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LACQUER AND CHEMICAL CORP., ALAKA RESEARCH LABS., BROOKLYN, N.Y. (2ND QUARTERLY REPORT)

SECOND QUARTERLY REPORT ON FUNGUS RESISTANCE OF PLASTICS - MAY 10 TO AUG 9, 1951

RUGGERI, S.; ATLAS, R. WAITZE 17 AUG'51 122PP PHOTOS, TABLES

USN CONTR. NO. NORD-11215

PLASTICS - EFFECT OF FUNGI
PLASTICS, LAMINATED

MATERIALS, NON-METALLIC(8)
PLASTICS (2)

UNCLASSIFIED

SECOND QUARTERLY REPORT

on

FUNGUS RESISTANCE OF PLASTICS

to

BUREAU OF ORDNANCE
DEPARTMENT OF THE NAVY
MOISTURE AND FUNGUS PROOFING SECTION
MATERIALS AND PRESERVATION BRANCH
RESEARCH AND DEVELOPMENT DIVISION

CONTRACT NOrd 11215

by

S. Ruggeri and R. Waitze Atlas

Period covered: May 10 to August 9, 1951

ALAKA RESEARCH LABORATORIES
division of
LACQUER AND CHEMICAL CORPORATION
214 - 40th Street
Brooklyn 32, N.Y.

August 17, 1951

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August 17, 1951

FOREWORD

During the second quarter of the period covered by Research Contract NOrd 11215 most of the plastic laminates, included in this program, were tested for funginertness using the Petri-Dish Method; one of the two test methods designated by the Bureau of Ordnance for inclusion in this program. Testing of these laminates using the second of the two methods, the Humidity-Exposure Method, was initiated.

Sufficient data have been obtained to allow a preliminary comparison of the two methods; this comparison being included in this report.

FUNGINERTNESS OF PLASTIC LAMINATES

(PETRI-DISH METHOD)

Introduction

Further work completed under this study has been a continuation of tests of fungus resistance of available plastic laminated materials following the Petri-Dish culture test procedure as outlined in the "Funginertness Requirement and Test, for use in MIL-I-631A(as completed 29 January 1951)," furnished by the Bureau of Ordnance with letter dated 16 February 1951. Earlier work covering this phase of the study was reported in the First Quarterly Report, pages 4 through 25.

Materials

The materials evaluated in this study include the following laminated, thermosetting, plastic materials as approved under the following specifications:

Specification	Type	Filler	Resin	Grade
MIL-P-997A	GSG	Glass Cloth	Silicone	General
MIL-P-15037A	GMG	Glass Cloth	Melamine	General
MIL-P-15047A	NPG	Nylon Cloth	Phenolic	General
MIL-P-3115A	PBG	Paper	Phenolic	General
MIL-P-3115A	PBE	paper	Phenolic	Electrical
MIL-P-3115A	PBE-P	paper	phenolic	Electrical; Punching
MIL-P-15035A	FBM	Cotton Fab.	Phenolic	Mechanical
MIL-P-15035A	FBG	Cotton Fab.	Phenolic	General
MIL-P-15035A	FBE	Cotton Fab.	Phenolic	Electrical
MIL-P-15035A	FBI	Cotton Fab.	Phenolic	Fine Machining

Experimental Procedure

The experimental procedure has been explained in detail in the First Quarterly Report, pages 5, 6, and 7. In this procedure, all specimens were again of 1/8" thickness, except specimens PBG, #13, XX-13 and PBE-P, #14, XXXP-26, which were 1/16" thick.

Evaluation of Results

At the end of the 21 day incubation period, each specimen was examined separately for growth on the surface and for growth on the cut edges and rated as follows:

Observed Fungus growth on the specimen	Rating
No growth	0
Traces of growth (*)	1
Slight to moderate growth: partial coverage	2
Moderate growth: considerable coverage	3
Abundant growth: complete coverage	4

(*) Traces of growth are defined as scattered, sparse fungus growth such as might develop from an unusual mass of spores in the original inoculm, or upon an occasional extraneous bit of debris. (Continous cobwebby growth extending over the entire surface or edge of the specimen, even though not necessarily obscuring the specimen, was rated as 2.)

Table 3, pages 31 through 46, lists the observations on the individual replicates of the unconditioned specimens and the numeric rating of each replicate both for surface and edge growth. Table 4, pages 47 through 62, lists the observations on the individual replicates of the conditioned specimens and the numeric rating of each replicate both for surface and edge growth.

Interpretation of Results for Determination of Funginertness

For a material to be considered funginert it shall not support fungus growth; this shall be due to absence of nutritive substances in the material and not to presence of a fungistatic agent. The absence of a fugitive fungistatic agent was determined from the results on the specimens which received the conditioning of 6 hours at 85° C.

On the basis of the numeric rating of the fungus growth on the six specimens for each sample of plastic laminate being evaluated, the following criteria were used for the various degrees of fungus resistance:

1) Funginert - where at least 2 of 3 specimens were rated 0 or 1 when tested as received and at least 2 of 3 specimens were rated 0 or 1 when tested after being conditioned.

2) Fugitive Fungistatic - where at least 2 of 3 specimens were rated 0 or 1 when tested as received and at least 2 of 3 specimens were not rated 0 or 1 when tested after being conditioned.

3) Fungus Susceptible - where at least 2 of 3 specimens were not rated 0 or 1 when tested as received and at least 2 of 3 specimens were not rated 0 or 1 when tested after being conditioned.

Since it has not been determined whether these criteria will be applied to surface growth alone or to surface growth together with edge growth, separate ratings have been assigned to the specimens based on surface growth alone and on surface and edge growth considered together.

Table 6, pages 63 through 72, lists the classification, of the plastic laminates tested, based on the ratings considering surface growth alone and on the ratings considering surface growth together with edge growth.

TABLE 4

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GSG	#1	119A	Traces (*)	Slight (1 edge)	1	2
		119B	Traces (*)	Traces	1	1
	11514	119C	Traces (*)	Traces	1	1
GMG	#1	118A	Mod: Part Cov. (*)	Slight	2	2
		118B	Mod: Part Cov. (*)	Moderate	2	2
	11508	118C	Mod: Part Cov.	Slight - Moderate	2	2
PBG	#1	65A	Slight	Slight	2	2
		65B	Slight	Slight - Moderate	2	2
	114	65C	Slight (*)	Slight	2	2
PBG	#1	66A	Slight (*)	Moderate	2	2
		66B	Slight (*)	Moderate	2	2
	2008	66C	Mod: Part Cov. (*)	Moderate-Abundant	2	2
PBM	#1	68A	Traces	Slight	1	2
		68B	Slight	Slight-Moderate	2	2
	2029	68C	Slight	Slight	2	2

*-Specimen surface was waterlogged **-Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 4 (Continued) Sheet 2 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBE-P	#1	69A	Slight	Moderate	2	2
		69B	Slight	Moderate	2	2
	2051	69C	Slight	Moderate	2	2
FBM	#1	116A	Mod: Consid Cov.	Moderate	3	3
		116B	Mod: Consid Cov.	Moderate	3	3
	113	116C	Mod: Consid Cov.	Moderate	3	3
FBG	#1	67A	Slight	Slight	2	2
		67B	Slight	Slight - Moderate	2	2
	2013	67C	Slight	Slight	2	2
FBE	#1	117A	Slight	Slight	2	2
		117B	Slight	Moderate	2	2
	1841	117C	Slight	Moderate	2	2
EBI	#1	70A	Mod: Part Cov.	Moderate	2	2
		70B	Slight	Moderate	2	2
	2080	70C	Slight (*)	Moderate	2	2

*-Specimen surface was waterlogged ** -Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29

TABLE 4 (CONTINUED)
GROWTH OF FUNGUS ON PLASTIC LAMINATES

(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMG	#2	71A	Slight	Slight	2	2
		71B	Slight	Slight	2	2
	140	71C	Traces (*)	Slight	1	2
NPG	#2	135A	Traces	Slight	1	2
		135B	Traces	Moderate	1	2
	190	135C	Traces (*)	Slight	1	2
PBG	#2	73A	Traces	Slight (1 edge)	1	2
		73B	Traces	Slight	1	2
	550	73C	Traces	Traces	1	1
PBE	#2	72A	Traces	Slight	1	2
		72B	Traces	Slight	1	2
	520	72C	Traces	Traces	1	1
PBE-P	#2	74A	Traces	Moderate	1	2
		74B	Traces	Moderate	1	2
	780	74C	Traces	Moderate	1	2

* Specimen surface was waterlogged ** - Same for 4 edges unless otherwise noted
Note - For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES

(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBM	#2	75A	Abundant (*)	Abundant	4	4
		75B	Abundant (*)	Abundant	4	4
	900	75C	Abundant	Abundant	4	4
FBM	#2	136A	Mod: Part Cov.	Moderate	2	2
		136B	Mod: Part Cov.	Moderate	2	2
	920	136C	Mod: Part Cov.	Moderate	2	2
FBG	#2	76A	Abundant	Abundant	4	4
		76B	Abundant	Abundant	4	4
	910	36C	Abundant	Abundant	4	4
FBE	#2	77A	Slight	Slight	2	2
		77B	Mod: Part Cov.	Moderate	2	2
	950	77C	Slight	Slight	2	2
FBI	#2	137A	Mod: Part Cov. (*)	Moderate	2	2
		137B	Mod: Part Cov. (*)	Moderate	3	3
	940	137C	Mod: Part Cov. (*)	Moderate	3	3

*-Specimen surface was waterlogged **-Same for 4 edges unless otherwise noted

Note - For emplanation of numeric rating code see page 29.

TABLE 4 (CONTINUED) Sheet 5 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Repli-cates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMG	#3 T-712	109A	Slight (*)	Slight	2	2
		109B	Slight	Slight - Moderate	2	2
		109C	Slight	Slight - Moderate	2	2
NPG	#3 T-819	114A	Slight	Slight	2	2
		114B	Slight	Slight	2	2
		114C	Traces (*)	Slight	1	2
PBG	#3 T-643	108A	Traces	Traces	1	1
		108B	Slight - Moderate	Slight - Moderate	2	2
		108C	Slight	Slight	2	2
PHG	#3 T-640	107A	Traces (*)	Slight	1	2
		107B	Traces (*)	Slight	1	2
		107C	Traces (*)	Slight - Moderate	1	2
PBH-P	#3 T-725	110A	Traces (*)	Slight	1	2
		110B	Traces (*)	Slight	1	2
		110C	Traces (*)	Slight	1	2

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
note- For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED) Sheet 6 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBE-P	#3 T-800	112A	Traces	Slight	1	2
		112B	Traces	Slight	1	2
		112C	Traces	Slight	1	2
PBE-P	#3 T-812	113A	Traces	Slight	1	2
		113B	Traces	Moderate	1	2
		113C	Traces (*)	Slight - Moderate	1	2
FEM	#3 T-601	105A	Abundant	Abundant	4	4
		105B	Abundant	Abundant	4	4
		105C	Abundant (*)	Abundant	4	4
FBG	#3 T-606	106A	Slight (*)	Slight - Moderate	2	2
		106B	Slight (*)	Slight - Moderate	2	2
		106C	Slight (*)	Slight - Moderate	2	2
FBE	#3 T-827	115A	Mod: Consid Cov.	Moderate-Abundant	3	3
		115B	Mod: Consid Cov.	Moderate	3	3
		115C	Mod: Consid Cov.	Moderate	3	3

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29

TABLE 4 (CONTINUED) SHEET 7 OF 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES

