

[INCH-POUND]  
A-A-59223  
May 18, 1998  
SUPERSEDING  
F-C-2791  
November 29, 1991

## COMMERCIAL ITEM DESCRIPTION

### COOLING TOWERS, LIQUID

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 factory assembled, induced mechanical draft and forced mechanical draft cooling towers for commercial and industrial use.
2. **CLASSIFICATION.** The cooling towers shall be of the following types, as specified (see 7.2).

#### TYPE

- Type I - Induced mechanical draft.
- Type II - Forced mechanical draft.

### 3. SALIENT CHARACTERISTICS.

3.1 Description. The cooling towers shall be of the induced mechanical draft or forced mechanical draft type as specified (see 2. and 7.2). The cooling towers shall be comprised of the following components and parts: frames and casings, louvers, drift eliminators, partitions, cold water basin equipment, fans, blowers, drives, electric motors, access doors, ladders, working platforms (if specified), inspection plates, and panels.

3.2 Standard commercial product. The cooling tower shall, as a minimum, be in accordance with the requirements of this CID and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this CID, but which are a

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part of the manufacturer's standard commercial product, shall be included in the cooling tower being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs or brochures, and represents the latest production model.

3.3 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to ensure interchangeability of component parts, assemblies, accessories, and spare parts.

3.4 Safety. Heavy-duty metal guards or enclosures shall be provided over all fans and around other rotating or reciprocating parts in accordance with Occupational Safety and Health Administration (OSHA) regulations. Inlets and openings other than louvered openings shall be provided with readily removable screens. Discharge fans shall be protected by a ruggedly framed screen or guard installed outside the fan and removable for service conforming to OSHA regulations. Ladders, safety cages, handrailings, working platforms, and fittings shall be provided where required, in accordance with OSHA regulations. All towers shall be designed and constructed to provide ready access for maintenance, servicing and repair.

3.5 Construction. The design of the cooling tower shall meet the requirements of this CID. All towers shall be constructed to withstand a wind pressure of not less than 30 pounds force per square foot (psf) (1.44 kilopascal (kPa)) on any external surface. Fan decks shall be constructed to withstand a live load of not less than 60 psf (2.87 kPa) in addition to the concentrated or distributed loads of equipment mounted thereon. When specified (see 7.2), a 15 percent increased loading shall be included for ice or snow load. The hot water distribution system shall be of the open basin gravity feed type or the pressurized spray header type design.

3.5.1 Towers and tower frames. The tower frame material shall be as specified (see 7.2).

3.5.2 Cold water basins and casings. Casings shall have suitable seals and flashings at joints and connections to ensure watertight construction and to minimize and control leakage.

3.5.3 Inlet and discharge terminations. When specified (see 7.2), on forced draft centrifugal type units the air inlet and discharge terminations shall have flanged or lipped projections for connecting to duct work.

3.5.4 Frames and louvers. Intermediate structural members shall be provided, whenever required, for rigidity and support of casings, louvers, fill, distribution systems, fan decks, and other equipment. Inlet air louvers shall permit free air passage and be designed to prevent debris and sunlight from entering the cold water basin while eliminating splashout.

3.5.5 Fill or contact surfaces. The fill shall support expected loads without sag or failure and arranged to effectively break up the water. The fill shall be manufactured and performance tested by the cooling tower manufacturer. The fill shall be of the materials as specified (see 7.2). Polyvinyl chloride fill is suitable for inlet temperatures to 125 degrees Fahrenheit (°F)

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(51.7 degrees Celsius (°C)) on cross flow type units and temperatures to 130 °F (54.4 °C) on counterflow type units. Chlorinated polyvinyl chloride fill shall be used for applications where inlet temperatures are greater than 130 °F (54.4 °C).

3.5.6 Drift eliminators. Drift eliminator sections shall be designed in accordance with commercial practice and arranged to effectively trap water droplets entrained in the discharge airstream. Sections shall be assembled in easily removable sections for type II and counterflow type I towers.

3.5.7 Partitions, windbreak baffles, drift-check walls, and fan walls. Partitions, windbreak baffles, drift-check walls, and fan walls, when provided, shall be installed to suit design and capacity of tower, as ordered.

3.5.8 Cold water basin equipment. The following equipment shall be furnished by the equipment supplier for all towers: sump with removable screen and vortex breaker, float valves, and all necessary pipe connections and fittings within the tower. Float valves when provided shall be of adequate sizes on adjustable arms. Sizes larger than 0.50-inch (12.70 mm) shall be the balanced piston type. Valve seats and composition disks shall be replaceable.

