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LACQUER AND CHEMICAL CORP., ALAKA RESEARCH LABS., BROOKLYN,  
N.Y. (4TH QUARTERLY REPORT)

FOURTH QUARTERLY REPORT ON FUNGUS RESISTANCE OF PLASTICS -  
NOV 17, 1951 TO FEB 8, 1952

RUGGERI, S.; ATLAS, R. WAITZE 15 FEB'52 71PP TABLES

USN CONTR. NO. NORD 11215

PLASTICS - EFFECT OF FUNGI  
FUNGI

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

UNCLASSIFIED

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FOURTH 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

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Period covered: November 17, 1951 to February 8, 1952

ALASKA RESEARCH LABORATORIES  
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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 the phase of the study was reported in the First Quarterly Report (pages 4 - 25), the Second Quarterly Report (pages 28-77), and the Third Quarterly Report (pages 124-136).

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<br>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<br>ing     |



Experimental Procedure

The experimental procedure has been explained in detail in the First Quarterly Report, pages 5,6, and 7.

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<br/>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 19 pages 253 through 255, 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 20 pages 256 through 258, 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 21 pages 259 and 260, 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 growths.

TABLE 19

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 |
| FBE         | #6<br>221-4                  | 533A                  | Slight (*)<br>Slight<br>Slight               | Moderate<br>Slight<br>Slight     | 2              | 2                 |
|             |                              | 533B                  |  |                                  | 2              | 2                 |
|             |                              | 533C                  |  |                                  | 3              | 2                 |
| PBG         | #7<br>XX-324                 | 534A                  | Slight (*)<br>Slight<br>Traces               | Slight<br>Slight<br>Slight       | 2              | 2                 |
|             |                              | 534B                  |  |                                  | 2              | 2                 |
|             |                              | 534C                  |  |                                  | 1              | 2                 |
| FBM         | #7<br>C - 525                | 535A                  | Abundant (*)<br>Abundant (*)<br>Abundant (*) | Abundant<br>Abundant<br>Abundant | 4              | 4                 |
|             |                              | 535B                  |  |                                  | 4              | 4                 |
|             |                              | 535C                  |  |                                  | 4              | 4                 |
| PBE         | #9<br>6022                   | 595A                  | Slight (*)<br>Slight (*)<br>Slight (*)       | Moderate<br>Moderate<br>Moderate | 2              | 2                 |
|             |                              | 595B                  |  |                                  | 2              | 2                 |
|             |                              | 595C                  |  |                                  | 2              | 2                 |
| PBE         | #12<br>XXX-13                | 596A                  | Slight (*)<br>Slight (*)<br>Slight (*)       | Moderate<br>Moderate<br>Moderate | 2              | 2                 |
|             |                              | 596B                  |  |                                  | 2              | 2                 |
|             |                              | 596C                  |  |                                  | 2              | 2                 |

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

Note - For explanation of numeric rating code see page 250

TABLE 19 (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 |
| FBE         | #12<br>LE-13                 | 555A                 | Mod: Part Cov (*)<br>Mod: Part Cov (*)<br>Mod: Part Cov (*) | Moderate<br>Slight<br>Moderate   | 2              | 2                 |
|             |                              | 555B                 |   |                                  | 2              | 2                 |
|             |                              | 555C                 |   |                                  | 2              | 2                 |
| PBE         | #13<br>XXX-13                | 558A                 | Traces (*)<br>None (*)<br>Traces                            | None<br>None<br>None             | 1              | 1                 |
|             |                              | 558B                 |   |                                  | 0              | 0                 |
|             |                              | 558C                 |   |                                  | 1              | 1                 |
| FBE         | #13<br>LE-13                 | 556A                 | Complete Waterlog<br>Traces<br>Traces                       | None<br>None<br>None             | 0              | 0                 |
|             |                              | 556B                 |   |                                  | 1              | 1                 |
|             |                              | 556C                 |   |                                  | 1              | 1                 |
| PBE-P       | #14<br>XXXP-26               | 597A                 | Complete Waterlog<br>Slight (*)<br>Slight                   | Waterlog<br>Slight<br>Slight     | 0              | 0                 |
|             |                              | 597C                 |   |                                  | 2              | 2                 |
|             |                              | 538C                 |   |                                  | 2              | 2                 |
| FBE         | #16<br>XXX                   | 539A                 | Mod: Part Cov<br>Slight (*)<br>Complete Waterlog            | Moderate<br>Moderate<br>Moderate | 2              | 2                 |
|             |                              | 539B                 |   |                                  | 2              | 2                 |
|             |                              | 539C                 |   |                                  | 0              | 0                 |

\* - Specimen surface was waterlogged \*\* - Same for 4 edges unless otherwise noted  
Note - For explanation of numeric rating code see page 250

TABLE 19 (CONCLUDED)

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 |
| FBI         | #16<br>L                     | 594A                 | Mod: Part Cov (*)            | Moderate   | 2              | 2                 |
|             |                              | 594B                 | Mod: Part Cov (*)            | Moderate   | 2              | 2                 |
|             |                              | 594C                 | Mod: Part Cov (*)            | Moderate   | 2              | 2                 |
| FBI         | #35<br>L                     | 540A                 | Slight                       | Traces     | 2              | 2                 |
|             |                              | 540B                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 540C                 | Slight                       | Traces     | 2              | 2                 |
|             |                              |                      |                              |            |                |                   |
|             |                              |                      |                              |            |                |                   |
|             |                              |                      |                              |            |                |                   |

\* - Specimen surface was waterlogged \*\* - Same for 4 edges unless otherwise noted  
Note - For explanation of numeric rating code see page 250



TABLE 20

Sheet 1 of 3

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 |
| FRE         | #6<br>221-A                  | 543A                 | Slight                       | Moderate   | 2              | 2                 |
|             |                              | 543B                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 543C                 | Slight                       | Moderate   | 2              | 2                 |
| PBG         | #7<br>XX-324                 | 544A                 | Slight                       | Moderate   | 2              | 2                 |
|             |                              | 544B                 | Complete                     | Moderate   | 0              | 2                 |
|             |                              | 544C                 | Slight                       | Slight     | 2              | 2                 |
| FBM         | #7<br>C-525                  | 545A                 | Abundant                     | Abundant   | 4              | 4                 |
|             |                              | 545B                 | Abundant (*)                 | Abundant   | 4              | 4                 |
|             |                              | 545C                 | Abundant                     | Abundant   | 4              | 4                 |
| PBE         | #9<br>6022                   | 602A                 | Slight (*)                   | Moderate   | 2              | 2                 |
|             |                              | 602B                 | Slight (*)                   | Moderate   | 2              | 2                 |
|             |                              | 602C                 | Slight (*)                   | Moderate   | 2              | 2                 |
| PBE         | #12<br>XXX-13                | 603A                 | Mod: Part Cov (*)            | Moderate   | 2              | 2                 |
|             |                              | 603B                 | Mod: Part Cov (*)            | Abundant   | 2              | 3                 |
|             |                              | 603C                 | Mod: Part Cov (*)            | Abundant   | 2              | 3                 |

\* - Specimen was waterlogged \*\* - Same for 4 edges unless otherwise noted  
Note - For explanation of numeric rating code see page 250



TABLE 20 (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 |
| FBE         | #12<br>LE-13                 | 563A                 | Mod: Part Cov (*)            | Moderate   | 2              | 2                 |
|             |                              | 563B                 | Mod: Part Cov                | Moderate   | 2              | 2                 |
|             |                              | 563C                 | Mod: Part Cov (*)            | Moderate   | 2              | 2                 |
| PBE         | #13<br>XXX-13                | 566A                 | Traces                       | None       | 1              | 1                 |
|             |                              | 566B                 | Traces                       | None       | 1              | 1                 |
|             |                              | 566C                 | Traces (*)                   | None       | 1              | 1                 |
| FBE         | #13<br>LE-13                 | 564A                 | Traces (*)                   | None       | 1              | 1                 |
|             |                              | 564B                 | None (*)                     | None       | 0              | 0                 |
|             |                              | 564C                 | Traces (*)                   | None       | 1              | 1                 |
| FBE-P       | #14<br>XXXP-26               | 548A                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 548B                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 548C                 | Complete Waterlog            | Slight     | 0              | 2                 |
| PBE         | #16<br>XXX                   | 549A                 | Complete Waterlog            | Moderate   | 0              | 2                 |
|             |                              | 549B                 | Slight (*)                   | Moderate   | 2              | 2                 |
|             |                              | 549C                 | Slight (*)                   | Moderate   | 2              | 2                 |

