MIL-P-23625 (OS)
Amendment 2
14 March 1973
SUPERSEDING
Amendment 1
17 February 1967

MILITARY SPECIFICATION

PBXN-4 EXPLOSIVE

This amendment forms a part of MIL-P-23625(Wep) of 27 March 1963 and has been approved by the Naval Ordnance Systems Command, Department of the Navy.

By this amendment basic specification MIL-P-23625 (Wep) PBXN-4 Explosive is changed to read MIL-P-23625 (OS) PBXN-4 Explosive. The basic specification has been declassified by authority in NAVORDINST 5511.4A dated 29 December 1972.

Page 1

* Delete " FSC 1375" and substitute " FSC 1376."

Page 2

* 3.3.1.2, delete first sentence and substitute: "The melting point shall be not less than 283° C."

Page 3

* 3.3.1.3, line 2: Delete "0.16" and substitute "0.20."

* 3.3.3.1, line 3: Add to end of sentence "or 4.5.1.2."

* 3.3.3.4, line 2: Delete "0.30"and substitute "0.55."

Page 4

4.2.1, line 10: Delete "1000" and substitute "1500" and add new sentence "Blending of heels of less than 50 pounds from accepted batches shall be identified as composite lots."

Page 5

4.3, line 3: Delete "specifications" and substitute "specification."

*4.3, line 4: Add "(For alternate apparatus see figure 4.)"

Page 6

Add:

* "4.5.1.2 Alternate purity test. An acceptable alternate method for determining the composition of PBXN-4 by extraction is as follows:

* "4.5.1.2.1 Equipment.

Fritted crucibles, medium porosity
Beaker, 100-ml tall form (Berzelius)
Balance, analytical
Oven 105° ± 5° C
Desiccator
Vacuum filter flask (500 ml) with adapter
Hose connection (rubber)
Vacuum source
Cover glasses
Dimethylsulfoxide (DMS) (technical grade)
Glass stirring rods (2-1/2 inches × 3 mm in diameter with one end flattened).

* "4.5.1.2.2 Procedure.

(a) Weigh a 0.5- to 1.0-gram ± 0.1-mg sample into a tared clean dry crucible. Place crucible and contents into a 100-ml (Berzelius) tall form beaker containing 15 ml DMS.

(b) Transfer approximately 10 ml of dimethylsulfoxide into the crucible containing the sample.

(c) Let stand approximately 10 minutes to soften "N."

(d) Crush the pellets with glass stirring rod for 30 seconds. Let stand for an additional 20 minutes.

(e) Remove crucible and contents from beaker and place the crucible with contents into the adapter on the vacuum filter flask. Turn on vacuum and filter; transfer the DMS in the beaker into the crucible and filter.

(f) After all solvent has filtered through, remove crucible from vacuum filter flask and again place crucible with contents in the beaker containing 15 ml of fresh DMS; transfer 10 ml of DMS into the crucible.

(g) Repeat steps (b) through (f) until the DMS, added to residue in crucible, is clear and colorless after step (d) (correction factor "X" to be figured if the number of times steps (b) through (f) are repeated, exceed six).

(h) Place crucible and content into adapter of vacuum filter flask. Turn on vacuum and filter.

(i) Disconnect rubber vacuum tubing from vacuum flask. Add approximately 15 ml of acetone to the sample in crucible. Stir for 30 seconds and reattach rubber vacuum tubing to vacuum flask and filter.

(j) Repeat step (i) six times.

(k) After the sixth extraction, let vacuum remain on until no odor of acetone is evident in crucible.

(l) Remove crucible and contents from vacuum filter flask and place in oven at 105° ± 5° C for 1 hour.

(m) Remove crucible and contents from oven and place in desiccator to cool for 15 to 20 minutes.

(n) When cool, weigh crucible and contents to nearest 0.1 mg.

* "4.5.1.2.3 Calculation.

$$X(N) = \frac{(C - A)100}{B - A}$$

where:

A = weight of empty crucible
B = weight of sample plus crucible
C = weight of crucible plus weight of extracted sample
N = percent nylon
X = correction factor 1.0226.

(Average recovery for "N" = 97.79% with a 3-sigma variation of 0.98 percent using the amount of DMS specified. Should this amount of DMS be increased, a new correction factor would have to be established.)

