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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 Nond 11215**

by

**S. Ruggeri and R. Waitze Atlas**

**Period covered: May 10 to August 9, 1951**

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

**August 17, 1951**



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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:

<u>Specification</u>	<u>Type</u>	<u>Filler</u>	<u>Resin</u>	<u>Grade</u>
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	PBG	Cotton Fab.	Phenolic	General
MIL-P-15035A	PBE	Cotton Fab.	Phenolic	Electrical
MIL-P-15035A	PBI	Cotton Fab.	Phenolic	Fine Machin- ing



## 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:

<u>Observed Fungus growth on the specimen</u>	<u>Rating</u>
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 inoculum, or upon an occasional extraneous bit of debris. (Continuous 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 Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GSG	#1 11514	119A	Traces (*) Traces (*) Traces (*)	Slight (1 edge) Traces Traces	1	2
		119B			1	1
		119C			1	1
GLG	#1 11508	118A	Mod: Part Cov. (*) Mod: Part Cov. (*) Mod: Part Cov. (*)	Slight Moderate Slight - Moderate	2	2
		118B			2	2
		118C			2	2
PBG	#1 114	65A	Slight Slight Slight (*)	Slight Slight - Moderate Slight	2	2
		65B			2	2
		65C			2	2
PBG	#1 2008	66A	Slight (*) Slight (*) Mod: Part Cov. (*)	Moderate Moderate Moderate-Abundant	2	2
		66B			2	2
		66C			2	2
PBH	#1 2029	68A	Traces Slight Slight	Slight Slight-Moderate Slight	1	2
		68B			2	2
		68C			2	2

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



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

Conditioning of Specimen: None

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

\*-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	#2 140	71A	Slight	Slight	2	2
		71B	Slight	Slight	2	2
		71C	Traces (*)	Slight	1	2
NPG	#2 190	135A	Traces	Slight	1	2
		135B	Traces	Moderate	1	2
		135C	Traces (*)	Slight	1	2
PBG	#2 550	73A	Traces	Slight (1 edge)	1	2
		73B	Traces	Slight	1	2
		73C	Traces	Traces	1	1
PBE	#2 520	72A	Traces	Slight	1	2
		72B	Traces	Slight	1	2
		72C	Traces	Traces	1	1
PBE-P	#2 780	74A	Traces	Moderate	1	2
		74B	Traces	Moderate	1	2
		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 Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FEM	#2 900	75A	Abundant (*)	Abundant	4	4
		75B	Abundant (*)	Abundant	4	4
		75C	Abundant	Abundant	4	4
FEM	#2 920	136A	Mod: Part Cov.	Moderate	2	2
		136B	Mod: Part Cov.	Moderate	2	2
		136C	Mod: Part Cov.	Moderate	2	2
FBG	#2 910	76A	Abundant	Abundant	4	4
		76B	Abundant	Abundant	4	4
		76C	Abundant	Abundant	4	4
FBE	#2 950	77A	Slight	Slight	2	2
		77B	Mod: Part Cov.	Moderate	2	2
		77C	Slight	Slight	2	2
FBI	#2 940	137A	Mod: Part Cov. (*)	Moderate	2	2
		137B	Mod: Part Cov. (*)	Moderate	3	3
		137C	Mod: Part 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 Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMC	#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
PEG	#3 T-643	108A	Traces	Traces	1	2
		108B	Slight - Moderate	Slight - Moderate	2	2
		108C	Slight	Slight	2	2
PEE	#3 T-640	107A	Traces (*)	Slight	1	2
		107B	Traces (*)	Slight	1	2
		107C	Traces (*)	Slight - Moderate	1	2
PBI-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)

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

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBT-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
FRM	#3 T-601	105A	Abundant	Abundant	4	4
		105B	Abundant	Abundant	4	4
		105C	Abundant (*)	Abundant	4	4
FRG	#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 2.



TABLE 4 (CONTINUED)

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

Conditioning of Specimen: None

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

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

Conditioning of Specimen: None

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

\* - Specimen surface was waterlogged. \*\* - Same for 4 edges unless otherwise noted.  
Note - For explanation of numeric ratings 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 Repliates	DESCRIPTION OF FUNGUS GROWTH			Numeric Rating	
			Surface	Edges (**)	Surface and Edges	Surface	Surface and Edges
FBI	#4 L	147A	M. 1: Consid. Cov.	Moderate	3	3	3
		147B	Mod: Part Cov.	Moderate (3 edges)	2	2	2
		147C	Mod: Part Cov. (*)	Moderate	2	2	2
GSG	#6 T-35210	167A	Traces	Traces	1	1	1
		167B	Traces	Traces	1	1	1
		167C	Traces	Traces	1	1	1
GSG	#6 20202	168A	Traces (*)	Traces	1	1	1
		168B	Traces (*)	Traces	1	1	1
		168C	Traces	Traces	1	1	1
GMC	#6 259-2	169A	Slight	Slight	2	2	2
		169B	Slight	Moderate	2	2	2
		169C	Slight (*)	Moderate	2	2	2
FBI	#6 262	170A	Slight	Slight	2	2	2
		170B	Slight	Moderate	2	2	2
		170C	Slight	Moderate	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)

