</tr>
<tr>
<td>ID of coating groups/thinner</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

* Maintained on site but not reported.

[This activity satisfies the requirements of 40 CFR §63.788]

3. TRANSFER, HANDLING, AND STORAGE PROCEDURES

Our company management policy takes a proactive role in the development of measures to minimize the likelihood for air pollution. We therefore develop procedures, practices, and equipment on an ongoing basis. The sections below discuss our policy with respect to work practices, and to self-inspection, respectively.

3.0 Work Practices

Regarding the transfer and handling of VOHAP-containing materials in a way that minimizes spills, the following elements of our policy are of particular relevance:

(1) Maintain a neat and orderly work environment including storing hazardous materials and wastes in a way that minimizes the potential for accidental releases.
(2) Keep lids on liquid volatile material containers when not directly in use.

(3) Practice clean up procedures to ensure that accidentally spilled solvents and paints are cleaned-up immediately.

(4) Store solvent contaminated rags, cloths, and materials in a covered container.

(5) Keep drums closed when not in use and equip drums with tight-fitting lids.

(6) Use funnels when filling and replace the cap covering the hole once filling is completed (or replace the funnel’s lid, if used).

(7) Dispose of solvent-wipe rags immediately in a covered container.

(8) Apply the volatile solvents directly to the rag and avoid spraying solvent directly on the surface.

(9) Avoid the use of VOCs for surface preparation whenever possible (i.e., substitute aqueous cleaners where possible).

(10) Maintain paint guns and pots to minimize the potential for leaks and improper spraying. (See also section 3.2, Self-inspection, below.)

(11) Clean lines or paint guns in a closed system to capture solvents.

(12) Provide containment for VOC-containing material storage areas.

(13) Perform mixing and transfer operations only in designated areas with containment.

[This activity meets the requirements of 40 CFR §63.783(b)(1)]

3.1 Self-Inspection

Our facility policy already prescribes reactions to malfunctions and/or leaks both by maintenance crews and by spill response teams. There are existing notification protocols to alert the appropriate response organization. Effectively, we use self-inspection of every equipment item (e.g., container, drum, vessel, vat, tank pipe, etc.) involved in coating application to determine its integrity. This strategy is executed for every activity and every organizational level associated with coating materials and thinning solvents, from initial receipt within the facility to final application.

[These policies and procedures meet the requirements of 40 CFR §63.783(b)(2).]
For compliance with MACT RECORD KEEPING requirements, we plan to document container self-inspection findings on *Form 3, Container Compliance Form*. This form will serve as a permanent record, and will be maintained for a minimum of 5 years.

[This activity assures compliance with 40 CFR §63.788(b)(2)(vi).]
APPENDIX A: FORMS
# A-OK SHIPYARDS COATING COMPLIANCE CERTIFICATION

- **AS SUPPLIED**
- **AS APPLIED**

<table>
<thead>
<tr>
<th>ID</th>
<th>Rem</th>
<th>Description</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Coating Name/ Identification</td>
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</tr>
<tr>
<td>B</td>
<td>Coating Manufacturer Name</td>
<td></td>
<td>I</td>
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<tr>
<td>C</td>
<td>Batch Identification Count/Volume</td>
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<td>D</td>
<td>Supplied By Source (check one)</td>
<td>q Customer</td>
<td>q Manufacturer</td>
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<td></td>
<td></td>
<td>q Government</td>
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<tr>
<td>E</td>
<td>VOC Content Concentration g/L</td>
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<td>Coating Category (check one below)</td>
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<td>Sealant for thermal spray aluminum</td>
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<td>Special marking</td>
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<td>S19</td>
<td>Specialty interior</td>
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</tr>
</tbody>
</table>

G. I certify that the VOC content of this product is less than or equal to the allowable federal VOC content for its applicable coating category.

Signed ____________________________ Date ____________

---

*File: PLAN1. WPD*
A-OK SHIPYARDS PAINT CREW USAGE FORM

MONTH OF ____________

JOB ID ________  CREW ID ________  DATE ________

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Activity (Complete Before Work)</th>
<th>Item</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACT</td>
<td>COATING</td>
<td>(1)</td>
<td>Mfg. Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2)</td>
<td>ID</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3)</td>
<td>Batch</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(4)</td>
<td>EpA Category (Note 1);</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5)</td>
<td>!VOC Limit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>THINNER</td>
<td>(6)</td>
<td>Manufacturer’s Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7)</td>
<td>ID</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(8)</td>
<td>Mix Ratio, Normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(9)</td>
<td>Mix Ratio, Cold</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10)</td>
<td>Actual Coating Volume</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MIXING</td>
<td>(11)</td>
<td>Allowable Thinner Vol, Normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(12)</td>
<td>Allowable Thinner Vol, Cold</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(13)</td>
<td>Actual Thinner Volume</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(14)</td>
<td>Temperature &lt;40°F (Y/N)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(15)</td>
<td>Actual Temp (°F)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(16)</td>
<td>Final Volume (Note 2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(17)</td>
<td>Volume Applied</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CERTIFICATION</td>
<td>(21)</td>
<td>Date</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(22)</td>
<td>By</td>
<td></td>
</tr>
</tbody>
</table>

Note 1: EPA Coating Categories are identified below:

- **General**
  - S7 Inorganic zinc high-build
  - S8 Military exterior
  - S9 Mist
  - S10 Navigational aids
  - S11 Nonskid
  - S12 Nuclear
  - S13 Organic zinc
  - S14 Pretreatment wash primer
  - S15 Remir/ maintenance of thermoplastics
  - S16 Rubber camouflage
  - S17 Sealant for thermal spray aluminum
  - S18 Special marking
  - S19 Specialty interior
  - S20 Tack coat
  - S21 Undersea weapons systems
  - S22 Weld-through precon. primer

Note 2: (16) = (10) + (12)

