

INCH-POUND

MIL-PRF-2940D

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SUPERSEDING

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PERFORMANCE SPECIFICATION

SNUBBERS, FLUID PRESSURE, INSTRUMENT PROTECTION

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. A snubber covered by this specification is a pressure transmission device which restricts the rate of fluid flow to a pressure sensing instrument and, as a result, the rate of pressure change.

1.2 Classification. Snubbers covered by this specification are classified according to the following characteristics, as specified (see 6.2).

EXAMPLE:

M2940	-	<u>1</u>	-	<u>L</u>	-	<u>A</u>	-	<u>P</u>	-	<u>G</u>
		Type		Class		Composition		End		Cleanliness
		(see		(see		(see 1.2.3)		connection		(see 1.2.5)
		1.2.1)		1.2.2)				(see 1.2.4)		

1.2.1 Types. The type of service in which the snubber will be used will be designated by one of the following numbers and should be selected based on the expected fluid at the snubber location:

<u>Type</u>	<u>Service</u>
1	Oils, hydraulic fluid above 20 centistokes (cSt). Oil above 225 Saybolt seconds universal (SSU) at operating temperatures.
2	Fresh water, steam, gasoline, light oils below 20 cSt.
3	Gases.
4	Seawater.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, SEA 03Q, Naval Sea Systems Command, 2531 Jefferson Davis Hwy, Arlington, VA 22242-5160 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 6685

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1.2.2 Class. The range of operating pressures is designated by the following letters:

<u>Class</u>	<u>Operating range limit</u>
L	10 to 1000 pounds per square inch gauge (psi).
H	1001 to 6000 psi.

1.2.3 Composition. The material composition of the snubber (see 3.2) is designated by one of the following letters:

<u>Composition</u>	<u>Material</u>
A	Copper nickel alloy
B	Nickel-copper (monel) alloy
C	Corrosion resisting steel
X	Other

1.2.4 End connection. The configuration for the snubber's end connection is designated by one of the following letters (see 3.3.2):

<u>End connection</u>	<u>Application</u>
P	Pressure gauge general applications (see 3.3.2.1.1).
F	Pressure gauge flareless (bite type) applications (see 3.3.2.1.2).
T	Pressure transducer general applications (see 3.3.2.2).
S	Other applications (see 6.2). The end connections must be specified in the contract ordering data.

1.2.5 Cleanliness. The level of cleanliness of the snubber is designated by one of the following letters:

<u>Cleanliness</u>	<u>Application</u>
G	General applications.
X	Oxygen and dry nitrogen applications.
Z	Special cleaning (see 6.2).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

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SPECIFICATIONS

DEPARTMENT OF DEFENSE

- MIL-S-901 - Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements for.
- MIL-PRF-17331 - Lubricating Oil, Steam Turbine and Gear, Moderate Service.
- MIL-F-18866 - Fittings, Hydraulic Tube, Flared, 37 Degree and Flareless, Steel.

STANDARDS

DEPARTMENT OF DEFENSE

- MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
- MIL-STD-1330 - Cleaning and Testing of Shipboard Oxygen, Nitrogen and Hydrogen Gas Piping Systems.
- MS16142 - Boss, Gasket Seal Straight Thread Tube Fitting, Standard Dimensions for.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publication.

- ASTM E 527 - Practice for Numbering Metals and Alloys (UNS).
- SAE J 1086 - Numbering Metals and Alloys.

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspections in accordance with 4.2.

3.2 Material. Material for wetted parts shall be selected for long term compatibility with the service fluid (see 1.2.1) and the environment in which they operate. Material for wetted parts shall be equal to or superior in corrosion resistance to that used in the body except that corrosion resistant steel is prohibited for type 4 (seawater) snubbers and for oxygen service. When copper-nickel, nickel-copper, or corrosion resistant steel alloys are used, they shall be identified as listed below. All other materials shall be identified as composition "X".

- Composition A - Copper-nickel alloys (C70600 and C71500).
- Composition B - Nickel-copper (monel) (55-70 percent nickel).
- Composition C - Corrosion resistant steel (S30400, S30403, S31600, S31603, S32100, and S34700).
- Composition X - Material, other than above.

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The material used in the body of the snubber shall be included in the marking (see 3.3.4) using the Unified Numbering System (UNS) designation in accordance with SAE J 1086, and ASTM E 527.