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

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Repl. codes	Description of Fungus Growth		Numeric Rating		
			Surface	Edges (**)	Surface	Surface and Edges	
FBG	#6	171A 171B 171C	Slight Slight Slight	{ * * *}	Slight Slight Slight	2 2 2	2 2 2
	#6	172A 172B 172C	Traces Slight Slight	{ * *}	Slight Slight Traces	1 2 2	2 2 2
	#9 6090	201A 201B 201C	Traces Traces Traces		Traces Traces Traces	1 1 1	1 1 1
GMC	#9	202A 202B 202C	Slight Slight Slight		Slight-Moderate Slight Moderate	2 2 2	2 2 2
	#9	203A 203B 203C	Slight Traces Slight	{ * *}	Slight Traces Slight	2 1 2	2 1 2
	#9 6051						

\* 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 Repliates	Description of Fungus Growth		Numeric Rating Surface and Edges
			Surface	Edges (**)	
FBG	#9 6020	204A	Traces	Traces	1
		204B	Traces	Slight	1
		204C	Slight	Slight	2
FBE-P	#9 6028	205A	Traces (*)	Traces	1
		205B	Traces	Traces	1
		205C	Traces (*)	Slight	2
FBX	#9 6030	206A	Abundant	Abundant	4
		206B	Abundant	Abundant	4
		206C	Abundant	Abundant	4
FBG	#9 6031	207A	Mod: Consid Cov.	Abundant	3
		207B	Mod: Consid Cov.	Abundant	3
		207C	Mod: Consid Cov.	Abundant	3
FBE	#9 6045	208A	Mod: Consid Cov.	Abundant	3
		208B	Mod: Consid Cov.	Moderate	3
		208C	Mod: Consid Cov.	Abundant	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	Mod: Consid. Cov.	Moderate	3	3
		209B	Mod: Consid. Cov.	Abundant	3	3
		209C	Mod: Consid. Cov.	Moderate	3	3
FBM	#10 C-30	148A	Mod: Consid. Cov.	Moderate	3	3
		148B	Mod: Consid. Cov.	Moderate	2	2
		148C	Mod: Part Cov.	Slight	2	2
FBG	#10 GE-34	149A	Mod: Part Cov.	Moderate	2	2
		149B	Mod: Part Cov. (*)	Moderate	2	2
		149C	Mod: Part Cov. (*)	Moderate	2	2
FBI	#10 L-40	150A	Slight	Slight (3 edges)	2	2
		150B	Slight	Slight (2 edges)	2	2
		150C	Slight	Slight (3 edges)	2	2
GSG	#12 GB-112S	173A	Traces	Traces	1	1
		173B	Traces	Traces	1	1
		173C	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 4 (CONTINUED)

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

Conditioning of Specimen: None

Spec. Grade	Manufacturer and Designation	Petri-dish Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMG	#12 GB-128M	174A	Slight	Moderate	2	3
		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
PBMP-P	#12 XXIP-26	177A	Slight	Slight	2	2
		177B	Slight	Slight	2	2
		177C	Slight	Slight	2	2
FBI	#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 Repliates	Description of Fungus Growth		Numeric Rating		
			Surface	Edges (**)	Surface	Surface and Edges	
FBG	#12 C-813	179A	Abundant (*) Mod: Consid. Cov. Abundant (*)	Abundant	4	4	
		179B					3
		179C					4
PBG	#13 IX-13	180A	Slight	Slight	2	2	
		180B					2
		180C					2
FBG	#13 C-813	181A	Mod: Part Cov. Mod: Part Cov. Mod: Part Cov.	Abundant	2	3	
		181B					2
		181C					2
FBI	#13 L-400	182A	Mod: Part Cov. (*) Mod: Part Cov. (*) Mod: Part Cov.	Moderate	2	2	
		182B					2
		182C					2
PBE-P	#14 XXXP-26	183A	Mod: Part Cov. Slight (*) Slight	Moderate	2	2	
		183B					2
		183C					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 Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GSG	#15 GSC	81A	Traces	Traces	1	1
		81B	Traces	Traces	1	1
		81C	Traces	Traces	1	1
GMC	#15 G-5	80A	Slight	Slight	2	2
		80B	Slight	Slight	2	2
		80C	Traces	Traces	1	1
PBG	#15 XX	83A	Slight	Abundant	2	3
		83B	Mod.: Part Cov.	Abundant	2	3
		83C	Slight	Abundant	2	3
PBE	#15 XXX	84A	Slight	Abundant	2	3
		84B	Slight	Abundant	2	3
		84C	Mod.: Part Cov.	Abundant	2	3
FBM	#15 0	78A	Mod.: Consid Cov.	Abundant	3	3
		78B	Mod.: Consid Cov.	Abundant	3	3
		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)

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

Conditioning of Specimen: None

Spec <sup>o</sup> Grade	Manufacturer and Designation	Petri- dish Repli- cates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBG	#15	79A	Abundant	Abundant	4	4
	CE	79B	Abundant	Abundant	4	4
		79C	Abundant	Abundant	4	4
FBE	#15	82A	Slight	Slight - Moderate	2	2
	IE	82B	Mod: Part Cov.	Moderate	2	2
		82C	Slight	Moderate	2	2
PBG	#16	210A	Abundant (*)	Abundant	4	4
	XX	210B	Abundant (*)	Abundant	4	4
		210C	Abundant	Abundant	4	4
FBM	#16	211A	Abundant	Abundant	4	4
	C	211B	Abundant	Abundant	4	4
		211C	Abundant	Abundant	4	4
FBE	#16	212A	Abundant (*)	Abundant	4	4
	IE	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° N

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

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

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

Conditioning of Specimen: 6 hrs at 85° C

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

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



TABLE 5 (CONTINUED)