From Paint and Thinner Usage Log

File: PLANI. WPD
A-OK SHipyards Container Compliance Form

Month of __________

<table>
<thead>
<tr>
<th>(1) Inspection Date</th>
<th>(2) By</th>
<th>(3) Equipment ID/No.</th>
<th>(4) Reference Drawing</th>
<th>(5) Cracks (Y/N)</th>
<th>(6) Holes (Y/N)</th>
<th>(7) Other (Y/N)</th>
<th>(8) Closed (Y/N)</th>
</tr>
</thead>
</table>
A-OK SHIPYARDS METHOD 24 TEST RESULTS FORM

MONTH OF __________

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
<th>THINNER</th>
<th>COATING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(3) Mfg. Name</td>
<td>(4) ID</td>
</tr>
<tr>
<td>Date</td>
<td>Basis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note (2)**
- R = Received
- M = Mixed

**Note (8)** Select EPA Category from list below
- G1 General use
- S1 Air flask
- S2 Antenna
- S3 Antifoulant
- S4 Heat resistant
- S5 High-gloss
- S6 High-temperature
- S8 Military exterior
- S9 Mist
- S10 Navigational aids
- S11 Nonskid
- S12 Nuclear
- S13 Organic zinc
- S14 Pretreatment wash primer
- S15 Repair and maintenance of thermoplastics
- S16 Rubber camouflage
- S17 Sealant for thermal spray aluminum
- S18 Special marking
- S19 Specialty interior
- S20 Tack coat
- S21 Undersea weapons systems
- S22 Weld-through precon. primer

**Note (9)**
- Use "**" for cold application (<40°F)

**Note (11)**
- L1 = ABC Labs
- L2 = DEF Labs

(1) In compliance with 40 CFR Part 63.788(b)(2).
# A-OK SHIPYARDS PAINT AND THINNER USAGE LOG

**MONTH OF __________**

- OPTION 2: Coating Group
- OPTION 3: Thinner Group

<table>
<thead>
<tr>
<th>COATING (Complete Before Work)</th>
<th>THINNER (Complete Before Work)</th>
<th>MACT REQUIREMENTS</th>
<th>MIXING</th>
<th>YOHAQ EMISSIONS</th>
<th>CERTIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mfg. Name</td>
<td>ID</td>
<td>Batch</td>
<td>EPA Cat.</td>
<td>VOC Limit</td>
<td>Mfg. Name</td>
</tr>
<tr>
<td>_____________________________</td>
<td>___________</td>
<td>_______</td>
<td>______</td>
<td>_______</td>
<td>__________________________</td>
</tr>
</tbody>
</table>

### Notes:

- **Note (1):** In compliance with 40 CFR Part 63,788(b)(2).

**File:** PLAN1.WPD  
**Page:** 17
NO THINNING

In compliance with 40 CFR Part 63.785.
Contact Paint Foreman or ________.
Maximum Allowable Thinning Ratio

<table>
<thead>
<tr>
<th>Ratio</th>
<th>Normal (≥ 40°F)</th>
<th>Cold (&lt; 40°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinner</td>
<td>USE NO SUBSTITUTE&lt;sup&gt;(1)&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Mfg. Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product ID</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Use no more than ___ gal thinner per gallon paint.

<sup>(1)</sup> In compliance with 40 CFR Part 63.785.
Contact Paint Foreman or ________

Maximum Allowable Thinning Label
MARINE COATING ALLOWABLE THINNING RATIO
CALCULATION SHEET (SIDE 1) FOR OPTIONS 2 AND 3

A Coating

<table>
<thead>
<tr>
<th>Batch Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
</tr>
<tr>
<td>ID</td>
</tr>
<tr>
<td>Category</td>
</tr>
</tbody>
</table>

B Thinner

<table>
<thead>
<tr>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
</tr>
</tbody>
</table>

Step Instructions (Use VOC data collection sheet for this batch of coating)

<table>
<thead>
<tr>
<th>Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Enter Vs the volume fraction solids in the batch as supplied, (liter solid/liter coating) on lines 1a and 1b.</td>
</tr>
<tr>
<td>2 Enter VOHAP LIMIT, for normal and for cold operation, based on the coating category (see side 2)</td>
</tr>
<tr>
<td>3 Multiply line 1a times line 2a and enter the results on line 3a.</td>
</tr>
<tr>
<td>4 Calculate Mv, the VOC Content of the Batch</td>
</tr>
<tr>
<td>5 Subtract line 4a from 3a and enter results on line 5a Subtract line 4b from 3b and enter result on line 5b. STOP if negative. See Supervisor.</td>
</tr>
<tr>
<td>6 Enter Dn, the Thinner Density, grams/liter, on lines</td>
</tr>
<tr>
<td>7 Divide line 5a by line 6a and enter result on line 7a.</td>
</tr>
</tbody>
</table>

8 Enter line 7a: Use no more than gallons thinner per gallon coating for normal temperatures.

Enter line 7b: Use no more than gallons thinner per gallon coating for cold temperatures.
# MARINE COATING ALLOWABLE THINNING RATIO
## CALCULATION SHEET (SIDE 1) FOR OPTION 4

<table>
<thead>
<tr>
<th>A</th>
<th>Coating</th>
<th>Batch Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Manufacturer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ID</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Category</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Thinner</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>ID</td>
</tr>
</tbody>
</table>