3.2.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements and promotes economically advantageous life cycle costs.

3.2.2 Nonmetallic materials. Nonmetals shall be moisture and flame resistant, shall not support fungus, insect, or bacteria growth, and shall not be adversely affected by the ambient environments specified in the configuration and performance requirements of this specification. Nonmetals shall not chemically react, degrade, or outgas when subjected to the following: air, distilled water, seawater, salt, petroleum and silicone based oils, oil solvents, prolonged (greater than one month) periods of exposure to ambient temperatures, prolonged periods of exposure to elevated temperatures (up to 350 degrees Fahrenheit (°F)), and exposure to prolonged cycling periods from ambient to elevated temperatures. Any material which provides a nutrient medium for fungus and insects shall not be used.

3.2. Porous metal. Snubbers with a porous metal composition (internal parts and configuration) are prohibited for gas (type 3) and for seawater (type 4) service (see 1.2.1). When used for oil or water (type 1 or 2) service, snubbers with porous metal compositions shall only be employed in systems with particulate contaminants less than 25 micrometers in size.

3.3 Configuration. Snubbers shall contain no electrical or electronic components.

3.3.1 Snubber body size. The length of the assembled snubber body shall be not greater than 4 inches. The body shall have hexagonal cross-sections of sufficient widths to allow the use of a wrench for installing and removing. The distance across the flats shall be not less than 0.375 inch nor greater than 1.25 inches. The maximum diameter of the snubber body shall be not greater than 2.0 inches.

3.3.2 End connections.

3.3.2.1 General pressure gauge applications. Snubbers used in pressure gauge applications shall be as follows.

3.3.2.1.1 O-ring union connection. Snubbers used for O-ring union pressure gauge application shall have 9/16-18 UNF-3A external threads on the inlet connection and 9/16-18 UNF-3B internal threads on the outlet connection in accordance with Drawing 803-1385850. When specified (see 6.2), each snubber shall be furnished with a union nut, tailpiece, and O-ring.

3.3.2.1.2 Flareless (bite type) connection. Snubbers used for flareless (bite type) pressure gauge applications shall have 7/16-20 UNF-2A external threads on the inlet connection and 7/16-20 UNF-2B internal threads on the outlet connection in accordance with MIL-F-18866, 6000 psi for 1/4-inch tubing.

3.3.2.2 General pressure transducer applications. Snubbers used for pressure transducer applications shall have a 7/16-20 UNF flareless tube connection (1/4 inch outside diameter (od)) in accordance with MIL-F-18866 on the inlet connection. The outlet connection shall be 7/16-20 UNF-2A external

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thread to mate with the MS16142 female connection port of the pressure transducer. An O-ring shall be supplied on the outlet connection.

3.3.3 Cleaning. The snubber body and all parts that come into contact with the service fluid shall be free of all loose scale, rust, grit, fillings, and free of mercury, calibration liquids, oil, grease, solvents, and other organic materials. Type 3 snubbers for oxygen or nitrogen service shall be cleaned in accordance with MIL-STD-1330.

3.3.4 Marking. Each snubber shall be metal stamped or otherwise permanently marked with the maximum working pressure, classification (see 1.2) and manufacturer's stamp or trademark. The material composition shall be included in the marking identified by the UNS (see 3.2). The maximum working pressure shall be followed by the abbreviation "psi." (For example: 6000 psi M2940-1HBPG *. *manufacturer's stamp or trademark and UNS, as applicable.)

3.3.4.1 Flow direction. The direction of flow through the snubber shall be indicated by an arrow with the word "gauge" at the point of the arrow. The arrow shall be raised from the surface or etched into the surface in a permanent manner and to the extent that it can be easily identified by human touch. The word "gauge" shall be metal stamped or otherwise permanently marked.

3.3.4.2 Type 3 snubbers shall have a warning label included on its primary pack marked "oxygen" or "nitrogen" service, as applicable for the system use when cleaned for these services.

3.4 Performance.

3.4.1 Steady state transmission. The difference in indicated output with and without the snubber under test shall be within the accuracy limits of the pressure transducer or pressure gauge employed when tested as specified in 4.6.1.