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

Conditioning of Specimens: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Repliates	Description of Fungus Growth		Numeric Ratings	
			Surface	Edges (**)	Surface	Surface and Edges
GNG	#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
FBG	#2 550	93A	Traces	Traces	1	1
		93B	Traces	Slight	1	2
		93C	Slight	Slight	2	2
FBE	#2 520	92A	Traces	Slight	1	2
		92B	Traces	Slight	1	2
		92C	Slight (*)	Slight	2	2
PPE-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 Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Ridges (**)	Surface	Surface and Edges
FBM	#2	95A	Abundant	Abundant	4	4
	900	95B	Abundant	Abundant	4	4
		95C	Abundant	Abundant	4	4
FBM	#2	152A	Mod: Part Cov.	Moderate	2	2
	920	152B	Mod: Part Cov.	Moderate	2	2
		152C	Mod: Consid Cov.	Moderate	2	3
FBG	#2	96A	Abundant	Abundant	4	4
	910	96B	Abundant	Abundant	4	4
		96C	Abundant	Abundant	4	4
FEE	#2	97A	Mod: Part. Cov.	Moderate	2	2
	950	97B	Mod: Part. Cov. (*)	Slight - Moderate	2	2
		97C	Mod: Part. Cov. (**)	Moderate	2	2
FBI	#2	153A	Abundant	Moderate	4	3
	940	153B	Abundant	Abundant	4	4
		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 Repliates	Description of Fungus Growth		Numeric Rating					
			Surface	Edges (**)	Surface	Surface and Edges				
CMG	#3 T-712	124A	Mod: Part Cov. Mod: Part Cov. Mod: Part Cov.	Moderate Moderate Moderate	2 2 2	2 2 2				
		129A					Traces Traces Slight	Slight Slight - Moderate Slight	1 1 2	2 2 2
		129B								
129C										
IBG	#3 T-819	123A	Slight Slight Slight	Moderate Moderate Moderate	2 2 2	2 2 2				
		123B								
		123C								
PBE	#3 T-640	122A	Slight Traces Traces	Slight (2 edges) Slight (2 edges) Moderate	2 1 1	2 2 2				
		122B								
		122C								
PBT-IP	#3 T-725	125A	Traces Slight Traces	Moderate Moderate Moderate	1 2 1	2 4 2				
		125B								
		125C								

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

\* - 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 Repl. Catalog	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FBI	#3 T-733	126A	Mod: Part Cov. (*)	Moderate-Abundant	2	3
		126H	Mod: Part Cov.	Moderate-Abundant	2	3
		126C	Mod: Part Cov.	Moderate	2	2
CMG	#4 GLCC-N	154A	Mod: Part Cov.	Moderate	2	2
		154B	Mod: Part Cov.	Moderate	2	2
		154C	Mod: Part Cov.	Moderate	2	2
NPG	#4 NN	155A	Slight	Slight	2	2
		155B	Mod: Part Cov.	Slight	2	2
		155C	Slight	Slight	2	2
PBG	#4 XX	156A	Mod: Part Cov.	Moderate	2	2
		156B	Mod: Part Cov. (*)	Moderate	2	2
		156C	Mod: Part Cov. (*)	Moderate (3 edges)	2	2
PBE	#4 XXI	157A	Mod: Consid Cov.	Abundant	3	3
		157B	Mod: Part Cov.	Moderate	2	2
		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)

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

Conditioning of Specimen: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
PBE-P	#4 XXXX	158A	Slight	Moderate	2	2
		158B	Slight	Moderate	2	2
		158C	Slight	Moderate	2	2
PBE-P	#4 XXXX-IR	159A	Slight	Abundant	2	3
		159B	Slight	Abundant	2	3
		159C	Slight	Abundant	2	3
FEM	#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 EE	162A	Mod: Consid Cov.	Abundant	3	2
		162B	Mod: Consid Cov.	Moderate	3	2
		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)

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

Conditioning of Specimen: 6 hrs at 85° C

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

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

TABLE 5 (CONTINUED)

SKETCH 10 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	#6	188A 188B 188C	Slight Slight (*) Slight	Moderate Moderate Moderate	2 2 2	2 2 2
	#6	189A 189B 189C	Slight Slight Slight	Slight Slight Slight	2 2 2	2 2 2
	#9 6090	213A 213B 213C	Traces Traces Traces	Traces Traces Traces	1 1 1	1 1 1
GMG	#9	214A 214B 214C	Slight Slight Slight	Moderate Slight Moderate	2 2 2	2 2 2
	#9 6038	215A 215B 215C	Slight Slight Slight	Traces Traces Slight	2 2 2	2 2 2
	#9 6051					

\* - 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 Specimens: 6 hrs at 85° C

Spec. Grade	Manufacturer and Designation	Petri-dish Repliates	Description of Fungus Growth		Numeric Ratings	
			Surface	Edges (**)	Surface	Surface and Edges
PBC	#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: 6 hrs at 85° C

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

Specs Grade	Manufacturer and Designation	Petri-dish Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
GMC	#12 CB-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
PBE-P	#12 JXXP-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)