\*-- Specimen surface was waterlogged \*\* - Same for 4 edges unless otherwise noted  
Note - For explanation of numeric rating code see page 250

TABLE 20 (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 Replicates | Description of Fungus Growth                                |            | Numeric Rating |                   |   |
|-------------|------------------------------|-----------------------|---|------------|----------------|-------------------|---|
|             |                              |                       | Surface   | Edges (**) | Surface        | Surface and Edges |   |
| FBI         | #16<br>L                     | 601A<br>601B<br>601C  | Mod: Part Cov (*)<br>Mod: Part Cov (*)<br>Mod: Part Cov (*) | Slight     |                | 2                 | 2 |
|             |                              |                       |   | Moderate   |                | 2                 | 2 |
|             |                              |                       |   | Moderate   |                | 2                 | 2 |
| FBI         | #35<br>L                     | 550A<br>550B<br>550C  | Slight<br>Slight<br>Slight                                  | Slight     |                | 2                 | 2 |
|             |                              |                       |   | Traces     |                | 2                 | 2 |
|             |                              |                       |   | Slight     |                | 2                 | 2 |
|             |                              |                       |   |            |                |                   |   |
|             |                              |                       |   |            |                |                   |   |
|             |                              |                       |   |            |                |                   |   |

\* - Specimen surface was waterlogged \*\* - Same for 4 edges unless otherwise noted  
 Note - For explanation of numeric rating code see page 250

TABLE 21  
 FUNGUS RESISTANCE OF PLASTIC LAMINATES  
 (PETRI-DISH METHOD)

Summary of more detailed data shown in tables 19 and 20.

| 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 #6      | 221-A                        | 2 2 2               | 2 2 2 | Susceptible           | 2 2 2                   | 2 2 2 | Susceptible           |
| PBG #7      | XX-324                       | 2 2 1               | 2 0 2 | Susceptible           | 2 2 2                   | 2 2 2 | Susceptible           |
| FBM #7      | C-525                        | 4 4 4               | 4 4 4 | Susceptible           | 4 4 4                   | 4 4 4 | Susceptible           |
| PBE #9      | 6022                         | 2 2 2               | 2 2 2 | Susceptible           | 2 2 2                   | 2 2 2 | Susceptible           |
| PBE #12     | XXX-13                       | 2 2 2               | 2 2 2 | Susceptible           | 2 2 2                   | 2 3 3 | Susceptible           |
| FBE #12     | IE-13                        | 2 2 2               | 2 2 2 | Susceptible           | 2 2 2                   | 2 2 2 | Susceptible           |
| PBE #13     | XXX-13                       | 1 0 1               | 1 1 1 | Funginert             | 1 0 1                   | 1 1 1 | Funginert             |
| FBE #13     | IE-13                        | 0 1 1               | 1 0 1 | Funginert             | 0 1 1                   | 1 0 1 | Funginert             |

\* - See page 251 for detailed explanation.



TABLE 21 (CONCLUDED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 19 and 20.

| 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       | #14 XXXP-26                  | 0                   | 2 2  | 2                     | 2 2                     | 2 2 2 | Susceptible           |
| PBE         | #16 XXI                      | 2                   | 2 0  | 0                     | 2 2                     | 2 2 2 | Susceptible           |
| FBI         | #16 L                        | 2                   | 2 2  | 2                     | 2 2                     | 2 2 2 | Susceptible           |
| FBI         | #35 L                        | 2                   | 2 2  | 2                     | 2 2                     | 2 2 2 | Susceptible           |
|             |                              |                     |      |                       |                         |       |                       |
|             |                              |                     |      |                       |                         |       |                       |
|             |                              |                     |      |                       |                         |       |                       |
|             |                              |                     |      |                       |                         |       |                       |

(\*) See page 251 for detailed explanation.



Summary of Observations

(Surface Growth Alone)

|   | <u>Manuf.</u> | <u>Designation</u> | <u>Grade</u> |
|---|---------------|--------------------|--------------|
| The following samples showed no growth or traces of growth on all six replicates: | #13           | XXX-13             | PBE          |
|   | #13           | LE-13              | FBE          |

|  |    |        |     |
|--|----|--------|-----|
| The following sample showed traces or slight growth on all six replicates: | #7 | XA-324 | PBG |
|--|----|--------|-----|

|   |     |         |       |
|---|-----|---------|-------|
| The following samples showed slight growth on all six replicates; | #6  | 221-A   | FBE   |
|   | #9  | 6022    | PBE   |
|   | #14 | XXXP-26 | PBE-P |
|   | #35 | L       | FBI   |

|   |     |        |     |
|---|-----|--------|-----|
| The following samples showed slight or moderate growth on all six replicates: | #12 | XXX-13 | PBE |
|   | #16 | XXX    | PBE |

|   |     |       |     |
|---|-----|-------|-----|
| The following samples showed moderate growth on all six replicates: | #12 | LE-13 | FBE |
|   | #16 | L     | FBI |

|  |    |       |     |
|--|----|-------|-----|
| The following sample showed abundant growth on all six replicates: | #7 | C-525 | FBM |
|--|----|-------|-----|

(Surface and Edge Growth)

|   | <u>Manuf</u> | <u>Designation</u> | <u>Grade</u> |
|---|--------------|--------------------|--------------|
| The following samples showed no growth or traces of growth on all six replicates: | #13          | XXX-13             | PBE          |
|   | #13          | LE-13              | FBE          |

|  |     |   |     |
|--|-----|---|-----|
| The following sample showed traces or slight growth on all six replicates: | #35 | L | FBI |
|--|-----|---|-----|

|  |     |         |       |
|--|-----|---------|-------|
| The following sample showed slight growth on all six replicates: | #14 | XXXP-26 | PBE-P |
|--|-----|---------|-------|



The following sample showed traces, slight or moderate growth on all six replicates:

| <u>Manuf.</u> | <u>Designation</u> | <u>Grade</u> |
|---------------|--------------------|--------------|
| #7            | XX-324             | PBG          |

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

|     |       |     |
|-----|-------|-----|
| #6  | 221-A | FBE |
| #9  | 6022  | PBE |
| #12 | LE-13 | FBE |
| #16 | XXX   | PBE |
| #16 | L     | FBI |

The following sample showed slight, moderate or abundant growth on all six replicates:

|     |        |     |
|-----|--------|-----|
| #12 | XXX-13 | PBE |
|-----|--------|-----|

The following sample showed abundant growth on all six replicates:

|    |       |     |
|----|-------|-----|
| #7 | C-525 | FBM |
|----|-------|-----|



FUNGINERTNESS OF PLASTIC LAMINATES

(HUMIDITY-EXPOSURE METHOD)

Introduction

Work during this period has been the testing of 34 additional plastic laminated materials for fungus resistance, following 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. Earlier work covering this phase of the study was reported in the Second Quarterly Report (pages 78-120) and the Third Quarterly Report (pages 137 - 201):

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         | GMC         | Glass Cloth   | Melamine     | General                 |
| MIL-P-15047A         | NPG         | Nylon Cloth   | Phenolic     | General                 |
| MIL-P-3115A          | FBG         | Paper         | Phenolic     | General                 |
| MIL-P-3115A          | FBE         | Paper         | Phenolic     | Electrical              |
| MIL-P-3115A          | FBE-P       | Paper         | Phenolic     | Electrical;<br>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-<br>ing.    |



### Experimental Procedure

The experimental procedure has been explained in detail in the Second Quarterly Report, pages 78 through 81.

### 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 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 two surfaces and each of the two side edges, of each specimen.

Table 22 pages 267 through 300, 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, shows more than 2% fungus growth and where fungus growth extends 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 22, pages 267 through 300 are listed the ratings for the 34 plastic laminated materials reported in this section. A separate page has been set aside for each -265-



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.



