INCH-POUND
MIL-DTL-22606D(SH)
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SUPERSEDING
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DETAIL SPECIFICATION

FLASK AND END PLUGS, COMPRESSED GAS - AIR, OXYGEN, AND NITROGEN

This specification is approved for use by Naval Sea Systems Command, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers seamless steel flasks with integral forged heads and various composition end plugs for storing compressed gases (air, oxygen, nitrogen, helium, or helium-oxygen mixtures).

1.2 Classification. Flasks and end plugs are of the following types, classes, and services as specified (see 6.2).

1.2.1 Types. The types of seamless steel flasks are as follows:

a. GF – General service flask, straight design (see figure 1)
b. CD – General service flask, curved design (see figure 1)
c. SF – Air moisture separator flask (see figure 2)

1.2.1.1 Subtypes. Flasks may have more than one subtype as follows:

a. A – Special attachments as specified (see 6.2)
b. S – Skirted (see figure 1)
c. W – Wide outside diameter (20 inches)

1.2.2 Classes. The classes of seamless steel flasks are as follows:

a. Class 3000 – 3000 pounds per square inch (psi) maximum allowable working pressure (MAWP)
b. Class 5000 – 5000 psi MAWP
c. Class 5500 – 5500 psi MAWP

1.2.3 Services. The services for seamless steel flasks are as follows:

a. Service A – Compressed air
b. Service B – Oxygen
c. Service C – Oil free nitrogen, helium, or helium-oxygen mixtures

1.2.4 Plug types. Each plug type is available in a range of sizes as indicated in their respective figures as follows:

a. S – Straight plug (see figure 3)
b. R – Right angle (90 degree) plug (see figure 4)
c. Y – "Y" plug (see figure 5)

Comments, suggestions, or questions on this document should be addressed to Commander, Naval Sea Systems Command, ATTN: SEA 05S, 1333 Isaac Hull Avenue, SE, Stop 5160, Washington Navy Yard DC 20376-5160 or emailed to CommandStandards@navy.mil, with the subject line "Document Comment". Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.daps.dla.mil.

d. M – Separator inlet/outlet plug (see figure 6)

e. D – Internal drain plug (see figure 7). Type D plugs can only be used as drain plugs, and not as inlet plugs. Horizontally mounted flasks and flasks mounted on an incline greater than 45 degrees from vertical require a Type D drain plug. Note that horizontal mounting of flasks is not recommended and is to be avoided whenever possible. Horizontally mounted flasks do not drain completely, necessitating increased recertification periodicity, which results in much higher life cycle costs of the flask.

f. X – Special plug. Type X plugs are of special design that does not comply with plug Types S, R, Y, M, or D. Type X plugs are provided in accordance with details specified by the procuring activity (see 6.2). All material, cleanliness, and testing requirements for plugs specified herein still apply.

1.2.4.1 Plug seal types. Every plug type is threaded into the flask and sealed by one of two methods as follows:

a. R – O-ring seal (see figures 3, 8, and 9)

b. W – Seal weld (see figures 10 and 11)

1.3 Part or identifying number (PIN).

M22606 - XXXX - XXXX - X - XX.X - XXX - XXX

Drain plug type: S – Straight plug
R – Right angle plug
Y – "Y" plug
M – Separator inlet/outlet plug
D – Internal drain plug (see figure 7)
X – Special plug

Drain plug seal: R – O-ring seal
W – Seal welded

Drain plug size: see figures 3, 4, or 5

Inlet plug type: S – Straight plug
R – Right angle plug
Y – "Y" plug
M – Separator inlet/outlet plug
X – Special plug

Inlet plug seal: R – O-ring seal
W – Seal welded

Inlet plug size: see figures 3, 4, or 5

Capacity: Minimum capacity in cubic feet (see table I)

Service: A – Compressed air
B – Oxygen
C – Oil free nitrogen, helium, or helium-oxygen mixtures

Class: 3000 – 3000 psi MAWP
5000 – 5000 psi MAWP
5500 – 5500 psi MAWP

Type/subtype: GF – General service flask, straight design
GFSW – General service flask, straight design, skirted, wide diameter
CD – General service flask, curved design
CDA – General service flask, curved design, special attachments
SF – Air moisture separator flask

Specification number

Example PIN: M22606-GF-3000-A-8.0-SR1-SW3

TABLE I. Dimensional characteristics of seamless flasks [7/].

Class and type	Minimum [6/] capacity (cubic feet)	Outside diameter [2/, 4/, 5/] (inches)	Vessel length, less end plugs (+½ inch -0 inch) (feet-inches)	Design wall thickness [3/, 5/] (min) (inches)	Weight [6/] (approx) (pounds)	Hydrostatic test pressure [5/] (psi)
Class 3000						
CD	21.0	18	14-10¼	0.561	1980	5000
GF	10.0	18	7-11½	0.561	980	5000
GFA	3.0	18	3-3	0.561	416	5000
GFA	4.27	18	4-0½	0.561	660	5000
GFA	6.0	18	5-4½	0.561	670	5000
GFAW	35.7	24	15-0	0.838	3671	5000
GFS	4.0	18	4-0	0.561	630	5000
GFS	8.0	18	6-8	0.561	1005	5000
GFS	10.0	18	7-9½	0.561	1060	5000
GFSW	6.0	20	4-6	0.619	820	5000
Class 5000						
GF	0.5	6⅝	3-11½	0.494	175	8330
GF [1/]	1.5	10¾	4-3½	0.572	335	8330
GFW	10.0	20	7-5½	1.028	1760	8330
GFA	2.0	10¾	5-3½	0.572	452	8330
GFA	6.0	18	5-10	0.933	1164	8330
GFS	1.5	10¾	4-1½	0.572	367	8330
GFSW	10.0	20	7-3½	1.028	1925	8330
SF [1/]	0.5	6⅝	3-11½	0.494	190	8330
Class 5500						
GF	6.0	18	5-10	0.939	1160	9167
GF	10.0	20	7-5½	1.037	1745	9167

NOTES:

[1/] Type SF and 1.5-cubic foot Type GF flasks shall be Class 5000 only.

[2/] Measure the OD tolerance and out of roundness as specified in 4.2.2.

[3/] Design wall thickness includes a minimum corrosion allowance of 0.041 inch for Class 3000 flasks, 0.0625 inch for Class 5000 flasks, and 0.0625 inch for Class 5500 flasks.

[4/] For flasks up to and including 18-inch OD, the OD tolerance shall be +¼, -1/16 inch. For 20-inch and 24-inch OD flasks, the OD tolerance shall be +5/16, -1/16 inch.

[5/] Type GFS and CDS flasks shall meet the outside diameter, design wall thickness, and hydrostatic test pressure requirements specified for Type GF and CD flasks of the same capacity.

[6/] Listed values are for information only.

[7/] This table provides requirements and information for commonly purchased flasks. Flasks with dimensions, pressures, and volumes other than specified in this table are permitted as specified (see 6.2), but shall comply with all other requirements of this specification.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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 of documents cited in sections 3, 4, or 5 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 cited in the solicitation or contract.

FEDERAL SPECIFICATIONS

O-S-642	-	Sodium Phosphate, Tribasic, Anhydrous; Dodecahydrate; and Monohydrate; Technical
QQ-N-281	-	Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections

FEDERAL STANDARDS

FED-STD-H28	-	Screw-Thread Standards for Federal Services

COMMERCIAL ITEM DESCRIPTIONS

A-A-59155	-	Nitrogen, High Purity, Special Purpose

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-E-22200/2	-	Electrodes, Welding, Covered (Austenitic Chromium-Nickel Steel)
MIL-DTL-24441/20	-	Paint, Epoxy-Polyamide, Green Primer, Formula 150, Type III
MIL-DTL-24441/29	-	Paint, Epoxy-Polyamide, Green Primer, Formula 150, Type IV
MIL-PRF-25567	-	Leak Detection Compound, Oxygen Systems
MIL-PRF-27617	-	Grease, Aircraft and Instrument, Fuel and Oxidizer Resistant

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1330	-	Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen, and Hydrogen Systems
MIL-STD-1622	-	Cleaning of Shipboard Compressed Air Systems
MIL-STD-2035	-	Nondestructive Testing Acceptance Criteria

(Copies of these documents are available online at https://assist.daps.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

NAVAL SEA SYSTEMS COMMAND (NAVSEA) PUBLICATIONS

S9074-AR-GIB-010/278	-	Requirements for Fabrication Welding and Inspection, and Casting Inspection and Repair for Machinery, Piping, and Pressure Vessels

S9551-AM-MMM-010	-	Gas Flask, High Pressure, Dynamic Strength Test; Equipment Specifications, Test Procedures & Operator Qualifications
T9074-AD-GIB-010/1688	-	Requirements for Fabrication Welding and Inspection of Submarine Structure; Requirements
T9074-AS-GIB-010/271	-	Requirements for Nondestructive Testing Methods
T9074-BD-GIB-010/300	-	Base Materials for Critical Applications: Requirements for Low Alloy Steel Plate, Forgings, Castings, Shapes, Bars, and Heads of HY-80/100/130 and HSLA-80/100

(Copies of these documents are available from the Naval Logistics Library, 5450 Carlisle Pike, Mechanicsburg, PA 17055 or online at https://nll1.ahf.nmci.navy.mil.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASME INTERNATIONAL

Boiler and Pressure Vessel Code, Section VIII, Division 1

(Copies of this document are available from ASME International, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900 or online at www.asme.org.)

ASTM INTERNATIONAL

ASTM A269	-	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
ASTM A322	-	Standard Specification for Steel Bars, Alloy, Standard Grades
ASTM A335/A335M	-	Standard Specification for Seamless Ferritic Alloy-Steel Pipe for High-Temperature Service
ASTM A336/A336M	-	Standard Specification for Alloy Steel Forgings for Pressure and High-Temperature Parts
ASTM A572/A572M	-	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
ASTM E8/E8M	-	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E10	-	Standard Test Method for Brinell Hardness of Metallic Materials
ASTM E23	-	Standard Methods for Notched Bar Impact Testing of Metallic Materials
ASTM E1282	-	Standard Guide for Specifying the Chemical Compositions and Selecting Sampling Practices and Quantitative Analysis Methods for Metals, Ores, and Related Materials

(Copies of these documents are available from ASTM International, 100 Barr Harbor Dr., P.O. Box C700, West Conshohocken, PA 19428-2959 or online at www.astm.org.)

COMPRESSED GAS ASSOCIATION

CGA C-1	-	Methods for Pressure Testing of Compressed Gas Cylinders

(Copies of this document are available from the Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923 or online at www.cganet.com.)

SAE INTERNATIONAL

SAE-AMS7259 - Rings, Sealing, Fluorocarbon (Fkm) Rubber High-Temperature-Fluid Resistant Low Compression Set 85 to 95

(Copies of this document are available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or online at www.sae.org.)

SOCIETY FOR PROTECTIVE COATINGS

SSPC-SP 10/NACE No. 2 - Near-White Blast Cleaning

(Copies of this document are available from SSPC Publication Sales, 40 24th Street, 6th Floor, Pittsburgh, PA 15222-4656 or online at www.sspc.org.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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 Material.

3.1.1 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.

3.1.2 Flasks. Material for flasks shall be forged or hot rolled steel in accordance with the chemistry specified in ASTM A336/A336M for Grade F22 or in ASTM A335/A335M for Grade P22. Material shall be heat-treated as specified in 3.3.3 to achieve the mechanical properties in table II. Material chemistry shall be verified by testing as specified in 4.3.1 and mechanical properties verified by testing as specified in 4.3.2.

