Wilo Star
Wet Rotor Circulation Pumps

Engineering Specification

PART 1 – GENERAL

1.1 SUMMARY

A. Furnish and install circulating pumps consistent with the hydronic system's performance and requirements. The circulating pumps shall be suitable for the specified system function and capacity.

1.2 REGULATORY

A. Circulating pumps shall be rated to a maximum working pressure of 140 psi (8.3 bar) and temperature of 230°F (110°C) for the cast iron and bronze bodied pumps and 150°F (66°C) for the Z15 pumps and where applicable, bear the approval symbol of the required regulatory body.

B. Electrical assemblies (circuitry, wiring terminals and internal connections) of the circulating pumps shall be certified and registered to bear the emblem of UL, CSA or ETL as required. Electrical assembly shall meet codes and standards established by national bodies.

1.3 REFERENCES

A. UL 778 Standard
B. NSF 61, Annex G only for models Z15 BN5, Z15 BS5, and Z15 BS7

1.4 SUBMITTALS

A. Provide submittals, warranty information and shop drawings in accordance with the General Requirements and as specified herein. Submit detailed product drawings including wiring schematics. Indicate critical dimensions of the circulating pumps.

B. Submit manufacturer's technical data in the form of published Installation and Operation and Maintenance Manuals to be supplied with the circulating pumps at time of installation.

C. Circulating pumps shall be tested and verified for performance. Copies of "Submittals" shall be made available to the specifying engineer if requested.

D. Submit dimensional data on for the pump in order to facilitate or allow the end-user/installer to anticipate the necessary pipe, fittings, fasteners, etc. to complete the system installation.

1.5 DELIVERY, STORAGE AND HANDLING

A. Circulating pumps are shipped in boxes and are to remain in factory shipping condition until immediately prior to installation.

B. Circulating pumps are to be stored indoors in a conditioned space, protected from exposure to the elements, and from exposure to other potential contaminants.

C. Factory applied labels are to remain in place and unobscured. These identification tags are to display model numbers, serial numbers, date codes, and evidence of certifications/listings.

1.6 WARRANTY

A. The Manufacturer shall warrant the circulating pumps for a period of 3 years from date of purchase, subject to the Terms and Conditions of said Warranty. A copy of the Manufacturer's Warranty shall be provided as part of the Submittals as outlined in Section 1.4 of this specification.

PART 2 – PRODUCTS

2.1 TERMINAL BOXES

A. The circulating pumps shall have a high quality cast aluminum terminal box.

2.2 ELECTRICAL CONNECTIONS

A. Circulating pump shall have a coded terminal strip indicating common/neutral/ground within the terminal box for field connections for single-phase power

2.3 ELECTRICAL

A. All 110-volt wiring shall be of 14 gauge or larger, UL/CSA approved, 300 volts, 220°F (104°C) maximum temperature.

B. The motor shall be a class F certified winding insulation as defined by UL 778.

C. Voltage variances shall be less than +/- 10% from rated voltage with pump under load conditions for single-phase power. Amperage variance between phases on single-phase systems shall be less than +/- 5%.

D. Impedance protection is an integral part of the pump and used to prevent against overload conditions.

2.4 CONTROL, OPERATION AND DIAGNOSTICS

A. Three-speed pumps shall have a manually adjustable speed switch, integral with the pump.

2.5 MATERIALS OF CONSTRUCTION

A. Circulating pumps shall be constructed with either cast iron or bronze bodies.

B. Standard shaft offering shall be constructed of high-quality, hardened stainless steel (AISI 420).

C. Motor bearings shall be metal-impregnated carbon. Optional material shall be metal-impregnated antimony, which does not change the pump applications.

D. Impellers will be constructed of a high strength, glass-filled polypropylene engineered composite.

E. Rotor assembly to be factory balanced.

PART 3 EXECUTION

3.1 PREPARATION

A. Prior to commencing work, the contractor will have read and understood the Installation, Operation and Maintenance Manual (IOM) supplied and enclosed with the attendant circulating pumps. This manual is supplied in English, French and Spanish.

B. The effectiveness of the system is dependent on the system being designed and installed correctly. Proper consideration of factors such as BTU loads, outdoor design temperature, indoor design temperature, room set-point temperature(s), differential fluid temperatures, head loss, flow rates and transfer capacities of the heat emitters is critical.

C. Prior to final connection of the circulators as part of the hydronic system, the system piping shall be flushed of all contaminants and foreign objects.

3.2 INSTALLATION

A. The circulating pumps must be installed by a qualified installer/service technician.

B. The circulating pumps shall be installed in accordance with the relevant requirements of the local authority having jurisdiction, as required to meet the performance requirements and function specified for the system.

C. The circulating pumps must be installed and operated strictly in accordance with the terms set out in the Installation, Operation and Maintenance Manual supplied and enclosed with the attendant circulating pumps.

D. The pump shall be installed with the motor shaft in a horizontal plane with no exceptions. The electrical terminal box shall be installed at the 3:00, 9:00 or 12:00 position, referenced from the nameplate end of the motor.

E. The pump must be installed in a way that it is not stressed by the pipework. A minimum of three pipe diameters of straight pipe is recommended on the inlet of the pump.

F. Where anti-freeze protection is required, the maximum concentration of heating system glycol is 50% by volume. High concentrations of glycol at lower system design temperatures may require increasing the design operating point [consult factory]. Use of leak sealant products or automotive anti-freeze is not permitted.

G. Fluid temperature limitations are 14°F (-10°C) to 230°F (110°C) for both the cast iron and bronze bodied pumps. Domestic hot water temperature limitations for the bronze bodied pumps (Z15 models) are <140°F (60°C) Maximum ambient temperature surrounding the cast iron or bronze bodied pumps shall be 104° F (40°C).

H. Minimum Inlet pressure (psi) at pump suction port to avoid cavitation at fluid temperatures:

122 °F (50 °C)	0.7 psi [.05 bar]
203 °F (95 °C)	4.4 psi [.3 bar]
230 °F (110 °C)	14.5 psi [1 bar]

3.3 FIELD QUALITY CONTROL

A. Upon receipt and prior to commissioning, the circulating pumps should be inspected for any sign of visible damage.

B. Prior to commissioning the circulating pumps, the system connections should be complete and leak-free. The system should be filled and purged as per instructions in the IOM manuals. The system fluid should be tested and have a pH level of between 6.5 and 9.5 and be suitable for hydronic system use.

C. Following fill and purge, the system should undergo a pressure test.

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