(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-Dish Replicates	Description of Fungus Growth: Surface	Description of Fungus Growth: Edges (**)	Numeric Rating*: Surface	Numeric Rating*: Surface and Edges
PBI	#3 T-733	111A	Mod: Consid Cov.	Moderate	3	3
		111B	Mod: Consid Cov.	Moderate	3	3
		111C	Mod: Consid Cov.	Moderate	3	3
GMG	#4 GLCC-M	138A	Mod: Part Cov.	Moderate	2	2
		138B	Mod: Part Cov.	Moderate	2	2
		138C	Mod: Part Cov.	Moderate	2	2
NPG	#4 NN	139A	Mod: Part Cov.	Moderate	2	2
		139B	Mod: Part Cov.	Moderate	2	2
		139C	Mod: Part Cov.	Moderate	2	2
PBG	#4 XX	140A	Mod: Part Cov.	Moderate (3 edges)	2	2
		140B	Traces	Slight (2 edges)	1	1
		140C	Slight	Moderate	2	2
PBE	#4 XXX	141A	Slight	Moderate	2	2
		141B	Mod: Part Cov.	Moderate	2	2
		141C	Mod: Part Cov.	Moderate	2	2

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note- For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED) SHEET 8 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-Dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBE-P	#4 XXX P	142A	Slight	Moderate	2	2
		142B	Slight	Moderate	2	2
		142C	Slight	Moderate	2	2
PBE-P	#4 XXXP-IR	143A	Slight	Slight	2	2
		143B	Slight	Slight	2	2
		143C	Slight	Slight	2	2
FHM	#4 C	144A	Mod: Consid Cov.	Moderate	3	3
		144B	Mod: Part Cov. (*)	Moderate	2	2
		144C	Mod: Consid Cov.	Moderate	3	3
FBG	#4 CE	145A	Mod: Consid Cov.	Moderate	3	3
		145B	Mod: Part Cov. (*)	Moderate	2	2
		145C	Mod: Part Cov. (*)	Moderate	2	2
FBE	#4 LE	146A	Mod: Consid Cov.	Moderate	3	3
		146B	Mod: Consid Cov.	Moderate	3	3
		146C	Mod: Consid Cov. (*)	Moderate	3	3

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted

Note- For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-Dish Replicates	DESCRIPTION OF FUNGUS GROWTH		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBI	#4	147A	M 1:Consid Cov.	Moderate	3	3
		147B	Mod: Part Cov.	Moderate (3 edges)	2	2
	L	147C	Mod: Part Cov. (*)	Moderate	2	2
GSG	#6	167A	Traces	Traces	1	1
		167B	Traces	Traces	1	1
	T-35210	167C	Traces	Traces	1	1
GSG	#6	168A	Traces (*)	Traces	1	1
		168B	Traces (*)	Traces	1	1
	20202	168C	Traces	Traces	1	1
GMG	#6	169A	Slight	Slight	2	2
		169B	Slight	Moderate	2	2
	259-2	169C	Slight (*)	Moderate	2	2
FBM	#6	170A	Slight	Slight	2	2
		170B	Slight	Moderate	2	2
	262	170C	Slight	Moderate	2	2

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Repli-cates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBG	#6 286	171A	Slight (*)	Slight	2	2
		171B	Slight (*)	Slight	2	2
		171C	Slight (*)	Slight	2	2
FBI	#6 238	172A	Traces	Slight	1	2
		172B	Slight (*)	Slight	2	2
		172C	Slight (*)	Traces	2	2
GSG	#9 6090	201A	Traces	Traces	1	1
		201B	Traces	Traces	1	1
		201C	Traces	Traces	1	1
GMG	#9 6038	202A	Slight	Slight-Moderate	2	2
		202B	Slight	Slight	2	2
		202C	Slight	Moderate	2	2
NPG	#9 6051	203A	Slight (*)	Slight	2	2
		203B	Traces	Traces	1	1
		203C	Slight	Slight	2	2

*-Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED) SHEET 11 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBG	#9 6020	204A	Traces	Traces	1	1
		204B	Traces	Slight	1	2
		204C	Slight	Slight	2	2
PBE-P	#9 6028	205A	Traces (*)	Traces	1	1
		205B	Traces	Traces	1	1
		205C	Traces (*)	Slight	1	2
FBM	#9 6030	206A	Abundant	Abundant	4	4
		206B	Abundant	Abundant	4	4
		206C	Abundant	Abundant	4	4
FBG	#9 6031	207A	Mod: Consid Cov.	Abundant	3	3
		207B	Mod: Consid Cov.	Abundant	3	3
		207C	Mod: Consid Cov.	Abundant	3	3
FBE	#9 6045	208A	Mod: Consid Cov.	Abundant	3	3
		208B	Mod: Consid Cov.	Moderate	3	3
		208C	Mod: Consid Cov.	Abundant	3	3

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted

Note - For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBI	#9 6040	209A 209B 209C	Mod: Consid. Cov. Mod: Consid. Cov. Mod: Consid. Cov.	Moderate Abundant Moderate	3 3 3	3 3 3
FBM	#10 C-30	148A 148B 148C	Mod: Consid. Cov. Mod: Consid. Cov. Mod: Part Cov.	Moderate Moderate Slight	3 2 2	3 2 2
FBG	#10 CE-34	149A 149B 149C	Mod: Part Cov. Mod: Part Cov. (*) Mod: Part Cov. (*)	Moderate Moderate Moderate	2 2 2	2 2 2
FBI	#10 L-40	150A 150B 150C	Slight Slight Slight	Slight (3 edges) Slight (2 edges) Slight (3 edges)	2 2 2	2 2 2
GSG	#12 GB-112S	173A 173B 173C	Traces Traces Traces (*)	Traces Traces Traces	1 1 1	1 1 1

*Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED) SHEET 13 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Repli-cates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMG	#12 GB-128M	174A	Slight	Moderate	2	2
		174B	Slight	Slight	2	2
		174C	Slight	Slight	2	2
NPG	#12 MZ C-5	175A	Slight	Slight	2	2
		175B	Slight	Moderate	2	2
		175C	Slight	Slight	2	2
PBG	#12 XX 13	176A	Traces (*)	Slight	1	2
		176B	Traces (*)	Slight	1	2
		176C	Traces	Slight	1	2
PBE-P	#12 XXXP-26	177A	Slight	Slight	2	2
		177B	Slight	Slight	2	2
		177C	Slight	Slight	2	2
FBM	#12 C-1513	178A	Abundant (*)	Abundant	4	4
		178B	Abundant	Abundant	4	4
		178C	Abundant (*)	Abundant	4	4

*-Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note. - For explanation of numeric rating code see page 29

TABLE 4 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBG	#12 C-813	179A 179B 179C	Abundant (*) Mod: Consid Cov. Abundant (*)	Abundant Abundant Abundant	4 3 4	4 3 4
PBG	#13 XX-13	180A 180B 180C	Slight Slight Slight	Slight Slight Moderate	2 2 2	2 2 2
FBG	#13 C-813	181A 181B 181C	Mod: Part Cov. Mod: Part Cov. Mod: Part Cov.	Abundant Moderate Moderate	2 2 2	3 2 2
FBI	#13 L-400	182A 182B 182C	Mod: Part Cov. (*) Mod: Part Cov. (*) Mod: Part Cov.	Moderate Moderate Moderate	2 2 2	2 2 2
PBE-P	#14 XXXP-26	183A 183B 183C	Mod: Part Cov. Slight (*) Slight	Moderate Slight Moderate	2 2 2	2 2 2

*-Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note- For explanation of numeric rating code see page 29.

TABLE 4 (CONTINUED) SHEET 15 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GSG	#15	81A	Traces	Traces	1	1
		81B	Traces	Traces	1	1
	GSC	81C	Traces	Traces	1	1
GMG	#15	80A	Slight	Slight	2	2
		80B	Slight (*)	Slight	2	2
	G-5	80C	Traces (*)	Traces	1	1
PBG	#15	83A	Slight	Abundant	2	3
		83B	Mod: Part Cov.	Abundant	2	3
	XX	83C	Slight	Abundant	2	3
PBE	#15	84A	Slight	Abundant	2	3
		84B	Slight	Abundant	2	3
	XXX	84C	Mod: Part Cov.	Abundant	2	3
FBM	#15	78A	Mod: Consid Cov.	Abundant	3	3
		78B	Mod: Consid Cov.	Abundant	3	3
	G	78C	Mod: Consid Cov.	Moderate	3	3

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note - For explanation of numeric rating code see page 29.

TABLE 4 (CONCLUDED) SHEET 16 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBG	#15 CE	79A	Abundant	Abundant	4	4
		79B	Abundant	Abundant	4	4
		79C	Abundant	Abundant	4	4
FBE	#15 LE	82A	Slight	Slight - Moderate	2	2
		82B	Mod: Part Cov.	Moderate	2	2
		82C	Slight	Moderate	2	2
PBG	#16 XX	210A	Abundant (*)	Abundant	4	4
		210B	Abundant (*)	Abundant	4	4
		210C	Abundant	Abundant	4	4
FBM	#16 C	211A	Abundant	Abundant	4	4
		211B	Abundant	Abundant	4	4
		211C	Abundant	Abundant	4	4
FBE	#16 LE	212A	Abundant (*)	Abundant	4	4
		212B	Abundant	Abundant	4	4
		212C	Abundant (*)	Abundant	4	4

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 5

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GSG	#1	134A	Traces	Traces	1	1
		134B	Traces	Slight (1 edge)	1	2
	11514	134C	Ttaces	Slight (1 edge)	1	2
GMG	#1	133A	Slight	Slight	2	2
		133B	Slight	Moderate	2	2
	11508	133C	Slight (*)	Slight	2	2
PBG	#1	85A	Mod: Part Cov. (*)	Slight	2	2
		85B	Slight (*)	Slight	2	2
	114	85C	Slight (*)	Slight	2	2
PBG	#1	86A	Mod: Part Cov. (*)	Moderate	2	2
		86B	Mod: Part Cov. (*)	Moderate	2	2
	2008	86C	Mod: Part Cov. (*)	Moderate	2	2
PBE	#1	88A	Slight	Moderate	2	2
		88B	Traces	Moderate	1	2
	2029	88C	Traces	Moderate	1	2

*. Specimen surface was waterlogged **. Same for 4 edges unless otherwise noted
For explaination of numeric rating code see page 29.

TABLE 5 (CONTINUED) Sheet 2 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Repli-cates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBE-P	#1	89A	Slight -Moderate	Moderate-Abundant	2	3
		89B	Slight	Slight - Moderate	2	2
	2051	89C	Slight -Moderate	Moderate	2	2
FBM	#1	131A	Mod: Part Cov. (*)	Slight - Moderate	2	2
		131B	Mod: Part Cov.	Slight - Moderate	2	2
	113	131C	Mod: Part Cov.	Moderate	2	2
FBG	#1	87A	Slight	Moderate	2	2
		87B	Slight	Slight	2	2
	2013	87C	Mod: Part Cov.	Moderate	2	2
FBE	#1	132A	Slight	Slight	2	2
		132B	Slight	Slight	2	2
	1841	132C	Slight	Slight - Moderate	2	2
FBI	#1	90A	Mod: Part Cov.	Moderate	2	2
		90B	Mod: Part Cov.	Moderate-Abundant	2	3
	2080	90C	Mod: Part Cov.	Moderate-Abundant	2	3

*- Specimen surface was waterlogged. **- Same for 4 edges unless otherwise noted.
Note- For explaination of numeric rating code see page 29.

