Fruitport Community Schools Request for Proposals

Boiler Replacement

03.15.2024

Mark Mesbergen
Fruitport Community Schools
3255 Pontaluna Road
Fruitport, MI 49415

Overview

Fruitport Community Schools (the “District”) is seeking proposals from a contractor (each a “Bidder’) for the removal and replacement of two boilers, excess tank, water filter, and 2 pumps at Shettler Elementary. Shettler Elementary is located at 2187 Shettler Road, Muskegon, MI 49444.

Bids to include the following:

- Refer to Appendix A
- Appendix B has the necessary notes and materials to include
- Appendix C has the specs for the four pieces of equipment that is district has determined to be required for the bid.

Additional Information

Non-Mandatory Walk-Throughs

Walk-throughs can be scheduled with John Winskas via email jwinskas@fruitportschools.net and are recommended. John Winksas will be on vacation from March 20 through April 5th.

Desired Installation Time-Line

The work shall be completed between July 8, 2024 and August 9, 2024.

Proposal Timeline

1. RFP released on 03/15/2024.
2. Non-mandatory walk throughs can happen during this timeframe.
3. **Proposals are due on April 19, 2024 at 10:00 am. Bids are to be submitted via mail to: Fruitport Community Schools, Attn: Mark Mesbergen, 3255 Pontaluna Road, Fruitport, MI 49415 OR via email to mmesbergen@fruitportschools.net with a subject line of “Parking Lot”.**
4. Board of Education will take action on the lowest qualified bidder on the May board meeting. The district will notify the company the following day.
5. This project needs to be completed by August 9, 2024.

Proposal Requirements

1. Proposals shall be prepared in compliance with provisions of this RFP. **All provisions and everything a bidder will need is in Appendix A.** Failure to comply may result in the disqualification of the proposal.

2. Interested Bidders are strongly encouraged to submit an intent to respond to Mark Mesbergen via mmesbergen@fruitportschools.net to ensure that the Bidder receives all addenda or communications regarding this RFP.
3. Late Proposals will not be accepted.
4. Each Bidder, before submitting a proposal, shall, if it is uncertain of the conditions, requirements, and/or obstacles that might impact the provision of the project, request further information. Failure to make such inquiry or receive an answer shall not relieve the selected Bidder from the obligation to comply, in every detail, with all provisions and requirements of the RFP nor shall it be a basis for any claim whatsoever for alteration in any term or payment required by the eventual contract between the selected Bidder and the District (the "Contract").
5. If a Bidder discovers any ambiguity, conflict, discrepancy, omission or other error in the RFP, they shall immediately notify the District of such error in writing and request modification or clarification of the document. Modifications will be made by issuing a revision and will be given by written notice to all parties who have submitted an intent to respond. The Bidder is responsible for clarifying any ambiguity, conflict, discrepancy, omission or other error in the RFP prior to submitting the proposal or it shall be deemed waived.
6. All proposals and any accompanying documents become the property of the District and will not be returned.
7. The District reserves the right to waive irregularities in this RFP, the bid process, or the proposals. Any such waiver shall not modify any remaining RFP requirements or excuse a Bidder from full compliance with the RFP specifications and other Contract requirements if the Bidder is awarded the Contract.
8. Each Bidder who submits a bid, by submitting a bid, agrees to indemnify and hold harmless the District and its employees, board members, and consultants for any claim against the District involving the Bidder and arising out of the bid process. By submitting a bid, each Bidder agrees that it will make not claim against the District regarding this RFP or the bid process.
9. All Bidders, by submitting proposals, agree that they have read and are familiar with all the terms and conditions of the RFP and applicable federal and state laws, rules and regulations and will abide by the terms and conditions thereof.
10. **Each Bidder complete Appendix A as the three forms are the proposal bidding documents. The documents include Affidavit of Bidder, Iran Economic Sanctions Act Certification, and the bid proposal sheet.**

APPENDIX A

Proposal:

Please make sure that you have accounted described in Appendix B.