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

Conditioning of Specimen: 6 hrs at 35° C

Spec. Grade	Manufacturer and Designation	Petri-dish Repliates	Description of Fungus Growth			Numeric Rating	
			Surface	Edges (**)	Surface and Edges	Surface	Surface and Edges
FBG	#12 C-813	196A	Abundant	Abundant	4	4	4
		196B	Abundant	Abundant	4	4	4
		196C	Abundant	Abundant	4	4	4
PRG	#13 XX-13	197A	Slight	Slight	2	2	2
		197B	Slight	Slight	2	2	2
		197C	Slight	Slight	2	2	2
FBG	#13 C-813	198A	Mod: Part Cov.	Abundant	2	3	2
		198B	Slight	Moderate	2	2	2
		198C	Slight (*)	Slight	2	2	2
FBI	#15 L-400	199A	Mod: Part Cov.	Moderate	2	2	2
		199B	Slight	Moderate	2	2	2
		199C	Mod: Part Cov.	Moderate	2	2	2
PBE-P	#14 XXXP-26	200A	Mod: Part Cov.	Moderate	2	2	2
		200B	Mod: Part Cov.	Moderate	2	2	2
		200C	Mod: Part Cov. (*)	Moderate	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 (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
GSG	#15 GSC	101A	Traces	Traces	1	1
		101B	Traces	Traces	1	1
		101C	Traces	Traces	1	1
GAG	#15 G-5	100A	Slight	Slight	2	2
		100B	Slight	Slight	2	2
		100C	Slight	Slight	2	2
PBG	#15 XX	103A	Slight	Moderate-Abundant	2	2
		103B	Slight	Moderate-Abundant	2	2
		103C	Slight	Moderate-Abundant	2	2
PBE	#15 XXX	104A	Slight	Moderate-Abundant	2	2
		104B	Slight	Moderate-Abundant	2	2
		104C	Slight	Moderate-Abundant	2	2
FEM	#15 D	98A	Mod.: Part Cov.	Moderate	2	2
		98B	Mod.: Part Cov.	Moderate	2	2
		98C	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 (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 Repliates	Description of Fungus Growth		Numeric Rating	
			Surface	Edges (**)	Surface	Surface and Edges
FRC	#15 CE	99A	Abundant	Abundant	4	4
		99B	Abundant	Abundant	4	4
		99C	Abundant	Abundant	4	4
FBE	#15 LE	102A	Mod: Part Cov.	Moderate	2	2
		102B	Mod: Part Cov.	Moderate	2	2
		102C	Mod: Part Cov.	Moderate	2	2
FBC	#16 XX	222A	Mod: Consid Cov. (*)	Abundant	3	3
		222B	Mod: Consid Cov.	Abundant	3	3
		222C	Abundant	Abundant	4	4
FEM	#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.



Sheet 1 of 10

TABLE 6

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
CMG	#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-2	#1 2051	2 2 2	2 2 2	Susceptible	2 2 2	3 2 2	Susceptible
PBI	#1 113	5 3 3	2 2 2	Susceptible	5 3 3	2 2 2	Susceptible
PBG	#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)  
 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	2	2	Susceptible
FBI #1	2080	2	2	2	2	2	2	3	3	Susceptible
GMG #2	140	2	2	1	2	2	2	2	2	Susceptible
NPG #2	190	1	1	1	1	1	1	2	2	Susceptible
P6G #2	550	1	1	1	1	1	2	2	2	Susceptible
PBE #2	520	1	1	1	1	1	2	2	2	Susceptible
PBE-P #2	780	1	1	1	1	1	2	2	2	Susceptible
FBI #2	900	4	4	4	4	4	4	4	4	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		Fungus Resistance (*)	Surface and Edge Growth		
		Numeric Rating	Uncond		Numeric Rating	Uncond	
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
CBG	#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
FEE	#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)  
 FUNGUS RESISTANCE OF PLASTIC LAMINATES  
 (FETRI-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				
		Surface Growth Only		Surface and Edge Growth		Surface Growth Only		Surface and Edge Growth		
		Fungus Resistance (*)		Fungus Resistance (*)		Fungus Resistance (*)		Fungus Resistance (*)		
Numeric Rating		Numeric Rating		Numeric Rating		Numeric Rating		Numeric Rating		
Uncond. Cond.		Uncond. Cond.		Uncond. Cond.		Uncond. Cond.		Uncond. Cond.		
PBE-P #3	T-725	1 1 1	1 2 1	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	Susceptible
PBE-P #3	T-800	1 1 1	2 2 1	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	Susceptible
PBE-P #3	T-812	1 1 1	1 1 1	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	Susceptible
FBM #3	T-601	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	4 4 4	Susceptible
FBC #3	T-606	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	Susceptible
FBE #3	T-827	3 3 3	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	Susceptible
FBI #3	T-733	3 3 3	2 2 2	2 2 2	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3	Susceptible
GMG #4	GLCC-M	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	2 2 2	Susceptible