TABLE 5 (CONTINUED) SHEET 3 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimens: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMG	#2 140	91A	Slight	Slight - Moderate	2	2
		91B	Slight	Slight - Moderate	2	2
		91C	Slight	Slight - Moderate	2	2
NPG	#2 190	151A	Traces	Moderate	1	2
		151B	Traces	Moderate	1	2
		151C	Traces	Moderate	1	2
PBG	#2 550	93A	Traces	Traces	1	1
		93B	Traces	Slight	1	2
		93C	Slight	Slight	2	2
PBE	#2 520	92A	Traces	Slight	1	2
		92B	Traces	Slight	1	2
		92C	Slight (*)	Slight	2	2
PBE-P	#2 780	94A	Traces	Moderate-Abundant	1	2
		94B	Traces	Moderate-Abundant	1	2
		94C	Slight	Moderate-Abundant	2	2

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBM	#2	95A	Abundant	Abundant	4	4
		95B	Abundant	Abundant	4	4
	900	95C	Abundant	Abundant	4	4
FBM	#2	152A	Mod: Part Cov.	Moderate	2	2
		152B	Mod: Part Cov.	Moderate	2	2
	920	152C	Mod: Consid Cov.	Moderate	2	3
FBG	#2	96A	Abundant	Abundant	4	4
		96B	Abundant (*)	Abundant	4	4
	910	96C	Abundant (*)	Abundant	4	4
FBE	#2	97A	Mod: Part. Cov.	Moderate	2	2
		97B	Mod: Part. Cov. (*)	Slight - Moderate	2	2
	950	97C	Mod: Part. Cov. (*)	Moderate	2	2
FBI	#2	153A	Abundant	Moderate	4	3
		153B	Abundant	Abundant	4	4
	940	153C	Mod: Consid Cov.	Moderate	3	3

*= Specimen surface was waterlogged **= Same for 4 edges unless otherwise noted

Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED) Sheet 5 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMG	#3 T-712	124A	Mod: Part Cov.	Moderate	2	2
		124B	Mod: Part Cov.	Moderate	2	2
		124C	Mod: Part Cov.	Moderate	2	2
NPG	#3 T-819	129A	Traces	Slight	1	2
		129B	Traces	Slight - Moderate	1	2
		129C	Slight	Slight	2	2
PBG	#3 T-643	123A	Slight	Moderate	2	2
		123B	Slight	Moderate	2	2
		123C	Slight	Moderate	2	2
PBE	#3 T-640	122A	Slight (*)	Slight (2 edges)	2	2
		122B	Traces (*)	Slight (2 edges)	1	2
		122C	Traces (*)	Moderate	1	2
PBE-P	#3 T-725	125A	Traces	Moderate	1	2
		125B	Slight	Moderate	2	2
		125C	Traces	Moderate	1	2

*- Specimen surface was waterlogged. **- Same for 4 edges unless otherwise noted
Note:- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED) Sheet 6 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBE-P	#3 T-800	127A	Slight	Slight (1 edge)	2	2
		127B	Slight	Slight (1 edge)	2	2
		127C	Traces (*)	Slight (3 edges)	1	2
PBE-P	#3 T-812	128A	Traces	Slight (2 edges)	1	2
		128B	Traces	Slight	1	2
		128C	Traces	Slight (3 edges)	1	2
FBM	#3 T-601	120A	Abundant	Abundant	4	4
		120B	Abundant	Abundant	4	4
		120C	Abundant	Abundant	4	4
FBG	#3 T-606	121A	Mod: Part Cov. (*)	Moderate	2	2
		121B	Mod: Part Cov. (*)	Moderate	2	2
		121C	Mod: Part Cov. (*)	Moderate	2	2
FBE	#3 T-827	130A	Mod: Part Cov. (*)	Moderate	2	2
		130B	Mod: Part Cov. (*)	Slight - Moderate	2	2
		130C	Mod: Part Cov. (*)	Slight - Moderate	2	2

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBI	#3	126A	Mod: Part Cov. (*)	Moderate-Abundant	2	3
		126B	Mod: Part Cov.	Moderate-Abundant	2	3
	T-733	126C	Mod: Part Cov.	Moderate-	2	2
GMG	#4	154A	Mod: Part Cov.	Moderate	2	2
		154B	Mod: Part Cov.	Moderate	2	2
	GLCC-M	154C	Mod: Part Cov.	Moderate	2	2
NPG	#4	155A	Slight	Slight	2	2
		155B	Mod: Part Cov.	Slight	2	2
	NN	155C	Slight	Slight	2	2
PBG	#4	156A	Mod: Part Cov.	Moderate	2	2
		156B	Mod: Part Cov. (*)	Moderate	2	2
	XX	156C	Mod: Part Cov. (*)	Moderate (3 edges)	2	2
PBE	#4	157A	Mod: Consid Cov.	Abundant	3	3
		157B	Mod: Part Cov.	Moderate	2	2
	XXX	157C	Mod: Consid Cov.	Abundant	3	3

*- Specimen surface was Waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED) SHEET 8 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBE-P	#4 XXXP	158A	Slight	Moderate	2	2
		158B	Slight	Moderate	2	2
		158C	Slight	Moderate	2	2
PBE-P	#4 XXXP-IR	159A	Slight	Abundant	2	3
		159B	Slight	Abundant	2	3
		159C	Slight	Abundant	2	3
FHM	#4 C	160A	Mod: Consid Cov.	Moderate	3	3
		160B	Mod: Part Cov (*)	Moderate	2	2
		160C	Mod: Part Cov (*)	Moderate	2	2
FBG	#4 CE	161A	Mod: Consid Cov.	Moderate	3	3
		161B	Mod: Part Cov.	Abundant	2	3
		161C	Mod: Part Cov.	Moderate	2	3
FBE	#4 LE	162A	Mod: Consid. Cov.	Abundant	3	3
		162B	Mod: Consid Cov.	Moderate	3	3
		162C	Mod: Part Cov.	Moderate	2	2

*- Specimen surface was waterlogged **-Same for 4 edges unless otherwise noted.
Note -For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED) SHEET 9 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Repli-cates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBI	#4	163A	Mod: Part Cov.	Moderate	2	2
		163B	Mod: Consid Cov.	Abundant	3	3
	L	163C	Mod: Part Cov.	Moderate	2	2
GSG	#6	184A	Traces	Traces	1	1
		184B	Traces	Traces	1	1
	T-35210	184C	Traces	Traces	1	1
GSG	#6	185A	Traces	Traces	1	1
		185B	Traces	Traces	1	1
	20202	185C	Traces	Traces	1	1
GMG	#6	186A	Mod: Part Cov.	Moderate	2	2
		186B	Mod: Part Cov.	Moderate	2	2
	259-2	186C	Mod: Consid Cov.	Moderate	3	3
FBM	#6	187A	Slight	Slight	2	2
		187B	Slight	Abundant	2	3
	262	187C	Slight	Abundant	2	3

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBG	#6	188A	Slight	Moderate	2	2
		188B	Slight (*)	Moderate	2	2
	286	188C	Slight	Moderate	2	2
FBI	#6	189A	Slight	Slight	2	2
		189B	Slight	Slight	2	2
	238	189C	Slight	Slight	2	2
GSG	#9	213A	Traces	Traces	1	1
		213B	Traces	Traces	1	1
	6090	213C	Traces	Traces	1	1
GMG	#9	214A	Slight	Moderate	2	2
		214B	Slight	Slight	2	2
	6038	214C	Slight	Moderate	2	2
NPG	#9	215A	Slight	Traces	2	2
		215B	Slight	Traces	2	2
	6051	215C	Slight	Slight	2	2

* - Specimen surface was waterlogged ** - Same for 4 edges unless otherwise noted.
Note - For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED) SHEET 11 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBG	#9 6020	216A	Slight (*)	Slight	2	2
		216B	Slight	Moderate	2	2
		216C	Slight (*)	Moderate	2	2
PBE-P	#9 6028	217A	Traces (*)	Slight	1	2
		217B	Traces	Traces	1	1
		217C	Traces	Traces	1	1
FBM	#9 6030	218A	Abundant	Abundant	4	4
		218B	Abundant	Abundant	4	4
		218C	Abundant	Abundant	4	4
FBG	#9 6031	219A	Mod: Consid Cov.	Abundant	3	3
		219B	Mod: Consid Cov.	Abundant	3	3
		219C	Mod: Consid Cov.	Abundant	3	3
FBE	#9 6045	220A	Mod: Consid Cov.	Moderate	3	3
		220B	Mod: Consid Cov.	Moderate	3	3
		220C	Mod: Consid Cov.	Abundant	3	3

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 4 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBI	#9	221A	Mod: Consid Cov.	Moderate	3	3
		221B	Mod: Consid Cov.	Moderate	3	3
	6040	221C	Mod: Consid Cov.	Moderate	3	3
FBM	#10	164A	Mod: Consid Cov.	Moderate	3	3
		164B	Abundant	Abundant	4	4
	C-30	164C	Mod: Consid Cov.	Moderate	3	3
FBG	#10	165A	Mod: Part Cov.	Moderate	2	2
		165B	Mod: Part Cov.	Abundant	2	3
	CM-34	165C	Mod: Part Cov. (*)	Moderate	2	2
FBI	#10	166A	Slight	Slight (2 edges)	2	2
		166B	Slight	Slight (3 edges)	2	2
	L-40	166C	Slight	Slight (2 edges)	2	2
GSC	#12	190A	Traces (*)	Traces	1	1
		190B	Traces	Traces	1	1
	GB-112S	190C	Traces	Traces	1	1

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted

Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMG	#12 GB-128M	191A	Slight	Moderate	2	2
		191B	Mod: Part Cov.	Moderate	2	2
		191C	Mod: Part Cov.	Moderate	2	2
NPG	#12 MEC-5	192A	Slight	Slight	2	2
		192B	Traces	Slight	1	2
		192C	Slight	Slight	2	2
PBG	#12 XX13	193A	Slight	Moderate	2	2
		193B	Slight	Moderate	2	2
		193C	Slight (*)	Slight	2	2
FRE-P	#12 XXXP-26	194A	Traces (*)	Slight	1	2
		194A	Slight	Slight	2	2
		194A	Slight	Slight	2	2
FBM	#12 C-1513	195A	Abundant	Abundant	4	4
		195B	Abundant	Abundant	4	4
		195C	Abundant	Abundant	4	4

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note - For explanation of numeric rating code see page 29.

TABLE 5 (CONTINUED) SHEET 14 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBG	#12 C-813	196A	Abundant	Abundant	4	4
		196B	Abundant	Abundant	4	4
		196C	Abundant	Abundant	4	4
PBG	#13 XX-13	197A	Slight	Slight	2	2
		197B	Slight	Slight	2	2
		197C	Slight	Slight	2	2
FBG	#13 C-813	198A	Mod: Part Cov.	Abundant	2	3
		198B	Slight	Moderate	2	2
		198C	Slight (*)	Slight	2	2
FBI	#13 L-400	199A	Mod: Part Cov.	Moderate	2	2
		199B	Slight	Moderate	2	2
		199C	Mod: Part Cov.	Moderate	2	2
PBE-P	#14 XXXP-26	200A	Mod: Part Cov.	Moderate	2	2
		200B	Mod: Part Cov.	Moderate	2	2
		200C	Mod: Part Cov. (*)	Moderate	2	2

*- Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note- For explamation of numeric rating code see page 29.

TABLE 5 (CONTINUED) SHEET 15 of 16

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Replicates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GSG	#15 GSC	101A 101B 101C	Traces Traces Traces	Traces Traces Traces	1 1 1	1 1 1
GMG	#15 G - 5	100A 100B 100C	Slight Slight Slight	Slight Slight Slight	2 2 2	2 2 2
PBG	#15 XX	103A 103B 103C	Slight Slight Slight	Moderate-Abundant Moderate-Abundant Moderate-Abundant	2 2 2	2 2 2
PBE	#15 XXX	104A 104B 104C	Slight Slight Slight	Moderate-Abundant Moderate-Abundant Moderate-Abundant	2 2 2	2 2 2
FRM	#15 D	98A 98B 98C	Mod: Part Cov. Mod: Part Cov. Mod.: Part Cov.	Moderate Moderate Moderate	2 2 2	2 2 2

* Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted.
Note- For explanation of numeric rating code see page 29.