TOTAL PROPOSAL PRICE:

$_____

FAMILIAL RELATIONSHIP DISCLOSURE FORM AFFIDAVIT OF BIDDER

The undersigned, the owner or authorized officer of _____(the Bidder), pursuant to the familial disclosure requirements provided in the Advertisement for Bid, hereby represents and warrants, except as provided below, that no familial relationships exist between the owner(s) or any employee of _____(the Bidder) and any member of the Board of Education of the School District or the Superintendent of Fruitport Community Schools.

List and describe any Familial Relationships:

_____
_____
_____
_____

BIDDER: _____
By:_____
Its:_____

STATE OF MICHIGAN)

) ss.
COUNTY OF _____)

The instrument was acknowledged before me on the _____ day of _____, 2024, by _____.

_____
, Notary Public
_____ County, Michigan

My Commission Expires: _____

Acting in the County of: _____

AFFIDAVIT OF COMPLIANCE – IRAN ECONOMIC SANCTIONS ACT

Michigan Public Act No. 517 of 2012

The undersigned, the owner or authorized officer of the below-named applicant (the "Applicant"), pursuant to the compliance certification requirement provided in the Fruitport Community Schools (the "School District") Request For Proposals (the "RFP"), hereby certified, represents and warrants that the Applicant *(including its officers, directors and employees) is not an "Iran linked business" within the meaning of the Iran Economic Sanctions Act, Michigan Public Act No. 517 of 2012 (the "Act"), and that in the event Applicant is awarded a contract as a result of the aforementioned RFP, the Applicant will not become an "Iran linked business" at any time during the course of performing any services under the contract.

The Contract further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than $250,000.00 or 2 time the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the School District's investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on a request for proposal for three (3) years from the date that it is determined that the person has submitted the false certification.

APPLICANT: _____
Name of Applicant By:_____
Title:_____
Date:_____

STATE OF MICHIGAN)
) ss.
COUNTY OF _____)

The instrument was acknowledged before me on the _____ day of _____, 2024,
by_____.

_____
Notary Public
_____ County, Michigan

Acting in the County of: _____

My Commission Expires: _____

APPENDIX B

- Removal and disposal of the existing heating boiler including associated materials.
- Provide and install all necessary steel piping and fittings for installation of gas piping to new unit and for installation of heating supply and return piping along with valves (as necessary).
- Provide and install all necessary vent piping from new boiler through the roof with Centrotherm piping.
- Provide and install all necessary intake air piping using pvc.
- Roof patching is included in this proposal for patching hole through roof around the reused penetration.
- Provide and install all necessary hangers, brackets and supports for all new piping.
- Electrical is included in this proposal for disconnecting existing unit and making connections to the new boiler.
- Insulation of all new piping is included in this proposal.
- Provide and install (2) new Viessmann Vitocrossal, 1500 MBH, 97% boiler including condensate neutralization kit, air intakekit, outdoor air temperature sensor and appliance adapter.
- Provide and install a new WILO stratos cast iron pump to serve the boiler assembly along with flange and gasket kits, RIBrelay and swing check valve
- Provide and install a new Fernox magnetic commercial water filter near the new boiler
- Chemical treatment is included.
- Startup and test new unit upon completion
- Cleanup and removal of all work associated debris
- Permits and inspections are included in this proposal

APPENDIX C

Engineering Specifications

Project:

Location:

Index:

Boiler Specifications: Vitocrossal 200, CI2-1500

1.0 General

The gas-fired hot water condensing heating boiler shall be fabricated of high grade stainless steel (SA240). The heat exchanger shall utilize the Inox-Crossal heating surface for maximum heat transfer for optimum energy savings. The smooth, non-fin heat exchanger surfaces shall provide a self-cleaning effect while promoting clean combustion through low heat exchanger loading and a straight-through design. The boiler shall be capable of operating at less than 20 PPM NOx (@ 3% O2) in natural gas operation throughout the firing range.

Each boiler shall be equipped with 2 modulating pre-mix cylindrical stainless steel gas burners with a high-alloy stainless steel surface capable of operating with consistently high efficiency, and wide operating modulation range. The burner shall be equipped with a variable speed combustion fan for quiet and economical operation. The burner shall include a combustion control system containing a broadband oxygen sensor and modulating gas valve to automatically adjust combustion for optimum performance.

