

ADDENDUM NO. 1

Date: 10/9/24

Project Name: DOC NCF CRC Boiler Replacement

DAS RFB# 940400.01

DAS Project # 9404.00

BIDS DUE: October 15th, 2024

The original Project Manual and Drawings for the project noted above are amended as noted in this Addendum. Included in this Addendum are Specification, Architectural, & Engineering items.

Please review all sheets and incorporate them into your set of Contract Documents.

The receipt of this Addendum shall be acknowledged by inserting its number and date in the space provided on the Bid Form.

This Addendum consists of:

General Items:

1. **Bid Date to be moved to October 15th, 2024 at 2:00 pm.**
2. See attached Pre-Bid Meeting Minutes w/ sign-in sheet
3. Drawings Re-Issued
 - a. M02 – Mechanical Plan
 - b. M03 – Mechanical Details
 - c. M04 – Mechanical Details
 - d. E02 – Electrical Plan
 - e. E03 – Electrical One-Line & Details
4. Project Manual Revisions
 - a. Re-issuance of Spec Section 00 4116 Bid Form to be utilized for bid.
5. General Project Note: Boiler flues are to be double walled
6. Approved Substitution Requests (see attached product information):
 - a. Spec Section 230520 Centrifugal Air Separators– Manufacturer: Grundfos
 - b. Spec Section 230520 HVAC Piping Specialties – Manufacturer: Grundfos
 - c. Spec Section 232113 Hydronic Pumps – Manufacturer: Grundfos
 - d. Spec Section 230520 – Manufacturer: American Wheatley
 - e. Spec Section 235200 – Manufacturer: Camus Hydraulics
 - f. VFD Manufacturer: Invertek
 - g. Hydronic Pumps – Wilo
 - h. Boiler Manufacturer: Torus

7. Mechanical Housekeeping Pads also referenced as “Concrete Base” (in addition to contract documents)
 - a. Pads to be constructed of reinforced structural cast-in-place batched concrete
 - b. 4,000 psi mix design (minimum)
 - c. Finish
 - i. Level
 - ii. Smooth trowel finish
 - d. Formed with chamfer corners and edges
 - e. Patch all holes used for forming
 - f. Verify pad construction with approved boiler submittal(s)
 - g. Submittals to include:
 - i. Pad design
 - ii. Reinforcing
 - iii. Concrete Mix Design
 - iv. Drawing Detail(s)

RFB Pre-Bid (Non-Mandatory On Site to bidders) Minutes: Meeting #1

| | | | |
|-------------------------|---------------------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Meeting Date | Oct 4, 2024 | Meeting Time | 1:30 PM - 2:30 PM Central Time (US & Canada) |
| Meeting Location | 307 S 60th Ave E W Newton, Iowa 50208 - CRC and Virtual | Video Conferencing Link | https://teams.microsoft.com/l/meetup-join/19%3ameeting_ZWQyZjFkMGUtMzJiNS00MjY4LThlZjZjOTgyZDhmNmRkMTgy%40thread.v2/0?context=%7b%22Tid%22%3a%22705e7dc3-c582-4519-a026-3a1c9fd5fc88%22%2c%22Oid%22%3a%22b3dfe6e2-eb8d-4d44-aa8e-e4324c35a073%22%7d |

Overview Meeting to allow prospective bidders to visit the site, when possible, and learn more about the project.

Meeting Location:

1. Meet at CRC Release Center Entrance
2. Escort to CRC Release Center Designated Meeting Room
3. When meeting is complete all will leave the building and walk the project location.

Notes

Attachments

Scheduled Attendees

| Name | Company | Phone Number | Email | Attendance |
|--------------------|-------------------------------------------------------|----------------------|--------------------------------------|------------|
| Rob Greiner | Boyd Jones Construction Company | P: (402) 553-1804 | rgreiner@boydjones.biz | Present |
| Mike Hoover | Boyd Jones Construction Company | P: (402) 553-1804 | mhoover@boydjones.biz | Present |
| Adam Papesh | Boyd Jones Construction Company | P: (402) 553-1804 | apapesh@boydjones.biz | |
| Mohammed Abu-Hasan | Innovative Engineers Inc. | P: (319) 855-4115 | mabuhasan@innovativeengineersinc.com | Conference |
| John Horn | Innovative Engineers Inc. | P: (319) 855-4115 | jhorn@innovativeengineersinc.com | Present |
| Brad Heir | Newton Correctional Facility | P: (515) 314-8820 | brad.hier@iowa.gov | |
| Justin Thomas | Newton Correctional Facility | P: +1 (641) 791-1684 | justin.thomas@iowa.gov | Present |
| Brad Tonyan | State of Iowa - Department of Administrative Services | P: 515-360-7718 | brad.tonyan@iowa.gov | Conference |

Introduction

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
|-----|------------|---------------------------------|------------|----------|----------|--------|
| 1.1 | 1 | Introductions | | | | Open |
| | | Description Attendees | | | | |

| |
|-----------------------------|
| Name + Organization + Title |
|-----------------------------|

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
|---------------------------------------------------------------------------------------------|------------|---------------|------------|----------|----------|--------|
| 1.2 | 1 | Sign-In Sheet | | | | Open |
| Description See attached sign-in sheet. | | | | | | |
| Attachments 9404.00 - Pre-Bid Meeting Sign-In Sheet - 10.4.24.pdf | | | | | | |

Project Overview

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
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| 2.1 | 1 | Project Description | | | | Open |
| Description <i>Bid Package I</i> <i>Phase 1</i> <ul style="list-style-type: none"> • Water Heater Boiler 1 - Removal • Disconnect Diesel Fuel connection(s) from Boiler 1 and Boiler 2 <ul style="list-style-type: none"> ◦ Preparation for Underground Storage Tank removal (Bid Package 2) • Water Heater Boiler 1 - Mechanical Pad Removal • Water Heater Boiler 1 - Removal of associated not to be reused electrical, plumbing, and mechanical systems/components <ul style="list-style-type: none"> ◦ Keep Water Heater Boiler 2 in Operation until new Water Heater Boiler 1 is commissioned and operating. • New Water Heater Boiler 1 Mechanical Pad - Prep/Pour • Patching unused penetrations <ul style="list-style-type: none"> ◦ Weather protect penetrations to be used with new water heater boilers. • Prep new systems/components in preparation for new water heater boilers (electrical, plumbing, mechanical) • New Propane Storage Tank (<i>Bid Package in drawing M02 to be changed in Addendum #1 from bid package II to bid package I</i>) <ul style="list-style-type: none"> ◦ Including associated concrete saddles (tank supports), concrete pad, protection bollards (concrete filled) and associated piping ◦ Including exterior mounted LP Vaporizers (and associated mounting devices/components) <i>Bid Package I</i> <i>Phase 2</i> <ul style="list-style-type: none"> • Water Heater Boiler 2 - Removal <ul style="list-style-type: none"> ◦ Only after water heater boiler 1 is commissioned and operating • Water Heater Boiler 2 - Mechanical Pad Removal • Water Heater Boiler 2 - Removal of associated not to be reused electrical, plumbing, and mechanical systems/components <ul style="list-style-type: none"> ◦ Including removal of existing expansion tanks, circulator pumps, air separator <ul style="list-style-type: none"> ▪ Including removal of pump/expansion tank mechanical pad ◦ Keep Water Heater Boiler 1 in Operation during new Water Heater Boiler 2 installation. • New Water Heater Boiler 2 and Pump Mechanical Pad - Prep/Pour • Prep new systems/components in preparation for new water heater boilers (electrical, plumbing, mechanical) • Reuse existing flue for new system components | | | | | | |

- Repair Louver and connect new system components

Bid Package II

- Underground Storage Tank Removal
- Including:
 - Permits
 - DNR Recording and Reporting
 - Water / Soil testing (if required by DNR)
 - Removal
 - Backfill - With compaction and testing as required
 - Include unit pricing
 - Contaminate Soil Removal
 - Structural Fill

Official Documented Meeting Minutes

There will be a clarification on the drawings that note the installation of the Propane tank is to be included in Bid Package 1.

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|------------|----------|----------|--------|
| 2.2 | 1 | Project Schedule | | | | Open |
| <p>Description</p> <ul style="list-style-type: none"> • NOI: Tentatively 10-11-2024 • Submittals: Procore > Submittals • Schedule: Proposed preliminary schedule is included in bid documents. • Construction Work Hours: 7:00 am - 3:00 pm Monday - Friday (No Exceptions) Afterhours must be approved & Coordinated with DAS/NCF prior if adjusted. • Substantial Completion: April 2025 • Closeout: <p>A pull-plan session will be held with the successful bid package contractors to finalize the construction schedule.</p> <p>No Work on State Holidays: New Year's Day, Martin Luther King Day, Memorial Day, 4th of July, Labor Day, Veterans Day, Thanksgiving and day after Thanksgiving, Christmas Day</p> | | | | | | |

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
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| 2.3 | 1 | Site Rules | | | | Open |
| <p>Description</p> <ul style="list-style-type: none"> • Onsite supervision by Prime Contractor is required at all times when work by that contractor or their subcontractors/suppliers is taking place. • Contractors shall provide daily logs for each day they are on site. • Construction progress meeting will be established once construction starts. • It is of the utmost importance to show respect and courtesy to all staff at all times. • Clean all debris, materials, and bring all finishes back to existing conditions in the area they were working in prior to moving to the next area. • No smoking, vaping or smokeless tobacco use onsite. • Temporary facilities (Define at meeting) • Demolished equipment - Owner has first rights • Tool control - Mandatory tools list and tool inspections in/out will be daily or each shift. | | | | | | |

- Plan accordingly ahead of time to expedite this process.
- Cell phones
 - Only supervisors can carry cell phone when inside secured area
 - No photos of residents or faculty
- Background checks - **Required prior to entering property; by all (No Exceptions)**
- Allow two (2) weeks to have background checks reviewed.
 - Schedule accordingly
- PREA Training - **Required prior to entering property; by all (No Exceptions)**
 - Schedule accordingly
- Work hours - **7:00 am - 3:00 pm Monday - Friday (No Exceptions)**
- View Specification 01 1200 - Contract Summary for more information.

Official Documented Meeting Minutes

While working on-site there will be 100% escort oversight provided by the facility.
 Best practice is for contractors to have job box and list of tools readily available to expedite check-in/out process.

RFB Overview

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------------|------------|----------|----------|--------|
| 3.1 | 1 | Bid Submission | | | | Open |
| Description | | | | | | |
| <ul style="list-style-type: none"> • Bids are due 2:00 pm 10-10-2024 • The Bid shall be submitted to the Issuing Officer through the IMPACS Electronic Procurement System. <ul style="list-style-type: none"> ◦ Link and information is in the project manual ◦ Contractors will need to register prior to bidding ◦ Bidders will need to register regardless of whether it has already done business with the State of Iowa. ◦ Bidders should complete the registration process and ensure the ability to log in as soon as possible to ensure Bids can be submitted on the due date. ◦ Please make sure the electronic documents submitted contain any required signatures. Digital signatures will be accepted. • Bid Opening will be held via conference call on 3:00 pm 10-10-2024 • Contractor shall reference section 00 0116 for the bid submittal checklist <ul style="list-style-type: none"> ◦ Bid Proposal Information ◦ Non Discrimination Clause Information ◦ Contractor Targeted Small Business Enterprise Pre-Bid Contract Information ◦ Bid Security – 5% of total Bid amount • Apparent low bidder will be required to submit subcontractor/supplier list 48hrs after the bid opening | | | | | | |

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------|------------|----------|----------|--------|
| 3.2 | 1 | Bid Schedule | | | | Open |
| Description | | | | | | |
| <ul style="list-style-type: none"> • Questions/Substitutions Due in Writing to Construction.Procurement@iowa.gov: • Addendum Issued: 10-9-2024 • Bids Due: 2:00 pm 10-10-2024 • Tentative NOI Issued: 10-11-2024 | | | | | | |

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
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| 3.3 | 1 | Administrative Details | | | | Open |
| <p>Description</p> <ul style="list-style-type: none"> • Contractors will sign a modified ConsensusDocs 802. Example in the project manual. • Project-specific Certificate of Insurance must be provided prior to contract execution. Follow example in the project manual and limits in the 802. • Project-specific P&P bonds must be provided prior to contract execution. • Successful contractor must turn in their list of subcontractors and suppliers within 48 hours of the bid. • DAS will provide tax exempt certificates upon request. • Procore will be used for all project management, at no cost to the trade contractor. <ul style="list-style-type: none"> ◦ Submittals, Invoicing, RFIs, ASIs, PRs, RFQs ◦ Contracts, Change Orders and Certificates of Substantial and Final Completion will also use Docusign • Contractor Schedule of Values shall be broken out as specified in the project manual. <ul style="list-style-type: none"> ◦ SOV must contain a closeout line item for at least 1% of the total contract value. ◦ This line item can only be invoiced once the certificate of final completion has been signed by all parties. | | | | | | |

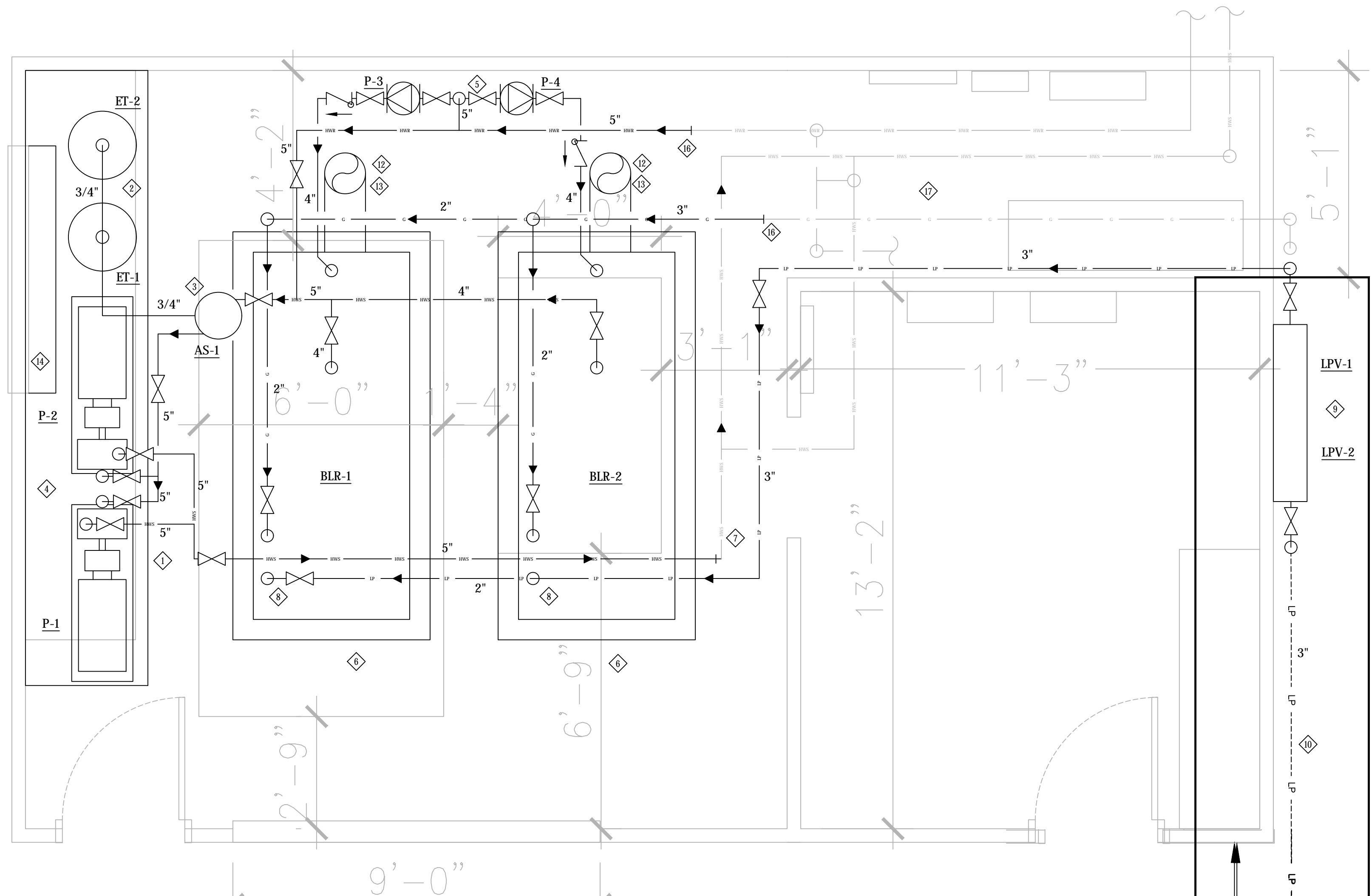
| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------|------------|----------|----------|--------|
| 3.4 | 1 | Pre-Bid Site Visits | | | | Open |
| <p>Description</p> <p>After pre-bid meeting the group will move to boiler building location on the North side of the CRC Release Center Building.</p> | | | | | | |

Questions

| No. | Mtg Origin | Title | Assignment | Due Date | Priority | Status |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|----------|----------|--------|
| 4.1 | 1 | Questions | | | | Open |
| <p>Description</p> <p>Submit all questions in writing to construction.procurement@iowa.gov. Questions are due on or before 8 am Tuesday October 8, 2024. Addendum #1 to be communicated Wednesday October 9,2024</p> | | | | | | |
| <p>Official Documented Meeting Minutes</p> <p>Bid Form will be modified via addendum to note the Unit Cost that are included in the Contract Summary, 011200. Several contractors asked if a bid extension would be a possibility to allow more time. CM will work with OR and team and if a bid extension is granted will be noted via Addenda.</p> | | | | | | |

These meeting minutes are believed to be an accurate reflection of those items discussed and the conclusions that were reached during the referenced meeting. Please contact State of Iowa - Department of Administrative Services if there are any discrepancies or questions with the content of these minutes.

EVERYTHING ON THIS SHEET IS BID PACKAGE 1



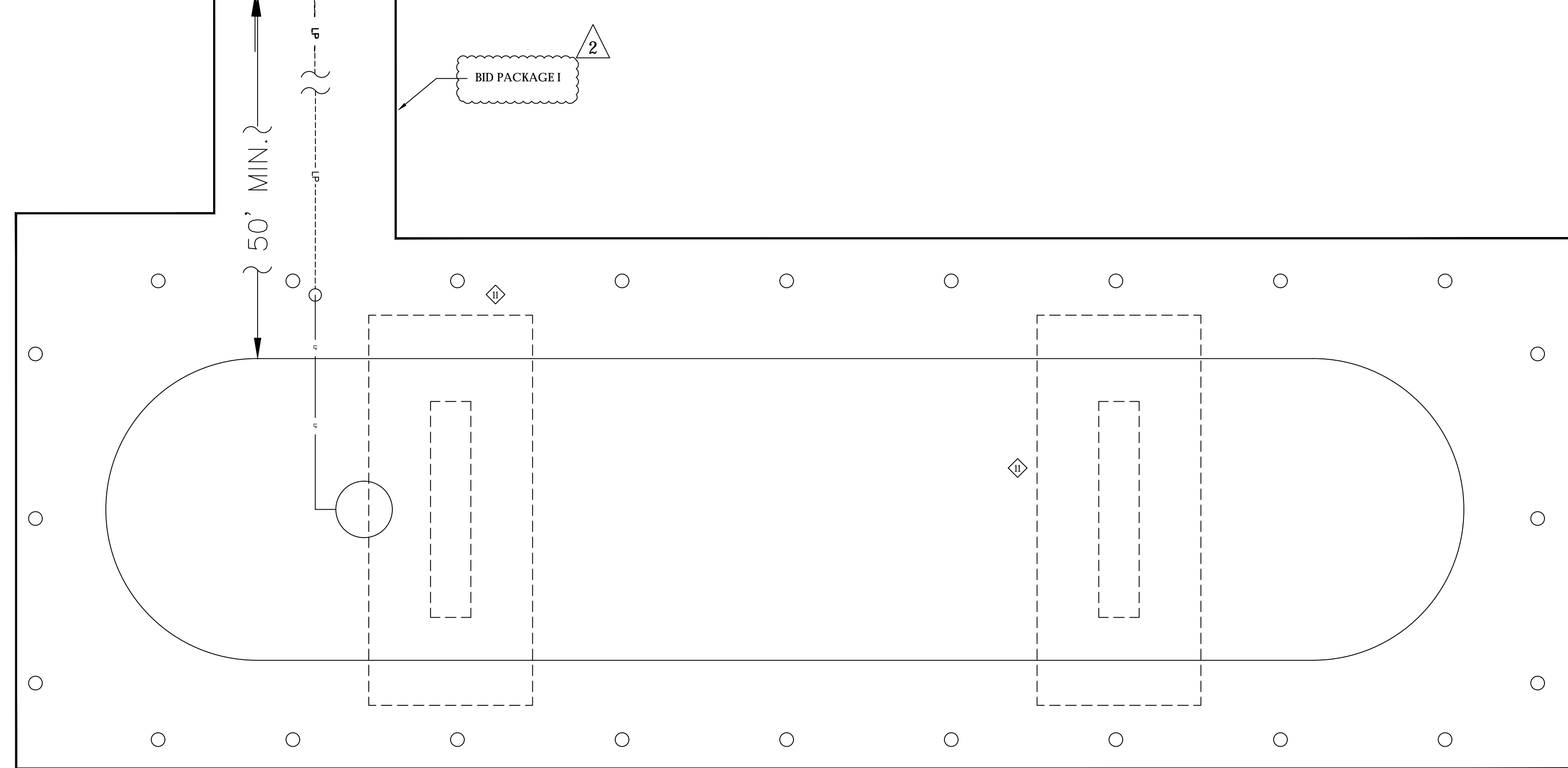
MECHANICAL KEYED NOTES:

- 1. INSTALL NEW 4" CONCRETE HOUSEKEEPING PAD FOR MOUNTING EXPANSION TANKS AND PUMP.
- 2. INSTALL NEW EXPANSION TANKS.
- 3. INSTALL NEW AIR SEPARATOR.
- 4. INSTALL NEW SYSTEM CIRCULATION PUMPS.
- 5. INSTALL NEW BOILER PUMPS. CONNECT TO BOILER RETURN WATER PORT.
- 6. INSTALL NEW 4" CONCRETE HOUSEKEEPING PAD AND BOILER. SEE GENERAL NOTE 5 ON SHEET M01.
- 7. RECONNECT HEATING SUPPLY WATER TO EXISTING SYSTEM HOT WATER SUPPLY PIPING.
- 8. ROUTE NEW LP PIPING AND CONNECT TO LP FUEL CONNECTION ON BOILERS.
- 9. MOUNT STACKED LP VAPORIZERS ON EXTERIOR WALL OF BUILDING.
- 10. ROUTE NEW BURIED LP LINE TO NEW LP TANKS.
- 11. INSTALL NEW 10,000 GAL LP TANK. COORDINATE EXACT SITE LOCATION WITH OWNER. MAINTAIN MINIMUM 50 FOOT CODE REQUIRED DISTANCE FROM BUILDINGS. PROVIDE CONCRETE SADDLE PIERS PER MANUFACTURER'S RECOMMENDATION. INSTALL CONCRETE BOLLARDS AROUND LP TANK ON 4 FOOT CENTERS. SEE DETAILS.
- 12. CONNECT NEW 12 INCH BOILER FLUE TO NEW BOILER AND ROUTE NEW STACK THROUGH EXISTING ROOF OPENING.
- 13. REPAIR ROOF PENETRATION AROUND NEW BOILER FLUE STACK. REPAIR ROOF PER ROOFING MANUFACTURER'S REQUIREMENTS TO MAINTAIN ROOF WARRANTY. CONTACT INFORMATION FOR EXISTING ROOF SYSTEM: ANDREW PRITCHARD, ACADEMY ROOFING AND SHEET METAL, 6381 NE 14TH ST., DES MOINES, IA 50313, 515-964-2345.
- 14. REPAIR EXISTING OPERABLE OUTDOOR AIR LOUVER AND CONNECT NEW DUCTWORK TO SPLIT ROOM COMBUSTION AIR. SEE DETAIL E, SHEET M03.
- 15. RECONNECT NEW NATURAL GAS LINE TO EXISTING.
- 16. RECONNECT NEW HEATING HOT WATER RETURN LINE TO EXISTING LINE.
- 17. EXISTING PIPING IN TUNNEL AREA IS TO REMAIN EXCEPT AS NOTED.

GENERAL MECHANICAL NOTES:

1. M.C. SHALL VERIFY THE EXISTING PIPING SIZES AND EQUIPMENT LOCATION.
2. REFER TO PIPING DETAILS FOR LOCATION OF VALVES AND ADDITIONAL PIPING SPECIALTIES.
3. M.C. TO OPERATE ALL EXISTING VALVES TO VERIFY THAT ALL VALVES ARE FUNCTIONAL. BASE BID IS TO INCLUDE COST FOR NEW VALVES REQUIRED FOR NEW CONSTRUCTION AND AN ALLOWANCE FOR AN ASSUMED 6 (SIX) 4" REPLACEMENT VALVES IN OTHER SYSTEM AREAS. ADJUSTMENTS LESS THAN SIX REPLACEMENT VALVES ARE TO BE ADJUSTED BY CREDIT AMOUNT. INCLUDE BID ALTERNATE TO PROVIDE ADDITIONAL VALVES OVER 6 ON A UNIT PRICE BASIS.

A MECHANICAL PLAN
M02 SCALE: 1/2" = 1'-0"



IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
 CENTRAL PROCUREMENT ENTERPRISES (CPE)
 HOOVER STATE OFFICE BUILDING, LEVEL 3
 1305 EAST WALNUT
 DES MOINES, IA 50319-0105

NEWTON CORRECTIONAL FACILITY
 9404.00 DOC NCF CRC BOILER REPLACEMENT
 307 S 60TH AVE W
 NEWTON, IA 50208

| MARK | DATE | DESCRIPTION |
|------|-----------|-------------|
| 1 | 8/27/2024 | OUT FOR BID |
| 2 | 10/8/2024 | ADDENDUM #1 |

PROJECT NO: 101323
 DATE: 8/27/2024
 DRAWN BY: MAH
 COPYRIGHT

SHEET TITLE

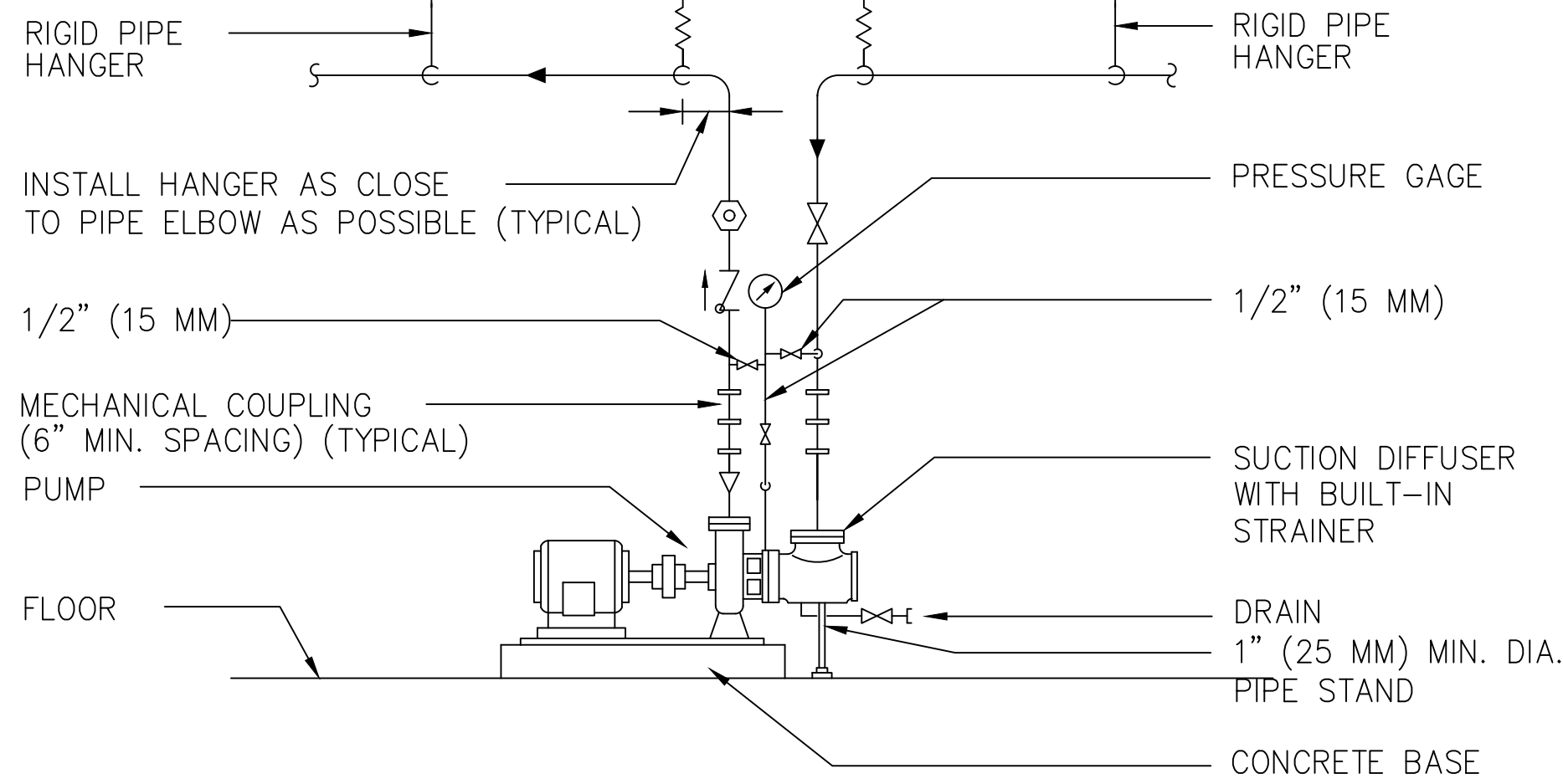
MECHANICAL PLAN

M02

MEP ENGINEER

 INNOVATIVE ENGINEERS, INC.
 2871 Heinz Rd. Suite B, Iowa City, IA 52240
 T 319.855.4115 I F 319.351.0070
www.innovativeengineersinc.com

FIRST 3 HANGERS FOR EACH PIPE AND BRANCH SHALL BE SPRING & NEOPRENE TYPE. TYPE "H" FOR 4" (100 MM) DIA. PIPE & SMALLER. TYPE "H-P" FOR 5" (125 MM) DIA. PIPE & LARGER.