### Instructions (Use VOC data collection sheet for this batch of coating)

<table>
<thead>
<tr>
<th>Step</th>
<th>Instructions</th>
<th>Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enter ( V_s ) the volume fraction solids in the batch as supplied, ( \text{liter solid/liter coating} ) on lines 1a and 1b.</td>
<td>[la%] [lb%]</td>
</tr>
<tr>
<td>2</td>
<td>Enter VOHAP LIMIT, for normal and for cold operation, based on the coating category (see side 2)</td>
<td>( t \geq 4.5^\circ\text{C} ) [2a] ( t &lt; 4.5^\circ\text{C} ) [2b]</td>
</tr>
<tr>
<td>3</td>
<td>Multiply line 1a times line 2a and enter the results on line 3a. Multiply line 1b times line 2b and enter the results on line 3b.</td>
<td>[3a] [3b]</td>
</tr>
<tr>
<td>4</td>
<td>Enter the VOHAP content, grams/liter, of the batch on lines 4a and 4b. Note: VOHAP content was determined using EPA approved test method.</td>
<td>[4a] [4b]</td>
</tr>
<tr>
<td>5</td>
<td>Enter ( D_{vw,hap} ) the average Density of the VOHAP Thinners, grams/liter, on lines 5a and 5b.</td>
<td>[5a] [5b]</td>
</tr>
<tr>
<td>6</td>
<td>Divide line 4a by line 5a and enter result on line 6a. Divide line 4b by line 5b and enter result on line 6b.</td>
<td>( RX ) ( R ) [c] [6a] [6b]</td>
</tr>
</tbody>
</table>

7 Enter line 6a: Use no more than _____ gallons thinner per gallon coating for normal temperatures.

Enter line 6b: Use no more than _____ gallons thinner per gallon coating for cold temperatures.
## MARINE COATING ALLOWABLE THINNING RATIO CALCULATION SHEET (SIDE 2)

### Coating Category:

<table>
<thead>
<tr>
<th>Coating Category</th>
<th>General Use 571</th>
<th>t &gt; 4.5°C</th>
<th>728</th>
<th>t &lt; 4.5°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty</td>
<td></td>
<td>1,439</td>
<td></td>
<td>971</td>
</tr>
<tr>
<td>S2 Antenna</td>
<td></td>
<td>8 4 1</td>
<td>1,069</td>
<td></td>
</tr>
<tr>
<td>S5 High-gloss</td>
<td></td>
<td>8 4 1</td>
<td>1,069</td>
<td></td>
</tr>
<tr>
<td>S6 High-temperature</td>
<td></td>
<td>2,3 7</td>
<td>1,597</td>
<td></td>
</tr>
<tr>
<td>S7 Inorganic zinc high-build</td>
<td></td>
<td>571</td>
<td>728</td>
<td></td>
</tr>
<tr>
<td>S8 Military exterior</td>
<td></td>
<td>5 7 1</td>
<td>728</td>
<td></td>
</tr>
<tr>
<td>S9 Mist</td>
<td></td>
<td>2.235</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S10 Navigational aids</td>
<td></td>
<td>1,597</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S11 Nonskid</td>
<td></td>
<td>5 7 1</td>
<td>728</td>
<td></td>
</tr>
<tr>
<td>S12 Nuclear</td>
<td></td>
<td>8 4 1</td>
<td>1,069</td>
<td></td>
</tr>
<tr>
<td>S13 Organic zinc</td>
<td></td>
<td>6 3 0</td>
<td>802</td>
<td></td>
</tr>
<tr>
<td>S14 Pretreatment wash primer</td>
<td></td>
<td>11,095</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>S15 Repair and maintenance of thermoplastics</td>
<td></td>
<td>1,597</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>S16 Rubber camouflage</td>
<td></td>
<td>571</td>
<td>728</td>
<td></td>
</tr>
<tr>
<td>S17 Sealant for thermal spray aluminum</td>
<td></td>
<td>2,235</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>S18 Special marking</td>
<td></td>
<td>1,178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S19 Specialty interior</td>
<td></td>
<td>571</td>
<td>728</td>
<td></td>
</tr>
<tr>
<td>S20 Tack coat</td>
<td></td>
<td>2,2 3 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S21 Undersea weapons systems</td>
<td></td>
<td>571</td>
<td>728</td>
<td></td>
</tr>
<tr>
<td>S22 Weld-through precon. primer</td>
<td></td>
<td>2,8 8 5</td>
<td>--</td>
<td></td>
</tr>
</tbody>
</table>

Note: To convert from g/L to lb/gal, multiply by (3.785 L/gal) (l/453.6 lb/g) or 1/120. For compliance purposes, metric units define the standards.

Note: Cold-weather allowances are not given to coatings in categories that permit over a 40 percent VOHAP content by volume. Such coatings are subject to the same limits regardless of weather conditions.
APPENDIX B: MARINE COATING DATA SHEETS
VOC DATA SHEET

PROPERTIES OF THE MARINE COATING OR THINNER “AS SUPPLIED” BY THE MANUFACTURER

Manufacture: ___________________ Product Identification: ________________

Is this product a coating or thinner? COATING_ THINNER_____

If product is a coating or paint please provide the information in the box below and provide all information for Items A through J below:

<table>
<thead>
<tr>
<th>MACT Coating Category:</th>
<th>General Use</th>
<th>or Specialty Coating ____</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Coating is a Specialty Coating Please list the specific Category type(s) below. (Use attached list of marine coating specialty categories):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>_</td>
<td>_</td>
<td></td>
</tr>
<tr>
<td>_</td>
<td>_</td>
<td></td>
</tr>
</tbody>
</table>

If the product is thinner or reducer, please provide the information requested in Items D through J below:

Properties of the coating or thinner as supplied to the customer

A. Coating Density (Dc) _____ g/L or _____ lbs/gal [ ] ASTM D1475-90 [ ] Other

B. Total Volatiles: Mass Percent [ ] ASTM D2369-93 [ ] Other

C. Cure Volatiles Content (Ccv) _____ g/L or _____ lbs/gal [ ] Calculated [ ] Other

D. Organic Volatiles: (Mo) _____ Mass Percent [ ] Calculated [ ] Other

E. Water Content
   1. (Mw) _____ Mass Percent [ ] ASTM D3792-91 [ ] ASTM D4017-90 [ ] Other
   2. (Vw)_____ Volume Percent [ ] Calculated [ ] Other

F. Exempt Compounds Content (Cex) _____ g/L or _____ lbs/gal [ ] Calculated [ ] Other

G. Nonvolatile: (Vs) _____ Volume Percent [ ] Calculated [ ] Other

H. VOC Content (VOC):
   1. _____ g/L or _____ lbs/gal solids (nonvolatiles)
   2. _____ g/L or _____ lbs/gal coating (less water and exempt compounds)

I. Thinner Density: (Dth) _______ g/L or _______ lbs/gal ASTM _____ [ ] Other
Coating Speciation: Provide the percentage of each chemical component of this coating or thinner. (If only a percentage range can be supplied, the range mean will be used to calculate VOC and HAP emissions.) This information is not required for compliance with the shipyard MACT, however other federal and/or state environmental regulations require this data. By providing this information now it will avoid the possibility that the shipyard will make redundant requests for the data in the future.