3.1.3 Skirts and bearing blocks. Material for support skirts shall be HY-80/100 steel plate or forgings in accordance with the chemistry specified in T9074-BD-GIB-010/300. The material for bearing blocks shall be steel in accordance with the chemistry specified in ASTM A572/A572M. Material shall be heat-treated as specified in 3.3.3 to achieve the mechanical properties specified in table II. Material chemistry shall be verified by testing as specified in 4.3.1 and mechanical properties verified by testing as specified in 4.3.2.1 and 4.3.2.2.

TABLE II. Minimum mechanical properties, flasks, skirts, and bearing blocks.

Mechanical property	Flasks [1/] ASTM A336/A336M Grade F22 ASTM A335/A335M Grade P22	Bearing blocks ASTM A572/A572M	Skirts HY-80/100 IAW T9074-BD-GIB-010/300
Yield strength at 0.2% offset (psi)	90,000 (min) 130,000 (max)	42,000 (min)	90,000 (min) 130,000 (max)
Tensile strength (psi)	110,000 (min)	63,000 (min)	110,000 (min)
Elongation in 2 inches (%)	15 (min)	21 (min)	15 (min)
Brinell hardness (BHN)	229 (min)	-	-
Charpy V-notch at -70 °F (foot-pounds)	35 (min)	-	35 (min)

NOTE:

[1/] For Class 5500 flasks, yield strength at 0.2% offset shall be 98,400 psi (min) and tensile strength shall be 120,000 psi (min). All other flask mechanical properties shall be as specified.

3.1.4 End plugs. Unless otherwise specified (see 6.2), end plugs (see figures 3, 4, 5, and 6) for Service A and Service C flasks shall be fabricated from bar stock or forged from material conforming to ASTM A322 Grade 4130. If bar stock is used, a minimum reduction ratio of 3-to-1 from solidified cross-sectional area to bar cross-sectional area shall be provided. End plugs shall be heat-treated to achieve the properties specified in table III when tested as specified in 4.3.2.1.

3.1.4.1 Oxygen and special flask plugs. Inlet/outlet plugs and drain plugs for Service B flasks shall be hot finished nickel-copper in accordance with the chemistry of QQ-N-281, Class A, and shall have mechanical properties specified in table III. Material chemistry shall be verified by testing as specified in 4.3.1 and mechanical properties verified by testing as specified in 4.3.2.1.

TABLE III. Mechanical properties, end plugs.

Mechanical properties	ASTM A322 Grade 4130	QQ-N-281 Class A hot finished
Yield strength at 0.2% offset (psi) (min)	55,000	30,000
Tensile strength (psi) (min)	85,000	75,000
Elongation in 2 inches (%) (min)	15	26

3.1.5 O-rings and back-up rings. O-rings shall be made of fluorocarbon rubber in accordance with SAE-AMS7259. O-rings more than 36 months old at time of initial flask shipment from the manufacturing facility shall not be used. Back-up rings shall be made of virgin polytetrafluoroethylene (PTFE).

3.1.6 Inerting caps. Inerting caps shall be constructed of material capable of withstanding a minimum pressure of 100 pound-force per square inch gauge (psig). All surfaces shall be corrosion resistant.

3.1.7 Oil. Oils used in the production process during fabrication shall be of the type that will fluoresce under the ultraviolet light examination specified in 4.2.3.

3.1.8 Mercury. Unless otherwise specified (see 4.5), vendor shall provide certification that each flask is mercury-free. Mercury-bearing instruments or equipment which may cause contamination shall not be used in manufacture, fabrication, assembly, or testing unless such instruments or equipment are protected by a double containment boundary.

3.2 Dimensional characteristics. Unless otherwise specified (see 3.2.1.1 and 6.2), the dimensional characteristics of seamless flasks shall be as specified in table I, and figures 1 and 2 when inspected as specified in 4.2.2. The flask out of roundness shall not exceed 2 percent of the flask outside diameter (OD). For Type CD and CDS flasks, the out of roundness shall not exceed 3.5 percent of the flask OD (see 6.4.4).

3.2.1 Wall thickness. Unless otherwise specified (see 6.2), flasks shall be manufactured with the design wall thickness specified in table I.

3.2.1.1 Wall thickness exception. A wall thickness less than that specified in table I is acceptable provided the wall thickness is equal to or greater than the thickness specified in table IV for the actual tensile strength of flask material determined after final heat treatment, and all other tests and inspection requirements are met. Flasks may have isolated areas where the wall thickness is less than that specified in table IV if the reinforcement of that isolated area meets the requirements of section UG-40 of the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1. The minimum wall thickness in the neck to head transition area (see figure 12) shall be equal to or greater than 75 percent of the minimum design wall thickness specified in table I. Exceptions for flask classes and outside diameters other than those listed in table IV shall be submitted to NAVSEA, via the contracting agency, for approval on a case by case basis.

TABLE IV. Minimum allowable wall thickness based upon actual tensile strength.

Actual tensile strength of material (psi)	Class 3000	Class 5000			
	18 OD (inches)	6⅝ OD (inches)	10¾ OD (inches)	18 OD (inches)	20 OD (inches)
112,000	0.551	0.489	0.562	0.917	1.010
114,000	0.542	0.483	0.553	0.902	0.993
116,000	0.534	0.478	0.545	0.888	0.997
118,000	0.525	0.473	0.536	0.874	0.962
120,000	0.517	0.468	0.528	0.860	0.947
122,000	0.509	0.463	0.520	0.847	0.932
124,000	0.502	0.458	0.513	0.834	0.918
126,000	0.494	0.454	0.505	0.822	0.904
128,000	0.487	0.449	0.498	0.810	0.891
130,000	0.480	0.445	0.491	0.798	0.878

3.3 Fabrication. Flasks may be fabricated of either seamless tubular material or pierced and drawn billets. Flask pipe material shall be 100 percent ultrasonically inspected in accordance with T9074-AS-GIB-010/271 to verify adequate wall thickness exists prior to fabrication. The adequacy of the wall thickness shall consider reductions that will occur due to scaling and grit blasting. The body of Types GF, SF, and GFS flasks shall be a straight cylinder as shown on figures 1 and 2. The body of Types CD and CDS flasks shall be a curved cylinder as shown on figure 1. Each end shall be hot formed to provide a neck for the flask end connections (see figure 12). The Type SF flask may be fabricated with a steel ring shrunk onto the neck to achieve the required 4.25-inch neck OD. The ring shall be of the same material as the flask and shall have a 0.002-inch minimum interference fit. Skirts and bearing blocks for Types GFS and CDS flasks shall be as specified (see 6.2).

3.3.1 Internal drain assemblies. Service A flasks intended for inclined installation beyond 45 degrees from vertical shall have an internal drain installed in accordance with figure 7 and the requirements specified (see 6.2). The internal drain tube shall be fabricated of ASTM A269 Grade TP 304. The open end of the drain tube shall be located at the lowest point to facilitate optimal drainage.

3.3.2 Fabrication welds. Welding shall be in accordance with S9074-AR-GIB-010/278. Seal welding procedures shall be approved by contracting activities (see figure 11 for a typical seal weld). Fabrication welds and weld repairs shall be inspected as specified in 4.3.4.1. Multi-pass fabrication and attachment welds, other than seal welds, shall have a separate root pass inspection. Weld acceptance shall be in accordance with MIL-STD-2035.

3.3.3 Heat treatment. After completion of hot forming operations and all welding on the flask body other than seal welding, the flask shall be heated above the upper critical transformation temperature and quenched in a suitable medium and tempered to achieve the required mechanical properties specified in table II. The minimum tempering temperature shall be 1100 °F. After heat treatment, welds shall be examined as specified in 4.3.4.1. If a weld joint repair is made within ⅜ inch of the flask body, the flask shall again be fully heat-treated, and all welds re-examined as specified in 4.3.4.1.

3.3.4 Threads. Threads shall be Unified National Threads in accordance with FED-STD-H28 (see figures 3, 4, 5, 6, 12, and 13).

3.3.5 End plugs. End plugs shall be in accordance with figures 3, 4, 5, and 6.

3.3.6 O-rings and backup rings. O-rings and backup rings shall be in accordance with figure 9. O-rings and backup rings shall be installed in end plugs as shown on figure 8 View A. O-rings and backup rings shall not be installed in seal welded plugs.

3.3.7 Inerting caps. Inerting caps shall be in accordance with figure 13.

3.4 Pressure integrity.

3.4.1 Flasks. After final heat treatment, but prior to final cleaning and painting, each flask shall pass the test specified in 4.3.3.1. Flasks shall meet the acceptance criteria specified in MIL-STD-2035 when examined as specified in 4.3.4.2. Flask indications and loss of back reflections shall not exceed that specified in 4.3.4.3 when examined as specified in 4.3.4.3.

3.4.2 End plugs. After final heat treatment, but prior to final cleaning and painting, end plugs shall not leak nor show any signs of leakage when tested as specified in 4.3.3.3. Plugs which pass the hydrostatic test shall be marked with the letter “H” as specified in 3.11.2.d.

3.5 Surface preparation prior to coating. Flask interior and exterior surfaces shall be free of mill scale, rust, manufacturing oils, and other dirt or debris that would interfere with the application of a protective coating. Flask surfaces shall be steam cleaned, dried, grit blasted, and vacuumed to remove all unwanted contamination in accordance with 3.5.1 and 3.5.2. Surface imperfections, such as round-bottom pits, scores, and gouges 1/16 inch or less in depth are acceptable, unless the depth of the imperfection violates the minimum wall thickness specified in the applicable table I or IV. The cylindrical section and formed ends and necks shall be free of surface cracks.

3.5.1 Blasting. Flask surfaces shall be abrasive blasted to a near-white finish in accordance with SSPC-SP 10/NACE No. 2. The abrasive and particle size shall be selected by the manufacturer to produce surface finishes suitable for the application of the protective coatings specified herein. The abrasive debris shall be removed by vacuuming or other suitable means. Threads shall be protected from damage during blasting operations.

3.5.2 Contamination. Cleaned flasks shall be oil-free when tested as specified in 4.2.3. Flasks showing any trace of oil contamination shall be recleaned as specified in 3.5.1. Flasks shall be recleaned until the ultraviolet light examination shows no oil contamination. If turning or rust bloom occurs, flasks shall be reblasted to near-white finish and retested with ultraviolet light until the UV light examination of 4.2.3 shows no contamination.

3.5.3 Drying. Flasks shall be thoroughly dried prior to painting or inerting.

3.5.4 End plugs. End plugs shall be free of oil, grit, products of machining, and other debris. End plugs shall be rinsed with detergent trisodium phosphate in accordance with O-S-642, or a commercially acceptable cleaner, until the ultraviolet light examination shows no oil contamination when tested as specified in 4.2.3.

3.6 Surface protection. Within 24 hours after cleaning and drying, the flasks shall be given internal and external surface protection as follows. If flasks are to remain uncoated for 24 hours or more, then protection against corrosion, such as nitrogen inerting, must be provided. Flask threaded areas shall be uncoated.

3.6.1 Interior. Unless otherwise specified (see 6.2), Service A flask interiors shall be coated with 0.004 to 0.005 inch dry film thickness (DFT) of epoxy-polyamide green primer in accordance with MIL-DTL-24441/29, Type IV, Formula 150. When the coating is dry, Service A flask interior surfaces shall show no oil contamination when inspected as specified in 4.2.3. Flasks which fail the test shall be recleaned (see 3.5), recoated, and reexamined until the flask passes the oil-free test. Service B and Service C flask interiors shall be uncoated.