The boiler control shall be a 7 inch (175 mm) full colour display with touch screen operation. The boiler shall be equipped with a WiFi communication module for remote connection.

The boiler shall be capable of operating as a single boiler control with outdoor reset capabilities or shall be cascadable as part of a multi-boiler system to a maximum of 16 boilers using CanBUS integrated communication protocol for boiler set point operation without the requirement for a separate stand-alone cascade controller.

In single boiler operation, the control unit shall provide control for a boiler with four zone circuits and three mixing valve circuits with accessory module, using digital weather responsive reset. System accessory components shall use PlusBUS communication protocol. The outdoor reset supply temperature of every heating circuit shall result from the outside temperature, the set room temperature, the operating mode and the heating curve.

In cascade operation, communication between boilers shall be via CanBUS protocol. In cascaded operation, one boiler will be selected and programmed as the Lead Boiler with the remaining boilers being programmed as Lag Boilers and commissioned using the software tool. The cascade system shall have the logic to control up to 16 boilers in a single cascade system (1 Lead boiler and up to 15 Lag boilers). The boilers shall be operated on a set point temperature generated through the Lead Boiler and delivered to the cascade system via CanBUS protocol. The Lead boiler shall provide control for four zone circuits and three mixing valve circuits with accessory module, using digital weather responsive reset. System accessory components shall use PlusBUS communication protocol. The outdoor reset supply temperature of every heating circuit shall result from the outside temperature, the set room temperature, the operating mode and the heating curve. The lead boiler shall provide control for DHW production, either through an indirect-fired DHW tank connected directly to the Lead boiler, or downstream of the low loss header. The cascade system logic shall have a preconfigured cascade sequence, configured to promote system efficiency and balanced run time across all boilers in the cascade. The cascade sequence shall also be capable of being manually configured.

The boiler vent system shall meet Category IV venting requirements. The vent material shall be UL/ULC/CSA listed for Category IV, made of either stainless steel, polypropylene (PPs) or CPVC, and be water and gas tight. Sidewall venting applications shall be acceptable.

1.1 Performance Criteria

Each boiler shall be designed for operating at:

NG input range	50 - 1500 MBH (14.7 - 440 kW)
LPG input range	50 - 1500 MBH (14.7 - 440 kW)
Output (Thermal efficiency)	1460 MBH (428 kW)

Boiler turn-down ratio shall be 30:1 for NG and LPG.

Combustion efficiency shall not be below 96.6% and thermal efficiency shall not be below 97.3% as tested to ANSI/AHRI standard 1500 Performance Rating of Commercial Space Heating Boilers / DOE Test Procedure 81 FR 89276 / U.S. Standards ANSI Z21.13/CSA 4.9 / AHRI.

ASME maximum allowable working pressure (MAWP): 80 psig.
ASME maximum water temperature (Fixed High Limit): 210°F (99°C).
Maximum boiler operating temperature (Adjustable High Limit): 185°F (85°C).

The boiler shall operate without a flow switch.

The boiler shall weigh no more than 1812 lbs (822 kg), including the burners, controls and jacketing.
Heat exchanger surface area shall not be less than 196.2 ft² (18.23 m²).

No additional safety devices shall be required to safeguard against low flow conditions.

The boiler shall be capable of accommodating a 50% glycol mixture.

The boiler shall incorporate wide water passageways, providing low flow resistance.

The condensation rate, controlled by optimum combustion, shall be able to meet a CO_2 value of 10% through the entire firing range.

The standard control options shall be able to operate independently, or integrate with building management system protocols as referenced in the control section.

2.0 Construction

The combustion chamber and heat exchanger shall be constructed of high-grade alloy stainless steel. The flue gas and condensate collector shall be made of a high-grade alloy stainless steel.

The R-value of the insulation shall be equivalent to 4" (100 mm) mineral wool with nylon backing to reduce the standby loss to a minimum as well as to guarantee a minimum of surface temperature.