<table>
<thead>
<tr>
<th>COATING OR THINNER COMPONENT</th>
<th>MASS PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonvolatile Components, Water and Exempt Comounds</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
</tbody>
</table>

| Organic Volatile Components: | |
| 1. |  |
| 2. |  |
| 3. |  |
| 4. |  |
| 5. |  |
| 6. |  |
| 7. |  |
| 8. |  |
| 9. |  |
| 10. |  |

Signed: ____________________________
Dated __________
## VOLATILE ORGANIC HAP (VOHAP) LIMITS FOR MARINE COATINGS

<table>
<thead>
<tr>
<th>Coating Category</th>
<th>VOHAP limits</th>
<th>grams/liter coating (minus water and exempt compounds)</th>
<th>grams/liter solids</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>t ≥ 4.5°C</td>
<td>t ≤ 4.5°C</td>
</tr>
<tr>
<td>General use</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Specialty</td>
<td></td>
<td>- --</td>
<td></td>
</tr>
<tr>
<td>Air flask</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Antenna</td>
<td></td>
<td>530 1,439 -</td>
<td></td>
</tr>
<tr>
<td>Antifoulant</td>
<td></td>
<td>400 765 971</td>
<td></td>
</tr>
<tr>
<td>Heat resistant</td>
<td></td>
<td>420 841 1,069</td>
<td></td>
</tr>
<tr>
<td>High-gloss</td>
<td></td>
<td>420 841 1,069</td>
<td></td>
</tr>
<tr>
<td>High-temperature</td>
<td></td>
<td>500 1,237 1,597</td>
<td></td>
</tr>
<tr>
<td>Inorganic zinc high-build</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Military exterior</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Mist</td>
<td></td>
<td>610 2,235 -</td>
<td></td>
</tr>
<tr>
<td>Navigational aids</td>
<td></td>
<td>550 1,597 -</td>
<td></td>
</tr>
<tr>
<td>Nonskid</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td></td>
<td>420 841 1,069</td>
<td></td>
</tr>
<tr>
<td>Organic zinc</td>
<td></td>
<td>360 630 802</td>
<td></td>
</tr>
<tr>
<td>Pretreatment wash primer</td>
<td></td>
<td>780 11,095</td>
<td></td>
</tr>
<tr>
<td>Repair and maint. of thermoplastics</td>
<td></td>
<td>550 1,597</td>
<td></td>
</tr>
<tr>
<td>Rubber camouflage</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Sealant for thermal spray aluminum</td>
<td></td>
<td>610 2,235</td>
<td></td>
</tr>
<tr>
<td>Special marking</td>
<td></td>
<td>490 1,178 -</td>
<td></td>
</tr>
<tr>
<td>Specialty interior</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Tack coat</td>
<td></td>
<td>610 2,235 -</td>
<td></td>
</tr>
<tr>
<td>Undersea weapons systems</td>
<td></td>
<td>340 571 728</td>
<td></td>
</tr>
<tr>
<td>Weld-through precon. primer</td>
<td></td>
<td>650 2,885</td>
<td></td>
</tr>
</tbody>
</table>

*The limits are expressed in units of grams per liter. Either of these units may be used for the compliance procedure described in 40 CFR 798.10(x), but only the limits expressed in units of g/L solids (or coatings) shall be used for the compliance procedure described in 40 CFR 798.10(x). *

**Cold weather allowances are not given to coatings in categories that permit over a 45 percent VOHAP content by volume. Such coatings are defined in the water-based reporting of weather conditions.**

---

File: PLANI. WPD

Page 26
### Shipyard MACT Marine Coating Expressions and Equations

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Constituents</th>
<th>Volume Expression</th>
<th>Mass Expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic</td>
<td>Organic-Volatiles</td>
<td>$V_o$</td>
<td>$M_o$</td>
</tr>
<tr>
<td></td>
<td>Exempt-Volatiles</td>
<td>$V_e$</td>
<td>$M_e$</td>
</tr>
<tr>
<td>Aqueous</td>
<td>Water</td>
<td>$V_w$</td>
<td>$M_w$</td>
</tr>
<tr>
<td>Solid</td>
<td>Non-Volatiles</td>
<td>$V_s$</td>
<td>$M_s$</td>
</tr>
<tr>
<td>“Cure-Volatiles”</td>
<td>Reaction Volatiles</td>
<td></td>
<td>$M_c$</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Coating Property</th>
<th>Expression</th>
<th>units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A $D_s$</td>
<td>$\frac{\Sigma M_i}{\Sigma V_i}$</td>
<td>grams/liter</td>
</tr>
<tr>
<td>B $M_v$</td>
<td>$\frac{M_v}{\Sigma M_i}$</td>
<td>%</td>
</tr>
<tr>
<td>C $c_{cm}$</td>
<td>$\frac{M_c}{\Sigma V_i}$</td>
<td>grams/liter</td>
</tr>
<tr>
<td>D $M_T$</td>
<td>$\frac{(M_o + M_e + M_w + M_c)}{\Sigma M_i}$</td>
<td>%</td>
</tr>
<tr>
<td>E $M_w$</td>
<td>$\frac{M_w}{\Sigma M_i}$</td>
<td>%</td>
</tr>
<tr>
<td>F $V_w$</td>
<td>$\frac{V_w}{\Sigma V_i}$</td>
<td>%</td>
</tr>
<tr>
<td>G $V_s$</td>
<td>$\frac{V_s}{\Sigma V_i}$</td>
<td>%</td>
</tr>
<tr>
<td>H $V_s$</td>
<td>$\frac{(M_v)}{V_s}$</td>
<td>grams/liter</td>
</tr>
<tr>
<td>I $D_{th}$</td>
<td>$\frac{\Sigma M_i}{\Sigma V_i}$</td>
<td>grams/liter</td>
</tr>
</tbody>
</table>

