

INCH-POUND

A-A-59469

23 June 1999

SUPERSEDING

MIL-W-19044E

18 September 1993

COMMERCIAL ITEM DESCRIPTION

WASHER-EXTRACTOR, LAUNDRY, 35 TO 200 POUND CAPACITY
(NAVAL SHIPBOARD)

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. SCOPE

This commercial item description (CID) covers fully automatic 35 to 200 pound (dry weight) capacity combination washer-extractor machines for Naval shipboard use. They are not suitable for use aboard Navy submarines.

2. CLASSIFICATION

Type 1: Steam booster heater
Type 2: Electric booster heater

Class 1: (Not used)
Class 2: Microprocessor automatic formula control unit
Class 3: Programmable logic control automatic formula control unit

Style 1: Unsectionalized
Style 2: Sectionalized

3. SALIENT CHARACTERISTICS

3.1 Design and construction. The washer-extractor shall be front loading, fully automatic, shell and cylinder (either open-pocket for washer-extractors 75 pounds or less or three-pocket for washer-extractors 100 pounds or greater, see Table I) with rotating action about the horizontal axis. Axial rotation of cylinders shall incorporate reversing action during appropriate parts of the cycle.

3.1.1 Shell. The shell shall be watertight and rigid. The front of the shell shall be removable to permit replacement of the cylinder and the shell seams shall not pass through the drain valve opening. The shell shall consist of the following: openings for a door; cylinder shaft; four-compartment automatic and manual supply dispensers; water piping and either steam or electric heat exchanger; drain outlet; overflow and vent outlet; and water level and temperature indicator. When the door is fitted with a window, the tempered glass used shall be strong enough to prevent damage under normal operation. The glass shall be sealed and be readily replaceable.

3.1.2 Cylinder. The cylinder construction shall be rigid. Perforations in the cylinder shall be sized and spaced for efficient washing, rinsing, and extraction. If the cylinder is the three-pocket type, it shall be provided with a hinged door as part of the front head and a means to prevent laundry from falling between the cylinder and shell during loading and unloading. The door shall be not less than 150 square inches for each 50 pounds of rated washer-extractor capacity.

Beneficial comments, recommendations, additions, deletions, clarifications, etc., and any other data which may improve this document should be sent to: Commander, Naval Sea Systems Command, 2531 Jefferson Davis Highway, Arlington, VA 22242-5160.

AMSC N/A

FSC 3510

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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3.1.2.1 Brake. The washer-extractor shall be provided with an electric or pneumatic power-operated brake for rapid deceleration and stopping of the cylinder. The brake shall stop rotation of a loaded cylinder within 60 seconds during any part of the extraction cycle.

3.1.3 Capacity, size, weight and volume. The capacity, size, weight, and volume of the washer-extractor shall be in accordance with Table I.

TABLE I. Capacity, size, weight, and volume.

Normal capacity per load up to this dry weight (pounds)	Overall dimensions (inches, maximum)			Maximum weight (pounds)	Cylinder volume (ft ³ , min.)	Cylinder pockets
	Length (across front)	Depth (front to rear)	Height			
35	35	45	62	900	6.1	Open
60	35	52	65	1300	9.0	Open
75	60	64	74	2600	12.4	Open
100	60	50	66	3000	20.0	Three
150	70	50	72	3500	27.0	Three
200	70	58	72	3750	34.5	Three

3.1.4 Style 2, Sectionalized. The style 2 washer-extractor shall be constructed to be disassembled, transported through a shipboard access measuring 26 X 66 inches with 8-inch radius corners and reassembled within the ship without hot work such as welding or brazing. Major subassemblies that bolt together are preferred and shall be match-marked to assist in field reassembly.

3.1.5 Water consumption. The contour and configuration of the shell plating and the location and configuration of the booster heater shall be such that the water consumption will be kept to a minimum. Water levels shall be readily adjustable in the field.

3.1.6 Pipes, fittings, valves, and connections. Piping valves and fittings shall have a working pressure of 100 pounds per square inch. A vacuum breaker backflow preventer shall be installed in the water inlet piping system.