TABLE 5 (CONCLUDED)

GROWTH OF FUNGUS ON PLASTIC LAMINATES
(PETRI-DISH METHOD)

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Repli-cates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FRG	#15 CE	99A	Abundant	Abundant	4	4
		99B	Abundant	Abundant	4	4
		99C	Abundant	Abundant	4	4
FRE	#15 LE	102A	Mod: Part Cov.	Moderate	2	2
		102B	Mod: Part Cov.	Moderate	2	2
		102C	Mod: Part Cov.	Moderate	2	2
FBG	#16 XX	222A	Mod: Consid Cov.(*)	Abundant	3	3
		222B	Mod: Consid Cov.	Abundant	3	3
		222C	Abundant	Abundant	4	4
FBM	#16 C	223A	Abundant	Abundant	4	4
		223B	Abundant	Abundant	4	4
		223C	Abundant	Abundant	4	4
FBE	#16 LE	224A	Abundant (*)	Abundant	4	4
		224B	Abundant (*)	Abundant	4	4
		224C	Abundant (*)	Abundant	4	4

*-Specimen surface was waterlogged **- Same for 4 edges unless otherwise noted
Note- For explanation of numeric rating code see page 29.

TABLE 6

Sheet 1 of 10

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of More detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
GSG	#1	11514	1 1 1	1 1 1	Funginert	1 1 2	1 2 2	Fungistatic
GMG	#1	11508	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
PBG	#1	114	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
PBG	#1	2008	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
PBE	#1	2029	1 2 2	2 1 1	Susceptible	2 2 2	2 2 2	Susceptible
PBE-P	#1	2051	2 2 2	2 2 2	Susceptible	2 2 2	3 2 2	Susceptible
FBI	#1	113	3 3 3	2 2 2	Susceptible	3 3 3	2 2 2	Susceptible
FBG	#1	2013	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED) Sheet 2 of 10

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
FBE	#1	1841	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
FBI	#1	2080	2 2 2	2 2 2	Susceptible	2 2 2	2 3 3	Susceptible
GMG	#2	140	2 2 1	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
NPG	#2	190	1 1 1	1 1 1	Funginert	2 2 2	2 2 2	Susceptible
PBG	#2	550	1 1 1	1 1 2	Funginert	2 2 1	1 2 2	Susceptible
PBE	#2	520	1 1 1	1 1 2	Funginert	2 2 1	2 2 2	Susceptible
PBE-P	#2	780	1 1 1	1 1 2	Funginert	2 2 2	2 2 2	Susceptible
FBM	#2	900	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED) sheet 3 of 10

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation	Surface Growth Only			Surface and Edge Growth		
		Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
		Uncond	Cond		Uncond	Cond	
FBM	#2 920	2 2 2	2 2 2	Susceptible	2 2 2	2 2 3	Susceptible
FBG	#2 910	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible
FBE	#2 950	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
FBI	#2 940	2 3 3	4 4 3	Susceptible	2 2 3	3 4 3	Susceptible
GMG	#3 T-712	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
NPG	#3 T-819	2 2 1	1 1 2	Susceptible	2 2 2	2 2 2	Susceptible
PBG	#3 T-643	1 2 2	2 2 2	Susceptible	1 2 2	2 2 2	Susceptible
PBE	#3 T-640	1 1 1	2 1 1	Funginert	2 2 2	2 2 2	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED) Sheet 4 of 10

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
PBE-P	#3	T-725	1 1 1	1 2 1	Funginert	2 2 2	2 2 2	Susceptible
PBE-P	#3	T-800	1 1 1	2 2 1	Fungistatic	2 2 2	2 2 2	Susceptible
PBE-P	#3	T-812	1 1 1	1 1 1	Funginert	2 2 2	2 2 2	Susceptible
FBM	#3	T-601	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible
FBG	#3	T-606	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
FBE	#3	T-827	3 3 3	2 2 2	Susceptible	3 3 3	2 2 2	Susceptible
FBI	#3	T-733	3 3 3	2 2 2	Susceptible	3 3 3	3 3 2	Susceptible
GMG	#4	GLCC-M	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED) Sheet 5 of 10

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
NPG	#4	NN	2 2 2	2 2 2	Susdeptible	2 2 2	2 2 2	Susceptible
PBG	#4	XX	2 1 2	2 2 2	Susceptible	2 1 2	2 2 2	Susceptible
PBE	#4	XXX	2 2 2	3 2 3	Susceptible	2 2 2	3 2 3	Susceptible
PBE-P	#4	XXXP	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
PBE-P	#4	XXXP-IR	2 2 2	2 2 2	Susceptible	2 2 2	3 3 3	Susceptible
FBM	#4	C	3 2 3	3 2 2	Susceptible	3 2 3	3 2 2	Susceptible
FBG	#4	CE	3 2 2	3 2 2	Susceptible	3 2 2	3 3 3	Susceptible
FBE	#4	LE	3 3 3	3 3 2	Susceptible	3 3 3	3 3 2	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED) Sheet 6 of 10

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
FBI	#4	L	3 2 2	2 3 2	Susceptible	3 2 2	2 3 2	Susceptible
GSG	#6	T-35210	1 1 1	1 1 1	Funginert	1 1 1	1 1 1	Funginert
GSG	#6	20202	1 1 1	1 1 1	Funginert	1 1 1	1 1 1	Funginert
GMG	#6	259-2	2 2 2	2 2 3	Susceptible	2 2 2	2 2 3	Susceptible
FBM	#6	262	2 2 2	2 2 2	Susceptible	2 2 2	2 3 3	Susceptible
FBG	#6	286	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
FBI	#6	238	1 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
GSG	#9	6090	1 1 1	1 1 1	Funginert	1 1 1	1 1 1	Funginert

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED) Sheet 7 of 10

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
GMG	#9	6038	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
NPG	#9	6051	2 1 2	2 2 2	Susceptible	2 1 2	2 2 2	Susceptible
PBG	#9	6020	1 1 2	2 2 2	Susceptible	1 2 2	2 2 2	Susceptible
PBE-P	#9	6028	1 1 1	1 1 1	Funginert	1 1 2	2 1 1	Funginert
FBM	#9	6030	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible
FBG	#9	6031	3 3 3	3 3 3	Susceptible	3 3 3	3 3 3	Susceptible
FBE	#9	6045	3 3 3	3 3 3	Susceptible	3 3 3	3 3 3	Susceptible
FBI	#9	6040	3 3 3	3 3 3	Susceptible	3 3 3	3 3 3	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond.		Uncond.	Cond.	
FBM	#10	C-30	3 2 2	3 4 3	Susceptible	3 2 2	3 4 3	Susceptible
FBG	#10	CE--34	2 2 2	2 2 2	Susceptible	2 2 2	2 3 2	Susceptible
FBI	#10	L-40	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
GSG	#12	GB-112S	1 1 1	1 1 1	Funginert	1 1 1	1 1 1	Funginert
GMG	#12	GB-128M	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
NPG	#12	MEC-5	2 2 2	2 1 2	Susceptible	2 2 2	2 2 2	Susceptible
PBG	#12	XX13	1 1 1	2 2 2	Fungistatic	2 2 2	2 2 2	Susceptible
PBE-P	#12	XXXP-26	2 2 2	1 2 2	Susceptible	2 2 2	2 2 2	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
FBM	#12	C-1513	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible
FBG	#12	C-813	4 3 4	4 4 4	Susceptible	4 3 4	4 4 4	Susceptible
PBG	#13	XX-13	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
FBG	#13	C-813	2 2 2	2 2 2	Susceptible	3 2 2	3 2 2	Susceptible
FBI	#13	L-400	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
PBE-P	#14	XXXP-26	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
GSG	#15	GSC	1 1 1	1 1 1	Funginert	1 1 1	1 1 1	Funginert
GMG	#15	G-5	2 2 1	2 2 2	Susceptible	2 2 1	2 2 2	Susceptible

(*) See page 30 for detailed explanation

TABLE 6 (CONCLUDED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 4 and 5

Spec. Grade	Manufacturer and Designation		Surface Growth Only			Surface and Edge Growth		
			Numeric Rating		Fungus Resistance (*)	Numeric Rating		Fungus Resistance (*)
			Uncond	Cond		Uncond	Cond	
PBG	#15	XX	2 2 2	2 2 2	Susceptible	3 3 3	2 2 2	Susceptible
PBE	#15	XXX	2 2 2	2 2 2	Susceptible	3 3 3	2 2 2	Susceptible
FBM	#15	C	3 3 3	2 2 2	Susceptible	3 3 3	2 2 2	Susceptible
FBG	#15	CE	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible
FBE	#15	LE	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
PBG	#16	XX	4 4 4	3 3 4	Susceptible	4 4 4	4 4 4	Susceptible
FBM	#16	C	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible
FBE	#16	LE	4 4 4	4 4 4	Susceptible	4 4 4	4 4 4	Susceptible

(*) See page 30 for detailed explanation

Summary of Observations

(Surface Growth Alone)

	Manuf.	Designation	Grade
The following samples showed traces of growth on all six replicates:	#1	11514	GSG
	#2	190	NPG
	#3	T 812	PBE-P
	#6	T35210	GSG
	#6	20202	GSG
	#9	6090	GSG
	#9	6028	PBE-P
	#12	GB-1128	GSG
	#15	GSC	GSG
The following samples showed traces or slight growth on all six replicates:	#1	2029	PBE
	#2	140	GMG
	#2	550	PBG
	#2	520	PBE
	#2	780	PBE-P
	#3	T 819	NPG
	#3	T 643	PBG
	#3	T 640	PBE
	#3	T 725	PBE-P
	#3	T 800	PBE-P
	#6	258	FBI
	#9	6051	NPG
	#9	6020	PBG
	#12	MEC-5	NPG
	#12	XX13	PBG
	#12	XXXP-26	PBE-P
	#15	G-5	GMG
The following samples showed slight growth on all six replicates:	#1	1841	FBE
	#4	XXXP	PBE-P
	#4	XXXP-IR	PBE-P
	#6	262	FBM
	#6	286	FBG
	#9	6038	GMG
	#10	L40	FBI
	#13	XX13	PBG
The following samples showed slight or moderate growth on all six replicates:	#1	11508	GMG
	#1	114	PBG
	#1	2006	PBG
	#1	2051	PBE-P

The following samples showed slight or moderate growth on all six replicates: (Continued from preceding page)

Manuf.	Designation	Grade
#1	2013	FBG
#1	2080	FBI
#2	950	FBE
#3	T 712	GMG
#3	T 606	FBG
#4	NN	NPG
#4	XX	FBG
#4	XXX	PBE
#4	259-2	GMG
#6	GB-128M	GMG
#12	C-813	FBG
#13	L-400	FBI
#13	XXXP-26	PBE-P
#14	XX	PBG
#15	XXX	PBE
#15	LE	FBE
#15		

The following samples showed moderate growth on all six replicates:

#1	113	FBM
#2	920	FBM
#3	T 827	FBE
#3	T 733	FBI
#4	CLCC-M	GMG
#4	C	FBM
#4	CE	FBG
#4	LE	FBE
#4	L	FBI
#4	6031	FBG
#9	6045	FBE
#9	6040	FBI
#9	CE-34	FBG
#10	C	FBM
#15		

The following samples showed moderate or abundant growth on all six replicates:

#2	940	FBI
#10	C30	FBM
#12	C 813	FBG
#16	XX	PBG

The following samples showed abundant growth on all six replicates:

#2	900	FBM
#2	910	FBG
#3	T 601	FBM
#9	6030	FBM
#12	C1513	FBM
#15	CE	FBG
#16	C	FBM
#16	LE	FBE

Summary of Observations

(Surface and Edge Growth)

	Manuf.	Designation	Grade
The following samples showed traces of growth on all six replicates:	#6	T35210	GSG
	#6	20202	GSG
	#9	6090	GSG
	#12	GB-112S	GSG
	#15	GSC	GSG
The following samples showed traces or slight growth on all six replicates:	#1	11514	GSG
	#2	550	PBG
	#2	520	PBE
	#3	T 819	NPG
	#3	T 800	PBE-P
	#6	238	FBI
	#9	6051	NPG
	#9	6028	PBE-P
	#12	XXXP-26	PBE-P
	#15	G-5	GMG
The following sample showed slight growth on all six replicates:	#10	L40	FBI
The following sample showed slight growth on all six surfaces; slight growth on the edges of the three unconditioned replicates; and abundant growth on the edges of the three conditioned replicates:	#4	XXXP-IR	PBE-P
The following samples showed traces, slight or moderate growth on all six replicates:	#1	2029	PBE
	#2	140	GMG
	#2	190	NPG
	#3	T 643	PBG
	#3	T 640	PBE
	#3	T 725	PBE-P
	#3	T 812	PBE-P
	#4	XX	PBG
	#9	6020	PBG
	#12	MEC-5	NPG
	#12	XX 13	PBG