**TABLE 22**  
**FUNGUS RESISTANCE OF PLASTIC LAMINATES**  
**(HUMIDITY EXPOSURE METHOD)**

Grade: FBE Manufacturer and Designation: #6

221-A

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   |                   |
| 1057      | Traces             | < 2%              | Traces                       | Traces | Moderate | < 2%              |
| 1058      | Traces             | < 2%              | Traces                       | Traces | Traces   | < 2%              |
| 1059      | Traces             | < 2%              | Traces                       | Traces | Moderate | < 2%              |
| 1060      | 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 |
| 1061      | 3 mm  | 1 mm       |
| 1062      | 5 mm  | 2 mm       |
| 1063      | 3 mm  | 1 mm       |
| 1064      | 4 mm  | 1 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



## FUNGUS RESISTANCE OF PLASTIC LAMINATES

(HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #7

XX-324

Specimens without strings attached:

| Replicate | Growth on Surface  |                   | Growth on Edges              |          |          |                   |
|-----------|--------------------|-------------------|------------------------------|----------|----------|-------------------|
|           | Relative Profusion | % of area covered | Relative Profusion of Growth |          |          | % of area covered |
|           |                    |                   | 2 sides                      | Top      | Bottom   |                   |
| 953       | Traces             | < 2%              | Slight                       | Slight   | Moderate | 2%                |
| 954       | Traces             | < 2%              | Slight                       | Traces   | Slight   | 2%                |
| 955       | Slight             | 2%                | Slight                       | Moderate | Moderate | 2%                |
| 956       | Traces             | < 2%              | Slight                       | Slight   | Moderate | 2%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 957       | 4 mm  | 2 mm       |
| 958       | 5 mm  | 3 mm       |
| 959       | 5 mm  | 2 mm       |
| 960       | 3 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):Based on surfaces alone;                      Fung<sub>s</sub> inertBased on Edges alone:                        Fung<sub>inert</sub>



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBM Manufacturer and designation: #7

C-525

Specimens without strings attached:

| Replicate | Growth on Surface  |                   | Growth on Edges              |          |          | % of area covered |
|-----------|--------------------|-------------------|------------------------------|----------|----------|-------------------|
|           | Relative Profusion | % of area covered | Relative Profusion of Growth |          |          |                   |
|           |                    |                   | 2 sides                      | Top      | Bottom   |                   |
| 1009      | Moderate           | 60%               | Moderate                     | Moderate | Moderate | 50%               |
| 1010      | Abundant           | 80%               | Moderate                     | Abundant | Abundant | 70%               |
| 1011      | Abundant           | 75%               | Abundant                     | Moderate | Moderate | 75%               |
| 1012      | Abundant           | 85%               | Abundant                     | Moderate | Moderate | 75%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 1013      | 8 mm  | 3 mm       |
| 1014      | 7 mm  | 2 mm       |
| 1015      | 12 mm   | 4 mm       |
| 1016      | 7 mm  | 5 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBE Manufacturer and Designation: #9

6022

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 |                   |
| 961       | Traces             | < 2%              | Traces                       | Traces | Slight | < 2%              |
| 962       | Traces             | < 2%              | Traces                       | Traces | Slight | < 2%              |
| 963       | Traces             | < 2%              | Traces                       | Traces | Slight | < 2%              |
| 964       | Traces             | < 2%              | Traces                       | Traces | Slight | < 2%              |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 965       | 5 mm  | 4 mm       |
| 966       | 6 mm  | 4 mm       |
| 967       | 6 mm  | 4 mm       |
| 968       | 6 mm  | 3 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBM Manufacturer and Designation: #10 C-30

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   |                   |
| 777       | Moderate           | 60%               | Moderate                      | Moderate | Moderate | 35%               |
| 778       | Moderate           | 65%               | Moderate                      | Moderate | Moderate | 30%               |
| 779       | Moderate           | 45%               | Moderate                      | Moderate | Moderate | 35%               |
| 780       | Moderate           | 70%               | Moderate                      | Moderate | Moderate | 35%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 781       | 5 mm  | 4 mm       |
| 782       | 5 mm  | 4 mm       |
| 783       | 7 mm  | 3 mm       |
| 784       | 3 mm  | 3 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)  
 FUNGUS RESISTANCE OF PLASTIC LAMINATES  
 (HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #10

CE-34

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   |                   |
| 825       | Moderate           | 5%                | Moderate                      | Slight   | Moderate | 15%               |
| 826       | Moderate           | 15%               | Moderate                      | Moderate | Slight   | 10%               |
| 827       | Moderate           | 15%               | Moderate                      | Moderate | Moderate | 40%               |
| 828       | Moderate           | 20%               | Moderate                      | Moderate | Moderate | 25%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 829       | 7 mm  | 4 mm       |
| 830       | 3 mm  | 4 mm       |
| 831       | 8 mm  | 4 mm       |
| 832       | 3 mm  | 8 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBI Manufacturer and Designation: #10 L-40

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   |                   |
| 873       | Moderate           | 10%               | Moderate                      | Moderate | Moderate | 10%               |
| 874       | Moderate           | 5%                | Moderate                      | Moderate | Moderate | 10%               |
| 875       | Moderate           | 5%                | Slight                        | Slight   | Slight   | 2%                |
| 876       | Moderate           | 5%                | Slight                        | Moderate | Moderate | 5%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 877       | 2 mm  | 4 mm       |
| 878       | 3 mm  | 2 mm       |
| 879       | 1 mm  | 1 mm       |
| 880       | .1 mm   | 1 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBG Manufacturer and Designation: #11 210

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   |                   |
| 785       | Moderate           | 5%                | Moderate                      | Moderate | Moderate | 40%               |
| 786       | Moderate           | 10%               | Moderate                      | Moderate | Moderate | 15%               |
| 787       | Moderate           | 20%               | Moderate                      | Moderate | Moderate | 35%               |
| 788       | Moderate           | 20%               | Moderate                      | Moderate | Moderate | 30%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 789       | 8 mm  | 7 mm       |
| 790       | 11 mm   | 8 mm       |
| 791       | 7 mm  | 6 mm       |
| 792       | 10 mm   | 3 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone:           Susceptible

Based on Edges alone:           Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBE Manufacturer and Designation: #11

215

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   |                   |
| 835       | Moderate           | 5%                | Slight                        | Moderate | Slight   | 2%                |
| 834       | Slight             | 2%                | Slight                        | Slight   | Slight   | 2%                |
| 835       | Slight             | 2%                | Slight                        | Slight   | Moderate | 2%                |
| 836       | 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 |
| 837       | 4 mm  | 7 mm       |
| 838       | 5 mm  | 2 mm       |
| 839       | 6 mm  | 6 mm       |
| 840       | 4 mm  | 4 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: GSG Manufacturer and Designation: #12 GB-112S

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 |                   |
| 793       | None               | 0%                | Traces                        | None | Traces | < 2%              |
| 794       | Traces             | < 2%              | None                          | None | None   | 0%                |
| 795       | Traces             | < 2%              | None                          | None | Traces | < 2%              |
| 796       | None               | 0%                | Traces                        | None | Traces | < 2%              |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 797       | 2 mm  | 3 mm       |
| 798       | 2 mm  | 1 mm       |
| 799       | 2 mm  | 2 mm       |
| 800       | 1 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: GMG Manufacturer and Designation: #12 GB 128M

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   |                   |
| 801       | Moderate           | 5%                | Moderate                      | Moderate | Moderate | 10%               |
| 802       | Moderate           | 5%                | Moderate                      | Moderate | Moderate | 10%               |
| 803       | Moderate           | 10%               | Moderate                      | Moderate | Moderate | 15%               |
| 804       | Moderate           | 5%                | Moderate                      | Moderate | Moderate | 5%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 805       | 7 mm  | 7 mm       |
| 806       | 2 mm  | 3 mm       |
| 807       | 3 mm  | 4 mm       |
| 808       | 4 mm  | 5 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: NPG Manufacturer and Designation: #12