3.4.2 Dampening. The pressure as indicated by the test pressure transducer shall satisfy both the following criteria when tested as specified in 4.6.2:

- (a) Indicate a pressure of 25 percent or less of the final steady state pressure at a time equal to that at which the monitoring pressure transducer initially reaches its step pressure level.
- (b) Reach at least 90 percent of its final steady state pressure in not more than 2.5 seconds after initiation of the pressure step as indicated by the monitoring transducer.

3.4.3 Temperature. The snubber under test shall show no evidence of leakage or damage as a result of the temperature test specified in 4.6.3. The snubber under test shall meet the dampening requirement of 3.4.2 after the high temperature, low temperature, and temperature cycling portions of 4.6.3.

3.4.4 Vibration. The snubber under test shall show no indication of leakage or damage as a result of the vibration testing specified in 4.6.4. Upon completion of the vibration test, the snubber shall meet the dampening requirement of 3.4.2.

3.4.5 Shock. The snubber under test shall show no indication of leakage or damage as a result of the shock testing specified in 4.6.5. Upon completion of the shock test, the snubber under test shall meet the dampening requirement as specified in 3.4.2.

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3.4.6 Pressure integrity. The snubber under test shall withstand the pressure specified in 4.6.6 without showing any evidence of leakage or damage. Upon completion of the pressure integrity test, the snubber under test shall meet the dampening requirement of 3.4.2.

3.5 Cleaning and surface finishes. Surfaces of castings, forgings, molded parts, stampings, machined, and welded parts shall be free of defects such as cracks, porosity, undercuts, voids, and gaps as well as sand, dirt, fins, sharp edges, scale, flux, and other harmful or extraneous materials. External surfaces shall be smooth and edges shall be either rounded or beveled. There shall be no burn-through. There shall be no warpage or dimensional change due to heat from welding operations. There shall be no damage to adjacent parts resulting from the welding.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- (a) First article inspection (see 4.2).
- (b) Conformance inspection (see 4.3).

4.2 First article inspection. First article inspection shall be performed and passed prior to production and shall be witnessed by a Government inspector. First article inspection shall be performed on samples which have been produced with equipment and procedures normally used in production. First article inspection shall consist of the examination and tests specified in table I and in the sequence listed.

4.2.1 Sample size. Two snubber samples of each type, class, composition, and end connection shall be subjected to the first article inspection.

TABLE I. Inspection, examination, and tests.

Inspection	Requirement	Test procedures	First article inspection	Conformance inspection
Examination	3.2, 3.3, 3.5	4.5	X	X
Steady state transmission	3.4.1	4.6.1	X	-
Dampening	3.4.2	4.6.2	X	X
Temperature	3.4.3	4.6.3	X	-
Vibration	3.4.4	4.6.4	X	-
Shock	3.4.5	4.6.5	X	-
Pressure integrity	3.4.6	4.6.6	X	X

4.3 Conformance inspection. Conformance inspection shall be performed at the place of manufacture. Conformance inspection shall consist of the examination and tests specified in table I and shall be witnessed by a Government inspector.

4.3.1 Lot. A lot shall consist of all snubbers of the same type, class, composition, and end connection manufactured at one time.

4.3.2 Sampling for conformance inspection. A random sample of snubbers will be selected by a Government inspector from each lot of snubbers (see 4.3.1 for conformance inspection (see 6.4)). Sample size shall be in accordance with table II.

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TABLE II. Conformance inspection sample size.

Lot size	Sample size
1 - 8	4
9 - 15	7
16 - 25	12
26 - 90	19
91 - 150	25
151 - 280	38
281 - 500	60

4.3.3 Lot acceptance criteria. If any snubber sample fails to meet the conformance inspection requirements of table I, no snubbers will be accepted until the contractor has determined the cause of the defect and has taken the necessary action to correct or eliminate the defect from each snubber in the lot. The failed test must be repeated to demonstrate that the corrective action will enable the snubber to conform to the requirements of the specification. In addition, the results of previous tests may be deemed invalid, unless the contractor can prove to the satisfaction of the Government that such tests would not be adversely impacted by the corrective action.

4.4 Test conditions. Test conditions shall be as specified in the applicable examinations and test procedures.

4.5 General examination. The snubbers shall be subjected to a thorough examination to ascertain that the material, finish, workmanship, construction, assembly, dimensions, and marking are in conformance with the requirements of this specification. Examinations shall be limited to disassembling the snubbers to the extent that the performance, durability, or appearance would not be affected.

