

## FEDERAL SPECIFICATION

# INSULATION SHEET, ELECTRICAL, NATURAL MUSCOVITE MICA

*This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.*

## 1. CLASSIFICATION

**1.1 Class and colors.**—Natural-muscovite-mica electrical insulation covered by this specification shall be class NM, natural block mica. Unless otherwise specified, the colors shall be either ruby or non-ruby, as specified.

**1.2 Types.**—Natural muscovite mica shall be of the following types by visual quality classification (see 3.2 and 4.4.1):

Type NMC. —Clear  
 Type NMS. —Clear and slightly stained  
 Type NMF. —Fair stained  
 Type NMG. —Good stained  
 Type NMSA. —Stained "A"  
 Type NMSB. —Stained "B"  
 Type NMH. —Heavily stained  
 Type NMBD. —Black dotted  
 Type NMBS<sub>p</sub>. —Black spotted  
 Type NMBS. —Black stained

The above types are listed in decreasing order of quality (increasing order of stain and waviness). Type NMBS is the lowest quality and NMC, the highest quality covered by this specification.

**1.3 Form.**—Mica electrical insulation shall be of but one form, i.e., form S, sheets, trimmed (uncut).

**1.4 Size grades.**—Mica electrical insulation shall be of the following size grades, as specified (see 3.4, 4.4.2, and 6.1):

Over over extra extra special (OOEES)  
 Over extra extra special (OEES)  
 Extra extra special (EES)  
 Extra special (ES)  
 Special (S)  
 1  
 2  
 3  
 4  
 5  
 5½  
 6

## 2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS

**2.1 Specifications.** — There are no other specifications applicable to this specification except those referenced in section 7 by individual departments.

(Copies of Federal specifications and the Federal Specifications Index may be obtained upon application, accompanied by money order, coupon, or cash, to the Superintendent of Documents, Government Printing Office, Washington 25, D. C., or to the GSA Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, and Seattle. Prices may be obtained from the Superintendent of Documents or from the GSA Regional Offices.)

**2.2 Other publications.** — The following publications, of the issues in effect on date of invitation for bids, or of date specified, form a part of this specification:

**HH-I-536****Governmental:****National Bureau of Standards:**

Research Paper 1671—Color Standard  
for Ruby Mica.

**Nongovernmental:****American Institute of Electrical Engineers:**

Standard No. 4—Measurement of  
Test Voltage in Dielectric Tests.  
(A.S.A.—C68.1-42)

**American Society for Testing Materials:**

D 351-49 T—Tentative Specification  
for Natural Muscovite Mica Based  
on Visual Quality.

(Copies of AIEE standards may be obtained from  
the American Institute of Electrical Engineers, 35  
West Thirty-Ninth Street, New York, N. Y.

(Copies of ASTM Tentative Specifications may  
be obtained from the American Society for Testing  
Materials, 1916 Race Street, Philadelphia 3, Pa.

(Reprints of National Bureau of Standards  
Research Paper, referenced above, may be obtained  
from the Superintendent of Documents, Government  
Printing Office, Washington 25, D. C. Price may  
be obtained from the Superintendent of Documents.)

**3. REQUIREMENTS**

**3.1 Composition.** — The mica electrical  
insulation shall be muscovite mica not cal-  
cined or treated in any manner which will  
affect its suitability for the purposes in-  
tended. It shall consist entirely of selected  
sheets or blocks of the naturally occurring  
minerals. (See 4.4.7.)

**3.2 Visual quality classification.** — The  
mica electrical insulation shall conform to  
the following visual quality classification  
(see 1.2 and 4.4.1):

**Type NMC<sub>1</sub>, clear.** — Hard, of uniform  
color, flat, free from all stains and for-  
eign inclusions, waves, cracks, buckles,  
and other similar defects.

**Type NMS<sub>1</sub>, clear and slightly stained.** —

Hard, of uniform color, fairly flat, free  
from all so-called vegetable and mineral  
stains, cracks, buckles, and other similar  
defects and foreign inclusions, except it  
may contain a few tiny air inclusions in  
not more than one-fourth of the usable  
area.