	Manuf.	Designation	Grade
The following samples showed slight or moderate growth on all six replicates:	#1	11508	GMG
	#1	114	PBG
	#1	2008	PBG
	#1	2051	PBE-P
	#1	113	FBM
	#1	2013	FBG
	#1	1841	FBE
	#1	2080	FBI
	#2	950	FBE
	#3	T 712	GMG
	#3	T 606	FBG
	#4	NN	NPG
	#4	XXXP	PBE-P
	#6	259-2	GMG
	#6	286	FBG
	#9	6038	GMG
	#12	GB-128M	GMG
	#13	XX-13	PBG
	#13	L-400	FBI
	#14	XXXP-26	PBE-P
	#15	LE	FBE
The following samples showed moderate growth on all six replicates:	#2	920	FBM
	#3	T 733	FBI
	#4	GLCC-M	GMG
	#4	C	FBM
The following sample showed traces, slight, moderate, or abundant growth on all six of the replicates:	#2	780	PBE-P
The following samples showed slight, moderate, or abundant growth on all six replicates:	#4	XXX	FBE
	#6	262	FBM
	#10	C-30	FBM
	#13	C-813	FBG
	#15	XX	PBG
	#15	XXX	PBE
The following samples showed moderate or abundant growth on all six replicates:	#2	940	FBI
	#3	T 827	FBE
	#4	CE	FBG
	#4	LE	FBE
	#4	L	FBI

The following samples showed moderate or abundant growth on all six replicates: (Continued from preceding page)

Manuf.	Designation	Grade
#9	6031	FBG
#9	6045	FBE
#9	6040	FBI
#10	CE-34	FBG
#12	C-813	FBG
#15	C	FBM
#16	XX	FBG

The following samples showed abundant growth on all six replicates:

#2	900	FBM
#2	910	FBG
#3	T 601	FBM
#9	6030	FBM
#12	C-1513	FBM
#15	CE	FBG
#15	C	FBM
#16	LE	FBE

FUNGINERTNESS OF PLASTIC LAMINATES

(HUMIDITY-EXPOSURE METHOD)

Introduction

This section presents the first results obtained in tests of fungus resistance of some of the plastic laminated materials, by the Humidity-Exposure Method as outlined in paragraph 4.2 of "Draft of BuOrd Specification 52T15 (Ord), rev. draft, Rele, of 15 August 1950", furnished by the Bureau of Ordnance with letter dated 17 January 1951.

Materials

The materials evaluated in this study include the following laminated, thermosetting, plastic materials as approved under the following specifications:

Specification	Type	Filler	Resin	Grade
MIL-P-997A	GSG	Glass Cloth	Silicone	General
MIL- P-15037A	GMG	Glass Cloth	Melamine	General
MIL-P-15047A	NPG	Nylon Cloth	Pheonlic	General
MIL-P-3115A	PBG	Paper	Phenolic	General
MIL-P-3115A	PBE	Paper	Phenolic	Electrical
MIL-P-3115A	PBE-P	Paper	Phenolic	Electrical; Punching
MIL-P-15035A	FBM	Cotton Fab.	Phenolic	Mechanical
MIL-P-15035A	FBG	Cotton Fab.	Phenolic	General
MIL-P-15035A	FBE	Cotton Fab.	Phenolic	Electrical
MIL-P-15035A	FBI	Cotton Fab.	Phenolic	Fine Machining.

Experimental Procedure

Test Organisms

The following fungi were used in this evaluation:

Organism	American Type Culture Collection No.
Aspergillus niger	9642
Aspergillus flavus	9643
Penicillium luteum	9644
Trichoderma T-1	9645

Preparation of Inoculum

The following nutrient medium was used in the preparation of cultures of the test fungi:

Agar	20.0 gm
Dextrose	10.0 gm
Ammonium nitrate	2.0 gm
Potassium phosphate	0.5 gm
Magnesium sulfate	0.3 gm
Distilled water	1000.0 ml

Cultures of the test organisms were prepared separately on test tube slants (18mm diameter x 150 mm length) of the culture medium and incubated for 12 days at 28° C. Ten milliliters of sterile distilled water, containing 0.05 gm of dioctyl sodium sulfosuccinate per liter of water, were added to one slant of each culture and agitated to dislodge the spores. The resulting separate suspensions were mixed to obtain a composite spore suspension for use in inoculating the test specimens.

Preparation and Mounting of Specimens

Sheets (1/8" thick) of the laminates, as received, were cut into test specimens 1" x 3", using an 8" arbor tilt saw equiped with a suitable cutting blade. A hole (1/8" diameter) was drilled into one end of each of the specimens. Eight Specimens were used in this test for each of the plastic laminates.

Portions of 3-ply cotton string, conforming to the requirements of Federal Specification T-T-871a, Type T, (a known source of nutrient), were tied to four of the test specimens at points 1" from each end of the specimens. No string was attached to the remaining four specimens.

The specimens were suspended in random order, by nichrome wire hooks, from a suitable steel rack, in such manner that the specimens were at least 1" apart.

Three 3½-inch lengths of cotton string, same as that tied around the test specimens, were tied to the top of the rack to serve as controls.

Figure 1, page 81 illustrates the stainless steel rack together with the nichrome wire hooks and with the cotton string controls tied to the rack. Figure 2, page 81 illustrates the rack loaded with 24 test specimens.

Inoculation and Incubation

The rack, loaded as described above, was then inoculated with the spore suspension as follows. The rack was placed into a 3-sided box, open on top and one side, and the spore suspension was sprayed onto the specimens from the open side. The rack was then turned 90° and resprayed from

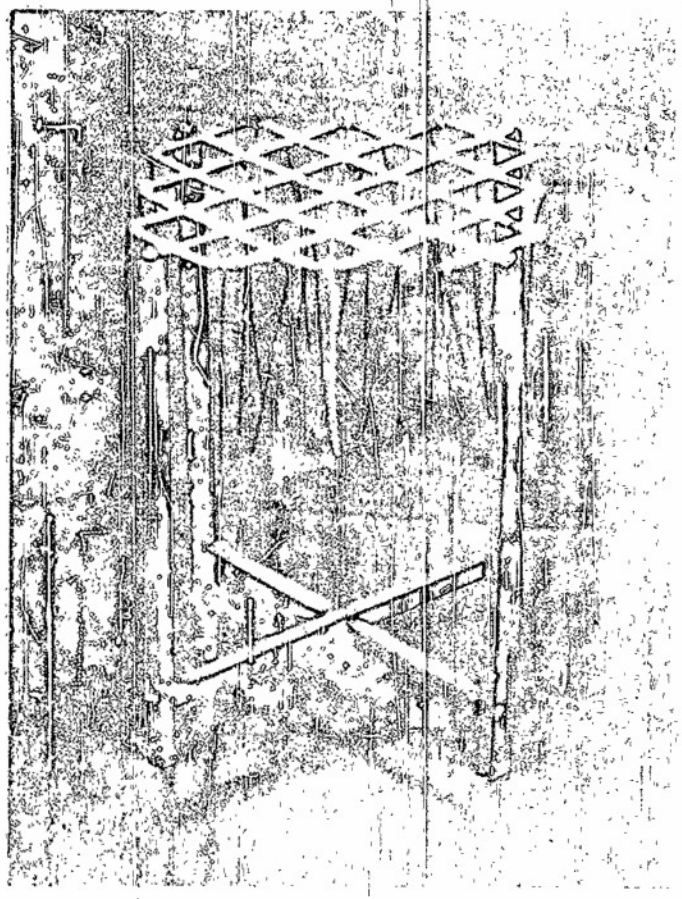


Figure 1

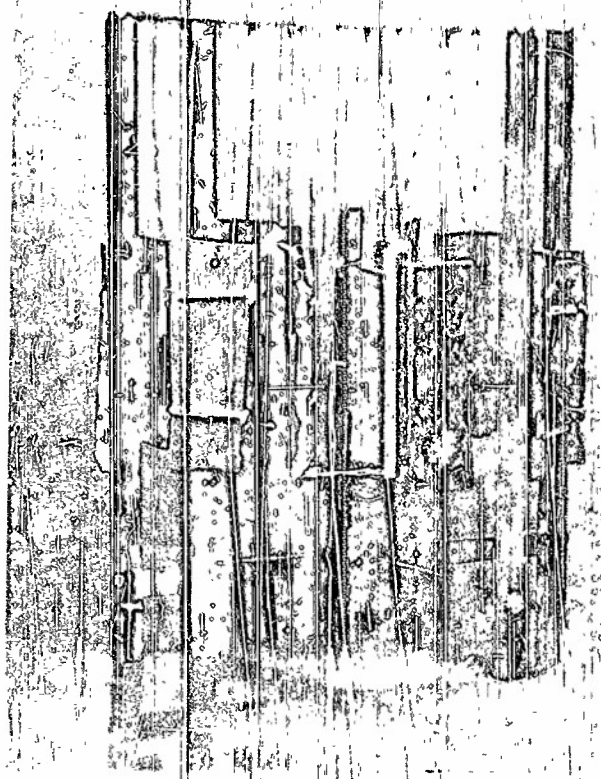


Figure 2

HUMIDITY TEST EXPOSURE RACKS

the open side. This was repeated until the specimens were sprayed from all four sides, thus receiving a thorough inoculation.

The rack was placed in a Pyrex battery jar, containing distilled water to a depth of approximately $\frac{1}{8}$". The specimens were then further inoculated by spraying the spore suspension into the jar from the top. A silicone ignition sealing compound (Dow-Corning DC-4) was applied liberally to the ground edge of the battery jar. A watch glass cover was inverted over the jar to form an airtight seal. The domed cover allows condensed water to run to and down the sides of the jar rather than dropping onto the specimens. Figure 3, page 83 illustrates the complete humidity exposure test chamber.

The complete humidity test chamber was than incubated for 28 days at 28° C, with a relative humidity of 100% maintained within the test chamber.

Evaluation of Results

At the end of the incubation period the watch glass was removed and the rack taken out of the jar. The separate pieces of string (controls) were examined for fungus growth (visible to the naked eye). All of the controls included in this set of tests developed profuse fungus growth.