4.5.1 Conformance inspection examination. The snubbers selected as specified in 4.3.2 shall be examined to determine conformance to the requirements of this specification.

4.5.1.1 Dimensional verification. Snubber samples selected as specified in 4.3.2 shall be subjected to dimensional verification of the pressure connection threaded end to verify conformance to the applicable document for the type threaded end or connection specified (see 6.). In order to comply with the dimensional verification, all dimensions, concentricities, and perpendicularities affecting interchangeability of parts, sealing effectiveness, strength and body size (see 3.3.1), shall be measured with sufficient precision to verify conformance to the applicable document. For a snubber having an O-ring union pressure connection, samples of the tail piece and a union nut shall also be subjected to this dimensional verification.

4.6 Test procedures. Tests shall be conducted as described below. For the dampening test, a storage oscilloscope, oscillographic recorder, or other data acquisition system with a frequency response sufficient to resolve full scale deflections in 10 milliseconds or less shall be utilized. Input signal resolution shall be 2 percent or less of full scale. Signals from both the test and monitoring transducers shall be recorded simultaneously (see 4.56.2).

With the exception of the dampening test, which requires the use of pressure transducers, all other tests may be monitored with either a pressure transducer or a pressure gauge of suitable range which shall have accuracies of 1 percent of span or better and shall have an overpressure rating of at least 125 percent of upper range value. To maintain sufficient accuracy, the maximum upper range limit for any pressure transducer or pressure gauge shall not exceed twice the maximum pressure expected in any test. In addition,

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controls of the storage oscilloscope, oscillographic recorder, or other data acquisition system should be set that recorded signals are at least 50 percent of full scale. Except for the dampening tests which require a specific fill fluid, the others may employ fresh water as the fill fluid. If fresh water is used as the fill fluid for the temperature test, provision should be made to employ a suitable additive to prevent freezing. As applicable, the snubber should be thoroughly cleaned prior to conducting the dampening test. The fill fluids for the dampening test shall be as follows:

- (a) Type 1: 2190-TEP oil in accordance with MIL-PRF-17331 (an equivalent oil may be substituted).
- (b) Types 2 and 4: Fresh water.
- (c) Type 3: Air or nitrogen.

Unless otherwise indicated, the pressure transducer or pressure gauge shall be connected to the output side of the snubber with only an adapter fitting between them. Except where temperature is a variable, the tests in this specification shall be conducted at an ambient temperature of $75 \pm 10^{\circ}\text{F}$.

4.6.1 Steady state transmission. A reference measurement shall be made employing either a pressure transducer or pressure gauge, both with and without a snubber. The reference measurement shall be made both upscale and down scale at the test pressures for the applicable class (see 1.2) as shown in table III. The snubber shall meet the requirements of 3.4.1.

TABLE III. Steady state transmission pressures.

Snubber class (see 1.2.2)	Operating range (psi)	Test pressures (psi)
L	10/1000	10, 250, 500, 750, 1000
H	1001/6000	1200, 2400, 3600, 4800, 6000

4.6.2 Dampening. The dampening test shall be conducted utilizing an apparatus similar to that shown on figure 1. A step change shall be made from atmospheric pressure to 200 ± 10 psi for class L snubbers and from atmospheric pressure to 1500 ± 100 psi for class H snubbers. The pressure step change shall be accomplished in 100 milliseconds or less as measured with the monitoring pressure transducer. Both the test and monitoring pressure transducers shall have frequency response characteristics sufficient to respond to and produce an electrical signal output in response to a full scale pressure change occurring in 10 milliseconds or less. The snubber shall meet the requirements of 3.4.2.

4.6.2.1 Dampening test procedure. The following procedure, applicable to figure 1, may be used to perform the dampening test:

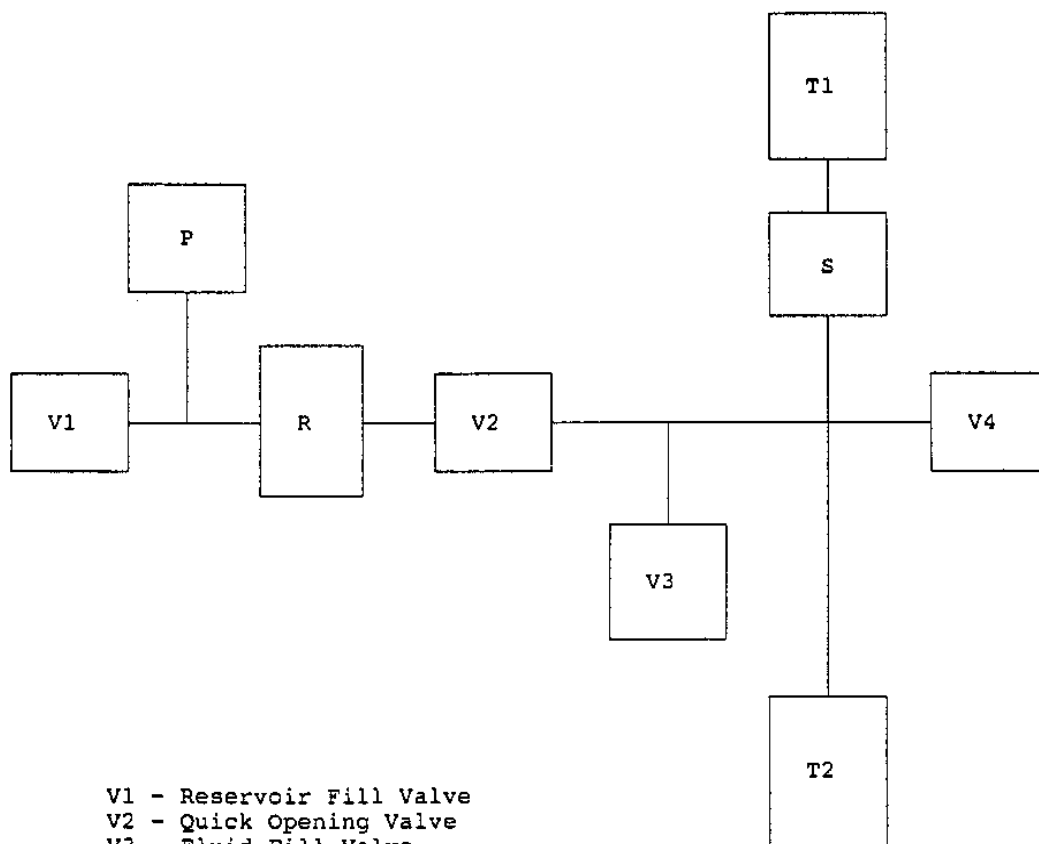
- (a) Ensure that V2 and V4 are closed and that V3 is open.
- (b) Utilizing V3, introduce the fill fluid, as applicable into the monitoring and test transducer legs. Loosen the fittings at T1 and T2 to ensure a complete fill. Tighten all transducer fittings and close V3 after the fill procedure is complete.
- (c) Utilizing V1, pressurize the high pressure reservoir with nitrogen to a value sufficient to ensure that the pressure step change in the transducer legs will satisfy the criteria of 4.6.2. Close V1.
- (d) Energize the transducers and applicable monitoring equipment,

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- and actuate V2.
- (e) After steady state has been achieved, close V2 and relieve the test pressure by opening V4.
 - (f) As applicable, thoroughly clean the entire dampening apparatus to remove residual traces of the fill fluid.

4.6.3 Temperature.

4.6.3.1 High temperature. Place the snubber in an environmental chamber and pressurize the snubber to 250 ± 10 psi for a class L snubber and 1500 ± 50 psi for a class H snubber. Increase the chamber temperature from ambient to $150 \pm 5^\circ\text{F}$ in not less than 1 hour. Adjust the pressure as necessary to maintain the required pressure. Maintain the pressure and temperature conditions for not less than 4 hours. Reduce the chamber to ambient temperature in not less than 1 hour. Remove the snubber from the chamber. Allow it to remain at ambient temperature for not less than 1 hour. The snubber shall meet the requirements of 3.4.3.



V1 - Reservoir Fill Valve
 V2 - Quick Opening Valve
 V3 - Fluid Fill Valve
 V4 - Vent Valve
 P - Reservoir Pressure Monitor
 R - High Pressure Reservoir
 S - Pressure Snubber
 T1 - Test Transducer
 T2 - Monitoring Transducer

FIGURE 1. Suggested dampening test setup.