3.5.9 Fans, blowers, and drives. The towers shall have propeller-type fans having not less than four blades or squirrel-cage, centrifugal-type blowers, as applicable. Centrifugal type blower fans shall be dynamically balanced. Wood fan blades are not acceptable. Fans and blowers shall be capable of withstanding 50 percent overspeed above normal maximum operating speeds. Fan and blower tip speeds shall be held within ranges which will permit conformance to sound level requirements specified herein (see 3.6.1). Drive components and supports shall be heavy-duty throughout. Forced draft towers shafts shall be the hollow type with outboard ball bearings or the solid type with outboard ball bearings and oil lubricated intermediate sleeve bearings. Induced draft towers shafts shall be solid type with outboard ball bearings. Bearings shall have L10 life of not less than 75,000 hours for type I towers and 40,000 hours for type II towers. If belt drives are utilized, multi-grooved solid back single belt design shall be used to avoid uneven belt stretch. Adjustment shall be provided for belt tension and drive centers shall be not greater than 50 inches (1 270 mm). Belt drives shall be designed for 150 percent overload. Sheaves located in the air stream shall be corrosion-resistant material. Shafting for gear drives shall have flexible-type couplings requiring no lubrication. Reduction gears shall be right angle, spiral bevel gear type with a service factor of not less than 2.0, or a service factor of 1.67 for intermittent duty applications. The gear and pinion of the spiral bevel type shall be lapped together. The gear assembly shall be enclosed in an oil filled housing provided with fill and drain plugs. The housing shall be of rigid construction to maintain precise alignment of gears under all loadings. Gear box shall be warranted for a period of five years from date of shipment by the manufacturer with proper routine maintenance.

3.5.10 Pipe and fittings. Plastic pipe, when used, shall be not less than schedule 40 and conform to ASTM D 2996. Plastic fittings shall be of the same kind, class, and grade as the plastic pipe used. Fittings for other pipe shall be of the same material or equal and of the same class and grade as the pipe. Materials used for joint compounds shall be in accordance with commercial practices.

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3.5.11 Hardware. Hardware material shall be as specified (see 7.2).

3.5.12 Electric motors. All motors used in tower installations shall be of the totally enclosed type with voltage, frequency, and phase characteristics as specified (see 7.2). Fractional horsepower (watt (W)) alternating current (ac) motors shall conform to NEMA MG 1. Integral horsepower (hp) (W) ac motors shall conform to NEMA MG 1. Fan motors, 1 hp (746 W) and above, shall be of the reversible two-speed type, when specified (see 7.2), and shall have single winding with variable torque characteristics.

3.5.12.1 Vibration cutout switch. When specified (see 7.2), a vibration cutout switch shall be supplied and installed in a protected position and in the most effective location, and interlocked with the fan wiring to electrically open the motor circuit under excessive fan vibration.

3.6 Performance. The performance of the towers shall be specified in terms of water flow, hot water temperature, cold water temperature, and wet bulb temperature, as specified (see 7.2). The performance of the towers shall be based on an ambient wind velocity of 3 miles per hour (4.83 kilometre per hour). Other design and rating requirements and permissible variations from the design conditions shall be in accordance with ASME PTC 23 or CTI ATC-105. A written thermal performance guarantee shall be provided by the cooling tower manufacturer.

3.6.1 Sound power level. Sound power levels (in decibels (dB)) with a reference pressure of 0.0002 microbars) of the cooling tower shall be not greater than the maximum permitted dB levels for the designated octave band as set forth in table I or table II. The sound power level data for the cooling tower shall be based on tests conducted in accordance with ASA S1.13.

TABLE I. Sound power level (type I towers).

Octave Band (Hertz)	63	125	250	500	1000	2000	4000	8000
Sound power level (dB)	112	112	110	108	102	98	93	90

TABLE II. Sound power level (type II towers).

Octave Band (Hertz)	63	125	250	500	1000	2000	4000	8000
Sound power level (dB)	105	102	99	99	94	92	89	84

3.6.2 Drift loss. Drift loss shall be not greater than 0.005 percent of the water circulated.

3.7 Lubrication. Unless otherwise specified (see 7.2), a means for lubrication shall be in accordance with the manufacturer's standard practice. The lubricating points shall be extended to the outside of the unit for easy accessibility. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high pressure lubricating equipment, 1,000 pounds per square inch (6 894 kPa) or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location.

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3.8 Anti-corrosion treatment. All punched, sheared, welded or exposed metallic areas, shall be treated with a cold galvanizing compound in accordance with good commercial practice, and surfaces overcoated with a factory coating or paint system that will withstand a salt-spray fog test in accordance with ASTM B 117.