MEC-5

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 |                   |
| 881       | Slight             | 2%                | Slight                        | Slight | Slight | 2%                |
| 882       | Slight             | 2%                | Slight                        | Slight | Slight | 2%                |
| 883       | Traces             | < 2%              | Traces                        | Traces | Slight | < 2%              |
| 884       | Slight             | 2%                | Slight                        | Slight | Slight | 2%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 885       | 1 mm  | 1 mm       |
| 886       | 1 mm  | 3 mm       |
| 887       | 1 mm  | 1 mm       |
| 888       | 1 mm  | 1 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade PBG Manufacturer and Designation: #12

XX-13

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   |                   |
| 889       | Slight             | 2%                | Traces                        | Traces | Moderate | < 2%              |
| 890       | Traces             | < 2%              | Traces                        | Traces | Slight   | < 2%              |
| 891       | Slight             | 2%                | Traces                        | Traces | Moderate | < 2%              |
| 892       | Traces             | < 2%              | Traces                        | Traces | Slight   | < 2%              |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 893       | 2 mm  | 2 mm       |
| 894       | 2 mm  | 1 mm       |
| 895       | 1 mm  | 1 mm       |
| 896       | 3 mm  | 3 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Fung inert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBE Manufacturer and Designation: #12

XXX-13

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   |                   |
| 1041      | Traces             | < 2%              | Traces                        | Traces | Traces   | < 2%              |
| 1042      | Traces             | < 2%              | Traces                        | Traces | Traces   | < 2%              |
| 1043      | Traces             | < 2%              | Traces                        | Traces | Moderate | < 2%              |
| 1044      | 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 |
| 1045      | 1 mm  | 2 mm       |
| 1046      | 3 mm  | 2 mm       |
| 1047      | 3 mm  | 2 mm       |
| 1048      | 2 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation:)

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDIFY EXPOSURE METHOD)

Grade: PBE-P Manufacturer and Designation: #12 XXXP-2G

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   |                   |
| 841       | Slight             | 2%                | Slight                        | Slight | Moderate | 2%                |
| 842       | Moderate           | 5%                | Moderate                      | Slight | Moderate | 5%                |
| 843       | Moderate           | 5%                | Slight                        | Slight | Moderate | 2%                |
| 844       | 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 |
| 845       | 8 mm  | 4 mm       |
| 846       | 3 mm  | 4 mm       |
| 847       | 11 mm   | 4 mm       |
| 848       | 3 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBM Manufacturer and Designation: #12 C-1513

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   |                   |
| 897       | Moderate           | 50%               | Moderate                      | Moderate | Moderate | 25%               |
| 898       | Moderate           | 40%               | Moderate                      | Moderate | Moderate | 25%               |
| 899       | Moderate           | 35%               | Moderate                      | Moderate | Moderate | 25%               |
| 900       | Moderate           | 55%               | Moderate                      | Moderate | Moderate | 50%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 901       | 8 mm  | 3 mm       |
| 902       | 3 mm  | 2 mm       |
| 903       | 2 mm  | 2 mm       |
| 904       | 4 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #12 C-813

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   |                   |
| 809       | Abundant           | 75%               | Moderate                      | Moderate | Moderate | 40%               |
| 810       | Abundant           | 75%               | Abundant                      | Moderate | Moderate | 75%               |
| 811       | Moderate           | 65%               | Moderate                      | Moderate | Moderate | 65%               |
| 812       | Abundant           | 75%               | Moderate                      | Moderate | Moderate | 45%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 813       | 3 mm  | 3 mm       |
| 814       | 5 mm  | 3 mm       |
| 815       | 2 mm  | 3 mm       |
| 816       | 8 mm  | 4 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone:                      Susceptible

Based on Edges alone:                        Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #13

C-813

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   |                   |
| 857       | Moderate           | 15%               | Moderate                      | Slight   | Moderate | 5%                |
| 858       | Moderate           | 5%                | Moderate                      | Moderate | Moderate | 5%                |
| 859       | Moderate           | 10%               | Moderate                      | Moderate | Moderate | 15%               |
| 860       | Moderate           | 5%                | Moderate                      | Moderate | Slight   | 10%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 861       | 3 mm  | 3 mm       |
| 862       | 3 mm  | 2 mm       |
| 863       | 3 mm  | 2 mm       |
| 864       | 2 mm  | 1 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBI Manufacturer and designation: #13 L-400

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   |                   |
| 817       | Moderate           | 65%               | Moderate                      | Moderate | Abundant | 55%               |
| 818       | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 20%               |
| 819       | Moderate           | 65%               | Moderate                      | Moderate | Moderate | 35%               |
| 820       | Moderate           | 35%               | Moderate                      | Moderate | Moderate | 25%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 821       | 7 mm  | 3 mm       |
| 822       | 3 mm  | 3 mm       |
| 823       | 6 mm  | 4 mm       |
| 824       | 3 mm  | 7 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDIFY EXPOSURE METHOD)

Grade: PBE-P Manufacturer and designation: #14 XXXP-26

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   |                   |
| 929       | Moderate           | 5%                | Slight                        | Traces | Moderate | 2%                |
| 930       | Slight             | 2%                | Traces                        | Traces | Slight   | < 2%              |
| 931       | Slight             | 2%                | Slight                        | Traces | Moderate | 2%                |
| 932       | Slight             | 2%                | Slight                        | Traces | Slight   | 2%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 933       | 7 mm  | 4 mm       |
| 934       | 4 mm  | 3 mm       |
| 935       | 3 mm  | 6 mm       |
| 936       | 3 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: GSG Manufacturer and Designation: #15 GSC

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 |                   |
| 865       | None               | 0%                | None                          | None | Traces | < 2%              |
| 866       | None               | 0%                | None                          | None | None   | 0%                |
| 867       | Traces             | < 2%              | Traces                        | None | Traces | < 2%              |
| 868       | None               | 0%                | None                          | None | None   | 0%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 869       | 2 mm  | 2 mm       |
| 870       | 2 mm  | 1 mm       |
| 871       | 2 mm  | 1 mm       |
| 872       | 3 mm  | 1 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Fung inert

Based on Edges alone: Fung inert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: GMG Manufacturer and Designation: #15

G-5

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   |                   |
| 913       | Moderate           | 5%                | Moderate                      | Moderate | Moderate | 5%                |
| 914       | Moderate           | 5%                | Moderate                      | Slight   | Slight   | 5%                |
| 915       | Moderate           | 5%                | Slight                        | Slight   | Moderate | 5%                |
| 916       | Moderate           | 5%                | Moderate                      | Slight   | Moderate | 5%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 917       | 2 mm  | 1 mm       |
| 918       | 1 mm  | 1 mm       |
| 919       | 3 mm  | 4 mm       |
| 920       | 2 mm  | 1 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: NPG Manufacturer and Designation: #15 NS

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   |                   |
| 921       | Traces             | < 2%              | Traces                        | Traces | Slight   | < 2%              |
| 922       | Traces             | < 2%              | Slight                        | Traces | Moderate | 2%                |
| 923       | Slight             | 2%                | Slight                        | Traces | Moderate | 2%                |
| 924       | Slight             | 2%                | Slight                        | Traces | Slight   | 2%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 925       | 4 mm  | 4 mm       |
| 926       | 9 mm  | 4 mm       |
| 927       | 3 mm  | 3 mm       |
| 928       | 11 mm   | 6 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBG Manufacturer and Designation: #15

XX

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 |                   |
| 849       | Traces             | < 2%              | Traces                       | None   | Traces | < 2%              |
| 850       | Traces             | < 2%              | None                         | None   | Traces | < 2%              |
| 851       | Traces             | < 2%              | Traces                       | Traces | Slight | < 2%              |
| 852       | 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 |
| 853       | 11 mm   | 6 mm       |
| 854       | 4 mm  | 3 mm       |
| 855       | 7 mm  | 8 mm       |
| 856       | 3 mm  | 5 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBE Manufacturer and Designation: #15 XXX

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   |                   |
| 969       | Traces             | < 2%              | Traces                        | Traces | Slight   | < 2%              |
| 970       | Traces             | < 2%              | Slight                        | Slight | Moderate | 2%                |
| 971       | Traces             | < 2%              | Slight                        | Traces | Moderate | 2%                |
| 972       | Traces             | < 2%              | Slight                        | Slight | Moderate | 2%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 973       | 2 mm  | 1 mm       |
| 974       | 4 mm  | 2 mm       |
| 975       | 2 mm  | 3 mm       |
| 976       | 4 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBE-P Manufacturer and Designation: #15 XXXP