**Type NMF<sub>1</sub>, fair stained.** — Hard, of uni-  
form color, free from all so-called vege-  
table and mineral stains, cracks, buckles,  
and other similar defects and foreign  
inclusions, except that it may be slightly  
wavy and may contain slight air inclu-  
sions in not more than one-half of the  
usable area.

**Type NMG<sub>1</sub>, good stained.** — Hard, free  
from so-called vegetable or mineral  
stains, cracks, buckles, and other similar  
defects and foreign inclusions, except it  
may be somewhat wavy but not rippled  
and may contain medium air inclusions  
in not more than two-thirds of the  
usable area but may not have heavily  
concentrated air inclusions in any of the  
usable area.

**Type NMSA, stained "A".** — Hard, free  
from cracks and other similar defects  
and foreign inclusions, except it may be  
wavy with slight buckles and may con-  
tain medium so-called vegetable stains,  
and the entire area may have air inclu-  
sions if not heavily concentrated.

**Type NMSB, stained "B".** — Hard, free  
from cracks and other similar defects  
and foreign inclusions, except it may be  
wavy and slightly buckled and may con-  
tain heavy air inclusions, medium so-  
called vegetable, clay, and mineral  
stains.

**Type NMSB, stained "B".** — Hard, free  
from cracks and other similar defects  
and foreign inclusions, except it may be  
wavy and slightly buckled and may con-  
tain heavy air inclusions, medium so-  
called vegetable, clay, and mineral  
stains.

**Type NMH<sub>1</sub>, heavily stained.** — Hard, free  
from cracks and other similar defects  
and foreign inclusions, except it may be  
wavy and buckled and may contain  
heavy air inclusions, heavy so-called  
vegetable and medium mineral stains.

*Type NMBD, black dotted.*—Same as type NMH, except it may contain black dots.

*Type NMBS<sub>p</sub>, black spotted.*—Hard, free from cracks and other similar defects and foreign inclusions, except it may be medium wavy and contain slight buckles and so-called vegetable stains, black or red spotted mineral stains, and heavy air inclusions.

*Type NMBS<sub>s</sub>, black stained.*—Same quality as type NMBS, except it may be soft and have black lines and/or short red bars or connected stains.

**3.3 Thickness.**—The thickness shall be not less than 0.007 inch. (See 4.4.3.)

**3.4 Size grading.**—(See 1.4 and 4.4.2.)

**3.4.1** The natural mica shall be graded for size according to the area of the maximum rectangle which can be cut from the specimen and the minimum dimension of one side as indicated in table I. The mica in the maximum rectangle shall meet the requirements for visual quality listed in 3.2.

TABLE I.—*Size grading*

Size grade	Minimum area of maximum rectangle	Average area of grade (see 4.4.2)	Minimum dimension of one side
	<i>Square inches</i>	<i>Square inches</i>	<i>Inches</i>
OOEES---	100	--	4.0
OEEES---	80	90	4.0
EES---	60	70	4.0
ES---	48	54	4.0
S---	36	42	4.0
1---	24	30	3.0
2---	15	19.5	2.0
3---	10	12.5	2.0
4---	6	8	1.5
5---	3	4.5	1.0
5½---	2¼	2.5	¾
6---	1	1.5	¾

**3.5 Cleavability.**—The natural mica shall have laminae of uniform thickness throughout and at least 90 percent of the sections resulting from the test for cleavability specified in 4.4.4 shall have a size grading equal to that of the original piece insofar as maximum usable area is concerned.

**3.6 Dielectric strength.**—When five tests are conducted per sheet as specified in 4.4.5 the average dielectric strength short-time per sheet shall be not less than 1,000 volts per mil. When one test is conducted per sheet the dielectric strength short-time per sheet shall be not less than 850 volts per mil.

**3.7 Conducting inclusions.**—There shall be no acute sparking when the natural mica sheet is tested as specified in 4.4.6.

#### 4. SAMPLING, INSPECTION, AND TEST PROCEDURES

##### 4.1 Sampling.

**4.1.1 Lot.**—For purposes of sampling, a lot shall consist of all mica of the same type (see 1.2) and size grade (see 1.4) offered for delivery at one time. The unit of sampling shall be a case when the mica is packed loose in 100-pound cases and shall be a 5-pound carton when it is packed in cartons.

