MILITARY SPECIFICATION

VALVE, 2-INCH NPS, AUXILIARY TURBINE OVERSPEED TRIP, SOLENOID ACTIVATED

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

1. SCOPE

1.1 Scope. This specification covers the design and manufacture of solenoid activated turbine trip valves.

1.2 Classification. Valve ratings shall be of the 600 pound class and 1,500 pound class in accordance with ANSI B16.34 as specified (see 6.2.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-S-901 - Shock Tests, H.I. (High-Impact); Shipboard Machinery, Equipment and Systems, Requirements for.
MIL-A-907 - Antiseize Compound, High Temperature.
MIL-R-17131 - Rods and Powders, Welding, Surfacing.
MIL-E-17555 - Electronic and Electrical Equipment Accessories, and Repair Parts; Packaging and Packing of.
MIL-G-21032 - Gaskets, Metallic-Asbestos, Spiral Wound.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

STANDARDS

MILITARY

MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
MIL-STD-278 - Fabrication Welding and inspection; and Casting Inspection and Repair for Machinery, Piping and Pressure Vessels for Ships of the United States Navy.
MS3402 - Connector, Receptacle, Electric, Box Mounting, Crimp Contact, AN Type.
MS3406 - Connector, Plug, Electric, Front Release, Crimp Contact, AN Type.

2.1.2 Government drawings. The following Government drawing forms a part of this specification to the extent specified herein.

DRAWING

NAVAL SEA SYSTEMS COMMAND (NAVSEA)
NAVSHIPS 803-1385620 - Handwheels for Valves.

(Copies of specifications, standards, and drawings required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

B1.12 - Class 5 Interference-Fit Thread.
B16.5 - Pipe Flanges and Flanged Fittings. (DoD adopted)
B16.34 - Valves-Flanged and Buttwelding End Steel, Nickel Alloy, and Other Special Alloys. (DoD adopted)
B18.2.1 - Square and Hex Bolts and Screws Inch Series Including Hex Cap Screws and Lag Screws. (DoD adopted)
B18.3 - Socket Gap, Shoulder and Set Screws-Inch Series Including dimensions of Hexagon and Spline Sockets and Keys to Match. (DoD adopted)
B46.1 - Surface Texture (Surface Roughness, Waviness and Lay). (DoD adopted)

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

ASTM

A 182 - Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service. (DoD adopted)
A 193 - Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service. (DoD adopted)
A 194 - Carbon and Alloy Steel Nuts for Bolts for High-Pressure and High-Temperature Service. (DoD adopted)
A 216 - Steel Castings, Carbon, Suitable for Fusion Welding for High-Temperature Service. (DoD adopted)
A 217 - Steel Castings, Martensitic Stainless and Alloy, for Pressure Containing Parts, Suitable for High-Temperature Service. (DoD adopted)
A 395 - Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures. (DoD adopted)
A 479 - Stainless and Heat-Resisting Steel Wire, Bars, and Shapes for Use in Boilers and Other Pressure Vessels. (DoD adopted)
A 582 - Free-Machining Stainless and Heat-Resisting Steel Bars, Hot-Rolled or Cold-Finished. (DoD adopted)
B 633 - Electrodeposited Coatings of Zinc on iron and Steel. (DoD adopted)

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

INSTRUMENT SOCIETY OF AMERICA (ISA)

S75.02 - Control Valve Capacity Test Procedure

(Application for copies should be addressed to Instrument Society of America, P.O. Box 12277, Research Triangle Park, NC 27709.)

NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA)

ICS.1 - General Standards for Industrial Control and Systems (DoD adopted)

(Application for copies should be addressed to National Electrical Manufacturer's Association, 2101 L Street NW, Washington, DC 20037.)

(Industry associations specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2.1), a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.2 General description. This valve is intended for installation in any position at the inlet of a steam driven turbine for the purpose of tripping closed to stop steam flow and turbine operation upon electrical command from a remote sensing system. The valve shall have a single seated disc which is driven toward the seated position by spring force. A latch device which opposes the spring force shall be engaged at all times regardless of the handwheel or disc position until the 12 volt direct current (Vd.c.) solenoid is energized. Energization of the solenoid will disengage the latch mechanism allowing the valve to close under spring force. No damage shall occur to the latch mechanism or seat if the maximum tangential force exerted on the rim of the handwheel (see 3.4.10.3) is exceeded. A manual tripping device shall be provided which will allow the valve, regardless of the position of the disc, to be tripped manually in the event of a loss of electrical power. A handwheel driven mechanism shall be incorporated to reset the valve after it has tripped closed. Clockwise rotation of the handwheel to the stop position shall allow manual engagement of the latch mechanism. Counterclockwise rotation shall then lift the valve disc to the fully open position. The valve shall incorporate a gland exhaust connection to prevent excess steam leakage past the stem without resorting to packing.