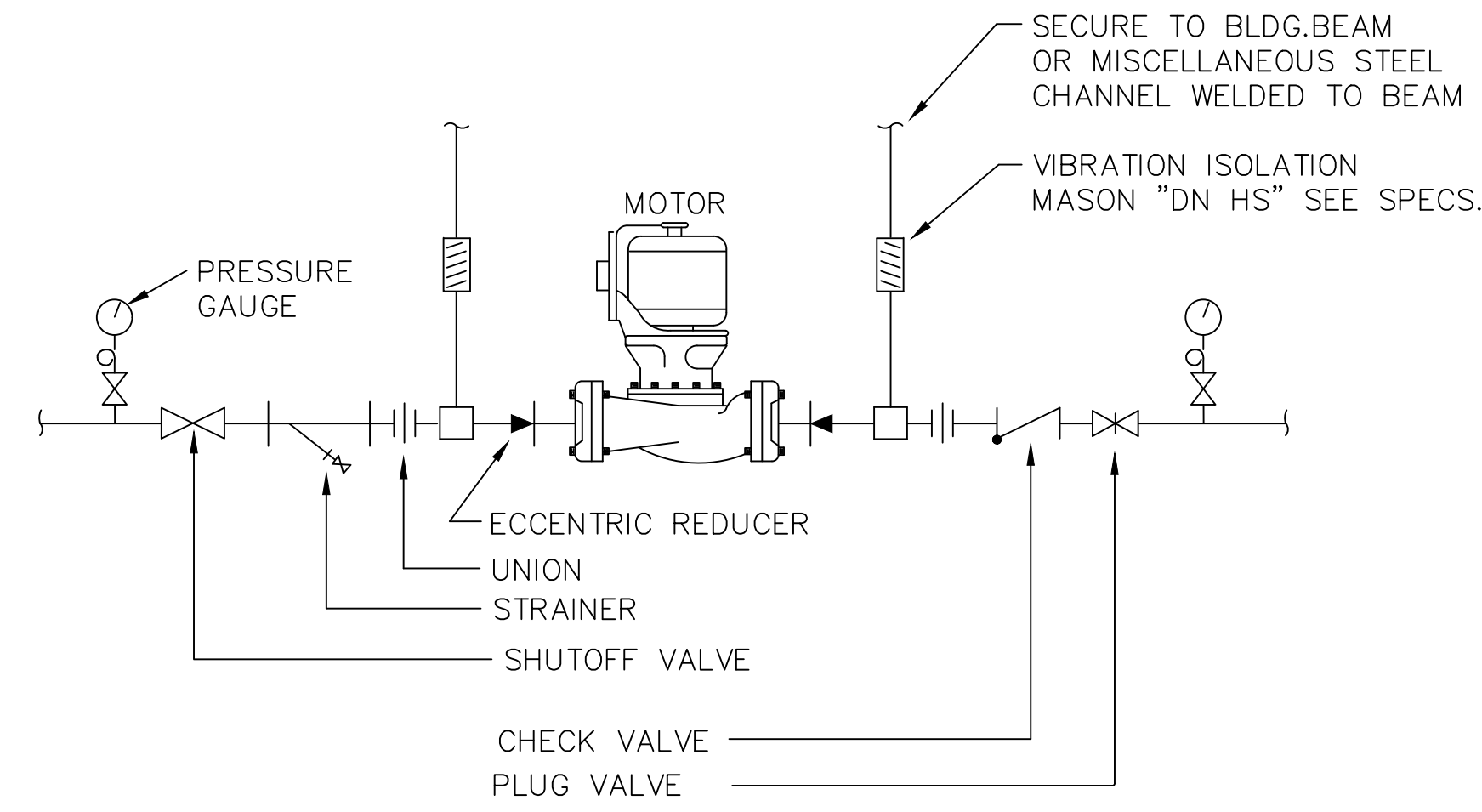


A TYPICAL PIPING CONNECTIONS TO FLOOR MOUNTED PUMPS

M03 NOT TO SCALE

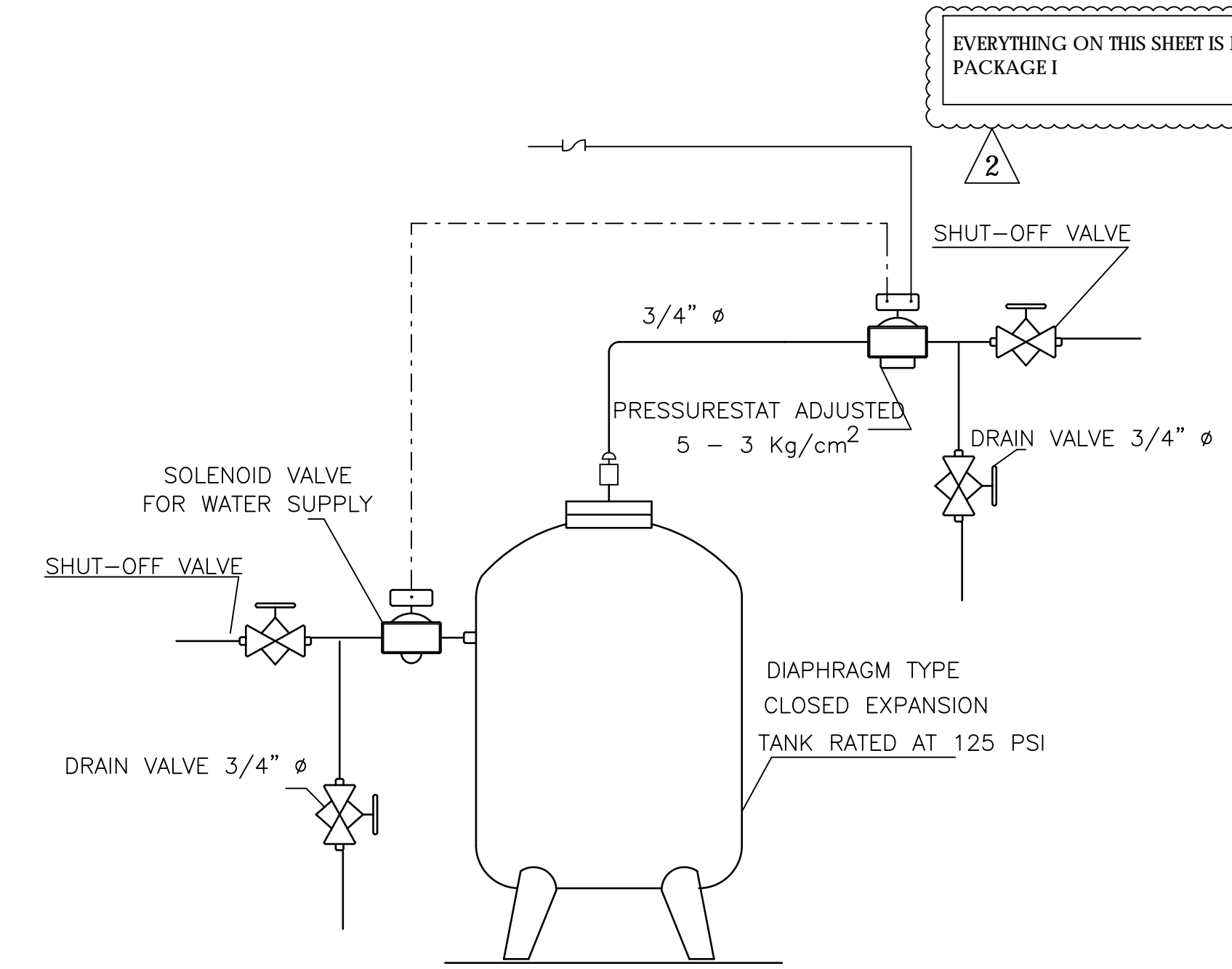
NOTES:

SEE SPECIFICATION SECTION "PUMPS" FOR Y STRAINER OPTION



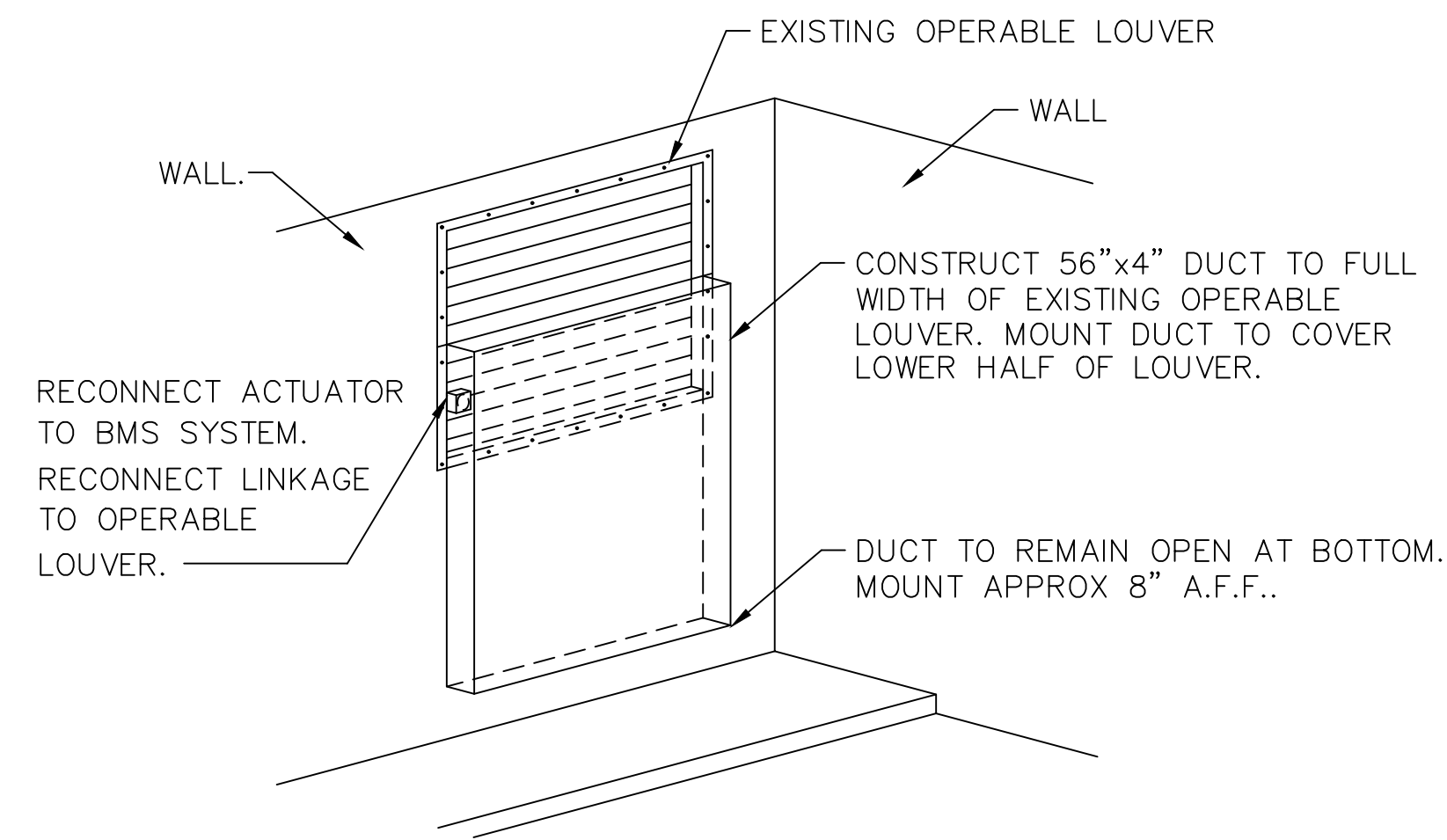
B TYPICAL IN-LINE PUMP CONNECTION

M03 NOT TO SCALE



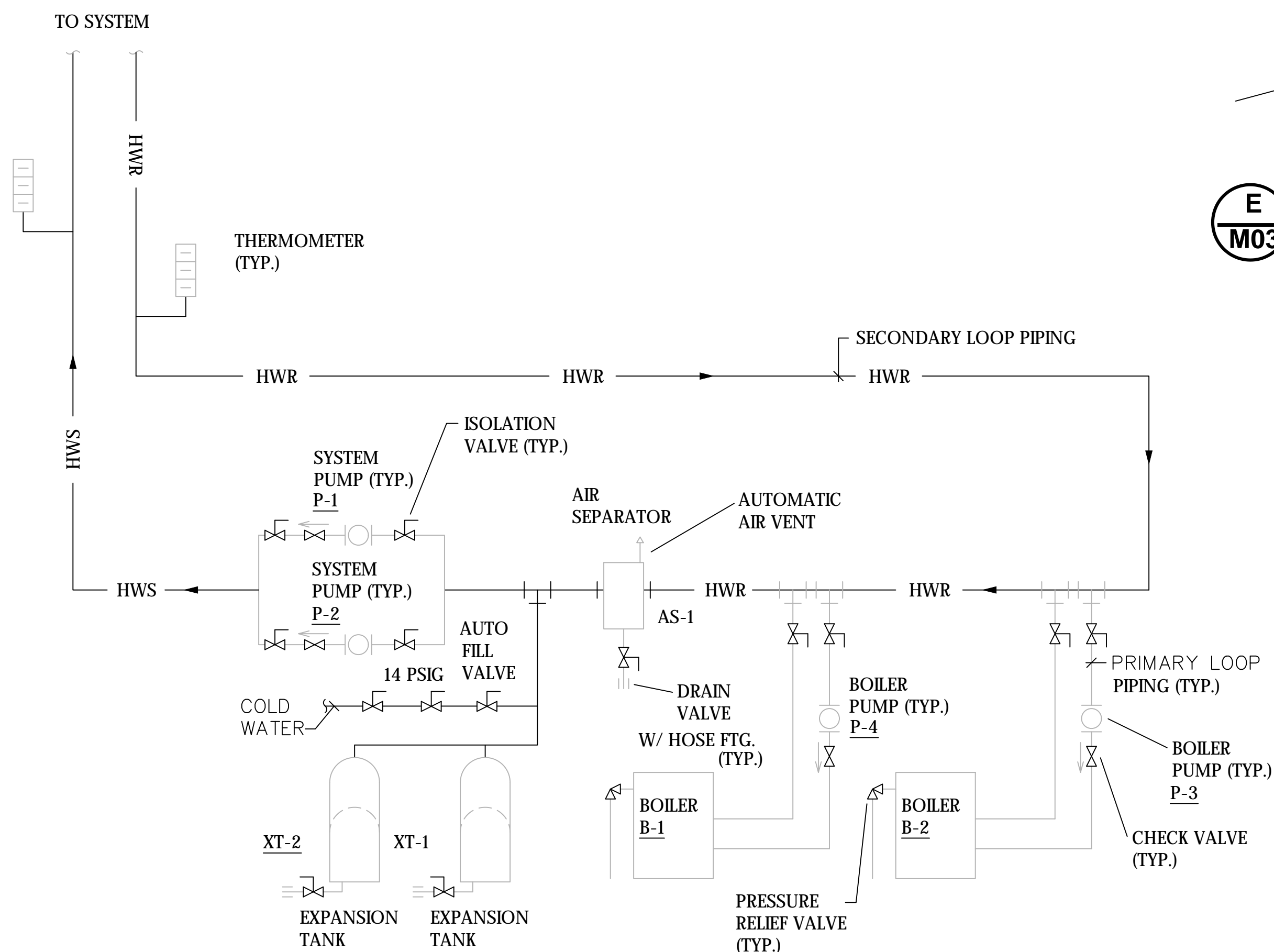
C TYPICAL EXPANSION TANK CONNECTION

M03 NOT TO SCALE



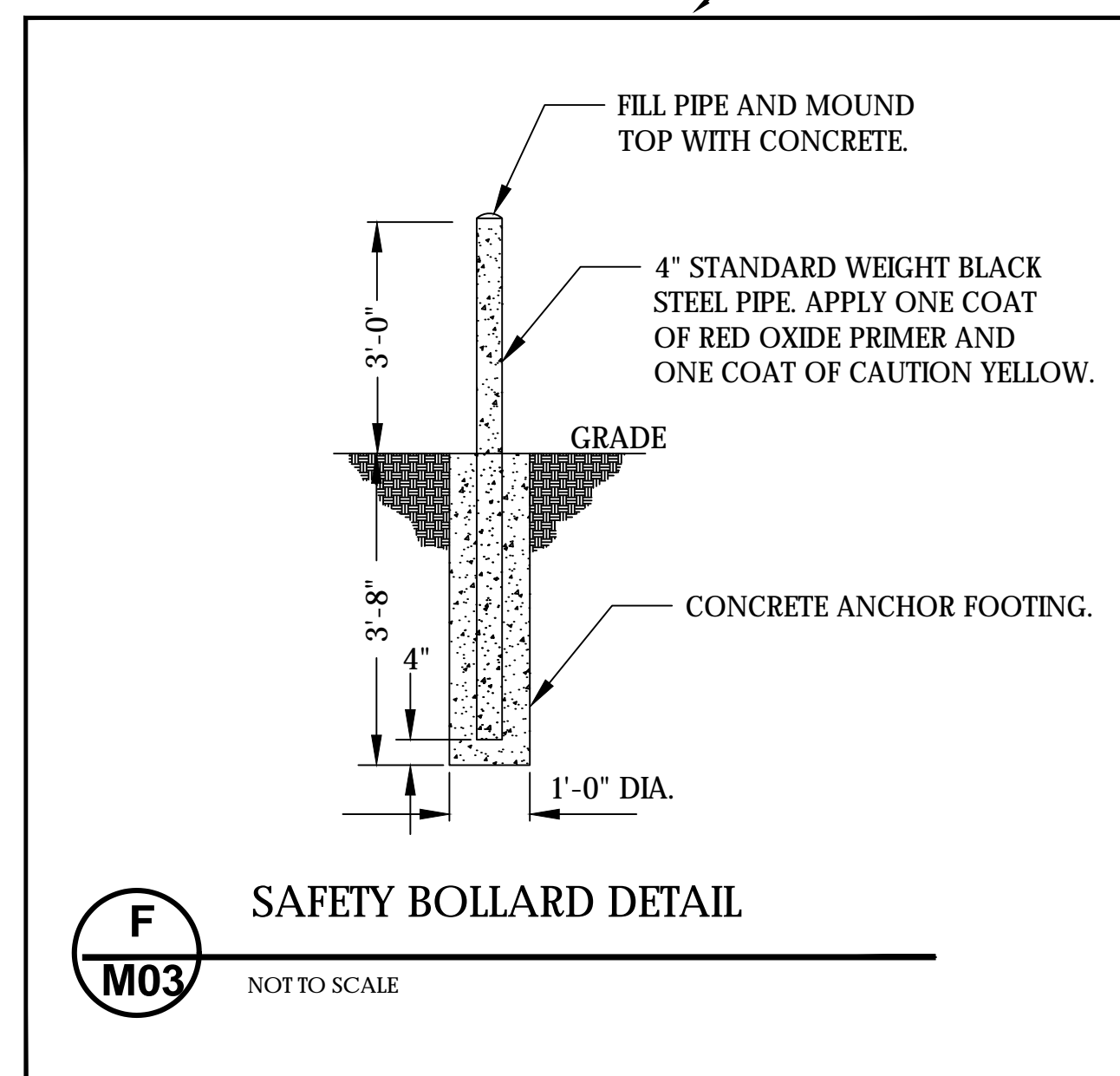
E COMBUSTION AIR DUCTWORK

M03 NOT TO SCALE



D HEATING HOT WATER SCHEMATIC

M03 NOT TO SCALE



F SAFETY BOLLARD DETAIL

M03 NOT TO SCALE

Heating Hot Water – Control Sequence

- All heating hot water equipment shall function in both normal and emergency power mode.
- Space heating shall be provided via circulation of hot water as provided by two hot water boilers. Hot water pumps are designed to operate as duty-standby units for circulation of heating hot water to all points of use.
- Each hot water pump is to be controlled by the existing BAS controlling a motor VFD. VFD's are to have hand-off auto (h-o-a) switches; units shall be in auto position when available for operation as controlled by the BAS.
- Upon a call for heating, either by any air handler unit, cabinet unit heater, fan coil unit, terminal box or unit heater, the following shall occur.
 - Pumps shall lead/lag on a weekly basis based upon runtime. (one pump is duty and one pump is stand-by)
 - BAS shall alternate pumps weekly on Tuesday at 11:00 am based upon runtime, sequencing equipment in order of least to greatest accumulated yearly runtime, where the lowest runtime unit is indexed as lead/first, and highest runtime unit is indexed as lag/last.
 - If unit selected as duty pump is unavailable for operation due to maintenance, failure, or selection of off position at unit (H-O-A) switch, the standby pump shall become the duty pump.
- Upon failure of the duty hot water pump, the BAS shall automatically initiate the start-up of the standby pump, and signal an alarm to the BAS.
- Hot water pump flow shall be maintained until there are no systems requesting heating. Each pump shall be provided with a current sensor to operate as a flow proof of that pumping unit. Any pump energized through the EMS system which does not give positive indication of flow shall signal an alarm after 90 seconds. Continued lack of flow proof for an energized pump to a period of 180 seconds shall de-energize that pump and initiate the startup of the standby unit.
- Two differential pressure sensors will provide input to the BAS. Each sensor shall have an adjustable set point (provided by TAB contractor). The BAS shall modulate the VFD's of both duty pumps to maintain DP setpoint for both sensors by calculating the difference between each sensor and its set point. The maximum difference shall be input into the VFD control loop.
- On the call for heating, the BAS is to signal the individual control panel on the selected duty boiler. Boilers will be scheduled for duty/standby by the BAS similar to the pump scheduling above.
- The two boilers will be set to operate shall operate in a lead/lag configuration. Upon initiation of heating system, the duty boiler shall slowly ramp up while the boiler circulation pump simultaneously energizes. System loop circulation pumps will simultaneously energize. The boiler shall modulate the boiler burner to maintain hot water supply temperature based on an outdoor air temperature reset schedule. The ratio shall be 180°F HW at 5° of outside air and 130°F HW at 60°F of outside air (field adjustable).
- Should one boiler fail to maintain proper hot water supply temperature alone, BAS will signal the designated lag boiler to fire to maintain hot water supply temperature.
- System is to shut down if discharge water temperature is +15°F (adj.) from setpoint, or on loss of water flow. Alarm BMS.
- Upon a loss or inability to maintain hot water supply temperature, an alarm shall signal the BAS.
- Incoming hot water supply temperature and flow rate shall be monitored and totalized by the B.A.S. Provide vortex shedding type meter.



IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
CENTRAL PROCUREMENT ENTERPRISES (CPE)
HOOPER STATE OFFICE BUILDING, LEVEL 3
1305 EAST WALNUT
DES MOINES, IA 50319-0105

NEWTON CORRECTIONAL FACILITY
9404.00 DOC NCF CRC BOILER REPLACEMENT
307 S 60TH AVE W
NEWTON, IA 50208

| OUT FOR BID | ADDENDUM #1 | DESCRIPTION |
|-------------|-------------|-------------|
| 8/27/2024 | 10/8/2024 | |
| 1 | 2 | |
| MARK | DATE | |

PROJECT NO: 101323
DATE: 8/27/2024
DRAWN BY: MAH
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SHEET TITLE

MECHANICAL DETAILS

M03

MEP ENGINEER:
IE INNOVATIVE ENGINEERS, INC.
2871 Heinz Rd. Suite B, Iowa City, IA 52240
T 319.855.4115 I F 319.351.0070
www.innovativeengineersinc.com

| SCHEDULE ABBREVIATIONS: | | | |
|-------------------------|-------------------------------|---------|--------------------------------|
| BHP | BRAKE HORSE POWER | MAX. | MAXIMUM |
| BTUH | BRITISH THERMAL UNIT PER HOUR | MBH | THOUSANDS OF BTU/HOUR |
| CAP. | CAPACITY | MCA | MINIMUM CIRCUIT AMPACITY |
| CFM | CUBIC FEET PER MINUTE | MHP | MOTOR HORSEPOWER |
| DIM. | DIMENSION | MIN. | MINIMUM |
| EFF | EFFICIENCY | MOC | MAXIMUM OVERCURRENT PROTECTION |
| EWT | ENTERING WATER TEMPERATURE | NO. | NUMBER |
| FLA | FULL LOAD AMPS | OA | OUTSIDE AIR |
| FPM | FEET PER MINUTE | OC | OVER-CURRENT PROTECTION |
| FT. | FEET | REQ'D | REQUIRED |
| GAL | U.S. GALLON | RLA | RATED LOAD AMPS |
| GPM | GALLON PER MINUTE | RPM | REVOLUTIONS PER MINUTE |
| H | HEIGHT | SCFM | STANDARD CUBIC FEET PER MINUTE |
| HP | HORSEPOWER | SQ. FT. | SQUARE FEET |
| HR | HOUR | TEMP. | TEMPERATURE |
| IN. | INCH | VOLT | VOLTAGE |
| IN. | INCH | W | WIDTH |
| KW | KILOWATTS | WC | WATER COLUMN |
| L | LENGTH | | |
| LB | POUNDS | | |
| LF | LINEAR FEET | | |
| LWT | LEAVING WATER TEMPERATURE | | |

| APPLICABLE CODES | |
|--------------------------------------------------------------------|------------------------------------|
| CONTRACTOR SHALL COMPLY WITH APPLICABLE CODES AND LOCAL AMENDMENTS | |
| BUILDING CODE: | INTERNATIONAL BUILDING CODE 2015 |
| MECHANICAL CODE: | INTERNATIONAL MECHANICAL CODE 2021 |
| PLUMBING CODE: | UNIFORM PLUMBING CODE 2021-AMENDED |
| LIFE SAFETY CODE: | NFPA 101 2021 |
| MODEL ENERGY CODE: | IECC 2012 |
| ELECTRICAL CODE: | NEC 2020 EDITION |

EXPANSION TANK SCHEDULE

| TAG | MANUFACTURER | MODEL | SERVICE | TYPE | CAPACITY (GAL) | MAXIMUM ACCEPTANCE (GAL) | DIMENSION (INCHES) | COMMENTS |
|------|--------------|------------|-------------------|------------------|----------------|--------------------------|--------------------|----------|
| ET-1 | TACO | PAX500-150 | HEATING HOT WATER | VERTICAL BLADDER | 132.0 | 61 | 85"H X 24"Φ | |
| ET-2 | TACO | PAX500-150 | HEATING HOT WATER | VERTICAL BLADDER | 132.0 | 61 | 85"H X 24"Φ | |

NOTES:
1.

AIR SEPARATOR SCHEDULE

| TAG | MANUFACTURER | MODEL | SERVICE | TYPE | CAPACITY (GPM) | DIMENSION (INCHES) | COMMENTS |
|------|--------------|--------|-------------------|-------------|----------------|--------------------|----------|
| AS-1 | TACO | ACT05F | HEATING HOT WATER | CENTRIFUGAL | 550 | 29"H x 14"Φ | 1 |

NOTES:
1. PROVIDE WITH REMOVABLE STRAINER

HOT WATER BOILER SCHEDULE

| SYMBOL | NOMINAL BHP | FUEL | INLET FUEL PRESSURE | TURNDOWN RATIO | INPUT MBTU/HR | OUTPUT MBTU/HR | EWT °F | LWT °F | MAXIMUM PRESSURE | ELECTRICAL | | | MANUFACTURER | MODEL | REMARKS | | |
|--------|-------------|-------|---------------------|----------------|---------------|----------------|--------|--------|------------------|------------|------------|-------------|--------------|-------|-------------------|--------------------------------|---------------|
| | | | | | | | | | | AMP | VOLT-PHASE | DISCONNECT | | | | CONTROLLER/STARTER BY (NOTE A) | |
| | | | | | | | | | | | | BY (NOTE A) | | | | | TYPE (NOTE B) |
| BLR-1 | 116 | NG/LP | 14" WC | 5:1 | 4,000 | 3,879 | 160° | 180° | 160 PSIG | 12 | 208/3 | EC | FUSED | MFR | THERMAL SOLUTIONS | 4000 | 1 |
| BLR-2 | 116 | NG/LP | 14" WC | 5:1 | 4,000 | 3,879 | 160° | 180° | 160 PSIG | 12 | 208/3 | EC | FUSED | MFR | THERMAL SOLUTIONS | 4000 | 1 |

NOTES:
1. DUAL FUEL BOILER. NATURAL GAS PRIMARY FUEL, LP BACKUP FUEL.

PUMP SCHEDULE

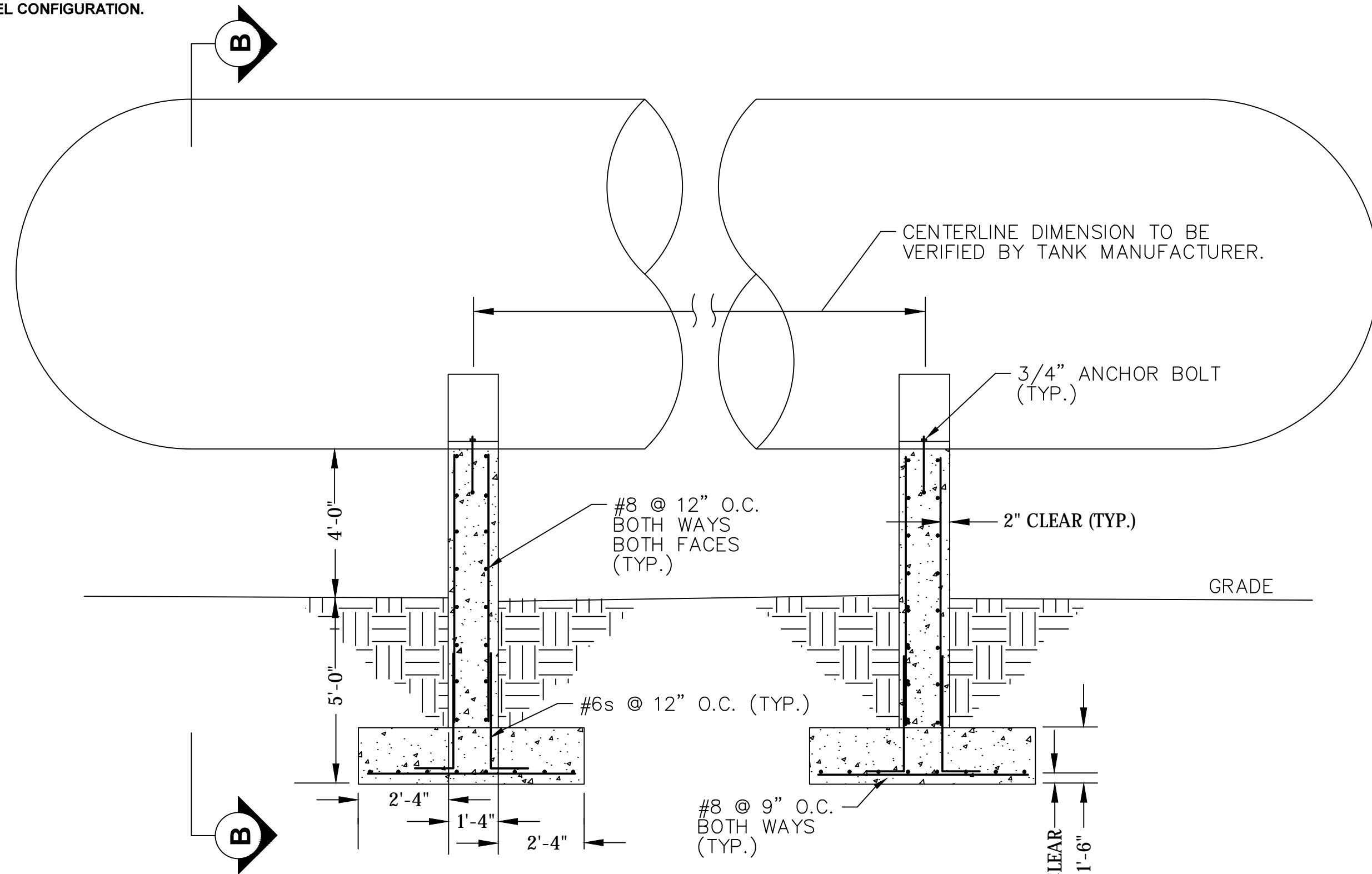
| SYMBOL | SERVICE | TYPE | GPM | PUMP FT. HEAD AT DESIGN | MINIMUM PUMP EFFICIENCY | INLET/IMPEL. SIZE IN. | VIBRATION ISOLATION | | ELECTRICAL | | | | MANUFACTURER | SERIES | MODEL | REMARKS | | | |
|--------|----------------|--------------------------|-------|-------------------------|-------------------------|-----------------------|---------------------|-------|-------------|-------|------------|-------------|--------------|--------|-------|---------|--------------------|-------------|---------------|
| | | | | | | | TYPE | DEFL. | HP (NOTE E) | RPM | VOLT-PHASE | DISCONNECT | | | | | CONTROLLER/STARTER | | |
| | | | | | | | | | | | | BY (NOTE A) | | | | | TYPE (NOTE B) | BY (NOTE A) | TYPE (NOTE C) |
| P-1 | HEATING SYSTEM | BASE MOUNTED END SUCTION | 400.0 | 16 | 77.0% | 6 / 6.85 | SPRING | 0.75 | 3.0 | 1,160 | 208/3 | EC | FUSED | EC | VFD/B | TACO | FI | 5009D | 1 |
| P-2 | HEATING SYSTEM | BASE MOUNTED END SUCTION | 400.0 | 16 | 77.0% | 6 / 6.85 | SPRING | 0.75 | 3.0 | 1,160 | 208/3 | EC | FUSED | EC | VFD/B | TACO | FI | 5009D | 1 |
| P-3 | BOILER | IN-LINE | 380.0 | 25 | 83.00% | 5 / 8.15 | SPRING | 0.75 | 3.0 | 1,160 | 208/3 | EC | FUSED | EC | VFD/B | TACO | CI | 4009D | 1 |
| P-4 | BOILER | IN-LINE | 380.0 | 25 | 83.00% | 5 / 8.15 | SPRING | 0.75 | 3.0 | 1,160 | 208/3 | EC | FUSED | EC | VFD/B | TACO | CI | 4009D | 1 |

NOTES:
1. PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.