3.6.2 Exterior. Following successful completion of the gas test (see 3.8) and prior to final cleaning (see 3.9), flask and end plug exterior surfaces shall be coated as specified herein. Unless otherwise specified (see 6.2), the exterior surfaces of each fully assembled flask shall be coated with a 0.002 to 0.004 inch DFT of green primer in accordance with MIL-DTL-24441/20, Type III, Formula 150. Heavier thicknesses at spray paint intersections and areas of potential buildup, such as skirt attachments, are acceptable, but shall be kept to a minimum consistent with normal coating procedures.

3.7 Assembly. Non-welded end plugs shall be assembled to the flask with O-rings, back-up rings, and retaining bands (see figure 8); and shall be torqued to 250 to 400 foot-pounds. Seal welded plugs shall be torqued to 800±200 foot-pounds prior to seal welding. When assembling plugs to flasks, no gap shall exist between the plug shoulder and the flask sealing surface. When inspected as specified in 4.3.4.1, completed seal welds shall meet the acceptance criteria specified in 3.3.2.

3.7.1 Thread coating. Threads shall be lubricated with grease in accordance with MIL-PRF-27617, Type III.

3.8 Gas leakage. When pressurized in accordance with 4.3.3.2, the assembled flask shall exhibit no evidence of leakage through any portion of the seal weld or end plug.

3.9 Cleanliness. Following coating of flask exteriors (see 3.6.2), the flasks shall be final cleaned to the requirements specified herein. Unless otherwise specified (see 6.2), Service A flasks shall meet the cleanliness requirements in MIL-STD-1622 for general applications. When specified (see 6.2), Service A flasks shall meet the cleanliness requirements in MIL-STD-1330. Prior to cleaning to MIL-STD-1330, Service B and C flasks shall be visually inspected for defects as specified in 4.2.1 and shall be oil-free when inspected as specified in 4.2.3. Service B and Service C flasks shall meet the cleanliness requirements in MIL-STD-1330.

3.10 Inerting. Flasks shall be preserved as follows: after final cleaning (see 3.9), each flask shall be evacuated to an absolute pressure of 3 to 8 inches mercury. From this partial vacuum, the flask shall be pressurized with nitrogen to a pressure of 5 to 25 psig. Unless otherwise specified (see 6.2), Service A flasks shall use commercial grade dry nitrogen. For Service A flasks cleaned to MIL-STD-1330 and all Service B and C flasks, flasks shall be inerted with nitrogen in accordance with A-A-59155 Type I. The charging pressure shall be determined at the ambient temperature when the flask is charged. A 10-micron filter (or finer) shall be used when pressurizing the flasks with nitrogen. Inerting caps shall be installed as shown on figure 13.

3.10.1 Inerting for emergency shipment. In the event that a carrier will not accept emergency shipment of pressurized flasks, the flasks shall be charged to 5 psig with nitrogen in accordance with 3.10 and the pressure bled down to 0 psig to meet carrier requirements.

3.11 Marking for identification. Flasks and end plugs shall be permanently marked as specified in 3.11.1 or 3.11.2 as applicable.

3.11.1 Flasks. Unless otherwise specified (see 6.2), permanent marking for identification of flasks shall be stamped on the cylindrical portion of the neck not closer than ½ inch to the tangent at the root of the neck. Markings shall be made with a round bottom low stress stamp and shall not be greater than 1/16 inch deep. Stamps with characters greater than ¼ inch in height shall not be used. Flasks with skirts shall have the specified stamping applied to the skirt rather than the flask neck. Flask markings shall include the following information in the order listed:

		Example of stamping
a.	Manufacturer's initial or trademark and date of hydrostatic test (month and year).	CPI, 7-2011
b.	Specification, type, class, and service.	22606D-GF-5000-A
c.	Nominal capacity and weight, diameter, and manufacturer's serial number.	10-1705-18-XXXX
d.	Design minimum wall thickness (inch).	0.933
e.	Minimum wall permitted by table IV using prefix "M" (inch).	M.860
f.	Actual measured wall thickness using prefix "A". Use only when 3.2.1.1 and table IV are invoked (inch).	A.902

Identification markings used by a manufacturer during fabrication may be stamped longitudinally on the cylindrical portion of the flask prior to forging and heat treating operations. Such markings shall be made with a round bottom, low-stress stamp and shall not be greater than 1/16 inch deep. Stamps with characters greater than ¼ inch in height shall not be used. Manufacturer applied fabrication markings do not require removal.

3.11.2 End plugs. Permanent marking for identification of plugs shall be made by stamping with round bottom, low-stress die stamps. Markings shall be applied to any suitable surface which will be exposed after assembly of the plug to the flask and shall contain, as a minimum, the following information:

		Example of stamping
a.	Manufacturer's initial or trademark.	CPI
b.	Hydrostatic test designation (see 3.4.2). Place immediately after manufacturer's initial.	H
c.	Plug material.	ASTM A322 Grade 4130
d.	Heat number or code for plug.	E6
e.	Part number or drawing number of plug.	2MP2945

3.11.3 Tagging. Flasks certified oxygen clean in accordance with MIL-STD-1330 shall be marked with a certification tag as specified in MIL-STD-1330. Each flask cleaned to MIL-STD-1330 shall also bear a weather-resistant tag reading, "This flask inerted with dry nitrogen (A-A-59155)". All other flasks shall bear a weather-resistant tag reading, "This flask inerted with dry nitrogen (Commercial Grade)".

3.12 Workmanship. Flasks and plugs shall be free from dirt, manufacturing debris, and oils. Threads shall be smooth, properly formed, and free from burrs and nicks. Protective coatings shall be continuous, adherent, and free from blisters, streaks, and bare spots.

4. VERIFICATION

4.1 Sampling for inspections.

4.1.1 Lot samples.

4.1.1.1 Lot - flasks. For purposes of heat treatment only, a lot shall consist of flasks of the same material, diameter, and wall thickness which are fabricated from approved heats of steel (see 6.4.1) that are heat-treated in the same heat treatment furnace charge (see 6.4.3).

4.1.1.2 Lot - non-pressure boundary parts. For non-pressure boundary parts which are welded to the flask, a lot shall consist of parts from an approved heat of steel (see 6.4.2). Non-pressure boundary parts may include, but are not limited to, such items as fitting and mounting attachments (e.g., skirts, mounting blocks, body bands), and accessory attachment equipment (e.g., pressure or temperature sensor sites).

4.1.1.3 Lot - plugs. For purposes of heat treatment only, a lot shall consist of plugs of the same material, heat, method of fabrication (i.e., forged or barstock), and treated in the same heat treatment furnace charge.

4.1.2 Sample tests.

4.1.2.1 Test samples representing flasks. A circular test sample (ring) at least 24 inches long shall be heat-treated with each lot of flasks. The test sample shall be in the shape of a right circular cylinder with ends closed if flasks are quenched from the outside only; otherwise, the cylinder shall be open ended. For closed ended test samples, one end may be vented to prevent pressure buildup during heat treatment. The cylinder shall be of the same material, diameter, wall thickness, and subjected to the same manufacturing processes (except end closure) and heat treatment as the flasks which it represents. Test specimens shall be cut from the cylindrical portion of the test sample. Four longitudinal round specimens shall be cut from the test sample at locations spaced 90 degrees apart for yield and tensile testing in accordance with 4.3.2.1. Three longitudinal Charpy V-notch test specimens shall be cut from the upper quadrant of the test sample for testing in accordance with 4.3.2.2. A flask from the lot may be substituted for the test ring specified.

4.1.2.2 Test samples representing non-pressure boundary parts. Test samples used in determining lot approval of non-pressure boundary parts shall be quenched in the same orientation and for the same quench medium exposure as during flask heat treatment. Non-pressure boundary parts which have been subjected to the lot approval procedure specified in 4.1.1.2, and which have met the mechanical property requirements specified in table II shall not be subject to additional testing with each heat treatment furnace charge. For all non-pressure boundary parts, four test specimens shall be cut from the test sample for yield and tensile testing in accordance with 4.3.2.1. For skirt material only, three longitudinal Charpy V-notch test specimens shall be cut from the test sample for testing in accordance with 4.3.2.2.

4.1.2.3 Test samples representing plugs. Test samples for use in determining lot approval of plugs shall be obtained from heat-treated stock. If individual forgings are heat-treated for plug manufacture, a treated forging from each lot shall be used as the test sample. If heat-treated bar stock is used for plug manufacture, a test sample shall be obtained out of a bar from each lot. Four test specimens shall be cut from the test sample for yield and tensile testing in accordance with 4.3.2.1.

4.2 Visual and dimensional examination. The following examinations shall be performed on each flask.

4.2.1 Visual examination. Each flask shall be visually examined to verify conformance to surface preparation in 3.5. Surface imperfections, if greater than 1/16 inch deep, shall be faired at not less than a 4-to-1 ratio into the adjacent area by grinding or machining. Tightly adhering weld spatter which is acceptable in accordance with T9074-AD-GIB-010/1688 shall not be cause for rejection.

4.2.1.1 Formed ends and neck examination. Integrally formed ends and necks of each flask shall be visually examined for surface cracks. Surface discontinuities such as blemishes, scale marks, chip marks, hammer marks, folds, seams, and scale that would not be considered cracks and would not be rejectable in the cylindrical section also would not be considered cracks and would not be rejectable on the integrally formed ends and necks. Flasks submitted under the wall thickness exception of 3.2.1.1 will be accepted provided:

a. All visible forging folds on the inside surface are ground out.

b. Irregularities on the outside surface in the transition region, such as from chipping or hammering, are ground out.

c. The final thickness measurement is performed after such grinding.

Flasks containing visual conditions other than those described above shall not be offered for delivery without approval of the contracting authority.

4.2.2 Dimensional examination. After grit blasting of the outside surface to remove heat treat scale, but before painting, the flask dimensions shall be measured. The flask diameter shall be measured using wrap tape or other suitable tool near the center of the flask. Flask out of roundness shall be determined by micrometers, calipers, or other suitable tools. Wall thickness shall be determined at all outside and inside surface ground or machined repair areas by ultrasonic inspection in accordance with T9074-AS-GIB-010/271. The flask length shall be measured after final machining of the nozzle faces but before installation of the end plugs.

4.2.3 Oil-free examination. Each flask interior and each end plug shall be inspected with an ultraviolet light having a wave length of 3600 to 3900 angstroms. Any evidence of fluorescence on the flask interior, flask threaded surfaces, or on the end plug will constitute failure of the examination for the item examined.

4.3 Tests. The following tests shall be performed on each test sample or flask as specified herein.

4.3.1 Chemical analysis. Prior to flask fabrication, the producing mill shall take a sample from a pipe or billet of each heat of steel to be used for flask fabrication and the sample shall be subjected to a chemical analysis to determine compliance with 3.1.2 and 3.1.3. Sample selection and testing shall conform to ASTM E1282. Failure of the chemical analysis to conform to specified material check analysis limits shall be cause for rejection of the heat of material represented.

4.3.2 Mechanical tests.

4.3.2.1 Yield and tensile (applicable to all steel grades). Four test specimens (see 4.1.2.1, 4.1.2.2, and 4.1.2.3) from each lot shall be tested in accordance with ASTM E8/E8M to determine compliance with the yield, tensile, and elongation properties specified in table II and III. Failure to pass the test shall be cause for rejection of the flask or plug lot represented by the test specimens.