The flue gasses shall pass by the return water in a counter-flow direction only, for maximum heat transfer effectiveness.

The heat exchanger shall be of a compact design for ease of handling, and the burner shall be mounted on the front of the boiler.

The boiler shall be equipped with three casters for easy transport and positioning into tight spaces.

The burner shall be constructed from high-grade stainless steel for operation with natural gas or liquid propane gas. Burner ignition shall be by a direct spark ignition system.

The burner shall be capable of operating at altitudes of up to 10,000 ft (3,000 m) without change of orifices, but with the use of electronic adjustment/setting.

The burner shall be capable of operating at natural gas pressures from 4 up to 14" W.C. or liquid propane gas pressures ranging from 10 up to 14" W.C.

The burner shall incorporate the electronic high limit, manual reset fixed high limit, and manual reset low gas pressure switch.

3.0 Certifications

All individual components shall be accepted as part of the system under the governing body having jurisdiction. Field approval shall not be required for any component. Boiler shall be CSA approved and shall be built in compliance with ASME Section IV, carrying the "H" stamp.

The boiler shall have the following approvals and listings, or be in compliance with:

CSA, CRN, ASME, AHRI, MA State approval, Energy Star

Control Specifications

1.0 General

The control with 7" colour touch screen display shall be integrated into the Vitocrossal 200 CI2 boiler and shall be capable of operating as a standalone boiler control with outdoor reset capabilities or shall be cascadable as part of a multi-boiler system (to a maximum of 15 boilers using CanBUS protocol) for boiler set point operation.

In standalone operation the control unit shall provide control for a boiler with one high temperature circuit and three zone circuits or three mixing valve heating circuits with accessory mixing valve extension modules, using digital weather responsive reset. Additional circuits shall be added with the order of an ancillary mixing valve controller and/or a custom control panel. System components shall use the Viessmann PlusBUS communication protocol. The outdoor reset supply temperature of every heating circuit shall result from the reference outside temperature which shall be provided from a hardwired sensor, building automation system or internet connection, the set room temperature, the operating mode and the heating curve.

Each boiler shall have integrated CanBUS for communication between boilers. In cascaded operation one boiler will be selected and programmed as the System and Lead control, with the remaining boilers sections being programmed as lag controls. The boilers shall be operated on a set point temperature only generated through the System and Lead boiler control and delivered to the cascaded boilers via the CanBUS communication protocol. The System and Lead control unit shall provide control for a heating system with one high temperature circuit and 3 zone circuits or three mixing valve circuits with accessory mixing valve extension modules, using digital weather responsive reset. Additional circuits shall be added with the order of an ancillary mixing valve controller and/or a custom control panel.

1.1 General Requirements

The controller shall have the following features:

- 7-inch colour touch screen user interface.
- Commissioning assist.
- Compatible with Viessmann modulating cylinder burner.
- EPROM memory is maintained without main power.
- Control algorithms are PID-based.
- Integrated CanBUS Communication Protocol.
- Integrated 0-10VDC temperature or modulation set point signal.
- Integrated 0-10VDC output for modulation feedback signal.
- Quick connect plug & play system for low voltage controls.
- Communication with BacNet or Modbus shall be available (through accessory gateways).
- Integrated WiFi communication.

The controller shall be factory tested and approved by CSA as part of a package with the compatible series of boilers.

The controller shall be able to support the following output devices (based on system configuration):

- (2) Viessmann modulating cylinder burners.
- (1) Boiler isolation valve.
- (1) Boiler pump or Variable Speed Boiler pump with 0-10VDC pump modulation signal.
- (1) Domestic hot water pump.
- (1) Domestic hot water re-circulation pump.
- (3) Low temperature heating loop circulation pumps in conjunction with mixing valves (with accessory mixing valve extension module).
- (3) Zone circuits without mixing valves

2.0 Construction

2.1 Control Interface

The control interface shall be a digital touch screen display capable of displaying temperatures as measurement unit in metric or imperial values, with menu driven selection functions, with access to the following operating points:

- Able to display all system temperatures and set points.