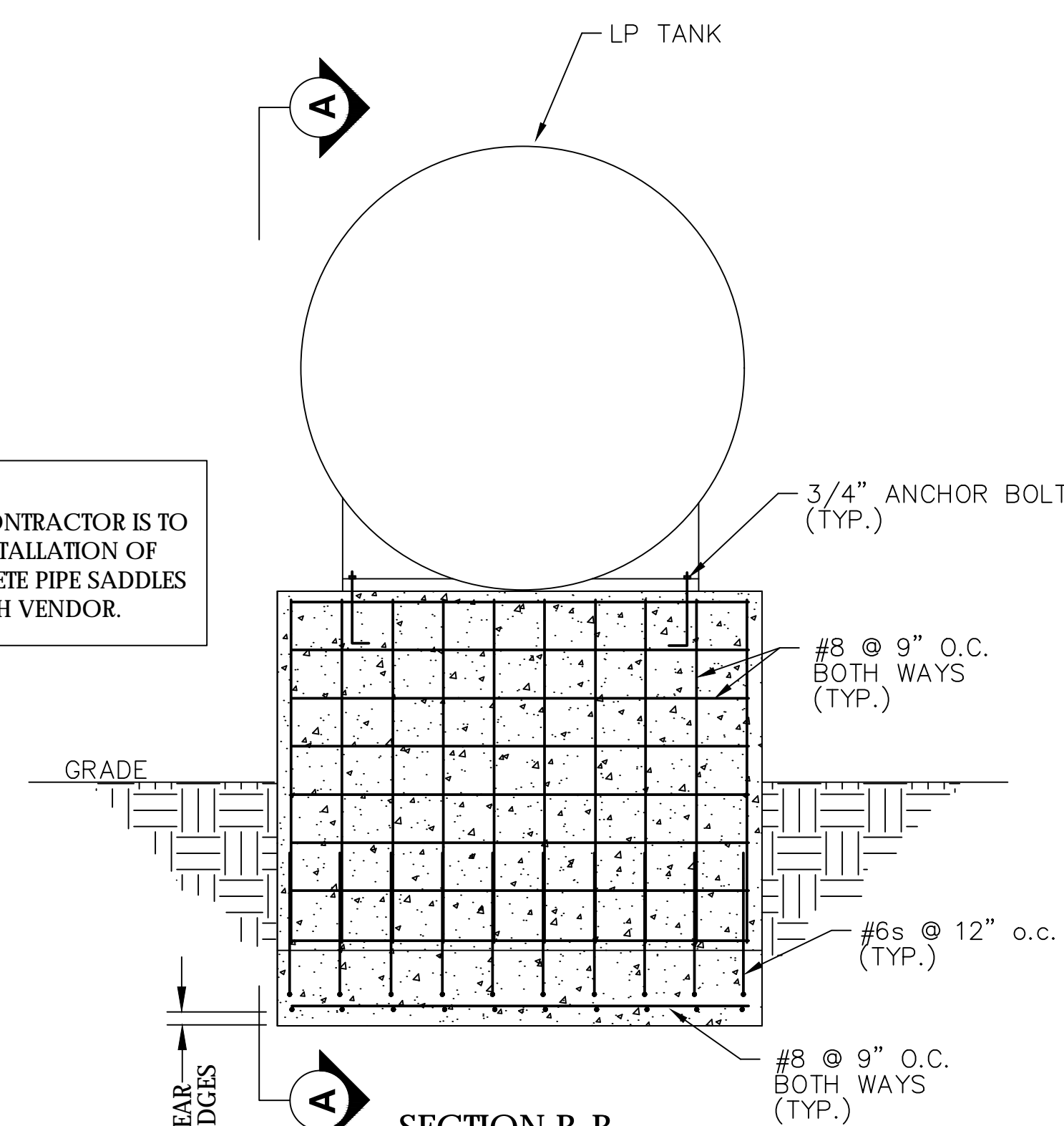
LP VAPORIZER SCHEDULE

| TAG | SERVICE | TYPE | VAPORIZING CAPACITY | | MAXIMUM PRESSURE (PSIG) | DIMENSIONS | | | ELECTRICAL | | | | MANUFACTURER | MODEL | REMARKS | | |
|-------|---------------|--------------|---------------------|---------|-------------------------|------------|--------|--------|------------|-------|-------|------------|--------------|-----------|-------------|--------------------|------|
| | | | GAL/HR | MBTU/HR | | L (IN) | H (IN) | W (IN) | VOLT-PHASE | MCA | MOP | DISCONNECT | | | | CONTROLLER/STARTER | |
| | | | | | | | | | | | | BY | | | | | TYPE |
| LPV-1 | LP GAS SYSTEM | DRY ELECTRIC | 50.0 | 4500 | 4 | 67.4 | 9.5 | 8.3 | 208/3 | 24.80 | 208/3 | EC | FUSED | ALGAS SDI | ZIMMER Z100 | 1 | |
| LPV-2 | LP GAS SYSTEM | DRY ELECTRIC | 50.0 | 4500 | 4 | 67.4 | 9.5 | 8.3 | 208/3 | 24.80 | 208/3 | EC | FUSED | ALGAS SDI | ZIMMER Z100 | 1 | |

NOTES:
1. MOUNT IN PARALLEL CONFIGURATION.



NOTE:
MECHANICAL CONTRACTOR IS TO COORDINATE INSTALLATION OF PRECAST CONCRETE PIPE SADDLES AND LP TANK WITH VENDOR.



A TYPICAL LP TANK SUPPORT SADDLES
M04 NOT TO SCALE

SYMBOLS

- HWS — HOT WATER HEATING SUPPLY
- HWR — HOT WATER HEATING RETURN
- LP — LIQUIFIED PETROLEUM (LP) GAS VAPOR
- LPL — LP LIQUID
- G — NATURAL GAS
- DIRECTION OF FLOW
- ⌞ TOP CONNECTION, 45° OR 90°
- ⌞ BOTTOM CONNECTION, 45° OR 90°
- ⌞ SIDE CONNECTION
- ⌞ CAPPED OUTLET
- ⌞ RISE OR DROP IN PIPE
- ⌞ UNION
- ⊗ POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
- ⊘ STRAINER
- ⊘ THERMOMETER
- ⊘ PRESSURE GAGE
- ⊘ WATER FLOW MEASURING DEVICE
- /// EXISTING EQUIPMENT TO DEMOLISH

BID PACKAGE I

EVERYTHING ON THIS SHEET IS BID PACKAGE I

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CENTRAL PROCUREMENT ENTERPRISES (CPE)
HOOPER STATE OFFICE BUILDING, LEVEL 3
1305 EAST WALNUT
DES MOINES, IA 50319-0105

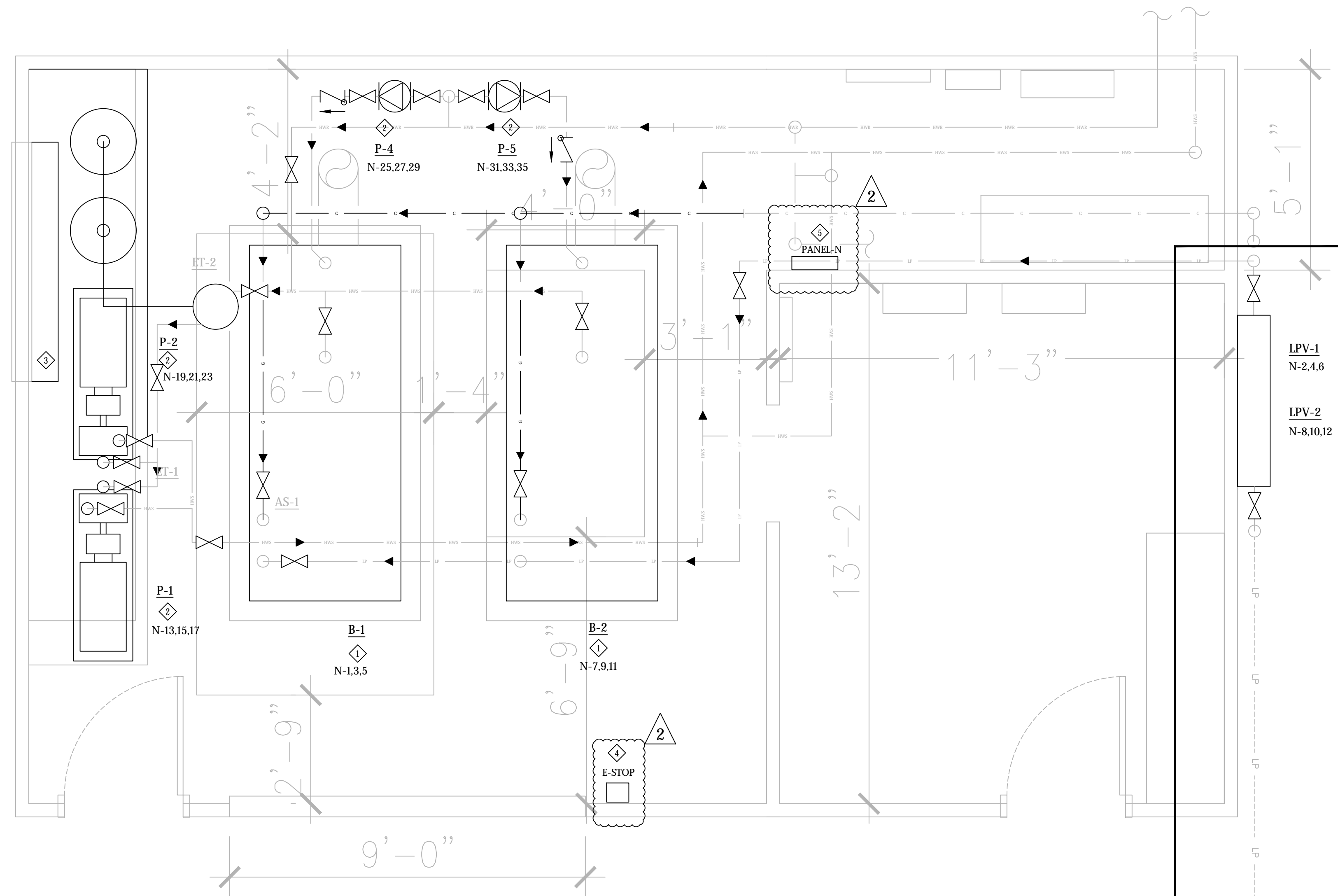
NEWTON CORRECTIONAL FACILITY
9404.00 DOC NCF CRC BOILER REPLACEMENT
307 S 60TH AVE W
NEWTON, IA 50208

| OUT FOR BID | ADDENDUM #1 | DESCRIPTION |
|-------------|-------------|-------------|
| 8/27/2024 | 10/8/2024 | |
| 1 | 2 | |
| MARK | DATE | DESCRIPTION |

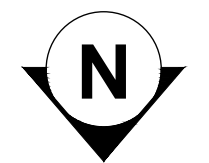
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SHEET TITLE
MECHANICAL DETAILS

M04



A
E02 ELECTRICAL PLAN
SCALE 1/2" = 1'-0"



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GENERAL POWER NOTES:

1. TYPICAL LIGHTING HOMERUN CIRCUITS SHALL BE #12 PHASE WIRE, #12 NEUTRAL WIRE, #12 GND, 3/4". FOR 120V, 20A HOMERUN CIRCUITS THAT EXCEED 100 FOOT FEEDER LENGTH, OVERSIZE CONDUCTOR TO #10 DUE TO VOLTAGE DROP.
2. 120V HOMERUN CIRCUITS SHALL CONTAIN NO MORE THAN (3) HOT OR SWITCHED CONDUCTORS PER CONDUIT.
3. CONTRACTOR SHALL INSTALL DISCONNECT SWITCHES SUCH THAT NEC CLEARANCES ARE MET. LOCATIONS OF DISCONNECTS ARE DIAGRAMMATIC.
4. EXPOSED RIGID GALVANIZED STEEL CONDUIT IS ACCEPTABLE FOR DEVICE DROPS. PROVIDE FLEX SEAL-TIGHT FOR EQUIPMENT CONNECTIONS.

ELECTRICAL KEY NOTES

- ◇ NEW BOILER. PROVIDE NEW CIRCUITRY. FEED FROM NEW PANEL-N.
- ◇ NEW PUMP. PROVIDE NEW CIRCUITRY. FEED FROM NEW PANEL-N.
- ◇ LOUVER ACTUATOR. PROVIDE A NEW 120V CIRCUIT.
- ◇ PROVIDE A NEW E-STOP TO SERVE NEW BOILERS.
- ◇ PROVIDE A NEW 100A BRANCH PANEL-N, 3PH, 4W.
- ◇ NEW LP VAPORIZERS. PROVIDE POWER PER MANUFACTURER RECOMMENDATIONS. REFERENCE ELECTRICAL SCHEDULES ON SHEET E03 FOR ADDITIONAL INFORMATION.

BID PACKAGE 1



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NEWTON CORRECTIONAL FACILITY
9:04.00 DOC NCF CRC BOILER REPLACEMENT
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NEWTON, IA 50208

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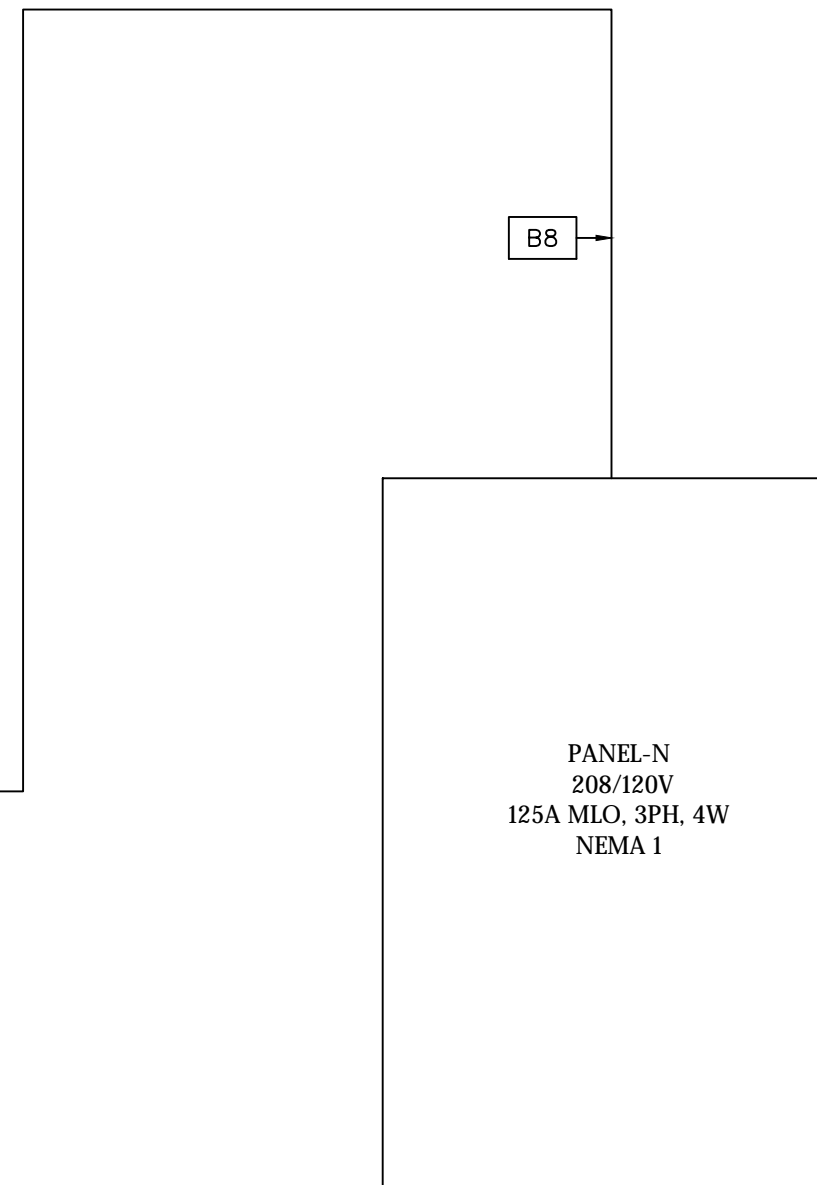
ELECTRICAL PLAN

E02

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GENERAL ELECTRICAL NOTES

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (N.E.C.) AND GOVERNING MUNICIPAL, STATE AND LOCAL CODES. ALL MATERIAL SHALL BE NEW AND SHALL BEAR THE U.L. LABEL WHERE APPLICABLE.
- CONTRACTOR SHALL MAKE ALL NECESSARY CUTTING AND DO ALL THE REPATCHING AS NECESSARY FOR THE PROPER EXECUTION OF THIS WORK.
- AFTER COMPLETION OF THE INSTALLATION, THE SYSTEM SHALL TEST FREE FROM SHORT CIRCUITS AND GROUNDS.
- WHERE ELECTRICAL CONDUCTORS ARE INSTALLED IN CONDUIT, THE CONDUIT SHALL COMPLY WITH THE N.E.C. REQUIREMENTS.
- ALL CONDUCTOR SHALL BE COPPER. NO CONDUCTOR SHALL BE SMALLER THAN #12 AWG AND SHALL BE RATED FOR 600VOLTS THWN OR THHN INSULATION. INSTALL A GROUNDING CONDUCTOR WITH ALL CIRCUITS, UNLESS NOTED OTHERWISE, SIZED PER N.E.C.250-122.
- VERIFY BREAKER AND CORRESPONDING WIRE SIZES FOR ALL ELECTRICAL EQUIPMENT. DONOT ORDER MATERIAL BEFORE VERIFYING BREAKER & WIRE SIZE. REPORT ANY DISCREPANCY IMMEDIATELY TO THE ENGINEER OF RECORD.
- VERIFY AVAILABLE INTERRUPTING CURRENT(AIC) WITH POWER COMPANY. EQUIPMENT AIC RATING MUST BE LARGER THAN THE POWER COMPANY AIC OR MUST BE PROTECTED ON THE LINE SIDE WITH A CURRENT LIMITING DEVICE.
- SAFETY SWITCHES SHALL BE SQUARE 'D', GENERAL ELECTRIC, OR WESTINGHOUSE, FUSED OR NON-FUSED AND SIZED AS INDICATED. NEMA 3R WHEN EXPOSED TO WEATHER
- PANELS SHALL BE SQUARE 'D', GENERAL ELECTRIC OR EQUAL, TYPE AND NUMBER OF BREAKERS AS INDICATED ON PANEL SCHEDULE. STENCIL PANEL DESIGNATION ON INSIDE OF PANEL. ALL TWO-POLE BREAKERS SHALL BE COMMON TRIP. PROVIDE TYPE WRITTEN SCHEDULE IN EACH LOAD CENTERS. CONNECTION TO MAIN BUS SHALL BE WITH BURNDY ANNULAR COMPRESSION LUGS.
- ALL EXTERIOR ELECTRICAL EQUIPMENT SHALL BE ANCHORED TO COMPLY WITH LOCAL CODE FOR WIND RESISTANCE.
- IT IS NOT THE INTENT OF THESE PLANS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL ITEMS FOR A COMPLETE ELECTRICAL SYSTEM AND PROVIDE ALL REQUIREMENTS NECESSARY FOR EQUIPMENT TO BE PLACED IN PROPER WORKING ORDER.
- ALL WORK SHALL BE PERFORMED BY A LICENSED ELECTRICAL CONTRACTOR IN A FIRST CLASS WORKMANLIKE MANNER. THE COMPLETED SYSTEM SHALL BE FULLY OPERATIVE AND ACCEPTED BY THE OWNER.
- LOAD DATA IS BASED ON INFORMATION GIVEN ENGINEER AT TIME OF DESIGN. VERIFY ALL EQUIPMENT AND PANEL SIZES BEFORE ORDERING AND BEFORE INSTALLATION.
- ALL BRANCH CIRCUITS SHALL HAVE GROUND CONDUCTORS.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE, IF REQUIRED, ADJUSTMENTS (+/- 6"-0" IN THE LOCATION OF ALL SYSTEM DEVICES, FIXTURES, OUTLETS, PANELS, ETC. IN ORDER TO EXPEDITE THE ELECTRICAL WORK. THE POSITION OF ALL WORK AS SHOWN IS INTENDED TO BE FIXED AND IN THE PROPER LOCATION. SUCH REQUIRED ADJUSTMENT SHALL BE DETERMINED BY THE A/E.
- PROVIDE SEPARATE NEUTRAL FOR EACH BRANCH CIRCUIT PHASE CONDUCTOR.



B E301 ELECTRICAL ONE-LINE
SCALE = NTS

| ELECTRICAL ONE-LINE FEEDER SCHEDULE | | | | | | | | | | | | | |
|-------------------------------------|-------------|------------------------------|--------|-----------------|------------------------------|-----|----------------|-------------------------------|-----|----------------|-----------------------------------------|--|--|
| FEEDER AMPACITY | NO. OF SETS | FEEDER CONDUCTOR SIZE (75°C) | | | | | | CONDUIT SIZE (EMT) | | | | | |
| | | COPPER CONDUCTORS (THWN) | | | ALUMINUM CONDUCTORS (XHHW-2) | | | 3 PHASE CONDUCTORS AND GROUND | | | 3 PHASE CONDUCTORS, NEUTRAL, AND GROUND | | |
| | | PHASE & NEUTRAL | GROUND | PHASE & NEUTRAL | GROUND | NO. | COPPER FEEDERS | ALUMINUM FEEDERS | NO. | COPPER FEEDERS | ALUMINUM FEEDERS | | |
| 30 | 1 | 10 | 10 | - | - | A1 | 1/2" | - | B1 | 1/2" | - | | |
| 50 | 1 | 8 | 10 | 6 | 6 | A2 | 3/4" | 3/4" | B2 | 3/4" | 1" | | |
| 60 | 1 | 6 | 10 | 4 | 6 | A3 | 3/4" | 1" | B3 | 1" | 1" | | |
| 65 | 1 | 6 | 8 | 4 | 6 | A4 | 3/4" | 1" | B4 | 1" | 1" | | |
| 85 | 1 | 4 | 8 | 2 | 6 | A5 | 1" | 1-1/4" | B5 | 1-1/4" | 1-1/4" | | |
| 100 | 1 | 3 | 8 | 1 | 6 | A6 | 1" | 1-1/4" | B6 | 1-1/4" | 1-1/4" | | |
| 115 | 1 | 2 | 6 | 1/0 | 4 | A7 | 1-1/4" | 1-1/4" | B7 | 1-1/4" | 1-1/2" | | |
| 130 | 1 | 1 | 6 | 2/0 | 4 | A8 | 1-1/4" | 1-1/2" | B8 | 1-1/2" | 2" | | |
| 150 | 1 | 1/0 | 6 | 3/0 | 4 | A9 | 1-1/2" | 1-1/2" | B9 | 1-1/2" | 2" | | |
| 175 | 1 | 2/0 | 6 | 4/0 | 4 | A10 | 1-1/2" | 2" | B10 | 2" | 2" | | |
| 200 | 1 | 3/0 | 6 | 250kcmil | 4 | A11 | 2" | 2" | B11 | 2" | 2-1/2" | | |
| 230 | 1 | 4/0 | 4 | 300kcmil | 2 | A12 | 2" | 2" | B12 | 2-1/2" | 2-1/2" | | |
| 250 | 1 | 250kcmil | 4 | 350kcmil | 2 | A13 | 2" | 2-1/2" | B13 | 2-1/2" | 2-1/2" | | |
| 300 | 2 | 1/0 | 4 | 3/0 | 2 | A14 | 1-1/2" | 1-1/2" | B14 | 2" | 2" | | |
| 350 | 2 | 2/0 | 3 | 4/0 | 1 | A15 | 1-1/2" | 2" | B15 | 2" | 2" | | |
| 380 | 1 | 500kcmil | 3 | 750kcmil | 1 | A16 | 2-1/2" | 3" | B16 | 3" | 3-1/2" | | |
| 400 | 2 | 3/0 | 3 | 250kcmil | 1 | A17 | 2" | 2" | B17 | 2" | 2-1/2" | | |
| 460 | 2 | 4/0 | 2 | 300kcmil | 1/0 | A18 | 2" | 2-1/2" | B18 | 2-1/2" | 2-1/2" | | |
| 500 | 2 | 250kcmil | 2 | 350kcmil | 1/0 | A19 | 2" | 2-1/2" | B19 | 2-1/2" | 2-1/2" | | |
| 600 | 2 | 350kcmil | 1 | 500kcmil | 2/0 | A20 | 2-1/2" | 2-1/2" | B20 | 2-1/2" | 3" | | |
| 760 | 2 | 500kcmil | 1/0 | 750kcmil | 3/0 | A21 | 2-1/2" | 3" | B21 | 3" | 3-1/2" | | |
| 800 | 3 | 300kcmil | 1/0 | 400kcmil | 3/0 | A22 | 2-1/2" | 2-1/2" | B22 | 2-1/2" | 2-1/2" | | |

NOTES: 1. CONDUIT SIZE BASED ON CONDUCTOR PROPERTIES LISTED IN THE CURRENT NEC EDITION, CHAPTER 9, TABLES 5 AND 5A, AND CONDUIT AREAS LISTED CHAPTER 9, TABLE 4 FOR EMT WITH 40% FILL. OTHER CONDITIONS MAY REQUIRE A LARGER CONDUIT, SIZED PER NEC.
2. COORDINATE SIZE, TYPE, AND QUANTITY OF LUGS WITH EQUIPMENT VENDOR

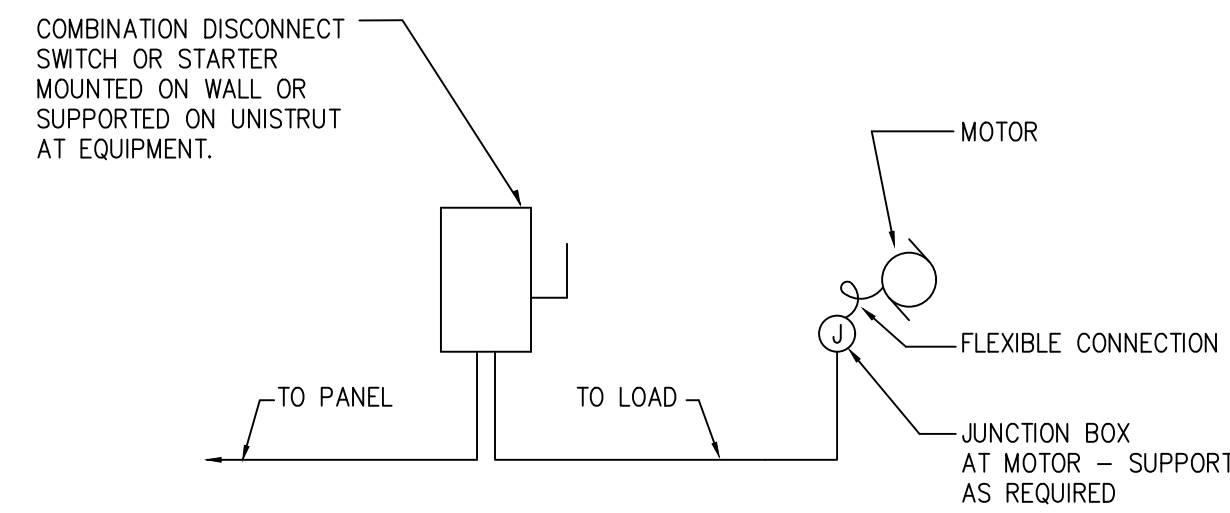
Iowa Department of Administrative Services
DAS
IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
CENTRAL PROCUREMENT ENTERPRISES (CPE)
HOOPER STATE OFFICE BUILDING, LEVEL 3
1305 EAST WALNUT
DES MOINES, IA 50319-0105

NEWTON CORRECTIONAL FACILITY
9404.00 DOC NCF CRC BOILER REPLACEMENT
307 S 60TH AVE W
NEWTON, IA 50208

| DISCONNECT SWITCH AND STARTER SCHEDULE | | | | | | | | | | | | | | |
|----------------------------------------|-------------|---------|----------|-------|-------|-----|-------|------|------|------|-----------|----------|------------|-------------------------|
| MARK | LOAD | DISC SW | STAR TER | VOLTS | PHASE | HP | VA | AMPS | SW | FUSE | NEMA SIZE | STR TYPE | NEMA ENCL. | CONDUIT & WIRE |
| BLR-1 | BOILER-1 | UNIT | | 208 | 3 | - | 4,318 | 12.0 | 30.0 | 20.0 | - | | 1 | 4#10,1#10 GND, 3/4" |
| BLR-2 | BOILER-2 | UNIT | | 208 | 3 | - | 4,318 | 12.0 | 30.0 | 25.0 | - | | 1 | 4#10,1#10 GND, 3/4" |
| P-1 | SYSTEM PUMP | X | X | 208 | 3 | 3.0 | 3,958 | 11.0 | ** | ** | ** | VFD | 1 | HOA 3#12,1#12 GND, 3/4" |
| P-2 | SYSTEM PUMP | X | X | 208 | 3 | 3.0 | 3,958 | 11.0 | ** | ** | ** | VFD | 1 | HOA 3#12,1#12 GND, 3/4" |
| P-3 | BOILER PUMP | X | X | 208 | 3 | 3.0 | 3,958 | 11.0 | ** | ** | ** | VFD | 1 | HOA 3#12,1#12 GND, 3/4" |
| P-4 | BOILER PUMP | X | X | 208 | 3 | 3.0 | 3,958 | 11.0 | ** | ** | ** | VFD | 1 | HOA 3#12,1#12 GND, 3/4" |

*ELECTRICAL CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH CONTRACTOR SUPPLYING EQUIPMENT PRIOR TO ALL TRADES ORDERING EQUIPMENT TO ENSURE THE PROPER SELECTION AND COST IMPLICATIONS OF EQUIPMENT SELECTION. COSTS INCURRED DUE TO CHANGES SHALL BE DEFERRED TO THE TRADE SUPPLYING THE EQUIPMENT.
**CONSULT VFD SUPPLIER FOR PROPER SWITCH/FUSE SIZING.
FBO=FEEDER BREAKER ONLY, VFD=VARIABLE SPEED DRIVE BY EC, ALT=ALTERATION REQUIRED
UNIT=INTEGRAL WITH UNIT

| POWER SYSTEMS | |
|---------------|--------------------------------------------------|
| SYMBOL | DESCRIPTION |
| SWBD 1 | LARGE ELECTRICAL EQUIPMENT WITH DESIGNATION |
| ▨ | DISTRIBUTION PANEL WITH DESIGNATION |
| ▩ | BRANCH PANEL WITH DESIGNATION |
| EF 3 | MECHANICAL EQUIPMENT CONNECTION WITH DESIGNATION |
| ⊖ | MOTOR WITH DESIGNATION |
| ⊖ | DISCONNECT SWITCH |
| ⊖ | MOTOR STARTER |
| ⊖ | COMBINATION MOTOR STARTER / DISCONNECT SWITCH |
| VFD | VARIABLE FREQUENCY DRIVE |
| ⊙ | JUNCTION BOX |
| F1 | FIXTURE TYPE |
| 23-1 | CIRCUIT-RELAY |
| a | CONTROL DEVICE |
| ⊕ | DUPLEX RECEPTACLE |
| ⊕ G | GROUND FAULT CIRCUIT INTERRUPTER |
| ⊕ | CEILING MOUNTED DUPLEX RECEPTACLE |
| ⊕ | SIMPLEX SPECIAL RECEPTACLE |
| ∇ | DATA/TELEPHONE ROUGH-IN, WALL MOUNTED |



B E301 EQUIPMENT WIRING - TYPICAL
SCALE = NTS

| BRANCH PANEL NAME | VOLTAGE | PHASE | WIRE | BUS SIZE | MAIN OCP | AIC RATING | | | | | | |
|-------------------|------------------------------------------------------|--------------|---------|----------|---------------|------------------|-----|--------|-----|------|---|---------------------|
| PANEL N | 120/208 | 3 | 4 | 125 | MLO | 22,000 | | | | | | |
| 100% NEUTRAL | CODE: L=LIGHTING, R=RECEPTACLES, M=MOTORS, K=KITCHEN | | | | | FLUSH MOUNTING | | | | | | |
| NEMA 1 | COPPER GROUND BAR, ISOLATED GROUND BAR | | | | | DOUBLE MAIN LUGS | | | | | | |
| LOAD | R | BKR | CTR | A | B | C | CTR | BKR | CTR | LOAD | | |
| BOILER-1 | M 3 | 20 | 1 | 1,440 | | | | 2 | 30 | 3 | M | LP VAPORIZER LPV-1 |
| | M 3 | 3 | | 2,800 | 1,440 | | | 4 | | 3 | M | |
| | M 3 | 5 | | | 1,440 | | | 6 | | 3 | M | |
| BOILER-2 | M 3 | 20 | 7 | 1,440 | | | | 8 | 30 | 3 | M | LP VAPORIZERS LPV-2 |
| | M 3 | 9 | | 2,800 | 1,440 | | | 10 | | 3 | M | |
| | M 3 | 11 | | | 2,800 | | | 12 | | 3 | M | |
| SYSTEM PUMP P-1 | M 3 | 20 | 13 | 1,320 | | | | 14 | | 2 | M | SPARE |
| | M 3 | 15 | | | 1,320 | | | 16 | 20 | 1 | M | SPARE |
| | M 3 | 17 | | | 1,320 | | | 18 | 20 | 1 | M | SPARE |
| SYSTEM PUMP P-2 | M 3 | 20 | 19 | 1,320 | | | | 20 | 20 | 1 | M | SPARE |
| | M 3 | 21 | | | 1,320 | | | 22 | 20 | 1 | M | SPARE |
| | M 3 | 23 | | | 1,320 | | | 24 | 20 | 1 | M | SPARE |
| BOILER PUMP P-3 | M 3 | 20 | 25 | 1,320 | | | | 26 | 30 | 2 | M | SPARE |
| | M 3 | 27 | | | 1,320 | | | 28 | | 2 | M | SPARE |
| | M 3 | 29 | | | 1,320 | | | 30 | 20 | 2 | M | SPARE |
| BOILER PUMP P-4 | M 3 | 20 | 31 | 132 | | | | 32 | | | | SPARE |
| | M 3 | 33 | | | 1,320 | | | 34 | | | | SPARE |
| | M 3 | 35 | | | 1,320 | | | 36 | | | | |
| | | 37 | | | | | | 38 | | | | |
| | | 39 | | | | | | 40 | | | | |
| | | 41 | | | | | | 42 | | | | |
| 12,572 | PHASE A | RECEPT-VA @ | per NEC | - | 100% VA | - | | 40,092 | | | | |
| 13,760 | PHASE B | LIGHTS-VA @ | 100% | - | DEMAND VA | - | | 38,087 | | | | |
| 13,760 | PHASE C | MOTOR-VA @ | 95% | 38,087 | HI-PH CONN. A | - | | 114 | | | | |
| 40,092 | TCL | KITCHEN-VA @ | 80% | - | DEMAND A | - | | 106 | | | | |

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| 10/8/2024 | | | | |
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ELECTRICAL ONE-LINE & DETAILS

E03

SECTION 00 4116

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The Bid Form must be submitted online through the State's [IMPACS Electronic Procurement System](#).