4.3.2.2 Charpy test. Three Charpy V-notch test specimens (see 4.1.2.1 and 4.1.2.2) from each lot shall be tested in accordance with ASTM E23 to determine conformance to table II. The average of the three test specimen Charpy V-notch values recorded during the test shall not be less than the value specified in table II. In addition, no single specimen Charpy V-notch value shall be less than 5 foot-pounds below the value specified in table II. Failure to pass the test shall be cause for rejection of the flask lot represented by the test specimens.

4.3.2.3 Brinell hardness testing (flasks). Each flask cylindrical section shall be Brinell hardness tested in accordance with ASTM E10. A minimum of two readings shall be obtained. Readings shall be taken at each end and shall be located 180 degrees apart.

4.3.3 Pressure tests.

4.3.3.1 Flask hydrostatic test. Each flask shall be tested to the hydrostatic test pressure specified in table I. Testing shall be conducted using either the Dynamic Pressure Test in accordance with S9551-AM-MMM-010 or the Water Jacket Method in accordance with CGA C-1. A deviation from a straight line on the Dynamic Pressure Test graph shall constitute failure of the test. A permanent expansion exceeding 10 percent of the total volumetric expansion during the Water Jacket test shall constitute failure of the test. Tap water shall be used for the hydrostatic test. Neither the water nor the flask shall be heated. The test pressure shall be held at least 5 minutes before the flask is visually inspected for compliance. Following the volumetric expansion inspection, each flask shall be inspected for defects as specified in 4.3.4.2 and 4.3.4.3. Any flask that fails the hydrostatic test shall not be offered for delivery.

4.3.3.2 Gas leakage test. Each fully assembled flask shall be pressurized with clean, dry air or nitrogen (as defined by MIL-STD-1622) to the maximum allowable working pressure specified in 1.2.2. The test pressure shall be held at least 5 minutes before the flask is inspected for compliance with 3.8. A leak test solution shall be applied to all joints to detect leakage. For Service B and Service C flasks, the leak detection compound shall comply with MIL-PRF-25567 or equal. Any flask that fails to comply with this test shall not be offered for delivery.

4.3.3.3 End plug hydrostatic test. Each end plug intended for use with flasks made to this specification shall be pressurized, using clean water, to 8330+200/-0 psi. The test pressure shall be held at least 5 minutes before being inspected for compliance with 3.4.2. Any end plug that fails to comply with this test shall not be offered for delivery.

4.3.4 Nondestructive tests.

4.3.4.1 Weld inspection. Weld inspection shall be by magnetic particle (MT) examination in accordance with T9074-AS-GIB-010/271. Liquid penetrant (PT) examination in accordance with T9074-AS-GIB-010/271 may be substituted for MT where MT is impractical.

4.3.4.2 Flask magnetic particle inspection. Hemispherical ends and necks of each flask shall be subjected to magnetic particle examination in accordance with T9074-AS-GIB-010/271. Flasks shall be visually inspected in accordance with 4.2.1.1 for compliance with 3.4.1 and 3.5.

4.3.4.3 Flask ultrasonic inspection. Each flask shall be ultrasonically examined over 100 percent of the external cylindrical section to a point 3 inches beyond the start of curvature of the integrally formed head, except where prevented by welded attachments (i.e., lifting lugs, skirts, body rings, etc.). Ultrasonic examination shall be conducted in accordance with T9074-AS-GIB-010/271 using shear wave testing in both the circumferential and axial direction, and longitudinal wave testing.

4.3.4.3.1 Flask shear wave acceptance. Any flask having an indication greater than 100 percent of the calibration level shall be rejected. Any flask having an indication of between 50 and 100 percent of the calibration level, and over 3 inches in length shall be rejected unless approved by NAVSEA or the agency concerned. Other ultrasonic indications over 25 percent of the calibration level shall be submitted for information to NAVSEA or the agency concerned as part of the test report.

4.3.4.3.2 Flask longitudinal wave acceptance. Any flask showing a 100 percent loss of back reflection shall be rejected. Flasks showing a loss of back reflection of between 50 and 100 percent, which is linearly disposed, and which totals 6 inches or more in 12 inches of flask length, shall be rejected. Areas of flasks showing a loss of back reflection between 50 and 100 percent, which are greater than 3 inches in length, shall be noted in the report. Any discontinuity signal accompanied by a loss of back reflection greater than 25 percent shall be reported.

4.4 Retests.

4.4.1 Mechanical retesting. If specimens fail the tests specified in 4.3.2, the test specimens and lot it represents may be reheat-treated as specified in 3.3.3 and the specimens retested as specified in 4.3.2.

4.4.2 Pressure tests. In the event a flask fails the hydrostatic test specified in 4.3.3.1, the manufacturer may apply to the contracting activity for a one-time reheat treatment and retest. If the reheat treatment and retest are approved by the contracting activity, the flasks shall be reheat-treated in accordance with 3.3.3 and retested as specified in 4.3.3.1. Flasks failing the gas leakage test shall have the defective O-ring seal area or seal weld repaired, recoated, and the flask retested as specified in 4.3.3.2.

4.4.3 Nondestructive and visual inspection. Surface imperfections detected by the methods specified in 4.2 or 4.3.4 which would require rejection but can be made acceptable by grinding, machining or cleaning, may be so treated and then reexamined by the same method as that which disclosed the imperfections.

4.5 Mercury contamination test. In the event of suspected mercury contamination or lack of mercury-free material certifications as specified in 3.1.8, testing shall be conducted to determine if excessive mercury contamination is present. Surface and internal contamination shall not exceed 0.01 milligram per cubic meter. The flask shall be pressurized, and a gas sample collected. The procedure to conduct such a sample, sampling/analysis devices, and acceptance criteria shall be approved by NAVSEA prior to conducting the test (see 6.2). If contamination testing is conducted, documentation stating test methods and test results shall be provided in lieu of a mercury-free material certification.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. 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. These flasks are intended for, but not limited to, shipboard use in the storage of high-pressure air, oxygen, nitrogen, helium, or helium/oxygen mixtures.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Flask type, subtype, class, and service (see 1.2).
c. Inlet and drain plug type, seal and size (see 1.2).
d. Skirt, bearing block, or special attachment details if required (see 1.2 and 3.3).
e. Part or Identifying Number (PIN) (see 1.3).
f. Specific issue of individual documents referenced (see 2.2.1 and 2.3).
g. End plug material if other than specified (see 3.1.4).
h. Special sizes and configurations (see 3.2 and 3.2.1).
i. Internal drain and details if required (see 3.3.1).
j. Internal preservation if other than specified (see 3.6.1).
k. External preservation if other than specified (see 3.6.2).
l. Special Service A cleaning requirements (see 3.9).
m. Special inerting requirements (see 3.10).
n. Approval of mercury contamination test sample, sampling/analysis devices, and acceptance criteria procedures (see 4.5).
o. "Y" plug details (see figure 5).

6.3 Selection instructions. For standardization and stocking purposes, the following should be used as a guide for the acquisition of high pressure flasks:

a. Flasks should be selected from the cubic capacities and working pressures specified in table I. When the desired capacity falls between the standard capacities listed, the next higher capacity should be used. When the system working pressure falls between those listed, the next higher working pressure flask should be used. Where it is impractical to conform to the standard capacities or working pressures specified in table I, NAVSEA approval should be obtained prior to the acquisition of any special flasks.

b. The ½-cubic foot Type SF (separator) and 1½-cubic foot Type GF flask should be acquired in the 5000 psi Class only and should be used for all pressures up to and including 5000 psi. When a separator with a capacity larger than ½ cubic foot is needed, consideration should be given to the 1½-cubic foot flask.

6.4 Definitions.

6.4.1 Approved heat of steel (for flask). An approved heat of steel is defined as one from which a test sample prepared as specified in 4.1.2 and heat-treated as specified in 3.3.3 has been tested and shown to have mechanical properties that meet the requirements specified in table II.

6.4.2 Approved heat of steel (for non-pressure boundary parts). An approved heat of steel is defined as one from which a test sample of the greatest material thickness supplied from the heat has been heat-treated as specified in 3.3.3 and has been tested and shown to have mechanical properties that meet the requirements specified in table II.

6.4.3 Furnace charge. A furnace charge is defined as flasks heat-treated at the same time in a batch-type furnace or up to a maximum elapsed time of 4 hours of production in a continuous furnace.

6.4.4 Out of roundness. The difference between the major and minor diameters, as a percentage of the flask OD.

6.5 Subject term (key word) listing.

Compressed air

Gas storage

Helium

High-pressure gas

Impulse

Moisture separator

6.6 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.

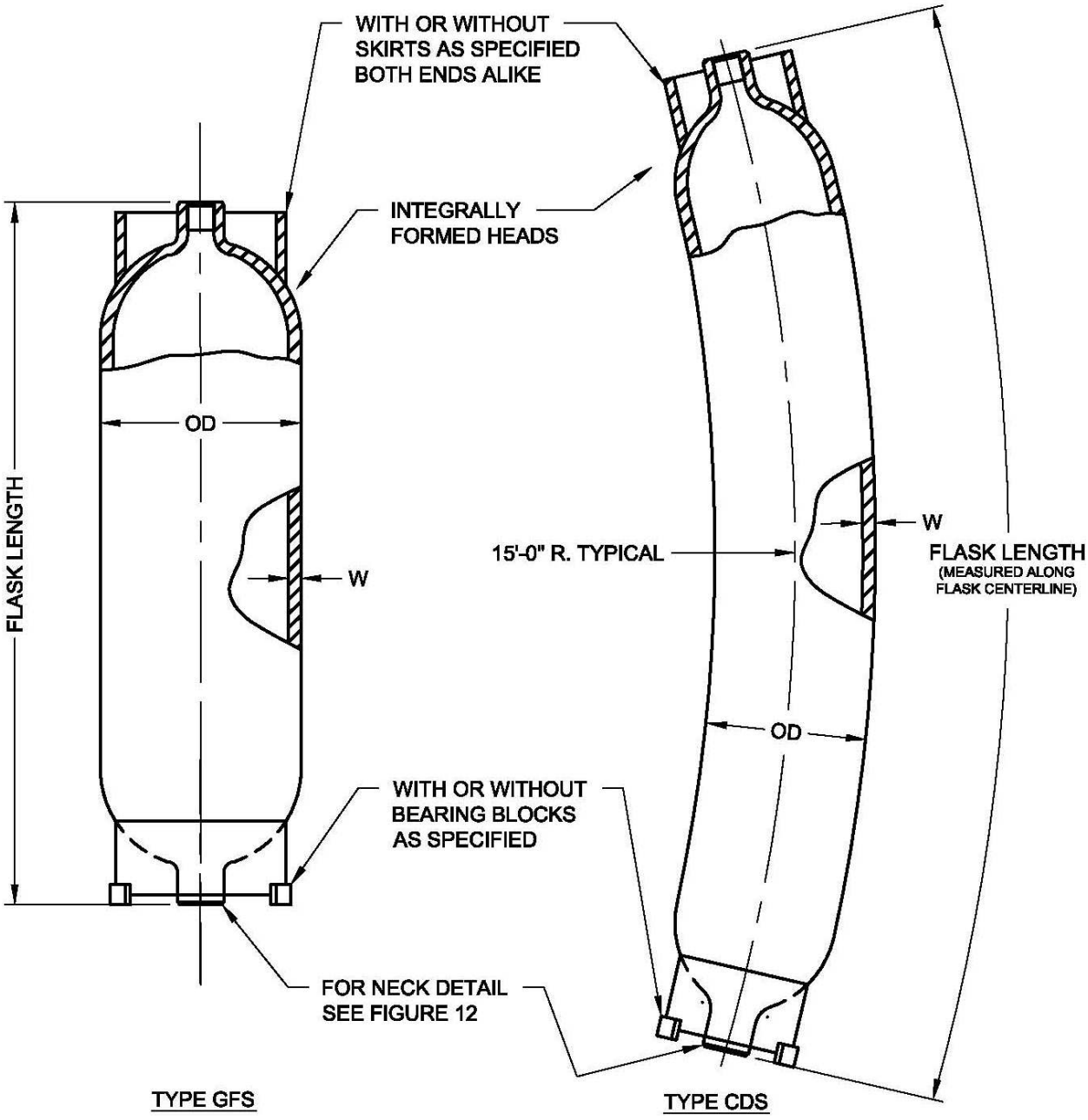


FIGURE 1. Type GFS and CDS flasks.

