Coded Note Number: LI117
Coded Note Revision: **C008**
Date: **February 11, 2015**
Title: Acceptable Products List (APL) Test Report Requirements for Solid Non-Metallic Materials

This revision is a total re-write from revision C007.

1. Purpose: To specify material testing and reporting requirements for Solid Non-Metallic (SNM) materials. It is the seller's responsibility to understand and comply with this Coded Note when it is specified as part of a Purchase Order (PO) issued by Newport News Shipbuilding (NNS). NNS has issued this Coded Note in order to assure compliance with applicable portions of MIL-STD-2041 Rev E, Notice 1 (2041).

2. General:

   A. Traceability from the Material Manufacturer, through subsequent sellers/distributors, to NNS must be maintained for material and documentation.

   B. Test Reports shall be submitted for each procurement and be readily identifiable to the NNS PO and Item number.

      1. The testing of the product must have been completed within the prior four years of material receipt by NNS.

      2. The manufacturer's material must be sufficiently identified by part number, model, and description to assure clear applicability of the associated Test Report.

      3. Analysis of a specific (manufacturer and compound/formulation) SNM is representative of all pieces/parts made of that compound regardless of geometry or dimensions.

      4. The Test Report shall be in the form of reports issued by the organization performing the analysis or exact copies thereof. Data transcribed to/from another organization's forms are not acceptable.

      5. Test Reports must be certified correct, contain a statement it is in accordance with this Coded Note (LI117 and the applicable coded note revision number), and be signed and dated by the seller's authorized representative.

   C. SNM products shall be quantitatively analyzed for total mercury; water leachable halides (bromides, chlorides, fluorides); and water leachable sulfur as identified below.

D. SNM materials shall be shipped in packaging/containers which protects from environmental precipitates and foreign material during shipment and storage.

E. If the manufacturer/vendor cannot meet the requirements of this Coded Note, NNS MUST be contacted prior to shipment of material in order to determine an alternative test plan.

F. Contact is to be made via email to NPMO@hii-nns.com , or by mail at:

Newport News Shipbuilding

4101 Washington Avenue

Newport News, VA 23607

Attn: E68 Software Coordinator

Bldg. 600-1

3. Test Methods/Processes:

A. Water Leaching Tests

1. Test Procedure. The water leaching test shall be performed as follows:
   a. Cut one specimen from the selected sample, weighing approximately 15 grams, and record its weight to 0.1 gram. When there is insufficient sample material available, the sample weight may be adjusted provided the ratio of sample weight to final volume of solution is maintained (i.e. 15 g/500 ml). When there is insufficient sample material to maintain the designated weight/volume ratio and perform the required analysis, a smaller ratio may be used provided the sensitivity of the analysis is sufficient to show that halide and sulfur levels are below required levels. Any adjustment of the weight/volume ratio shall be indicated in the analysis report along with the supplied material weight and volume.
   b. Cut the specimen into small pieces not greater than 1/4 inch in any dimension.
   c. Place the specimen in an appropriately sized beaker.
   d. Add approximately 400 ml of distilled water per 15 grams of sample weight to the beaker or approximately 80% of the final predetermined volume of leachate.
   e. Cover the beaker with a watch glass and heat for one hour minimum at 200 to 212 degrees F.
   f. Allow the beaker to cool to room temperature.
   g. Vacuum filter the leachate from the beaker separately through a prewashed filter (No. 41 Whatman or equivalent coarse porosity filter) and a Buchner funnel. Wash the beaker thoroughly with distilled water

using ten or more washes and vacuum filter the wash solutions. Dilute the filtrate to 500 ml, or the appropriate volume to maintain a 15 g/500 ml ratio or other predetermined volume. Any other equivalent filtration technique or decantation technique may be used as determined by the analyst.

h. If necessary, store the filtrate in a cleaned polyethylene or glass container covered to prevent evaporation.

i. Prepare a control filtrate with no specimen following the instructions in d through h.

