



Wilo-SiBooster EXCEL
EC Motor-Driven, Pressure Boosting Systems

Engineering Specification

22 11 23.13 – DOMESTIC-WATER PACKAGED BOOSTER PUMPS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Vertical, multistage, centrifugal pump booster package shall be a SiBooster EXCEL booster as manufactured by Wilo USA.
- B. Furnish and install a variable speed, vertical-multistage, centrifugal booster pumping package, with a capacity as indicated in the plans.

1.02 RELATED SECTIONS

- A. 23 21 23 – Hydronic Pumps.
- B. 23 22 23.13 – Electric-Driven Steam Condensate Pumps.
- C. 23 53 13 – Boiler Feedwater Pumps.

1.03 REFERENCES

- A. NSF – NSF International
- B. HI – Hydraulic Institute
- C. UL – Underwriters Laboratories
- D. NEC – National Electrical Code
- E. ANSI – American National Standards Institute
- F. AISI - American Iron and Steel Institute
- G. ISO – International Standards Organization
- H. NEMA – National Electrical Manufacturers Association
- I. VFD – Variable Frequency Drive
- J. ODP – Open Drip Proof
- K. TEFC – Totally Enclosed Fan Cooled

1.04 SUBMITTALS

- A. Submittal data sheet(s).
- B. Dimensional print(s).
- C. Wiring diagram(s).
- D. Installation, operation, and maintenance manual.

1.05 QUALITY ASSURANCE

- A. The complete packaged pumping system shall be NSF61 Annex G listed for drinking water and low lead requirements.
- B. The complete packaged pumping systems shall be UL QCZJ listed for “packaged pumping systems”.
- C. All wetted surfaces shall be made of corrosion-resistant material.
- D. Water temperature range for the booster package shall be rated for -22°F to 248°F

- E. Ambient temperature range for the booster package shall be rated for 5°F - 104°F.
- F. Booster pressure rating shall be 232 or 363 PSI depending on number of pump stages.
- G. The pumping package shall be hydrostatically tested prior to shipment.
- H. High efficiency drive (HED) control interface and electronic communicated motor (ECM) shall produce motor efficiencies greater than, or equal to, IE5 (NEMA MG1 TABLE 12-12) motor efficiency standards.

1.06 WARRANTY

- A. Provide manufacturer’s standard warranty against defects in materials and workmanship
 - 1. Warranty Period: SiBooster EXCEL Boosters shall be free of defects in materials and workmanship for a period of two (2) years from date of installation; not to exceed 6 months from date of purchase.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
 - 1. Wilo- SiBooster EXCEL series boosters as manufactured by Wilo.
 - 2. Pre-approved equal.
- B. The packaged pumping system shall be a standard product of a single pump manufacturer. The entire pump system including pumps and pump logic controller, shall be designed, built, and tested by the same manufacturer.

2.02 COMPONENTS

A. PUMPS

- 1. Shall be of vertical, In-Line, multistage design.
- 2. Shall be ANSI/NSF 61 Annex G listed for drinking water and low lead requirements.
- 3. Pump housings:
 - a. Shall be constructed of AISI 304 Stainless Steel with 300 class ANSI flanges for up to V80 and 250Lb ANSI cataphoresis coated ductile iron (EN-GJS-500-7) split flanges for V110-V270.

22 11 23.13 – DOMESTIC-WATER PACKAGED BOOSTER PUMPS

- b. Shall be furnished with a carbon and polyphenylene sulfide (PPS) wear ring.
- c. Shall be equipped with drain and vent ports with the ability to accommodate a bypass.

2.03 COMPONENTS – Continued

- 4. Shall be equipped with an AISI304, AISI318 LN, or AISI431 stainless steel shaft depending on number of Impeller stages and flowrate.
- 5. Shall have lifting lugs to facilitate pump installation or extraction from packaging.
- 6. Shall have a coupling guard in AISI316L stainless steel with Wilo design for better shaft protection.
- 7. Shall allow for easy access to the coupler, spacer and seal cartridge assembly.
- 8. Shall allow for removal/replacement of seal cartridge without removing motor at any horse power.
- 9. Seal cartridge assemblies shall have the ability to be disassembled and replace the mechanical seal without having to replace the entire X-cartridge assembly.
- 10. Mechanical seal:
 - a. Sleeve shall be AISI316L.
 - b. Springs and clips shall be AISI304 stainless steel.
 - c. Inserts shall be constructed of EPDM.
- 11. Impellers shall be constructed of AISI304L stainless steel and 100% laser-welded 2D/3D blades shall be sandblasted prior to shipment.

B. MOTORS

- 1. Shall be a Wilo developed, electrically commutated, synchronous permanent magnet, super premium motor.
- 2. Shall have a protection class of IP52.
- 3. Shall produce motor efficiencies equal to IE5 and NEMA MG1 TABLE 12-12 motor efficiency standards.