**4.1.2 Sampling for lot acceptance inspection.**—The sample units for lot acceptance inspection shall be taken at random in accordance with table II. For each case sample unit, a total of 50 ounces shall be extracted from at least four different parts of the case. For each carton sample unit, a total of 10 ounces shall be taken from at least four different parts of the carton. The mica so taken shall be used for the lot acceptance inspection specified in 4.2.

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TABLE II.—Sampling plan for lot acceptance inspection

Type of mica	Size grade	When packed loose in cases, percent of cases selected	When packed in 5-lb. cartons, percent of cartons selected <sup>1</sup>
NMC <sub>1</sub>	1 and larger	100	25
NMS.	2, 3, 4	50	12.5
	5, 5½, 6	30	7.5
NMF.	1 and larger	100	25
	2, 3, 4	30	7.5
	5, 5½, 6	20	5
NMG.	1 and larger	100	25
	2, 3, 4	30	7.5
	5, 5½, 6	10	2.5
NMSA, NMSB, NME., NMBD, NMBS., and NMBS.	1 and larger	50	25
	2, 3, 4	20	5
	5, 5½, 6	5	1

<sup>1</sup> Not less than five cartons shall be taken unless the lot contains less than five cartons when all cartons shall be inspected.

4.1.2.1 When purchase contract or order provides for "visual inspection only," inspection for lot acceptance shall be limited to visual quality (4.4.1), size grading (4.4.2), and thickness (4.4.3).

4.1.3 Sampling for lot acceptance test.—The number of sample sheets (taken from each 10-ounce portion of the sample units inspected in accordance with 4.1.2 and 4.2) required for lot acceptance tests shall be as specified in table III.

TABLE III.—Sampling plan for lot acceptance inspection tests

Test	Number of sample sheets per 10-ounce portion of sample unit
Cleavability -----	3
Dielectric strength -----	3
Conducting inclusions -----	3
Special tests of mica for capacitors and similar applications, when required (see 4.4.7 and 6.2.1) -----	3

## 4.2 Lot acceptance inspection.

4.2.1 The samples taken in accordance with 4.1.2 shall be inspected under the supervision of the Government inspector, as follows:

Visual quality ----- See 4.4.1  
Size grading ----- See 4.4.2  
Thickness ----- See 4.4.3

4.2.2 The defective sheets of mica shall be separated from the rest and weighed. The following tolerances shall be allowed:

Percent  
5 —for under 0.007 inch thick  
10 —for next lower quality  
10 —for next smaller size  
15 —maximum for all causes

4.2.3 Rejection.—Acceptance or rejection of the entire lot shall be determined as indicated in 4.2.2.

## 4.3 Lot acceptance tests.

4.3.1 The sample sheets taken in accordance with 4.1.3 shall be tested under the supervision of the Government inspector, as follows:

Cleavability ----- See 4.4.4  
Dielectric strength ----- See 4.4.5  
Conducting inclusions ----- See 4.4.6  
Special tests of mica for capacitors and similar applications, (when required) ----- See 4.4.7 and 6.2.1

4.3.2 *Rejection.* — If any of the sample sheets taken in accordance with 4.1.3 fails any of the tests specified in 4.3.1, the entire lot shall be rejected.

#### 4.4 Inspection and tests.

4.4.1 *Visual quality.*—The natural mica shall be examined visually for hardness, color, degree of flatness, stains and foreign inclusions, waves, cracks, buckles, air inclusions, and similar defects. (See 1.2 and 3.2.)

4.4.2 *Size grading.*—Before grading for size, all edges of natural mica shall be fully trimmed. All cracks, holes, reeves or cross-grains shall be trimmed out. In eliminating such defects the trimming shall follow the natural contour of the mica. There shall be not more than two V or figure cuts on any one piece of mica, and no such V cuts shall be longer than one-fourth the width of the piece of mica measured at the point of cut. The mica shall be graded for size according to the area of the maximum rectangle which can be cut from the specimen and the minimum dimension of one side. At least 30 percent by weight of the mica for each grade shall have a maximum rectangle with an area equal to or greater than the average area between the minimum for the specified grade and the next higher grade. (See dotted lines on figure 1.) The mica in the maximum rectangle shall meet the requirements for visual quality listed in paragraph 3.2.