(\*) See page 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	(*)
NPC	#4 NN	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
ZBG	#4 XI	2 1 2	2 2 2	Susceptible	2 1 2	2 2 2	Susceptible
FBE	#4 XXX	2 2 2	3 2 3	Susceptible	2 2 2	2 2 3	Susceptible
PBE-P	#4 XXXP	2 2 2	2 2 2	Susceptible	2 2 2	2 2 2	Susceptible
PBE-IR	#4 XXXP-IR	2 2 2	2 2 2	Susceptible	2 2 2	3 3 3	Susceptible
FEM	#4 C	3 2 3	3 2 2	Susceptible	3 2 3	3 2 2	Susceptible
FBC	#4 OE	3 2 2	3 2 2	Susceptible	3 2 2	3 3 3	Susceptible
FBE	#4 IE	3 3 3	3 3 2	Susceptible	3 3 3	3 3 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			
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
EMG	#6 259-2	2	2 2	2 2 3	Susceptible	2	2 2	2 2 3	Susceptible
FBI	#6 262	2	2 2	2 2 2	Susceptible	2	2 2	2 3 3	Susceptible
FBC	#6 296	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)  
 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.					
CMC	#9 6038	2	2	2	2	Susceptible	2	2	2	2	Susceptible
NPG	#9 6051	2	1	2	2	Susceptible	2	1	2	2	Susceptible
PBG	#9 6020	1	1	2	2	Susceptible	1	2	2	2	Susceptible
PBE-P	#9 6028	1	1	1	1	Funginert	1	1	2	2	Funginert
PFM	#9 6030	4	4	4	4	Susceptible	4	4	4	4	Susceptible
PEG	#9 6031	3	3	3	3	Susceptible	3	3	3	3	Susceptible
NBE	#9 6045	3	3	3	3	Susceptible	3	3	3	3	Susceptible
PEI	#9 6040	3	3	3	3	Susceptible	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 2	3	4 3	3	2 2	3	4 3	Susceptible
FBC	#10 CE-34	2	2 2 2	2	2 2 2	2	2 2	2	3 2	Susceptible
FBI	#10 L-40	2	2 2 2	2	2 2 2	2	2 2	2	2 2	Susceptible
GSG	#12 GB-112S	1	1 1 1	1	1 1 1	1	1 1	1	1 1	Funginert
GMG	#12 GB-128M	2	2 2 2	2	2 2 2	2	2 2	2	2 2	Susceptible
NPG	#12 MEC-5	2	2 2 2	2	2 1 2	2	2 2	2	2 2	Susceptible
PBG	#12 XXL3	1	1 1 1	2	2 2 2	2	2 2	2	2 2	Susceptible
PBE-P	#12 XXXP-26	2	2 2	1	2 2	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-815	4 3 4	4 4 4	Susceptible	4 3 4	4 4 4	Susceptible
PBG	#13 YX-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
CMG	#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									
FBG	#15 XX	2	2	2	2	Susceptible	3	3	3	2	2	2	Susceptible		
PBE	#15 XXX	2	2	2	2	Susceptible	2	2	2	2	2	2	Susceptible		
FEM	#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
FEM	#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)

The following samples showed traces of growth on all six replicates:

<u>Manufa.</u>	<u>Designation</u>	<u>Grade</u>
#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-1125	GSG
#15	GSC	GSG

The following samples showed traces or slight growth on all six replicates:

#1	2029	PBE
#2	140	GMC
#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	238	FBI
#9	6051	NPG
#9	6020	PBG
#12	MEC-5	NPG
#12	XX13	PBG
#12	XXXP-26	PBE-P
#15	G-5	GMC

The following samples showed slight growth on all six replicates:

#1	1841	FBE
#4	XXXP	PBE-P
#4	XXXP-IR	PBE-P
#6	262	FBI
#6	286	PBG
#9	6038	GMC
#10	L40	FBI
#13	XX13	PBG

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

#1	11508	GMC
#1	114	PBG
#1	2008	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	NFG
#4	XX	FBG
#4	XXX	PBE
#6	259-2	GMG
#12	GB-128M	GMG
#13	C-813	FBG
#13	L-400	FBI
#14	XXXP-26	PBE-F
#15	XX	FBG
#15	XXX	PBE
#15	LE	FBE

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	PBE
#4	L	FBI
#9	6031	FBG
#9	6045	PBE
#9	6040	FBI
#10	CE-34	FBG
#15	C	FBM

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

#2	940	FBI
#10	030	FBM
#12	C 813	FBG
#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	C1513	FBM
#15	CE	FBG
#16	C	FBM
#16	LE	FBE



Summary of Observations  
(Surface and Edge Growth)

The following samples showed traces of growth on all six replicates:

<u>Manuf.</u>	<u>Designation</u>	<u>Grade</u>
#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



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

Manuf.	Designation	Grade
#1	11508	GMG
#1	114	PBG
#1	2008	PBG
#1	2051	FBE-P
#1	113	FBM
#1	2013	PBG
#1	1841	FBE
#1	2080	FBI
#2	950	FBE
#3	T 712	GMG
#3	T 606	PBG
#4	NN	NFG
#4	XXXP	PBE-P
#6	259-2	GMG
#6	286	PBG
#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	XXI	FBE
#6	262	FBM
#10	C-30	FBM
#13	C-813	PBG
#15	XX	PBG
#15	XXX	FBE

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

#2	940	FBI
#3	T 827	FBE
#4	CE	PBG
#4	LE	FBE
#4	L	FBI



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

<u>Manuf.</u>	<u>Designation</u>	<u>Grade</u>
#9	6031	FBG
#9	6045	FBE
#9	6040	FBI
#10	GE-34	FBG
#12	C-813	FBG
#15	C	FBM
#15	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:

<u>Specification</u>	<u>Type</u>	<u>Filler</u>	<u>Resin</u>	<u>Grade</u>
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	FBE-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 Machin- ing.