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   |                   |
| 905       | Slight             | 2%                | Traces                        | Traces | Traces   | < 2%              |
| 906       | Slight             | 2%                | Traces                        | Traces | Traces   | < 2%              |
| 907       | Slight             | 2%                | Slight                        | Traces | Moderate | 2%                |
| 908       | Slight             | 2%                | Traces                        | Traces | Moderate | < 2%              |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 909       | 3 mm  | 2 mm       |
| 910       | 3 mm  | 2 mm       |
| 911       | 3 mm  | 2 mm       |
| 912       | 3 mm  | 4 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Funginert

Based on Edges alone: Funginert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBM Manufacturer and Designation: #15 G

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   |                   |
| 937       | Moderate           | 20%               | Moderate                      | Moderate | Moderate | 30%               |
| 938       | Moderate           | 25%               | Moderate                      | Moderate | Moderate | 25%               |
| 939       | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 40%               |
| 940       | Moderate           | 25%               | Moderate                      | Moderate | Moderate | 30%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 941       | 2 mm  | 3 mm       |
| 942       | 2 mm  | 1 mm       |
| 943       | 2 mm  | 2 mm       |
| 944       | 3 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBG Manufacturer and Designation: #15 CE

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   |                   |
| 977       | Moderate           | 20%               | Moderate                      | Moderate | Moderate | 25%               |
| 978       | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 25%               |
| 979       | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 30%               |
| 980       | Moderate           | 20%               | Moderate                      | Moderate | Moderate | 25%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 981       | 2 mm  | 1 mm       |
| 982       | 2 mm  | 1 mm       |
| 983       | 2 mm  | 1 mm       |
| 984       | 6 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #15 IE

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   |                   |
| 1017      | Moderate           | 40%               | Moderate                      | Moderate | Moderate | 30%               |
| 1018      | Moderate           | 35%               | Moderate                      | Moderate | Moderate | 35%               |
| 1019      | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 20%               |
| 1020      | Moderate           | 25%               | Moderate                      | Moderate | Slight   | 25%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 1021      | 2 mm  | 2 mm       |
| 1022      | 2 mm  | 1 mm       |
| 1023      | 1 mm  | 1 mm       |
| 1024      | 4 mm  | 2 mm       |

Rating (See pages 264 through 265 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBI Manufacturer and Designation: #15 L

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   |                   |
| 945       | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 25%               |
| 946       | Moderate           | 15%               | Moderate                      | Moderate | Moderate | 35%               |
| 947       | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 30%               |
| 948       | Moderate           | 20%               | Moderate                      | Moderate | Moderate | 35%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 949       | 3 mm  | 4 mm       |
| 950       | 2 mm  | 2 mm       |
| 951       | 4 mm  | 2 mm       |
| 952       | 4 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation:)

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: PBG Manufacturer and Designation: #16 XX

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   |                   |
| 985       | Traces             | < 2%              | Traces                        | Traces | Moderate | < 2%              |
| 986       | Traces             | < 2%              | Traces                        | Traces | Slight   | < 2%              |
| 987       | Traces             | < 2%              | Traces                        | Traces | Slight   | < 2%              |
| 988       | Slight             | 2%                | Slight                        | Traces | Moderate | 2%                |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 989       | 3 mm  | 2 mm       |
| 990       | 2 mm  | 1 mm       |
| 991       | 2 mm  | 1 mm       |
| 992       | 6 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Fung inert

Based on Edges alone: Fung inert



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBM    Manufacturer and Designation: #16    C

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   |                   |
| 1025      | Moderate           | 35%               | Moderate                      | Moderate | Moderate | 20%               |
| 1026      | Moderate           | 70%               | Moderate                      | Moderate | Moderate | 30%               |
| 1027      | Moderate           | 65%               | Moderate                      | Moderate | Moderate | 40%               |
| 1028      | Moderate           | 60%               | Moderate                      | Moderate | Moderate | 30%               |

Specimens with strings attached:

| Replicate | Maximum extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 1029      | 2 mm  | 1 mm       |
| 1030      | 2 mm  | 2 mm       |
| 1031      | 4 mm  | 1 mm       |
| 1032      | 5 mm  | 2 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone:                      Susceptible

Based on Edges alone:                      Susceptible



TABLE 22 (CONTINUED)

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

Grade: FBE Manufacturer and Designation: #16 LE

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   |                   |
| 993       | Moderate           | 35%               | Moderate                      | Moderate | Moderate | 25%               |
| 994       | Moderate           | 25%               | Moderate                      | Moderate | Moderate | 30%               |
| 995       | Moderate           | 35%               | Moderate                      | Moderate | Moderate | 30%               |
| 996       | Moderate           | 30%               | Moderate                      | Moderate | Moderate | 25%               |

Specimens with strings attached:

| Replicate | Maximum Extent of Fungus Growth from Point of Contact with String |            |
|-----------|---|------------|
|           | Surfaces  | Side Edges |
| 997       | 3 mm  | 2 mm       |
| 998       | 4 mm  | 2 mm       |
| 999       | 4 mm  | 2 mm       |
| 1000      | 6 mm  | 3 mm       |

Rating (See pages 264 through 266 for explanation):

Based on surfaces alone: Susceptible

Based on Edges alone: Susceptible



TABLE 23

FUNGUS RESISTANCE OF PLASTIC LAMINATES  
(HUMIDITY EXPOSURE METHOD)

(Summary of ratings listed in table 22)

| <u>Spec. Grade</u> | <u>Manufacturer and Designation</u> |         | <u>Surface Rating</u> | <u>Edge Rating</u> |
|--------------------|-------------------------------------|---------|-----------------------|--------------------|
| FBE                | #6                                  | 221-A   | Funginert             | Funginert          |
| PBG                | #7                                  | XX-324  | Funginert             | Funginert          |
| FBM                | #7                                  | C-525   | Susceptible           | Susceptible        |
| PBE                | #9                                  | 6022    | Funginert             | Funginert          |
| FBM                | #10                                 | C-30    | Susceptible           | Susceptible        |
| FBG                | #10                                 | CE-34   | Susceptible           | Susceptible        |
| FBI                | #10                                 | L-40    | Susceptible           | Susceptible        |
| PBG                | #11                                 | 210     | Susceptible           | Susceptible        |
| PBE                | #11                                 | 215     | Susceptible           | Funginert          |
| GSG                | #12                                 | GB-112S | Funginert             | Funginert          |
| GMG                | #12                                 | GB-128M | Susceptible           | Susceptible        |
| NPG                | #12                                 | MEC-5   | Funginert             | Funginert          |
| PBG                | #12                                 | XX-13   | Funginert             | Funginert          |
| PBE                | #12                                 | XXX-13  | Funginert             | Funginert          |
| PBE-P              | #12                                 | XXXP-26 | Susceptible           | Susceptible        |
| FBM                | #12                                 | C-1513  | Susceptible           | Susceptible        |
| FBG                | #12                                 | C-813   | Susceptible           | Susceptible        |
| FBG                | #13                                 | C-813   | Susceptible           | Susceptible        |
| FBI                | #13                                 | L-400   | Susceptible           | Susceptible        |
| PBE-P              | #14                                 | XXXP-26 | Susceptible           | Funginert          |
| GSG                | #15                                 | GSC     | Funginert             | Funginert          |
| GMG                | #15                                 | G-5     | Susceptible           | Susceptible        |
| NPG                | #15                                 | NS      | Funginert             | Funginert          |
| PBG                | #15                                 | XX      | Funginert             | Funginert          |
| PBE                | #15                                 | XXX     | Funginert             | Funginert          |
| PBE-P              | #15                                 | XXXP    | Funginert             | Funginert          |
| FBM                | #15                                 | C       | Susceptible           | Susceptible        |
| FBG                | #15                                 | CE      | Susceptible           | Susceptible        |
| FBE                | #15                                 | LE      | Susceptible           | Susceptible        |
| FBI                | #15                                 | L       | Susceptible           | Susceptible        |
| PBG                | #16                                 | XX      | Funginert             | Funginert          |
| FBM                | #16                                 | C       | Susceptible           | Susceptible        |
| FBE                | #16                                 | LE      | Susceptible           | Susceptible        |
| PBG                | #17                                 | 300     | Funginert             | 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> |
|---------------|--------------------|--------------|
| #6            | 221-A              | FBE          |
| #7            | XX-324             | PBG          |
| #9            | 6022               | PBE          |
| #12           | GB-112S            | GSG          |
| #12           | MFC-5              | NPG          |
| #12           | XX-13              | PBG          |
| #12           | XXX-13             | FBE          |
| #15           | GSC                | GSG          |
| #15           | NS                 | NPG          |
| #15           | XX                 | PBG          |
| #15           | XXX                | PBE          |
| #15           | XXXP               | PBE-P        |
| #16           | XX                 | PBG          |
| #17           | 300                | PBG          |

