

CSS/CSR™ Specification for Cooling Towers

GWS-1049-E, August 2009

SECTION 23 25 00 – HVAC Water Treatment

COOLING TOWER WATER TREATMENT SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section specifies cleaning and treatment of circulating HVAC water systems, including the following:
 - 1. Tower Cooling Water - Closed Loop Systems Fluid Coolers
 - 2. Condenser Water – Open Cooling Water Loop Systems
 - 3. Tower Cooling Water – Evaporative Condensers
 - 4. Evaporative Fluid Coolers – Direct and/or Indirect

1.2 RELATED WORK

- A. Test requirements and instructions on use of equipment/system: Section 01 00 00, GENERAL REQUIREMENTS.
- B. General mechanical requirements and items, which are common to more than one section of Division 23: Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- C. Piping and valves: Section 23 21 13, HYDRONIC PIPING and Section 23 22 13, STEAM AND CONDENSATE HEATING PIPING.

1.3 QUALITY ASSURANCE

- A. Refer to paragraph, QUALITY ASSURANCE in Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- B. Technical Services: Provide the services of an experienced water treatment specialist or technical

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representative approved by the Water Treatment System Manufacturer to direct flushing, cleaning, pre-treatment, training, debugging, and acceptance testing operations; direct and perform chemical limit control during construction period.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.
- B. Manufacturer's Literature and Data including:
 - 1. Filtration skid and sweeper jet system for cooling tower solids removal, including installation and operating instructions.
- C. Maintenance and operating instructions in accordance with Section 01 00 00, GENERAL REQUIREMENTS suitable for inclusion into a standard 3-ring binder.

PART 2 - PRODUCTS

3.1 GENERAL

- A. The Contractor shall furnish and install a Tower Basin Filtration System as shown and detailed on the contract documents. All components of the system provided will be manufactured and supplied by a single company and be certified to be functionally compatible, such as the **CSS™** or **CSS™** manufactured by Griswold Water Systems of Corona, CA or an approved substitution.

3.2 BYPASS TOWER FILTRATION SYSTEM

- A. Provide an integrated Bypass Tower Basin Filtration System treatment skid as shown and detailed on the contract documents equal to the **CSS/CSR™** manufactured by Griswold Water Systems of Corona, CA or an approved substitution. The optional Sweeper System using eductors to move debris in the basin to be picked up by the filtration unit will be provided if shown and detailed on the contract documents.
- B. System Description:
 - 1. System shall consist of a Centrifugal Separator, Pump and Motor, Pump Suction Strainer, Control Panel
 - 2. Filtration Skid will be provided with Inlet Block Valve and Outlet Throttling Valve as shown and detailed on the contract documents to allow for servicing of system components and adjustment for proper operation.

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3. Basin Sweeper Eductors and Sweeper system design drawings will be provided by the Filtration System Manufacturer if Sweeper System is detailed in the contract documents.
4. The system shall be sized and designed to reduce the amount of debris circulating in the cooling system water.
 - a. CSS/CSR™ Systems shall be sized to provide a minimum of 10 to 15 percent of the total tower recirculation rate (percentage is dependant upon the expected level of particulates in the air) to the basin sweeper system as shown and detailed on the contract documents.
 - b. Calculated flows shall be at 40 Feet Total Dynamic Head for standard systems that do not use Sweepers.
 - c. Calculated flows shall be at 80 Feet Total Dynamic Head to provide pressure drop required for the separator as well as the 20 PSIG pressure required for the sweeper system eductors and nozzles.

C. Separator

1. A Centrifugal vortex style, solids from liquid separator shall be employed to remove particles from the cooling tower basin.
2. Separator shall be constructed to ASME standards with high quality carbon steel or stainless steel as shown and detailed on the contract documents
3. Material thickness shall be a minimum of 0.25 inches.
4. Maximum operating pressure shall be 150 psig unless otherwise specified.
5. Separator inlet shall be capable of passing a solid sphere equal to 25 percent of the inlet pipe connection size.
6. Separator shall be low pressure drop design.
 - a. Minimum is 3 psid
 - b. Maximum is 14 psid
7. Separator shall have cleanout opening on side of unit.
8. Separator shall have a non-removable head.
 - a. No slots or movable parts are allowed in the head area that requires servicing or

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cleaning.