3.3 Material. Valve body and bonnet material composition shall be 1-1/4 percent chromium and 1/2 percent molybdenum. Other material shall be as specified in table I. Material for parts not listed in table I shall be suitable for the Intended pressures and temperatures, and selected to prevent galling, seizing, or excessive wear on operating parts. Clearances shall prevent interferences due to thermal expansion.

TABLE I. Material.

Name of parts	Applicable document
Body and bonnet	ASTM A 182, grade F11; ASTM A 217, grade WC6
Yoke	ASTM A 395; ASTM A 216, grade WCB
Gaskets	MIL-G-21032
Bolting	ASTM A 193, grade B16; ASTM A 194, grade 4
Stem	ASTM A 582, type 416; ASTM A 479, type 410
Seat and disc facing	MIL-R-17131, type MIL-RCoCr-A

3.3.1 Hard facing of seats and discs. The seating surfaces of discs and seats shall be hard faced. Welding rods used for hard facing shall be type MIL-RCoCr-A of MIL-R-17131. The finished thickness of hard faced surfaces shall be not less than 3/32 inch. Seating surface shall be liquid penetrant inspected after final machining in accordance with MIL-STD-278 (see 3.4.11.7.2).

3.3.2 Handwheels. Handwheels 10 inches and smaller in diameter shall be of malleable iron or aluminum. Handwheels larger than 10 inches in diameter shall be of aluminum alloy.

3.3.3 Recovered materials. Unless otherwise specified herein, all equipment, materials, and articles incorporated in the products covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term “recovered materials” means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.4 Design and construction.

3.4.1 Threads. Where necessary, provisions shall be incorporated to prevent the accidental loosening of threaded parts. Pipe threads shall not be used. The threads on all threaded fasteners, except handwheel nuts, shall be coated with antiseize compound in accordance with MIL-A-907 prior to assembly.

3.4.2 Interchangeability. Valve design shall permit interchangeability without individual modification of like parts between valves. Each part shall have part number identity, and shall be replaceable on a nonselective and random basis. Physical interchangeability shall be in accordance with the following definition: Interchangeable assemblies, components, and parts are those which are capable of being readily installed, removed, or replaced without alteration, misalinement, or damage to parts being installed or to adjoining parts. No fabrication operations such as cutting, filing, drilling, reaming, hammering, bending, prying, or forcing shall be required. This does not preclude lapping in metal-to-metal seating surfaces to obtain required seat tightness. No special tools shall be required for maintenance of the valve. Parts having the same manufacturer’s part number shall be directly interchangeable with each other with respect to installation and performance without requiring selection or fitting.

3.4.3 Accessibility. Valves shall be accessible for adjustment, repair, or replacement of the solenoid without requiring removal from the line.

3.4.4 Maintainability. Valve design shall permit disassembly and reassembly of internal parts with standard tools and prevent the incorrect reassembly of parts. Positioning and alinement of all parts in the assembly shall employ a positive means so that correct reassembly is repeatedly assured.

3.4.5 Cyclic life. Valves shall pass the cyclic life test of 2,000 cycles as specified in 4.6.4. During and subsequent to this test, valves shall not fail to perform their principal function as specified in 3.2.

3.4.6 Space envelope. The valve shall not exceed the following dimensions: Applicable length (see 3.4.11.2), 17 inches width, and 44 inches in height.

3.4.7 Maintenance envelope. The valve maintenance envelope shall not exceed the following dimensions: 24 inches length by 17 inches width by 58.5 inches height.

3.4.8 Gland exhaust connection. The gland exhaust connections shall be 1/2-inch diameter flanges in accordance with ANSI B16.5.

3.4.9 Welding and fabrication.

3.4.9.1 Welding. Unless otherwise specified (see 6.2.1), welding shall be in accordance with MIL-STD-278.

3.4.9.2 Fabrication. Fabricated assemblies shall be stress relieved as units prior to finish machining. The stress relieving shall be in accordance with MIL-STD-278.