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4.6.3.2 Low temperature. Place the snubber in an environmental chamber and pressurize the snubber to 250 ± 10 psi for a class L snubber and 1500 ± 50 psi for a class H snubber. Decrease the chamber temperature from ambient to $40 \pm 5^\circ\text{F}$ in not less than 1 hour. Adjust the pressure as necessary to maintain the required pressure. Maintain the pressure and temperature conditions for not less than 4 hours. Increase the chamber to ambient temperature in not less than 1 hour. Remove the snubber from the chamber and allow it to remain at ambient temperature for not less than 1 hour. The snubber shall meet the requirements of 3.4.3.

4.6.3.3 Temperature cycling. Place the snubber in an environmental chamber. The snubber shall remain unpressurized during the temperature cycling. The test shall consist of 4 complete cycles (steps 1 through 4), as shown in table IV. After completion of the 4th cycle, the snubber shall be removed from the chamber and allowed to stabilize at ambient conditions for not less than 1 hour. The snubber shall meet the requirements of 3.4.3.

TABLE IV. Temperature cycle.

Step	Temperature condition	Duration
1	Increase temperature <u>1/</u> from $75 \pm 5^\circ\text{F}$ to $150 \pm 5^\circ\text{F}$	1 hour
2	Constant temperature of $150 \pm 5^\circ\text{F}$	22 hours <u>3/</u>
3	Decrease temperature to $-10 \pm 5^\circ\text{F}$	2 hours
4	Constant temperature of $-10 \pm 5^\circ\text{F}$	22 hours <u>3/</u>
5	Increasing temperature to $75 \pm 5^\circ\text{F}$ <u>2/</u>	1 hour

1/ Ambient temperature for the first cycle.

2/ Ambient temperature for the last cycle.

3/ Minimum duration.

4.6.4 Vibration. The snubber shall be tested in accordance with type I (environmental) vibration of MIL-STD-167-1 except that the upper frequency shall be 175 hertz (Hz); the amplitude of vibration shall be as specified in table V; and for the variable frequency portion, the vibration level shall be maintained for 2 minutes at every integral value of frequency. If no resonances are observed, the 2-hour endurance test shall be conducted at 175 Hz. If a particular snubber is determined to be axisymmetric, then the vibration test need only be conducted along the two mutually perpendicular axes. The snubber shall be pressurized to 250 ± 10 psi for a class L snubber and 1500 ± 50 psi for a class H snubber and monitored throughout the test. The snubber shall meet the requirements of 3.4.4.

TABLE V. Vibratory displacement criteria.

Frequency range (Hz)	Table displacement (inches peak to peak) Exploratory Variable frequency	
5 to 20	0.020 ± 0.004	0.060 ± 0.012
21 to 50	0.010 ± 0.002	0.040 ± 0.008
51 to 100	0.003 ± 0.0006	0.020 ± 0.004
101 to 175	0.001 ± 0.0002	0.003 ± 0.0006

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4.6.4.1 Vibration fixture. The snubber shall be connected to the outlet side of an instrument cutoff valve. The valve and snubber assembly shall be mounted to a vertical panel of the vibration fixture using the valve mounting nut and lockwasher. A flexible hose shall be used to connect the pressure source to the inlet side of the instrument cutoff valve. A flexible hose shall be used to connect a pressure monitor (gauge or transducer) to the test connection port located in the stem of the instrument cutoff valve. Flexible pressure hoses shall be of sufficient length so as not to interfere with the vibration fixture and shall have appropriate pressure ratings. The snubber shall be mounted to the instrument cutoff valve as indicated below for the various snubber end connection types. After filling and pressurizing the system, the snubber and pressure monitor shall be isolated from the pressure source by means of the instrument cutoff valve.

4.6.4.1.1 O-ring union connection. Thread the output side of the snubber onto the output side of the instrument cutoff valve. Seal the inlet side of the snubber with a blanked tailpiece after the system is filled.

4.6.4.1.2 Flareless (bite type) connection. Mount the outlet side of the snubber to the outlet side of the instrument cutoff valve by means of an O-ring union to flareless (bite type) adapter in accordance with Drawing 803-1385850. Seal the inlet side of the snubber after the system is filled.

4.6.4.1.3 Pressure transducer connection. Mount the inlet side of the snubber to the outlet side of the instrument cutoff valve by means of a short length of 1/4-inch od stainless steel tubing and fittings in accordance with MIL-F-18866. As required, clamp the snubber to the vibration fixture to prevent movement during test. Seal the outlet side of the snubber after the system is filled.