3.1.6.1 Automatic valves. The drain valve, hot and cold freshwater inlet valves, and steam inlet valve (on type 1 washer-extractor) shall be electric or pneumatic and automatically controlled by the automatic formula control unit.

3.1.6.2 Inlet valves. Two separate inlet valves, for hot and cold fresh water, shall be provided. The machine shall also be fitted with a threaded 1-1/2 inch connection on the top of the shell for manual salt water supply. (Shipboard requirement, see 7.2)

3.1.6.3 Overflow and vent connections. The washer-extractor shall be provided with combination overflow and vent connections, located so that the overflow may be piped to the drain line when the washer-extractor is installed.

3.1.6.4 Type 1, washer-extractor, steam connection. The type 1 washer-extractor shall be provided with a steam connection not less than a threaded 1/2-inch national pipe size.

3.1.6.5 Drain valve. A normally open drain valve shall be fitted at the lowest point of the shell. A filter shall be provided to prevent foreign objects from passing through the drain valve into the ship's drainage system. The filter shall be readily accessible and easily removable for cleaning.

3.1.7 Automatic supply. Each washer-extractor shall have an automatic supply dispenser for adding supplies under control of the automatic formula control unit. The dispenser shall contain not less than four compartments which can be filled manually at the beginning of the wash cycle. Supply dispenser compartments shall be the water flushing type. Automatic supply dispensers shall not allow soap or detergent to clog or cake. Tilt cans, dump cans, or supply cups shall not be used.

3.1.7.1 Automatic supply injection hose assembly. The hose assembly shall consist of an inner rubber tube, two or more plies of fabric braid reinforcement with a rubber ply between the braids, a cover, couplings, and clamps.

3.1.7.1.1 Inner tube. The inner tube shall be homogeneous, nonporous, water resistant, and shall be of uniform thickness.

3.1.7.1.2 Fabric reinforcement. The fabric reinforcement shall consist of two or more plies of braided cotton, rayon, or polyester, embedded in a rubber compound with a rubber ply between the braids. The reinforcement shall be evenly and uniformly braided, free from knots, lumps, irregularities of twist, and all other defects.

3.1.7.1.3 Couplings. For the hose, each 3-feet of length shall have one male and one female coupling fitted into alternate ends of the hose.

3.1.7.1.4 Clamps. Each coupling shall be secured on the hose end by means of three metal clamps staggered at 120 degrees.

3.1.8 Manual supply. A separate opening shall be provided for manual addition of supplies. The opening shall be designed to protect against water splashing or overflowing during normal operation or in the event the washer-extractor overfills.

3.1.9 Type 1 and type 2, washer-extractor, booster heater. Each washer-extractor shall be provided with a booster heater unit. One of the following two types of booster heaters shall be provided, depending on the type of washer-extractor: (1) Indirect steam heating for type 1 washer-extractors, or: (2) Electric heating for type 2 washer-extractors. The booster heater shall be located in the tub and shall remain fully submerged at inclination angles of 12 degrees at the lowest water level fill. The configuration of the booster heater shall efficiently heat the tub water as specified in 3.4.1. (Shipboard requirement, see 7.2)

3.1.9.1 Type 1, washer-extractor, indirect steam heater. Each type I washer-extractor shall be provided with a means of efficiently transferring the heat entering the washer-extractor at the steam connection to the wash and rinse solutions, without the steam or its condensate coming into direct contact with the solution or wash load. A steam heat valve, strainer, and trap shall be provided with the steam piping system and shall be suitable for 100 psi saturated steam working pressure. The heat exchanger assembly shall be in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII.

3.1.9.2 Type 2, washer-extractor, electric immersion heater. The heating elements shall operate on 440 VAC, 60 Hz, three-phase power and shall use power at a rate not greater than the maximum specified in Table II.

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TABLE II. Power usage of heating element assembly

Normal maximum capacity per load (dry weight, pounds)	Maximum power (kW)
75	24
100	35
150	50
200	60

3.1.10 Mounting. The unit shall be provided with not less than four bolt holes suitable for securing the unit to the deck.