3.4.10 Valve handwheels.

3.4.10.1 Operation. Valve shall be closed manually by clockwise rotation of the handwheel when facing the handwheel. In addition, the handwheel shall not move when the valve is tripped closed.

3.4.10.2 Design. Handwheels 10 inches and smaller in diameter shall be of commercial design. Handwheels larger than 10 inches in diameter shall be in accordance with Drawing 803-1385620, except that they may be forged or die cast.

3.4.10.3 Size. Valve handwheels shall be sized so that a tangential force no more than the value specified in table II is required to be exerted on the rim of the handwheel to affect closure of the valve against a differential pressure equal to the cold working pressure of the valve and pass the hydrostatic pressure test of 4.6.5.

TABLE II. Maximum allowable tangential force to operate valve reset mechanism based on valve handwheel size.

Handwheel diameter (inches)	Tangential force (pounds)
2 and below	90
3	98
4	106
5	112
6	118
7	121
8	124
9	127

TABLE II. Maximum allowable tangential force to operate valve reset mechanism based on valve handwheel size. - Continued

Handwheel diameter (inches)	Tangential force (pounds)
10	130
11	133
12	135
14	138
16	141

3.4. 10.4 Handwheel fastening. Handwheels shall be secured to the valve stem with a locknut.

3.4.11 Body subassembly.

3.4.11.1 Pressure-temperature ratings. The design and pressure-temperature rating for valves shall be 600 and 1,500 class in accordance with ANSI B16.34.

3.4.11.2 End connections. The valves shall be furnished with 2-inch nominal pipe size (rips) flanged ends in accordance with ANSI B16.5. Valves shall be of a basic globe configuration with inline inlet and outlet ports. Flange to flange distance shall be as shown below:

Rating	Flange to flange distance
600 class	13-3/4 inches ± 1/32 inch
1,500 class	16-1/2 inches ± 1/32 inch

3.4.11.3 Bonnet and bottom flange joints. Bonnet and bottom flange (where applicable) shall be flanged for attachment to the body and shall be located by body guiding (i.e., a close tolerance fit between machined diameters on the body, bonnet and bottom flange) rather than depending on studs or bolts for location. Spiral wound gaskets shall be fully retained, and the joints shall have metal-to-metal take-up to provide controlled compression of the gaskets. Joint design shall assure parallel alinement of the valve guiding surfaces. Sufficient bolting area shall be provided to retain metal-to-metal make-up. Flanges shall be secured by one of the following:

(a) Stud bolts threaded the entire length and fitted with a nut on each end. Threads on bolts and nuts shall be a class 2 fit.
(b) Tap-end studs with interference fit at the tap end and a class 2 fit at the nut end. Interference fit shall be in accordance with ANSI B1.12.
(c) Hex head cap screws in accordance with ANSI B18.2.1 or hexagon socket head cap screws in accordance with ANSI B18.3.

3.4.11.3.1 Bonnet flange cap screws shall have a minimum length of one diameter of fully formed threads engaged in the body of the valve. Lead and vanishing threads shall not be counted as fully formed threads.

3.4.11.3.2 Where stud bolts are used, the nuts shall be fully engaged with a minimum of one thread and a maximum of five threads protruding beyond the nut after joint assembly.

3.4.11.4 Spot Lacing. Bearing surfaces of nuts and their respective surfaces on the valve shall be finish machined or cast smooth and true without nut interference.

3.4.11.5 Gland construction. The valve shall utilize a gland exhaust connection. When this is connected to a vacuum of 10 inches of water in accordance with 4.6.7, there shall be no visible leakage past the stem to atmosphere under normal operating conditions. Visible leakage is defined as an amount exceeding that which will form a fixed or stable meniscus or ring of water. Packing shall not be allowed.

3.4.11.6 Gaskets. Spiral wound gaskets shall retain sufficient residual load in service to maintain a leak-tight joint under system operating pressure and temperature.

3.4.11.7 Internal trim.

3.4.11.7.1 Guiding surfaces. A difference in hardness of at least 100 points Brinell shall be maintained between the rubbing surfaces for main valve guiding. This requirement shall not apply if both the guide, posts and bushings are stellited or if the hardness of either exceeds 450 Brinell. Rubbing surfaces for valve guiding shall have a finish of 32 or better in accordance with ANSI B46.1.

