

CSS/CSR™ Specification for Bypass Filtration

GWS-1050, February 2010

SECTION 23 25 00 – HVAC Water Treatment

CLOSED LOOP BYPASS FILTRATION SYSTEM

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section specifies cleaning and treatment of circulating HVAC water systems, including the following:
 - 1. Chilled Water Circulation Loops
 - 2. Hot Water Circulation Loops

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

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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. Non-media Filtration skid for circulating water system 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. To help prevent particle fouling of the cooling system's various components, reduce maintenance and servicing of equipment and maintain optimum energy efficiency of the system heat exchangers, the Contractor shall furnish and install a Bypass Filtration System as shown and detailed on the contract documents.

3.2 BYPASS WATER FILTRATION SYSTEM

- A. 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 **CSR™** manufactured by Griswold Water Systems of Corona, CA or an approved substitution.
- B. System Description:
 - 1. System shall consist of a Vortex Solids Separator, Pump, Motor, Control Panel and means for removal of collected solids as specified on the contract documents.
 - 2. Solids removal for non-evaporative closed loops shall be by use of Recovery Tank and associated bag filter while evaporative loops requiring normal bleed will make use of a timer controlled motorized purge valve.
 - 3. 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.
 - 4. The system shall be sized and designed to reduce the amount of debris circulating in the

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HVAC heating/cooling water.

- a. CSS/CSR™ Systems shall be sized to provide a minimum of 10 to 15 percent of the system recirculation rate as detailed on the contract documents.
- b. Calculated flows shall be at 40 Feet Total Dynamic Head for standard systems.

C. Separator

1. A vortex style, solids from liquid separator shall be employed to remove particles from the recirculating water system.
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 operating in the range of 1-8 psid.
7. Separator shall be accessible having cleanout opening on side of unit.
8. Separator shall not have flanged body or removable dome.
 - a. No slots or movable parts are allowed in the head area that requires servicing or cleaning.
9. Separator shall incorporate both an automatic internal air bleed and manual air bleed.
10. Spin arrestor plates shall be installed under the bottom spin plate to retard re-entrainment of solids.

D. For non-evaporative heating and cooling loops the CSR™ with Recovery Tank is available where it is not desirable to flush solids collected down the drain and/or loose treated water.

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. The Recovery Tank monitoring package includes a Differential Pressure switch with “Clean-Dirty-Change” indicator and magnetic operated Reed Switch to provide alarm indication.
3. An optional 25-watt Amber Service Beacon light that is mounted on the separator skid control

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panel is included if so indicated in the contract documents.

- E. For evaporative loops where normal controlled bleed is required, the CSS™ Separator system is available. The CSS™ 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.
 - 1) 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).
 - 1) Cycle time for the MBVSR option is 55 to 150 seconds.
 - 2) 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).
- F. 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.
- G. Filtration System electrical panel shall be UL approved, with NEMA 4 powder coated steel, NEMA 4X Fiberglass is not acceptable for outdoor installations., door interlock safety, fusible disconnect switch or disconnect motor starter with thermal overload, 120 VAC magnetic contactor, 460/120 VAC transformer with primary/secondary circuit breakers, pump “run” light and provision for automatic and manual operation.

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.

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- C. Install equipment per recommendations in the manufacturer's published installation data.
- D. Cleaning of piping systems using the CSS/CSR™ Bypass Filtration System.
 - 1. The Bypass 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 operation, the system shall be re-filled with clean water and appropriate water treatment will be employed..
 - 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, if required, 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.

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- 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 By-pass 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 for proper operation.
 4. An Initial Start-up Service Report shall be provided to the operator and the Manufacturer by field service technician.

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