Each of the 4 specimens, exposed without

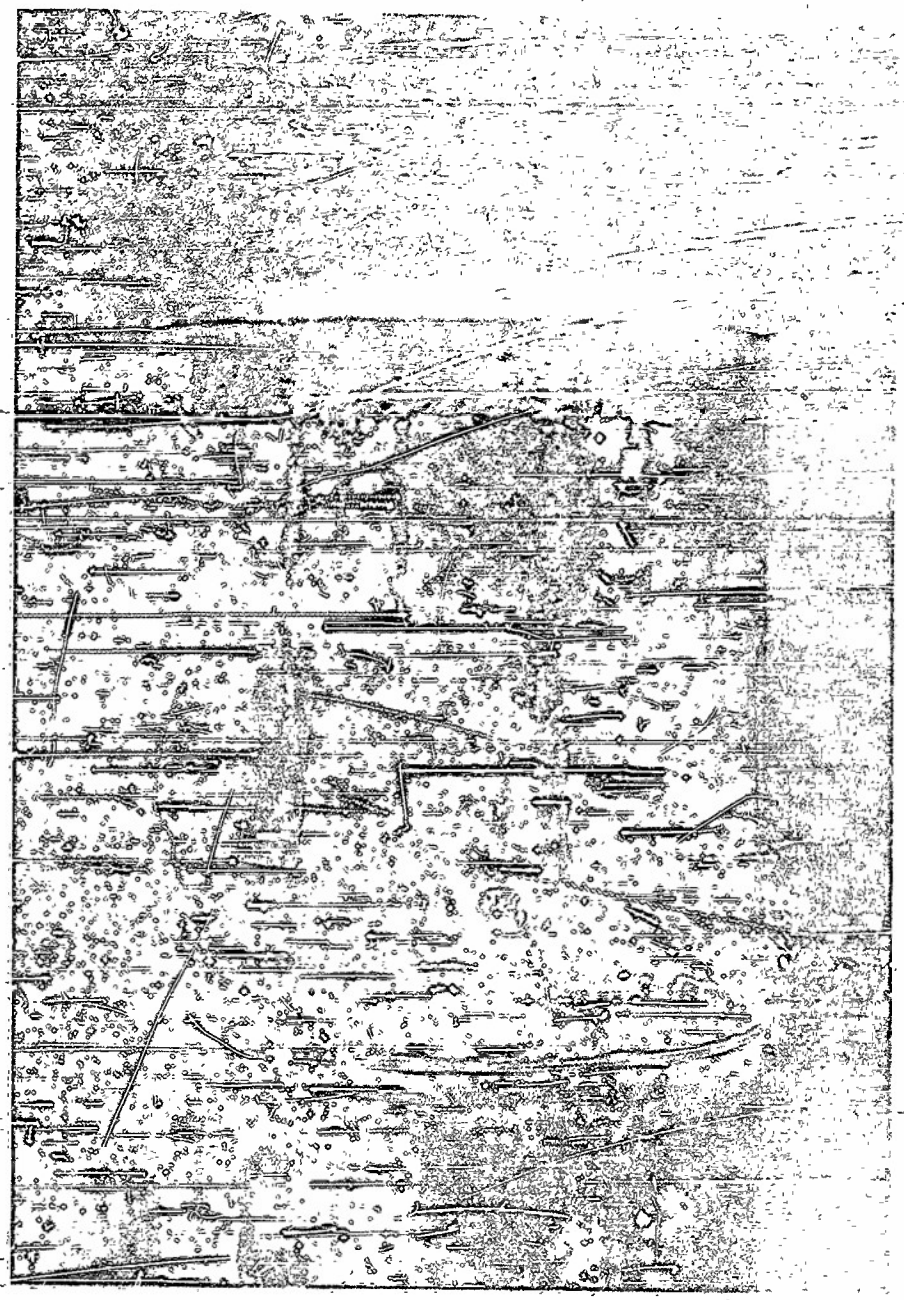


Figure 3

HUMIDITY EXPOSURE TEST CHAMBER

attached cotton string, was examined (with the aid of a 7X "flash-O-Lens" magnifier) for fungus growth. The percentage of area covered by fungus growth was noted for each of the two surfaces, two side edges, top edge, and bottom edge.

Each of the 4 specimens, exposed with attached cotton string was examined for fungus growth (visible to the naked eye) extending from the cotton string. The maximum extent of the fungus growth from point of contact with the string was noted for each of the two surfaces and each of the two side edges, of each specimen.

Table 7, pages 88 through 117, lists the observations on the individual replicates.

Interpretation of Results for Determination of Funginertness

For a material to be considered funginert it shall not support fungus growth; this shall be due to absence of nutritive substances in the material and not to presence of a fungistatic agent. The absence of a fungistatic agent was determined by the fungus growth extending from the cotton string on those replicates exposed with string attached.

On the basis of the percentage of area covered by fungus growth on four of the eight specimens, and the extent of fungus growth from a known nutrient source on the remaining four of the eight specimens, for each sample of plastic laminate being evaluated; the following criteria were used for the

various degrees of fungus resistance:

1) FUNGINERT - where none of the replicates, exposed without attached cotton string, show more than 2% fungus growth and where fungus growth extend at least 1 mm from the string on at least 2 of the 4 replicates exposed with cotton string attached.

2) FUNGISTATIC - where none of the replicates, exposed without attached cotton string, shows more that 2% fungus growth and where fungus growth does not extend at least 1 mm from the string on at least 2 of the 4 replicates exposed with cotton string attached.

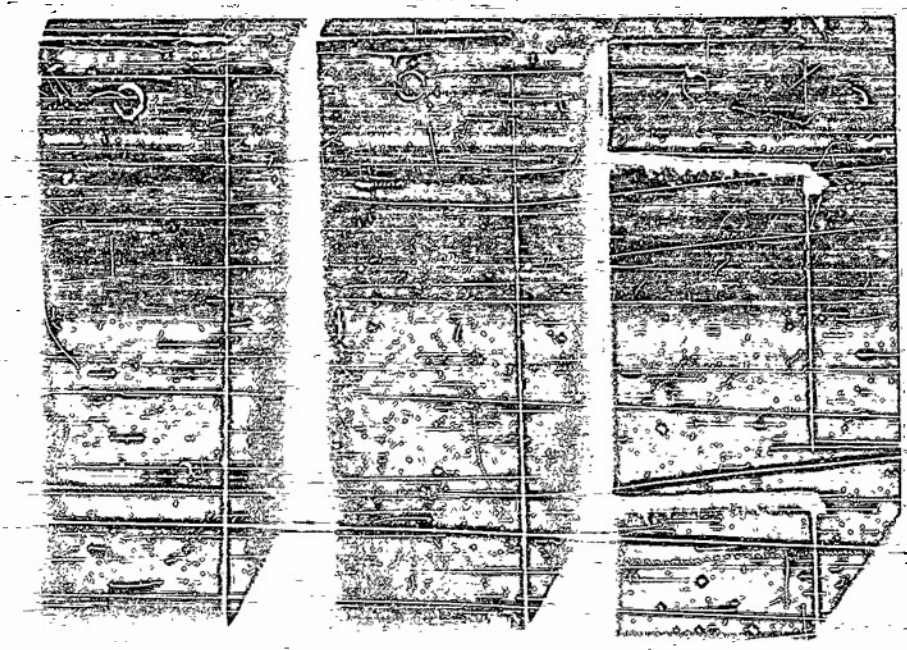
3) FUNGUS SUSCEPTIBLE - where at least one of the four replicates, exposed without attached cotton string, shows more than 2% fungus growth.

In table 7, pages 88 through 117 are listed the ratings for the 30 plastic laminated materials reported in this section. A separate page has been set aside for each sample and each page presents both the original data and the fungus resistance rating both for surface growth and for edge growth. The Humidity-exposure Method permits a separate evaluation based on the edge growth alone, hence the separate ratings. In this method the edge growth is true edge growth in contrast to the Petri-dish Method where edge growth could in reality be deriving its nourishment from the agar and merely extending over the edges of the specimen.

Figures 4 and 5, page 86 illustrate two representative "Funginert" plastic laminates.

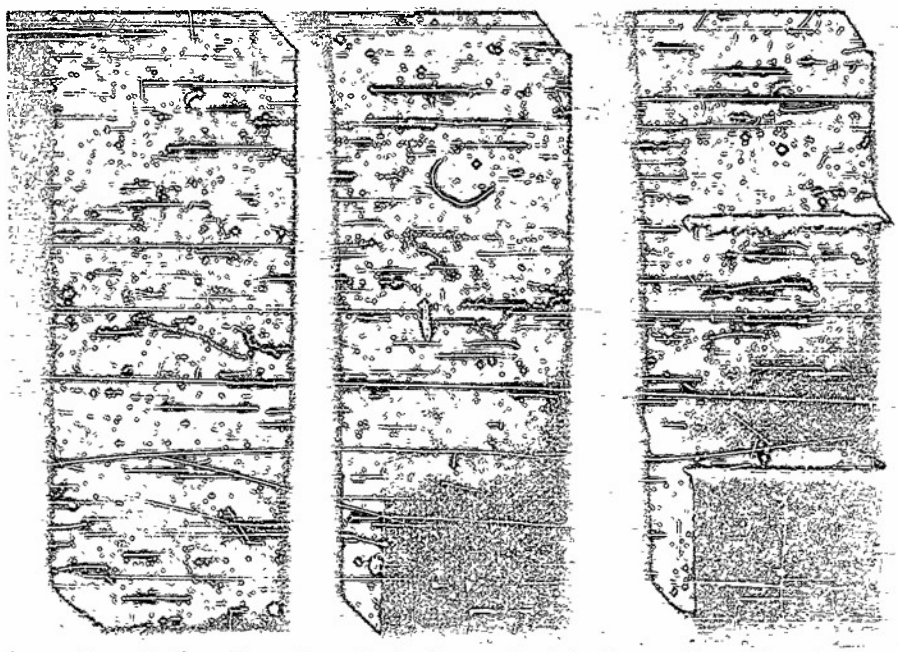
Figures 6 and 7, page 87 illustrate two representative "Fungus Susceptible" plastic laminates.

FUNGINERT LAMINATES



(a) (b) (c)

Figure 4



(a) (b) (c)

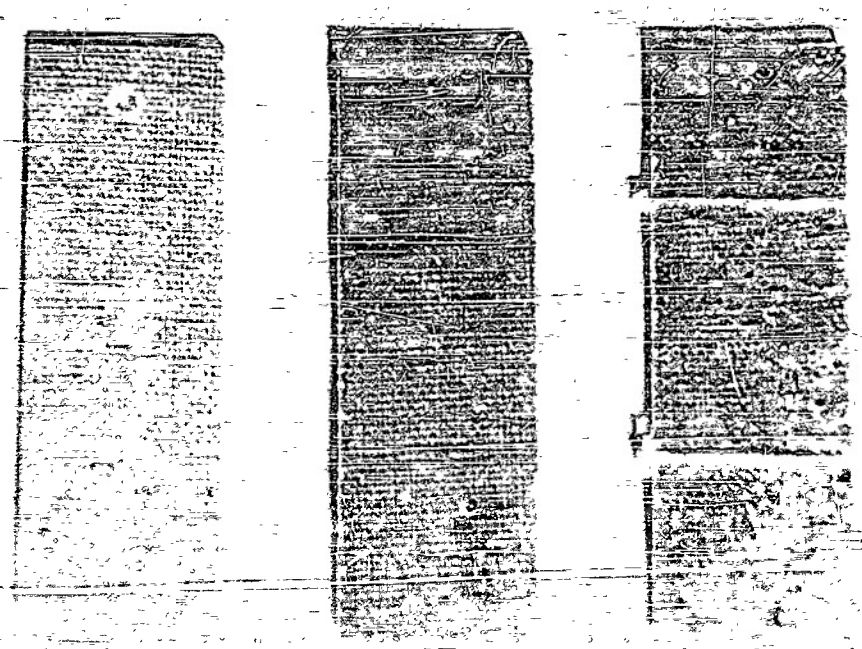
Figure 5

Legend: (a) - unexposed specimen
(b) - specimen exposed without string attached
(c) - specimen exposed with string attached