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

|     |         |       |
|-----|---------|-------|
| #10 | L-40    | FBI   |
| #11 | 215     | PBE   |
| #12 | GB-128M | GMG   |
| #12 | XXAP-26 | PBE-P |
| #13 | C-813   | FBG   |
| #14 | XXXP-26 | PBE-P |
| #15 | C-5     | GMG   |

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

|     |       |     |
|-----|-------|-----|
| #10 | CE-34 | FBG |
| #11 | 210   | PBG |
| #15 | C     | FBM |
| #15 | CE    | FBG |
| #15 | LE    | FBE |
| #15 | L     | FBI |
| #16 | LE    | FBE |

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

|     |        |     |
|-----|--------|-----|
| #7  | C-525  | FBM |
| #10 | C-30   | FBM |
| #12 | C-1513 | FBM |
| #13 | L-400  | FBI |
| #16 | C      | FBM |

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

|     |       |     |
|-----|-------|-----|
| #12 | C-813 | FBG |
|-----|-------|-----|



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)

| <u>Manuf.</u> | <u>Designation</u> | <u>Grade</u> |
|---------------|--------------------|--------------|
| #6            | 221-A              | FBE          |
| #7            | KX-324             | PBG          |
| #9            | 6022               | PBE          |
| #11           | 215                | PBE          |
| #12           | GB-112S            | GSG          |
| #12           | MEC-5              | NPG          |
| #12           | XX-13              | PBG          |
| #12           | XXX-13             | PBE          |
| #14           | XAA-P-26           | PBE-P        |
| #15           | GSG                | GSG          |
| #15           | NS                 | NPG          |
| #15           | XX                 | PBG          |
| #15           | XXX                | PBE          |
| #15           | XXXP               | PBE-P        |
| #16           | XX                 | PBG          |

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

|     |         |       |
|-----|---------|-------|
| #10 | L-40    | FBI   |
| #12 | GB-128M | GMG   |
| #12 | XXXP-26 | PBE-P |
| #13 | C-815   | FBG   |
| #15 | -5      | GMG   |

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

|     |       |     |
|-----|-------|-----|
| #10 | C-30  | FBM |
| #10 | CE-34 | FBG |
| #11 | 210   | PBG |
| #15 | C     | FBM |
| #15 | CE    | FBG |
| #15 | LE    | FBE |
| #15 | L     | FBI |
| #16 | C     | FBM |
| #16 | LE    | FBE |
| #17 | 300   | PBG |

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

|     |        |     |
|-----|--------|-----|
| #7  | C-525  | FBM |
| #12 | C-1513 | FBM |
| #12 | C-813  | FBG |
| #13 | L-400  | FBI |



## FUNGINERTNESS OF THE THERMOSETTING MOLDED PLASTICS

### (PETRI-DISH METHOD)

#### Introduction

During the period covered by this Fourth Report, a number of additional available thermosetting molded plastics were tested for funginertness 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 Third Quarterly Report (pages 202-244).

#### Materials

The plastics evaluated in this study include the following thermosetting molded plastics as approved under MILITARY SPECIFICATION MIL-P-14B:

##### Phenolic Resin:

Type CFG - Cellulose filler, general-purpose.

Type CFI-5-Cellulose filler, impact-resistant; nominal impact strength, 0.60 foot-pounds per inch notch.

Type CFI-10-Cellulose filler, impact-resistant; nominal impact strength, 1.0 foot-pounds per inch notch.

Type CFI-20-Cellulose filler, impact-resistant; nominal impact strength, 2.0 foot-pounds per inch notch.

Type CFI-30-Cellulose filler, impact-resistant; nominal impact strength, 3.0 foot-pounds per inch notch.



Type CFI-40 - Cellulose filler, impact-resistant; nominal impact strength, 4.0 foot-pounds per inch notch.

Type MFE - Mineral filler, best electrical properties.

Type MFG - Mineral filler, general-purpose, heat-resistant.

Type MFH - Mineral filler, heat-resistant.

Type MFI-10 - Mineral filler, impact resistant; nominal impact strength, 1.0 foot-pounds per inch notch.

Type MFI-20 - Mineral filler, impact resistant; nominal impact strength, 2.0 foot-pounds per inch notch.

Melamine Resin:

Type CMG - Cellulose filler, general-purpose.

Type CMI-5 - Cellulose filler, impact-resistant; nominal impact strength, 0.60 foot-pounds per inch notch.

Type MME - Mineral filler, arc- and flame-resistant.

Alkyd Resin:

Type MAG - Mineral filler, general-purpose alkyd resin.

Experimental Procedure

The experimental procedure used was the same as that used in the Petri-dish funginertness tests of plastic laminates except for the test specimens used. The details of this procedure are found in the First Quarterly Report of this series. (See pages 5, 6, and 7.)

The specimens used in these tests were prepared as follows. The thermosetting molding plastic, being tested, was molded into discs of 1/8" thickness in such diameters as to



allow subsequent cutting of squares 1 inch by 1 inch from the discs. This cutting was done using an 8" arbor tilt saw equipped with a suitable cutting blade.

The resulting specimens (1/8" x 1" x 1") were then handled in the same manner as the plastic laminate specimens.

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<br/>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 24, pages 308 through 310, lists the observations on the individual replicates of the unconditioned specimens and numeric rating of each replicate both for surface and edge growth. Table 25, pages 311 through 313, 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 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 26, pages 314 and 315, lists the classification, of the molded plastics tested, based on the rating considering surface growth alone and on the ratings considering surface growth together with edge growth.

TABLE 24  
GROWTH OF FUNGUS ON MOLDED PLASTICS  
(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 |
| CFI 20      | #12<br>20 Natural            | 614A                 | Abundant                     | Abundant   | 4              | 4                 |
|             |                              | 614B                 | Abundant                     | Abundant   | 4              | 4                 |
|             |                              | 614C                 | Abundant                     | Abundant   | 4              | 4                 |
| CFG         | #21<br>GP-130 Nat.           | 598A                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 598B                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 598C                 | Slight                       | Slight     | 2              | 2                 |
| CFG         | #21<br>GP-130 Brown          | 599A                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 599B                 | Mod: Part Cov                | Slight     | 2              | 2                 |
|             |                              | 599C                 | Mod: Part Cov                | Slight     | 2              | 2                 |
| CFI 5       | #21<br>IM-510 Natural        | 611A                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 611B                 | Slight                       | Slight     | 2              | 2                 |
|             |                              | 611C                 | Traces                       | Traces     | 1              | 1                 |
| CFI 5       | #21<br>IM-510 Brown          | 612A                 | Mod: Part Cov                | Moderate   | 2              | 2                 |
|             |                              | 612B                 | Slight                       | Traces     | 2              | 2                 |
|             |                              | 612C                 | Slight                       | Slight     | 2              | 2                 |

\* - Specimen surface was waterlogged  
\*\* Same for 4 edges unless otherwise noted  
Note - For explanation of numeric rating code see page 306.