NOTE: When the 3-sigma variations of this analysis is applied to the nylon percentage, this makes reproducibility of this analysis procedure equal to 0.06 percent."

Page 6

4.5.2, line 3: Delete all reference to NOL standard sample.

Page 7

* Line 1: Delete "4.5.3 Vacuum stability test." and substitute "4.5.3 Vacuum stability test. Vacuum stability shall be determined by either the method outlined in 4.5.3.1 through 4.5.3.4 or by the alternate method of 4.5.3.5."

Page 10

* 4.5.3.4, after line 11, add:

* "4.5.3.5 Alternate vacuum stability test.

* "4.5.3.5.1 Constant-temperature apparatus. Aluminum heating block containing appropriate-size holes to receive the test tubes of the thermal stability apparatus. This block is electrically heated and thermostatically controlled to maintain a temperature of 200° C ± 1.0° C.

* "4.5.3.5.2 Thermal-stability apparatus. Use a thermal-stability apparatus similar to the one shown in figure 4.

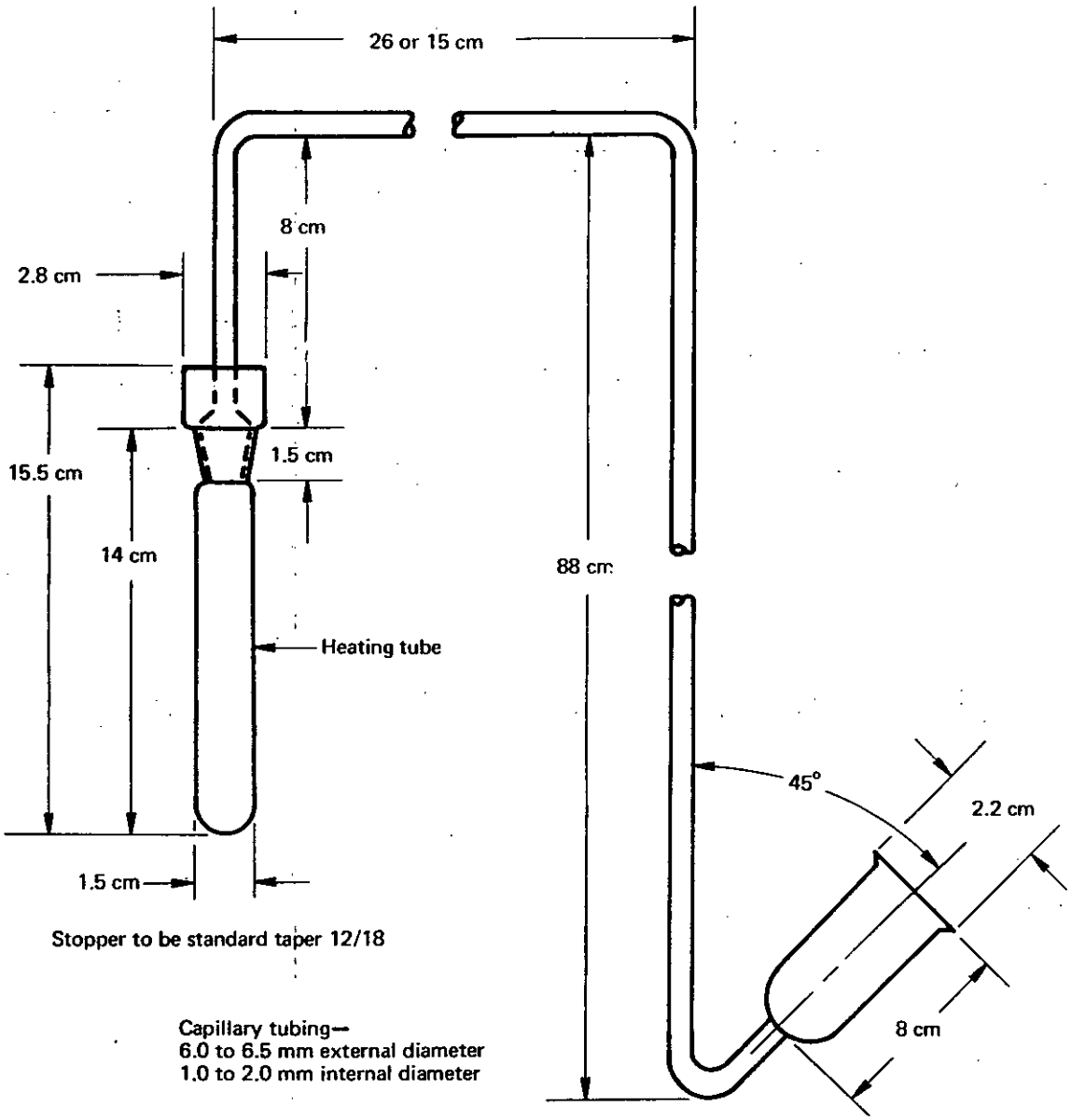
NOTE: The apparatus must be thoroughly cleaned to remove any decomposition products from previous tests and then dried. Heating tubes and the balance of the apparatus should be marked in pairs so as to ensure that matched parts will always be used together.