3.1.11 Drives.

3.1.11.1 Cylinder drive. The cylinder shall be driven by an electric motor or motors through V-belts or a combination of gearing and V-belts to provide proper speed for the washing, extracting, and draining (distribution) cycles. The cylinder shall perform not more than three reverse rotations per 95 seconds during the washing cycle. A means shall be provided for inching the cylinder door to the proper loading position on three-pocket washer-extractors. Means shall be provided for adjusting tension of the V-belts.

3.1.11.2 Gears. Gears shall be in accordance with AGMA 2000-A88 and AGMA 2001-B88. The gears shall transmit full rated horsepower throughout the speed ranges without failure for the expected service life of the washer-extractor.

3.1.12 Interlock and safety devices.

3.1.12.1 Functional modes. Safety and interlocking devices shall function for both clockwise and counterclockwise rotation of the cylinder and when the ship is rolling or listing at not less than 12° from its normal position. (Shipboard requirement, see 7.2)

3.1.12.2 Wash-extract interlock. The driving arrangement shall permit changing from the wash to the extract cycle and vice versa with interlocking feature to ensure smooth transfer.

3.1.12.3 Brake interlock. The main brake shall be normally closed and prevent cylinder rotation while the machine is off. Also, in the event of power loss and/or loss of low pressure air the brake shall close automatically.

3.1.12.4 Shell door interlock. The shell door shall be fitted with an electric interlock that prevents the door from being opened when the machine is in the extract mode, and prevents rotation of the cylinder when the shell door is open except in the JOG mode.

3.1.12.5 JOG buttons. JOG or inching buttons shall be provided on the control panel on multi-pocket machines. The JOG function shall require the use of both hands of the operator while inching the cylinder. Depressing both the JOG button and either of the directional buttons shall release the brake and engage cylinder movement. Releasing either button shall bring the cylinder to an immediate stop.

3.1.12.6 Guards. Exposed belts, shafts, pulleys, and other moving parts shall be fully enclosed by metal guards. Gears shall be fully enclosed in gear housing. Metal guards shall be firmly supported, but shall also be readily removable for maintenance.

3.1.12.7 Vibration switch. The washer-extractor shall be provided with an adjustable vibration limit cutout device to disconnect service should excessive equipment-damaging vibration occur.

3.1.12.8 Drain interlock. An interlock shall be provided which will prevent the machine from extracting until the water level has drained to a safe level.

3.1.12.9 Emergency stop button. The washer-extractor shall be provided with an emergency stop button, located on the front of the unit within an accessible area. The button shall bring the washer-extractor to an immediate stop when activated.

3.1.13 Automatic formula control unit. Each washer-extractor shall be provided with an automatic formula control unit for controlling the washer-extractor through any complete cycle of wash, multiple rinse, drain, and intermediate and final extraction phases up to 60 minutes in duration. The unit shall automatically control fills, drains, temperatures, rinses, extracts, supply injection, all phases of clutching and braking, and audible and visible signals. The automatic formula control unit shall be the solid state, microprocessor type on class 2 washer-extractors and the programmable logic control type on class 3 washer-extractors.

3.1.13.1 Functional control. Water level control shall be achieved by a switch electrically interconnected to the automatic formula control unit as programmed. The control unit shall automatically control the water level for not less than two separate levels and a safety level (3.1.12.8) and shall automatically add water to compensate for water absorbed by the load. The water levels shall be readily adjustable. Water temperature control be achieved by thermostatic regulation of the hot and cold water inlet valves and the booster heater and shall be electrically interconnected to the automatic formula control unit as programmed. Means shall be provided to allow the operator to set and adjust not less than two separate bath temperatures ranging from 60 to 220 °F; (1) A controlled temperature bath in which the hot and cold water valves alternately cycle open and closed to approximately attain the set point temperature, timing shall advance after the water level is attained, and (2) A heated temperature bath in which the machine fills with hot water after which the heater shall energize if the bath temperature is below the set point temperature (the heater shall not energize until the minimum water level is attained). An ON/OFF switch shall be provided on the control unit which shall allow formula timing to advance while the heater is energized. With the switch in the OFF position the timing shall not proceed until the heated bath set point temperature is attained. The thermostatic control shall provide a digital display which will allow the operator to scroll through the set point temperatures and actual bath temperature.