## Experimental Procedure

### Test Organisms

The following fungi were used in this evaluation:

<u>Organism</u>	<u>American Type Culture Collection No.</u>
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 5", using an 8" arbor tilt saw equipped 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 5-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 3 1/2-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

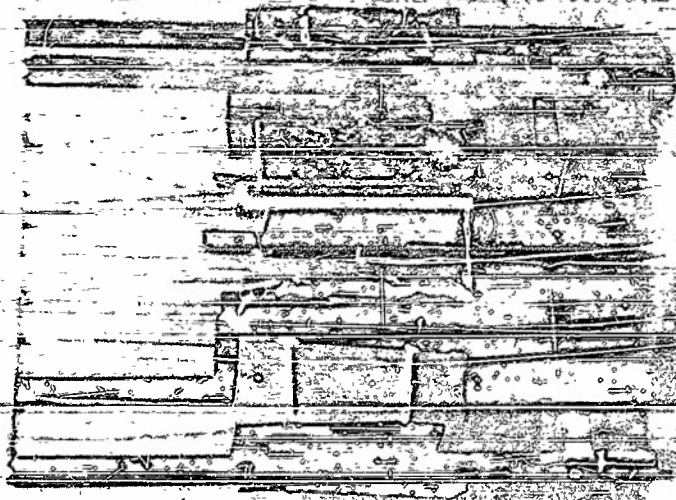


Figure 2

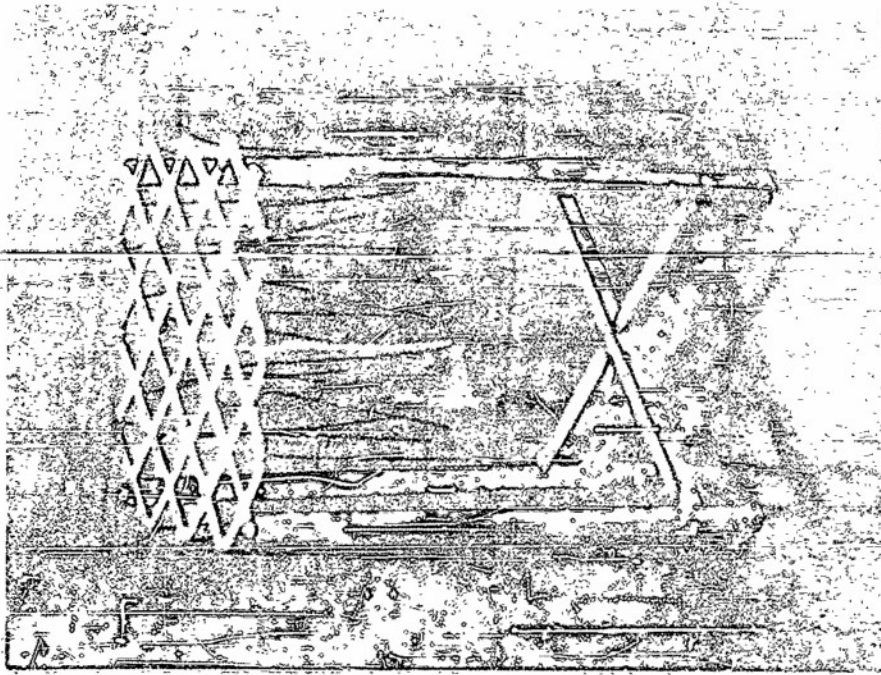


Figure 1

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  $\frac{1}{2}$ ". 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 then 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 than 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.

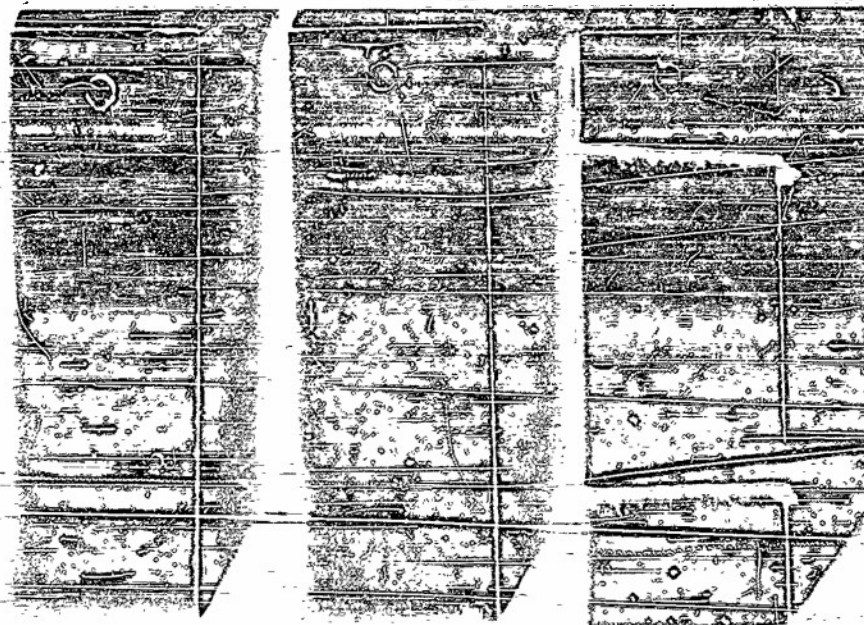
In table 7, pages 88 through 117 are listed the ratings for the 30 plastic laminated materials reported in this section. A separate page has been set aside for each sample and each page presents both the original data and the fungus resistance rating both for surface growth and for edge growth. The Humidity-exposure 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