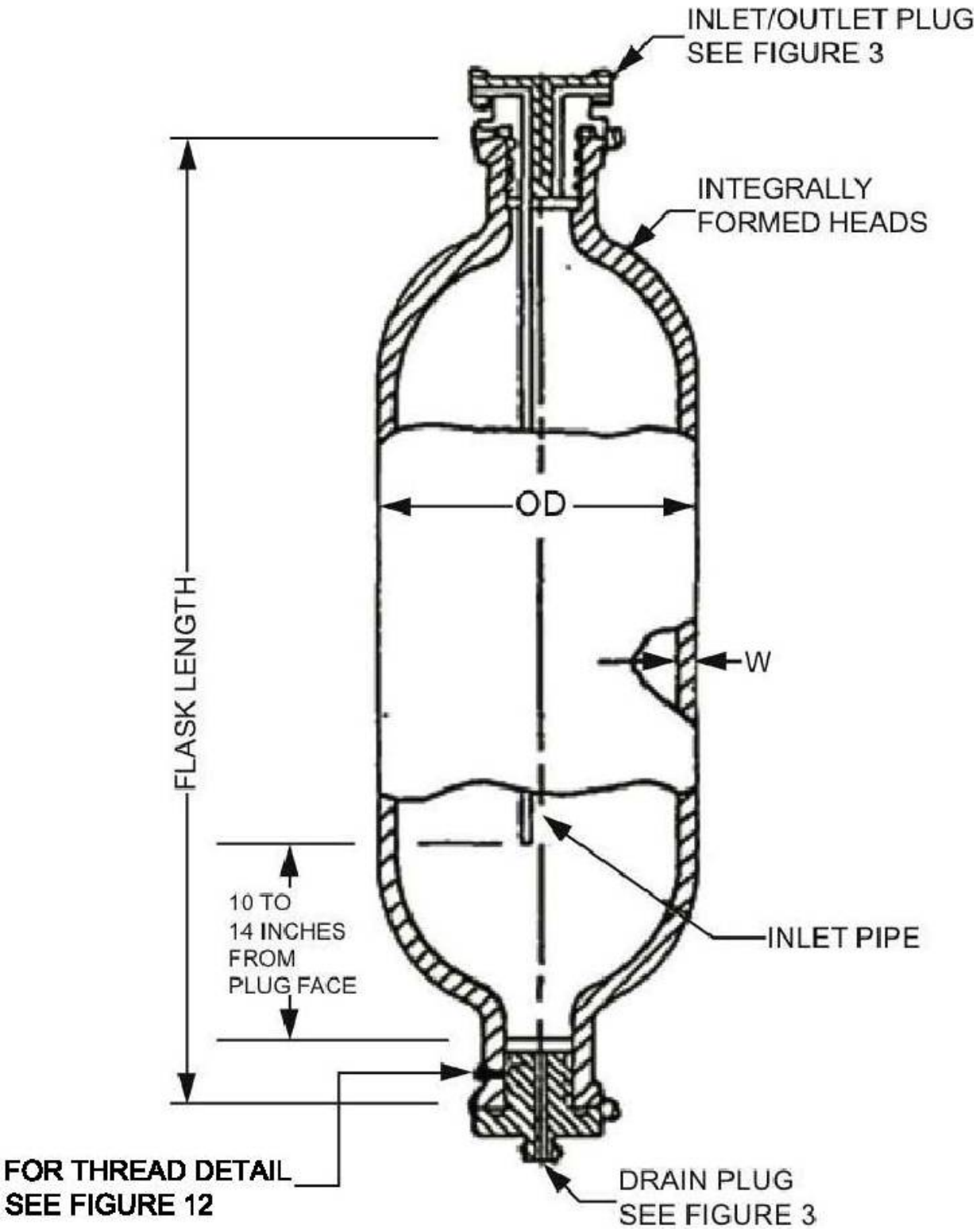
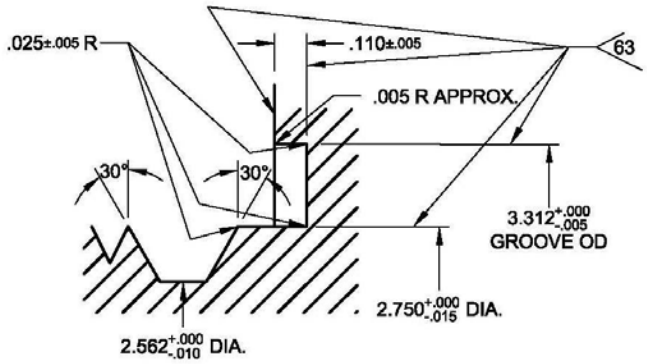
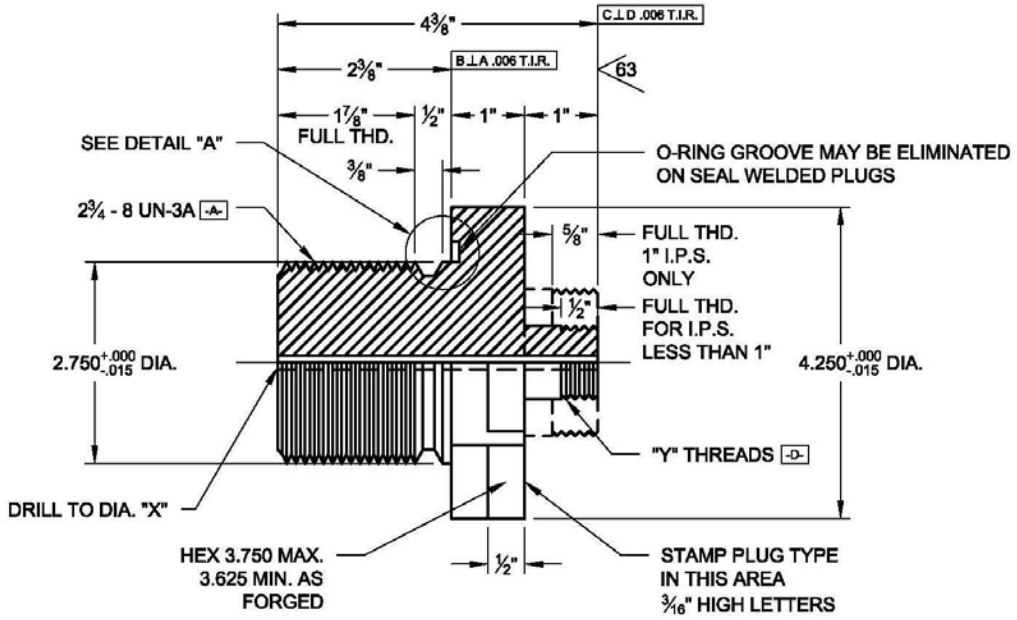


FIGURE 2. Type SF moisture separator flask.



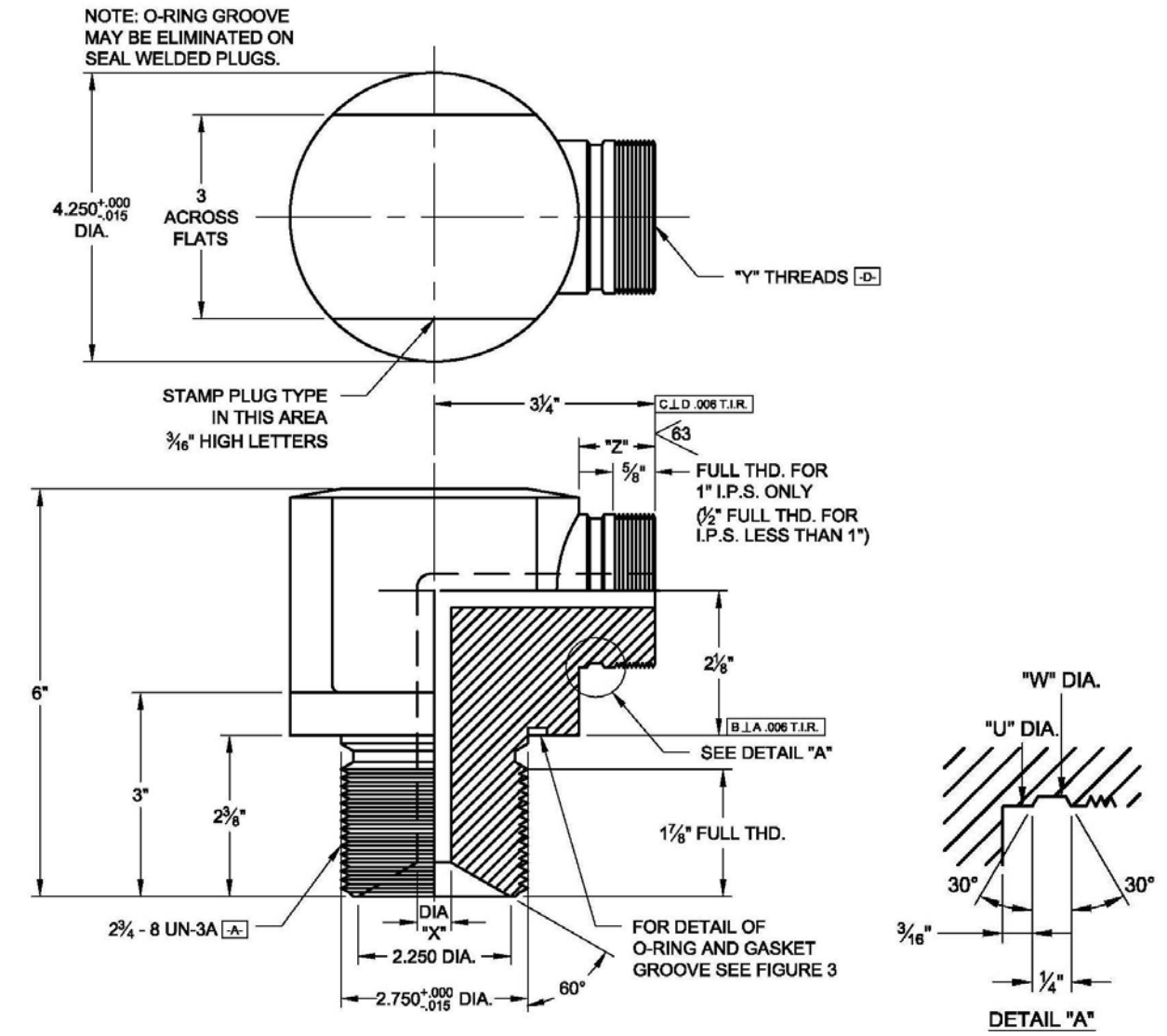
DETAIL "A"



SXX
- R – O-Ring Seal
- W – Seal Welded

Size identifier	Nominal pipe size	"X" diameter	"Y" threads	Remarks
0	Solid	--	--	End Closure Plug, No Boss
1	1/4	5/16	1 3/16 - 12 UN-3A	Drain Plug
2	3/8	7/16	1 5/16 - 12 UN-3A	Inlet and Outlet Plug
3	1/2	1/2	1 3/4 - 12 UN-3A	Inlet and Outlet Plug
3S	1/2	13/16	1 3/4 - 12 UN-3A	Special
4	3/4	5/8	2 - 12 UN-3A	Inlet and Outlet Plug
5	1	13/16	2 5/16 - 12 UN-3A	Inlet and Outlet Plug
6	2	1 7/8	4 1/2 - 12UN-2A	Inlet and Outlet Plug

FIGURE 3. Type S inlet/drain plug for o-ring and welded assemblies.