3.1.13.2 Class 2, microprocessor control unit. The microprocessor formula control unit located on the class 2 washer-extractor shall have an operational mode for storing not less than four independent laundry wash formulas. The four formulas shall have not less than 25 separate steps (that is, break suds, rinse, extract, drain, and finish). The control unit shall be provided with a means to start, stop, or reset the existing selected formula.

3.1.13.2.1 Class 2, non-programmable control unit. The nonprogrammable control unit shall be preprogrammed with three standard Navy wash formulas published in the Navy Exchange Service Command Ship's Store Bulletin, and one short-cycle test formula which demonstrates each phase of operation. The nonprogrammable control unit shall retain formulas on a single replaceable etched electronic chip. Replaceable chips shall snap in and out of microprocessor circuitry without any type of soldering, rewiring, or special tools.

3.1.13.2.2 Class 2, programmable controllers. The programmable control unit on the class 2 washer-extractor shall retain formulas in static random access memory, incorporating a back-up power source to maintain the memory in case power is lost to the washer-extractor. A locking mechanism shall be provided to prevent accidental reprogramming or tampering by untrained and unauthorized personnel. The circuitry for the microprocessor shall reside on circuit boards which can be removed and replaced using a plug-type receptacle. The mounting of the circuit boards within the microprocessor shall prevent electrical

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disconnection or shorting under adverse conditions such as washer-extractor out-of-balance and vibrational forces.

3.1.13.3 Class 3, programmable logic control. The programmable logic control automatic formula control unit shall be preprogrammed with three standard Navy wash formulas published in the Navy Exchange Service Command Ship's Store Bulletin, and one short-cycle test formula which demonstrates each phase of operation. Each of the four formulas shall be energized by pressing a single, individual push-button located on the front of the control panel. A means shall be provided to lock-out the test formula to prevent its use except during testing and maintenance operations. Interruption of the formula at any time during the cycle shall automatically reset the formula to the beginning of the cycle. A program pause or program advance feature shall not be provided. Program memory shall be stored in EEPROM memory. The EEPROM cassette shall be mounted to the programmable logic control unit and shall be readily replaceable to accommodate program changes. The programmable logic control unit shall be in accordance with UL 508.
(Shipboard requirement, see 7.2)

3.1.13.4 Manual operation.

3.1.13.4.1 Class 2, microprocessor control unit. Switches, push-buttons or similar devices shall be provided on the control panel to allow the operator to control the machine through a complete manual wash cycle independent of the programmed formulas.

3.1.13.4.2 Class 3, programmable logic control unit. An integrated female pin connector for manual override operation shall be provided. Its location shall be in an accessible area on the back of the control panel electrical box enclosure. Manual operation shall be independent of the programmable logic control unit and shall individually control hot and cold water valves, wash, low extract, drain, and brake. The phases of manual operation shall be controlled by a hand held remote control unit with a male pin connector and individual switches corresponding to each phase of manual operation. Braking and door interlocks shall be automatically incorporated into the manual operation. The female pin connector shall be threaded and provided with a protective cap.

3.1.13.5 Automatic formula control unit mounting. The automatic formula control unit shall be mounted directly to the washer-extractor. The control unit shall permit easy viewing and accessibility, and shall not interfere with the operation or maintenance of the washer-extractor. The mounting shall also inhibit the transfer of vibration and provide a dripproof seal for the controller.

3.1.14 Interchangeability. All parts of components or assemblies of the washer-extractor having the same manufacturer's part number shall be manufactured to standards and tolerances that will provide for the interchangeability of respective replacement parts between assemblies and components of the washer-extractor without modification of the part or the washer-extractor.

3.2 Materials.

3.2.1 Structure. The frame, base, and strength members shall be constructed of malleable iron, ductile iron, or steel, hot-dipped galvanized in accordance with ASTM A123 for corrosion protection. Gray cast iron or other brittle materials shall not be used for these parts. Except as otherwise specified herein, gray cast iron may be used for other components such as gear reducers and bearing housings, which are not strength members unless manufactured as an integral part of the frame. Aluminum castings shall not be used.