A standard chart, as illustrated in figure 1, shall be used for grading the mica according to size. In grading the mica for size, all dimensions apply to the smaller surface measured from the foot of the bevel-trimmed edge. The specimen to be graded shall be laid upon the chart so that it covers point O and has its maximum and minimum dimensions extending along and covering lines OA and OB, respectively. The specimen shall be shifted until the usable area completely covers the largest rectangle determined by a diagonal extending from point O to or beyond a point on any of the curves. The

number of the curve at the greatest distance from O cut by the diagonal of the rectangle designates the grade of the specimen. (See 1.4 and 3.4.)

4.4.3 *Thickness.*—The thickness shall be determined by a machinist's micrometer with ratchet. Because of the abrasive nature of mica the micrometer shall be checked periodically for accuracy. The anvil and spindle shall be cleaned as frequently as necessary to prevent the accumulation of mica dust on the surfaces so as to preserve the accuracy of the measurements. To clean, the micrometer shall be closed lightly on a clean sheet of bond paper and the paper moved between the surfaces. Care must be exercised in moving from one measurement location to another to maintain the surfaces of the anvil and spindle parallel to the surfaces of the specimen at all times so as to avoid scratching the mica and accumulating dust under the micrometer surfaces causing false readings. When size permits, at least five readings shall be taken to determine the average thickness in mils.

4.4.4 *Cleavability.* — The cleavability or splitting quality shall be tested by splitting the samples to a uniform thickness of not more than 0.0015 inch and determining the size grade of the films, resulting from the splitting, by the method specified in 4.4.2.

#### 4.4.5 *Dielectric strength.*

4.4.5.1 *Test equipment.*—A suitable high-voltage transformer shall be connected to an alternating-current supply having as nearly a true sine wave as possible. The capacity of the source of supply of energy shall be not less than 2 kilovolt-amperes for voltages of 50,000 volts or less, and not less than 5 kilovolt-amperes for voltages above 50,000 volts. The frequency shall not exceed 100 cycles per second.

4.4.5.2 *Voltage control.* — The regulation shall be so controlled that the voltage from the secondary of the testing transformer can be raised gradually, in no case more than 500 volts per step, if step control is used.

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Any method of regulating the voltage will be satisfactory, provided the crest factor (ratio of maximum to mean effective) of the test voltage does not differ by more than plus or minus 5 percent from that of a sinusoidal wave over the upper half of the range of voltage.

**4.4.5.3 Voltage measurements.**—The voltage may be measured by an approved method which gives root-mean-square values, preferably by means of a voltmeter connected to a special voltmeter coil in the high-voltage winding of the testing transformer, or to a separate step-down instrument potential transformer. A voltmeter on the low-voltage side of the transformer will be satisfactory if the known ratio of transformation does not change by more than 2 percent under the test condition. A properly calibrated electrostatic voltmeter connected across the high-voltage supply will also be satisfactory. A sphere spark gap may be used in accordance with American Institute of Electrical Engineers' Standard No. 4, Measurement of Test Voltage in Dielectric Tests, (ASA—C68.1-42) to check the readings at very high voltages.

**4.4.5.4 Surge protection.**—Some protection is desirable in the high-voltage circuit of testing transformers where the voltage is 25,000 volts or over, to prevent dangerous surges and limit the current at flash-over or when the test specimen is punctured. It is, however, desirable to have as much energy available as possible when puncture occurs. If impedance in the form of choke coils is used in series with the high-voltage terminals, it should be not greater than that which will limit the current through the specimen to double the normal rated current of the testing transformer.

**4.4.5.5 Spark gap.**—When a sphere spark gap is used, a noninductive resistance approximately 1 ohm per volt may be inserted in series with 1 terminal of the spark gap, to damp high-frequency oscillations at the time of break-down, and to limit the current

flow. This resistance shall be as near the gap as possible. If the test is made with one side grounded, this resistance shall be on the ungrounded side of the circuit and, if neither side is grounded, one-half of the resistance shall be inserted on each side of the spark gap. Water tube resistors are preferable to carbon for this purpose as the resistance of the carbon resistors may be materially decreased by the passage of current.