3.4.11.7.2 Seat rings. Seat rings shall be seal welded circumferentially into the valve body.

3.4.12 Solenoid release mechanism. The unit shall utilize a 12 Vd.c. electrical solenoid which when energized will cause the valve to trip closed.

3.4.12.1 Solenoid electrical characteristics. The electrical solenoid shall be rated at 12 Vd.c. with a maximum current rating of 4.0 amperes (A). The solenoid shall be designed for continuous duty at 185 degrees Fahrenheit (°F) and classified as dripproof.

3.4.12.2 Manual reset mechanism. Reset of the valve from the trip to the open position shall be accomplished in 25 seconds or less by means of a threaded stem and handwheel device. Clockwise rotation of the handwheel to a positive stop position shall allow manual engagement of the latch mechanism. Counterclockwise rotation of the handwheel shall then allow the latch mechanism to lift the valve to the fully open position. The 1,500 class valve shall open against a pressure differential of 1,200 pounds per square inch (lb/in^2) acting on the top of the disc. The 600 class valve shall open against a pressure differential of 600 lb/in^2 acting on top of the disc. 1500 and 600 class valve openings shall be accomplished by one person without mechanical aid.

3.4.12.3 Response time. The valve, when operating at rated pressure and flow, shall close fully in 1 to 2 seconds. This shall be measured from the time the solenoid is energized to the time the valve stem is in the full closed position.

3.4.12.4 Coils. Coils may be encapsulated or varnish impregnated.

3.4.12.5 Class of insulation. The solenoids shall conform with the requirements specified for NEMA ICS.1, class H insulation.

3.4.12.6 Temperature rise. The maximum temperature rise for the solenoid coils , based on 122°F ambient temperature, shall be 266°F for class H insulation.

3.4.12.7 Mounting positions. The solenoids shall operate properly when mounted in any position.

3.4.12.8 Plating. The solenoid plunger, pole piece, and housing shall be plated in accordance with ASTM B 633.

3.4.12.9 Electrical requirements.

3.4.12.9.1 Operation. Unless otherwise specified in the contract or order, the solenoid shall be capable of 100,000 electrical operations at rated voltage. The solenoid shall operate without hesitation when energized or deenergized. When the solenoid is mounted in any position, the solenoid shall operate in either a continuous or intermittent duty cycle at 85 percent of rated voltage.

3.4.12.9.2 Voltage. The solenoid shall operate at 12 volts full win-e rectifier d.c.

3.4.12.9.3 Dielectric strength. The solenoid shall withstand the power frequency dielectric test of NEMA ICS.1.

3.4.12.9.4 Insulation resistance. The insulation resistance of coil to ground shall be 10 megohms minimum.

3.4.12.9.5 Coil resistance. The resistance on d.c. coils shall be within 10 percent of the design value at 77°F.

3.4.12.9.6 Electrical connection. The electrical connection on the solenoid shall be in accordance with the following:

(a) Plug - MS3406D-14S-7PY
(b) Receptacle - MS3402D-14S-7SY

3.5 Performance requirements.

3.5.1 Capacity. The valve shall have a flow coefficient (C_v) of not less than 40 as defined in ISA S75.02.

3.5.2 Seat tightness. The seat leakage shall not exceed 20 cubic centimeters per hour when pressurized in accordance with 3.5.6.

3.5.3 External leakage. There shall be no visible external leakage during the seat tightness test of 4.6.6.

3.5.4 Manual trip. The solenoid shall be capable of being manually tripped, thereby causing the valve to close, regardless of the position of the disc. Manual trip shall be located so that it is readily accessible to the person at the trip valve, but cannot be tripped accidentally. A guard shall be installed around the trip button, lever, or handle.

3.5.5 Shock and vibration. Valves shall meet the shock requirements for grade A, class 1 of MIL-S-901, and the type I environmental vibration requirements of MIL-STD-167-1 (including the solenoid). This shall apply to the entire valve. The valve shall not inadvertently trip as a result of these conditions. During and subsequent to these conditions, the valve shall perform its principle function as specified in 3.2.

3.5.6 Hydrostatic pressure. The valve shall pass the test of 4.6.5. The hydrostatic pressure shall be as specified in table III.

TABLE III. Hydrostatic tests for shell strength and seat tightness.