- Displays unique fault message during an alarm.
- An operating selection mode.
- Domestic hot water temperature set point adjustment.
- Information indicator with confirmation.
- Boiler operating hours.
- Number of burner starts display.
- Operating status check.
- Adjustable display contrast.
- Slope and shift adjustment for the heating curve.

2.2 Additional Features

The controller shall have the following additional features:

- On/Off switch.
- Default factory settings reset.
- Light guide for operating status and fault indication.
- Tamper-proof fixed high limit.
- Emissions test function.
- Operating condition scans.
- Maintenance requirement status.
- Relay test function (actuator test).
- Quick heat up and quick set-back functions.
- Start-up and shut-down optimization functions.
- Warm weather shut-down.
- Energy savings mode.
- Ability to restore the control to factory defaults.
- Integrated WiFi for wireless communication.
- High limit testing function.
- Adjustable electronic altitude setting.
- Supplemental heating.
- Internet connectivity for connection to Viessmann digital services.
- Access point for connecting to Vitoguide.

The fixed high limit shall have the following tamper-proof features:

- CSA certified burner control with integrated Electronic Fixed and Adjustable High limit sensors are used.

2.3 Boiler System Supply Water Temperature Control

Each controlled circuit shall have a calculated heating curve which describes the required supply water temperature at different outside air temperatures. The slope and shift of each heating curve shall be adjusted to fit any type of building or system. The highest required temperature of all connected heating zones and heating circuits shall be used together with conjunction from an optional room temperature sensor to determine the common boiler supply temperature set-point.

In the unoccupied mode, the supply water temperature set-point shall be reduced by a pre-determined amount. A call for domestic hot water or an external demand signal shall override this set-point to pre-determined values.

Control logic shall be equipped to protect the heating system from freeze-up if left powered during the off season.

2.4 Domestic Hot Water Control

The DHW temperature shall be controlled through starting and stopping the DHW circulation pump. An automatic or individual time program shall be selected for the control of the DHW and the DHW tank re-circulating pump. An individual time program shall enable up to four switching periods per day to be set to control the DHW heating and the DHW re-circulation pump.

The DHW control sequence shall use an adaptive algorithm that takes into account the rate at which the temperature changes and whether the boiler will be required to supply heat after the DHW tank has been heated or whether residual boiler heat should be transferred to the DHW tank. Available domestic hot water strategies shall include: priority control (supply water set-point increases, the mixing valve closes and the heating circuit pumps are shut off on a call for DHW), modulating priority (the supply water set-point of the mixing valve circuits shall be reduced until the DHW supply temperature requirements have been met), or no priority at all.

A frost protection function shall energize the DHW production should the supply water temperature drop below a pre-determined value. An optional second temperature sensor placed in the cold water inlet can be incorporated to determine if DHW production should begin prematurely. If required, a solar heating control strategy using an extra temperature sensor in the solar system shall be selected.

2.5 Fault Management

If a fault occurs on a boiler, the fault code shall be indicated in the display window and by the flashing light bar. A compiled failure alarm contact shall close in order to signal the alarm condition to a Building Automation System (BAS). The error history shall be saved to memory.

2.6 Scheduling

There shall be separate time schedules for central heating, DHW heating and the DHW re-circulation pump. Each device shall be able to be scheduled to switch between occupied and unoccupied modes up to four times per day.

2.7 Auxiliary Inputs

The following dry contact inputs shall be available to be wired to each boiler to control the following functions (functionality dependent on operating mode):

- Boiler disable.
- External heat demand.
- Boiler sequencing.
- External enable.
- External blocking.

2.8 Building Management System Interface

The controller shall have the ability to accept a 0-10VDC signal from a Building Management System for the purpose of allowing remote control of the boiler supply water temperature set point, or burner modulation setpoint.

The controller shall be able to fully integrate with Building Management Systems running on the BacNet, or Modbus communication protocols via an accessory gateway.

2.9 Remote Communication Interface

The controller shall have the ability to be connected to an Internet server interface, which shall allow access to programming and operating parameters over the World Wide Web. The controller shall have integrated WiFi.