Exposure: 28 days at 28°C and 100% Relative Humidity

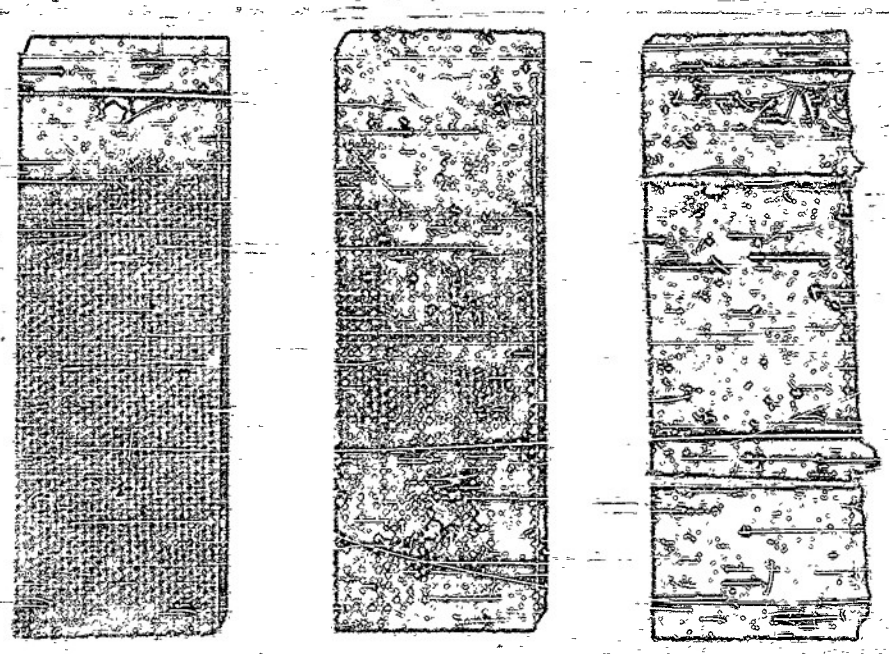
Test Fungi: "JAN Spore Mixture"

FUNGUS SUSCEPTIBLE LAMINATES



(a) (b) (c)

Figure 6



(a) (b) (c)

Figure 7

Legend: (a) - unexposed specimen
(b) - specimen exposed without string attached
(c) - specimen exposed with string attached

Exposure: 28 days at 28°C and 100% Relative Humidity

Test Fungi: "JAN Spore Mixture"

TABLE 7

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade E GSG Manufacturer and Designation: #1 11514

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of Area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
177	Traces	< 2%	None	Traces	Traces	< 2%
178	Traces	< 2%	Traces	Traces	None	< 2%
179	Traces	< 2%	None	None	Traces	< 2%
180	Traces	< 2%	None	None	Traces	< 2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
181	2 mm	1 mm
182	1 mm	1 mm
183	1 mm	2 mm
184	2 mm	1 mm

Rating (See Pages 84 & 85 for explanation):

Based on surfaces alone: Funginert

Based on edges alone: Funginert

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: GMG Manufacturer and Designation: #1 11508

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
321	Moderate	5%	Moderate	Slight	Moderate	5%
322	Moderate	5%	Moderate	Slight	Moderate	5%
323	Moderate	5%	Slight	Slight	Slight	2%
324	Moderate	5%	Slight	Slight	Slight	2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
325	2 mm	2 mm
326	1 mm	1 mm
327	1 mm	1 mm
328	1 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: PBG Manufacturer and Designation: #1 114

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2-sides	Top	Bottom	% of area covered
241	Moderate	5%	Slight	Slight	Moderate	2%
242	Slight	2%	Slight	Slight	Moderate	5%
243	Traces	<2%	Traces	Traces	Moderate	2%
244	Slight	2%	Slight	Slight	Moderate	2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
245	11 mm	10 mm
246	4 mm	4 mm
247	4 mm	5 mm
248	4 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: PBG Manufacturer and Designation: #1 2008

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
193	Moderate	5%	Moderate	Moderate	Slight	10%
194	Moderate	5%	Moderate	Moderate	Moderate	20%
195	Moderate	5%	Moderate	Moderate	Moderate	50%
196	Moderate	10%	Moderate	Moderate	Moderate	15%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
197	8 mm	5 mm
198	6 mm	3 mm
199	3 mm	2 mm
200	6 mm	4 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #1 2029

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
185	Moderate	5%	Moderate	Slight	Moderate	5%
186	Slight	2%	None	Moderate	Moderate	<2%
187	Moderate	10%	Slight	Slight	Moderate	5%
188	Moderate	5%	Slight	Slight	Moderate	5%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
189	8 mm	7 mm
190	4 mm	4 mm
191	9 mm	10 mm
192	10 mm	6 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: PBE-P Manufacturer and Designation: #1 2051

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
249	Slight	2%	Slight	Slight	Moderate	2%
250	Moderate	5%	Moderate	Slight	Moderate	5%
251	Moderate	10%	Moderate	Moderate	Moderate	15%
252	Moderate	5%	Slight	Slight	Moderate	5%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
253	5 mm	4 mm
254	2 mm	3 mm
255	3 mm	3 mm
256	6 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

TABLE 7 (CONTINUED) Sheet 7 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBH Manufacturer and Designation: #1 113

Specimens without strings attached:

Replicate	Growth on Surfaces:		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
257	Moderate	65%	Moderate	Moderate	Moderate	50%
258	Abundant	80%	Moderate	Moderate	Moderate	50%
259	Moderate	65%	Moderate	Moderate	Moderate	60%
260	Moderate	70%	Moderate	Moderate	Moderate	65%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
261	4 mm	2 mm
262	3 mm	2 mm
263	7 mm	6 mm
264	4 mm	5 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #1 2013

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
265	Moderate	20%	Moderate	Moderate	Moderate	5%
266	Moderate	30%	Moderate	Moderate	Moderate	5%
267	Moderate	25%	Moderate	Moderate	Moderate	5%
268	Moderate	35%	Moderate	Moderate	Moderate	10%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
269	9 mm	2 mm
270	9 mm	2 mm
271	7 mm	4 mm
272	11 mm	4 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

TABLE 7 (CONTINUED) Sheet 9 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES

(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #1 1841

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
201	Moderate	55%	Moderate	Moderate	Moderate	20%
202	Moderate	50%	Moderate	Moderate	Moderate	15%
203	Moderate	55%	Moderate	Moderate	Moderate	30%
204	Moderate	65%	Moderate	Moderate	Moderate	45%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
205	12 mm	4 mm
206	11 mm	6 mm
207	6 mm	4 mm
208	8 mm	3 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

TABLE 7 (CONTINUED) Sheet 9 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES

(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #I 1841

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
201	Moderate	55%	Moderate	Moderate	Moderate	20%
202	Moderate	50%	Moderate	Moderate	Moderate	15%
203	Moderate	55%	Moderate	Moderate	Moderate	30%
204	Moderate	65%	Moderate	Moderate	Moderate	45%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
205	12 mm	4 mm
206	11 mm	6 mm
207	6 mm	4 mm
208	8 mm	3 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBI Manufacturer and Designation: #1 2080

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
209	Moderate	20%	Moderate	Moderate	Moderate	20%
210	Moderate	25%	Moderate	Moderate	Moderate	20%
211	Moderate	20%	Moderate	Moderate	Moderate	45%
212	Moderate	25%	Moderate	Moderate	Moderate	10%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth From Point of Contact with String	
	Surfaces	Side Edges
213	11 mm	3 mm
214	4 mm	1 mm
215	12 mm	14 mm
216	3 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

TABLE 7 (CONTINUED) Sheet 11 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: GMG Manufacturer and Designation #2 140

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
97	Moderate	10%	Moderate	Moderate	Moderate	10%
98	Moderate	5%	Slight	Moderate	Moderate	10%
99	Moderate	5%	Moderate	Moderate	Moderate	15%
100	Moderate	10%	Moderate	Moderate	Moderate	5%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
101	1 mm	2 mm
102	1 mm	3 mm
103	1 mm	3 mm
104	6 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: NPG Manufacturer and Designation: #2 190

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area Covered	Relative Profusion of Growth			% of area covered
			2 sides	Top	Bottom	
105	Slight	2%	Slight	Slight	Moderate	5%
106	Moderate	10%	Slight	Slight	Moderate	5%
107	Moderate	5%	Slight	Moderate	Moderate	5%
108	Slight	2%	Slight	Slight	Traces	2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
109	3 mm	3 mm
110	7 mm	1 mm
111	6 mm	4 mm
112	2 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #2 550

Specimens without Strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth			% of area covered
			2 sides	Top	Bottom	
121	Moderate	5%	Slight	Slight	Moderate	2%
122	Traces	≤ 2%	Traces	None	Moderate	< 2%
123	Slight	2%	Traces	None	Moderate	< 2%
124	Traces	≤ 2%	Traces	Traces	Traces	< 2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
125	9 mm	4 mm
126	12 mm	4 mm
127	6 mm	3 mm
128	6 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Funginert

TABLE 7 (CONTINUED) Sheet 14 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #2 520

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 Sides	Top	Bottom	% of area covered
113	Traces	< 2%	Traces	Slight	Moderate	2%
114	Moderate	10%	Slight	Slight	Moderate	5%
115	Slight	2%	Traces	Slight	Slight	< 2%
116	Moderate	5%	Slight	None	Slight	2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
117	10 mm	3 mm
118	5 mm	2 mm
119	8 mm	2 mm
120	5 mm	1 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: ~~MBE~~-P Manufacturer and Designation: #2 780

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
129	None	0%	None	None	None	0%
130	Traces	< 2%	Traces	None	Slight	< 2%
131	Traces	< 2%	Traces	Slight	None	< 2%
132	Slight	2%	Traces	None	None	< 2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
133	12 mm	2 mm
134	6 mm	3 mm
135	10 mm	4 mm
136	6 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Funginert

Based on edges alone: Funginert

TABLE 7 (CONTINUED) Sheet 16 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBM Manufacturer and Designation: #2 900

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
137	Abundant	95%	Abundant	Abundant	Moderate	80%
138	Abundant	80%	Moderate	Moderate	Moderate	60%
139	Moderate	70%	Abundant	Moderate	Moderate	80%
140	Abundant	90%	Moderate	Moderate	Moderate	35%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
141	9 mm	4 mm
142	7 mm	4 mm
143	8 mm	5 mm
144	3 mm	3 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBM Manufacturer and Designation: #2 920

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
153	Moderate	20%	Moderate	Moderate	Moderate	10%
154	Moderate	15%	Moderate	Moderate	Moderate	15%
155	Moderate	30%	Moderate	Moderate	Moderate	20%
156	Moderate	15%	Moderate	Moderate	Moderate	15%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with string	
	Surfaces	Side Edges
157	4 mm	2 mm
158	4 mm	2 mm
159	3 mm	2 mm
160	8 mm	4 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade : FBG Manufacturer and Designation: #2 910

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 Sides	Top	Bottom	% of area covered
145	Moderate	50%	Moderate	Moderate	Moderate	40%
146	Moderate	50%	Moderate	Moderate	Moderate	30%
147	Moderate	60%	Moderate	Moderate	Moderate	30%
148	Moderate	60%	Moderate	Moderate	Moderate	35%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
149	10 mm	4 mm
150	12 mm	6 mm
151	2 mm	2 mm
152	3 mm	7 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #2 950

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
169	Moderate	50%	Moderate	Moderate	Moderate	50%
170	Moderate	50%	Moderate	Moderate	Moderate	30%
171	Abundant	80%	Moderate	Moderate	Moderate	50%
172	Moderate	30%	Moderate	Moderate	Moderate	35%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
173	12 mm	4 mm
174	9 mm	3 mm
175	2 mm	3 mm
176	2 mm	3 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBI Manufacturer and Designation: #2 940

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
161	Moderate	65%	Moderate	Moderate	Moderate	65%
162	Moderate	70%	Moderate	Moderate	Moderate	30%
163	Moderate	35%	Moderate	Moderate	Moderate	20%
164	Moderate	40%	Moderate	Moderate	Moderate	30%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from point of Contact with String	
	Surfaces	Side Edges
165	3 mm	2 mm
166	4 mm	3 mm
167	1 mm	1 mm
168	1 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: GSG Manufacturer and Designation: #8 G-7

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
33	Traces	< 2%	Traces	None	None	< 2%
34	Traces	< 2%	Traces	None	None	2%
35	Traces	< 2%	Traces	None	Moderate	< 2%
36	Slight	2%	None	None	Slight	< 2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
37	1 mm	3 mm
38	1 mm	2 mm
39	3 mm	3 mm
40	2 mm	3 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Funginert

Based on edges alone: Funginert

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: EMG Manufacturer and Designation: #8 FP-55