Material	600 pound class		1,500 pound class	
	Shell test (lb/in^2)	Seat test (lb/in^2)	Shell test (lb/in^2)	Seat test (lb/in^2)
ASTM A 182, grade F11	2,250	1,650	5,625	4,125
ASTM A 217, grade WC6	2,250	1,650	5,625	4,125

3.6 Marking.

3.6.1 Body marking. The manufacturer's name or trademark and the material composition shall be cast or forged integral with the valve body and bonnet. The size, rating, and a flat arrow or "inlet" and "outlet" shall be cast or forged integral with the valve body. Bridge wall markings shall be cast or forged into the valve body.

3.6.2 Identification plates. Valves shall have an identification plate made of corrosion-resisting steel or brass. Identification plates shall be permanently fastened to a part of the valve not subjected to working pressure and which will not be covered by insulation. Identification plates shall contain the following data or a space therefore:

(a) Manufacturer's name.
(b) MIL-V-24642.
(c) Body material composition.
(d) Size and rating.
(e) maximum inlet temperature and pressure rating.
(f) Manufacturer's model and part number or identification.
(g) Manufacturer's drawing numbers.
(h) Space for 9-digit CID/APL number.

3.7 Technical data. The contractor shall prepare drawings and a technical manual in accordance with the data ordering documents included in the contract or order (see 6.2.2).

3.7.1 Drawings. In addition to the drawing content required by the data ordering document (see 6.2.2), the following, unique technical features shall be included:

(a) Accurately scaled sectional assembly which clearly depicts the design and construction of the valve.
(b) Bill of material listing specification, grade, condition, and any other data required to fully identify the properties of the materials.
(c) Dimensions - overall, accessibility space, including disassembly clearances, and all other dimensions pertinent to installation.
(d) Estimated weight and center of gravity and any limitations on installation of valve which must be noted and approved by the contracting activity prior to manufacture of the first valve.
(e) Reference to any previous shock and vibration for valve and test report numbers.
(f) Details of the seat, disc, and stem assembly and all other replaceable internal trim.
(g) Recommended assembly torques, or equivalent procedures, for making up all joints and threaded assemblies.
(h) Table of seal dimensions and a tabulation of required gasket characteristics including all dimensions (with tolerances) and load versus compression characteristics (with tolerances).
(i) Table of spring data.
(k) Designed flow coefficient.
Mark areas to be radiographer, magnetic particle or liquid penetrant inspected.
(l) identify all weld joint types.
(m) State all references to MIL-STD-278.

3.7.2 Technical manual. In addition to the general requirements covered by the data ordering document (see 6.2.2) and as part of the Technical Manual Contract Requirement (TMCR), the following unique technical features shall be included:

(a) The engineering drawings for the valve (including certification data sheet). Drawings shall be supplemented by additional illustrations where necessary to adequately illustrate the operation and maintenance.
(b) Table listing wrench sizes and assembly torques (or other equivalent procedures for making up all joints and threaded assemblies).
(c) Instructions to permit overhaul by shipyard or other repair facility. These should include procedures for checking all critical dimensions subject to wear or change and the acceptable dimensional limits, surface finish condition, etc. Also, the appropriate procedure (that is, part replacement, correction at repair facility, or repair at manufacturer's facility)

which should be followed to correct each case of damage or wear. These instructions shall provide detailed procedures for regrinding valve seats and discs (where applicable).

(d) Detailed disassembly and reassembly procedures in addition to providing procedures for the complete disassembly and reassembly of the valve. Maintenance and troubleshooting sections shall contain, or refer to, only the limited disassembly and reassembly required to accomplish each particular operation. This is intended to reduce the possibility of unnecessary disassembly and unnecessary disturbance of adjustments when performing specific or limited maintenance or troubleshooting operations.

(e) Complete maintenance and adjustment procedures for ail instrumentation.

A technical manual should accompany each valve.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to the prescribed requirements.

4.1.1 Inspection system. The contractor shall provide and maintain an inspection system in accordance with the data ordering document, included in the contract or order (see 6.2.2).

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

(a) First article inspection (see 4.3).
(b) Quality conformance inspection (see 4.4).

4.3 First article inspection. The first valve of the same class furnished under a contract or order shall be subjected to the examination specified in 4.5.1 and the tests specified in 4.6.1 through 4.6.6. A first article test report shall be prepared in accordance with the data ordering document included in the contract or order (see 6.2.2).