Acetone was recently identified to have a low photochemical reactivity, as a result it was added to the list of “exempt” compounds. When Method 24 in 40 CFR Part 60 was published, acetone was considered a VOC. Therefore, the method that will be used to determine the acetone content in a coating should be specified. This is also applicable to any new addition to the list of exempt compounds, unless an EPA approved test method already exists.

In calculating the mass of VOCs in a coating the “exempt” compounds which are on the HAP list should not be subtracted from the mass of total volatiles.
40 CFR 51.100 (s) - Exempt Compounds

(s) Volatile organic compounds (VOC) means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions.

(1) This includes any such organic compound other than the following, which have been determined to have negligible photochemical reactivity:

- acetone;
- methane;
- ethane;
- methylene chloride (dichloromethane);
- 1,1,1-trichloroethane (methyl chloroform);
- 1,1,1-trichloro-2,2,2-trifluoroethane (CFC-113);
- trichlorofluoromethane (CFC-11);
- dichlorodifluoromethane (CFC-12);
- chlorodifluoromethane (CFC-22);
- trifluoromethane (FC-23);
- 1,2-dichloro-1,1,2,2-tetrafluoroethane (CFC-114);
- chloropentafluoroethane (CFC-115);
- 1,1,1,2-tetrafluoroethane (HFC-134a);
- 1,1-dichloro 1-fluoroethane (HCFC-141b);
- 1-chloro 1,1-difluoroethane (HCFC-142b);
- 2-chloro-1,1,1,2- tetrafluoroethane (HCFC-124);
- pentafluoroethane (HFC-125);
- 1,1,2,2- tetrafluoroethane (HFC-134);
- 1,1,1-trifluoroethane (HFC-143a);
- 1,1-difluoroethane (HFC-152a);

and perfluorocarbon compounds which fall into these classes:

(i) Cyclic, branched or linear, completely fluorinated alkanes;
(ii) Cyclic, branched or linear, completely fluorinated ethers with no unsaturations;
(iii) Cyclic, branched or linear, completely fluorinated tertiary amines with no unsaturations; and
(iv) Sulfur containing perfluorocarbons with no unsaturations and with sulfur bonds only to carbon and fluorine.

(2) For purposes of determining compliance with emissions limits, VOC will be measured by the test methods in the approved State implementation plan (SIP) or 40 CFR part 60, appendix A as applicable. Where such a method also measures compounds with negligible photochemical reactivity, these negligibly-reactive compounds may be excluded as VOC if the amount of such compounds is accurately quantified and such exclusion is approved by the enforcement authority.
APPENDIX C: COATING DEFINITIONS
### General use coating

**GI** General use coating means any coating that is not a specialty coating.

### Specialty coating

**S1** Air flask specialty coating means any special composition coating applied to interior surfaces of high pressure breathing air flasks to provide corrosion resistance and that is certified safe for use with breathing air supplies.

**S2** Antenna specialty coating means any coating applied to equipment through which electromagnetic signals must pass for reception or transmission.

**S3** Antifoulant specialty coating means any coating that is applied to the underwater portion of a vessel to prevent or reduce the attachment of biological organisms and that is registered with the EPA as a pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act.

**S4** Heat resistant specialty coating means any coating that during normal use must withstand a temperature of at least 204°C (400°F).

**S5** High-gloss specialty coating means any coating that achieves at least 85 percent reflectance on a 60 degree meter when tested by ASTM Method D523 (incorporation by reference—see §63.14).

**S6** High-temperature specialty coating means any coating that during normal use must withstand a temperature of at least 426°C (800°F).

**S7** Inorganic zinc (high-build) specialty coating means a coating that contains 960 grams per liter (8 pounds per gallon) or more elemental zinc incorporated into an inorganic silicate binder that is applied to steel to provide galvanic corrosion resistance. (These coatings are typically applied at more than 2 mil dry film thickness.)

**S8** Military exterior specialty coating or Chemical Agent Resistant Coatings (“CARC”) means any exterior topcoat applied to military or U.S. Coast Guard vessels that are subject to specific chemical, biological, and radiological washdown requirements.

**S9** Mist specialty coating means any low viscosity, thin film epoxy coating applied to an inorganic zinc primer that penetrates the porous zinc primer and allows the occluded air to escape through the paint film prior to curing.

**S10** Navigational aids specialty coating means any coating applied to Coast Guard buoys or other Coast Guard waterway markers when they are recoated aboard ship at their usage site and immediately returned to the water.