RFB #940400-01

BID FORM for CONSTRUCTION CONTRACT
For
Newton Correctional Facility
307 S 60th Ave W, Newton, IA 50208
Project 9404.00

Iowa Department of Administrative Services
Hoover State Office Building, Level 3
1305 East Walnut Street
Des Moines, Iowa 50319-0105

The following information is to be completed and submitted with your bid..

1. Bid Form - Completed and Signed (to be uploaded with bid submission)
2. Non Discrimination Clause Information
3. Contractor Targeted Small Business Enterprise Pre-Bid Contract Information
4. Bid Security – 5% of total Bid amount (to be uploaded with bid submission)

Authorized Representative:

The undersigned Bidder, in response to your Request for Bid for construction of the above project, having examined the Drawings, Specifications, and other Bidding Documents dated August 27, 2024 and Addenda issued and acknowledged below as received and being familiar with all the conditions surrounding the construction of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials, equipment and supplies to perform all work to construct the project in strict accordance with the proposed Contract Documents, within the time and at the prices stated below. Prices are to cover all expenses incurred in performing the work required under the proposed Contract Documents, of which this bid is a part.

Bidder acknowledges receipt of the following Addenda which are a part of the Bidding Documents and for which any effect on cost of the Work is included in the bid amounts indicated:

Number _____ _____ _____ _____ _____
Dated _____ _____ _____ _____ _____

Note that the State of Iowa is exempt from State and Local sales and use taxes (including local option and school option) for this project. Taxes on construction materials shall NOT be included in the bid amounts.

Amounts shall be indicated in both words and figures. In case of discrepancy, the amount indicated in words shall govern.

BID PACKAGES:

BP 01 – Boiler Replacement

Description: Removal and Replacement of two (2) boilers in separate phases to keep one (1) boiler live during construction.

Bidder proposes and agrees to perform all work as described in the Construction Documents for the sum of:

_____ Dollars
(\$_____).

BP 02 – Tank Removal

Description: Removal of Underground storage tank per DNR specifications included proper backfill.

Bidder proposes and agrees to perform all work as described in the Construction Documents for the sum of:

_____ Dollars
(\$_____).

UNIT PRICES:

BP 01 - UNIT 01 – Replacement Valve

Description: Cost to include one (1) additional 4” diameter replacement valve

_____ Dollars
(\$_____).

BP 01 - UNIT 02 – Bollard

Description: Cost to provide and install additional bollard per contract drawings.

_____ Dollars
(\$_____).

BP 02 - UNIT 01 – Structural Backfill

Description: Cost to include one (1) cubic yard of structural backfill for new propane tank (as required)

Dollars

(\$_____).

BP 02 - UNIT 02 – Removal of Contaminated Excavated Materials

Description: Complete cost to include removal of one (1) cubic yard of Contaminated Excavated Material removal / disposal.

Dollars

(\$_____).

Bidder hereby certifies that:

1. This bid is genuine and is not made in the interest of or on behalf of any undisclosed person, firm or corporation;
2. Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain any advantage over any other bidder or over the Owner.
3. Bidder hereby certifies that the Bidder is registered with the Iowa Labor Commissioner as a Contractor as required by Chapter 91C, Code of Iowa.
4. Bidder agrees to comply with all Federal and State Affirmative Action/Equal Employment Opportunity requirements concerning fair employment and will not discriminate between or among them by reason of race, color, religion, sex, national origin or physical handicap.
5. All construction under this Contract shall conform to the requirements of the *Iowa State Building Code*.
6. Bidder agrees that this bid shall remain valid and shall not be withdrawn for a period of thirty (30) calendar days after the date for receipt of bids.
7. Bidder agrees that if written notice of acceptance of this bid is mailed, emailed, or delivered to the undersigned within thirty (30) days after the date in which bids are due, or at any time thereafter before it is withdrawn, the undersigned will sign and return the Contract Agreement, prepared in accord with the Bidding Documents and this bid as accepted; and will also provide proof of insurance coverage and required surety bonds.
8. Bidder understands that the Owner reserves the right to reject any and all bids, and to waive irregularities or informalities and enter into a contract for the work, as the Owner deems to be in the best interest of the State.
9. Bidder understands that the Owner reserves the right to accept any, or no, Alternate Bid, if requested, and that the Alternate Bids may be considered in any order or combination, and the low Bidder shall be determined on the basis of the sum of the base bid and any Alternate(s) accepted.

Subcontractors:

The Trade Contractor must identify all Subcontractors and Suppliers within 48 hours of the published date and time for which bids must be submitted, in accordance with Iowa Code Section 8A311, as amended by

House File 646 in 2011. Subcontractors and suppliers may not be changed without the approval of the Owner. Requests for changing a Subcontractor or supplier must identify the reason for the proposed change, the name of the new Subcontractor or supplier, and the change in the subcontractor or supplier price as a result of the change. Any reduction in subcontractor or supplier price as a result of the change, if the change is approved by the Owner, shall be deducted from the Trade Contract Price via a deductive Change Order. Any such changes, if approved by the Owner, which result in an increase in the Trade Contract Price shall be borne by the Trade Contractor.

Enforcement of Reciprocal Resident Bidder Preference, per Iowa Code 73A.21.

All bidders shall either check the box next to "Resident Bidder" or check the box next to "Nonresident Bidder" and by doing so and signing thereafter certifies and attests to the same. All information requested must be provided. Seek out the advice of an attorney if you have questions.

"Resident Bidder" means a person or entity authorized to transact business in of the State of Iowa and having a place of business for transacting business within the State of Iowa at which it is conducting and has conducted business for at least three years prior to the date of the first advertisement for the public improvement. Note, however, that if a nonresident bidder's state or foreign country has a more stringent definition of a resident bidder, the more stringent definition is applicable as to bidders from that state or foreign country.

Resident Bidder

Name of Resident Bidder: _____

By: _____
Authorized Agent and Signatory of Resident Bidder

OR:

Nonresident Bidder

Name of Nonresident Bidder: _____

Name of State or Foreign Country of Nonresident Bidder: _____

Particularly identify and describe any preference, labor preference, or any other type of preferential treatment, in effect in the nonresident bidder's state or foreign country at the time of this bid:

NOTICE: Nonresident Bidders domiciled in a state or country with a resident labor force preference shall make and keep, for a period of not less than three years, accurate records of all workers employed on the public improvement. The records shall include each worker's name, address, telephone number when available, social security number, trade classification, and the starting ending time of employment.

By: _____
Authorized Agent and Signatory of Nonresident Bidder

Bid Form shall be signed by an officer of the company with authority to bind in a contract. Notice of acceptance of this bid, or request for additional information by the Department of Administrative Services, may be addressed to the undersigned at the address set forth below:

Legal Name of Firm: _____

Date: _____

Signature of Bidder: _____

Title: _____

Typed Name of Signatory: _____

Email: _____

Business Address:

Telephone Number: _____ Fax Number: _____

Federal Tax Identification Number: _____

Iowa Contractor Registration Number: _____

Bidder Safety Manager Name: _____

For an out-of-state Bidder, Bidder certifies that the Resident Preference given by the State or Foreign Country of Bidder's residence, _____, is _____ %.

END OF SECTION

SUBSTITUTION REQUEST FORM

Project: NEWTON CORRECTIONAL FACILITY Substitution Request Number: _____
9404.00 DOC NCF CRC BOILER REPLACEMENT
From: _____
To: _____ Date: _____
A/E Project Number: _____
Re: _____

Specification Title: HVAC Piping Specialties Description: CENTRIFUGAL AIR SEPARATOR
Section: 23 05 20 Page: 154 Article/Paragraph: 2.4

Proposed Substitution: Grundfos
Manufacturer: Grundfos Address: 902 Koomey Rd, Brookshire, TX 77423 Phone: _____
Trade Name: Grundfos Model No.: GSPA w/ strainer

History: New product 2-5 years old 5-10 yrs old More than 10 years old

Differences between proposed substitution and specified product: N/A

Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: we rep Grundfos.

Similar Installation: this can be provided if needed. We have Grundfos pumps installed all over the state and metro area
Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

can be provided at later time. Just need approved to bid.

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Reid Ryan

Signed by: Reid Ryan

Firm: Mechanical Sales, Inc.

Address: 9550 White Oak Lane; Suite 100
Johnston, IA 50131

Telephone: 515-343-6525

Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: John J Horn

Date: 10/7/24

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____

SUBSTITUTION REQUEST FORM

Project: NEWTON CORRECTIONAL FACILITY Substitution Request Number: _____
9404.00 DOC NCF CRC BOILER REPLACEMENT
From: _____
To: _____ Date: _____
A/E Project Number: _____
Re: _____

Specification Title: HVAC Piping Specialties Description: Bladder Expansion Tanks
Section: 23 05 20 Page: 153 Article/Paragraph: 2.3

Proposed Substitution: Grundfos
Manufacturer: Grundfos Address: 902 Koomey Rd, Brookshire, TX 77423 Phone: _____
Trade Name: Grundfos Model No.: GNLA

History: New product 2-5 years old 5-10 yrs old More than 10 years old
Differences between proposed substitution and specified product: N/A

 Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: we rep Grundfos.

Similar Installation: this can be provided if needed. We have Grundfos pumps installed all over the state and metro area
Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

can be provided at later time. Just need approved to bid.

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Reid Ryan

Signed by: Reid Ryan

Firm: Mechanical Sales, Inc.

Address: 9550 White Oak Lane; Suite 100
Johnston, IA 50131

Telephone: 515-343-6525

Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: John J Horn

Date: 10/7/24

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____

SUBSTITUTION REQUEST FORM

Project: NEWTON CORRECTIONAL FACILITY
9404.00 DOC NCF CRC BOILER REPLACEMENT
Substitution Request Number: _____
From: _____
To: _____ Date: _____
A/E Project Number: _____
Re: _____

Specification Title: Hydronic Pumps Description: _____
Section: 23 21 13 Page: 201 Article/Paragraph: 2.1

Proposed Substitution: Grundfos
Manufacturer: Grundfos Address: 902 Koomey Rd, Brookshire, TX 77423 Phone: _____
Trade Name: Grundfos Model No.: NBS or LC & VL
NBS = base mounted, split coupled LC = base mounted, close coupled VL = vertical, in-line, close coupled

History: New product 2-5 years old 5-10 yrs old More than 10 years old

Differences between proposed substitution and specified product: N/A

Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: we rep Grundfos.

Similar Installation: this can be provided if needed. We have Grundfos pumps installed all over the state and metro area
Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

can be provided at later time. Just need approved to bid.
Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Reid Ryan

Signed by: Reid Ryan

Firm: Mechanical Sales, Inc.

Address: 9550 White Oak Lane; Suite 100
Johnston, IA 50131

Telephone: 515-343-6525

Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: **John J Horn**

Date: **10/7/24**

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____

SUBSTITUTION REQUEST FORM

Project: Newton Correction Facility
DOC NCF CRC Boiler Replacement

To: Innovative Engineers, Inc.

Re: Substitution Request

Substitution Request Number: _____

From: VHF Sales, Inc.

Date: 10/1/24

A/E Project Number: 101323

Specification Title: Piping Specialties for HVAC Piping Description: Acceptable Manufacturers

Section: 23 05 20 Page: 1-3 Article/Paragraph: 2.1, 2.2, 2.3, 2.4, 2.5

Proposed Substitution: To add American Wheatley HVAC as an approved manufacturer

Manufacturer: American Wheatley Address: 2701 W Concord St. Broken Arrow, OK Phone: 918-317-0401

Trade Name: HVAC - Hydronic Model No.: Multiple - See Attachments

History: New product 2-5 years old 5-10 yrs old More than 10 years old

Differences between proposed substitution and specified product: Unit has much smaller footprint but is taller.

Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: To be able to bid American Wheatley on Bid Day.

Similar Installation:

Project: Meskwaki Rec Center Architect: ISG

Address: 1644 305th Street Owner: Meskwaki Nation
Tama, IA 52339 Date Installed: 9-2022

Proposed substitution affects other parts of Work: No Yes; explain _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Michael Skallerud

Signed by: *Michael Skallerud*

Firm: VHF Sales, Inc.

Address: 2655 SE Enterprise Drive Grimes, IA 50111

Telephone: 515-986-3671

Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: John J Horn

Date: 10/7/24

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____

Air Release Valve

Features:

- NPT Threads
- Provides air release at high points in the system
- Maximum working pressure 232 psi
- Maximum working temperature 14° to 248° F
- 1/16" Orifice
- Sizes 1/2", 3/4" and 1"

Optional Features:

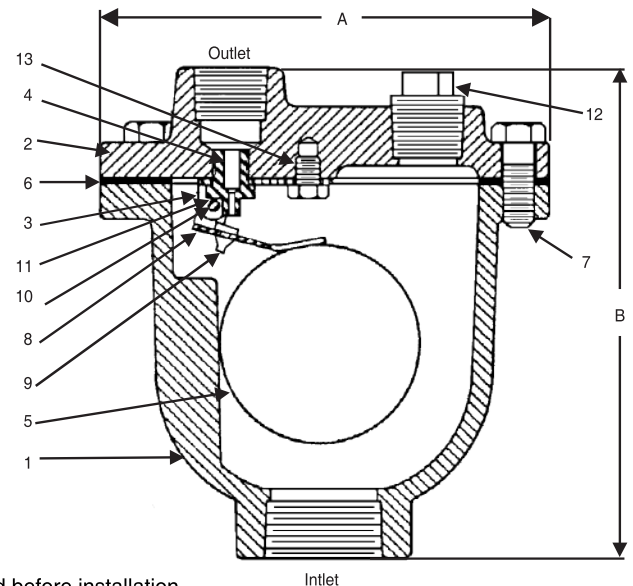
- Metric thread of inlet



| PART NUMBER | VALVE SIZE | WIDTH A (IN.) | HEIGHT B (IN.) | INLET SIZE | OUTLET SIZE |
|-------------|------------|---------------|----------------|------------|-------------|
| ARV0050 | 1/2" | 4 3/4" | 5 1/4" | 1/2" NPT | 1/2" NPT |
| ARV0075 | 3/4" | 4 3/4" | 5 1/4" | 3/4" NPT | 1/2" NPT |
| ARV0100 | 1" | 4 3/4" | 5 1/4" | 1" NPT | 1/2" NPT |

Bill of Materials

| Part No. | Part Name | Material |
|----------|----------------|----------------------------------|
| 1 | Body | Cast Iron ASTM A126, Class B |
| 2 | Cover | Cast Iron ASTM A126, Class B |
| 3 | Lever Frame | Stainless Steel T304, ASTM A240 |
| 4 | Seat | Stainless Steel T304, ASTM A276 |
| 5 | Float | Stainless Steel T304, ASTM A276 |
| 6 | Gasket | Garlock #3000 (Non-asbestos) |
| 7 | Cover Bolt | Alloy Steel SAE Grade 5 |
| 8 | Float Arm | Stainless Steel T304, ASTM A240 |
| 9 | Orifice Button | Viton |
| 10 | Pivot Pin | Stainless Steel T303, ASTM A276 |
| 11 | Pine Retainer | Stainless Steel PH 15-7 MO |
| 12 | Pipe Plug | Malleable Iron |
| 13 | Locator | Stainless Steel T18-8, ASTM A276 |



All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.

Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.

| |
|---------------------------|
| JOB NAME _____ |
| LOCATION _____ |
| _____ |
| CONTRACTOR _____ |
| CONTRACTOR P.O. NO. _____ |

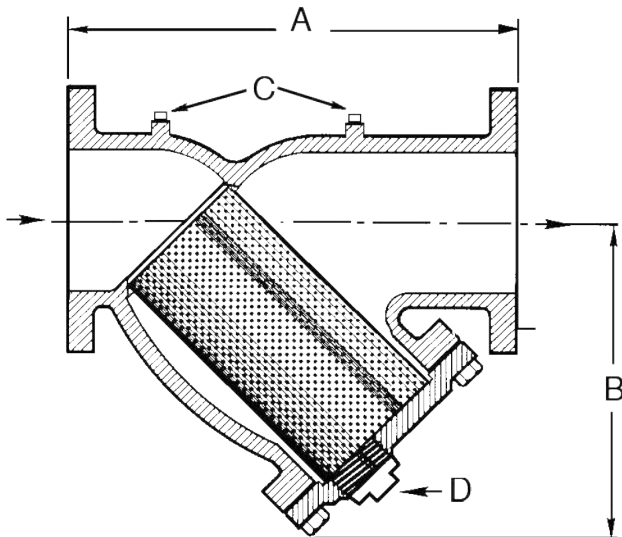
| ITEMS | QUANTITY |
|-------|----------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

American WHEATLEY
HVAC PRODUCTS®
 A GFP COMPANY

2701 W. Concord Street
 Broken Arrow, OK 74012
 Toll Free: 866-204-5229
 PH: 918-317-0401
 FAX: 918-317-0407
 www.wheatleyhvac.com
 e-mail: sales@globalflowproducts.com

Y-Type Flanged Strainer Model YF

Dimensional Data (In Inches)



| Model | Size | A | B | C NPT Pressure Gauge | D NPT Blowoff | Screen Removal | Weight (Lbs.) |
|---------|-------|---------------------------------|---------------------------------|-------------------------|------------------|--------------------------------|------------------|
| YF0200 | 2 | 8 ⁷ / ₈ | 5 ¹ / ₄ | 1/2 | 1 | 7 | 36 |
| YF0250 | 2 1/2 | 10 ³ / ₄ | 5 ³ / ₄ | 1/2 | 1 | 9 ³ / ₄ | 48 |
| YF0300 | 3 | 11 ¹ / ₂ | 6 ¹ / ₂ | 1/2 | 1 | 10 | 86 |
| YF0400 | 4 | 13 ⁵ / ₈ | 8 | 1/2 | 1 | 12 | 106 |
| YF0500 | 5 | 16 ³ / ₈ | 10 ¹ / ₂ | 1/2 | 1 1/2 | 17 | 156 |
| YF0600 | 6 | 18 ¹ / ₂ | 12 | 1/2 | 1 1/2 | 20 | 201 |
| YF0800 | 8 | 21 ¹ / ₂ | 14 ¹ / ₂ | 1/2 | 1 1/2 | 22 ³ / ₄ | 321 |
| YF1000 | 10 | 26 | 18 | 1/2 | 2 | 28 | 370 |
| YF1200 | 12 | 30 | 20 ¹ / ₂ | 1/2 | 2 | 30 | 621 |
| YF1400 | 14 | 37 ³ / ₈ | 27 ¹ / ₈ | 1/2 | 2 | 36 ¹ / ₂ | 992 |
| YF1600 | 16 | 42 ¹ / ₂ | 31 ¹ / ₁₆ | 1/2 | 2 | 42 | 1367 |
| YF 1800 | 18 | 45 ¹ / ₄ | 32 ³ / ₄ | 1/2 | 2 | 43 | 1676 |
| YF 2000 | 20 | 50 ¹ / ₄ | 36 ¹ / ₈ | 1/2 | 2 | 44 | 1764 |
| YF2400 | 24 | 57 ³ / ₃₂ | 40 ⁵ / ₃₂ | 1/2 | 2 | 68 | 2535 |

Operating Pressure & Temperature

| | |
|--------|-----------------|
| Steam | 125 PSI @ 350°F |
| Liquid | 200 PSI @ 150°F |

Standard Screens

| Service | Sizes | Screen Openings | Screen Material |
|----------------|---------|-----------------|---------------------|
| Steam & Liquid | 2"-3" | .045 (3/64") | Stainless Steel-304 |
| | 4"- 20" | .125 (1/8") | |

Bill of Materials

| Part Name | Material |
|-----------|------------------------------|
| Cover | Cast Iron ASTM A126 Class B* |
| Gasket | Graphite & Steel |
| Screen | Stainless Steel - Type 304* |
| Body | Cast iron ASTM A126 Class B |
| Bolts | Steel ASTM A307 |

Screen Materials available in various perforation sizes and materials of construction.

All sizes come complete with flanged blow off cover, gasket and plug.

Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.

| |
|---------------------------|
| JOB NAME _____ |
| LOCATION _____ |
| _____ |
| CONTRACTOR _____ |
| CONTRACTOR P.O. NO. _____ |

| ITEMS | QUANTITY |
|-------|----------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

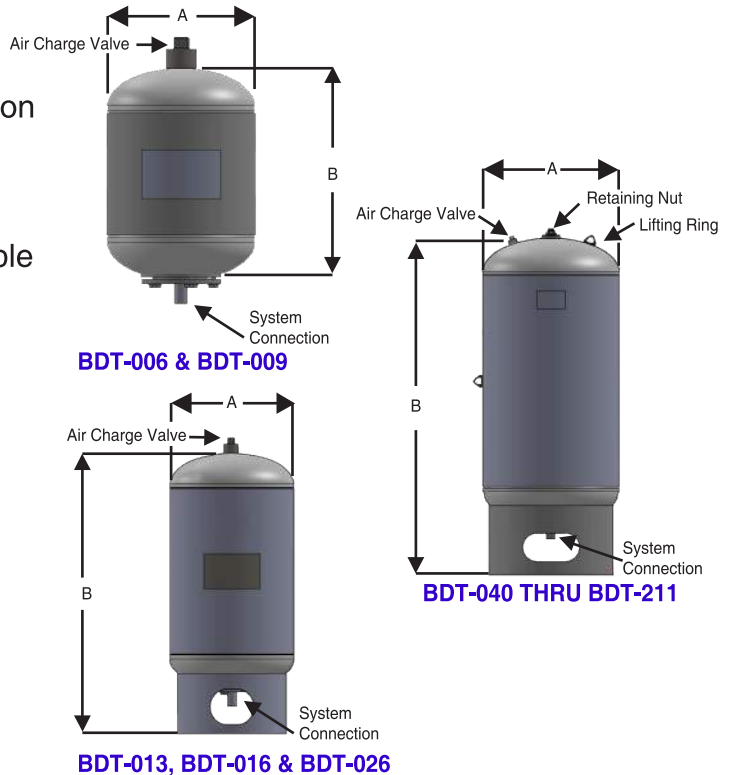
BDT Series ASME “Multi-Purpose” Expansion Tank

Features:

- Constructed in accordance with ASME Section VIII, Division I, Latest Edition
- Stainless Steel System Connection
- EPDM Bladder
- Full Acceptance Bladder Design / Replaceable
- Factory Air Charged to 12 P.S.I.
- Maximum Temperature 280°F Intermittent
- Constructed of NSF 61 Compliant Materials
- Primed Exterior

Optional Features:

- Higher working pressures available
- Top entry
- “Bulls Eye” sight glass
- Seismic mounting (clips or legs)
- Painted Exterior, Epoxy Coatings



| PART NUMBER | ACCEPTANCE VOLUME | DIAMETER A (IN.) | HEIGHT B (IN.) | SYSTEM CONNECT (IN.) | WEIGHT | WORKING PRESSURE |
|-------------|-------------------|------------------|----------------|----------------------|--------|------------------|
| BDT-006 | 6 GALLON | 12 | 12 | 3/4" | 24 | 150 PSI |
| BDT-009 | 9 GALLON | 12 | 17 | 3/4" | 28 | 150 PSI |
| BDT-013 | 13 GALLON | 14 | 28 | 3/4" | 50 | 150 PSI |
| BDT-016 | 16 GALLON | 14 | 32 | 3/4" | 65 | 150 PSI |
| BDT-026 | 26 GALLON | 16 | 40 | 3/4" | 98 | 150 PSI |
| BDT-040 | 40 GALLON | 20 | 41 | 1" | 140 | 150 PSI |
| BDT-060 | 60 GALLON | 24 | 48 | 1 1/2" | 220 | 150 PSI |
| BDT-080 | 80 GALLON | 24 | 50 | 1 1/2" | 235 | 150 PSI |
| BDT-112 | 112 GALLON | 30 | 52 | 1 1/2" | 273 | 150 PSI |
| BDT-135 | 135 GALLON | 30 | 59 | 1 1/2" | 340 | 150 PSI |
| BDT-162 | 162 GALLON | 30 | 61 | 1 1/2" | 360 | 150 PSI |
| BDT-185 | 185 GALLON | 30 | 80 | 1 1/2" | 545 | 200 PSI |
| BDT-211 | 211 GALLON | 32 | 71 | 1 1/2" | 480 | 150 PSI |

All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.

Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.

JOB NAME _____
 LOCATION _____

 CONTRACTOR _____
 CONTRACTOR P.O. NO. _____

| ITEMS | QUANTITY |
|-------|----------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |



2701 W. Concord Street
 Broken Arrow, OK 74012
 Toll Free: 866-204-5229
 PH: 918-317-0401
 FAX: 918-317-0407
 www.wheatleyhvac.com
 e-mail: sales@globalflowproducts.com

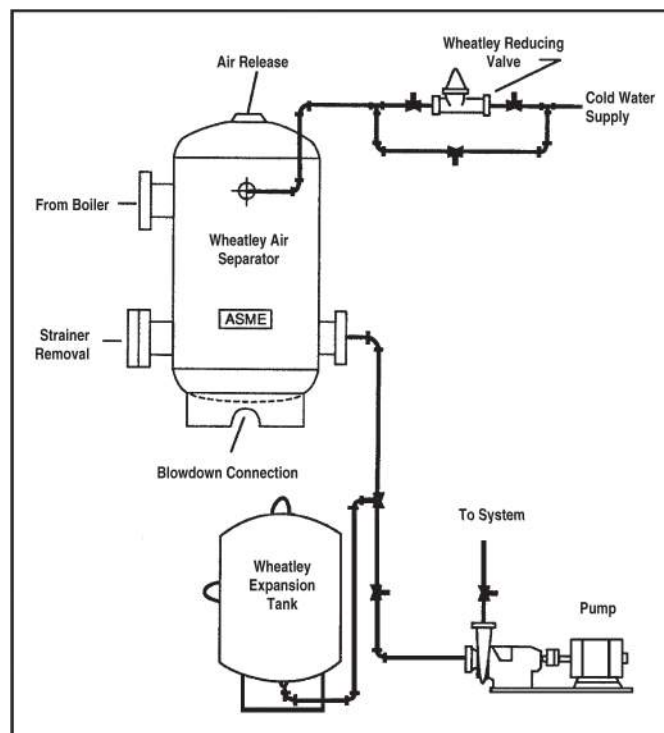
USE:

Designed to absorb expansion of fluids in typical hydronic systems. The BDT Tank is designed for pressure boost systems as well as typical cooling and heating applications. Bladder material is suitable for hot water applications. Installation of the tank will help eliminate constant pump use, prolonging pump life and unnecessary blowing of relief valves.

Specifications:

Furnish and install and shown on plans, American Wheatley BDT series, full acceptance expansion tank. Tank shall be constructed of carbon steel in accordance with ASME Section VIII, Division 1, latest edition. Tank shall incorporate a removable and replaceable heavy duty EPDM bladder. Tank shall be supplied with 12 psi factory air charge. Tanks shall be supplied on standard base ring unless otherwise specified. Tanks shall be constructed and ASME stamped for 150 psi working pressure at 240°F. Tanks shall be supplied with exterior high grade red oxide primer finish. Vertical or horizontal installation is acceptable. Non-replaceable diaphragm type tanks are not acceptable.

Typical Piping Details
With Bladder Type Tanks (BDT Series)



WFA Series

ASME Bladder Expansion Tank

Full Acceptance

Features:

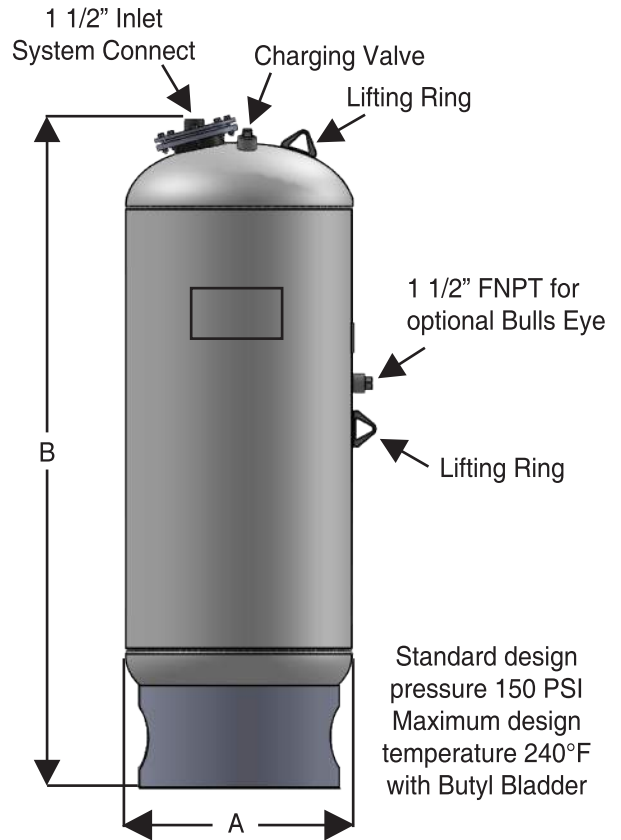
- Constructed in accordance with ASME Section VIII, Division I, Latest Edition
- Heavy Duty Butyl Bladder - NSF 61 Approved - Field Replaceable
- Fully Adjustable Field Air Charging
- Factory Air Charged to 12 P.S.I.
- Primed Exterior

Optional Features:

- Trimmed for Potable Water
- "Bulls Eye" sight glass
- Seismic mounting (clips or legs)
- EPDM Bladder Material
- Higher pressures available upon request
Tank dimensions will not change
- Painted Exterior, Epoxy Coatings

All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.

Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.



| PART NUMBER | ACCEPTANCE VOLUME | DIAMETER A (IN.) | HEIGHT B (IN.) | SYSTEM CONNECT (IN.) | WEIGHT (LBS) | WORKING PRESSURE |
|-------------|----------------------------|------------------|----------------|----------------------|--------------|------------------|
| WFA-140 | 36 | 20" | 39 1/2" | 1 1/2" | 195 | 150 PSI |
| WFA-215 | 57 | 20" | 54" | 1 1/2" | 290 | 150 PSI |
| WFA-300 | 82 | 24" | 57 1/8" | 1 1/2" | 320 | 150 PSI |
| WFA-450 | 120 | 24" | 78 3/8" | 1 1/2" | 400 | 150 PSI |
| WFA-600 | 165 | 30" | 69 3/4" | 1 1/2" | 450 | 150 PSI |
| WFA-800 | 220 | 30" | 88" | 1 1/2" | 590 | 150 PSI |
| WFA-1000 | See 3.250 WFA Large Series | | | | | |
| WFA-1200 | | | | | | |
| WFA-1400 | | | | | | |
| WFA-1600 | | | | | | |
| WFA-2000 | | | | | | |

JOB NAME _____
 LOCATION _____

 CONTRACTOR _____
 CONTRACTOR P.O. NO. _____

| ITEMS | QUANTITY |
|-------|----------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

American WHEATLEY
HVAC PRODUCTS®
A GFP COMPANY

2701 W. Concord Street
 Broken Arrow, OK 74012
 Toll Free: 866-204-5229
 PH: 918-317-0401
 FAX: 918-317-0407
 www.wheatleyhvac.com
 e-mail: sales@globalflowproducts.com

USE:

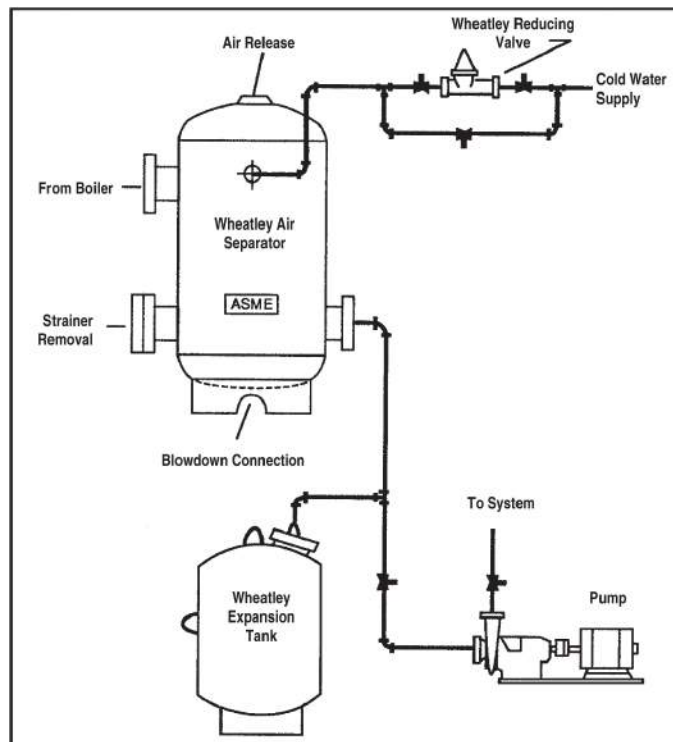
Designed to absorb expansion of fluids in typical hydronic systems. The WFA Tank is designed for pressure boost systems as well as typical cooling and heating applications. Bladder material is suitable for hot water applications. Installation of the tank will help eliminate constant pump use, prolonging pump life and unnecessary blowing of relief valves.

Specifications:

Furnish and install and shown on plans, American Wheatley WFA series, full acceptance expansion tank. Tank shall be constructed of carbon steel in accordance with ASME Section VIII, Division 1, latest edition. Tank shall incorporate a removable and replaceable heavy duty butyl bladder. Tank shall be supplied with 12 psi factory air charge. Tanks shall be supplied on standard base ring unless otherwise specified. Tanks shall be constructed and ASME stamped for 150 psi working pressure at 240°F. Tanks shall be supplied with exterior high grade red oxide primer finish. Vertical or horizontal installation is acceptable. Non-replaceable diaphragm type tanks are not acceptable.

Typical Piping Details

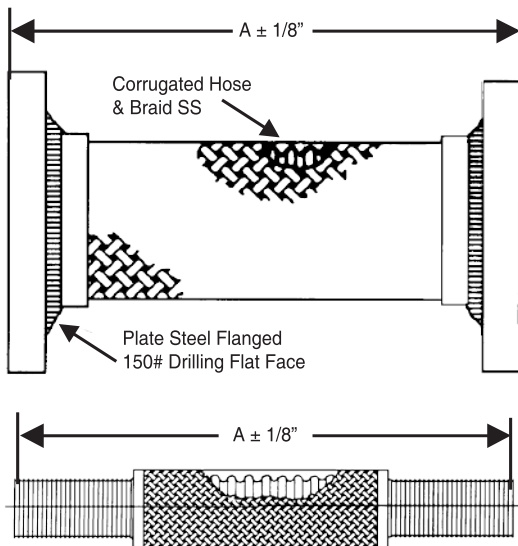
With Bladder Type Tanks (WFA/WPA Series)



Stainless Steel Pump Connectors

Features:

- Constructed of stainless steel annular corrugated metal surrounded with a woven wire braid of high tensile stainless steel
- High pressure and temperature capabilities
- Absorbs pump vibration and noise
- Reduces piping stress due to minor misalignment and pressure variations



| TEMPERATURE °F | CORRECTION FACTORS |
|----------------|--------------------|
| 70 | 1.00 |
| 200 | .94 |
| 300 | .88 |
| 400 | .83 |
| 500 | .78 |
| 600 | .74 |

All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.

Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.

| MODEL NO. | PIPE SIZE X LENGTH (A) | PRESSURE @ 70° F* |
|---------------------------------------|------------------------|-------------------|
| Mini Length: Flanged Ends | | |
| SS0209 | 2 X 9 | 350 |
| SS2509 | 2 1/2 X 9 | 275 |
| SS0309 | 3 X 9 | 275 |
| SS0409 | 4 X 9 | 230 |
| SS0511 | 5 X 11 | 265 |
| SS0611 | 6 X 11 | 240 |
| SS0812 | 8 X 12 | 185 |
| SS1013 | 10 X 13 | 165 |
| SS1214 | 12 X 14 | 155 |
| SS1414 | 14 X 14 | 150 |
| Long Length: Flanged Ends | | |
| SM0210 | 2 X 10 | 350 |
| SM2510 | 2 1/2 X 10 1/4 | 275 |
| SM0310 | 3 X 10 5/8 | 275 |
| SM0411 | 4 X 11 3/4 | 230 |
| SM0513 | 5 X 13 5/8 | 265 |
| SM0614 | 6 X 14 1/4 | 240 |
| SM0815 | 8 X 15 3/8 | 185 |
| SM1017 | 10 X 17 3/4 | 165 |
| SM1218 | 12 X 18 3/8 | 155 |
| SM1420 | 14 X 20 | 150 |
| Extended Length: Flanged Ends | | |
| SL0212 | 2 X 12 | 350 |
| SL2512 | 2 1/2 X 12 | 275 |
| SL0314 | 3 X 14 | 275 |
| SL0416 | 4 X 16 | 230 |
| SL0518 | 5 X 18 | 265 |
| SL0620 | 6 X 20 | 240 |
| SL0822 | 8 X 22 | 185 |
| SL1024 | 10 X 24 | 165 |
| SL1226 | 12 X 26 | 155 |
| SL1428 | 14 X 28 | 150 |
| Standard Length: Threaded Ends | | |
| ST0510 | 1/2 X 10 | 750 |
| ST7510 | 3/4 X 10 | 750 |
| ST0110 | 1 X 10 | 650 |
| ST1210 | 1 1/4 X 10 | 550 |
| ST1510 | 1 1/2 X 10 | 500 |
| ST0214 | 2 X 14 | 475 |
| ST2516 | 2 1/2 X 16 | 375 |
| ST0316 | 3 X 16 | 325 |

*Ratings for constant pressure. Use 1/2 of ratings for pulsating pressures and 1/6 of ratings for surge pressures.

For Temperatures above 70°F, multiply pressure shown at 70°F by correction factor of required temperature.

JOB NAME _____
 LOCATION _____

 CONTRACTOR _____
 CONTRACTOR P.O. NO. _____

| ITEMS | QUANTITY |
|-------|----------|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |



2701 W. Concord Street
 Broken Arrow, OK 74012
 Toll Free: 866-204-5229
 PH: 918-317-0401
 FAX: 918-317-0407
 www.wheatleyhvac.com
 e-mail: sales@globalflowproducts.com

Flanged Globe Style Non Slam Check Valve

Engineered for silent operation, low head loss - plus....

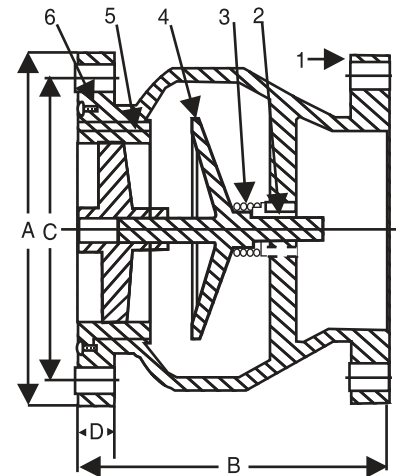
Features:

- Designed to eliminate water hammer
- Low Pressure loss
- Provides maximum efficiency
- Compact design flange face to flange face
- Valve activated at low psi, 1/4 - 1/2
- Sizes 2" - 16"



Optional Features:

- Trim Material
- Additional materials and pressure classifications available
- Larger sizes POA



Bill of Materials

| Part No. | Part Name | Material |
|----------|-----------|-----------------|
| 1 | Body | Cast Iron |
| 2 | Seat | Bronze |
| 3 | Plug | Bronze |
| 4 | Spring | Stainless Steel |
| 5 | Bushing | Bronze |
| 6 | Screw | Stainless Steel |

All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.

Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.

| ANSI CLASS 125 | | | | | | | | |
|----------------|--------|---------|---------|---------|----------|---------------|-----------|--------------|
| PART NUMBER | SIZE | A | B | C | D | WEIGHT (lbs.) | BOLT SIZE | NO. OF BOLTS |
| SGB020 | 2" | 6" | 5 1/4" | 4 3/4" | 13/16" | 17 | 5/8" | 4 |
| SGB025 | 2 1/2" | 7" | 5 1/2" | 5 1/2" | 11/16" | 23 | 5/8" | 4 |
| SGB030 | 3" | 7 1/2" | 6" | 6" | 15/16" | 30 | 5/8" | 4 |
| SGB040 | 4" | 9" | 7 1/4" | 7 1/2" | 15/16" | 42 | 5/8" | 8 |
| SGB050 | 5" | 10" | 8 1/2" | 8 1/2" | 15/16" | 53 | 3/4" | 8 |
| SGB060 | 6" | 11" | 9 3/4" | 9 1/2" | 1" | 75 | 3/4" | 8 |
| SGB080 | 8" | 13 1/2" | 12 1/2" | 11 3/4" | 1 1/8" | 134 | 3/4" | 8 |
| SGB100 | 10" | 16" | 15 1/2" | 14 1/4" | 1 13/16" | 177 | 7/8" | 12 |
| SGB120 | 12" | 19" | 14 1/4" | 17" | 1 1/4" | 276 | 1" | 12 |
| SGB140 | 14" | 21" | 15 3/4" | 18 3/4" | 1 3/8" | 407 | 1" | 12 |
| SGB160 | 16" | 25 3/4" | 17 5/8" | 21 1/4" | 1 7/16" | 567 | 1" | 16 |

| ANSI CLASS 250 | | | | | | | | |
|----------------|--------|---------|---------|---------|---------|---------------|-----------|--------------|
| PART NUMBER | SIZE | A | B | C | D | WEIGHT (lbs.) | BOLT SIZE | NO. OF BOLTS |
| SGB020 | 2" | 6 1/2" | 5 1/4" | 4 3/4" | 5/8" | 17 | 3/4" | 8 |
| SGB025 | 2 1/2" | 7 1/2" | 5 1/2" | 5 7/8" | 1" | 23 | 3/4" | 8 |
| SGB030 | 3" | 8 1/4" | 6" | 6 5/8" | 1 1/8" | 30 | 3/4" | 8 |
| SGB040 | 4" | 10" | 7 1/4" | 7 7/8" | 1 1/4" | 41 | 3/4" | 8 |
| SGB050 | 5" | 11" | 8 1/2" | 9 1/4" | 1 3/8" | 57 | 3/4" | 8 |
| SGB060 | 6" | 12 1/2" | 9 3/4" | 10 5/8" | 1 7/16" | 76 | 3/4" | 12 |
| SGB080 | 8" | 15" | 12 1/2" | 13" | 1 5/8" | 134 | 7/8" | 12 |
| SGB100 | 10" | 17 1/2" | 15 1/2" | 15 1/4" | 1 7/8" | 177 | 1" | 16 |
| SGB120 | 12" | 20 1/2" | 14 1/4" | 17 3/4" | 2" | 276 | 1 1/8" | 16 |

JOB NAME _____
 LOCATION _____

 CONTRACTOR _____
 CONTRACTOR P.O. NO. _____

| ITEMS | QUANTITY |
|-------|----------|
| _____ | _____ |
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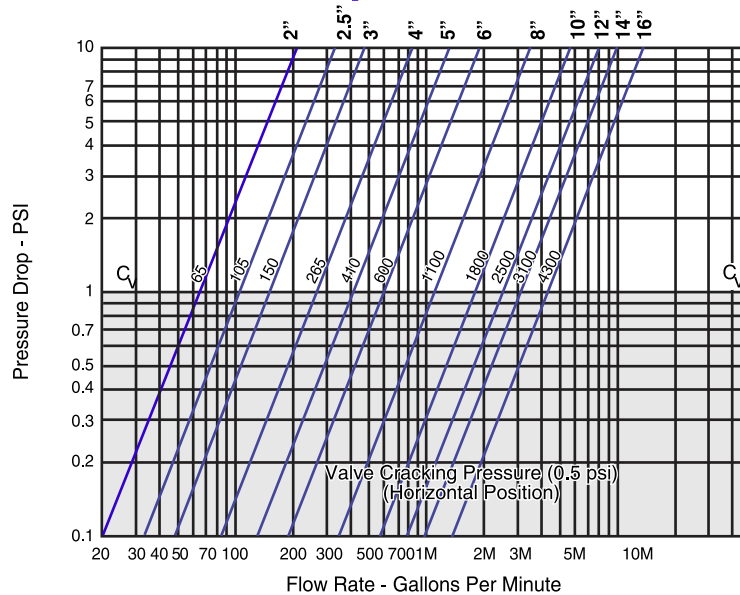
American WHEATLEY
HVAC PRODUCTS®
A GFP COMPANY

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 www.wheatleyhvac.com
 e-mail: sales@globalflowproducts.com

Recommended Maximum GPM per Valve Size/Flow Velocity of 10 F.P.S.

| | |
|--------|----------|
| 2" | 100 GPM |
| 2 1/2" | 150 GPM |
| 3" | 225 GPM |
| 4" | 400 GPM |
| 5" | 625 GPM |
| 6" | 900 GPM |
| 8" | 1600 GPM |
| 10" | 2500 GPM |
| 12" | 3500 GPM |
| 14" | 4250 GPM |
| 16" | 5500 GPM |

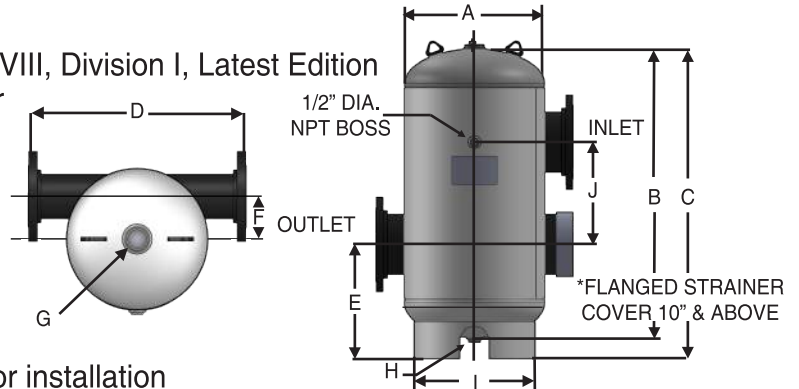
Pressure Drop Chart



Air Separator (Tangential Design) (with strainer)

Features:

- Constructed in accordance with ASME Section VIII, Division I, Latest Edition
- Carbon Steel Construction with 304 SS Strainer
- Primed Exterior
- 12" and under 150 P.S.I. working pressure
- 14" and larger 125 P.S.I. working pressure
- MNPT inlet & outlet on 2" & 2 1/2"
- 3" and larger flanged inlet and outlet
- Grooved end connections available
- 32" and above units available upon request
- Standard units are skirt mounted for vertical floor installation

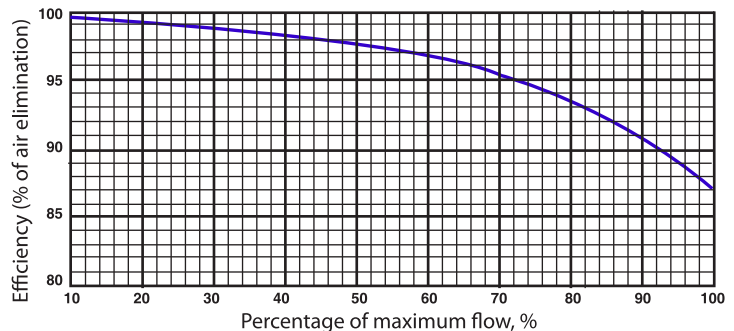


| PART NUMBER | INLET & OUTLET | A (IN.) | B (IN.) | C (IN.) | D (IN.) | E (IN.) | F (IN.) | G (IN.) | H (IN.) | I (IN.) | J (IN.) | OPTIMAL GPM | WEIGHT LBS |
|-------------|----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------------|------------|
| TASS002 | 2" | 12 | 19 1/2 | 23 1/8 | 16 5/8 | 9 1/8 | 4 5/16 | 1 | 1 | 9 1/2 | 8 1/2 | 121 | 53 |
| TASS025 | 2 1/2" | 12 | 19 1/2 | 23 1/8 | 16 5/8 | 9 1/8 | 4 1/16 | 1 | 1 | 9 1/2 | 8 1/2 | 190 | 58 |
| TASS003 | 3" | 12 | 19 1/2 | 23 1/8 | 19 3/4 | 9 3/8 | 3 3/4 | 1 | 1 | 9 1/2 | 8 | 285 | 95 |
| TASS004 | 4" | 14 | 29 | 32 5/8 | 21 3/4 | 12 3/4 | 4 1/4 | 1 1/2 | 1 | 11 1/2 | 10 3/4 | 450 | 118 |
| TASS005 | 5" | 14 | 29 | 32 5/8 | 21 3/4 | 12 3/4 | 3 3/4 | 1 1/2 | 1 | 11 1/2 | 10 3/4 | 780 | 125 |
| TASS006 | 6" | 20 | 41 | 44 5/8 | 28 | 16 7/8 | 6 1/4 | 1 1/2 | 1 | 18 | 14 1/2 | 1,150 | 220 |
| TASS008 | 8" | 20 | 41 | 44 5/8 | 28 | 16 7/8 | 5 3/16 | 1 1/2 | 1 | 18 | 14 1/2 | 2,000 | 260 |
| TASS010 | 10" | 30 | 58 | 61 5/8 | 41 | 22 5/8 | 9 1/8 | 2 | 1 | 24 | 20 | 3,100 | 710 |
| TASS012 | 12" | 30 | 58 | 61 5/8 | 41 | 22 5/8 | 8 1/8 | 2 | 1 | 24 | 20 | 4,800 | 890 |
| TASS140 | 14" | 36 | 75 1/2 | 79 1/8 | 46 3/8 | 25 5/8 | 10 3/16 | 2 | 1 | 30 | 31 1/2 | 5,800 | 1,225 |
| TASS160 | 16" | 48 | 100 | 108 1/2 | 60 | 38 | 12 1/2 | 2 | 2 | 45 | 40 | 7,600 | 2,200 |
| TASS180 | 18" | 54 | 116 | 125 1/4 | 66 | 41 | 13 5/8 | 2 | 2 1/2 | 51 1/2 | 50 | 10,000 | 2,700 |
| TASS200 | 20" | 60 | 130 | 138 | 72 | 43 1/2 | 16 | 2 | 2 1/2 | 58 5/8 | 60 | 12,500 | 3,850 |
| TASS240 | 24" | 72 | 152 | 160 | 84 | 47 7/8 | 19 | 2 | 2 1/2 | 69 5/8 | 72 | 19,100 | 5,800 |
| TASS300 | 30" | 72 | 152 | 162 | 86 | 48 | 19 7/8 | 2 | 2 1/2 | 69 5/8 | 76 | 22,500 | 7,100 |

Options:

- Stainless Steel Construction
- Other Alloy Construction
- Higher pressures available
- Painted surface top coat / Epoxy coats
- Magnetic Insert
- Ceiling clips/seismic clips

For automatic air removal, we recommend adding our high capacity air vent part ARV.



NOTE: All packaging materials, thread protectors, plastic plugs and caps must be removed before installation. Dimensions are subject to change without notice. Please confirm actual dimensions with factory at time of order.

JOB NAME _____
 LOCATION _____

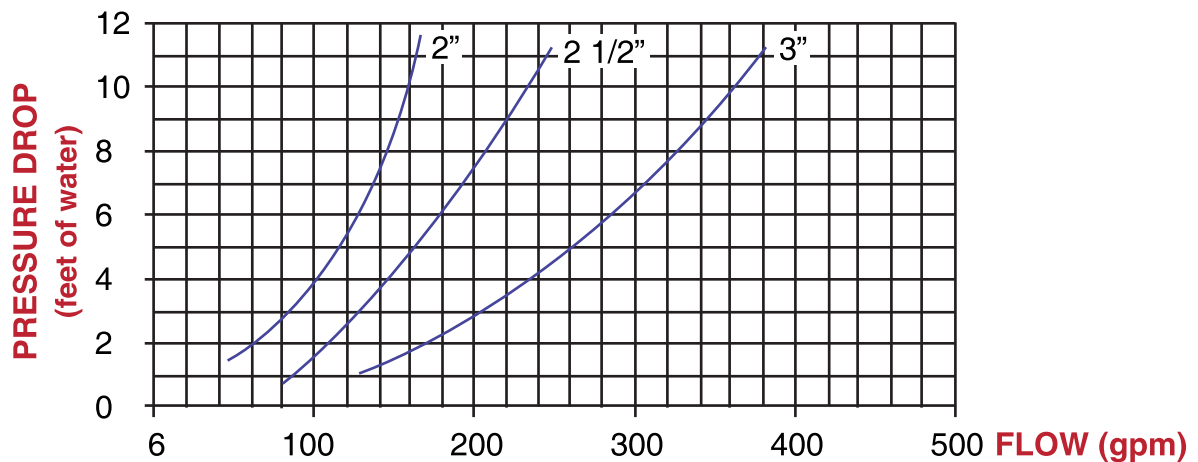
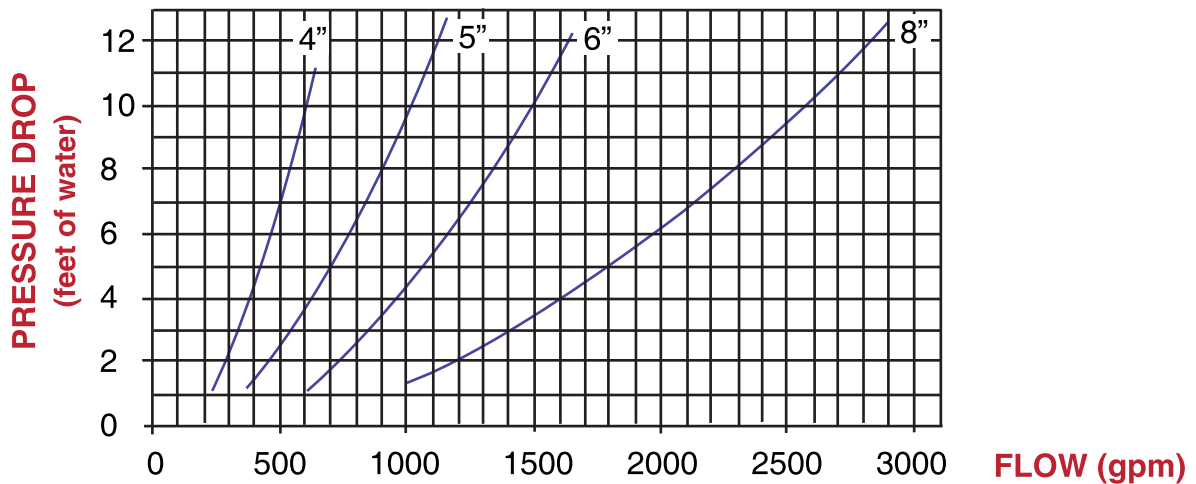
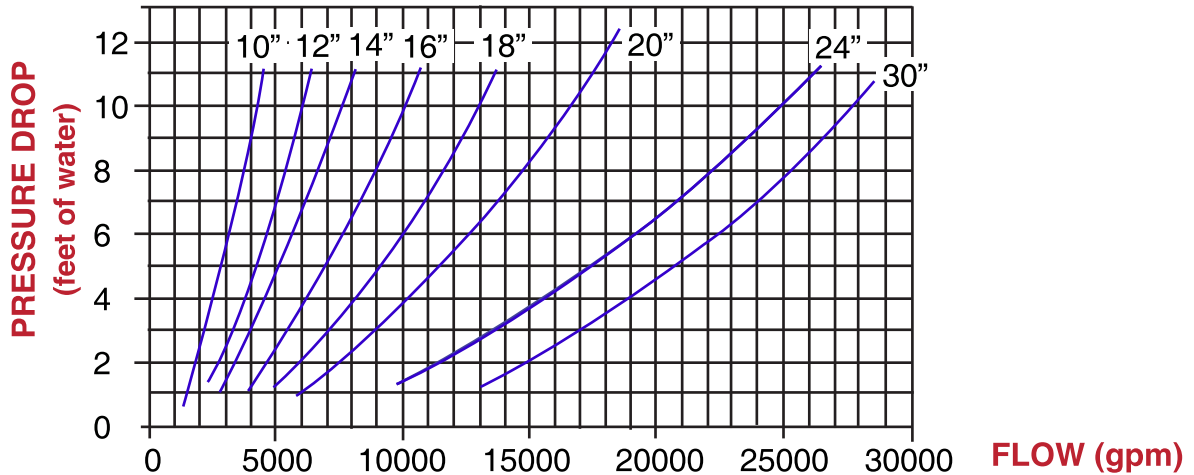
 CONTRACTOR _____
 CONTRACTOR P.O. NO. _____

| ITEMS | QUANTITY |
|-------|----------|
| _____ | _____ |
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 e-mail: sales@globalflowproducts.com

PRESSURE DROP CHART AIR SEPARATOR (with strainer)



Wheatley HVAC Suction Diffuser

Class 125

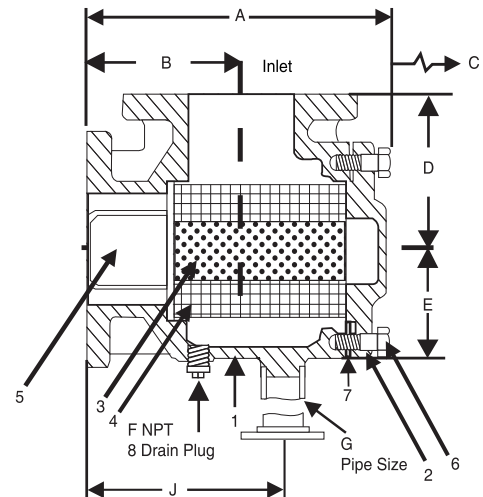
The Wheatley Suction Diffuser is designed to reduce space and installation costs by replacing a long radius elbow, strainer and extended entry pipe on suction side of the pump. The flow stabilizing vanes reduce turbulence and resulting stress and vibration.

In addition, the suction Diffuser strainer removes foreign particles which may be hazardous to the pump and other system components. Consult the factory for materials recommendation based on flow media.



Features:

- Available in sizes 2" x 1 1/2" through 12"x12"
- Ductile iron bodies
- Flanged inlet-outlet connections
- Direct mounting in horizontal or vertical position ANSI (ASA) flat faced
- Integrally cast stabilizing vanes
- Separate fine mesh start up screen surrounds each perforated screen
- Cast on pads for convenient mounting of standard I.D. Support foot
- Magnetic drain plugs for removal of foreign particles without disassembly
- Class 125 (175 PSI)
- 300° F maximum working temperature
- Painted Exterior



Multi-function Benefits:

- Saves cost and space by replacing: 90° Elbow, strainer and flow stabilizing piping

Bill of Materials

| ITEM | DESCRIPTION | MATERIAL |
|------|-------------------|------------------------|
| 1 | Body | ASTM A536 Ductile Iron |
| 2 | Cover | ASTM A536 Ductile Iron |
| 3 | Strainer | 304 Stainless Steel |
| 4 | Start Up Strainer | 20 Mesh Screen 304 SS |
| 5 | Diffuser | ASTM A536 Ductile Iron |
| 6 | Cap Screw | Steel |
| 7 | Gasket/O-Ring | Consult Factory |
| 8 | Plug | Steel with magnet |

All packaging materials, thread protectors, plastic plugs and caps must be removed before installation.