The controller shall have the ability to be connected to a Modbus or BACnet BMS system, which shall allow access to all programming and operating parameters using the accessory WAGO gateway.

3.0 Certifications

All individual components shall be accepted as part of the system under the governing body having jurisdiction. Field approval shall not be required for any component.

All electrical wiring is to be done in accordance with the latest editions of:

CSA C22.1 Canadian Electrical Code and/or local electrical codes (for Canada)
ANSI/NFPA 70 National Electrical Code (for U.S.)

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Pump Spec



Wilo-Stratos MAXO/-D/-Z

High Efficiency Commercial Circulators

Engineering Specification

Wilo_Spec_Stratos_MAXO_092023

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Variable speed, high efficiency, electronically commutated motor-driven, wet rotor circulator pump shall be a Wilo-Stratos MAXO/-D/-Z as manufactured by Wilo USA.
B. Furnish and install a variable speed, high efficiency, electronically commutated motor-driven, wet rotor circulator pump with a capacity as indicated in the plans.

1.02 RELATED SECTIONS

A. 23 21 23.19 – Vertical-Mounted, Double-Suction Centrifugal Hydronic Pumps.
B. 22 11 23.23 – Close-Coupled, Inline, Sealless Centrifugal Domestic-Water Pumps.

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1.03 REFERENCES

A. NSF – NSF International.
B. HI – Hydraulic Institute.
C. UL – Underwriters Laboratories.
D. cUL – Canadian Underwriters Laboratories.
E. NEC – National Electrical Code.
F. ANSI – American National Standards Institute.
G. ECM – Electronically Commutated Motor.
H. HMI – Human Machine Interface.

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 Hydronic pump shall be NSF 61 Annex G and NSF 372 listed for drinking water and low lead requirements (-Z Models only).
B. Liquid temperature range for the variable speed, high efficiency, electronically commutated motor-driven, wet rotor circulator pump shall be rated for 14°F to 230°F; with a minimum of 32°F for domestic water.
C. Ambient temperature range for the variable speed, high efficiency, electronically commutated motor-driven, wet rotor circulator pump shall be rated for +14°F to 104°F.
D. Stratos MAXO/-D/-Z pressure rating shall be 145 PSI.
E. The wet rotor pump manufacturer shall have minimum 10 years of experience in the country of the installation.

F. Shall be compliant to the UL Standard for Adjustable Speed Electrical Power Drive Systems - Part 5-1: Safety Requirements - Electrical, Thermal and Energy; UL61800-5-1.
G. Shall be compliant to UL 778 standards for motor pump.
H. Shall be compliant to UL 50 and UL 50E standards for enclosures for electrical equipment.
I. Shall be compliant to CAN/CSA C22.2 No. 274.
J. The pump shall be labeled on the nameplate as having an Energy Efficiency Index (EEI) of no greater than 0.20.

1.06 WARRANTY

A. Provide manufacturer's standard warranty against defects in materials and workmanship.
   1. Warranty Period: Wilo-Stratos MAXO/-D/-Z shall be free of defects in materials and workmanship for a period of four (4) years from date of manufacture or three (3) years from the date of installation; whichever expires first. Warranty shall cover pump, motor and terminal box as a complete unit.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
   1. Wilo-Stratos MAXO/-D/-Z as manufactured by Wilo.
   2. Pre-approved equal.
B. The variable speed, high efficiency, electronically commutated motor-driven, wet rotor circulator pump shall be a standard product of a single pump manufacturer. The entire pump system including pump, motor and pump HMI, shall be designed, built and tested by the same manufacturer.
C. The variable speed, high efficiency, electronically commutated motor-driven, wet rotor circulator pump manufacturer shall have a minimum of 10 years of experience in the country of the installation.

