NOTICE OF CHANGE

INCH-POUND

MIL-STD-286C
NOTICE 1
8 January 1994

MILITARY STANDARD
PROPELLANTS, SOLID: SAMPLING, EXAMINATION AND TESTING

TO ALL HOLDERS OF MIL-STD-286C

1. The following pages of MIL-STD-286C have been revised and supersede the pages listed:

New Page	Date	Superseded Page	Date
IX	8 January 1994	IX	28 August 1991
XV	8 January 1994	XV	28 August 1991

2. The following methods have been revised and supersede the methods listed:

Revised Method	Pages	Date	Superseded Method	Superseded Page	Date
406.1.3	1-4	8 January 1994	406.1.2	1-4	28 August 1991

3. Retain this notice and insert before the table of contents.

4. Holders of MIL-STD-286C will verify that page changes and additions indicated above have been entered and will destroy the previous notice (notice page only). The latest notice (notice page) will be retained as a check sheet. This issuance, together with appended pages, is a separate publication. Each notice is to be retained by stocking point until the Military Standard is completely revised or canceled.

Custodian:
Army-AR
Navy-OS
Air Force-70

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(Project 1376-0488)

AMSC N/A

FSC 1376

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ALPHABETICAL INDEX OF TEST METHODS (Cont'd)

NUMERICAL INDEX OF TEST METHODS (Cont'd)

STABILITY TESTS

GROUP 400

METHOD NO.	TITLE
403.1.3	Vacuun Stability Tests (90 and 100° C)
404.1.2	Heat Tests (120 and 134.5° C)
406.1.3	Taliani Test
407.1	Surveillance Test (65.5° C)
408.1.1	Reactivity Test (90 and 100° C)
409.1.1	Nitrogen Oxide Evolution Profile (NEP)

1.0 SCOPE

1.1 This method is used for determing the stability of propellants by subjecting them to a specified temperature and atmosphere. Unless otherwise specified, a temperature of 110°C and a nitrogen atmosphere should be used.

2.0 SPECIMEN

2.1 The specimen shall consist of 1.000±0.001 g of the propellant, which has been dried previously for 16 hours in a desiccator containing an indicating desiccant (duplicate specimens shall be processed for each test).

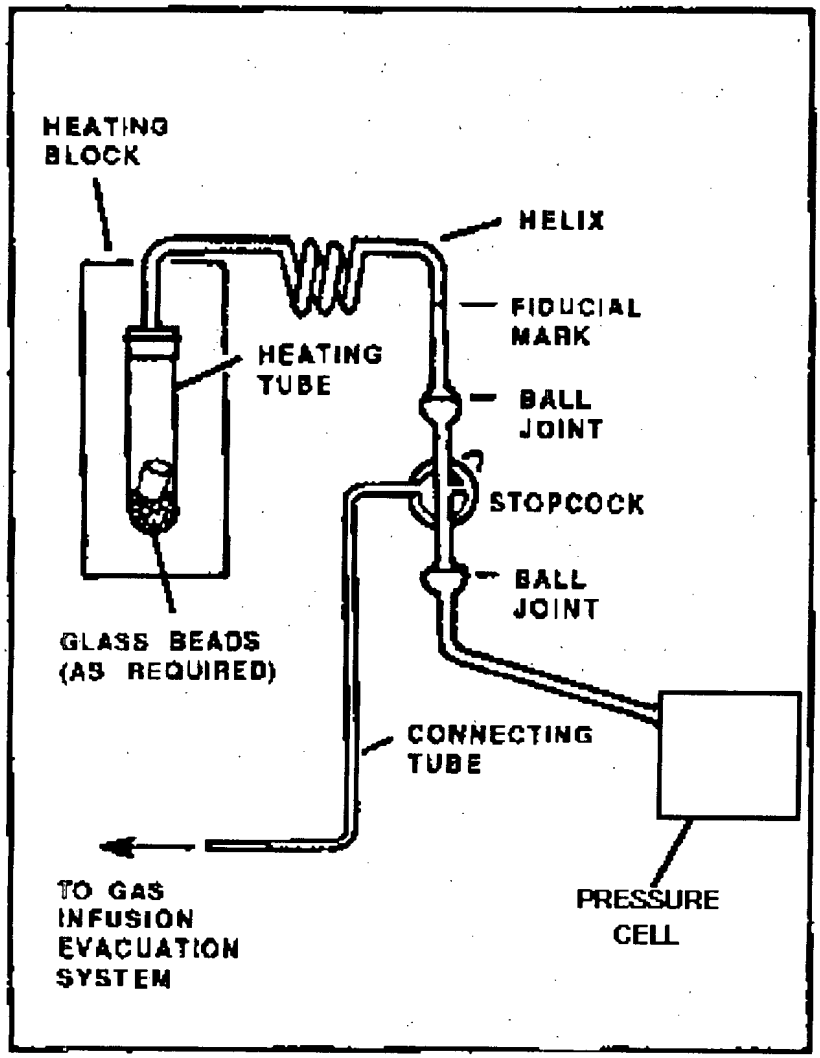

Figure 1. Taliani test apparatus.