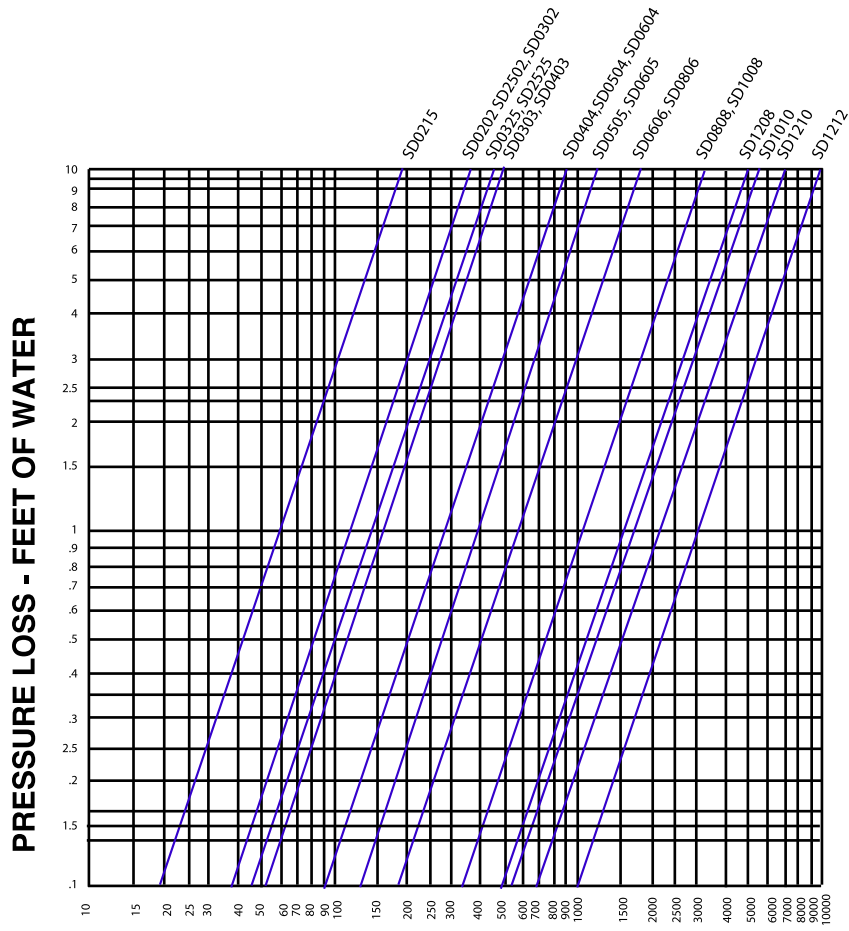
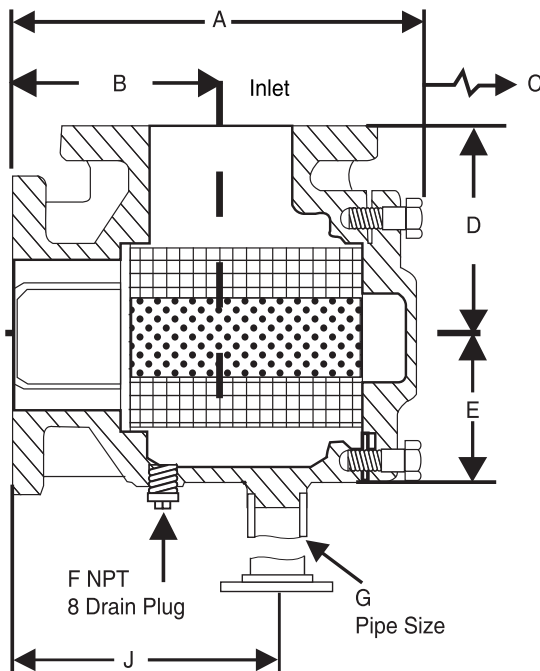
Dimensions are subject to change without notice, please confirm actual dimensions with factory at time of order.

| |
|---------------------------|
| JOB NAME _____ |
| LOCATION _____ |
| _____ |
| CONTRACTOR _____ |
| CONTRACTOR P.O. NO. _____ |

| ITEMS | QUANTITY |
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FLOW RATE - GPM WATER AT 70°F

*For individual balancing flow charts, please consult factory

| PART NUMBER | INLET | OUTLET | STRAINER | | DIMENSIONS (IN) | | | | | | | | WIDTH | WEIGHT (LBS) |
|-------------|-------|--------|-----------|------------------|-----------------|-------|---------|---------|--------|--------|-------|--------|--------|--------------|
| | | | FREE AREA | DIA. OPEN. (IN.) | A | B | C | D | E | F(NPT) | **G | J | | |
| SD0215 | 2 | 1 1/2 | 27 | 1/8 | 9 3/8 | 4 1/2 | 8 13/16 | 4 1/2 | 2 3/16 | 3/4 | 1 | 6 1/8 | 6 1/2 | 21 |
| SD0202 | 2 | 2 | 27 | 1/8 | 9 3/8 | 4 1/2 | 8 13/16 | 4 1/2 | 2 3/16 | 3/4 | 1 | 6 1/8 | 6 1/2 | 23 |
| SD2502 | 2 1/2 | 2 | 37 | 1/8 | 10 3/8 | 5 | 9 3/8 | 5 | 3 1/8 | 3/4 | 1 | 6 9/16 | 7 1/2 | 32 |
| SD2525 | 2 1/2 | 2 1/2 | 37 | 1/8 | 10 3/8 | 5 | 9 3/8 | 5 | 3 1/8 | 3/4 | 1 | 6 9/16 | 7 1/2 | 34 |
| SD0302 | 3 | 2 | 37 | 1/8 | 8 1/8 | 4 1/4 | 5 | 4 11/16 | 3 1/8 | 3/4 | 1 | 5 5/8 | 7 1/2 | 37 |
| SD0325 | 3 | 2 1/2 | 37 | 1/8 | 8 1/4 | 4 3/8 | 5 | 4 11/16 | 3 1/8 | 3/4 | 1 | 5 3/4 | 7 1/2 | 49 |
| SD0303 | 3 | 3 | 50 | 1/8 | 9 3/8 | 4 3/4 | 5 1/4 | 4 3/4 | 3 5/8 | 3/4 | 1 | 6 5/8 | 7 1/2 | 55 |
| SD0403 | 4 | 3 | 50 | 1/8 | 9 3/8 | 4 3/4 | 5 1/4 | 5 5/8 | 3 5/8 | 3/4 | 1 | 6 5/8 | 9 | 57 |
| SD0404 | 4 | 4 | 82 | 1/8 | 11 1/8 | 5 3/4 | 6 3/4 | 5 3/4 | 4 1/4 | 3/4 | 1 1/4 | 7 5/8 | 9 | 92 |
| SD0504 | 5 | 4 | 82 | 1/8 | 11 1/8 | 5 3/4 | 6 3/4 | 6 5/8 | 4 1/4 | 3/4 | 1 1/4 | 7 5/8 | 10 | 97 |
| SD0505 | 5 | 5 | 104 | 1/8 | 12 5/8 | 6 1/2 | 7 1/8 | 6 1/2 | 4 7/8 | 1 | 1 1/4 | 8 5/8 | 10 | 101 |
| SD0604 | 6 | 4 | 82 | 1/8 | 11 1/8 | 5 3/4 | 6 3/4 | 7 1/2 | 4 1/4 | 3/4 | 1 1/4 | 7 3/4 | 11 | 104 |
| SD0605 | 6 | 5 | 104 | 1/8 | 12 5/8 | 6 1/2 | 7 1/8 | 7 3/8 | 4 7/8 | 1 | 1 1/4 | 8 5/8 | 11 | 145 |
| SD0606 | 6 | 6 | 153 | 1/8 | 13 7/8 | 7 | 7 7/8 | 7 | 5 7/8 | 1 | 2 | 9 1/8 | 11 | 182 |
| SD0806 | 8 | 6 | 153 | 1/8 | 13 7/8 | 7 | 7 7/8 | 8 3/4 | 5 7/8 | 1 | 2 | 9 1/8 | 13 1/2 | 197 |
| SD0808 | 8 | 8 | 275 | 1/8 | 18 7/8 | 9 1/4 | 16 1/4 | 9 1/4 | 6 3/8 | 1 | 2 | 11 5/8 | 13 1/2 | 292 |
| SD1008 | 10 | 8 | 275 | 1/8 | 18 7/8 | 9 1/4 | 16 1/4 | 11 | 6 3/8 | 1 | 2 | 11 5/8 | 16 | 312 |
| SD1010 | 10 | 10 | 420 | 1/8 | 23 7/8 | 11 | 16 1/8 | 11 1/4 | 8 | 1 | 2 | 13 3/4 | 16 | 398 |
| SD1208 | 12 | 8 | 250 | 1/8 | 18 7/8 | 9 1/4 | 16 1/4 | 12 | 6 3/8 | 1 | 2 | 11 5/8 | 19 | 412 |
| SD1210 | 12 | 10 | 380 | 1/8 | 23 7/8 | 11 | 16 1/8 | 12 | 8 | 1 | 2 | 13 3/4 | 19 | 491 |
| SD1212 | 12 | 12 | 560 | 1/8 | 26 | 12 | 18 1/8 | 12 | 9 1/4 | 1 | 2 | 13 7/8 | 19 | 573 |

*Perforated basket includes fine mesh start-up screen. Start-up screen should be removed and disposed of after 1 month of operation.

**Pipe Support supplied by contractor.

SUBSTITUTION REQUEST FORM

Project: Newton Correction Facility
DOC NCF CRC Boiler Replacement

To: Innovative Engineers, Inc.

Re: Substitution Request

Substitution Request Number: _____

From: VHF Sales, Inc.

Date: 10/1/24

A/E Project Number: 101323

Specification Title: Condensing Hot Water Boilers Description: Acceptable Manufacturers

Section: 23 52 00 Page: 2 Article/Paragraph: 2.1 /Acceptable Manufacturers

Proposed Substitution: To add Camus Hydronics as an approved manufacturer

Manufacturer: Camus Hydronics Address: 6266 Netherhart Rd, Mississauga ON Phone: 1-905-696-7800

Trade Name: HVAC - Hydronic Model No.: Dynaforce 4000

History: New product 2-5 years old 5-10 yrs old More than 10 years old

Differences between proposed substitution and specified product: Unit has much smaller footprint but is taller.

Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: To be able to bid Camus

Similar Installation:

Project: Ankeny Iowa Alcohol & Beverage Architect: KCL

Address: 1918 SE Hulsizer Drive Owner: Stage of Iowa
Ankeny, IA 50021 Date Installed: 10-2023

Proposed substitution affects other parts of Work: No Yes; explain _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Michael Skallerud

Signed by: *Michael Skallerud*

Firm: VHF Sales, Inc.

Address: 2655 SE Enterprise Drive Grimes, IA 50111

Telephone: 515-986-3671

Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____



Typical Specifications for Dynaforce Hydronic Heating Boilers Condensing Models DR(H) 0300 – DR(H) 5000

The heating boiler shall be a CAMUS Dynaforce® model 4000 having an input rating of 8000 Btu/hr (kW). and 3780 Btu/hr (kW) output for hydronic heating.

The hydronic heating boiler shall be design certified by UL and shall meet the requirements of ANSI Z21.13, and CSA 4.9. The heating boiler shall be vented as a Category II or IV condensing appliance.

Performance Overview:

- Boiler shall operate up to 99% thermal efficiency.
- Heat exchanger shall be a fully condensing vertical cylindrical counter-flow water tube design with 439 grade tubes and 316L grade headers of stainless steel construction and all welded design with constant allowable system return temperatures of 40F.
- Fine-tuned combustion premix providing homogeneous air and gas combustion mix to a radial burner incorporating a knitted stainless steel wrap ensuring stable light off and efficient clean combustion.
- Up to 10:1 gas input turn-down ratio with sustained efficient combustion characteristics throughout entire modulating range.
- Oxides of Nitrogen (NOx) of 9 ppm corrected to 3% oxygen.
- Category II venting certification with Category II and IV venting options.
- The boiler is fully factory fire tested to obtain optimum combustion characteristics and to establish certified gas input rates.
- System safety and operating devices and controls are fully configured, calibrated and factory tested.
- Models consist of an input range of 300 MBTUH to 4999 MBTUH.
- The boiler shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard.

Combustion Chamber:

The combustion chamber shall be an all welded stainless steel construction and an integral part of the heat exchanger which shall be an all welded vertical cylindrical stainless steel counter-flow design consisting of an upper section for primary heat transfer and a lower section for extracting latent heat from flue gases. Stainless steel access heat exchanger wraps shall be provided for ease of service and inspection of the external heat exchanger and an easily removable radial fired knitted fiber stainless steel burner to access the internal combustion chamber for inspection, service, and cleaning. A window view port shall be provided for visual inspection of the boiler combustion during firing.

Heat Exchanger:

The stainless steel heat exchanger shall be inspected and tested to A.S.M.E. Section IV requirements. The A.S.M.E. Section IV seal of approval will not be provided as standard for jurisdictions not requiring the A.S.M.E Section IV seal of approval. The stainless steel heat exchanger shall be a 12 pass construction with a maximum working pressure of 160 psig (1100 kPa). The heat exchanger shall be of 439 grade stainless steel welded construction with a vertical cylindrical counter-flow water tube design complete with integral 439 grade stainless steel finned heat transfer tubes and 316L waterways. The heat exchanger design shall be capable of 40°F constant system return temperatures and have a fully condensing heat exchanger complete with condensate trap and drains. A pressure relief valve of _____ lb/hr shall be furnished with the heater.

Gas Train:

The gas train shall consist of a pressure regulating electro-hydraulic proportional air/gas main gas actuator providing a slow opening, fast closing shutoff valve and proportional 1:1 air/gas ratio control, a fast closing safety shutoff gas pressure regulator with 1 PSI allowable static pressure, and a low gas pressure switch. Optional high gas pressure switch is available. A factory pre-set combination metering valve and orifice shall be provided for setting combustion parameters. Models DR 300 – DR 5000 operate with a 5:1 turndown ratio. Models DR 500 – 1800 are available to operate with a 10:1 turndown ratio.

Burner/Combustion:

The combustion air fan draws gas under negative pressure and mixes it with air to generate a fine-tuned air gas mixture which is delivered under positive pressure to the radial knitted stainless steel burner. Combustion modulation is established by either a pulse width modulation signal on models (DR300 – DR1000) or by a variable frequency drive on models (DR1200 – DR5000). The burner shall be a 100% stainless steel vertical mounted radial fired type with stainless knitted metal fiber construction. The burner shall combust a precise amount of premixed combustion air and gas to provide equal distribution of heat for heat transfer throughout the entire heat exchanger. Combustion products are exhausted under minimum back pressure. Combustion operates with a 5:1 (or available 10:1 on DR500 – 1800 models) turn down ratio while sustaining combustion characteristics throughout the entire modulating range. Operation of up to 99% thermal efficiency and shall be certified for Oxides of Nitrogen (NOx) of 9 ppm corrected to 3% oxygen.



Typical Specifications for Dynaforce Hydronic Heating Boilers Condensing Models DR(H) 0300 – DR(H) 5000

Firing Mode:

The burner combustion shall operate as proportional modulating with a 5:1 turndown ratio with a minimum 20% firing rate. Models 500 – 1800 are available to modulate with a 10:1 turndown ratio with a minimum 10% firing rate. Multiple boiler "Cascade" firing algorithms are proportional modulation. Light off shall be at no more than 50% input to assure rumble free soft start. Combustion shall be optionally suitable for natural gas, propane and dual fuels operation.

Controls:

Standard controls include a SOLA electronic proportional integrated combination ignition limit/operator control accurate to 1°F (0.5°C) having a 4-20 mA output signal suitable for control of a variable frequency motor drive or a pulse width modulation signal output for modulating fan speeds. Controls are lead lag "Cascade" ready for control of up to eight boilers c/w Indoor outdoor reset and lead lag control. Control shall be equipped and ready with 4-20 mA remote set point or modulating control, capable with 0-10 VDC remote set point or modulating control. Control is BMS Modbus RTU protocol ready and capable of other alternate protocol conversions with additional optional gateway protocol converter. Control shall be supplied with a mounted touchscreen display which shall also provide for control system configuration and set up, readouts of boiler target, differential and inlet/outlet temperatures as well as accumulated runtime, enunciator diagnostics, and firing rates. Touchscreen display shall provide full diagnostics including real time data logging and support for up to eight (8) boilers in "Cascade" sequencing application, Modbus ready. The complete control package shall be mounted on the front panel with a hinged door for easy access to all control modules. The boiler safety control string shall be furnished with controls for low gas pressure, optional high gas pressure, fan air proving, blocked flue, water pressure, high limit, stack limit and flow switch. A flow switch shall be installed on the boiler outlet. Additional control safeties shall include flue gas stack temperature, flame rectification, fan speed, and auto recycling high limit.

Ignition Module:

The ignition module shall employ a direct igniter with 3 tries for ignition followed by lockout for DR 300 - DR 2500. A proven pilot is used on DR 3000 – DR 5000. Trial for ignition shall proceed with 15 seconds between retrials. Ignition control shall include times for pre-purge, pre-ignition, ignition, and post purge.

Venting Options

The following venting options shall be utilized:

- Category II Venting – single or combined vent*
- Category IV Outside Air (Horizontal & Vertical)
- Category IV Through-wall Venting (Horizontal & Vertical)
- Outdoor Venting
- Category II & IV Direct Venting

* Category II combined vent shall only employ an engineered designed vent system prepared by a certified vent manufacturer

The following category II and IV optional vent materials shall be utilized

- Stainless or AL29-4C for all system applications
- PPE or polypropylene for all system applications
- PVC for select low temperature systems only – consult factory
- CPVC for domestic hot water systems and select low temperature systems – consult factory

External Jacket and Fasteners:

The external jacket shall be of 430 stainless steel mirror finish panels and a powder paint coated access top cover assembled utilizing interference fit locks and minimal non-strip self-tapping screws for ease of removal and access to the heat exchanger and combustion air/gas control.



Typical Specifications for Dynaforce Hydronic Heating Boilers

Condensing Models DR(H) 0300 – DR(H) 5000

Heat Exchanger Water Content

| Model | Water Content (Gal) |
|-------|---------------------|
| 300 | 5.7 |
| 350 | 5.7 |
| 400 | 6.3 |
| 500 | 6.3 |
| 600 | 6.6 |
| 800 | 6.6 |
| 1000 | 8.9 |
| 1200 | 8.9 |
| 1400 | 9.6 |
| 1600 | 9.9 |
| 1800 | 9.9 |
| 2000 | 11.4 |
| 2500 | 13.2 |
| 3000 | 15.6 |
| 3500 | 18.6 |
| 4000 | 18.6 |
| 4500 | 20.1 |
| 5000 | 21.2 |

Input and Output

| Model | Input [MBTU/hr] | Output [MBTU/hr] | 5:1 Minimum Input [MBTU/hr] | 10:1 Minimum Input [MBTU/hr] |
|-------|-----------------|------------------|-----------------------------|------------------------------|
| 0300 | 300 | 282 | 60 | -- |
| 0350 | 350 | 329 | 70 | -- |
| 0400 | 399 | 375 | 80 | -- |
| 0500 | 500 | 470 | 100 | 50 |
| 0600 | 600 | 564 | 120 | 60 |
| 0800 | 800 | 752 | 160 | 80 |
| 1000 | 1000 | 940 | 200 | 100 |
| 1200 | 1200 | 1137 | 240 | 120 |
| 1400 | 1400 | 1327 | 280 | 140 |
| 1600 | 1600 | 1516 | 320 | 160 |
| 1800 | 1800 | 1706 | 360 | 180 |
| 2000 | 2000 | 1896 | 400 | -- |
| 2500 | 2500 | 2362 | 500 | -- |
| 3000 | 3000 | 2835 | 600 | -- |
| 3500 | 3500 | 3307 | 700 | -- |
| 4000 | 4000 | 3780 | 800 | -- |
| 4500 | 4500 | 4252 | 900 | -- |
| 5000 | 4999 | 4725 | 1000 | -- |

Voltage Requirement

| Model | Voltage Requirement | Max Amp Draw – Boiler Only |
|--------------------------|-----------------------------|----------------------------|
| 300 – 2000 | 120VAC, 60Hz | 20 |
| 2500 | 120VAC, 60Hz | 30 |
| 3000 – 3500 | 208/230VAC, 60Hz* | 30 |
| 4000 – 5000 | 208/230VAC, 60Hz, 3 Phase** | 30 |
| 1200 – 5000 ^Δ | 460VAC, 60Hz, 3 Phase | 10 |

*This is a 4-wire power supply requiring two (2) lives, a neutral and a ground

**This is a 5-wire power supply requiring three (3) lives, a neutral and a ground

^Δ Optional power supply available upon request

Heat Exchanger Head Loss & Flow

| Size | Output Max Btu/hr | 10°F | | 15°F | | 20°F | | 25°F | |
|------|-------------------|------------|--------|------------|--------|------------|--------|------------|--------|
| | | Flow (GPM) | ΔP-Ft. | Flow (GPM) | ΔP-Ft. | Flow (GPM) | ΔP-Ft. | Flow (GPM) | ΔP-Ft. |
| 300 | 282,000 | 57.0 | 0.5 | 38.0 | 0.3 | 28.3 | 0.2 | - | - |
| 350 | 329,000 | 66.5 | 0.7 | 44.3 | 0.4 | 33.0 | 0.2 | - | - |
| 400 | 375,060 | 76.0 | 1.0 | 50.1 | 0.5 | 37.8 | 0.3 | - | - |
| 500 | 470,000 | 95.0 | 1.6 | 63.3 | 0.8 | 47.0 | 0.4 | - | - |
| 600 | 564,000 | 113.9 | 2.5 | 75.9 | 1.3 | 56.3 | 0.7 | - | - |
| 800 | 752,000 | 152.0 | 6.6 | 101.3 | 3.2 | 75.1 | 1.8 | - | - |
| 1000 | 940,000 | 189.8 | 11.4 | 126.5 | 5.4 | 93.9 | 3.0 | 75.1 | 1.9 |
| 1200 | 1,137,600 | 227.3 | 39.9 | 151.6 | 17.7 | 113.8 | 10.0 | 101.3 | 3.2 |
| 1400 | 1,327,200 | 265.2 | 55.8 | 176.8 | 25.0 | 132.8 | 14.0 | 126.5 | 5.4 |

Head loss is for boiler only with no piping

| Size | Output Max Btu/hr | 25°F | | 30°F | | 35°F | | 40°F | |
|------|-------------------|------------|--------|------------|--------|------------|--------|------------|--------|
| | | Flow (GPM) | ΔP-Ft. | Flow (GPM) | ΔP-Ft. | Flow (GPM) | ΔP-Ft. | Flow (GPM) | ΔP-Ft. |
| 1600 | 1,516,800 | 121.4 | 9.3 | 101.2 | 6.5 | 86.6 | 4.7 | 75.8 | 3.6 |
| 1800 | 1,706,400 | 136.7 | 9.4 | 113.8 | 6.7 | 97.4 | 4.9 | 85.2 | 3.8 |
| 2000 | 1,896,000 | 151.8 | 13.6 | 126.4 | 9.7 | 108.3 | 7.1 | 94.7 | 5.5 |
| 2500 | 2,362,500 | 189.8 | 17.7 | 158.0 | 12.5 | 134.9 | 9.1 | 118.0 | 7.0 |
| 3000 | 2,835,000 | 227.7 | 17.8 | 189.6 | 12.7 | 161.9 | 9.3 | 141.6 | 7.2 |
| 3500 | 3,307,500 | 265.4 | 21.5 | 221.2 | 15.3 | 188.8 | 11.2 | 165.2 | 8.5 |
| 4000 | 3,780,000 | 303.6 | 24.0 | 253.0 | 17.1 | 215.8 | 12.5 | 188.8 | 9.5 |
| 4500 | 4,252,500 | 341.5 | 36.3 | 284.6 | 25.6 | 242.8 | 18.6 | 212.4 | 14.3 |
| 5000 | 4,725,000 | 379.2 | 39.0 | 316.0 | 27.5 | 269.8 | 21.0 | 236.1 | 15.5 |

Head loss is for boiler only with no piping



Typical Specifications for Dynaforce Hydronic Heating Boilers

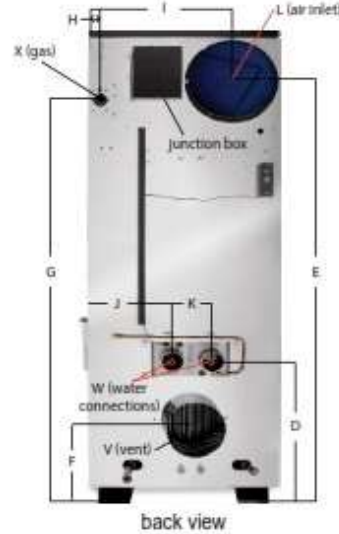
Condensing Models DR(H) 0300 – DR(H) 5000

Date: _____
 Engineer: _____
 Job Name: _____

 Buyers Name: _____

Quote No.: _____
 Prepared by: _____
 Job Location: _____

 Buyers Address: _____



Dynaforce Dimensional Data

| Model | Dim. "A" | Dim. "B" | Dim. "C" | Dim. "D" | Dim. "E" | Dim. "F" | Dim. "G" | Dim. "H" | Dim. "I" | Dim. "J" | Dim. "K" | Ø Dim. "L" Air Inlet | Ø Air Inlet up to 100 Ft. Equiv. Length | Ø Dim. "V" Vent CAT. IV up to 100 Ft. Equiv. Length (as shipped) | Ø Dim. "V" Vent CAT. II | Dim. "M" | Ø Dim. "W" Water | Ø Dim. "X" Gas | Shipping Weight (lbs) |
|-------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------------------|-----------------------------------------|------------------------------------------------------------------|-------------------------|----------|------------------|----------------|-----------------------|
| 300 | 25" | 27" | 42" | 15 1/2" | 34 7/8" | 9 3/4" | 31 1/4" | 6 3/4" | 4 3/4" | 11 7/8" | 6" | 6" | 4" | 4" | 4" | 5" | 1 1/2" | 3/4" | 500 |
| 350 | 25" | 27" | 42" | 15 1/2" | 34 7/8" | 9 3/4" | 31 1/4" | 6 3/4" | 4 3/4" | 11 7/8" | 6" | 6" | 4" | 4" | 5" | 5" | 1 1/2" | 3/4" | 500 |
| 400 | 25" | 27" | 48 3/4" | 16 3/8" | 41 7/8" | 10 1/2" | 39 3/4" | 9 3/4" | 3 3/4" | 12" | 6" | 6" | 5" | 4" | 5" | 5" | 1 1/2" | 1" | 500 |
| 500 | 25" | 27" | 48 3/4" | 16 3/8" | 41 7/8" | 10 1/2" | 39 3/4" | 9 3/4" | 3 3/4" | 12" | 6" | 6" | 5" | 5" | 5" | 5" | 1 1/2" | 1" | 560 |
| 600 | 25" | 27" | 55 1/4" | 18 1/2" | 46" | 11 1/2" | 45 7/8" | 10 1/2" | 4 5/8" | 12" | 6" | 8" | 6" | 5" | 6" | 5" | 2" | 1" | 585 |
| 800 | 25" | 27" | 55 1/4" | 18 1/2" | 46" | 11 1/2" | 45 7/8" | 10 1/2" | 4 5/8" | 12" | 6" | 8" | 6" | 6" | 6" | 5" | 2" | 1" | 640 |
| 1000 | 25" | 27" | 65" | 20 3/4" | 57" | 13" | 57 3/4" | 10 3/8" | 4 3/8" | 12" | 6" | 8" | 8" | 6" | 7" | 5" | 2 1/2" | 1" | 750 |
| 1200 | 29 3/8" | 31 3/4" | 70 1/2" | 20 3/4" | 59 1/2" | 13" | 56 3/8" | 1 7/8" | 23 1/4" | 12" | 6" | 10" | 8" | 7" | 8" | 5" | 2 1/2" | 1 1/4" | 845 |
| 1400 | 29 3/8" | 31 3/4" | 73 1/2" | 22 5/8" | 62 1/2" | 14" | 59 1/4" | 1 7/8" | 23 1/4" | 12" | 6" | 10" | 8" | 7" | 8" | 5" | 2 1/2" | 1 1/4" | 845 |
| 1600 | 29 3/8" | 31 3/4" | 73 1/2" | 22 5/8" | 62 1/2" | 13 1/2" | 59 1/4" | 1 7/8" | 23" | 12" | 6" | 12" | 10" | 7" | 9" | 5" | 2 1/2" | 1 1/4" | 875 |
| 1800 | 29 3/8" | 31 3/4" | 73 1/2" | 22 5/8" | 62 1/2" | 13 1/2" | 59 1/4" | 1 7/8" | 23" | 12" | 6" | 12" | 10" | 8" | 9" | 5" | 2 1/2" | 1 1/4" | 1120 |
| 2000 | 29 3/8" | 31 3/4" | 81 1/4" | 24 5/8" | 72 3/8" | 14 3/8" | 69" | 1 7/8" | 22 3/4" | 12 1/2" | 6 1/2" | 12" | 10" | 8" | 10" | 5" | 3" | 1 1/4" | 1138 |
| 2500 | 29 3/8" | 31 3/4" | 82 5/8" | 25" | 74" | 15 3/4" | 69 1/2" | 1 7/8" | 22 1/2" | 11 1/4" | 6 1/2" | 12" | 12" | 9" | 10" | 5 1/2" | 3" | 1 1/2" | 1250 |
| 3000 | 35 3/4" | 39 1/4" | 85 3/4" | 25 1/2" | 75 7/8" | 16" | 70 1/2" | 1 7/8" | 27 3/4" | 14" | 7 3/4" | 12" | 12" | 9" | 10" | 5 1/2" | 3" | 1 1/2" | 1425 |
| 3500 | 35 3/4" | 39 1/4" | 93" | 26 7/8" | 82 1/4" | 15 1/2" | 76 1/4" | 4 1/2" | 27 3/4" | 12" | 12" | 12" | 12" | 10" | 12" | 7" | 4" | 2" | 1840 |
| 4000 | 35 3/4" | 39 1/4" | 93" | 26 7/8" | 82 1/4" | 15 1/2" | 76 1/4" | 4 1/2" | 27 3/4" | 12" | 12" | 12" | 12" | 10" | 12" | 7" | 4" | 2" | 1912 |
| 4500 | 35 3/4" | 39 1/4" | 96" | 29" | 81 1/4" | 16 1/2" | 79 1/4" | 4 1/2" | 28" | 12" | 12" | 14" | 14" | 12" | 12" | 7 1/2" | 4" | 2 1/2" | 2000 |
| 5000 | 35 3/4" | 39 1/4" | 102" | 29 1/2" | 87 1/2" | 16 3/4" | 85 1/2" | 4 1/2" | 27 3/4" | 12" | 12" | 14" | 14" | 12" | 12" | 8" | 4" | 2 1/2" | 2200 |

Model No.: _____ No. of Units: _____ Type of Gas: _____
 Total Input: _____ BTU/hr Total Output: _____ BTU/hr
 Flow: _____ USGPM @ Allowable Pressure Drop _____ ft.
 Optional Accessories: _____

SUBSTITUTION REQUEST FORM

Project: Newton Correction Facility
DOC NCM CRC Boiler Replacement
To: Innovative Engineers, Inc.

Re: Substituion Request

Substitution Request Number: _____
From: VHF Sales, Inc.
Date: 10/7/24
A/E Project Number: 101323

Specification Title: None Listed Description: VFD Manufacturers
Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: To add Invertek as an approved VFD manufacturer
Manufacturer: Invertek Address: 1226 American Way Libertyville, IL 60048 Phone: 847-549-3669
Trade Name: Mechanical / Electrical Model No.: Optidrive E3

History: New product 2-5 years old 5-10 yrs old More than 10 years old

Differences between proposed substitution and specified product: No major variances

Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: _____

Similar Installation:

Project: _____ Architect: _____
Address: _____ Owner: _____
Date Installed: _____

Proposed substitution affects other parts of Work: No Yes; explain _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Michael Skallerud

Signed by: *Michael Skallerud*

Firm: VHF Sales, Inc.

Address: 2655 SE Enterprise Drive Grimes, IA 50111

Telephone: 515-986-3671

Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: **John J Horn**

Date: **10/7/24**

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____



Member of Sumitomo Drive Technologies

OPTIDRIVE™

AC Variable Speed Drive

General Purpose Drive
Easy control for all motor types

Easy to Use



0.37kW–37kW / 0.5HP–50HP
110–480V Single & 3 Phase Input

IP20

IP66/NEMA 4X

Easy to Use

General Purpose Drive

Focused on ease of use, **Optidrive E3** provides unrivalled simplicity of installation, connection and commissioning, allowing the user to benefit from precise motor control and energy savings within minutes.



Simple Commissioning

With just 14 basic parameters and application macro functions providing rapid set up, Optidrive E3 minimises start-up time.



Intuitive Keypad Control

Precise digital control at the touch of a button.



Application Macros

Switch between **Industrial, Pump & Fan** modes to optimise Optidrive E3 for your application.

Industrial | Pump | Fan

See **Page 6**

IP20

Up to 50HP/37kW/46A

- ✓ Easy to use
- ✓ Compact & robust

See **Page 4**



Take a closer look at the stunning Optidrive E3



www.invertekdrives.com/optidrive-e3

Sensorless Vector Control for all Motor Types

IM

IE2 & IE3
Induction
Motors

PM

AC Permanent
Magnet
Motors

BLDC

Brushless DC
Motors

SynRM

Synchronous
Reluctance
Motors

Precise and reliable control for
IE2, IE3 & IE4 motors

IP66/NEMA 4X

Up to 30HP/22kW/46A

- ✓ Outdoor rated
- ✓ Dust-tight
- ✓ Washdown ready

See Page 5

Now Available

Single Phase Input
Up to 10HP/7.5kW/30A



Key Features

- ✓ Internal Category C1 EMC filter
- ✓ Internal PI control
- ✓ Internal brake chopper
- ✓ Dual analogue inputs
- ✓ Operates up to 122°F/50°C
- ✓ Bluetooth connectivity
- ✓ Option for control of single phase motors (see Page 8)

Modbus RTU
CAN

On-board as standard

EtherNet/IP™
Modbus TCP

Internal option available on NEMA 4X units only

Internal Category C1 EMC Filter

An internal filter in every Optidrive E3 saves cost and time for installation.

Cat C1 according to EN61800-3:2004



OPTIDRIVE™ E³

IP20

Up to 50HP/37kW/46A

Suitable for mounting in a cabinet

Compact, robust and reliable general purpose drive

Simple Installation

DIN rail and keyhole mounting options

Fast Connection

5mm rising clamp terminals with captive screws

Quick Reference


Integrated help card

Operates up to 122°F/50°C

Modbus RTU CAN

On-board as standard
Optional external Ethernet IP or Modbus TCP Modules available

Incredibly Easy to Use

- ✓ Built in PI control, EMC filter (C1) & brake chopper (Size 2~4)
- ✓ Application macros for industrial, fan and pump operation
- ✓  Bluetooth® connectivity

OPTISTICK

Rapid parameter cloning and Bluetooth PC interface

See Page 10

Dual analogue inputs

Motor supply connects at base

Controls Multiple Motor Types

- ✓ IE2, 3 & 4
- ✓ IM, PM, BLDC and SynRM

5 sizes cover global supply ratings

Simply Power Up

Optidrive E3 provides precise motor control and energy savings using the factory settings. Simply power up and the drive can immediately deliver energy savings.

14 basic parameters allow simple adjustment for your application if required, with up to 50 parameters available in total for a highly flexible performance.