**S11** Nonskid specialty coating means any coating applied to the horizontal surfaces of a marine vessel for the specific purpose of providing slip resistance for personnel, vehicles, or aircraft.
means any protective coating used to seal porous surfaces such as steel (or concrete) that otherwise would be subject to intrusion by radioactive materials. These coatings must be resistant to long-term (service life) cumulative radiation exposure (ASTM D4082-89 [incorporation by reference-see §63. 14]), relatively easy to decontaminate (ASTM D4256-89 [reapproved 1994] [incorporation by reference-see §63.14]), and resistant to various chemicals to which the coatings are likely to be exposed (ASTM D3912-80 [incorporation by reference--see §63.14]). [Nuclear coatings should meet the general protective requirements outlined by the Department of Energy (formerly U.S. Atomic Energy Commission Regulatory Guide 1.54).]

means any coating derived from zinc dust incorporated into an organic binder that contains more than 960 grams of elemental zinc per liter (8 pounds per gallon) of coating, as applied and that is used for the expressed purpose of corrosion protection.

means any coating that contains a minimum of 0.5 percent acid by mass, and is applied only to bare metal to etch the surface and enhance adhesion of subsequent coatings.

means any vinyl, chlorinated rubber, or bituminous resin coating that is applied over the same type of existing coating to perform the partial recoating of any in-use commercial vessel. (This definition does not include coal tar epoxy coatings, which are considered “general use” coatings.)

means any specially formulated epoxy coating used as a camouflage topcoat for exterior submarine hulls and sonar domes.

means any epoxy coating applied to thermal spray aluminum surfaces at a maximum thickness of 1 dry mil.

means any coating that is used for safety or identification applications, such as markings on flight decks and ships’ numbers.

means any coating used on interior surfaces aboard U.S. military vessels pursuant to a coating specification that requires the coating to meet specified fire retardant and low toxicity requirements, in addition to the other applicable military physical and performance requirements.

means any thin film epoxy coating applied at a maximum thickness of 2 dry mils to prepare an epoxy coating that has dried beyond the time limit specified by the manufacturer for the application of the next coat.

means any coating applied to any component of a weapons system intended to be launched or fired from under the sea.

means a coating that provides corrosion protection for steel during inventory, is typically applied at less than 1 mil dry film thickness, does not require removal prior to welding, is temperature resistant (burn back from a weld is less than 1.25 centimeters [0.5 inches]), and does not normally require removal before applying film-building coatings, including inorganic zinc high-build coatings. When constructing new vessels, there may be a need to remove areas of weld-through preconstruction primer due to surface damage or contamination prior to application of film-building coatings.
THREE:
THINNING RATION CALCULATION SHEETS
FOR
OPTIONS 2 & 3
AND
OPTION 4
### MARINE COATING ALLOWABLE THINNING RATIO CALCULATION SHEET (SIDE 1) FOR OPTIONS 2 AND 3

<table>
<thead>
<tr>
<th>A</th>
<th>Coating</th>
<th>I</th>
<th>Batch Number</th>
<th>Manufacturer</th>
<th>ID</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Thinner</td>
<td>Manufacturer</td>
<td>ID</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Step Instructions (Use VOC data collection sheet for this batch of coating)

<table>
<thead>
<tr>
<th>Step</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enter Vs the volume fraction solids in the batch, as supplied (liter solid/liter coating) on lines 1a and 1b.</td>
</tr>
<tr>
<td>2</td>
<td>Enter VOHAP LIMIT, for normal and for cold operation, based on the coating category (see side 2)</td>
</tr>
<tr>
<td>3</td>
<td>Multiply line 1a times line 2a and enter the results on line 3a. Multiply line 1b times line 2b and enter the results on line 3b.</td>
</tr>
<tr>
<td>4</td>
<td>Calculate $M_{voc}$ the VOC Content of the Batch. Enter Method 24 $M_v$, mass fraction Total Volatiles. Enter $M_w$, the mass fraction Water. Subtract line 4.2 from line 4.1, enter difference. Enter $D_c$ the Coating Density, grams/liter. Multiply line 4.3 times line 4.4, enter result on lines 4a and 4b.</td>
</tr>
<tr>
<td>5</td>
<td>Subtract line 4a from 3a and enter results on line 5a Subtract line 4b from 3b and enter result on line 5b. STOP if negative. See Supervisor.</td>
</tr>
<tr>
<td>6</td>
<td>Enter $D_t$, the Thinner Density, grams/liter, on lines 6a and 6b.</td>
</tr>
<tr>
<td>7</td>
<td>Divide line 5a by line 6a and enter result on line 7a. Divide line 5b by line 6b and enter result on line 7b.</td>
</tr>
</tbody>
</table>

### Calculations

<table>
<thead>
<tr>
<th>Calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a %</td>
</tr>
<tr>
<td>2a t $\geq$ 4.5°C</td>
</tr>
<tr>
<td>3a</td>
</tr>
<tr>
<td>4a</td>
</tr>
<tr>
<td>5a</td>
</tr>
<tr>
<td>6a</td>
</tr>
<tr>
<td>7a $R_n$</td>
</tr>
</tbody>
</table>

### Line 8

Enter line 7a: Use no more than ______ gallons thinner per gallon coating for normal temperatures.

Enter line 7b: Use no more than ______ gallons thinner per gallon coating for cold temperatures.
MARINE COATING ALLOWABLE THINNING RATIO
CALCULATION SHEET (SIDE 1) FOR
OPTIONS 4

<table>
<thead>
<tr>
<th>A</th>
<th>Coating</th>
<th>Batch Number</th>
<th>Manufacturer</th>
<th>ID</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Thinner</td>
<td>Manufacturer</td>
<td>ID</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Step Instructions (Use VOC data collection sheet for this batch of coating)  
Calculations

1. Enter Vs the volume fraction solids in the batch, as supplied (liter solid/liter coating) on lines la and lb.
   \[ \text{1a \%} \quad \text{lb \%} \]

2. Enter VOHAP LIMIT, for normal and for cold operation, based on the coating category (see side 2)
   \[ t > 4.5^\circ C \quad t < 4.5^\circ C \]
   \[ \text{2a} \quad \text{2b} \]

3. Multiply line la times line 2a and enter the results on line 3a.
   \[ \text{3a} \]
   Multiply line lb times line 2b and enter the results on line 3b.
   \[ \text{3b} \]

4. Enter the VOHAP content, grams/liter, of the batch on lines 4a and 4b.
   Note: VOHAP content was determined using EPA approved test method.
   \[ \text{4a} \quad \text{4b} \]

5. Enter \( D_{\text{thvohap}} \) the average Density of the VOHAP Thinners, grams/liter, on lines 5a and 5b.
   \[ \text{5a} \quad \text{5b} \]