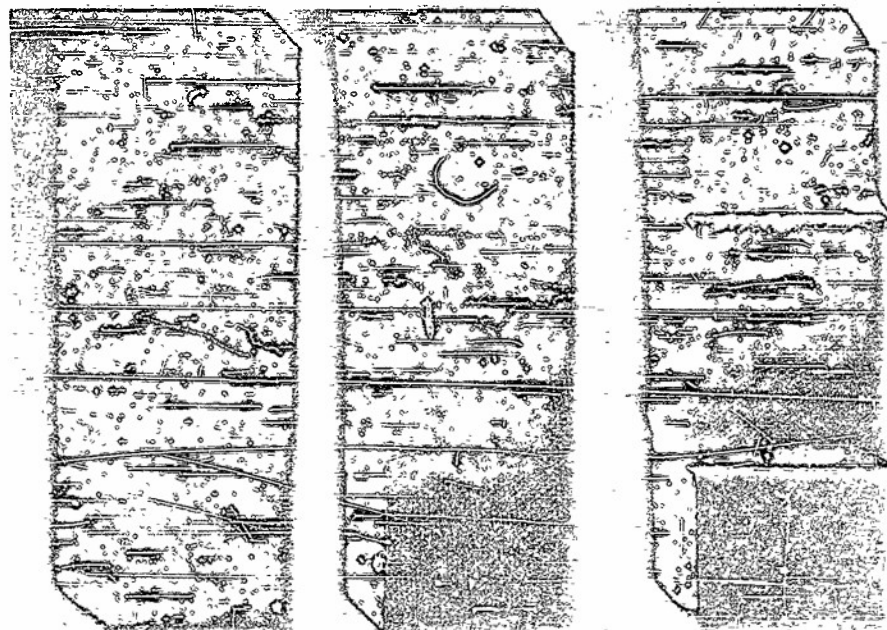


(a)

(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

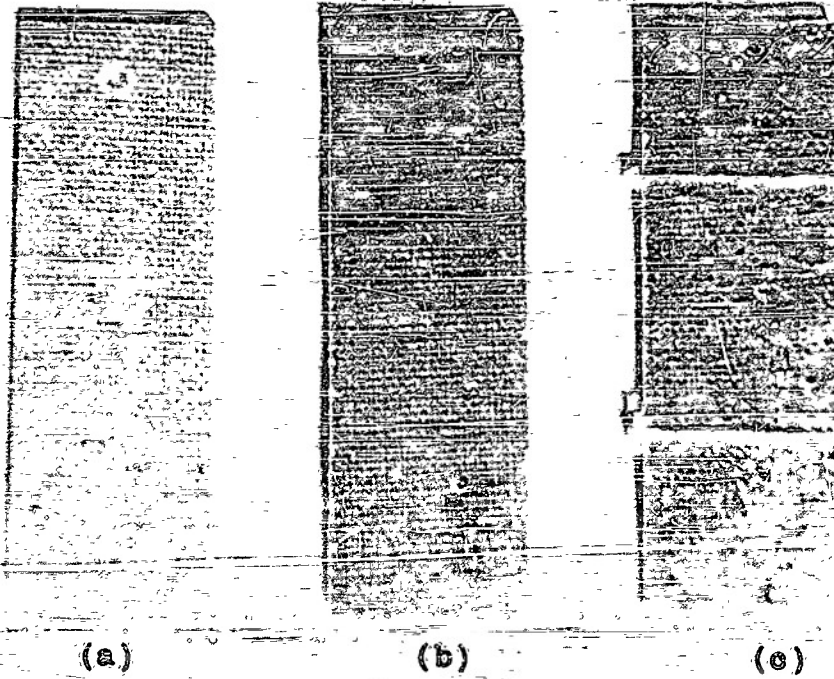


Figure 6

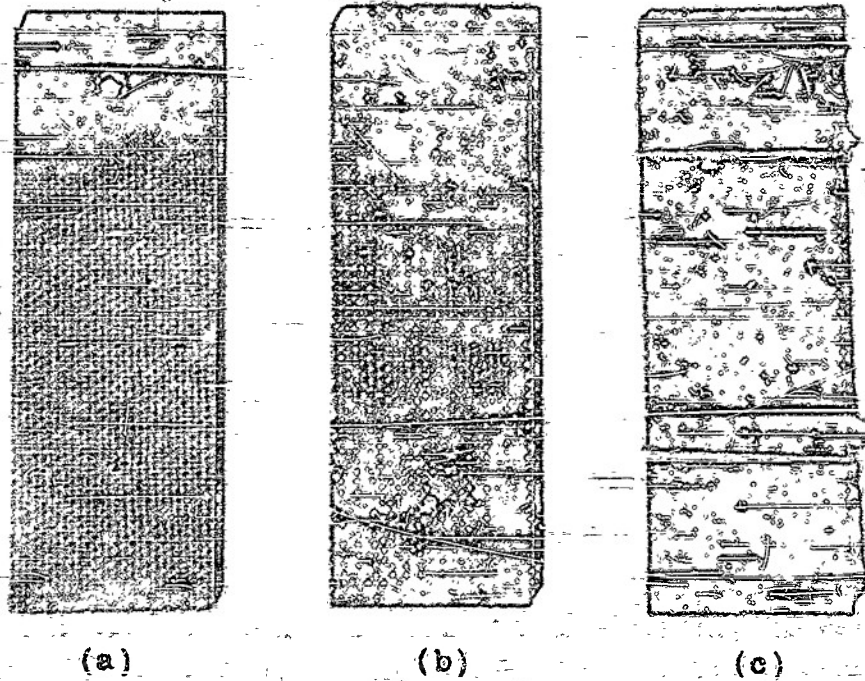


Figure 7

- 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

Sheet 1 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade B GSG Manufacturer and Designation: #1

I1514

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of Area covered	Relative Profusion of Growth:	Top	Bottom	
			2 sides			
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



TABLE 7 (CONTINUED) Sheet 2 of 30

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:			% of area covered
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED)

Sheet 3 of 30

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:			% of area covered
			2-sides	Top	Bottom	
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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 5 of 30

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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 6 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