OPTIDRIVE™ E³

IP66/NEMA 4X Outdoor

Up to 30HP/22kW/46A

Coated Heatsink as Standard

Ideal for operations requiring washdown — such as food and beverage

Outdoor rated enclosed drives for direct machine mounting, dust tight and ready for washdown duty



Locally customisable

Flat front to terminal cover with mounting points for switches and an internal PCB.

Conformal coating as standard

Switched or non-switched



- 1** 2 x RJ45 ports eliminate the need for a splitter.
- 2** Easily accessible EMC disconnect
- 3** Easy to wire due to the large, accessible chamber and removeable gland plate.

IP66/Nema 4X outdoor rated

Built with tough polycarbonate plastics specifically chosen to withstand degradation by ultra violet (UV), greases, oils and acids. Also robust enough not to be brittle at -4°F (-20°C).

Dust-Tight Design

Install directly on your processing equipment and be sure of protection from dust and contaminants.

Washdown Ready Polycarbonate

With a sealed polycarbonate enclosure and corrosion resistant heatsink, the Optidrive E3 IP66/NEMA 4X is ideal for high-pressure washdown applications.

Switched models

Simply wire up the drive, turn the inbuilt potentiometer and the motor will start running – allowing immediate energy savings.

Saving energy cannot be easier than this!

For ultimate ease of use

- Local Speed Potentiometer
- Run Reverse / Off / Run Forward Switch
- Lockable Mains Disconnect / Isolator



Application Macros

Switch modes at the touch of a button to optimise Optidrive E3 for your application

Single parameter application macro selection



Industrial Mode

Industrial Mode optimises Optidrive E3 for load characteristics of typical industrial applications.

Applications include:

- ✓ Conveyors
- ✓ Mixers
- ✓ Treadmills

Sensorless Vector provides high starting torque and excellent speed regulation

IP20 panel mount units or **IP66/NEMA 4X** for direct machine mounting

Rapid parameter cloning using **OPTISTICK**







Pump Mode

Pump Mode makes energy efficient pump control easier than ever.

Applications include:

- ✓ Dosing Pumps
- ✓ Borehole Pumps
- ✓ Transfer Pumps
- ✓ Swimming Pools
- ✓ Spas
- ✓ Fountains

- Constant or variable torque
- Internal PI control

Fan Mode

Fan Mode (inc. fire operation) makes air handling a breeze, ideal for simple HVAC systems.

Applications include:

- ✓ Air Handling Units
- ✓ Ventilation Fans
- ✓ Circulating Fans
- ✓ Air Curtains
- ✓ Kitchen Extract

High efficiency **variable torque** motor control

- Flying start capability
- Mains loss ride through
- PI control

Instant Power Savings

The graph below shows the incredible efficiency of Optidrive E3 for controlling airflow compared to traditional damper control methods.




| Air Volume (%) | Outlet Damper (%) | Inlet Damper (%) | Optidrive E3 (%) |
|----------------|-------------------|------------------|------------------|
| 0 | 0 | 0 | 0 |
| 20 | 55 | 35 | 5 |
| 40 | 75 | 55 | 15 |
| 60 | 90 | 70 | 35 |
| 80 | 95 | 85 | 65 |
| 100 | 100 | 100 | 100 |

Modbus RTU
CAN

On-board as standard

EtherNet/IP™
Modbus TCP

Internal option available on NEMA 4X units only

How much energy could you save?

Estimate potential energy savings, CO₂ emissions and financial savings for your application with the Inverter Drives **Energy Savings Calculator**.



www.invertekdrives.com/calculator



| | kW | HP | Amps | Size | Model Code | Product Family | Generation | Frame Size | Voltage Code | Capacity | Supply Phases | EMC Filter | Brake Transistor | Enclosure Type |
|-------------------------------------------------------------|------|-----|------|------------------------|------------------------|----------------|------------|------------|--------------|----------|---------------|------------|------------------|----------------|
| Input 1Ø 110-115V+/-10% Output (Motor) 3Ø 200-240V | 0.37 | 0.5 | 2.3 | 1 | ODE - 3 - 1 1 0023 - 1 | 0 | 1 | # | | | | | | |
| | 0.75 | 1 | 4.3 | 1 | ODE - 3 - 1 1 0043 - 1 | 0 | 1 | # | | | | | | |
| | 1.1 | 1.5 | 5.8 | 2 | ODE - 3 - 2 1 0058 - 1 | 0 | 4 | # | | | | | | |
| Input 1Ø 200-240V+/-10% Output (Motor) 3Ø 200-240V | 0.37 | 0.5 | 2.3 | 1 | ODE - 3 - 1 2 0023 - 1 | F | 1 | # | | | | | | |
| | 0.75 | 1 | 4.3 | 1 | ODE - 3 - 1 2 0043 - 1 | F | 1 | # | | | | | | |
| | 1.5 | 2 | 7 | 1 | ODE - 3 - 1 2 0070 - 1 | F | 1 | # | | | | | | |
| | 1.5 | 2 | 7 | 2 | ODE - 3 - 2 2 0070 - 1 | F | 4 | # | | | | | | |
| | 2.2 | 3 | 10.5 | 2 | ODE - 3 - 2 2 0105 - 1 | F | 4 | # | | | | | | |
| | 4 | 5 | 15.3 | 3 | ODE - 3 - 3 2 0153 - 1 | F | 4 | # | | | | | | |
| | 4 | 5 | 15.3 | 3 | ODE - 3 - 3 2 0153 - 1 | O | 4 | 2 | | | | | | |
| | 5.5 | 7.5 | 24 | 4 | ODE - 3 - 4 2 0240 - 1 | O | 4 | # | | | | | | |
| 7.5 | 10 | 30 | 4 | ODE - 3 - 4 2 0300 - 1 | O | 4 | # | | | | | | | |
| Input 3Ø 200-240V+/-10% Output (Motor) 3Ø 200-240V | 0.37 | 0.5 | 2.3 | 1 | ODE - 3 - 1 2 0023 - 3 | 0 | 1 | # | | | | | | |
| | 0.75 | 1 | 4.3 | 1 | ODE - 3 - 1 2 0043 - 3 | 0 | 1 | # | | | | | | |
| | 1.5 | 2 | 7 | 1 | ODE - 3 - 1 2 0070 - 3 | 0 | 1 | # | | | | | | |
| | 1.5 | 2 | 7 | 2 | ODE - 3 - 2 2 0070 - 3 | F | 4 | # | | | | | | |
| | 2.2 | 3 | 10.5 | 2 | ODE - 3 - 2 2 0105 - 3 | F | 4 | # | | | | | | |
| | 4 | 5 | 18 | 3 | ODE - 3 - 3 2 0180 - 3 | F | 4 | # | | | | | | |
| | 5.5 | 7.5 | 24 | 3 | ODE - 3 - 3 2 0240 - 3 | F | 4 | # | | | | | | |
| | 7.5 | 10 | 30 | 4 | ODE - 3 - 4 2 0300 - 3 | F | 4 | # | | | | | | |
| | 11 | 15 | 46 | 4 | ODE - 3 - 4 2 0460 - 3 | F | 4 | # | | | | | | |
| | 15 | 20 | 61 | 5 | ODE - 3 - 5 2 0610 - 3 | F | 4 | 2 | | | | | | |
| 18.5 | 25 | 72 | 5 | ODE - 3 - 5 2 0720 - 3 | F | 4 | 2 | | | | | | | |
| Input 3Ø 380-480V+/-10% Output (Motor) 3Ø 380-480V | 0.37 | 0.5 | 1.2 | 1 | ODE - 3 - 1 4 0012 - 3 | F | 1 | # | | | | | | |
| | 0.75 | 1 | 2.2 | 1 | ODE - 3 - 1 4 0022 - 3 | F | 1 | # | | | | | | |
| | 1.5 | 2 | 4.1 | 1 | ODE - 3 - 1 4 0041 - 3 | F | 1 | # | | | | | | |
| | 1.5 | 2 | 4.1 | 2 | ODE - 3 - 2 4 0041 - 3 | F | 4 | # | | | | | | |
| | 2.2 | 3 | 5.8 | 2 | ODE - 3 - 2 4 0058 - 3 | F | 4 | # | | | | | | |
| | 4 | 5 | 9.5 | 2 | ODE - 3 - 2 4 0095 - 3 | F | 4 | # | | | | | | |
| | 5.5 | 7.5 | 14 | 3 | ODE - 3 - 3 4 0140 - 3 | F | 4 | # | | | | | | |
| | 7.5 | 10 | 18 | 3 | ODE - 3 - 3 4 0180 - 3 | F | 4 | # | | | | | | |
| | 11 | 15 | 24 | 3 | ODE - 3 - 3 4 0240 - 3 | F | 4 | # | | | | | | |
| | 15 | 20 | 30 | 4 | ODE - 3 - 4 4 0300 - 3 | F | 4 | # | | | | | | |
| | 18.5 | 25 | 39 | 4 | ODE - 3 - 4 4 0390 - 3 | F | 4 | # | | | | | | |
| | 22 | 30 | 46 | 4 | ODE - 3 - 4 4 0460 - 3 | F | 4 | # | | | | | | |
| | 30 | 40 | 61 | 5 | ODE - 3 - 5 4 0610 - 3 | F | 4 | 2 | | | | | | |
| | 37 | 50 | 72 | 5 | ODE - 3 - 5 4 0720 - 3 | F | 4 | 2 | | | | | | |

Replace # in model code with colour-coded option:

Enclosure Types



IP66/NEMA 4X Outdoor
Non-switched



IP66/NEMA 4X Outdoor
Switched



IP20

EMC Filter



Internal EMC Filter



No Internal EMC Filter



| Size | 1 | 2 | 3 | 4 | 5 |
|-----------|------|------|------|------|------|
| mm Height | 173 | 221 | 261 | 420 | 486 |
| mm Width | 83 | 110 | 131 | 171 | 222 |
| mm Depth | 123 | 150 | 175 | 212 | 226 |
| kg Weight | 1 | 1.7 | 3.2 | 9.1 | 21.1 |
| Fixings | 4xM5 | 4xM5 | 4xM5 | 4xM8 | 4xM8 |



| Size | 1 | 2 | 3 | 4 |
|-----------|------|------|------|------|
| mm Height | 232 | 257 | 310 | 360 |
| mm Width | 161 | 188 | 211 | 240 |
| mm Depth | 162 | 182 | 235 | 271 |
| kg Weight | 2.3 | 3.5 | 6.6 | 9.5 |
| Fixings | 4xM4 | 4xM4 | 4xM4 | 6xM4 |

Drive Specification

| | | | | | | | | | |
|--------------------|---------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Input Ratings | Supply Voltage | 110 – 115V ± 10% 200 – 240V ± 10% 380 – 480V ± 10% | Programming | Keypad | Built-in keypad as standard Optional remote mountable keypad | I/O Specification | Power Supply | 24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer | |
| | Supply Frequency | 48 – 62Hz | | Display | 7 Segment LED | | Programmable Inputs | 4 Total 2 Digital 2 Analog / Digital selectable | |
| | Displacement Power Factor | > 0.98 | | PC | OptiTools Studio | | Digital Inputs | 8 – 30 Volt DC, internal or external supply Response time < 4ms | |
| | Phase Imbalance | 3% Maximum allowed | | Control Specification | Control Method | | Sensorless Vector Speed Control PM Vector Control BLDC Control Synchronous Reluctance | Analog Inputs | Resolution: 12 bits Response time: < 4ms Accuracy: ± 2% full scale Parameter adjustable scaling and offset |
| | Inrush Current | < rated current | | | PWM Frequency | | 4–32kHz Effective | Programmable Outputs | 2 Total 1 Analog / Digital 1 Relay |
| | Power Cycles | 120 per hour maximum, evenly spaced | | | Stopping Mode | | Ramp to stop: User Adjustable 0.1–600 secs Coast to stop | Relay Outputs | Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 6A AC, 5A DC |
| | Output Ratings | Output Power | | 110V 1 Ph Input: 0.5–1.5HP (230V 3 Ph Output) 230V 1 Ph Input: 0.37–7.5kW (0.5–10HP) 230V 3 Ph Input: 0.37kW–18.5kW (0.5–25HP) 460V 3 Ph Input: 0.5–30HP | Fieldbus | | Skip Frequency | Single point, user adjustable | Application Features |
| Overload Capacity | | 150% for 60 Seconds 175% for 2.5 seconds | Braking | Motor Flux Braking Built-in braking transistor (not frame size 1) | | Fire Mode | Bidirectional Selectable Speed Setpoint (Fixed / PI / Analog / Fieldbus) | | |
| Output Frequency | | 0 – 500Hz, 0.1Hz resolution | Setpoint Control | Analog Signal 0 to 10 Volts 10 to 0 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA | | Maintenance & Diagnostics | Fault Memory | Last 4 Trips stored with time stamp | |
| Acceleration Time | | 0.01 – 600 seconds | Digital | Motorised Potentiometer (Keypad) Modbus RTU CANopen EtherNet/IP | | | Data Logging | Logging of data prior to trip for diagnostic purposes: Output Current Drive Temperature DC Bus Voltage | |
| Deceleration Time | | 0.01 – 600 seconds | Built-in | CANopen 125–1000 kbps Modbus RTU 9.6–115.2 kbps selectable | | | Monitoring | Hours Run Meter | |
| Typical Efficiency | | > 98% | Optional Built-in Modules IP66/NEMA4X Only | Ethernet IP (factory fit, consult factory for details) Modbus TCP (factory fit, consult factory for details) | | Standards Compliance | Low Voltage Directive | Adjustable speed electrical power drive systems. EMC requirements | |
| Ambient Conditions | Temperature | Storage: –40 to 60°C Operating: –10 to 50°C (14 to 122°F) IP20 –20 to 40°C (–14 to 104°F) IP66 | Optional External Modules IP20 Only (see page 10) | Ethernet IP Modbus TCP | EMC Directive | | 2014/30/EU Cat C1 according to EN61800-3:2004 | | |
| | Altitude | Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL) | Enclosure | Ingress Protection | IP20, IP66/NEMA 4X | | Machinery Directive | 2006/42/EC | |
| | Humidity | 95% Max, non condensing | | | | Conformance | CE, UL, RCM | | |
| | Vibration | Conforms to EN61800-5-1 | | | | | | | |

Pump control in swimming pools & spas

Single Phase Motor Control for Permanent Split Capacitor & Shaded-Pole Motors

IP20

IP66/NEMA 4X

Up to 1.5HP/1.1kW

Key Features

- ✓ 110–115V and 200–240V models
- ✓ Small mechanical envelope
- ✓ Rugged industrial operation
- ✓ Fast setup, and simple operation with 14 basic parameters
- ✓ Unique motor control strategy optimised for single phase motors
- ✓ Motor current and rpm indication
- ✓ Built in PI control, EMC filter (C1) & brake chopper
- ✓ Application macros for industrial, fan and pump operation
- ✓ Bluetooth® connectivity

Modbus RTU
CAN

On-board as standard

150% overload for 60 secs
(175% for 2 secs)



Simple airflow control

Dedicated to Single Phase Motor Control

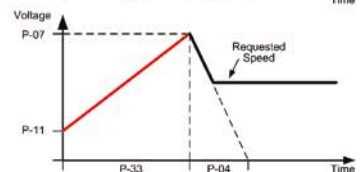
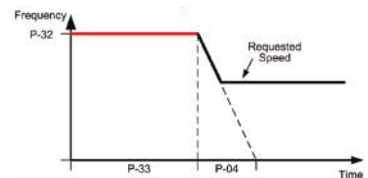
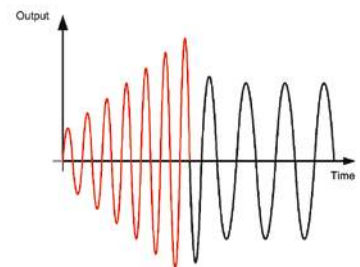
Designed to be cost effective and easy to use, the Optidrive E3 for Single Phase Motors is for use with PSC (Permanent Split Capacitor) or Shaded-Pole Single Phase induction motors.

Optidrive E3 for Single Phase Motors uses a revolutionary motor control strategy to achieve reliable intelligent starting of single phase motors.

- Removes the need for 3 phase supply wiring
- Provides the same performance features as the 3 phase Optidrive E3
- The ideal energy saving solution where high starting torque is not required – typically including fans, blowers, centrifugal pumps, fume extractors and air flow controllers

Special Boost Phase

To ensure reliable starting of single phase motors, the drive initially ramps the motor voltage up to rated voltage whilst maintaining a fixed starting frequency, before reducing the frequency and voltage to the desired operating point.



OPTIDRIVE™

For Single Phase Motors

| kW | | | | HP | | | | Amps | | | | Size | | | | | | | | | |
|----------------------------------------|--|--|--|------|-----|-----|---|------------------------|--|--|--|------|-----|------|------------------------|--|--|--|-----|-----|------|
| 110-115V ± 10% 1 Phase Input/Output | | | | 0.37 | 0.5 | 7 | 1 | ODE - 3 - 1 1 0070 - 1 | | | | # 1 | # 1 | - 01 | ODE - 3 - 2 1 0105 - 1 | | | | # 4 | # 4 | - 01 |
| 200-240V ± 10% 1 Phase Input/Output | | | | 0.37 | 0.5 | 4.3 | 1 | ODE - 3 - 1 2 0043 - 1 | | | | # 1 | # 1 | - 01 | ODE - 3 - 1 2 0070 - 1 | | | | # 1 | # 1 | - 01 |
| | | | | 0.75 | 1 | 7 | 1 | ODE - 3 - 2 2 0105 - 1 | | | | # 4 | # 4 | - 01 | | | | | # 4 | # 4 | - 01 |

Replace # in model code with colour-coded option:

Enclosure Types



EMC Filter

| | |
|---------------------|------------------------|
| F | O |
| Internal EMC Filter | No Internal EMC Filter |

Model Code Guide:

ODE-3-120043-3F12-01

- ODE**: Product Family
- 3**: Generation
- 1**: Frame Size
- 2**: Voltage Code
- 00**: Capacity
- 43**: Supply Phases (3 Phase = 3)
- 3**: Internal EMC Filter (F = F, No Internal EMC Filter = 0)
- F**: EMC Filter
- 1**: Brake Transistor (No Internal Brake Transistor = 1)
- 2**: Enclosure Type (IP20 = 2, IP66/NEMA 4X)
- 12**: Enclosure Type (Outdoor non-switched = A, Outdoor switched = B, Indoor non-switched = X, Indoor switched = Y)
- 01**: Single Phase Output

| Size | 1 | 2 |
|-----------|------|------|
| mm Height | 173 | 221 |
| mm Width | 83 | 110 |
| mm Depth | 123 | 150 |
| kg Weight | 1 | 1.7 |
| Fixings | 4xM5 | 4xM5 |

| Size | 1 | 2 |
|-----------|------|------|
| mm Height | 232 | 257 |
| mm Width | 161 | 188 |
| mm Depth | 162 | 182 |
| kg Weight | 2.3 | 3.5 |
| Fixings | 4xM4 | 4xM4 |

| Size | 1 | 2 |
|-----------|------|------|
| mm Height | 232 | 257 |
| mm Width | 161 | 188 |
| mm Depth | 179 | 187 |
| kg Weight | 3.1 | 4.1 |
| Fixings | 4xM4 | 4xM4 |

Drive Specification

| | | | | | | | | | |
|--------------------|---------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Input Ratings | Supply Voltage | 110 – 115V ± 10% 200 – 240V ± 10% | Programming | Keypad | Built-in keypad as standard Optional remote mountable keypad | I/O Specification | Power Supply | 24 Volt DC, 100mA, Short Circuit Protected 10 Volt DC, 10mA for Potentiometer | |
| | Supply Frequency | 48 – 62Hz | | Display | 7 Segment LED | | Programmable Inputs | 4 Total 2 Digital 2 Analog / Digital selectable | |
| | Displacement Power Factor | > 0.98 | | PC | OptiTools Studio | | Digital Inputs | 8 – 30 Volt DC, internal or external supply Response time < 4ms | |
| | Phase Imbalance | 3% Maximum allowed | | Control Specification | Control Method | | V/F Voltage Energy Optimised V/F | Analog Inputs | Resolution: 12 bits Response time: < 4ms Accuracy: ± 2% full scale Parameter adjustable scaling and offset |
| | Inrush Current | < rated current | | | PWM Frequency | | 4–32kHz Effective | Programmable Outputs | 2 Total 1 Analog / Digital 1 Relay |
| | Power Cycles | 120 per hour maximum, evenly spaced | | | Stopping Mode | | Ramp to stop: User Adjustable 0.1–600 secs Coast to stop | Relay Outputs | Maximum Voltage: 250 VAC, 30 VDC Switching Current Capacity: 6A AC, 5A DC |
| | Output Ratings | Output Power | | 110V 1 Ph Input: 0.5–0.75HP 230V 1 Ph Input: 0.37–1.1kW (0.5–1.5HP) | Braking | | Motor Flux Braking Built-in braking transistor (frame size 2) | Application Features | Analog Outputs |
| Overload Capacity | | 150% for 60 Seconds 175% for 2.5 seconds | Skip Frequency | Single point, user adjustable | PI Control | Internal PI Controller Standby / Sleep Function | | | |
| Output Frequency | | 0 – 500Hz, 0.1Hz resolution | Setpoint Control | Analog Signal | 0 to 10 Volts 10 to 0 Volts 0 to 20mA 20 to 0mA 4 to 20mA 20 to 4mA | Fire Mode | Selectable Speed Setpoint (Fixed / PI / Analog / Fieldbus) | | |
| Acceleration Time | | 0.01 – 600 seconds | | Digital | Motorised Potentiometer (Keypad) Modbus RTU CANopen EtherNet/IP | Maintenance & Diagnostics | Fault Memory | | Last 4 Trips stored with time stamp |
| Deceleration Time | | 0.01 – 600 seconds | | Fieldbus | Built-in | | CANopen 125–1000 kbps Modbus RTU 9.6–115.2 kbps selectable | | Data Logging |
| Typical Efficiency | > 98% | Optional Built-in Modules IP66/NEMA4X Only | Ethernet IP (factory fit, consult factory for details) Modbus TCP (factory fit, consult factory for details) | | Monitoring | Hours Run Meter | | | |
| Ambient Conditions | Temperature | Storage: –40 to 60°C Operating: –10 to 50°C (14 to 122°F) IP20 –20 to 40°C (–14 to 104°F) IP66 | Optional External Modules IP20 Only (see page 10) | Ethernet IP Modbus TCP | Standards Compliance | Low Voltage Directive | Adjustable speed electrical power drive systems. EMC requirements | | |
| | Altitude | Up to 1000m ASL without derating Up to 2000m maximum UL approved Up to 4000m maximum (non UL) | | | | EMC Directive | 2014/30/EU 230V 1Ph, Filtered Units : Cat C1 according to EN61800-3:2004 | | |
| | Humidity | 95% Max, non condensing | | | | Machinery Directive | 2006/42/EC | | |
| Enclosure | Ingress Protection | IP20, IP66/NEMA 4X | | | Conformance | CE, UL, RCM | | | |

Options & Accessories

OPTISTICK Smart



Optistick **OPT-3-STICK-IN**
Rapid Commissioning Tool

- Allows copying, backup and restore of drive parameters
- Provides Bluetooth interface to a PC running OptiTools Studio or the OptiTools Mobile app on a smartphone
- Onboard NFC (Near Field Communication) for rapid data transfer

Remote Keypads



Optiport 2 **OPT-2-OPOINT-IN**
Remote Keypad & LED Display

PC Connection Kit



OPT-2-USB-OBUS is a dedicated PC connection kit for all Optidrive models, allowing direct connection from the PC USB port to the drive RJ45 communication connection for use with Optitools studio software.

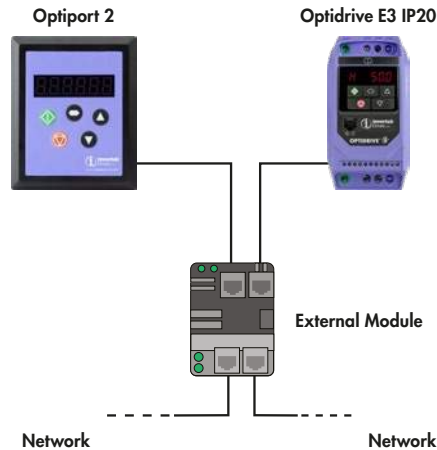
OPT-2-USB485-OBUS

EtherNet Module



EtherNet Module **OPT-2-ETHEG-IN**

- ODVA compliant EtherNet/IP Modbus Translator Device
- Compatible with all drive platforms: P2, E3 & Eco
- Integrated network switch: simplifying network architecture
- Compatible with RSLogix and CoDeSys PLCs



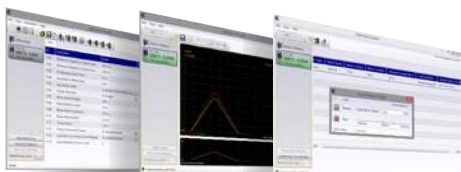
Modbus TCP Module



Modbus TCP Module **OPT-3-MTPEG-IN**

- Compatible with all drive platforms: P2, E3 & Eco
- Integrated network switch: simplifying network architecture

OptiTools Studio



Drive commissioning and parameter backup

- Real-time parameter editing
- Drive network communication
- Parameter upload, download and storage
- Simple PLC function programming
- Real-time scope function and data logging
- Real-time data monitoring

Compatible with:
Windows XP, Windows Vista & Windows 7,
Windows 8, Windows 8.1 & Windows 10

External EMC Filters, Input Chokes, Output Filters & Dynamic Braking Resistors are available



See www.invertekdrives.com for details

Proven Worldwide in Low Power Applications

Cooling loop for solar energy research

Solar Tech Lab, Italy



Chain wax development for Team Sky cycling team

Muc-Off, UK



Business-critical climate control for commercial horticulturist

Hatziminas Flowers, Greece



Chilled water pump control predicted to save AED 12385 per year

Al Jahili Fort, UAE



Efficient water circulation gives energy savings of 60% per annum

Leisure World, Australia



Pallet handling in **UK**

Olive oil decanting in **Greece**

Seed processing in **Netherlands**

Pizza making in **Belgium**

Chamfering machines in **Italy**

Machine tool OEM in **UK**

Chemical fume removal in **Singapore**

Sawmill optimisation in **UK**

Precision polishing in **Switzerland**

See www.invertekdrives.com/solutions for full case studies



Optidrive E3

✓ Low Power Applications

Dedicated to low power applications, Optidrive E3 combines innovative technology, reliability, robustness and ease of use in a range of compact IP20 & IP66/NEMA 4X enclosures.

✓ Simple Commissioning

14 parameter basic setup. Default settings suitable for most applications. Contactor style connection for simple wiring.

✓ Optidrive E3 IP66/NEMA 4X

Environmentally protected, IP66/NEMA 4X rated models can be mounted directly on your processing equipment.



✓ Washdown Ready Polycarbonate

With a sealed polycarbonate enclosure and corrosion resistant heatsink, Optidrive E3 IP66/NEMA 4X models are ideal for high-pressure washdown applications.

✓ On-drive Control

IP66/NEMA 4X models feature optional, convenient controls for speed control, REV/OFF/FWD and Power ON/OFF, complete with safety lock.

✓ Single Phase Motor Control

Optidrive E3 for Single Phase Motors provides accurate speed control of single phase PSC or shaded pole motors. Special boost phase ensures reliable starting, initially ramping the motor voltage up to rated voltage whilst maintaining a fixed starting frequency, before reducing the frequency and voltage to the desired operating point.



About Inverter Drives

- ✓ Sales, service & application support in over 80 countries
- ✓ World-class production, innovation & training facilities at UK headquarters
- ✓ Global assembly cells controlled by cloud-based manufacturing database
- ✓ ISO 14001 environmental & ISO 9001 quality management systems



www.inverterdrives.com/optidrive-e3

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INVERTEK DRIVES LIMITED UK Headquarters

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SY21 8JF

Tel: +44 (0)1938 556868
Fax: +44 (0)1938 556869
Email: sales@inverterdrives.com



SUBSTITUTION REQUEST FORM

Project: Newton Correction Facility
DOC NCF CRC Boiler Replacement

Substitution Request Number: _____

From: VHF Sales, Inc.

To: Innovative Engineers, Inc.

Date: 10/1/24

A/E Project Number: 101323

Re: Substitution Request

Specification Title: Hydronic Pumps

Description: Acceptable Manufacturers

Section: 23 21 23 Page: 2

Article/Paragraph: 2.1A /Acceptable Manufacturers

Proposed Substitution: To add Wilo as an approved manufacturer

Manufacturer: Wilo Address: W66N1253 Forward Way, Cedarburg, WI Phone: 262-204-6700

Trade Name: Hydronic Pumps Model No.: NL-HE (basemount) & IL (inline)

History: New product 2-5 years old 5-10 yrs old More than 10 years old

Differences between proposed substitution and specified product: Unit has much smaller footprint but is taller.

Point-by-point comparative data prepared by contractor and attached - REQUIRED BY A/E

Reason for not providing specified item: To be able to bid Wilo Pumps on Bid Day.

Similar Installation:

Project: Meskwaki Rec Center Architect: ISG

Address: 1644 305th Street Owner: Meskwaki Nation

Tama, IA 52339 Date Installed: 9-2022

Proposed substitution affects other parts of Work: No Yes; explain _____

Supporting Data Attached: Drawings Product Data Samples Tests Reports _____

SUBSTITUTION REQUEST FORM

(Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: Michael Skallerud

Signed by: *Michael Skallerud*

Firm: VHF Sales, Inc.