3.2.2 Shell. The shell, including the shell door, shall be constructed of stainless steel in accordance with ASTM A167, type 302 or 304, nickel-copper

alloy (not less than 60 percent nickel) or ferrous metal with stainless liners on the side exposed to the washing solution.

3.2.3 Cylinder. The cylinder shall be constructed of stainless steel in accordance with ATSM A167, type 302 or 304, or of nickel-copper-alloy (not less than 60 percent nickel). The driving trunnion and spider shall be constructed of the same material as the cylinder, or ferrous metal protected by hot-dip galvanizing in accordance with ASTM A123, or by a stainless steel coating.

3.2.4 Pipes. Pipes shall be constructed of stainless steel, in accordance with ASTM A269, type 304, of brass in accordance with ASTM B43, or of copper in accordance with ASTM B75.

3.2.5 Flexible steam hose assemblies. Flexible steam hose assemblies shall be extruded or convoluted tetrafluoroethylene hose with stainless steel wire braid and end fittings in accordance with SAE AS 604 or SAE AS 620.

3.2.6 Flexible hot and cold water hose assemblies. Flexible hot and cold water supply hose assemblies shall consist of a synthetic rubber tube, synthetic fiber reinforcement, and a synthetic rubber cover. The rubber compounds shall use polymerized chloroprene or a copolymer product of butadiene as the basic material. The reinforcement shall consist of high quality polyester or aramid fibers, processed and treated to obtain high strength and low creep properties. The frictioned fabric layer, if used, shall be a cotton, synthetic, or combination cotton-synthetic fiber.

3.2.7 Fittings. Fittings shall be cast of bronze in accordance with ASTM B61 or ASTM B62, or shall be stainless steel.

3.2.8 Valves. Valves shall be cast of bronze in accordance with ASTM B61.

3.2.9 Supply dispensers. The automatic and manual supply dispensers shall be constructed of stainless steel.

3.2.10 Booster heater.

3.2.10.1 Type 1, washer-extractor, indirect steam heater. The heat exchanger assembly shall be in accordance with ASME Boiler and Pressure Vessel Code, Section II.

3.2.10.2 Type 2, washer-extractor, electric immersion heater. The tubular electric heating elements on type 2 washer-extractor booster heaters shall be the screw plug type, sheathed in Incoloy (800 or 825) or Iconel (600 or 625) or equal. The spiral wound resistance wire composition shall be 80 percent nickel/ 20 percent chromium suspended in a densely packed magnesium oxide dielectric. Insulating material for formed parts such as spacers, cores, or bushings shall be a high quality electrical grade ceramic of high insulation resistance, formulated for physical and thermal strength.

3.3 Electrical requirements. The unit shall operate on 440 VAC, 60 Hz, three-phase power, as defined in DOD-STD-1399, Section 300, and shall have provisions for making direct (hardwired) connections for electric power (3 conductors) and for equipment grounding (1 conductor). All outermost metallic surfaces shall be grounded via the equipment grounding connection. The grounding resistance between any exposed metallic surfaces and the common ground point shall be not greater than 0.1 ohm. Electrical components, other than the hermetically sealed motor, shall be provided in accordance with NEMA 250, Type 13 or equivalent enclosure protection. Metal parts of electrical components and enclosures shall be inherently corrosion resistant or shall be treated and processed for corrosion resistance in accordance with IEEE Standard 45. (Shipboard requirement, see 7.2)

3.3.1 Electric motors. Electric motors shall be in accordance with NEMA MG 1 and shall have the following characteristics.

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Rating	Continuous
Insulation	Class B or F
Voltage	440 VAC, 60 Hz, three-phase
Enclosure	Drip-proof or better
Speed	Wash motor: constant, reversing not less than three times per 95 seconds Extract motor: multispeed
Protection	Thermally protected

3.3.1.1 Wire. The motor shall be wound with wire sizes in accordance with American Wire Gauge.

3.3.1.2 Controllers. Motor controllers shall be of the magnetic type with overload protection relays. Contactors shall switch all three lines of three-phase circuits and both sides of single-phase power circuits. Motor controllers shall provide thermal overload protection for motors of 1/8-horsepower or larger. Control circuits shall operate at not greater than 240 VAC. Reduced voltage control circuits shall be protected by cartridge fuses sized not greater than 200 percent of the transformer kilovoltampere rating or 100 percent of control wire amperage rating, whichever is smaller. Start, stop, and jog buttons and interlocks shall be commercially drip-proof.