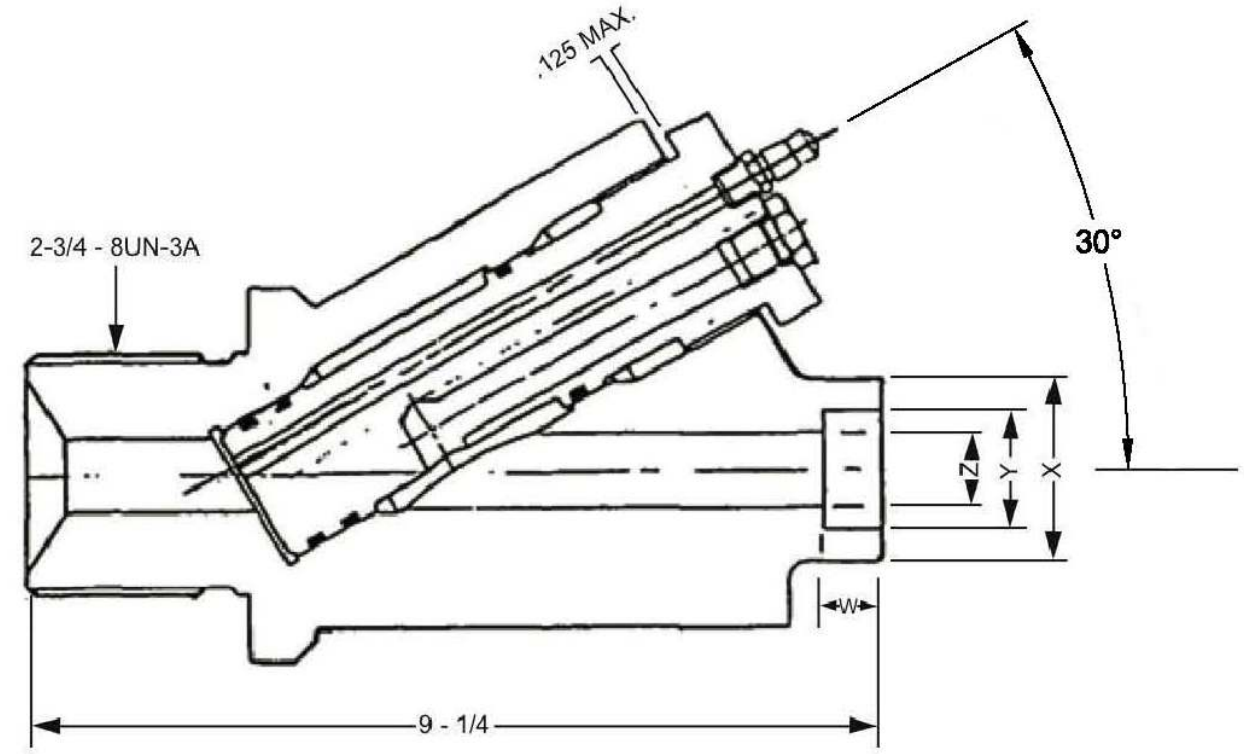


RXX

R – O-Ring Seal
W – Seal Welded

Size identifier	Nominal pipe size	"X" diameter	"Y" threads	"Z" +0.006	"U" diameter -0.010	"W" diameter -0.015	Remarks
1	1/4	5/16	1 3/16 - 12 UN-3A	0.916	1.187	1.075	
2	3/8	7/16	1 3/8 -12 UN-3A	0.916	1.375	1.262	
3	1/2	1/2	1 3/4 - 12 UN-3A	0.916	1.750	1.637	
3S	1/2	13/16	1 3/4 - 12 UN-3A	0.916	1.750	1.637	special
4	3/4	5/8	2 - 12 UN-3A	0.916	2.000	1.887	
5	1	13/16	2 5/16 -12 UN-3A	1.041	1.750	2.200	

FIGURE 4. Type R inlet/drain plug for o-ring and welded assemblies.



YWX

Size identifier	Connecting pipe/tube size	W inch	X inch	Y inch	Z±0.010 inch
2P	0.25 inch × 0.140 wall pipe	0.50	0.96	0.547 0.552	0.260
2T	0.25 inch × 0.150 wall tube	0.50	1.05	0.547 0.552	0.198
4T	0.5 inch × 0.147 wall tube	0.50	1.28	0.847 0.852	0.548
8P	1 inch × 0.250 wall pipe	0.62	2.06	1.323 1.328	0.815
8T	1 inch × 0.300 wall tube	0.62	2.34	1.323 1.328	0.631

NOTE:

1. "Y" plugs shall be seal welded. All other details for the "Y" plug shall be as specified (see 6.2).

FIGURE 5. Type Y inlet/drain plug.

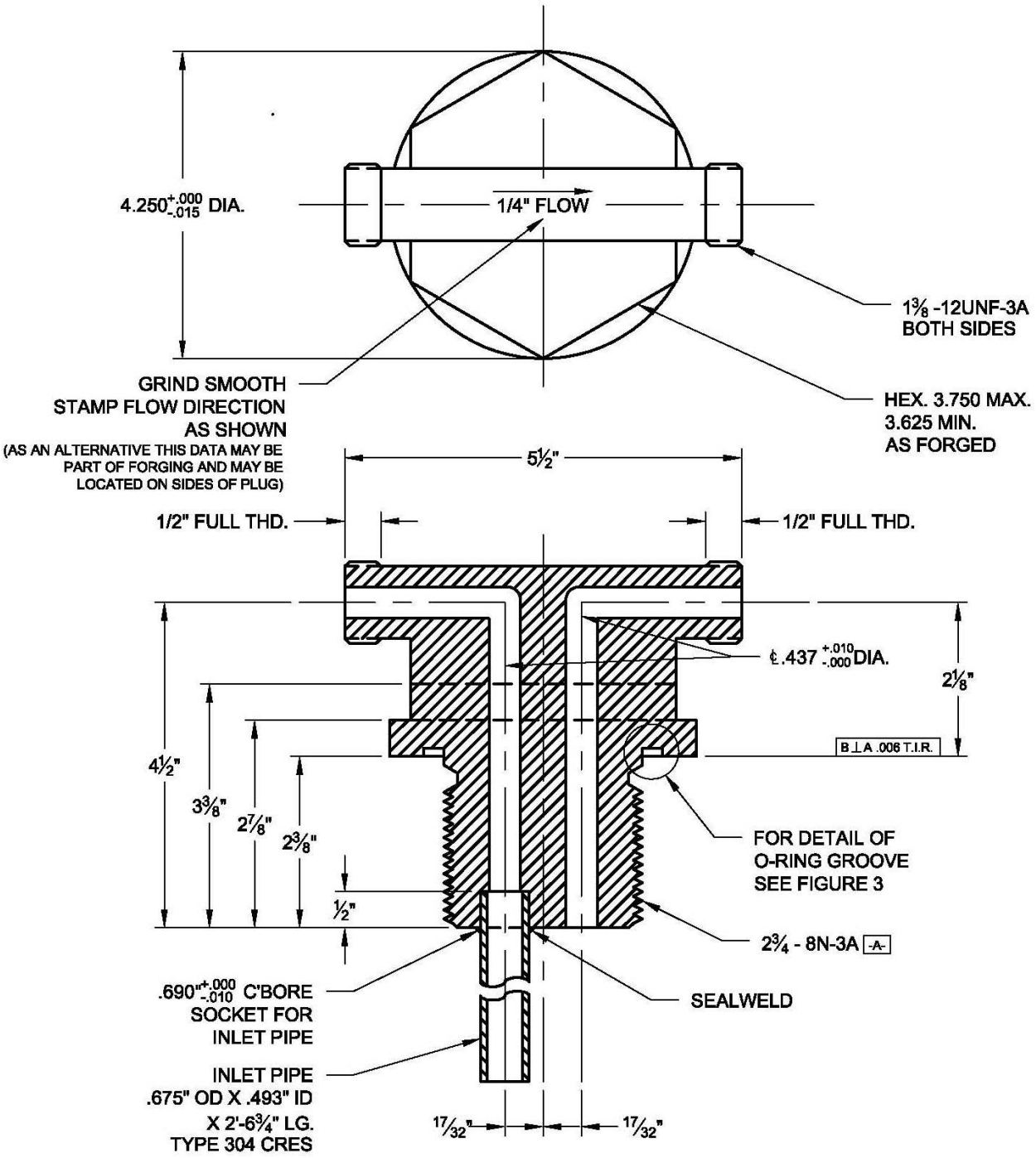
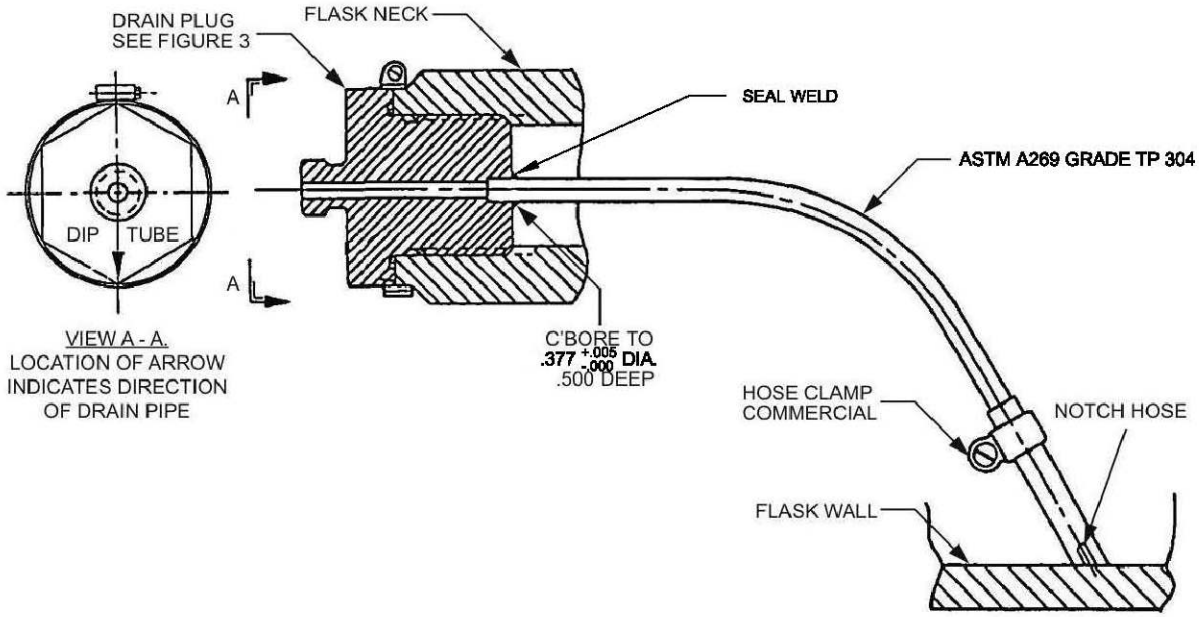


FIGURE 6. Type M inlet and outlet plug for type SF flasks.