* "4.5.3.5.3 Calibration.

(a) Calibrate the volume of the heating tube by filling the tube with mercury until the top of the mercury meniscus reaches the height at which the end of the male ground-glass joint protrudes into the tube. Weigh the mercury; then divide the weight by 13.6 to obtain the volume of the heating tube (in milliliters) used in the test.

(b) Invert the tubular apparatus and rest it on a level surface so that the male part of the ground-glass joint points upward.

(c) Add mercury through the male ground-glass joint until the ground-glass joint is filled with mercury. Note the height of the mercury column on the leg opposite the ground-glass joint. Mark this point "A." The mercury column must be in a continuous, unbroken thread. Weigh the mercury; then divide the weight by 13.6 to give the volume (in milliliters) of the capillary section down to point "A."



* FIGURE 4. ALTERNATE VACUUM THERMAL STABILITY APPARATUS

(d) Determine the average volume in milliliters per millimeter of the capillary tube in the following manner. With the tubular apparatus in its normal upright position, add approximately 8 grams of mercury (weighed to the nearest 0.001 gram) to the reservoir on the end of the capillary tubing. Holding the tubular apparatus, manipulate the apparatus until the mercury lies in a continuous unbroken thread in the capillary tube. The thread should begin near point "A" and extend along the capillary tube toward the reservoir. Measure the length of the mercury thread to the nearest millimeter. Repeat this procedure three more times. To obtain an average volume, V_i, divide the weight of mercury used by 13.6 times the average length of the thread.

(e) With the capillary tube in the orientation it will have during the test and with 5 ml of mercury in the reservoir and lower bend of the tube, mark point "B" at the top of the mercury level in the tube and the reservoir.

(f) With the apparatus in the normal upright position, carefully measure the constant, "Q," by measuring the vertical distance (in millimeters) from point "A" down along the capillary tube to a point level with point "B" on the reservoir.

NOTE: It is convenient to have a downward-extending scale (calibrated in millimeters) attached to the capillary tube with its zero point coinciding with point "A."

* "4.5.3.5.4 Test procedure. Determine thermal stability of the sample at 200° ± 1.0° C under vacuum as follows:

(a) Place approximately 1 gram of sample, dried according to 4.5.3.5 and weighed to the nearest milligram, into the clean and dried heating tube (see figure 4). After applying a thin film of high temperature stop cock grease to the ground-glass surfaces, assemble the apparatus as shown in figure 4. With the apparatus in an upright position, add approximately 5 ml of mercury to the reservoir. CAUTION: Because of the weight of mercury and the fragility of the apparatus, it is desirable to provide a support under the reservoir. By means of a tube extending through a stopper, attach a vacuum pump to the reservoir. Tilt the apparatus so that all of the mercury is held in the reservoir and thus does not obstruct the capillary passage. Evacuate the assembly to 1 mm or less, tilt the apparatus upright again, and carefully remove the vacuum source. With the aid of an eyedropper, adjust the height of the mercury in the reservoir until it is just level with point "B."

NOTE: Care should be taken in handling the assembled apparatus that air does not leak in through the ground-glass joint.

(b) Using the scale mentioned above, take a reading of the distance, d, in millimeters from point "A" to the top of the mercury column in the capillary. Add the distance, d, to the current barometric pressure (expressed in millimeters); then subtract the quantity, Q, (as determined above). If this distance is 1 mm or less, continue with the test; if it is greater than 1 mm, reevacuate the apparatus as above, and retest until a difference of 1 mm or less is obtained.