3.4 Performance requirements.

3.4.1 Booster heater efficiency. The type 1 washer-extractor booster heater shall increase water temperature by 15 °F per minute. The type 2 washer-extractor booster heater shall increase water temperature by 10 °F per minute.

3.4.2 Inclined operation. The unit shall operate satisfactorily, in accordance with the requirements of this CID (such as the door remaining closed to prevent the loss of contents) when inclined at angles of 12° to the left, front, right, and back. There shall be no spillage of liquid or product when test operated through a complete wash formula with a capacity load. The overflow may be blanked off during this test. (Shipboard requirement, see 7.2)

3.4.3 Extract efficiency. The machine shall extract water from a load of 100 percent cotton fiber to the extent the water retention of the material shall not be greater than 55 percent after five minutes of extraction.

3.4.4 Environmental suitability. The unit shall be capable of withstanding ship's vibration and motion. Controls, switches, moving parts, and electrical circuits shall operate under shipboard conditions without malfunction, binding, excessive looseness, or damage, when tested in accordance with MIL-STD-167-1, type I equipment. The unit shall be secured to the test machine in the same manner that it will be secured on shipboard. (Shipboard requirement, see 7.2)

3.4.5 Shipboard power. Washer-extractor shall meet the following shipboard requirements. (Shipboard requirement, see 7.2)

<u>Requirement</u>	<u>Performance requirement</u>
Steady state voltage and frequency	The unit shall operate satisfactorily at voltages and frequency ranges of ± 5 percent of the normal ratings.
Transient voltage and frequency	The unit shall return to normal operation following a transient voltage of ± 18 percent of the normal rating for a period of two seconds and transient frequency of

Power interruption	± 8 percent of the normal rating for a period of two seconds. When the external power source is suddenly interrupted the unit shall return to normal operation without deterioration in performance after power is reapplied at intervals between 0.5 and 20 seconds.
Insulation resistance	The insulation resistance of electrical circuits shall not be less than 10 megohms at 500 volts direct current.
Leakage current	The leakage current of the equipment shall not be greater than 5mA to ground when measured through a 1500 ohm resistive load.
Power input/motors	The motors shall not draw in excess of the rated current after accelerating to full speed under full capacity.

3.5 Standards compliance. The unit shall be in accordance with and certified to meet the applicable requirements of UL 508 and UL 969.

3.6 Finish. Stainless steel shall have a type 2B or smoother finish, in accordance with ASTM A480.

3.7 Label plates. The unit shall be provided with a data nameplate and an instruction plate, both attached to the front of the unit. They shall be readily visible during normal operating use and shall not adversely affect the life and utility of the unit.

3.7.1 Data nameplate. The data nameplate shall contain the manufacturer's name, model, serial number, date manufactured, and any other information needed to uniquely identify the unit.

3.7.2 Instruction plate. The instruction plate shall provide instructions for start-up, operation, and shut-down.

3.8 Shock hazard labels. A label reading " Danger - Shock Hazard" shall be affixed to the outer case assembly, on or adjacent to each service access cover near one of the fasteners securing the cover. In addition, a warning label in accordance with UL 969 shall be placed near the high voltage components inside the equipment. This label shall include, but not be limited to the following texts:

- Danger - Shock Hazard.
- Power supply must be disconnected before servicing.
- Access covers must be in place before use.
- Service should be performed by authorized personnel only.

4. REGULATORY REQUIREMENTS

The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation.

5. QUALITY ASSURANCE PROVISIONS

5.1 Product conformance. The product provided shall meet the salient characteristics of this CID; conform to the producer's own drawings, specifications, standards, and quality assurance practices; and be the same

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product offered for sale in the commercial market, or the same product that has been delivered to the Government for shipboard use on a previous procurement. The Government reserves the right to require proof of such compliance.

6. PACKAGING

Preservation, packing, and marking shall be as specified in the contract or purchase order.