6. Divide line 4a by line 5a and enter result on line 6a.
   \[ \text{6a} \quad \text{RN} \]
   Divide line 4b by line 5b and enter result on line 6b.
   \[ \text{6b} \quad \text{RN} \]

7. Enter line 6a: Use no more than ______ gallons thinner per gallon coating for normal temperatures.

   Enter line 6b: Use no more than ______ gallons thinner per gallon coating for cold temperatures.
<table>
<thead>
<tr>
<th>Coating Category:</th>
<th>VOHAP limits grams/liter solids</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$t \geq 4.5^\circ C$</td>
</tr>
<tr>
<td>General G1</td>
<td>571 728</td>
</tr>
<tr>
<td>Specialty</td>
<td></td>
</tr>
<tr>
<td>S1 Air flask</td>
<td>571 728</td>
</tr>
<tr>
<td>S2 Antenna</td>
<td>1,439 --</td>
</tr>
<tr>
<td>S3 Antifoulant</td>
<td>7 6 5 971</td>
</tr>
<tr>
<td>S4 Heat resistant</td>
<td>8 4 1 1,069</td>
</tr>
<tr>
<td>S5 High-gloss</td>
<td>8 4 1 1,069</td>
</tr>
<tr>
<td>S6 High-temperature</td>
<td>1,237 1,597</td>
</tr>
<tr>
<td>S7 Inorganic zinc high-build</td>
<td>5 7 1 728</td>
</tr>
<tr>
<td>S8 Military exterior</td>
<td>5 7 1 728</td>
</tr>
<tr>
<td>S9 Mist</td>
<td>2,235 --</td>
</tr>
<tr>
<td>S10 Navigational aids</td>
<td>1,597</td>
</tr>
<tr>
<td>S11 Nonskid</td>
<td>5 7 1 728</td>
</tr>
<tr>
<td>S12 Nuclear</td>
<td>8 4 1 1,069</td>
</tr>
<tr>
<td>S13 Organic zinc</td>
<td>6 3 0 802</td>
</tr>
<tr>
<td>S14 Pretreatment wash primer</td>
<td>11,095 --</td>
</tr>
<tr>
<td>S15 Repair and maintenance of thermoplastics</td>
<td>1,597 --</td>
</tr>
<tr>
<td>S16 Rubber camouflage</td>
<td>571 728</td>
</tr>
<tr>
<td>S17 Sealant for thermal spray aluminum</td>
<td>2,235</td>
</tr>
<tr>
<td>S18 Special marking</td>
<td>1,178</td>
</tr>
<tr>
<td>S19 Specialty interior</td>
<td>571 728</td>
</tr>
<tr>
<td>S20 Tack coat</td>
<td>2,235 --</td>
</tr>
<tr>
<td>S21 Undersea weapons systems</td>
<td>5 7 1 728</td>
</tr>
<tr>
<td>S22 Weld-through precon. mimer</td>
<td>2, 8 8 5</td>
</tr>
</tbody>
</table>

Note: To convert from g/L. to lb/gal, multiply by (3.785 L/gal) (1/453.6 lb/g) or 1/120. For compliance purposes, metric units define the standards.

Note: Cold-weather allowances are not given to coatings in categories that permit over a 40 percent VOHAP content by volume. Such coatings are subject to the same limits regardless of weather conditions.
# MARINE COATING ALLOWABLE THINNING RATIO
CALCULATION SHEET (SIDE 1)

<table>
<thead>
<tr>
<th>A</th>
<th>Coating</th>
<th>Batch Number</th>
<th>Manufacturer</th>
<th>ID</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PR0369-4009</td>
<td><em>1234</em></td>
<td><em>SIGMA</em></td>
<td>PR0369-4009</td>
<td><em>GENERAL USE</em></td>
</tr>
<tr>
<td>B</td>
<td>Thinner</td>
<td>Manufacturer</td>
<td>ID</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>91-92</td>
<td><em>SIGMA</em></td>
<td><em>91-92</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Step Instructions (Use VOC data collection sheet for this batch of coating)**

1. Enter Vs the volume fraction solids in the batch as supplied (liter solid/liter coating) on lines 1a and 1b.
   - 1a 61.28 %
   - 1b 61.28 %

2. Enter VOHAP LIMIT, for normal and for cold operation, based on the coating category (see side 2).
   - 2a t ≥ 4.5°C
   - 2b t ≤ 4.5°C
   - 2a 571
   - 2b 728

3. Multiply line 1a times line 2a and enter the results on line 3a.
   Multiply line 1b times line 2b and enter the results on line 3b.
   - 3a 349.9
   - 3b 446.1

4. Calculate $M_{Voc}$ the VOC Content of the Batch
   - Enter Method 24 $M_v$ the mass fraction Total Volatiles.
   - Enter $M_w$ the mass fraction Water.
   - Subtract line 4.2 from line 4.1, enter difference.
   - Enter $D_c$ the Coating Density, grams/liter.
   - Multiply line 4.3 times line 4.4, enter result on lines 4a and 4b.
   - 4a 329.8
   - 4b 329.8

5. Subtract line 4a from 3a and enter results on line 5a. Subtract line 4b from 3b and enter result on line 5b. STOP if negative. See Supervisor.
   - 5a 20.1
   - 5b 116.3

6. Enter $D_t$ the Thinner Density, grams/liter, on lines 6a and 6b.
   - 6a 848
   - 6b 848

7. Divide line 5a by line 6a and enter result on line 7a.
   Divide line 5b by line 6b and enter result on line 7b.
   - 7a 0.024
   - 7b 0.137

8. **Enter line 7a: Use no more than 0.024 gallons thinner per gallon coating for normal temperatures.**
   - Enter line 7b: Use no more than 0.137 gallons thinner per gallon coating for cold temperatures.
FOUR:
NOTIFICATION FORMS
AOK SHIPYARDS
The Best in the West

13 June 1996

EPA Region V
Director, Air and Radiation Division
77 West Jackson Blvd.
Chicago, IL 60604-3507

RE: 40 CFR PART 63, SUBPART II
National Emission Standards for Shipbuilding and Ship Repair (Surface Coating)

Dear Sir:

AOK Shipyard is pleased to submit the enclosed Implementation Plan for your review and approval. Our Implementation Plan is fully compliant with all requirements of the subject Rule.