2.02 COMPONENTS

A. PUMP(S)
   1. Shall be of variable speed, high efficiency, electronically commutated motor-driven, wet-rotor circulator pump design.
   2. Shall be NSF 61 Annex G / NSF-372 listed for drinking water and low lead requirements (-Z Models Only)
   3. Pump Housing:
      a. Stratos MAXO and Stratos MAXO –D pump housings shall be constructed of EN-GJL-250 Grey Cast Iron and surface-treated with Cataphoretic coating. Stratos MAXO-Z pump housings shall be constructed of Austenitic Stainless Steel 1.4408.
   4. Impeller(s) shall be constructed of glass fiber reinforced PPS-GF40.
   5. Shaft:
      a. Stratos MAXO shall have a shaft constructed of X39CrMo17-1 Martensitic stainless steel.
      b. Stratos MAXO-D shall have shafts constructed of X30Cr13 Martensitic stainless steel.
      c. Stratos MAXO-Z shall have a shaft constructed of 1.4122 Chromium martensitic stainless steel with molybdenum.
   6. Bearing:

a. Stratos MAXO and Stratos MAXO –D bearings shall be constructed of Carbon-Graphite. Stratos MAXO-Z bearings shall be constructed of Antimony-Impregnated Carbon.

B. MOTOR/ELECTRONICS
   1. Shall be an Electronically Commutated Motor.
   2. Voltage and Hz:
      a. Stratos MAXO and Stratos MAXO-Z shall be compatible to supply voltage in 115v~1±10%, 50/60 Hz or 230v -240v~1±10%, 50/60 Hz.
      b. Stratos MAXO- D shall compatible to supply voltage 230v -240v~1±10%, 50/60 Hz.
   3. Shall have a protection class of Enclosure 2 with Class F insulation.

C. HMI
   1. Shall have a 4.3" LED color screen.
   2. Shall allow for easy menu navigation using "GREEN BUTTON" technology.
   3. Shall have the following, selectable, control modes:
      a. Permanent, automatic performance adaptation to system requirements without set point specification; Wilo Dynamic Adapt plus with up to 20% energy savings compared to dp-v control mode.
      b. Constant temperature (T-const., factory setting).
      c. Constant differential temperature (dT-const.).
      d. Needs-based volume flow optimization of the feeder pump through connectivity and communication between multiple pumps (Multi-Flow Adaptation).
      e. Constant volume flow (Q-const.).
      f. Differential pressure control (dp-c) to a remote point in the pipe network (index circuit evaluator).
      g. Constant differential pressure (dp-c).
      h. Variable differential pressure (dp-v) with the option to set the nominal duty point.
      i. Constant speed (n-const.).
      j. User-defined PID control.
   4. Shall have the following display characteristics:
      a. Control mode.
      b. Setpoint.
      c. US gallons per minute.
      d. Power consumption.
      e. Active influences (e.g. STOP, No-flow Stop).
      f. Fault; yellow screen – pump still runs.
      g. Failure; red screen – pump stop.
   5. Shall have the following I/O:
      a. Two configurable analogue inputs: 0–10 V, 2–10 V, 0–20 mA, 4–20 mA and commercially available PT1000; +24 V DC power supply.
      b. Two configurable digital inputs (Ext. OFF, Ext. Min, Ext. Max, heating/cooling, manual override (uncoupled from building automation), operation lock (key lock and remote operation configuration protection).
      c. Two configurable signal relays for operational and fault messages.
      d. Slot for Wilo-CIF modules with interfaces for building automation BA (optional accessories: CIF modules Modbus RTU, BACnet MS/TP).
      e. Wilo Net as a Wilo system bus for communication between Wilo products, e.g. Multi-Flow Adaptation; double pump operation and Wilo-Smart Gateway.

f. Integrated temperature sensor.
g. Automatic emergency operation with definable pump speed for exceptional circumstances, e.g. bus communication or sensor value malfunction.
h. Use the Wilo-Assistant app to read and set operating data and –among other things– set up a commissioning protocol through the Bluetooth interface (no further accessories required).
i. Cable break detection when using an analogue signal (in connection with 2–10 V or 4–20 mA).
j. Pre-set date and time.