4.4 Quality conformance inspection. Each valve offered for delivery shall be subjected to the examination specified in 4.5.2 and the tests specified in 4.6.5 and 4.6.6. A test report shall be prepared In accordance with the data ordering document included in the contract or order (see 6.2.2).

4.5 Examination.

4.5.1 First article. The valve shall be disassembled (see 4.5.1.1) and visually and dimensionally examined to determine conformance with the

requirements of this specification and drawings. Particular emphasis shall be placed on the dimensions, finishes, and condition of the guiding and seatin surfaces and latches.

4.5.1.1 Disassembly. In lieu of disassembly for examination, valve may be visually and dimensionally examined prior to assembly.

4.5.1.2 Examination after first article tests. Valve shall be disassemb and visually and dimensionally examined for damage and wear after completion o first article tests. Disassembly and reassembly shall be performed to determi the practicability of maintaining a valve of this design (see 3.4.4).

4.5.2 Quality conformance.

4.5.2.1 Visual examination. Each valve shall be visually examined to verify compliance with the requirements of the specification and drawings.

4.5.2.2 Nondestructive tests. Nondestructive tests shall be performed a required by MIL-STD-278.

4.6 Tests.

4.6.1 Operational. The valve shall be assembled and subjected to operating pressure and temperature. The valve gland exhaust connection shall be connected to a vacuum system and monitored with a manometer to determine gland leakage as specified in 3.4.11.5. Stem leakage shall not exceed that specified in 3.4.11.5. The valve shall be manually tripped closed from its fully open position as well as reset as specified in 3.4.12.2 and manually closed . The valve response time, reset time, and the force required to manually open and close the valve shall be recorded and they shall not exceed the values specified herein.

4.6.2 Flow. A flow test shall be conducted in accordance with ISA S75.02. Flow rating shall comply with the value specified in 3.5.1.

4.6.3 Shock and vibration. The valve shall successfully pass the shock tests of MIL-S-901, grade A, class I, and the vibration tests of MIL-STD-167-1, type I and a post shock and vibration operational test. Operation during testing shall be as required in 3.5.5. Post shock operational tests shall be in accordance with 4.6.1. Post shock seat leakage and hydrostatic tests shall be in accordance with 3.5.2 and 3.5.6.

4.6.4 Life cycle. A life cycle test shall be conducted to ensure proper valve operation throughout the required valve life. Life cycle test phases and conditions shall be as specified in tables IV and V. At the conclusion of phase I and phase III of the test, the valve shall be subjected to a hydro-static pressure test and a seat leakage test. The valve shall then be disassembled and inspected in accordance with MIL-STD-278, Cycles incurred during other tests shall not be counted toward the life cycle test.

TABLE IV. Life cycle test phases.

Phase	Number of cycles	Conditions
I	1,800	Cold
II	180	Rated temperature and pressure
III	20	Rated pressure and flow at saturated steam condition

TABLE V. Pressure-temperature conditions for life cycle test.

600 pound class		1,500 pound class	
Pressure (lb/in^2)	Temperature (°F)	Pressure (lb/in^2)	Temperature (°F)
600	950	1,200	950

4.6.4.1 One life cycle from the trip position shall consist of the following:

(a) Reenergize the solenoid.
(b) Rotate the handwheel clockwise to a stop position.
(c) Latch the trip mechanism.
(d) Fully open the valve by turning handwheel counterclockwise.
(e) Energize the solenoid.

4.6.5 Hydrostatic pressure test. Each valve shall be subjected to an internal pressure as specified in table III for a duration of 1 minute (minimum). The water temperature shall not exceed 100°F. Any weeping, leakage, or permanent deformation shall be cause for rejection. The valve shall be tested in the fully open position.

4.6.6 Seat leakage test. Each valve shall be pressurized in the direction of flow and examined for seat tightness. Test pressures shall be in accordance with table III. The testing medium shall be clean tap water with no additive other than cutting oil at temperatures not less than 40°F or more than 100°F. Duration of test shall be 1 minute (minimum). There shall be no visible signs of leakage. Should there be any visible leakage, this test shall be continued for the length of time required to accurately determine the rate of leakage. Leakage shall not exceed 20 cubic centimeters per hour. The valve shall be tested in the tripped closed position.