7. NOTES

7.1 Ordering data.

- Title, number, and date of this CID
- Type and class required
- Open or three-pocket cylinder construction (see Table 2)
- When required, manuals shall be in accordance with ASTM F760

7.2 Shipboard requirement. Whenever a " (Shipboard requirement)" is included in a paragraph under SALIENT CHARACTERISTICS, it is meant that the requirement is something that is not normally offered to the commercial market by the manufacturer.

7.3 Sources of documents.

7.3.1 Military documents. Copies of documents required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.

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|---------------|---|--|
| DOD-STD-1399 | - | Interface Standard for Shipboard Systems Section
300A Electric Power, Alternating |
| MIL-STD-167-1 | - | Mechanical Vibrations of Shipboard Equipment |

7.3.2 American Society for Testing and Materials (ASTM) Standards. ASTM Standards are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

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|-----------|---|--|
| ASTM A123 | - | Standard Specification for Zinc (Hot Dip Galvanized)
Coatings on Iron and Steel Products |
| ASTM A167 | - | Standard Specification for Stainless and Heat-resisting
Chromium-Nickel Steel Plate, Sheet, and Strip |
| ASTM A269 | - | Standard Specification for Seamless and Welded
Austenitic Stainless Steel Tubing for General Service |
| ASTM A480 | - | General Requirements for Flat-Rolled Stainless and
Heat-Resisting Steel Plate, Sheet, and Strip |
| ASTM B43 | - | Standard Specification for Seamless Red Brass Pipe,
Standard Sizes |
| ASTM B61 | - | Standard Specification for Steam or Valve Bronze
Castings |
| ASTM B62 | - | Standard Specification for Composition Bronze or Ounce
Metal Castings |
| ASTM B75 | - | Standard Specification for Seamless Copper Tube |
| ASTM F760 | - | Food Service Equipment Manuals |

7.3.3 American Gear Manufacturers Association (AGMA) Standards. AGMA Standards are available from the American Gear Manufacturers Association, 1500 King Street, Suite 201, Alexandria, VA 22314-2730.

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|-----------|---|---|
| AGMA 2000 | - | Gear Classification and Inspection Handbook Tolerances
and Measuring Methods for Unassembled Spur and Helical
Gears |
| AGMA 2001 | - | Fundamental Rating Factors and Calculation Methods for
Involute Spur and Helical Gear Teeth |

7.3.4 Society of Automotive Engineers (SAE) Standards. SAE Standards are available from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

- SAE AS 604 - Hose Assembly, Tetrafluoroethylene, 400 Degrees F, 3000 psi Hydraulic, Heavyweight
- SAE AS 620C - High Temperature Hose Assembly, Convoluted Tetrafluoroethylene, for Aircraft

7.3.5 Underwriters Laboratories (UL) Standards. UL Standards are available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062.

- UL 508 - UL Standard for Safety Industrial Control Equipment (Sixteenth Edition)

7.3.6 American Society of Mechanical Engineers (ASME) Standards. ASME Standards are available from the American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017.

- Boiler and Pressure Vessel Code, Section VIII - Rules for Construction of Pressure Vessels

7.3.7 National Electrical Manufacturers Association (NEMA) Standards. NEMA Standards are available from the National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209.

- NEMA MG 1 - Motors and Generators
- NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum)

7.3.8 The Institute of Electrical and Electronic Engineers (IEEE) Standards. IEEE Standards are available from The Institute of Electrical and Electronic Engineers, 445 Hoes Lane, P.O. Box 1331, Piscataway, NJ 08855-1331.

- IEEE 45 - IEEE Recommended Practice for Electric Installations on Shipboard

7.4 Suggested sources of supply. Manufacturers known to meet the requirements of this CID are listed below. However, competition is not limited to these companies.

Edro Corporation
37 Commerce Street
East Berlin, CT 06023

Pellerin Milnor Corporation
P.O. Box 400
Kenner, LA 70063

MILITARY INTERESTS:

Custodian:
Navy - SH

CIVIL AGENCY COORDINATING ACTIVITIES:
GSA - FSS

Preparing activity:
Navy - SH
(Project 3510-0369)