We have also enclosed the required Initial Notification form. Our facility is located in <STATD>, where

☐ The State has been delegated authority. You are provided herein a copy of the Initial Notification sent in its original to

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

☐ Your office is the delegated authority. This is the single original Initial Notification.

If you have any questions, please contact me personally at (618) 955-1234.

Sincerely yours,

Richard L. Jones
Environmental Manager

2245 Tower Drive, Rolling Meadow, IL 60822-2543 (618) 955-1212
FAX (618) 955-2121
# INITIAL NOTIFICATION

| A. APPLICANT'S NAME AND ADDRESS | AOK SHIPYARDS  
2245 Tower Drive  
Rolling Meadow, Illinois 60822-2543 |
|----------------------------------|--------------------------------------------------|
| B. FACILITY'S NAME AND ADDRESS   | AOK SHIPYARDS  
128 South Industrial Boulevard  
Pineville, Illinois 68234-2543 |
| C. RELEVANT STANDARD            | 40 CFR PART 63, SUBPART II  
*National Emission Standards for Shipbuilding and Ship Repair (Surface Coating)* |
| D. COMPLIANCE DATE              | The relevant standard became effective on 12/15/95. The compliance date for the relevant standard is <date>. |
| E. INITIAL STARTUP DATE         | AOK SHIPYARDS began operations on <date> and was in operation when the relevant standard was enacted. |
Dear Sir,

AOK Shipyard currently has a potential to emit hazardous air pollutants ("HAP") in amounts greater than 25 tons per year of all combined HAPs and/or 10 tons per year of an individual HAP. AOK Shipyard would therefore be classified as a "major" source of hazardous air pollutants and be subject to the requirements of the National Emission Standards for Shipbuilding and Ship Repair (Surface Coating) Maximum Achievable Control Technology ("MACT"). This letter is to inform you that AOK Shipyard is intending to accept a federally enforceable limit on it’s potential to emit hazardous air pollutants ("HAP"), on or before <compliance date>, to a level less than 25 tons per year of all combined HAPs and 10 tons per year of any individual HAP. This action will make AOK Shipyard an "area" source of hazardous air pollutants and therefore not subject to the requirements of the shipyard MACT.

We have also enclosed the required Initial Notification form. Our facility is located in <STATE>, where

☐ The State has been delegated authority. You are provided herein a copy of the Initial Notification sent in its original to:

   ____________________________
   ____________________________
   ____________________________

☐ Your office is the delegated authority. This is the single original Initial Notification.

If you have any questions, please contact me personally at (618) 955-1234.

Sincerely yours,

Richard L. Jones
Environmental Manager

SHIPYARD MACT RULE
40 CFR PART 63, SUBPART II
NATIONAL EMISSION STANDARDS FOR SHIPBUILDING AND SHIP REPAIR (SURFACE COATING)
**INITIAL NOTIFICATION**

<table>
<thead>
<tr>
<th>A. APPLICANT'S NAME AND ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOK SHIPYARDS</td>
</tr>
<tr>
<td>2245 Tower Drive</td>
</tr>
<tr>
<td>Rolling Meadow, Illinois 60S22-2543</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. FACILITY'S NAME AND ADDRESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOK SHIPYARDS</td>
</tr>
<tr>
<td>128 South Industrial Boulevard</td>
</tr>
<tr>
<td>Pineville, Illinois 68234-2543</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. RELEVANT STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 CFR PART 63, SUBPART II</td>
</tr>
<tr>
<td><em>National Emission Standards for Shipbuilding and Ship Repair (Surface-Coating)</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>D. COMPLIANCE DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The relevant standard became effective on 12/15/95. The compliance date for the relevant standard is &lt;date&gt;.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E. INITIAL STARTUP DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOK SHIPYARDS began operations on &lt;date&gt; and was in operation when the relevant standard was enacted.</td>
</tr>
</tbody>
</table>
FIVE:
“LOW-USAGE EXEMPTION” FORM
AND
“UNAFFECTED MAJOR SOURCE” FORM
<table>
<thead>
<tr>
<th>Coating ID and Description of Use</th>
<th>Date Applied</th>
<th>Volume Applied</th>
<th>Cumulative Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>S7 Inorganic zinc high-build</td>
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<tr>
<td>S8 Military exterior</td>
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<tr>
<td>S9 Mist</td>
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<tr>
<td>S10 Navigational aids</td>
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<td>S11 Nonskid</td>
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<tr>
<td>S12 Nuclear</td>
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<tr>
<td>S13 Organic zinc</td>
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<tr>
<td>S14 Pretreatment wash primer</td>
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</tbody>
</table>

Note 1: EPA Coating Categories are identified below.

**General**
- S7 Inorganic zinc high-build
- S8 Military exterior
- S9 Mist
- S10 Navigational aids
- S11 Nonskid
- S12 Nuclear
- S13 Organic zinc
- S14 Pretreatment wash primer

**Specialty**
- S15 Repair/maint. of thermoplastics
- S16 Rubber camouflage
- S17 Sealant for thermal spray aluminum
- S18 Special marking
- S19 Specialty interior
- S20 Tack coat
- S21 Undersea weapons systems
- S22 Weld-through precon. primer

Complies with 40 CFR Part 63.781(b). Individual coating limit is 200 liters (52.8 gal), total for all coatings is limited to 1,000 liters (264 gal).
Use additional sheet if required to record monthly coating application. Records must be compiled monthly and retained for five years. Annual total for all coatings is limited to 1,000 liters (264 gal).

Complies with 40 CFR Part 63.788(b).
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