TABLE 24 (CONTINUED)

GROWTH OF FUNGUS ON MOLDED PLASTICS  
(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 |   |   |   |
| CFI<br>E    | #21<br>IM-510 Black          | 613A                 | Complete waterlog<br>Traces (*)<br>Traces (*) | Waterlog<br>Slight<br>Slight | 0              | 0                 | 0 |   |   |
|             |                              | 613B                 |   |                              |                |                   |   | 1 | 2 |
|             |                              | 613C                 |   |                              |                |                   |   | 1 | 2 |
| MFG         | #21<br>HR-350 Natural        | 609A                 | Slight (*)<br>Slight<br>Slight                | Slight<br>Slight<br>Slight   | 2              | 2                 | 2 |   |   |
|             |                              | 609B                 |   |                              |                |                   |   | 2 | 2 |
|             |                              | 609C                 |   |                              |                |                   |   | 2 | 2 |
| MFG         | #21<br>HR-350 Brown          | 610A                 | Slight (*)<br>Slight<br>Slight                | Moderate<br>Slight<br>Traces | 2              | 2                 | 2 |   |   |
|             |                              | 610B                 |   |                              |                |                   |   | 2 | 2 |
|             |                              | 610C                 |   |                              |                |                   |   | 2 | 2 |
| MFH         | #21<br>HR-340 Natural        | 607A                 | Slight (*)<br>Slight (*)<br>Slight (*)        | Slight<br>Slight<br>Slight   | 2              | 2                 | 2 |   |   |
|             |                              | 607B                 |   |                              |                |                   |   | 2 | 2 |
|             |                              | 607C                 |   |                              |                |                   |   | 2 | 2 |
| MFH         | #21<br>HR-340 Brown          | 608A                 | Slight (*)<br>Slight (*)<br>Slight (*)        | Slight<br>Slight<br>Slight   | 2              | 2                 | 2 |   |   |
|             |                              | 608B                 |   |                              |                |                   |   | 2 | 2 |
|             |                              | 608C                 |   |                              |                |                   |   | 2 | 2 |

\* Specimen surface was waterlogged. \*\* Same for 4 edges unless otherwise noted.  
Note- For explanation of numeric rating code see page 206



Sheet 3 of 3

TABLE 24 (CONCLUDED)  
GROWTH OF FUNGUS ON MOLDED PLASTICS  
(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 |
| MAG         | #28<br>420                   | 244A                 | Traces                       | Traces     | I              | I                 |
|             |                              | 244B                 | Traces (*)                   | Traces     | I              | I                 |
|             |                              | 244C                 | Traces                       | Traces     | I              | I                 |
| MAG         | #28<br>422                   | 245A                 | Traces                       | Traces     | I              | I                 |
|             |                              | 245B                 | Traces                       | Traces     | I              | I                 |
|             |                              | 245C                 | Traces                       | Traces     | I              | I                 |
|             |                              |                      |                              |            |                |                   |
|             |                              |                      |                              |            |                |                   |
|             |                              |                      |                              |            |                |                   |

\* - Specimen surface was waterlogged \*\* - Same for 4 edges unless otherwise noted  
Note \* For explanation of numeric rating code see page 306.



TABLE 25

Sheet 1 of 3

GROWTH OF FUNGUS ON MOLDED PLASTICS  
(PETRI-DISH METHOD)

Conditioning of Specimen: 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 |
| CFI 20      | #12<br>20 Natural            | 622A                 | Abundant (*)                 | Abundant   | 4               | 4                 |
|             |                              | 622B                 | Abundant (*)                 | Abundant   | 4               | 4                 |
|             |                              | 622C                 | Abundant                     | Abundant   | 4               | 4                 |
| CFG         | #21<br>GP-130 Natural        | 605A                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 605B                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 605C                 | Slight (*)                   | Slight     | 2               | 2                 |
| CFG         | #21<br>GP-130 Brown          | 606A                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 606B                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 606C                 | Slight (*)                   | Slight     | 2               | 2                 |
| CFI 5       | #21<br>IM 510 Natural        | 619A                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 619B                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 619C                 | Slight (*)                   | Slight     | 2               | 2                 |
| CFI 5       | #21<br>IM 510 Brown          | 620A                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 620B                 | Slight (*)                   | Slight     | 2               | 2                 |
|             |                              | 620C                 | Slight (*)                   | Moderate   | 2               | 2                 |

\* - Specimen surface was waterlogged \*\* - Same for 4 edges unless otherwise noted  
Note - For explanation of numeric rating code see page 205

TABLE 25 (CONTINUED)  
 GROWTH OF FUNGUS ON MOLDED PLASTICS  
 (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 |
| CFI<br>5    | #21<br>IM-510 Black          | 621A                 | Slight<br>Slight<br>Slight<br>(*)<br>(*)<br>(*)     | Slight<br>Slight<br>Slight   | 2<br>2<br>2    | 2<br>2<br>2       |
|             |                              | 621B                 |   |                              |                |                   |
|             |                              | 621C                 |   |                              |                |                   |
| MFG         | #21<br>HR-350 Natural        | 617A                 | Complete Waterlog<br>Slight<br>Traces<br>(*)<br>(*) | Waterlog<br>Slight<br>Slight | 0<br>2<br>2    | 2<br>2<br>2       |
|             |                              | 617B                 |   |                              |                |                   |
|             |                              | 617C                 |   |                              |                |                   |
| MFG         | #21<br>HR-350 Brown          | 618A                 | Slight<br>Slight<br>Traces<br>(*)<br>(*)            | Slight<br>Slight<br>Slight.  | 2<br>2<br>2    | 2<br>2<br>2       |
|             |                              | 618B                 |   |                              |                |                   |
|             |                              | 618C                 |   |                              |                |                   |
| MFH         | #21<br>HR-340 Natural        | 615A                 | Slight<br>Slight<br>Slight<br>(*)<br>(*)            | Slight<br>Slight<br>Slight   | 2<br>2<br>2    | 2<br>2<br>2       |
|             |                              | 615B                 |   |                              |                |                   |
|             |                              | 615C                 |   |                              |                |                   |
| MFH         | #21<br>HR-340 Brown          | 616A                 | Slight<br>Slight<br>Slight<br>(*)<br>(*)<br>(*)     | Slight<br>Slight<br>Slight   | 2<br>2<br>2    | 2<br>2<br>2       |
|             |                              | 616B                 |   |                              |                |                   |
|             |                              | 616C                 |   |                              |                |                   |

\* - Specimen surface was waterlogged  
 Note - For explanation of numeric rating code see page 306  
 \*\* - Same for edges unless otherwise noted

TABLE 26  
 FUNGUS RESISTANCE OF MOLDED PLASTICS  
 (PETRI-DISH METHOD)

Summary of more detailed data shown in tables 24 and 25.

| Spec. Grade | Manufacturer and Designation | Surface Growth Only |             |                       |                | Surface and Edge Growth |                       |  |  |
|-------------|------------------------------|---------------------|-------------|-----------------------|----------------|-------------------------|-----------------------|--|--|
|             |                              | Numeric Rating      |             | Fungus Resistance (*) | Numeric Rating |                         | Fungus Resistance (*) |  |  |
|             |                              | Uncond              | Cond        |                       | Uncond         | Cond                    |                       |  |  |
| CFI 20      | 12 20 Nat                    | 4                   | 4 4 4       | Susceptible           | 4              | 4 4 4                   | Susceptible           |  |  |
| CFG         | 21 GP-130 Nat                | 2                   | 2 2 2       | Susceptible           | 2              | 2 2 2                   | Susceptible           |  |  |
| CFG         | 21 GE-130 Br.                | 2                   | 2 2 2       | Susceptible           | 2              | 2 2 2                   | Susceptible           |  |  |
| CFI 5       | 21 IM-510 Nat                | 2                   | 2 1 2 2 2   | Susceptible           | 2              | 2 1 2 2 2               | Susceptible           |  |  |
| CFI 5       | 21 IM-510 BR                 | 2                   | 2 2 2 2 2 2 | Susceptible           | 2              | 2 2 2 2 2 2             | Susceptible           |  |  |
| CFI 5       | 21 IM-510 Bl.                | 0                   | 1 1 2 2 2 2 | Fungistatic           | 0              | 2 2 2 2 2 2             | Susceptible           |  |  |
| MFG         | 21 HR-350 Nat                | 2                   | 2 2 0 2 1   | Susceptible           | 2              | 2 2 0 2 2               | Susceptible           |  |  |
| MFG         | 21 HR-350 Br.                | 2                   | 2 2 2 2 1   | Susceptible           | 2              | 2 2 2 2 2 2             | Susceptible           |  |  |

\* See page 307 for more detailed explanation.

