

SECTION 23 25 10 - FLUID FILTRATION

PART I – GENERAL

1.1 SECTION INCLUDES

- A. Bypass Bag Filter
 - 1. Permanent Unit
 - 2. Temporary Unit

1.2 RELATED SECTIONS

- A. 23 21 13 Hydronic Piping
- B. 23 34 16 Chemical Treatment for Hydronic Piping

1.3 REFERENCES

- A. Applicable ASME codes and standards

1.4 QUALITY ASSURANCE

- A. Products and execution shall be in compliance with applicable codes and standards including those referenced above in paragraph 1.3 REFERENCES.
- B. Installation, start-up and operation shall be in compliance with Manufacturer's recommendations and IOM.

1.5 SUBMITTALS

- A. Unit description
- B. Unit data
- C. Performance data
- D. Piping diagram
- E. Operation and maintenance manual

1.6 WARRANTY

- A. Assembled unit shall be warranted by manufacturer to be free from defects in material and workmanship for period of one year from date of startup or 18 months from date of delivery whichever occurs first. Manufacturer shall repair or replace unit at no cost to Owner.

PART 2 - PRODUCTS

2.1 FLUID FILTRATION EQUIPMENT

- A. Hydronic Heating/Cooling Systems - Bag Type Bypass Filter

[Note to PSC: At the time of this writing, it is the University's intent that both an in-line air/dirt separator (specified elsewhere) and a bag type bypass filter be provided in each closed loop hydronic system. This requirement is in response to growing problems with system fouling. Experience may prove that this "double coverage" is not necessary, in which case the Standard will be edited accordingly. It is the intent of the University that each bypass bag filter be provided in lieu of a traditional chemical pot feeder. It shall be located/configured within the piping system as if it was, in fact, a pot feeder. Given that each bypass filter incorporates a removable cover, it may be used as both a chemical feeder and a filter.]

- 1. Housing and cover
 - a. Stainless steel - Units with connection size 2" and smaller

- b. Epoxy coated steel - Units with connection size 2 ½” and large
- 2. Davit for cover removal if cover exceeds 50 lb.
- 3. Eye bolt cover retainers
- 4. Support legs
 - a. Material of construction to match housing
- 5. Pipe connections, inlet and outlet
 - a. NPT - Pipe size 2” and smaller
 - b. Flanged - Pipe size 2 ½” and larger
- 6. Air vent and drain connections
- 7. Pressure gauge ports (for differential pressure measurement)
- 8. Perforated stainless steel basket(s)
- 9. Filter bag(s)
 - a. Fully welded construction
 - b. Locking seal ring to provide 100% bypass-free filtration
 - c. Bag Insertion tool to ensure correct alignment
 - d. 50-micron polyester felt bag(s) for initial system “rough cleaning”
 - e. 25-micron oil-absorbent polypropylene microfiber bag(s) for oil removal
 - f. 10-micron polyester felt bag(s) for final filtering and on-going system maintenance
- 10. Housing/cover assembly rated for 150 PSIG
- 11. All components including filter bags rated for 250 degrees F
- 12. All components including filter bags approved for use with ethylene glycol/water solutions up to 50% concentration
- 13. Size
 - a. Provide Size 01 unit (minimum) for systems with total design flow rate of 50 GPM or less.
 - b. Provide Size 02 unit (minimum) for systems with total design flow rate greater than 50 GPM.
 - c. Provide unit with multiple bags for systems with design flow rate of 800 GPM or greater.
 - d. At a minimum, size for flow rate of 10% system design flow rate through 10 micron filter with 2 PSIG maximum clean-filter pressure drop, 1 cps system fluid viscosity.
- 14. Approved Manufacturers:
 - a. Basis of Design: FSI (Filter Specialists Inc.)
 - b. Other approved:
 - 1) Eaton Filtration
 - 2) Rosedale Products
 - 3) Siemens Water Technologies
 - c. Not approved:
 - 1) LeSac Corporation

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hydronic Heating/Cooling Systems - Bag Type Bypass Filter

1. Install filter unit in bypass piping between pump discharge main and pump suction main. Piping shall be configured to allow blow-down discharge from air-dirt separator to be directed into filter inlet piping. Refer to applicable drawing detail.
2. Provide rigid structural support using factory fabricated legs.
3. Provide check valve and properly sized adjustable flow-limiting valve (see section 23-21-13 *Hydronic Piping* for specification).
4. Provide shut-off valves for isolation of bypass piping from main system piping. Locate at tie-in points to mains.
5. Provide shut-off valves in bypass piping at filter inlet and outlet openings to minimize fluid loss when cover is removed. Locate each valve at elevation of associated inlet or outlet opening.
6. Provide pressure gauge piped across gauge ports. Include shut-off valves.
7. If differential pressure monitoring via EMS is required, provide differential pressure transmitter installed in parallel with pressure gauge.
8. Provide air vent valve with hose adapter and cap.
9. Provide drain valve with hose adapter and cap.
10. Provide insulation of filter and associated piping, valves, etc. as appropriate for fluid media temperature.

3.2 START-UP AND MAINTENANCE

A. Hydronic Heating/Cooling Systems - Bag Type Bypass Filter

1. At initial startup, balance fluid flow rate through clean 50-micron filter to 5-10% of total system design flow rate. Use balance valve to adjust flow rate.
2. Replace 50-micron bag repeatedly as required to accomplish rough cleaning. This may require repeated bag replacement over an extended period of time.
3. Replace 50-micron bag with 25-micron oil-absorbent bag. Continue filtration until oil is removed from system to satisfaction of Owner. This too may require repeated bag replacement.
4. Replace 25-micron bag with 10-micron bag. Continue filtration until system is clean to satisfaction of Owner.
5. Rebalance flow rate through clean 10-micron filter to 5% of system design flow rate. Use balance valve to adjust flow rate. After adjustment lock memory stop on valve in place.
6. Inspect filter monthly throughout warranty period. Provide written log at filter indicating date of monthly inspection and filter bag replacement.
7. In no case shall filter pressure drop be allowed to exceed 10 PSI. Doing so will result in inadequate fluid flow and potential filter bag damage.

3.3 TEMPORARY UNIT

A. Hydronic Heating/Cooling Systems - Bag Type Bypass Filter

1. Bypass filter unit may be installed on temporary basis if indicated in project documents. If so, unit remains permanent property of installing Contractor.
2. Install temporary unit as described in paragraph above entitled *INSTALLATION* with the exception that flexible hoses may be used in lieu of permanent piping. Requirement for permanent structural support may also be deleted.

3. Requirement for shut-off valves for isolation of bypass piping from main system piping indicated in the paragraph *above entitled INSTALLATION* remains. Locate valves at tie-in points to mains for isolation of bypass piping from main system piping as if permanent filter unit was being installed. Provide nipple and cap at each valve.
4. Startup and maintenance requirements shall be as described in paragraph above entitled "*START-UP AND MAINTENANCE*" except filter unit may be removed after initial start-up and commissioning period. Unit shall not be removed until system is deemed clean to satisfaction of Owner.

END OF SECTION **23** 25 10

This section of the *U of I Facilities Standards* establishes minimum requirements only.
It should not be used as a complete specification.