9. Separator shall incorporate an automatic internal air bleed. Manual air bleed only is not allowed.
 10. Spin arrestor plates shall be installed under the bottom spin plate to retard re-entrainment of solids.
 11. The CSS™ Separator system will be equipped with a timer controlled motor-operated purge valve to periodically flush solids collected in the separator down the service drain.
 - 1) Normally a fast acting motorized ball valve (MBV) is supplied that will stop at its then position upon loss of power.
 - a. Cycle time for the MBV option is between 11 and 25 seconds.
 - 2) If the contract documents so state a slower operation motorized spring return ball valve will be used (MBVSR).
 - a. Cycle time for the MBVSR option is 55 to 150 seconds.
 - 3) If the contract documents so state a battery backup system can be applied to the faster operating motorized ball valve to provide for failsafe operation (MBVFS option).
- D. The CSR™ with Recovery Tank is available if required by the contract documents for those instances where it is not desirable to flush solids collected down the drain.
1. The Recovery Tank is fitted with a 25-micron filter bag, inlet/outlet liquid filled gauges, manual air bleed valve, and flow sight glass with propeller.
 2. Recovery tank monitoring package including Differential Pressure switch with “Clean-Dirty-Change” indicator and magnetic operated Reed Switch to provide alarm indication is.
 3. A 25-watt Amber Service Beacon light is mounted on the separator skid control panel.
- E. Pump and Motor will be as shown and detailed on the contract documents.
1. Piping between pump and separator will be provided with union or flanged connections to allow for easy replacement of pump seals when required.
- F. A basket strainer with 0.25 inch perforated 304 stainless steel screen shall protect the pump inlet.
- G. Filtration System electrical panel shall be UL approved, with NEMA 4 powder coated steel, door interlock safety, fusible disconnect switch or disconnect motor starter with thermal overload, 120

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VAC magnetic contactor, 460/120 VAC transformer with primary/secondary circuit breakers, pump “run” light and provision for automatic and manual operation.

- H. Sweeper Systems if required by the contract documents shall be designed by the Filtration System Manufacturer to provide good quality cleaning of the tower basin. Systems not approved by the Filtration System Manufacturer are not allowed.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify field conditions and suitability for installation according to manufacturer’s published installation data.

3.4 INSTALLATION

- A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
- B. Install equipment level and plumb.
- C. Install equipment per recommendations in the manufacturer's published installation data.
- D. Cleaning of piping systems using the CSS/CSR™ Tower Basin Filtration System.
 - 1. The Tower Basin Filtration System does not relieve the contractor or owner of normal cleaning of the system prior to startup.
 - 2. Immediately after hydrostatic testing of piping, systems shall be cleaned, drained, and flushed with clean water. Any chemical cleaners used in this process shall be thoroughly flushed from the piping system.
 - 3. Under no circumstance will water be allowed to sit stagnant or circulate without water treatment after initial cleaning and testing.
 - 4. Proper system layup procedures must be followed anytime the water system is not running.
 - a. An appropriate corrosion inhibitor as determined by the factory trained and certified water treatment specialist shall be first circulated in the system for a minimum of two hours.
 - b. The system shall be drained of all water.
 - c. Immediately prior to putting the Tower Basin Filtration System (CSS/CSR™) into

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operation, the system shall be re-filled with clean water.

5. Consult with Water Treatment System Manufacturer or the local Representative for additional details.

E. CONNECTIONS

1. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
2. Install piping adjacent to equipment to allow service and maintenance.
3. Separator purge line should be routed to the nearest floor drain.
4. Floor drain shall be large enough to take the full amount of water flow from the separator during its purge cycle without overflowing.
5. Confirm applicable electrical requirements in Division 26 Sections for connecting electrical equipment.
 - a. Provide proper electrical ground to the equipment.
 - b. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 TESTING

- A. Engage a factory-authorized service representative to perform startup service for the Tower Basin Filtration System.
 1. Inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
 2. Inspect piping and equipment to determine that systems and equipment have been cleaned, flushed, and filled with water, and are fully operational.
 3. Place HVAC water filtration system into operation and check sweeper jets, if installed for proper orientation in the tower basin during the preliminary phase of HVAC systems' startup procedures.
 4. An Initial Start-up Service Report shall be provided to the operator and the Manufacturer by field service technician.

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- B. No water system using a Tower Basin Filtration System shall be put into operation without the Tower Basin Filtration System being energized and fully operational. Failure to comply may result in damage to connected heat exchange equipment from dirt and debris.

3.4 TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain Tower Basin Filtration System and equipment.
- B. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, and maintaining equipment and schedules.
 - 1. Schedule at least two (2) hours of training with Owner.
 - 2. Provide at least seven days' advance notice.
- C. Review data in maintenance manuals.

END OF SECTION