**4.4.5.6 Test electrodes.**—The test electrodes shall be made of brass or copper, with flat polished contact surfaces. They shall be cylinders 1 inch in length and 2 inches in diameter, with the contact edges rounded to a radius of  $\frac{1}{8}$  inch, except that in the case of mica too small for the 2-inch-diameter electrodes, the electrodes may be  $\frac{1}{4}$  inch in diameter with edges rounded to a radius of  $\frac{1}{2}$  inch. The electrodes shall be self-aligning and shall be placed exactly opposite one another, with the specimen in a horizontal plane between them.

**4.4.5.7 Type and application of the electrodes and sample size** shall be such as to avoid flash-over. The tests shall be made under oil.

**4.4.5.8 Rate of rise of voltage.**—Starting at zero the testing voltage shall be increased uniformly to break-down at a rate of 500 volts per second.

**4.4.5.9 Number of tests.**—When possible, five tests shall be conducted per sheet and the average dielectric strength shall be reported in volts per mil of thickness. If five tests are not possible per sheet, one test shall be conducted per sheet.

**4.4.6 Conducting inclusions.**

**4.4.6.1 Apparatus.**—The apparatus shall consist of the following:

**4.4.6.1.1 Spark coil.**—A spark coil of the

vibrator type capable of giving a spark from  $\frac{3}{8}$  to 1 inch in length between needle points.

**4.4.6.1.2 Current source.**—Six volts direct current.

**4.4.6.1.3 Electrodes.** — One electrode consisting of a sharp-pointed 0.1285-inch (No. 8 B&S gage) bare copper wire, about 4 inches in length, mounted on the end of a hard rubber rod about 1 inch in diameter and 1 foot in length. This electrode shall be connected to the high-tension side of the spark coil. The other electrode shall be a sheet of metal of suitable size on which the mica under test can be laid. This electrode shall be connected to the grounded terminal of the spark coil.

**4.4.6.2 Procedure.**

**4.4.6.2.1** With both electrodes connected to the spark coil, the spark coil vibrator shall be adjusted to give as smooth and steady a tone as possible. The pointed electrode shall be brought within  $\frac{3}{8}$  to 1 inch of the plate electrode, depending upon the capacity of the coil used. A continuous spark discharge should take place under these circumstances.

**4.4.6.2.2** The test specimen shall be laid on the grounded electrode and the pointed electrode brought to within  $\frac{1}{4}$  inch of the specimen. Under these circumstances a small amount of typical bluish brush discharge will be noted at the point. The test specimen shall be carefully explored for scintillations or acute sparking with the pointed electrode over its entire face and edges. This test shall be made in subdued light in a lighted room.

**4.4.6.3 Conducting stains and spots.** — Electrical conductivity adjacent to or located in visible spotted and stained areas of sheet or block mica is revealed when visible sparking, scintillation or glowing occurs either inside or on the surface of the test specimen in the vicinity of the test probe and not by actual puncture of the mica by the high potential current. If actual puncture of the

test specimen does take place, this indicates that the dielectric strength of the mica has been exceeded or indicates the presence of mechanical faults, such as pin holes, tears, or cracks which extend completely through the mica.

**4.4.7 Identity test for muscovite mica.**—When it is required that an identity test for muscovite mica be made, the tests for optical angle and weight loss on heating as described in American Society for Testing Materials Test Method D 351-49 T, Tentative Specification for Natural Muscovite Mica Based on Visual Quality, are recommended. (See 6.2.)

**4.4.8 Color tests.**—When color tests are required, the tests shall be made in accordance with the method described in Color Standard for Ruby Mica, by Deane B. Judd, National Bureau of Standards, Journal of Research, Volume 35, October 1945, R.P. 1671. (See 6.2.)

## 5. PREPARATION FOR DELIVERY

**5.1 Packaging.** — Unless otherwise specified, block mica of the same type and size grade shall be packaged in units of 5 pounds in fiberboard boxes strong enough to resist puncture from the sharp edges of the mica and of such size that there will be no shifting of the mica in the boxes with resulting damage to the mica.