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
41	Moderate	15%	Moderate	Moderate	Moderate	15%
42	Moderate	20%	Moderate	Moderate	Moderate	30%
43	Moderate	10%	Moderate	Moderate	Moderate	55%
44	Moderate	30%	Moderate	Moderate	Moderate	45%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
45	3 mm	4 mm
46	3 mm	3 mm
47	2 mm	3 mm
48	5 mm	3 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: NPG Manufacturer and Designation: #8 YN-25

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
225	Traces	< 2%	Traces	Traces	Traces	< 2%
226	Slight	2%	Traces	Traces	Traces	< 2%
227	Traces	< 2%	Slight	Slight	Moderate	2%
228	Traces	< 2%	Traces	Traces	Traces	< 2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
229	6 mm	4 mm
230	3 mm	1 mm
231	4 mm	4 mm
232	5 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Funginert

Based on edges alone: Funginert

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: PBG Manufacturer and Designation: #8 XXN-23

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
49	Moderate	15%	Moderate	Moderate	Moderate	55%
50	Moderate	10%	Moderate	Moderate	Moderate	35%
51	Moderate	15%	Moderate	Moderate	Moderate	30%
52	Moderate	10%	Moderate	Moderate	Moderate	20%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
53	4 mm	5 mm
54	1 mm	2 mm
55	5 mm	3 mm
56	2 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: PBE Manufacturer and Designation: #8 XXXN

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
57	Moderate	20%	Moderate	Moderate	Moderate	20%
58	Moderate	30%	Moderate	Moderate	Moderate	35%
59	Moderate	15%	Moderate	Moderate	Moderate	15%
60	Moderate	15%	Moderate	Moderate	Moderate	15%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
61	3 mm	12 mm
62	4 mm	4 mm
63	3 mm	4 mm
64	5 mm	7 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FSE-P Manufacturer and Designation: #6 XXXFN

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
65	Moderate	10%	Moderate	Moderate	Moderate	35%
66	Moderate	5%	Moderate	Moderate	Moderate	20%
67	Moderate	5%	Moderate	Moderate	Moderate	35%
68	Moderate	10%	Moderate	Moderate	Moderate	50%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
69	1 mm	3 mm
70	7 mm	3 mm
71	1 mm	2 mm
72	1 mm	1 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

TABLE 7 (CONTINUED) Sheet 27 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FSM Manufacturer and Designation: #8 CN-16

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
73	Abundant	85%	Moderate	Moderate	Moderate	75%
74	Moderate	65%	Moderate	Moderate	Moderate	70%
75	Abundant	80%	Moderate	Moderate	Moderate	50%
76	Abundant	75%	Moderate	Moderate	Moderate	50%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
77	2 mm	2 mm
78	1 mm	1 mm
79	1 mm	1 mm
80	1 mm	1 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #8 CEN

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
81	Moderate	55%	Moderate	Moderate	Moderate	50%
82	Moderate	50%	Moderate	Moderate	Moderate	50%
83	Moderate	40%	Moderate	Moderate	Moderate	70%
84	Moderate	35%	Moderate	Moderate	Moderate	50%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
85	1 mm	2 mm
86	3 mm	1 mm
87	2 mm	1 mm
88	2 mm	1 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #8 LEN-15

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
89	Moderate	10%	Moderate	Moderate	Moderate	15%
90	Moderate	20%	Moderate	Moderate	Moderate	15%
91	Moderate	10%	Moderate	Slight	None	2%
92	Moderate	10%	Slight	None	Trace	2%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
93	1 mm	2 mm
94	2 mm	1 mm
95	4 mm	2 mm
96	3 mm	3 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

TABLE 7 (CONCLUDED) Sheet 30 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

Grade: FBI Manufacturer and Designation: #8 LN

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	% of area covered
233	Moderate	60%	Moderate	Moderate	Moderate	50%
234	Moderate	70%	Moderate	Moderate	Moderate	40%
235	Moderate	65%	Moderate	Moderate	Moderate	50%
236	Moderate	65%	Moderate	Moderate	Moderate	50%

Specimens with strings attached:

Replicate	Maximum Extent of Fungus Growth from Point of Contact with String	
	Surfaces	Side Edges
237	2 mm	1 mm
238	2 mm	2 mm
239	2 mm	1 mm
240	2 mm	2 mm

Rating (See pages 84 & 85 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible

TABLE 8

FUNGUS RESISTANCE OF PLASTIC LAMINATES
(HUMIDITY EXPOSURE METHOD)

(Summary of ratings listed in table 7)

Spec. Grade	Manufacturer and Designation		Surface Rating	Edge Rating
GSG	#1	11514	Funginert	Funginert
GMG	#1	11508	Susceptible	Susceptible
FBG	#1	114	Susceptible	Susceptible
PBG	#1	2008	Susceptible	Susceptible
PBE	#1	2029	Susceptible	Susceptible
PBE-P	#1	2051	Susceptible	Susceptible
FBM	#1	113	Susceptible	Susceptible
FBG	#1	2013	Susceptible	Susceptible
FBE	#1	1841	Susceptible	Susceptible
FBI	#1	2080	Susceptible	Susceptible
GMG	#2	140	Susceptible	Susceptible
NPG	#2	190	Susceptible	Susceptible
PBG	#2	550	Susceptible	Susceptible
PBE	#2	520	Susceptible	Funginert
PBE-P	#2	780	Funginert	Susceptible
FBM	#2	900	Susceptible	Funginert
FBM	#2	920	Susceptible	Susceptible
FBG	#2	910	Susceptible	Susceptible
FBE	#2	950	Susceptible	Susceptible
FBI	#2	940	Susceptible	Susceptible
GSG	#8	G-7	Funginert	Susceptible
GMG	#8	FF-55	Susceptible	Funginert
NPG	#8	YN-25	Funginert	Susceptible
PBG	#8	XXN-23	Susceptible	Funginert
PBE	#8	XXXN	Susceptible	Susceptible
PBE-P	#8	XXXPN	Susceptible	Susceptible
FBM	#8	CN-16	Susceptible	Susceptible
FBG	#8	CEN	Susceptible	Susceptible
FBE	#8	LEN-15	Susceptible	Susceptible
FBI	#8	LN	Susceptible	Susceptible

Summary of Observations

(Surface Growth)

	Manuf.	Designation	Grade
The following samples showed growth covering 2% or less of the area on all 4 replicates: (These samples also showed a minimum of 1 mm growth from string on replicates exposed with string attached)	#1	11514	GSG
	#2	780	FBE-P
	#8	G-7	GSG
	#8	YN-25	NPG
The following samples showed growth covering 2 - 10% of the area on all 4 replicates:	#1	11508	GMG
	#1	114	FBG
	#1	2008	FBG
	#1	2029	FBE
	#1	2051	FBE-P
	#2	140	GMG
	#2	190	NPG
	#2	550	FBG
	#2	520	FBE
	#8	XXXPN	FBE-P
The following samples showed growth covering 10-40% of the area on all 4 replicates:	#1	2013	FBG
	#1	2080	FBI
	#2	920	FBM
	#8	FF-55	GMG
	#8	XXN-23	FBG
	#8	XXXN	FBE
	#8	LEN-15	FBE
The following samples showed growth covering 30 - 80% of the area on all 4 replicates:	#1	1841	FBE
	#2	910	FBG
	#2	950	FBE
	#2	940	FBI
	#8	CEN	FBG
	#8	LN	FBI
The following samples showed growth covering 65% or over of the area on all 4 replicates:	#1	113	FBM
	#2	900	FBM
	#8	CN-16	FBM

Summary of Observations

(Edge Growth)

The following samples showed growth covering 2% or less of the area on all 4 replicates:
(These samples also showed a minimum of 1 mm growth from string on replicates exposed with string attached)

Manuf.	Designation	Grade
#1	11514	GSG
#2	550	FBG
#2	780	FBE-P
#8	C-7	GSG
#8	YN-25	NPG

The following samples showed growth covering 2 - 15% of the area on all 4 replicates:

#1	11508	GMG
#1	114	PBG
#1	2029	PBE
#1	2051	PBE-P
#1	2013	FBG
#2	190	NPG
#2	520	PBE
#8	LEN-15	FBE

The following samples showed growth covering 10 - 45% of the area on all 4 replicates:

#1	2008	PBG
#1	1841	FBE
#1	2080	FBI
#2	140	GMG
#2	920	FBM
#2	910	FBG
#8	FF-55	GMG
#8	XXXN	PBE

The following samples showed growth covering 30- 80% of the area on all 4 replicates:

#1	113	FBM
#2	900	FBM
#2	950	FBE
#2	940	FBI
#3	XXN-23	PBG
#8	XXXPN	PBE-P
#8	CN-16	FBM
#8	CEN	FBG
#8	LN	FBI

PRELIMINARY COMPARISON OF RESULTS OBTAINED BY THE TWO TEST METHODS

A total of 30 plastic laminated materials have been tested for resistance to fungus growth using both the Petri-Dish Method and the Humidity-Exposure Method as supplied by the Bureau of Ordnance.

Observations and ratings of the individual replicates of these 30 laminates have been reported on previous pages of this report and in the First Quarterly Report.

Table 9, page 122, lists the 30 laminates arranged in decreasing order of fungus resistance, as determined by the Petri-Dish Method, considering surface growth alone. Also listed in table 9, are the corresponding results as obtained using the Humidity-Exposure Method.

This listing has been compiled using results of surface growth alone since it is not felt that the edge growth obtained in the Petri-Dish Method is comparable to that obtained in the Humidity-Exposure Method.

No conclusions are being drawn from this listing at this time since the number of samples tested is small in proportion to the entire number to be tested.

TABLE 9

FUNGUS RESISTANCE OF PLASTIC LAMINATES
AS DETERMINED BY TWO TEST METHODS

Spec. Grade	Manufacturer and Designation	Surface Growth by: Petri-Dish Method: Relative Profusion	Petri-Dish Method: Rating (*)	Humidity-Exposure Method: Relative Profusion	Humidity-Exposure Method: % of Area Covered
GSG	#1 11514	Traces	1	Traces	1%
FBE-P	#2 780	Traces	1	Tr - Sl	1%
GSG	#8 G-7	Traces	1	Tr - Sl	1%
NPG	#8 YN-25	Traces	1	Tr - Sl	1%
PBG	#2 550	Traces	1	Tr - Mod	2%
NPG	#2 190	Traces	1	Sl - Mod	5%
PBE	#2 520	Traces	1	Tr - Mod	5%
PBE-P	#8 XXXPN	Traces	1	Moderate	7.5%
PBG	#8 XXN-23	Traces	1	Moderate	12.5%
PBE	#8 XXXN	Traces	1	Moderate	20%
PBG	#1 114	Slight	2	Tr - Mod	2.5%
GMG	#1 11508	Mod: Part Cov.	2	Moderate	5%
PBE	#1 2029	Slight	2	Sl - Mod	5.5%
PBE-P	#1 2051	Slight	2	Sl - Mod	5.5%
PBG	#1 2008	Slight	2	Moderate	6%
GMG	#2 140	Slight	2	Moderate	7.5%
FBE	#8 LEN-15	Slight	2	Moderate	12.5%
FBM	#2 920	Mod: Part Cov.	2	Moderate	20%
GMG	#8 FF-55	Slight	2	Moderate	20%
FBI	#1 2080	Slight	2	Moderate	22.5%
FBG	#1 2013	Slight	2	Moderate	27.5%
FBG	#8 CEN	Sl - Mod	2	Moderate	45%
FBE	#2 950	Mod: Part Cov.	2	Mod - Abund	52.5%
FBE	#1 1841	Slight	2	Moderate	56%
FBI	#2 940	Mod: Consid Cov	3	Moderate	52.5%
FBM	#1 113	Mod: Consid Cov	3	Mod - Abund	70%
FBM	#8 CN-16	Mod: Consid Cov	3	Mod - Abund	75%
FBG	#2 910	Abundant	4	Moderate	55%
FBI½	#8 LN	Abundant	4	Moderate	65%
FBM	#2 900	Abundant	4	Mod - Abund	85%

* - See page 29 for explanation