4.6.7 Gland exhaust leakage. The valves gland exhaust flange shall be connected to a manometer with a graduated scale of 30 inches of water and a vacuum system to meet the requirements as specified in 3.4.11.5,

4.7 Verification of material identification and control. Valves will be used in critical shipboard systems. The use of incorrect or defective material would create a high probability of failure resulting in serious personnel injury, loss of life, loss of vital shipboard systems, or loss of the

ship itself. Therefore, valves have been designated as level I material and special control procedures are invoked to ensure receipt of correct material.

4.7.1 Materials which form the pressure boundary valves shall be controlled by the level I requirements specified in 4.7.1.1.

4.7.1.1 Quantitative chemical and physical analysis of material traceable to heat identification shall be required for the following. Certification documentation (see 6.2.2) shall include, in addition to the material specification: class, form, condition, grade, type and composition, as applicable to material supplied.

(a) Valve body.
(b) Valve bonnet.
(c) The valve stem which penetrates the pressure boundary.
(d) Metallic pressure boundary internal parts.
(e) Threaded fasteners, 1/2 inch nominal and larger.
(f) The following are specifically excluded for level I material control requirements:
(1) Pressure seals, such as O-rings.
(g) Questions regarding applicability of level I requirements shall be referred to the Naval Sea Systems Command.
(h) A statement of hydrostatic tests performed giving test pressures.

4.8 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with requirements of section 5 and the documents specified therein.

5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the preparation for delivery requirements of referenced documents listed in section 2, see 6.4.)

5.1 Preservation-packaging, packing, and marking. valves shall be individually preserved-packaged level A or C, packed level A, B, or C, as specified (see 6.2.1), and marked in accordance with MIL-E-17555.

6. NOTES

6.1 Intended use. The 2-inch auxiliary turbine trip valves covered by this specification are intended for use in steam service.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification,
(b) Rating required (see 1.2).
(c) When first article is required (see 3.1).

(d) If welding is other than specified (see 3.4.9.1).
(e) Level of preservation-packaging and packing required (see 5.1).

6.2.2. Data requirements. When this specification is used in acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL), the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered In accordance with the approved CDRL incorporated into the contract. When the provisions of FAR 52.227-7031 are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

Paragraph no.	Data requirements title	Applicable DID no.	Option
3.701	Drawings, engineering and associated lists	DI-E-7031	Level 2 Design activity designation - contractor Drawing no. - contractor delivery of hard copy - contracting activity
3.7.2	Commercial off-the-shelf manual	DI-M-7024	MIL-M-15071, type I
4.1.1	Inspection system program plan	DI-R-4803	----
4.3	First article inspection procedure	DI-T-4901	----
4.3	First article inspection report	DI-T-4902	----
4.4	Report, test/inspection	UDI-T-23473	----
4.4	procedures, test	UDI-T-23732	----
4.7.1.1	Certification data for level I material	UDI-T-23191	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19L., Vol. II, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 The data requirements of 6.2.2 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted

by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical Item has been supplied previously (for example, test reports).

6.2.2.2 Limited rights legend. When the Government has only limited rights in the data shown on the drawings, as determined by the contractual provisions regarding rights in technical data, the drawings furnished may be marked with the following restrictive legend:

"Furnished under United States Contract No. . Shall not be either released outside the Government, or used, duplicated, or disclosed in whole or in part for manufacture or acquisition, without the written permission of , except for: (a) emergency repairs or overhaul work by or for the Government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work; Or (b) release to a foreign government, as the interests of the United States may require; provided that in either case the release, use, duplication or disclosure hereof shall be subject to the foregoing limitations. This legend shall be marked on any reproduction hereof in whole or in part."

6.3 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as 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.

6.4 Sub-contracted material and parts. The preparation for delivery requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.5 Provisioning. Provisioning Technical Documentation (PTD), spare parts, and repair parts should be furnished as specified in the contract.

6.5.1 When ordering spare parts or repair parts for the equipment covered by this specification, the contract should state that such spare parts and repair parts should meet the same requirements and quality assurance provisions as the parts used in the manufacture of the equipment. Packaging for such parts should also be specified.

Preparing activity:
Navy - SH
(Project 4810-N054)

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-V-24642(SH)	Valve, 2-Inch NPS, Auxiliary Turbine Overspeed Trip, Solenoid Activated

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)* _____

5 PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

(FOLD BACK ON THIS FORM, CUT ALONG THIS LINE.)