**5.2 Packing.**—Unless otherwise specified the subject commodity shall be prepared for shipment to permit acceptance by carrier for transportation at the lowest applicable rate, and to afford maximum protection from normal hazards of transportation.

**5.3 Marking.**

**5.3.1 Issue packages.** — Unless otherwise specified, issue packages shall be marked with the name, color, type, form, size grade, and thickness of the commodity, the quantity contained therein, and the names of the contractor and the manufacturer.

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5.3.2 *Shipping containers.*—Unless otherwise specified, shipping containers shall be marked with the name, color, type, form, size grade, and thickness of the commodity as defined by the contract or order under which shipment is made, the quantity contained therein, the name of the contractor, the number of the contract or order, the name and address of the consignee, and the gross weight.

**6. NOTES**

6.1 *Intended use.* — Types NMC, NMS, NMF, and NMG, mica are intended for use in high-quality capacitors and similar electronic applications requiring both high dielectric strength and low dielectric loss. All other types of mica are intended for applications where less stringent electrical characteristics are required. Natural mica of higher quality than type NMSA should not be issued for routine stock purposes.

6.2 *Ordering data.* — Purchasers should exercise any desired options offered herein and should specify color, type, and size grade, and whether color and identity tests are required. Purchasers should specify method of identity test if other than recommended herein (see 4.4.7). (See 1.1, 1.2, 1.4, 4.4.8, 5.1, 5.2, 5.3, and 7.2.3.4.)

6.2.1 *Special tests of mica for capacitors and similar applications (see 6.1).* — In the case of natural mica to be employed for use in high-quality capacitors and similar electronic applications it may be desirable to require tests for Q value (reciprocal of power factor). In such cases the property limit and test method should be specified in the contract or order (see 6.2). The property limit and indirect or rapid, direct-reading test methods described in American Society for Testing Materials Test Method D 748-47 T (Tentative Specifications for Natural Block Mica and Films Suitable for Use in Fixed Mica-Dielectric Capacitors) are suggested for this purpose.

6.3 Federal specifications do not include all types, classes, grades, sizes, etc., of the commodities indicated by the titles of the specifications or which are commercially available, but are intended to cover the types, etc., which are suitable for Federal Government requirements.

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

**7. DEPARTMENTAL REQUIREMENTS**

7.1 The following specifications and standard, of the issues in effect on date of invitation for bids, and special requirements, form a part of this specification for purchases made under this specification by the respective departments:

**7.2 Army, Navy, and Air Force.**

7.2.1 *Applicable specifications and standard.*

*Federal Specifications:*

NN-B-591—Boxes; Fiberboard, Wood-Cleated (for Domestic Shipment).<sup>1</sup>

NN-B-601—Boxes; Wood-Cleated-Plywood, for Domestic Shipment.<sup>1</sup>

NN-B-621—Boxes; Wood, Nailed and Lock-Corner.<sup>1</sup>

NN-B-631—Boxes; Wood, Wirebound, (for Domestic Shipment).<sup>1</sup>

LLL-B-631—Boxes; Fiber, Corrugated (for Domestic Shipment).<sup>1</sup>

LLL-B-636—Boxes; Fiber, Solid (for Domestic Shipment).<sup>1</sup>



*Military Specifications:*

- JAN-P-105—Packaging and Packing for Overseas Shipment — Boxes, Wood, Cleated, Plywood.<sup>2</sup>
- JAN-P-106—Packaging and Packing for Overseas Shipment — Boxes, Wood, Nailed.<sup>2</sup>
- MIL-B-107—Boxes, Wood, Wirebound (Overseas Type).<sup>1</sup>
- JAN-P-108—Packaging and Packing for Overseas Shipment — Boxes, Fiberboard (V-Board and W-Board), Exterior and Interior.<sup>2</sup>
- JAN-P-125—Packaging and Packing for Overseas Shipment — Barrier-Materials, Waterproof, Flexible.<sup>1</sup>
- JAN-P-128—Packaging and Packing for Overseas Shipment — Tape; Water-Resistant, Gummed.<sup>3</sup>
- JAN-P-138—Packaging and Packing for Overseas Shipment — Boxes, Wood, Fiberboard-Lined.<sup>1</sup>
- JAN-P-140—Packaging and Packing for Overseas Shipment — Adhesives, Water-Resistant, Case-Liner.<sup>1</sup>

*Military Standard:*

- MIL-STD-129—Marking of Shipments.