DR1

R – Type D plugs shall be O-ring sealed.

1 – Type D plugs are based on Type S, Size 1 plugs.

FIGURE 7. Type D drain plug with internal drain piping assembly for flasks installed horizontally.

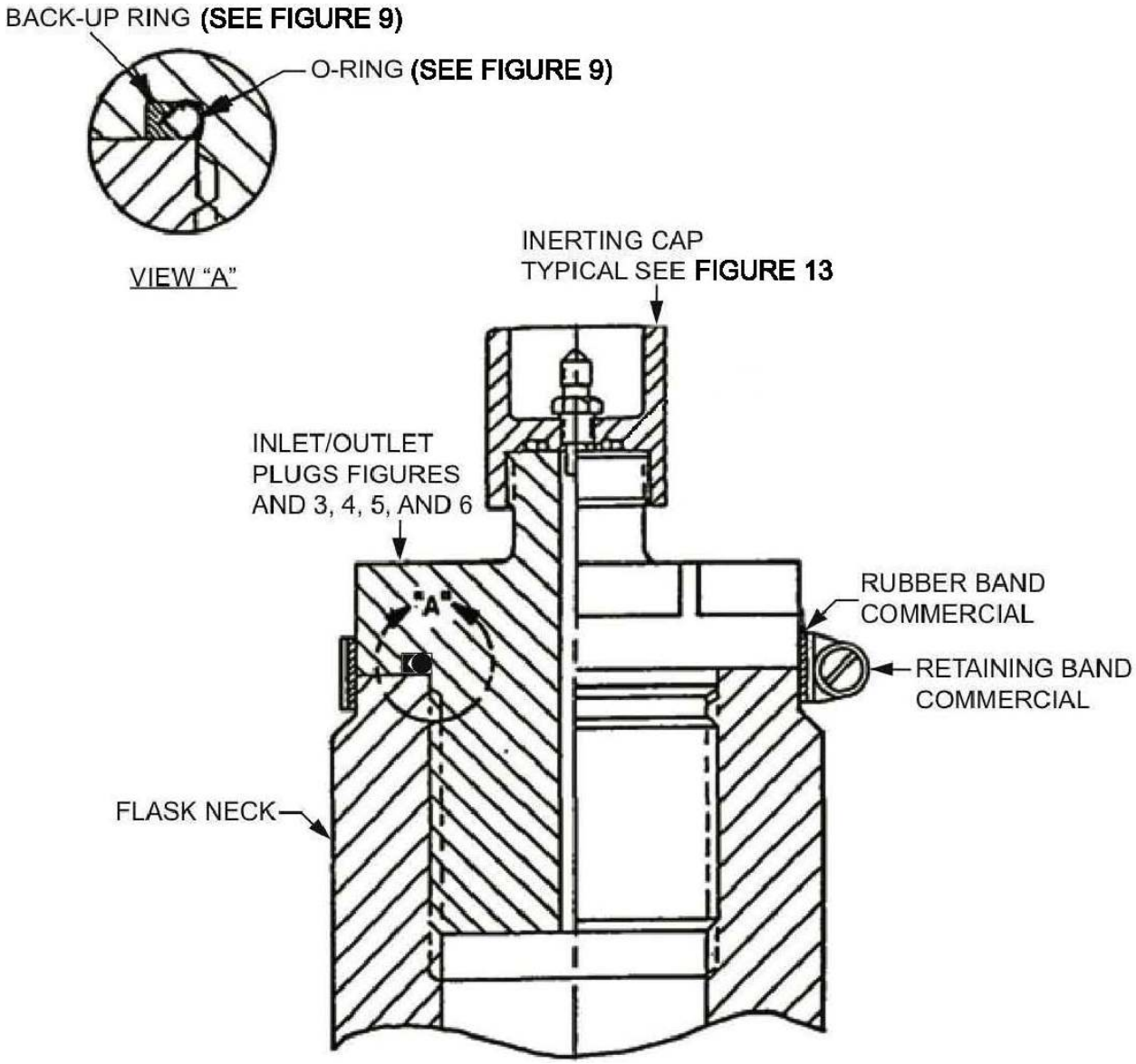


FIGURE 8. Assembly of o-ring sealed inlet/drain plug.

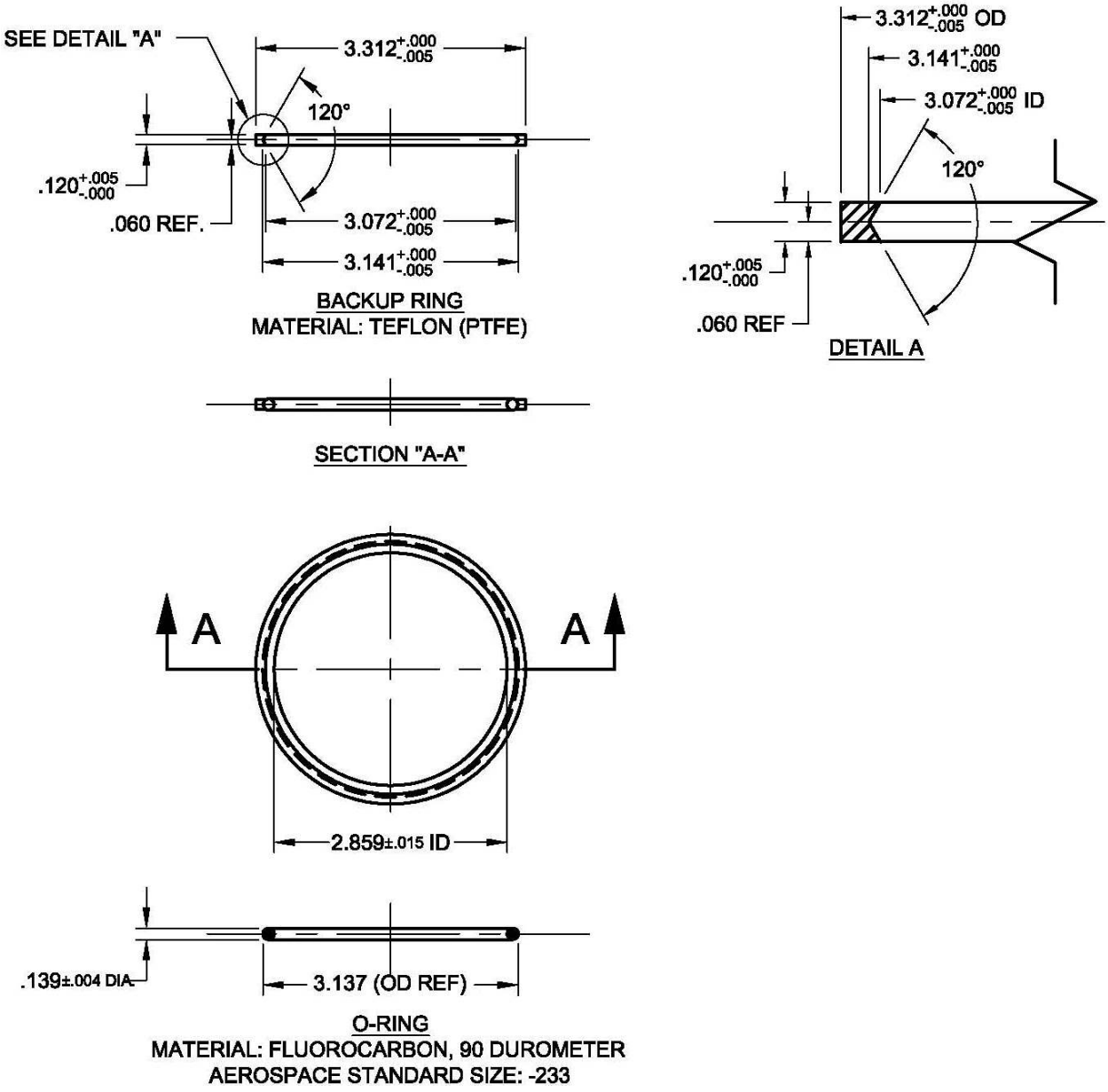


FIGURE 9. O-ring and back-up ring assembly.