3.9 Fire protection. When specified (see 7.2), field erected towers constructed of flammable materials shall have a fire protection system and other provisions in conformance with the NFPA 214.

3.10 Identification marking. Identification shall be permanently and legibly marked directly on the tower or on a corrosion-resisting metal plate securely attached to the tower at the source of manufacturer. Identification shall include the manufacturer's model and serial number, name, and trademark to readily identify the manufacturer.

#### 4. REGULATORY REQUIREMENTS.

4.1 Materials. 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 (FAR). Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this commercial item description are to be new and fabricated using materials produced from recovered materials to the maximum extent possible 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. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this commercial item description.

4.2 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of ASTM SI-10 (IEEE/ASTM SI-10), and all other requirements of this commercial item description including form, fit, and function are met. If a product is manufactured to metric dimensions and these dimensions exceed the tolerances specified in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

#### 5. QUALITY ASSURANCE PROVISIONS.

5.1 Product conformance. The products provided shall meet the salient characteristics of this commercial item description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

6. PACKAGING. The preservation, packing, and marking shall be as specified in the contract or order.

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## 7. NOTES.

### 7.1 Source of documents.

7.1.1 Occupational Health and Safety Administration (OSHA) regulations may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

7.1.2 The Federal Acquisition Regulation (FAR) and Code of Federal Regulations (CFR) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

7.1.3 ASA Standards are available from the Acoustical Society of America, 120 Wall Street, 32<sup>nd</sup> Floor, New York, NY 10005-3993.

7.1.4 ASME Standards are available from the American Society of Mechanical Engineers, 345 East 47<sup>th</sup> Street, New York, NY 10017.

7.1.5 ASTM Standards are available from the American Society of Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

7.1.6 CTI Standards are available from the Cooling Tower Institute 530 Wells Fargo, Suite 113, Houston, TX 77090.

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

7.1.8 NEMA Standards are available from the National Electrical Manufacturers Association, 1300 North 17<sup>th</sup> Street, Suite 1847, Rosslyn, VA 22209.

7.1.9 NFPA Standards are available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269-9101.

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

### 7.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this CID.
- b. Type of tower required (see 2. and 3.1).
- c. If design loading is to be increased for ice and snow conditions (see 3.5).
- d. Type of tower fill and frame material required (see 3.5.1).
- e. When flange or lipped projections is required (see 3.5.3).
- f. Fill material required (see 3.5.5).
- g. Hardware material required (see 3.5.11).

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- h. Electric motor characteristics required and when reversible two-speed fan motors are required (see 3.5.12).
- i. When a vibration cutout switch is required (see 3.5.12.1).
- j. Tower performance required, in terms of waterflow, hot water temperature, cold water temperature, and wet bulb temperature (see 3.6).
- k. Lubrication requirements, if different than as specified, (see 3.7).
- l. When fire protection system is required (see 3.9).

7.3 Supersession data. This CID replaces Federal Specification F-C-2791, dated November 29, 1991.

7.4 Classification cross reference. Classifications used in this CID (see 2.) are identical to those found in superseded Federal Specification F-C-2791.

7.5 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PIN to be used for items acquired to this description are created as follows:

AA59223	-	X
CID number _____		
Type (see 2.) _____		

7.6 Metric units. The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system should be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

7.7 Subject term (key word) listing.

Cooler  
Tower  
Water

MILITARY INTERESTS:

Custodians:

Navy - YD1

Air Force - 99

Review Activities:

Air Force - 82

DSC - GS

CIVIL AGENCY COORDINATING ACTIVITY:

GSA -FSS

Preparing Activity:

Navy - YD1

(Project 4130-0401)

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

## INSTRUCTIONS

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

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

### I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER  
A-A-59223

2. DOCUMENT DATE (YYMMDD)  
980518

### 3. DOCUMENT TITLE

COOLING TOWERS, LIQUID

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

### 5. REASON FOR RECOMMENDATION

### 6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

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

7. DATE SUBMITTED  
(YYMMDD)

### 8. PREPARING ACTIVITY

a. NAME

RUSSELL REYNOLDS

b. TELEPHONE (Include Area Code)

(1) Commercial 805-982-5946 (2) AUTOVON 551-5946

c. ADDRESS (Include Zip Code)

COMMANDING OFFICER, NCBC CODE 15E2C  
1000 23RD AVENUE  
PORT HUENEME, CA 93043-4301

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DEFENSE QUALITY AND STANDARDIZATION OFFICE  
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22401-3466  
Telephone (703) 756-2340 AUTOVON 289-2340