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

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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 64 & 65 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: FBM Manufacturer and Designation: #1 113

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 8 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBC Manufacturer and Designation: #1 2013

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth 2 sides	Top	Bottom	
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: FBE Manufacturer and Designation: #1 1841

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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 10 of 30

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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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:			% of area covered
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 12 of 30

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			% of area covered
	Relative Profusion	% of area Covered	Relative Profusion of Growth			
			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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth			
			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: Fungineert



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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 Sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 15 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBE-P Manufacturer and Designation: #2 780

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
137	Abundant	95%	Abundant	Abundant	Moderate	60%
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 24 & 25 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible



TABLE 7 (CONTINUED) Sheet 17 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBM Manufacturer and Designation: #2 92C

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 18 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade : F3C Manufacturer and Designation: #2 910

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 19 of 30

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:			% of area covered
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 20 of 30

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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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: CSG 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: SMC Manufacturer and Designation: #8

FP-55

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	
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: NFG Manufacturer and Designation: #8 YN-25

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED)

Sheet 24 of 30

**FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)**

**Grade:** FPG **Manufacturer and Designation:** #8 XXN-23

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	
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	1 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



TABLE 7 (CONTINUED) Sheet 25 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FEE Manufacturer and Designation: #8 XXN

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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	2 mm
64	5 mm	7 mm

Rating (See pages 34 & 35 for explanation):

Based on surfaces alone: Susceptible

Based on edges alone: Susceptible



TABLE 7 (CONTINUED)

Sheet 26 of 30

**FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)**

Grade: FBE-1 Manufacturer and Designation: #3

XXXA

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	2 sides	Top	Bottom	
65	Moderate	10%	Moderate	Moderate	Moderate	36%
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: NBM Manufacturer and Designation: #8 CN-16

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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



TABLE 7 (CONTINUED) Sheet 28 of 30

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FIG Manufacturer and Designation: #8 CEN

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth:			
			2 sides	Top	Bottom	
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

Notes (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 LFN-15

Specimens without strings attached:

Replicate	Growth on Surfaces		Growth on Edges			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	
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 20 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			% of area covered
	Relative Profusion	% of area covered	Relative Profusion of Growth: 2 sides	Top	Bottom	
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
FBC	#1	2008	Susceptible	Susceptible
FBE	#1	2029	Susceptible	Susceptible
FBE-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
NFG	#2	190	Susceptible	Susceptible
FBG	#2	550	Susceptible	Susceptible
FBE	#2	520	Susceptible	Funginert
FBE-P	#2	780	Funginert	Susceptible
FBM	#2	900	Funginert	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	Susceptible	Susceptible
GMG	#8	FF-55	Funginert	Funginert
NFG	#8	YN-25	Susceptible	Susceptible
FBG	#8	XXN-23	Funginert	Funginert
FBE	#8	XXXN	Susceptible	Susceptible
FBE-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)

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)

<u>Manuf.</u>	<u>Designation</u>	<u>Grade</u>
#1	11514	GSG
#2	780	FBE-P
#8	G-7	GSG
#8	YN-25	NFC

The following samples showed growth covering 2 - 10% of the area on all 4 replicates:

#1	11508	GMG
#1	114	PBG
#1	2008	PBG
#1	2029	PBE
#1	2051	PBE-P
#2	143	GMG
#2	130	NFC
#2	550	PBG
#2	520	PBE
#8	XXXPN	PBE-P

The following samples showed growth covering 10-40% of the area on all 4 replicates:

#1	2013	FBG
#1	2080	FBI
#2	920	FBI
#8	FF-55	GMG
#8	XXN-23	PBG
#8	XXXN	PBE
#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	GBN	FBG
#8	LN	FBI

The following samples showed growth covering 65% or over of the area on all 4 replicates:

#1	113	FBI
#2	900	FBI
#8	CN-16	FBI



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	659	FBG
#2	780	FBE-P
#8	C-7	GSG
#8	YN-25	NFG

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	PBG
#2	190	NFG
#2	520	PBE
#8	LEN-15	PBE

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	PBG
#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	PBE
#2	940	FBI
#3	XXN-23	PBG
#8	XXXPN	PBE-P
#8	CN-16	FBM
#8	CEN	PBG
#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		Humidity-Exposure Method	
		Relative Profusion	Rating (*)	Relative Profusion	% of Area Covered
GSG #1	11514	Traces	1	Traces	1%
FBE-P #2	780	Traces	1	Tr - S1	1%
GSG #8	G-7	Traces	1	Tr - S1	1%
NFG #8	YN-25	Traces	1	Tr - S1	1%
FBG #2	550	Traces	1	Tr - Mod	2%
NFG #2	190	Traces	1	S1 - Mod	5%
PBE #2	520	Traces	1	Tr - Mod	5%
PBE-P #3	XXXPN	Traces	1	Moderate	7.5%
FBG #8	XXN-23	Traces	1	Moderate	12.5%
PBF #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	S1 - Mod	5.5%
PBE-P #1	2051	Slight	2	S1 - Mod	5.5%
PBG #1	2008	Slight	2	Moderate	6%
GMG #2	140	Slight	2	Moderate	7.5%
FBE #2	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	S1 - Mod	2	Moderate	45%
FBE #2	950	Mod: Part Cov.	2	Mod - Abund	52.5%
FBE #1	1841	Slight	2	Moderate	56%
FBI #2	930	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%
FBI #8	LN	Abundant	4	Moderate	65%
FBM #2	900	Abundant	4	Mod - Abund	85%

\* - See page 29 for explanation