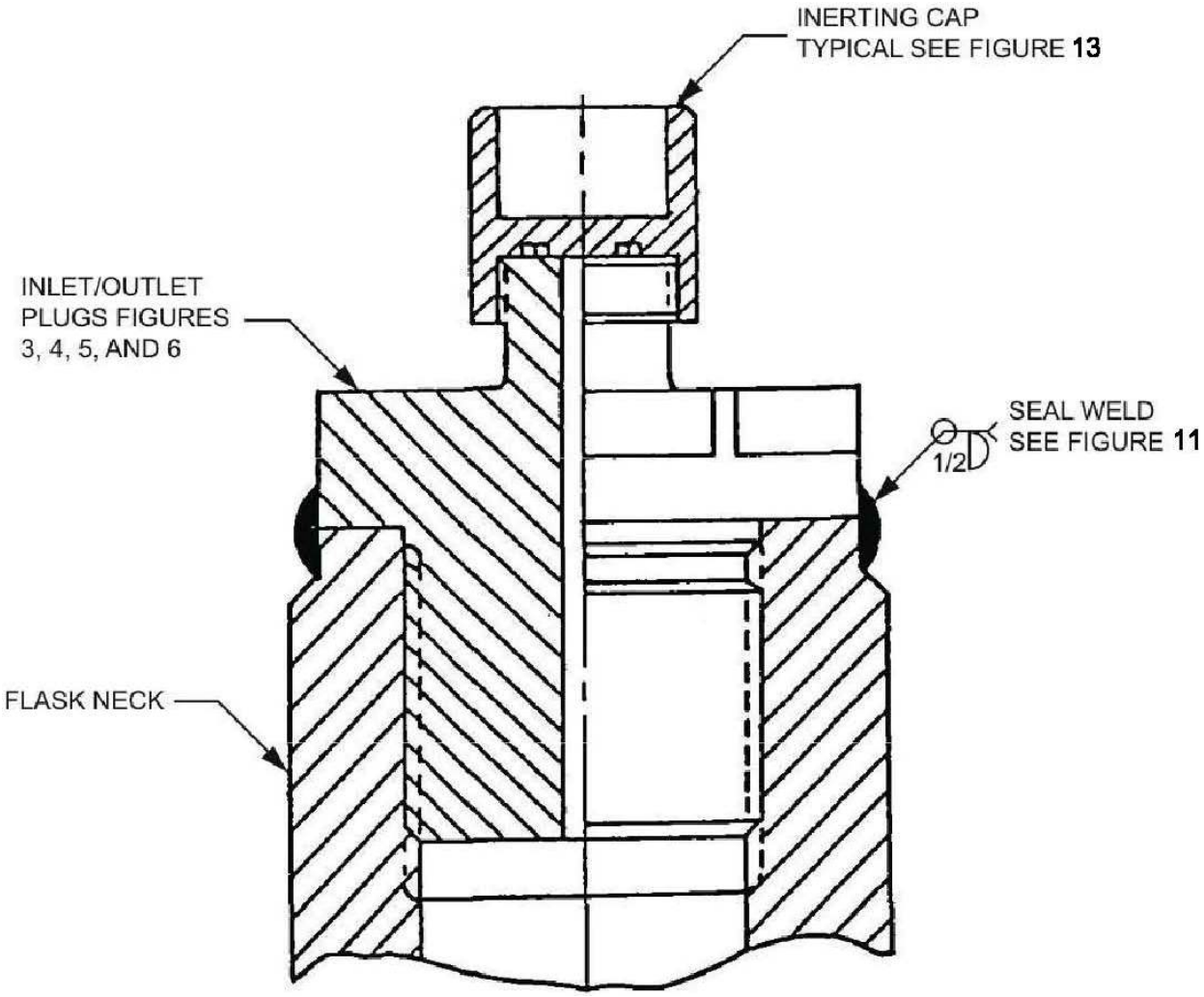
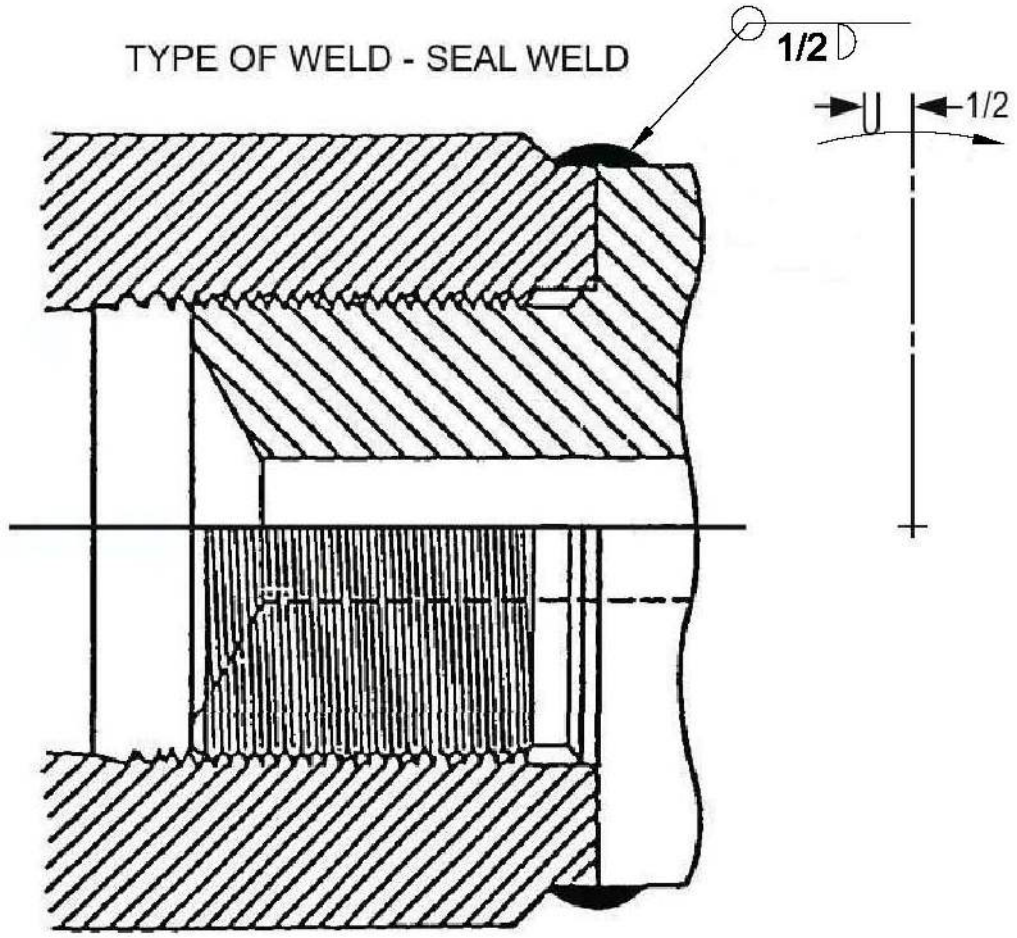


FIGURE 10. Assembly of seal welded inlet/drain plug.



SEAL WELD PROCEDURE

PREPARATION - Torque plug to 800±200 foot-pounds.

Clean area to be seal welded including abutting faces of cylinder neck and plug.

POSITION - Horizontal roll with electrode ½ inch ahead of top center as illustrated.

PREHEAT - 100 to 200 °F maximum.

ELECTRODE - MIL-309-16 in accordance with MIL-E-22200/2 preferred, using DC reverse polarity current at 24 to 26 volts and 80 to 100 amps.

NO. OF BEADS - Two, with all starts and stops staggered. Clean slag with blunt tool and stainless steel wire brush before continuing a weld.

ARC TRAVEL SPEED - 1st layer at 9 to 11 inches per minute.

2nd layer at 8 to 12 inches per minute.

FIGURE 11. Typical seal weld.

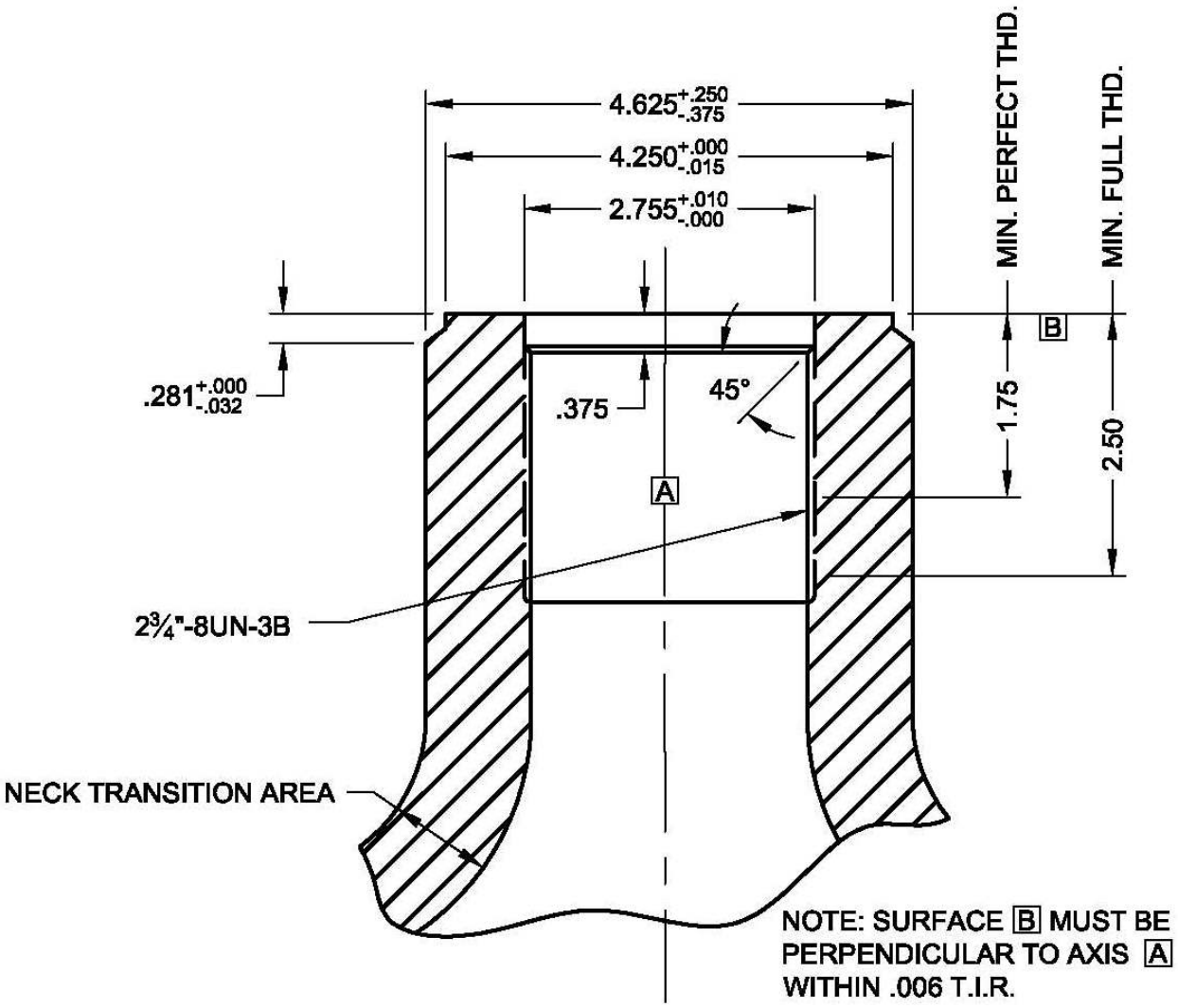
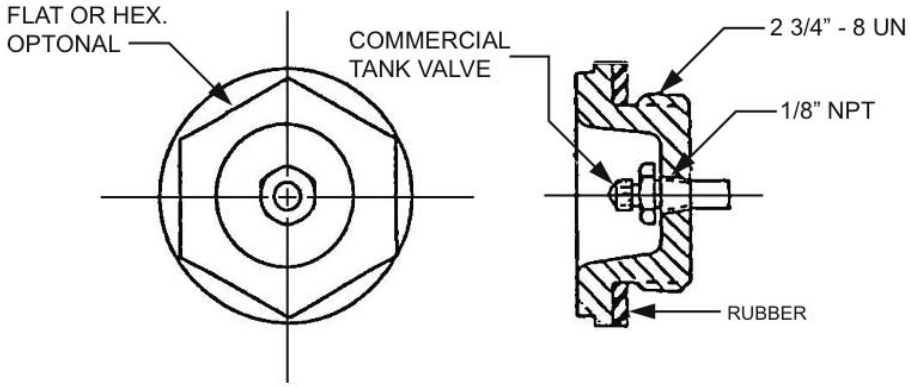
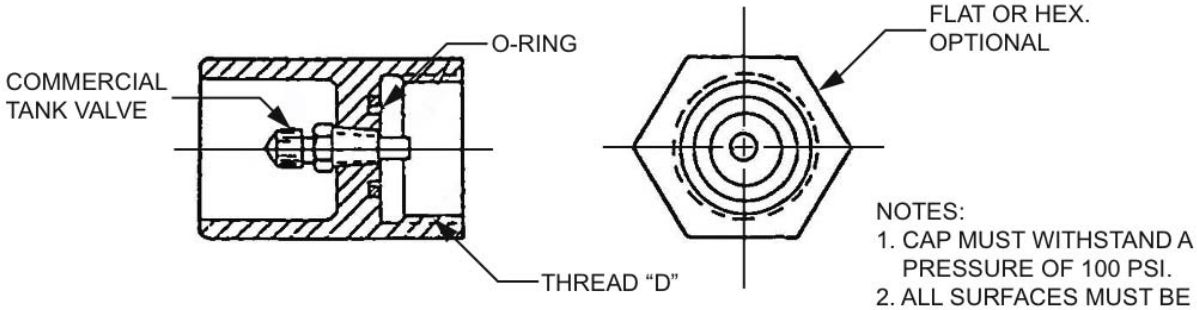


FIGURE 12. Neck thread details.



INERTING CAP - TYPE A
WITHOUT TANK VALVE - TYPE B - SOLID



INERTING CAP - TYPE C
WITHOUT TANK VALVE - TYPE D - SOLID

IPS	"D" Threads	O-Ring Size
¼	1 3/16 - 12 UN	-114
⅜	1⅜ -12 UNF	-210
½	1¾ - 12 UN	-212
¾	2 - 12 UN	-214
1	2 5/16 - 12 UNS	-217

NOTES:
1. Cap shall withstand a pressure of 100 psi.
2. All surfaces shall be corrosion resistant.
3. O-rings shall be in accordance with SAE-AMS7259.

FIGURE 13. Inerting caps.

Custodian:
Navy – SH

Review activity:
DLA – GS

Preparing Activity:
Navy – SH
(Project 8120-2009-003)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.daps.dla.mil.