



**Wilo-Helix EXCEL Complete
High Efficiency Multistage Single-Pump Booster Package**

Engineering Specification

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. EC Motor-Driven, Vertical, multistage, centrifugal pump booster package shall be a Wilo-Helix EXCEL Complete pressure booster package as manufactured by Wilo USA
- B. Furnish and install a EC Motor-Driven, 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. EC – Electronically Commutated
- B. HI – Hydraulic Institute
- C. NSF – NSF International.
- D. UL – Underwriters Laboratories.
- E. NEC – National Electrical Code.
- F. ANSI – American National Standards Institute.
- G. ISO – International Standards Organization.
- H. IEC – International Electro technical Commission.
- I. TIA/EIA-485 – Telecommunications Industry Association/Electronic Industries Alliance.

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 NSF 61 and NSF 372 listed for drinking water and low lead requirements.
- B. The complete packaged pumping system shall be UL QCZJ listed and compliant for “packaged pumping systems”.
- C. All wetted surfaces shall be made of corrosion-resistant material
- D. Pumps using EPDM seals with flowrates 10–80 GPM, shall be rated for –22°F to 248°F fluid temperatures. Pumps using EPDM seals with flowrates 110–270 GPM shall be rated for –4°F to 248°F fluid temperatures.
- E. Pumps using FKM seals with flowrates 10–270 GPM, shall be rated for 5°F to 194°F fluid temperatures.

- F. The pump shall either have a maximum operating pressure rating of 232 PSI or 363 PSI.
- G. The pump shall have an ambient air temperature range of 5°F – 104°F.
- H. High efficiency drive (HED) control interface and electronic commutated motor (ECM)

1.06 WARRANTY

- A. Provide manufacturer's standard warranty against defects in materials and workmanship
 - 1. Warranty Period: Wilo-Helix EXCEL complete shall be free of defects in materials and workmanship for a period of two (2) years from the date of purchase; 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 Helix EXCEL complete series pumping package 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. BASE ASSEMBLY

- 1. Base material of construction shall be S235JP Steel in accordance to EN 10025-2:2004; which is an atmospheric corrosion resistant, non-alloy, structural steel.
- 2. Base assembly fasteners shall be Zinc-plated with grade 5 rating tensile strength.
- 3. Vibration dampeners shall be made of natural, black, rubber with hardness approximately 55° +/- 5 shore thread rod, washer, - steel ST37, yellow chromated steel.

B. PUMPS

- 1. Shall either be constructed of:
 - a. AISI304 stainless steel.
 - b. AISI316L stainless steel.
- 2. Shall be assembled with 300 Class ANSI flanges for Helix V10-V80 or 250 Lb ANSI split flanges for Helix V110-V270.
- 3. Shall be furnished with a carbon and polyphenylene sulfide (PPS) wear ring.
- 4. Shall be equipped with drain and vent ports with ability to accommodate a bypass.

C. PUMP SHAFT

- 1. 304 stainless steel and cast Iron pumps with flowrates 10-80 GPM shall be equipped with an AISI304 or AISI318 LN stainless steel shaft depending on number of Impeller stages.
- 2. 304 stainless steel and cast Iron pumps with flowrates 110-270 GPM shall be equipped with an AISI431 stainless steel shaft.
- 3. 316L stainless steel pumps shall be equipped with an AISI316L or AISI318 LN; depending on number of impeller stages.

D. IMPELLER

1. Shall be 100% laser-welded, 2D/3D blades, and sandblasted.
2. 304 stainless steel and cast Iron pumps shall be equipped with AISI304L stainless steel impeller(s).
3. 316L stainless steel pumps shall be equipped with AISI316L stainless steel impeller(s).

E. PUMP SEAL

1. Seal cartridge assemblies shall facilitate, at the discretion of the operator, a seal replacement or an entire cartridge replacement.
2. Sleeve under mechanical seal shall be AISI316L.
3. 304 stainless steel and cast Iron pumps shall be equipped with 304 stainless springs, clips, and constructed with EPDM inserts.
4. 316L stainless steel and cast Iron pumps shall be equipped with 304 stainless springs, clips, and constructed with FKM inserts.