4.6.5 Shock. A lightweight shock test shall be conducted in accordance with MIL-S-901 for grade A, class 1, type A equipment. A total of nine blows shall be applied, three blows applied parallel to each axis of the snubber. The snubber shall be pressurized to 250 ± 10 psi for a class L snubber and 1500 ± 50 psi for a class H snubber and monitored throughout the test. The snubber shall meet the requirements of 3.4.5.

4.6.5.1 Shock fixture. The snubber shall be connected to the outlet side of an instrument cutoff valve. The valve and snubber assembly shall be mounted to a vertical panel of a type 6D-1 adapter plate using the valve mounting nut and lockwasher. A flexible hose shall be used to connect the pressure source to the inlet side of the instrument cutoff valve. A flexible hose shall be used to connect a pressure monitor (gauge or transducer) to the test connection port located in the stem of the instrument cutoff valve. Flexible pressure hoses shall be of sufficient length so as not to interfere with the shock fixture and shall have appropriate pressure ratings. The snubber shall be mounted to the instrument cutoff valve as required for the various snubber end connection types (see 4.4.1.1 through 4.4.1.3). After filling and pressurizing the system, the snubber and pressure monitor shall be isolated from the pressure source by means of the instrument cutoff valve.

4.6.6 Pressure integrity. Pressurize the snubber to a value indicated in table VI appropriate to the snubber class. Isolate the pressurized snubber from the pressure source and monitor the snubber pressure with the appropriate range pressure transducer or pressure gauge. Maintain the pressure for a period of 1 hour. The snubber shall meet the requirements of 3.4.6.

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TABLE VI. Pressure integrity test pressures.

Snubber class (see 1.2.2)	Operating range (psi)	Test pressure (psi)
L	10/1000	1500
H	1001/6000	9000

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity with the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Snubbers are intended for use in pressure instrument piping systems to suppress pressure spikes and dampen pressure fluctuations (both periodic and nonperiodic) before they can reach and damage pressure sensing instrumentation.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Snubber classification variables, as follows:
 - (1) Type of service (see 1.2.1).
 - (2) Class (see 1.2.2).
 - (3) Material composition, excluded, selected by manufacturer (see 1.2.3 and 3.2).
 - (4) End connection (see 1.2.4).
 - (5) Cleanliness (see 1.2.5).
- (c) Issue of DoDISS to be cited in the individual documents referenced (see 2.2.1).
- (d) When first article is required (see 3.1).
- (e) If union nut, tail piece, and O-ring should be furnished with each snubber that is intended for pressure gauge general applications (see 3.3.2.1.1).
- (f) Special cleaning (see 3.3.3).
- (g) Packaging requirements (see 5.1).

6.3 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, a standard production item from the contractor's current inventory, and the number of items to be tested as specified in 4.2. The contracting officer should also

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include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.4 Subject term (key word) listing.

Dampening
Pressure gauge
Pressure transducer

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodian activities:

Army - CR4
Navy - SH
Air Force - 99

Preparing activity:

Navy - SH
(Project 6685-0941)

Review activities:

Army - MI
Air Force - 82
DLA - GS

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4,5,6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of this form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-PRF-2940D

2. DOCUMENT DATE (YYMMDD)
990413

3. DOCUMENT TITLE
SNUBBERS, FLUID PRESSURE, INSTRUMENT PROTECTION

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*

b. ORGANIZATION

c. ADDRESS *(Include Zip Code)*

d. TELEPHONE *(Include Area Code)*
(1) Commercial
(2) AUTOVON
(if applicable)

7. DATE SUBMITTED
(YYMMDD)

8. PREPARING ACTIVITY

a. NAME
Technical Point Of Contact (TPOC)
Mr. Donald E Strawser 03Z73

b. TELEPHONE *(Include Area Code)*
(1) Commercial (703) 602-6137x344
(2) AUTOVON

c. ADDRESS *(Include Zip Code)*
Commander, Naval Sea Systems Command
ATTN: SEA 03Q, 2531 Jefferson Davis Hwy
Arlington, VA 22242-5160

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Quality and Standardization Office
5203 Leesburg P ke, Suite 1403, Falls Church, VA 22041-3466
Telephone (703) 756-2340 AUTOVON 289-2340