*Navy Department Specification:*

- General Specifications for Inspection of Material.<sup>1</sup>

(Copies of specifications, standards, and drawings required by the contractor in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

**7.2.2 Army.****7.2.2.1 Packaging and packing for overseas shipment.**

<sup>1</sup> Applicable only to Navy purchases.

<sup>2</sup> Applicable only to Army and Navy purchases.

<sup>3</sup> Applicable only to Army purchases.

**7.2.2.1.1 Packaging.** — Unless otherwise specified in the contract or order, sheets of insulation of like description shall be packaged together in quantities of 5 pounds in snug-fitting fiberboard boxes conforming to Military Specification JAN-P-108, compliance symbol W6s or W6c. Suitable cushioning shall be provided to prevent movement within the boxes. The boxes shall be closed and sealed in conformance with the appendix to the box specification, and in addition, all joints and seams, including those occurring in the manufacture of the boxes, shall be covered with minimum 3-inch-wide gummed tape conforming to Military Specification JAN-P-128, extended over all corners and edges at least 3 inches.

**7.2.2.1.2 Packing.** — Unit packages of insulation of like description shall be packed together in quantities not to exceed 200 pounds gross weight, in snug-fitting nailed wood boxes conforming to Military Specification JAN-P-106, style 2, 2½, or 3, or wood-cleated plywood boxes conforming to Military Specification JAN-P-105, style A or B, for type 3 load. Suitable blocking and cushioning shall be provided to prevent movement within the boxes. The boxes shall be closed and strapped in conformance with the appendix to the applicable box specification.

**7.2.2.2 Marking.**

**7.2.2.2.1 Interior containers.**—Each package and box shall be marked or labeled to indicate the item and quantity contained therein.

**7.2.2.2.2 Shipping containers.**—In addition to any special marking required by the contract or order, each shipping container shall be marked in accordance with Military Standard MIL-STD-129.

**7.2.3 Navy.**

**7.2.3.1 Inspection procedures.**—For Naval purchases, the general inspection procedures

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shall be in accordance with Navy Department General Specifications for Inspection of Material.

**7.2.3.2 Packing.**

**7.2.3.2.1 For domestic shipment.**—Insulation, packaged as specified in 5.1, shall be packed in wood-cleated fiberboard boxes, wood-cleated plywood boxes, nailed wood boxes, wirebound wood boxes, corrugated fiber boxes, or solid fiber boxes conforming to the requirements of Federal Specifications NN-B-591, NN-B-601, NN-B-621, NN-B-631, LLL-B-631, and LLL-B-636, respectively. The gross weight of wood boxes shall not exceed approximately 200 pounds. The gross weight of fiberboard boxes shall be subject to the limitation of the box specification.

**7.2.3.2.2 For overseas shipment.**—Insulation, packaged as specified in 5.1, shall be packed in cleated plywood boxes, nailed wood boxes, wirebound wood boxes, fiberboard boxes, or fiberboard-lined wood boxes, conforming to the requirements of Military Specifications JAN-P-105, JAN-P-106, MIL-B-107, JAN-P-108, and JAN-P-138, respectively. The gross weight of wood boxes shall not exceed approximately 200

pounds; of fiberboard boxes, approximately 70 pounds.

**7.2.3.2.1 Contents** shall be enclosed within a sealed waterproof bag, or its equivalent, made from material conforming to the requirements of Military Specification JAN-P-125, for case-liner material. Seams and closures shall be sealed with adhesive conforming to the requirements of Military Specification JAN-P-140.

**7.2.3.3 Marking.** — In addition to any special marking required by the contract or order, shipping containers shall be marked in accordance with the requirements of Military Standard MIL-STD-129.

**7.2.3.4 Ordering data.**—Procurement documents should specify whether the subject commodity is to be packed and shipping containers marked for domestic or overseas shipment (see 7.2.3 and 7.2.4).

NAVY INTEREST: A O Sh S Y

**7.2.4 Air Force.**

**7.2.4.1 Marking.** — In addition to any special marking required by the contract or order, shipping containers shall be marked in accordance with the requirements of Military Standard MIL-STD-129.