D. FUNCTIONS

1. Heat quantity measurement.
2. Cooling quantity measurement.
3. Pump automatically deactivates when no flow is detected (No-Flow Stop).
4. Switchover between heating and cooling mode (automatic, external or manual).
5. Adjustable volume flow limiter using the Q-Limit function (Qmin. and Qmax.).
6. Operating modes of twin-head pumps: Efficiency-optimized parallel operation for dp-c and dp-v, main and standby operation.
7. Ability to save and restore configured pump settings of up to three restoration points.
8. Fault and warning messages shown in plain text with advice on resolving the issue.
9. Pump venting function for automatic venting of the rotor chamber.
10. Automatic setback operation.
11. Automatic deblocking function and integrated full motor protection.
12. Dry-running detection.
13. Automatic detection of thermal disinfection for domestic hot water circulation in conjunction with a separate temperature sensor (Stratos MAXO-Z Only).

E. EXTERNAL ACCESSORIES

1. CIF Modules:
   a. BACnet MS/TP.
   b. Modbus RTU.
   c. LonWorks.
   d. CanBUS.
2. PT 1000 (B) pipe contact sensor (for domestic hot water).
3. PT 1000 (AA) sensor for installation in immersion well.
4. Differential pressure sensor.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Scope of delivery

a. Complete pump and motor assembly.
b. Stratos MAXO and Stratos MAXO-Z shall have an optimized Wilo-Connector with ½" NPT connection adaptor. Stratos MAXO-D shall have 2x optimized Wilo-Connector with ½" NPT connection adaptor.
c. Stratos MAXO and Stratos MAXO-Z shall have 5x threaded cable glands M16 x 1.5. Stratos MAXO-D shall have 10x threaded cable glands M16 x 1.5.

d. Stratos MAXO and Stratos MAXO-Z shall have gaskets for 1.25, 1.5 and 2 inch flange connections.
e. Concise Installation and operating instructions.

B. Install equipment in accordance with manufacturer's instructions.
C. 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.
D. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.
E. Unit shall be a Wilo-Stratos MAXO as manufactured by Wilo USA.

END OF SECTION

aalberts hydronic flow control

HYDRONIC PIPING SPECIALTIES
NexTank SPECIFICATION

PRODUCT

1. Manufacturer: Aalberts Hydronic Flow Control, Flamco Division, NexTank model NEXP-XXXX,

2. Expansion tank to be manufactured of fabricated steel, rated for 125 PSI working pressure and stamped and registered in accordance with ASME Section VIII, Division 1 for pressure vessels.

3. Expansion tank shall be suitable for use on systems with glycol additives up to 50%

4. Expansion tank to feature a full-acceptance replaceable bladder to reduce the risk of rupture during operation and increase overall tank longevity.

5. Expansion tank shall incorporate a pressure gauge to allow monitoring of the gas pre-charge during installation and system operation.

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aalberts hydronic flow control

HYDRONIC PIPING SPECIALTIES
FLAMCOVENT CLEAN SMART SPECIFICATION

PRODUCT

1. Manufacturer: Aalberts Hydronic Flow Control, Flamco Division, Clean Smart model FSADS-XXXXA, Magnetic Air & Dirt Separator

2. Air and Dirt eliminator shall utilize double thrust technology to minimize pressure drop to a maximum of 1.5 PSI at a velocity of 9.8ft/s and to eliminate the possibility of pipe blockage/obstruction.

3. Air and Dirt eliminator to be manufactured of fabricated steel, rated for 150 PSI working pressure and stamped and registered in accordance with ASME Section VIII, Division 1 for pressure vessels.

4. Air and Dirt eliminator shall incorporate a conically shaped air elimination device at the top of the separator to prevent damage to the float valve mechanism.

5. Internal separating element to be cone shaped with a return injection port, manufactured of steel, and welded into outlet of flow through separator.

6. Air and dirt eliminator shall incorporate a skim valve near the top of the separator to allow the removal for floating particulates.

7. Air and Dirt eliminator shall incorporate a magnetic dirt collector in the base of the separator comprised of a brass drywell holding 25 Neodymium supermagnets rated at 13,000 Gauss. The magnets shall be stacked in a breakaway configuration for ease of service.

8. Each unit shall incorporate a dual edged rotating steel scraper in the bottom of the separator to break up coagulated particulates and a blow down valve for removal of system debris.

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