TABLE 26 (CONCLUDED)

FUNGUS RESISTANCE OF MOLDED PLASTICS  
(PETRI-DISH METHOD)

Summary of more detailed data shown in tables 24 and 25.

| Spec. Grade | Manufacturer and Designation | Surface Growth Only |       | Surface and Edge Growth |       |
|-------------|------------------------------|---------------------|-------|-------------------------|-------|
|             |                              | Numeric Rating      |       | Numeric Rating          |       |
|             |                              | Uncond              | Cond  | Uncond                  | Cond  |
| MFH         | 21 HR-340 Nat                | 2 2 2               | 2 2 2 | 2 2 2                   | 2 2 2 |
| MFH         | 21 HR-340 Br.                | 2 2 2               | 2 2 2 | 2 2 2                   | 2 2 2 |
| MAG         | 28 420                       | 1 1 1               | 1 1 1 | 1 1 1                   | 1 1 1 |
| MAG         | 28 422                       | 1 1 1               | 1 1 1 | 1 1 1                   | 1 1 1 |
|             |                              |                     |       |                         |       |
|             |                              |                     |       |                         |       |
|             |                              |                     |       |                         |       |
|             |                              |                     |       |                         |       |

\* See page 307 for more detailed explanation.





Summary of Observations

(Surface Growth Alone)

|  | <u>Manuf.</u> | <u>Designation</u> | <u>Grade</u> |
|--|---------------|--------------------|--------------|
| The following samples showed traces of growth on all six replicates: | #28           | 420                | MaG          |
|  | #28           | 422                | MaG          |

|   |     |             |       |
|---|-----|-------------|-------|
| The following samples showed traces or slight growth on all six replicates: | #21 | IM-510 Nat. | CFI-5 |
|   | #21 | IM-510 Bl.  | CFI-5 |
|   | #21 | HR-350 Nat. | MFG   |
|   | #21 | HR-350 Br.  | MFG   |

|   |     |             |     |
|---|-----|-------------|-----|
| The following samples showed slight growth on all six replicates: | #21 | GP-130 Nat. | CFG |
|   | #21 | HR-340 Nat. | MFH |
|   | #21 | HR-340 Br.  | MFH |

|   |     |            |       |
|---|-----|------------|-------|
| The following samples showed slight or moderate growth on all six replicates: | #21 | GP-130 Br. | CFG   |
|   | #21 | IM-510 Br. | CFI-5 |

|  |     |            |        |
|--|-----|------------|--------|
| The following sample showed abundant growth on all six replicates: | #12 | 20 Natural | CFI-20 |
|--|-----|------------|--------|



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> |
|---------------|--------------------|--------------|
| #28           | 420                | MLG          |
| #28           | 422                | MLG          |

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

|     |             |       |
|-----|-------------|-------|
| #21 | IM-510 Nat. | CFI-5 |
| #21 | IM-510 Bl.  | CFI-5 |
| #21 | HR-350 Nat. | MFG   |

The following samples showed slight growth on all six replicates:

|     |             |     |
|-----|-------------|-----|
| #21 | GP-130 Nat. | CFG |
| #21 | HR-340 Nat. | MFH |
| #21 | HR-340 Br.  | MFH |

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

|     |            |       |
|-----|------------|-------|
| #21 | HR-350 Br. | MFG   |
| #21 | IM-510 Br. | CFI-5 |

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

|     |            |     |
|-----|------------|-----|
| #21 | GP-130 Br. | CFG |
|-----|------------|-----|

The following sample showed abundant growth on all six replicates:

|     |            |        |
|-----|------------|--------|
| #12 | 20 Natural | CFI-20 |
|-----|------------|--------|



PARTIAL COMPARISON OF RESULTS OBTAINED  
BY THE TWO TEST METHODS

A total of 129 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 129 laminates have been reported on previous pages of this report and in the First, Second and Third Quarterly Reports.

A preliminary comparison of 30 of these 129 laminates has been reported in the Second Quarterly Report, pages 121 and 122. An additional 55 laminates are included in the Third Quarterly report, pages 245 through 247. The additional 34 laminates are included in this report. Table 27, pages 319 lists these additional 34 laminates arranged in decreasing order of fungus resistance, as determined by the Petri-Dish Method, considering surface growth alone. Also listed in table 27, are the corresponding results as obtained using the Humidity-Exposure Method.

This listing has been compiled using results of surface growth alone (on unconditioned specimens) 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 until all the laminates under test have been reported.



TABLE 27

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         | #12 GB-112S                  | Traces             | 1          | None- Tr.                | 0%                |
| GSG         | #15 GSC                      | Traces             | 1          | None- Tr.                | 0%                |
| PBG         | #12 XX-13                    | Traces             | 1          | Tr. - Sl.                | 1.5%              |
| FBE         | #6 221-A                     | Slight             | 2          | Traces                   | 1%                |
| PBE         | #15 XXX                      | Slight             | 2          | Traces                   | 1%                |
| PRG         | #15 XX                       | Slight             | 2          | Traces                   | 1%                |
| PBE         | #9 6022                      | Slight             | 2          | Traces                   | 1%                |
| PBE         | #12 XXX-13                   | Slight             | 2          | Traces                   | 1%                |
| PBG         | #7 XX-324                    | Slight             | 2          | Tr. - Sl.                | 1%                |
| NPG         | #15 NS                       | Slight             | 2          | Tr. - Sl.                | 1.5%              |
| NPG         | #12 MEC-5                    | Slight             | 2          | Tr. - Sl.                | 1.75%             |
| PBE-P       | #15 XXXP                     | Slight             | 2          | Slight                   | 2%                |
| PBG         | #17 300                      | Slight             | 2          | Slight                   | 2%                |
| PBE         | #11 215                      | Slight             | 2          | Tr. - Mod.               | 2.5%              |
| PBE-P       | #14 XXXP-26                  | Slight             | 2          | Sl. - Mod.               | 2.75%             |
| PBE-P       | #12 XXXP-26                  | Slight             | 2          | Sl. - Mod.               | 4.25%             |
| GMG         | #15 G-5                      | Slight             | 2          | Moderate                 | 5%                |
| FBI         | #10 L-40                     | Slight             | 2          | Moderate                 | 5%                |
| GMG         | #12 GB-128M.                 | Slight             | 2          | Moderate                 | 6.25%             |
| PBG         | #11 210                      | Slight             | 2          | Moderate                 | 14%               |
| FBE         | #15 LE                       | Slight             | 2          | Moderate                 | 32.5%             |
| FBG         | #13 C-813                    | Mod: Part Cov      | 2          | Moderate                 | 8.75%             |
| FBG         | #10 CE-34                    | Mod: Part Cov      | 2          | Moderate                 | 14%               |
| FBI         | #15 L                        | Mod: Part Cov      | 2          | Moderate                 | 24%               |
| FBI         | #13 L-400                    | Mod: Part Cov      | 2          | Moderate                 | 50%               |
| FBM         | #15 C                        | Mod: Cons Cov      | 3          | Moderate                 | 25%               |
| FBM         | #10 C-30                     | Mod: Cons Cov      | 3          | Moderate                 | 60%               |
| PBG         | #16 XX                       | Abundant           | 4          | Tr. - Sl.                | 1%                |
| FBG         | #15 CE                       | Abundant           | 4          | Moderate                 | 25%               |
| FBE         | #16 IE                       | Abundant           | 4          | Moderate                 | 31%               |
| FBM         | #12 C-1513                   | Abundant           | 4          | Moderate                 | 45%               |
| FBM         | #16 C                        | Abundant           | 4          | Moderate                 | 57.5%             |
| FBG         | #12 C-813                    | Abundant           | 4          | Mod.- Abund              | 72.5%             |
| FBM         | #7 C-525                     | Abundant           | 4          | Mod. - abund             | 75%               |

\* - See page 250 for explanation