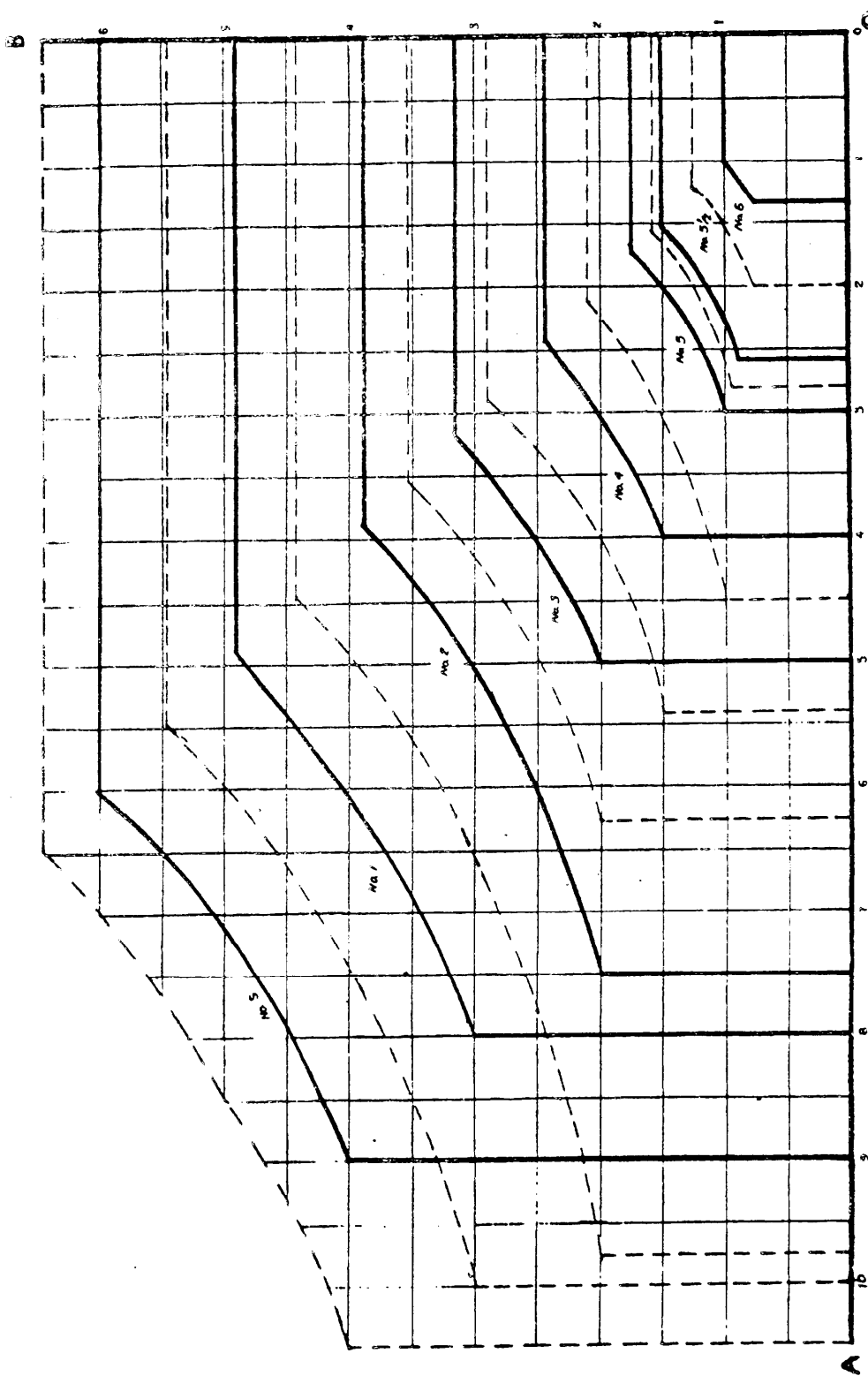


FIGURE 1.  
 STANDARD TEMPLATE FOR GRADING MICA, SIZES "S" AND SMALLER  
 NOT TO SCALE

Note 1. This template may be readily extended for larger sizes listed in table I.