C. PUMP INVERTER INTERFACE

- 1. Shall allow for quick access to the main parameters using LCD display and Wilo GREEN BUTTON.
- 2. Shall have two configurations:
 - a. Standard control.
 - b. Expert control.
- 3. Shall allow for speed reduction turndown of up to 70%.
- 4. Shall be UL 508C compliant and listed.

D. CONTROL PANEL

- 1. Shall meet the requirements of UL508A; Standard for Industrial Control Equipment.
- 2. Shall be rated as a NEMA 12 enclosure with a fan, CFM rated for heat sink requirements of VFDs (Variable Frequency Drive).
- 3. Shall have labeled wires and terminal block for easy reference to the wiring diagram.
- 4. Motor protector circuits sized for motor amperage.
- 5. Through the door disconnect with selector handle and lockout.

E. PROGRAMABLE LOGIC CONTROLLER

- 1. Shall have a 7" LED Color Touchscreen.
- 2. Shall have a display resolution of 800 x 480 pixels.
- 3. Shall indicate on the display, per the Pump Icon, whether or not each pump is either Green=Running, Red=Faulted, No Color=Off.
- 4. Shall be programmed for lead/lag or duty/standby operation.
- 5. Shall provide off/hand/auto function. Hand operation shall be password protected.
- 6. Shall display pump hours, suction PSI, discharge PSI, pump frequencies, total Kwh for system, and current Kwh per pump.
- 7. Shall be able to modify the discharge pressure setting through password protected screen.
- 8. Shall have a low pressure cut out.
- 9. Shall have pipe burst protection.
- 10. Shall be able to be able to flash the PLC program by means of a Micro-SD card via Micro-SD port.

22 11 23.13 – DOMESTIC-WATER PACKAGED BOOSTER PUMPS

11. Shall have a RJ45 Ethernet port capable of transmitting data 10/100Mbps using a Cat 5 cable.
12. Shall have a 2.0 USB port available for communication.
13. Shall have onboard Modbus Protocol. Two ports available; one for communication to the VFD and one open for the building management system.
14. Shall have the following I/O:
 - a. Number of digital inputs: 18
 - b. Number of digital outputs: 17
 - c. Number of analog inputs: 9
 - d. Number of analog outputs: 2
15. Shall be programmed for lead/lag operation.
16. Shall use a coin-type 3v, lithium battery, CR2450.
17. Shall have a have the ability of the owner/operator to receive a text message for critical alarms.
18. Shall have the ability to access the PLC via downloadable app. Functionality shall be identical to PLC interface.

F. PUMP MANIFOLD

1. Shall be constructed of AISI 304 Stainless steel.
2. All pump connections shall be 300 Class ANSI flanges.
3. System connection flanges shall either be ANSI 150 Class or 300 Class flanges depending on system pressure.
4. All manifolds shall be electrolytic polished.
5. All manifolds shall be 10S and rated for 363 PSI maximum pressure.
6. Manifold shall have two, ¼" FNPT shut off valves; one connected to an analog dial pressure gauge and one connected to a pressure transducer.
7. Discharge manifold shall have a ¾" connection with plugged shut off valve.

G. ISOLATION VALVES

1. Shall be constructed using ASTM 304 Stainless steel.

2. All threads shall be female, nominal tapered threads in accordance with ANSI B1.20.1.
3. Packing, thrust washer, and gasket, shall all be constructed of PTFE.
4. Seat shall be constructed of PTRE.

H. CHECK VALVE

1. Every pump, in relation to the pump manifold, shall have a 316 Stainless Steel ASTM A240 check valve in either an NPT or Victaulic connection; depending on booster size and model.
2. Check valve shall be a "flapper-style", non-slam, check valve.
3. Elastomer seal for check valve shall be made of Buna N.

I. OPTIONAL COMPONENTS¹

1. (Hydropneumatic Tank Option).
 - a. Shall be a 2.1 gallon capacity.
 - b. Shall be rated for 232 PSI.
 - c. Shall be Non-ASME rated.
 - d. Shall be only rated to prevent short cycling of the pump package and provide water hammer protection.
 - e. Tanks for system capacity and ASME-rated tanks shall also be available upon request.
2. (ODP motors available in lieu of TEFC upon request (but not recommended)).
3. (NEMA 3R Control panel enclosure).
4. (Dome tower light; options for Green (Run – System good), Yellow (Fault – Still running), Red (Failure – Not running) and White (Power Present)).
5. (Run/Fault LED lights, per Pump, mounted on front of panel).
6. (BMS Protocol Options):
 - a. (BacNET)
 - b. (LonWorks)
7. (Booster packages available at higher pressures upon request).

PART 3 EXECUTION

3.01 INSTALLATION

Division 22 – PLUMBING

22 11 23.13 – DOMESTIC-WATER PACKAGED BOOSTER PUMPS

- A. Install equipment in accordance with manufacturer's instructions.
- B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.
- C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.
- D. Unit shall be a Wilo- SiBooster EXCEL as manufactured by Wilo USA.

END OF SECTION

¹ Components in parenthesis indicate an optional item.

Division 22 – PLUMBING
22 11 23.13 – DOMESTIC-WATER PACKAGED BOOSTER PUMPS

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