3. APPARATUS

3.1 Taliani test apparatus (figure 1), consisting of the following:

a. Heating block, maintained at required temperature to within + 0.1°C.

b. Helix, consisting of a coiled 2mm capillary having a volume of approximately 0.75 ml.

c. Connecting tube, containing a three way stopcock.

d. Gas infusion-evacuating system, consisting of a vacuum pump with a modulating control, and a gas supply with a flow control (pressure gage, needle valve, and bubble counter containing dibutylphthalate). Connect the vacuum line and gas supply to the connecting tube (item C) by a two way stopcock.

e. Pressure Cell

f. Heating tubes, 6 ml.

4. PROCEDURE

4.1 Set up the apparatus as shown in figure 1. Apply a thin coating of silicone stopcock grease for all glass to glass joints twist to assure good seal.

4.2 Standardize the apparatus as follows:

a. Adjust the total volume of the heating tube and the helix (up to the fiducial mark) to exactly 6 ml by placing an appropriate number of 6mm glass beads into the heating tube.

b. Reconnect the helix to the apparatus.

NOTE: The average volume of the beads in a lot can be calculated by placing 100 beads (ten at a time) in a buret partially filled with softened water, noting the water displacement, and dividing by 100. Also check the uniformity of the lot by noting the displacement of each ten beads.

c. Check condition of the pressure cell prior to purging and calibration to insure that the cell has sufficient silicone oil and that no foreign substances are present.

d. Install Taliani reaction tubes into their selected cavities and secure all connections with clamps.

NOTE: The regular taliani test tubes must be installed using cavities 1 and 2, 3 and 4, or 5 and 6 to satisfy the requirements of the computer program. Modifieds must be installed blank, sample, blank, sample in cavities 1-4 or 3-6.

NOTE: Three modified samples can be run if put into the taliani blocks in the following order: Sample 1: Block 2, cavities 1-4; Sample 2: Block 2, cavities 5 and 6 and Block 3 cavities 1 and 2; Sample 3: Block 3, cavities 3-6.

e. Turn the stopcock on each test cell to 12 o'clock and attach the purge/calibration hoses to the stopcocks.

f. Make sure the digital pressure gage is turned off and the nitrogen supply (on the east wall) is turned on.

g. Turn the selector switch to "VACUUM", hold for at least 15 to 20 seconds. Turn the selector switch to purge, hold for at least 15 seconds. Then repeat this procedure 3-5 times.

4.3 Test Cell Calibration

After a 15 minute conditioning period, attach the rubber hoses to the stopcocks to be calibrated first. For modified tests do the lower numbered cavities first. Turn the stopcock to 3 O'clock. Set the "selector" switch to "calibrate". Set the "calibrator" switch to "vent" or zero. The computer will instruct you to apply zero (vent) and then 250 mm of pressure to each cavity. wait 15 seconds before confirming the zero or 250 mm of pressure. Follow the screen prompt carefully and 1f there is an error, try to calibrate the cavity again. Repeat for all cavities.

NOTE: The cells may be calibrated in the 6 o'clock position without compromising the test.

Note: 250 mm Hg is equivalent to 4.83 psi; 500 mm Hg is equivalent to 9.67 psi.

4.4 Prepare the propellant specimen by grinding or rasping to a 10 to 40 mesh.

4.5 Transfer duplicate specimens to the heating tubes, connect the tube to the helix, and heat it in the heating block.

4.6 Adjust the three way stopcock in the connecting tube so that the helix and heating tube connected to the gas infusion evacuation apparatus.

NOTE: The gas in the system should be at approximately atmospheric pressure.

4.8 Allow the tube and helix to remain sealed for 15 minutes, while continuing the heating.

4.9 At the end of 15 minutes, release the pressure from the helix by opening the stopcock, and quickly closing it again.

4.10 Average the readings for the two specimens.

4.11 Prepare a graph, H required, on a linear graph paper with time in minutes on the abscissa and the average pressure on the ordinate.

4.12 Report the desired data or report the slope at 100 mm and at 100 minutes, and the time to 100 mm.

5. CALCULATE AND REPORTING

5.1 Average the reading where duplicate samples are used.

5.2 Plot a graph of time in minutes versus pressure in mm and draw the best straight line or two lines, if necessary, through the points. If the plotted graph is curved, the slope is computed from the best straight line drawn tangent to the curve.

OR

Select a point above and below positions where slope is desired and geometrically calculate slope of line joining the two point.

$$\text{SLOPE} = \frac{\text{Different in pressure from lower to upper point in mm}}{\text{Different in time from lower to upper point in minutes}}$$

Geometrically determine the time to 100mm pressure based on the slope at the pressure.

5.3 Report the following data:

1. Time in minutes to reach 100-mm pressure.

2. Slope of line at 100-mm pressure.

3. Slope of line at 100 minutes.

5.4 Figures, 1, 2, and 3 are examples of typical stability curves.