2. Determination of leachable halide ion concentration. Using aliquots from the control filtrate and the sample filtrate, the concentration of bromide, chloride, and fluoride ions in each filtrate shall be determined by an appropriate method of ASTM D 1246, ASTM D 512, and ASTM D1179, respectively. The concentration of water-leachable halide in the material shall be determined as follows:

Bromide, Chloride, or Fluoride, micrograms per gram (ppm) = C X Vs/M
Where:
C = concentration of bromide, chloride, or fluoride in filtrate, in milligrams per liter (micrograms per milliliter), and
Vs = final volume of solution in milliliters per 3.A.1.g
M = grams of the test specimen, prepared per 3.A.1.a

Acceptance criteria: The concentration of each leachable halide shall not exceed 250 ppm, maximum.

B. Determination of leachable sulfur concentration

When using an analytical test method that only detects sulfur in sulfate form, the leachable sulfur concentration shall be determined in accordance with the following. Using aliquots from the control filtrate and the sample filtrate in 3.A.1.g, determine the concentration of sulfur as follows:

a. Place 25 ml of the filtrate in a 50 ml or larger clean beaker properly identified.

b. Add distilled water saturated with bromine drop by drop while stirring until a red-brown color persists. Then cover the beaker with a watch glass.

c. Heat the solution in the covered beaker on a hot plate until the bromine color disappears.

d. Allow the solution to cool to room temperature.

e. Transfer the solution to a volumetric flask and add distilled water rinses from the beaker to make up a final volume that is consistent with the sulfate test method. Determine the sulfate ion concentration of this final diluted volume using an appropriate method of ASTM D 516 or ion chromatography in accordance with ASTM D 4327.

f. Use the following formula to obtain the water-leachable sulfur concentration of the filtrate:

Sulfur, micrograms per grams (ppm) C x Vs x V x 0.334/ (25.0 x M)
Where:
C = concentration of sulfate ion in filtrate, in milligrams per liter (micrograms per milliliter), determined in step 3.B.e.
Vs = final volume of solution in milliliters per 3.A.1.g
V = milliliters of final diluted volume, and
M = grams of the test specimen, prepared per 3.A.1.a

Acceptance criteria. The concentration of leached sulfur and sulfur compounds in the specimen shall not exceed 250 ppm, maximum.

C. Mercury
Mercury is to be tested as a Total analysis. Testing is to be performed in accordance with Standard Lab Test Methods. The total allowable is 10 ppm, maximum.

D. Acceptable alternate test methods.
Ion chromatography analysis in accordance with ASTM D 4327 and inductively coupled plasma (ICP) analysis are acceptable alternates for the ASTM leachate analyses specified herein. Other methods may be used when approved by NNS.

4. Exceptions

A. Rubber gloves may be leach tested at 150 degrees F minimum vice 200 degrees F minimum.
B. Water-leachable chloride limits of 500 ppm apply for rubber gloves, in lieu of 250 ppm.
C. If tested rubber gloves are rinsed with water prior to testing, then all gloves furnished must be rinsed in a similar manner prior to shipment.
D. Solid nonmetallic materials may be analyzed for the total levels of halogens (bromide, chloride, fluoride) or sulfur instead of water leachable levels. The acceptance criteria for total halogens and sulfur are 250 ppm, maximum, each.
E. Water-leachable chloride and sulfur limits of 500 ppm each apply for tape, in lieu of 250 ppm each.
F. Solid nonmetallic material manufacturers may certify that mercury and mercury compounds have not been added to the solid nonmetallic material and have not come in contact with the solid nonmetallic material during processing in lieu of performing a chemical analysis. This allowance requires the following:
Contact of mercury and mercury compounds with hardware final surfaces shall be prohibited. Possible sources of mercury include (but are not limited to):
    1. Instrumentation such as thermometers and manometers.
    2. Mercury vapor and fluorescent light fixtures
    3. No-bounce hammers.
    4. Electronic levels.
    5. Electrical switches and relays.
    6. Metal halide lamps.

7. Backlight assemblies in electronic devices that use liquid crystal displays.
8. Mercury-containing batteries.
9. Light sources. Each light source, where hardware may be present that contains mercury and that is located less than twenty feet above the shop floor or less than two feet above the top surface of hardware, shall employ a secondary boundary of protection or containment. Each portable or handheld light source that contains mercury shall be shock resistant and employ a secondary boundary of containment regardless of location. Commonly installed glass or plastic shields are considered to be acceptable protection for permanent light fixtures.