F. LANTERN

1. Shall be constructed cataphoresis-coated grey cast iron EN-GJL 250
2. Shall be rotatable by 90°.
3. Shall have lifting lugs to facilitate pump installation or extraction from packaging.
4. Shall have a coupling guard in AISI316L stainless steel with Wilo design for better shaft protection.
5. Shall allow for easy access to the coupler, spacer and seal cartridge assembly.
6. Shall allow for removal/replacement of seal cartridge without removing motor on motor sizes 7.5 HP and greater.

G. MOTOR

1. Shall be a Wilo developed, electrically commutated, synchronous permanent magnet, super premium motor.
2. Shall have a NEMA C-faced flange for vertical mounting
3. Shall meet standard IEC 60034-30
4. Shall be a 2-pole motor and run up to 60 hz
5. Shall produce motor efficiencies greater than, or equal to, IE5 and NEMA MG1 TABLE 12-12 motor efficiency standards
6. Shall have a protection class of IP52

H. 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 offer four control modes:
 - a. Speed control
 - b. Constant pressure
 - c. Variable pressure
 - d. PID control
4. Shall allow for speed reduction turndown of up to 70%.

5. Shall be UL 508 compliant and listed.

I. PUMP MANIFOLD

1. Shall be constructed of AISI 304 Stainless Steel
2. Manifolds shall have smooth contour transitions to minimize build-up of organisms
3. All pump line connections shall either be NPT male or female pipe threads in accordance with ANSI B1.20 or flanged connections depending on size
4. All system connections shall either be NPT male or female pipe threads in accordance with ANSI B1.20, ANSI 150 class flanges.
5. All manifolds shall be electrolytic polished
6. All manifolds shall be 5S or 10S depending on size and rated for 363 PSI maximum pressure
7. Suction and discharge manifolds shall each have two ¼" male NPT connections; one for a 316 stainless steel, pressure transducer and the other for a 2.5" 316 stainless steel, glycol-filled, analog pressure gauge
8. Suction and discharge manifolds shall have a ¾" Female NPT connection
9. Discharge manifold shall be equipped with ¾" Male NPT x ¾" Female NPT shut-off valve with ¾" stainless steel plug engaged into the Female NPT portion of the shut-off valve
10. Suction manifold shall be equipped with a ¾" stainless steel plug engaged into the Female NPT portion of the ¾" connection

J. ISOLATION VALVES

1. Shall be constructed of either ASTM 304 Stainless steel or an epoxy coated cast iron wafer body ISO 5211 with API609 face to face flange; depending on size
2. All threads shall be female, nominal tapered threads in accordance with ANSI B1.20.1
3. Packing, thrust washer, seal and gasket shall all be constructed of PTFE for threaded valve bodies
4. Seat shall be constructed of PTRE for threaded Stainless steel valve bodies and EPDM resilient seat for cast iron wafer body

K. CHECK VALVE

1. Shall have a 316 Stainless Steel ASTM A240 in Female NPT or a Wafer-Style, Epoxy Coated Ductile Iron Body ASTM 65-45-12, with 316 Stainless steel internals; depending on booster size and model
2. Check valve shall be a "Piston-style, non-slam, check valve
3. Elastomer seal for check valve shall be made of EPDM

L. (Communications)¹

1. Shall allow for real time interfaces for BUS communication via plug-in IF-modules.
2. IF-modules shall accommodate the following protocols:
 - a. BACnet
 - b. Modbus
 - c. LON
3. IR Stick shall allow for communication with the pump(s) via an infrared interface. Software updates shall be available.

M. (External Components)¹

1. Pressure sensor

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions as written in the Installation and Operation Manual (IOM).
- 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 Helix EXCEL Complete as manufactured by Wilo.

END OF SECTION

¹Components in parenthesis indicate an optional item.