NOTE: A reading in excess of 1 mm may be due to leaks, insufficient evacuation time, or an inefficient vacuum pump.

(c) To test the sample and to liberate any decomposition products, place the heating tube of the assembled apparatus in the constant-temperature apparatus. At the end of 30 minutes, read the distance, d, then read the current room temperature in °C to the nearest degree and the current barometric pressure to the nearest millimeter. This constitutes the start of the test, or 0 hour. Using the formula below, calculate the volume of gas (at 0° C and 760 mm Hg) per gram of sample enclosed in the apparatus at 0 hour.

$$\text{Volume of gas} = \frac{0.359}{W}(P + d - Q)\left[\frac{V_t - V_s}{273 + t_b} + \frac{V_c + d\bar{v}_i}{273 + t_r}\right]$$

where

W = weight of sample taken, grams

P = current barometric pressure, millimeters

d = distance from point "A" to top of mercury column in the capillary, millimeters

Q = a constant, being the vertical distance from point "A" down along the capillary tube to a point level with point "B" on the reservoir, millimeters

V_t = volume of heating tube (as determined in 4.5.3.5.3 above), milliliters

V_s = volume of sample $\frac{W}{\text{density}}$, milliliters; density shall be as measured in 3.3.3.2

V_c = volume of capillary section down to point "A" (as determined in 4.5.3.5.3 above), milliliters

V_i = average volume per unit length of the capillary tubing in the region below point "A," in milliliters/millimeter

t_r = current room temperature, °C

t_b = block temperature, °C.

(d) Continue the heating for 24 hours after 0 hour.

Next, take a final reading of the distance, d. Also, take a new reading of the current room temperature in °C to the nearest degree and the current barometric pressure to the nearest millimeter. Using these new values in the above equation, calculate the volume of gas per gram of sample in the apparatus at the end of the 24-hour test. From this value, subtract the volume of gas found in the apparatus at 0 hour to give the net volume of gas evolved per gram of sample during the 24-hour test period.

This test shall be performed on one specimen from each of the DATB samples specified in 4.2.2.1. The volume of gas evolved per gram of specimen shall meet the requirements of 3.3.1.3."

Page 13

4.5.5.1, delete and substitute:

"4.5.5.1 Procedure. The pressability test shall be performed on a 5- to 6-gram test specimen from each of the samples specified in 4.2.2.2. The mold and test specimen shall be preheated and allowed to reach equilibrium at 120° + 5° C, - 0° C. The mold plug is lowered to the surface of the sample in the mold, and the mold is evacuated to 10 mm of mercury (Hg) pressure. Full ram pressure of 20,000 to 25,000 psi is then applied and allowed to dwell for 15 to 30 minutes before ejection. A thin coat of fast drying varnish, not exceeding 5 mils shall be applied and allowed to dry. Density of the compressed test specimen shall be determined by the submersion method of ASTM Method B-311-58. Pressability of the test specimen to a pellet of PBXN-4 of the required density shall conform to the requirements of 3.3.3.2."

4.5.6, delete and substitute:

"4.5.6 Moisture content. The moisture content shall be determined on a 5- ± 0.5-gram specimen from each 50-gram sample specified in 4.2.2.2. The test specimen shall be weighed in a tared porcelain crucible and heated in an oven at 150° F until constant weight is obtained. When constant weight is obtained, the crucible and test specimen shall be placed in a desiccator until cool and reweighed. The loss in weight shall be considered the moisture content of the test specimen and shall be in accordance with requirements of 3.3.3.3."

Page 14

*5.1.1.1, line 4: Add sentence "A plastic bag is acceptable for the inner container provided it is made of a conductive plastic material and has been found to be compatible with PBXN-4."

*6.2, delete entire paragraph and substitute:

"6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number, and date of this specification.

(b) Exceptions to this specification, applicable drawings, and other documents.

(c) That the safety precaution requirements of the Contractor's Safety Manual for Ammunition, Explosives and Related Dangerous Material, DOD 4145.26M, are applicable. NOTE: When this specification is used as a part of the description of work to be accomplished by a Government activity, the safety precaution requirements of Ammunition Ashore, OP 5, should be made applicable."

Pages 14 and 15

* Delete paragraph 6.3 and subparagraphs 6.3.1 through 6.3.5.8.

Page 15

*Add:

"6.5 The margins of this amendment are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue."

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