Address: 2655 SE Enterprise Drive Grimes, IA 50111

Telephone: 515-986-3671

Attachments: _____

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 3300.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 3300.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: John J Horn

Date: 10/7/24

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E _____



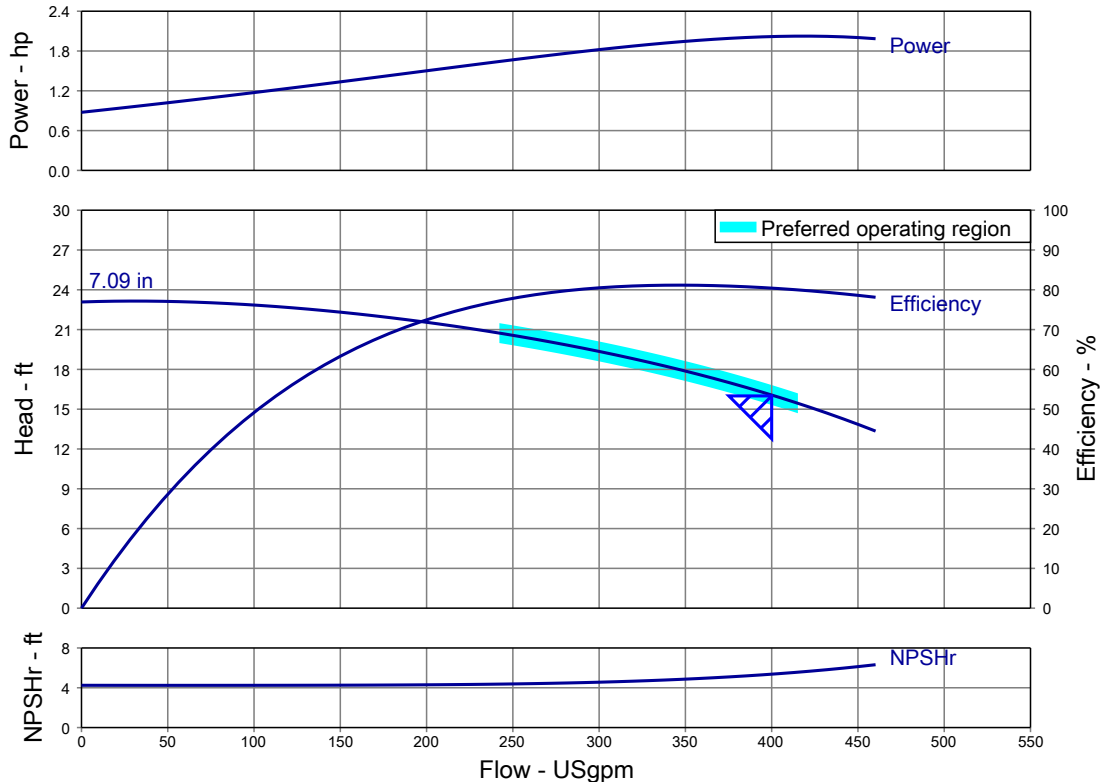
Customer :
Reference :

Pump Performance Datasheet

Wilo Quotation System 24.3.1

| | | | |
|--------------|-----------|-----------------------|------------------------|
| Item number | : 001 | Size | : NL-HE 4x3x6 |
| Service | : | Stages | : 1 |
| Quantity | : 1 | Based on curve number | : 80-160 1800 |
| Quote number | : 2359154 | Article Number | : |
| | | Date last saved | : 30 Sep 2024 12:53 PM |

| Operating Conditions | | Liquid | |
|------------------------------------------|-----------------------------|--------------------------------------|---------------------|
| Flow, rated | : 400.0 USgpm | Liquid type | : Water |
| Head, rated (requested) | : 16.00 ft | Additional liquid description | : |
| Head, rated (actual) | : 16.07 ft | Solids Diameter, required / pump max | : 0.00 in / 0.00 in |
| Suction pressure, rated / max | : 0.00 / 0.00 psi.g | Solids concentration, by volume | : 0.00 % |
| NPSH available | : Ample | Temperature | : 68.00 deg F |
| Site Supply Frequency | : 60 Hz | Fluid density | : 1.000 / 1.000 SG |
| | | Viscosity | : 1.00 cP |
| | | Vapor pressure, rated | : 0.34 psi.a |
| Performance | | Material | |
| Speed criteria | : Variable speed | Material selected | : Standard |
| Speed | : 1164 rpm | Pressure Data | |
| Impeller dia. | : 7.09 in | Maximum working pressure | : 10.02 psi.g |
| Impeller diameter, maximum | : 7.09 in | Maximum allowable working pressure | : 232.0 psi.g |
| Impeller diameter, minimum | : 5.35 in | Maximum allowable suction pressure | : N/A |
| Efficiency | : 80.42 % | Hydrostatic test pressure | : N/A |
| PEI (VL) | : - | Driver & Power Data (@Max density) | |
| NPSH required / margin required | : 5.37 / 0.00 ft | Driver sizing specification | : Maximum power |
| Ns (imp. eye flow) / Nss (imp. eye flow) | : 2,480 / 6,640 US Units | Margin over specification | : 0.00 % |
| MCSF | : - | Service factor | : 1.00 |
| Head max. | : 23.15 ft | Power, hydraulic | : 1.62 hp |
| Head rise to shutoff | : 43.65 % | Power, rated | : 2.02 hp |
| Flow, best eff. point | : 346.0 USgpm | Power, maximum | : 2.02 hp |
| Flow ratio, rated / BEP | : 115.61 % | Motor rating | : 3.00 hp / 2.24 kW |
| Diameter ratio (rated / max) | : 100.00 % | | |
| Head ratio (rated dia / max dia) | : 100.00 % | | |
| Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010] | : 1.00 / 1.00 / 1.00 / 1.00 | | |
| Selection status | : Acceptable | | |



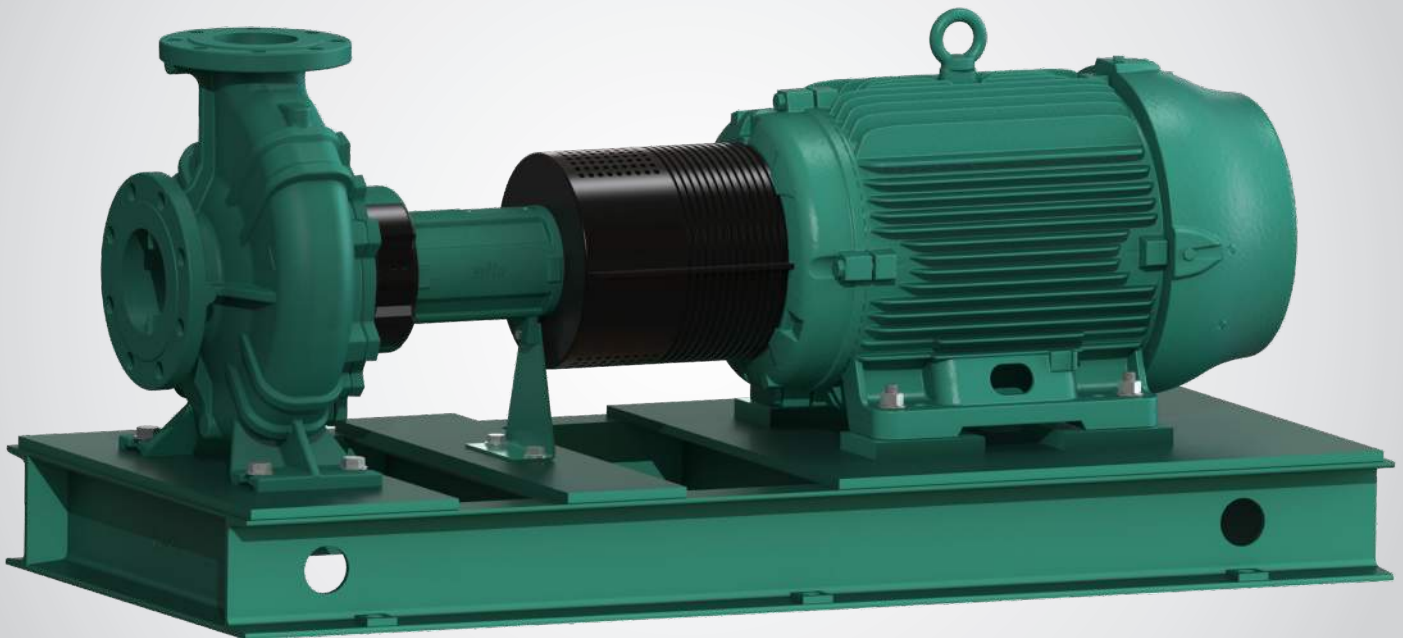
Pioneering for You

wilo®

2021 Product Brochure - 60 Hz

Wilo-NL-HE

High-Efficiency Base Mount End Suction Pumps



NL_HE_0121

High-Efficiency Base Mount End Suction Pumps

Wilo-NL-HE



Applications

- Heating and Cooling Systems
- Air Conditioning
- Municipal Water Supply
- Pressure Boosting
- Raw Water Intake
- Irrigation/Agriculture
- Industrial Process

Max Head: 475 feet

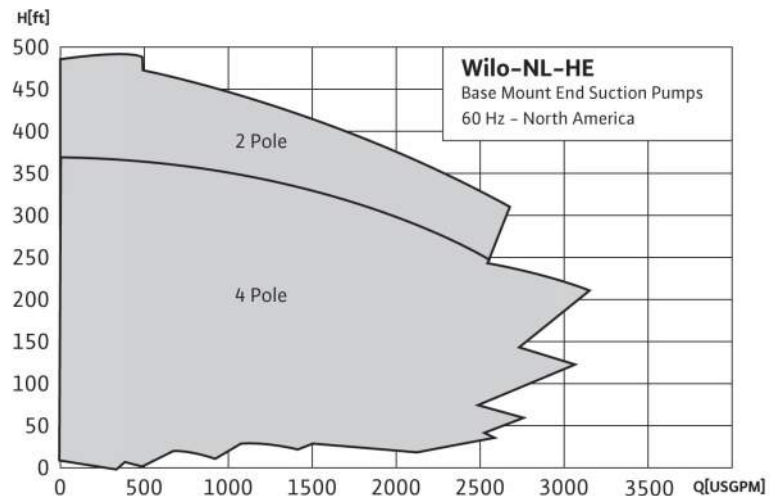
Max. Flow: 3,000 gpm

Features & Benefits

- VFD Ready
- Stainless steel impeller
- High-Efficiency
- Improved Hydraulic design
- Energy Savings
- Cathaphoretic coating of all cast iron components
- High corrosion resistance
- Long service life
- Easy maintenance
- C-channel construction welded base

Technical Data

- Temp range -4 °F to 284 °F
- ANSI Class 125
- Maximum operating pressure of 232 PSI
- Main Connection - 3~[208-230/460V, 575V] 60Hz
- EN 1.4408 (Equivalent: AISI 316) Stainless Steel Impellers
- DIN 1.4021 (Equivalent: 420) Stainless Steel Pump Shaft
- Antimony Impregnated Carbon/Silicon Carbide/EPDM (E1) Stainless Steel Spring & Body mechanical seal
- NEMA Premium Efficient Motors





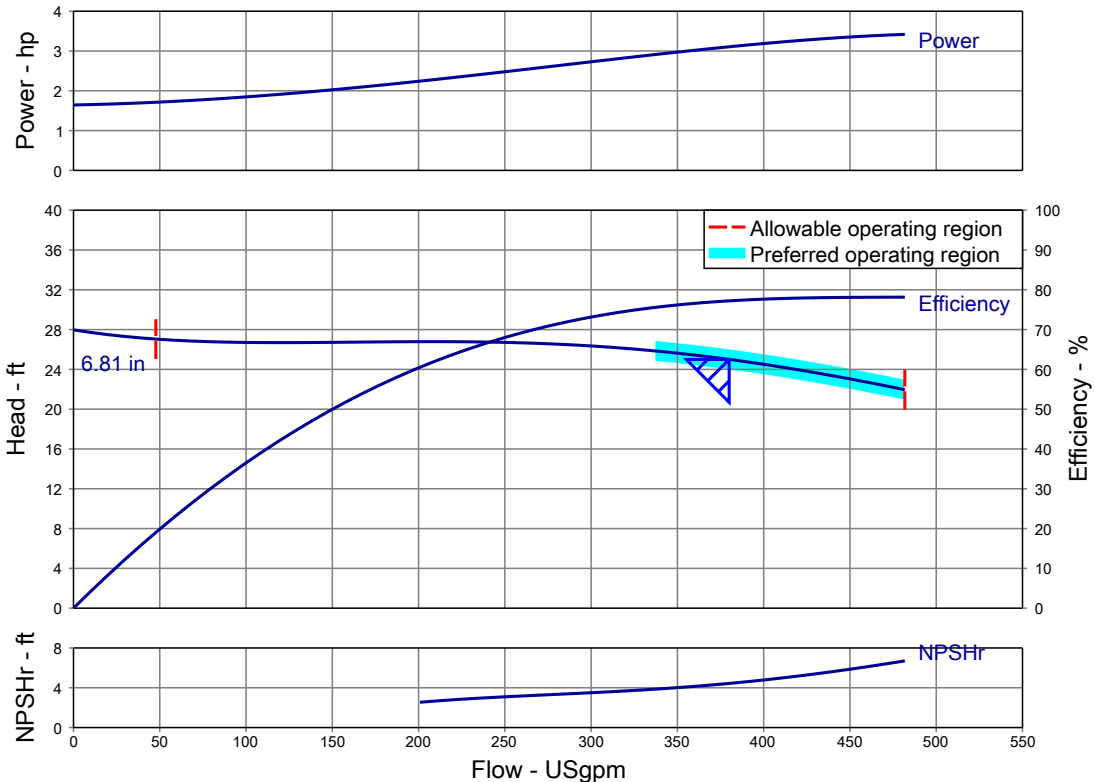
Customer :
Reference :

Pump Performance Datasheet

Wilo Quotation System 24.3.1

| | | | |
|--------------|-----------|-----------------------|------------------------------------|
| Item number | : 002 | Size | : IL4 45-610 4 3~208-230/460V TEFC |
| Service | : | Stages | : 1 |
| Quantity | : 1 | Based on curve number | : IL4 45-610 4 Rev O |
| Quote number | : 2359154 | Article Number | : 2714523 |
| | | Date last saved | : 30 Sep 2024 1:21 PM |

| Operating Conditions | | Liquid | |
|------------------------------------------|-----------------------------|--------------------------------------|---------------------|
| Flow, rated | : 380.0 USgpm | Liquid type | : Water |
| Head, rated (requested) | : 25.00 ft | Additional liquid description | : |
| Head, rated (actual) | : 25.01 ft | Solids Diameter, required / pump max | : 0.00 in / 0.00 in |
| Suction pressure, rated / max | : 0.00 / 0.00 psi.g | Solids concentration, by volume | : 0.00 % |
| NPSH available | : Ample | Temperature | : 68.00 deg F |
| Site Supply Frequency | : 60 Hz | Fluid density | : 1.000 / 1.000 SG |
| | | Viscosity | : 1.00 cP |
| | | Vapor pressure, rated | : 0.34 psi.a |
| Performance | | Material | |
| Speed criteria | : Variable speed | Material selected | : Standard |
| Speed | : 1351 rpm | | |
| Impeller dia. | : 6.81 in | Pressure Data | |
| Impeller diameter, maximum | : 6.81 in | Maximum working pressure | : 12.11 psi.g |
| Impeller diameter, minimum | : 6.81 in | Maximum allowable working pressure | : 175.0 psi.g |
| Efficiency | : 77.22 % | Maximum allowable suction pressure | : N/A |
| PEI (VL) | : - | Hydrostatic test pressure | : N/A |
| NPSH required / margin required | : 4.44 / 0.00 ft | Driver & Power Data (@Max density) | |
| Ns (imp. eye flow) / Nss (imp. eye flow) | : 2,923 / 7,120 US Units | Driver sizing specification | : Maximum power |
| MCSF | : 47.73 USgpm | Margin over specification | : 0.00 % |
| Head max. | : 27.97 ft | Service factor | : 1.00 |
| Head rise to shutoff | : 11.86 % | Power, hydraulic | : 2.40 hp |
| Flow, best eff. point | : 481.8 USgpm | Power, rated | : 3.11 hp |
| Flow ratio, rated / BEP | : 78.87 % | Power, maximum | : 3.42 hp |
| Diameter ratio (rated / max) | : 100.00 % | Motor rating | : 5.00 hp / 3.73 kW |
| Head ratio (rated dia / max dia) | : 100.00 % | | |
| Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010] | : 1.00 / 1.00 / 1.00 / 1.00 | | |
| Selection status | : Acceptable | | |



Wilo IL
Inline Centrifugal Circulators

Product Brochure

Extended Range for 2013!



Wilo IL

Inline Centrifugal Circulators

Applications Include:

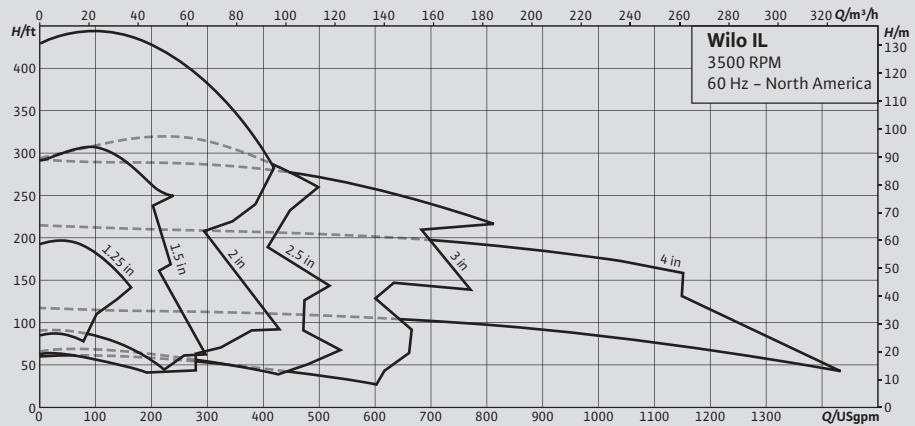
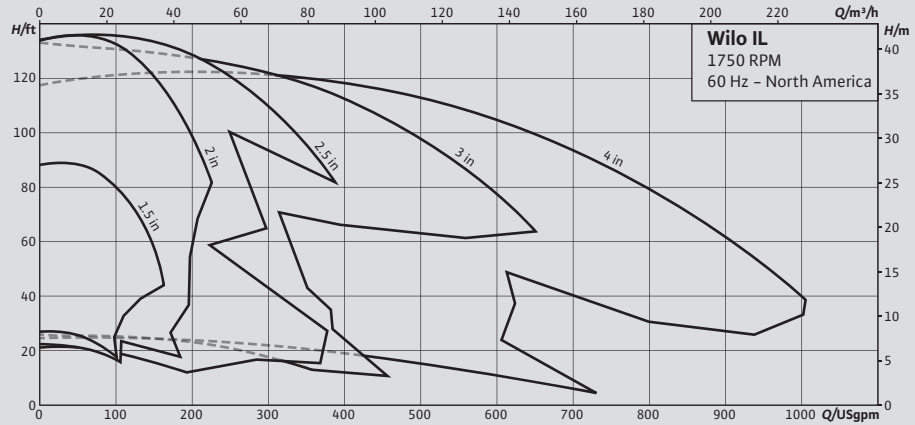
- » Hot water heating systems
- » Closed cooling circuits
- » Solar Systems
- » Air conditioning systems
- » Industrial circulation systems
- » Geothermal Systems

WILO IL



Extended Range for 2013!

- » Available in 1¼" to 4" flange sizes
- » NEMA frame inverter Baldor motors
- » Flows up to 1600 USGPM
- » Heads up to 220'
- » Trimmable bronze impeller
- » Cast iron volute
- » Industrial quality bellows style mechanical seal
- » Pumps are typically shipped within 24 hours!
- » Integrated suction straightening vane
- » Optional seals available
- » Short flange to flange dimensions
- » Volute legs drilled and tapped for mounting
- » All fasteners SAE
- » Jack screws for easy disassembly
- » Suction and discharge pressure gauge tappings with square head plugs



WILO USA LLC

Toll-Free: 866-945-6872
Web: www.wilo-usa.com
Email: info@wilo-usa.com

WILO Canada Inc.

Toll-Free: 866-945-6236
Web: www.wilo-canada.com
Email: info@wilo-canada.com



wilo®

TORUS 4000 DUAL FUEL

Category II or Category IV Appliance

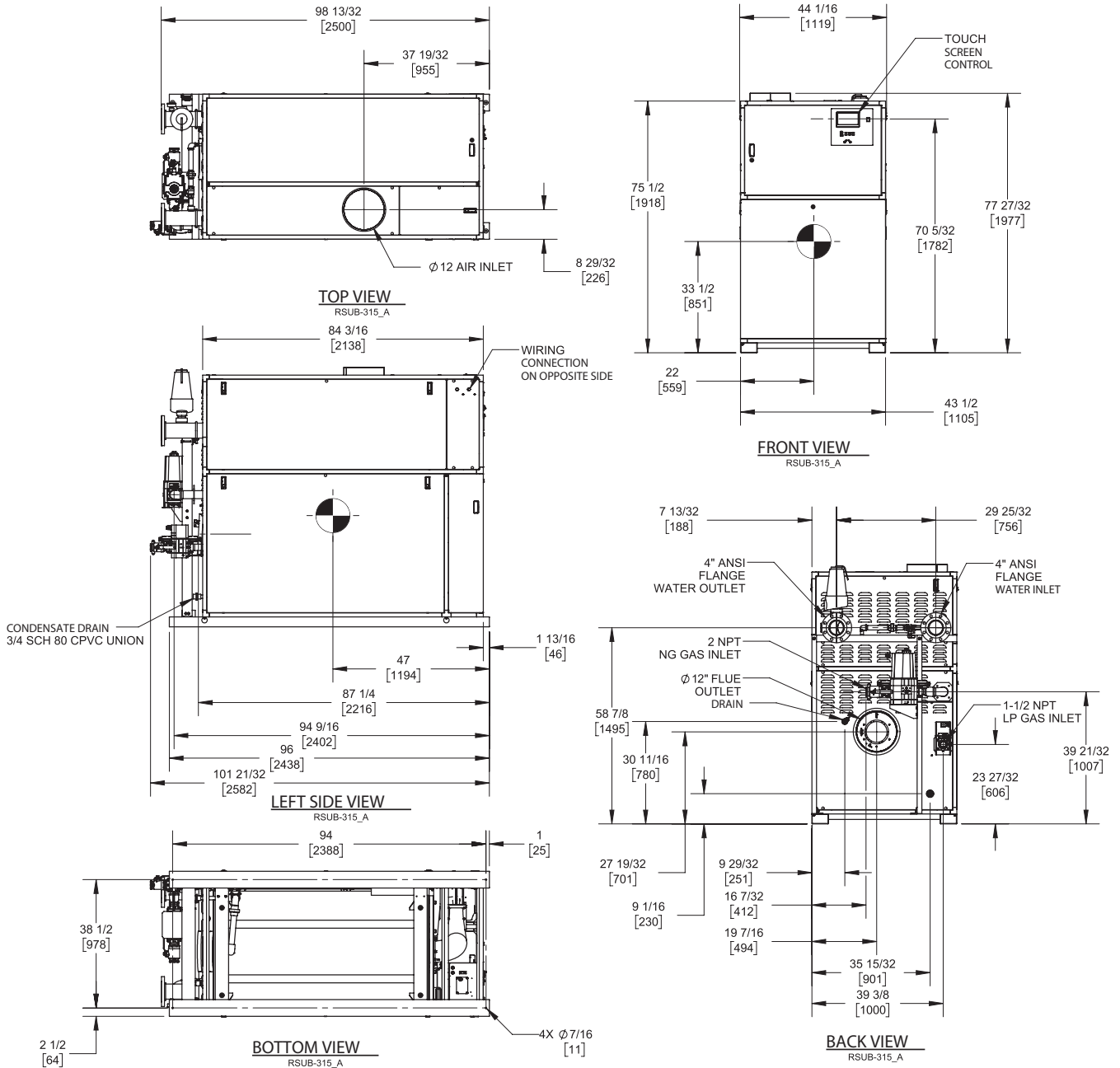
(see Installation and Operation Manual for venting information)

CODE OPTIONS

CSD-1

FIRMWARE W/REMOTE TEST
MANUAL RESET LWCO

INDOOR UNIT



Notes:

1. Dimensions are approximate and should not be used to "rough-in" equipment.
2. Dimensions are subject to change without notice.
3. All dimensions are in inches (mm).
4. ⦿ Symbol indicates center of gravity.

BOILER CERTIFIED RATINGS & CAPACITIES

| | | | |
|--------------------------------|---------------------|-----------------------------------|--------------------|
| Fuel Type | Natural/Propane Gas | Boiler FLA | 19.9* |
| Input BTU/hr. | 4,000,000 / 1172kW | Boiler HP | 116.52 |
| Output BTU/hr. | 3,900,000 / 1143kW | Min. Gas Pressure Required | 4"W.C. |
| Electrical Requirements | 230 VAC/60 Hz/3PH | Max. Gas Pressure Allowed | 14" W.C. |
| | | Operating Weight | 2866 lbs / 1300 kg |

BOILER TRIM & CONTROLS

| | | | |
|--------------------------|-----------|----------------------------|-------------------------------|
| Main Gas Valve | Dungs MBC | Air Switch | Huba |
| Firing Valve | 2" Apollo | Flow Switch | SIKA |
| Ignition Control | Fenwal | Blocked Flue Switch | Cleveland NS2 |
| Operating Control | HeatNet® | Blower Motor | Ametek |
| High Limit | Jumo | L.W.C.O. | 800 |
| Main Ball Valve | 2" Apollo | Relief Valve (WB) | 1" x 1 1/2" set @ 50 psi |
| | | Relief Valve (WW) | 1 1/2" x 1 1/2" set @ 125 psi |

Pump contactor strongly recommended for water heater applications.

A.S.M.E.

| | | | |
|--------------------------------|-------------------------------|---------------------|--------------------------|
| ASME Sect IV Fire Side | 402.93 Sq. Ft. / 37.43 Sq. M. | Design Data | Max. 160 psig & 210°F |
| Htg Surface | | Water Volume | 41.3 gal. / 156.3 Liters |
| ASME Sect IV Water Side | 371.25 Sq. Ft. / 34.49 Sq. M. | pH Level | 6.5-8.5 |
| Htg Surface | | | |

* Add circulator amps.

BOILER TEMPERATURE RISE / PRESSURE DROP (Based on Full Input)

| 20°F / 11.1°C | | | | 30°F / 16.7°C | | | | 40°F / 22.2°C | | | | 50°F / 27.8°C | | | | 60°F / 33.3°C | | | |
|---------------|------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|-----|---------------|------|---------------|-----|---------------|------|
| Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | |
| GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa |
| 390.2 | 24.6 | 26.0 | 77.7 | 260.1 | 16.4 | 11.5 | 34.5 | 195.1 | 12.3 | 6.5 | 19.3 | 156.1 | 9.8 | 4.7 | 14.0 | 130.1 | 8.2 | 3.7 | 10.9 |

| Flow GPM (Boiler) | | Temp. Rise (°F) (Boiler**) | | Vent Length (Equiv. Ft.) | | Air Inlet Length (Equiv. Ft.) | |
|-------------------|-------|----------------------------|-----|--------------------------|-----|-------------------------------|-----|
| Min | Max | Min | Max | Min | Max | Min | Max |
| 130.1 | 390.2 | 20 | 60 | 12 | 160 | 0 | 160 |


** Min/Max delta t reflects boiler operation at full input. For applications requiring operation above/below these parameters please consult factory.

WATER HEATER HOURLY RECOVERY CAPACITY (GPH & LPH)

| 40°F | 22°C | 60°F | 33°C | 80°F | 44°C | 100°F | 56°C | 120°F | 67°C | 140°F | 78°C |
|-------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| 11765 | 44471 | 7843 | 29647 | 5882 | 22235 | 4706 | 17788 | 3922 | 14824 | 3361 | 12706 |

Water Heater Min Flow Rates

| Normal (4 to 12) gpg | | | | Hard (12 to 15) gpg | | | |
|----------------------|------|---------------|------|---------------------|------|---------------|------|
| Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | |
| gpm | L/s | Ft | kPa | gpm | L/s | Ft | kPa |
| 294.7 | 18.6 | 14.8 | 44.2 | 392.9 | 24.8 | 26.4 | 78.9 |

| | | |
|---------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| REP FIRM | _____ | <h1 style="margin: 0;">TORUS 4000 DUAL FUEL</h1> <p style="margin: 0;">Category II or Category IV Appliance (see Installation and Operation Manual for venting information)</p>  <p style="margin: 0;">A Division of Mestek, Inc. Westfield, MA 01085 (413) 564-5515</p> |
| SUBMITTED BY | _____ | |
| JOB NAME | _____ | |
| ARCHITECT | _____ | |
| ENGINEER | _____ | |
| CONTRACTOR | _____ | |
| DATE | _____ | |

TORUS 4000 DUAL FUEL

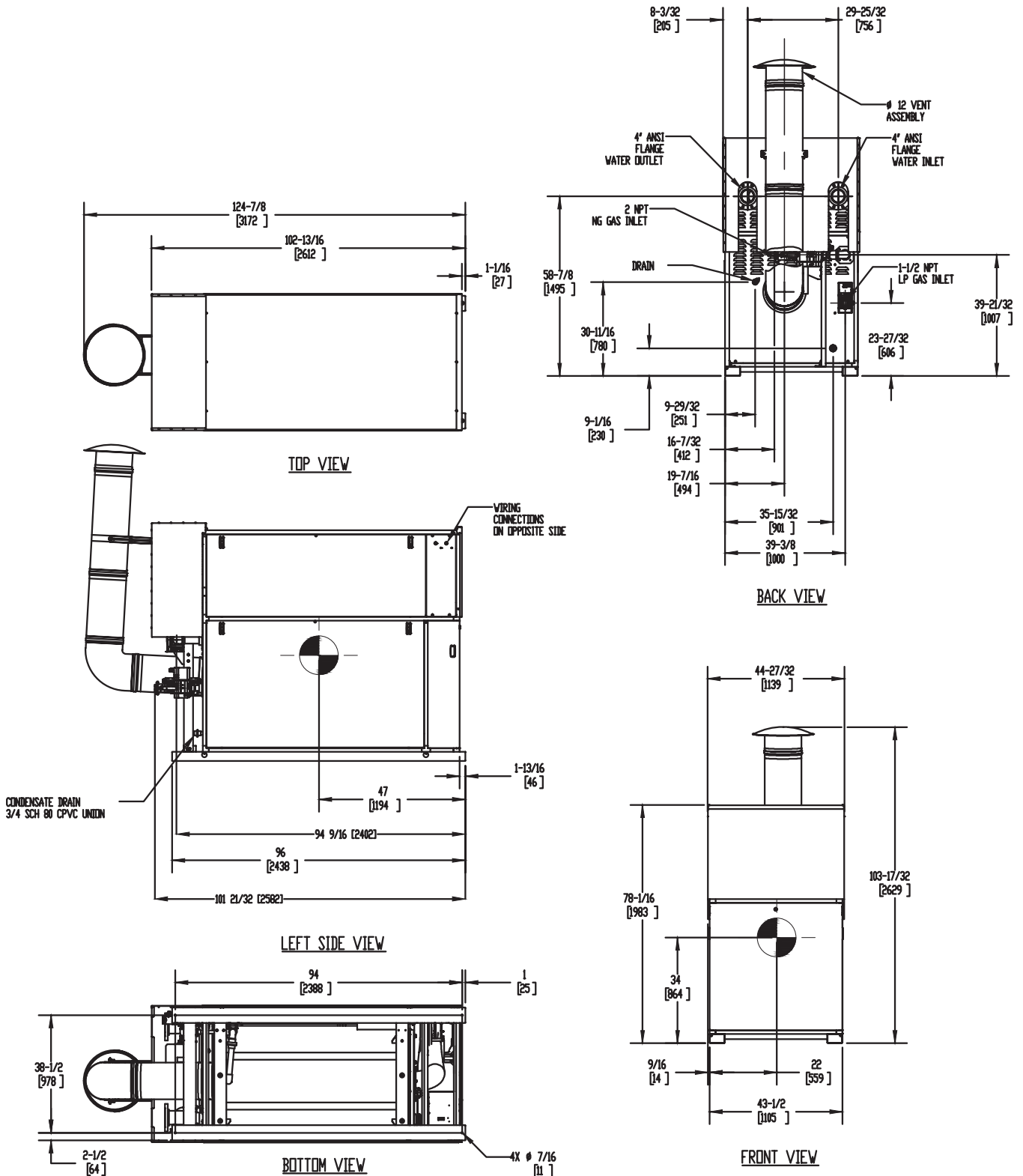
Category II or Category IV Appliance

(see Installation and Operation Manual for venting information)

CODE OPTIONS

| | |
|-------|---------------------------------------------|
| CSD-1 | FIRMWARE W/REMOTE TEST MANUAL RESET LWCO |
|-------|---------------------------------------------|

OUTDOOR UNIT



Notes:

1. Dimensions are approximate and should not be used to "rough-in" equipment.
2. Dimensions are subject to change without notice.
3. All dimensions are in inches (mm).
4. Symbol indicates center of gravity.

BOILER CERTIFIED RATINGS & CAPACITIES

| | | | |
|--------------------------------|---------------------|-----------------------------------|--------------------|
| Fuel Type | Natural/Propane Gas | Boiler FLA | 19.9* |
| Input BTU/hr. | 4,000,000 / 1172kW | Boiler HP | 116.52 |
| Output BTU/hr. | 3,892,000 / 1141kW | Min. Gas Pressure Required | 4"W.C. |
| Electrical Requirements | 230 VAC/60 Hz/3PH | Max. Gas Pressure Allowed | 14" W.C. |
| | | Operating Weight | 2866 lbs / 1300 kg |

BOILER TRIM & CONTROLS

| | | | |
|--------------------------|-----------|----------------------------|-------------------------------|
| Main Gas Valve | Dungs MBC | Air Switch | Huba |
| Firing Valve | 2" Apollo | Flow Switch | SIKA |
| Ignition Control | Fenwal | Blocked Flue Switch | Cleveland NS2 |
| Operating Control | HeatNet® | Blower Motor | Ametek |
| High Limit | Jumo | L.W.C.O. | 800 |
| Main Ball Valve | 2" Apollo | Relief Valve (WB) | 1" x 1 1/2" set @ 50 psi |
| | | Relief Valve (WW) | 1 1/2" x 1 1/2" set @ 125 psi |

Pump contactor strongly recommended for water heater applications.

A.S.M.E.

| | | | |
|--------------------------------|-------------------------------|---------------------|--------------------------|
| ASME Sect IV Fire Side | 402.93 Sq. Ft. / 37.43 Sq. M. | Design Data | Max. 160 psig & 210°F |
| Htg Surface | | Water Volume | 41.3 gal. / 156.3 Liters |
| ASME Sect IV Water Side | 371.25 Sq. Ft. / 34.49 Sq. M. | pH Level | 6.5-8.5 |
| Htg Surface | | | |

* Add circulator amps.

BOILER TEMPERATURE RISE / PRESSURE DROP (Based on Full Input)

| 20°F / 11.1°C | | | | 30°F / 16.7°C | | | | 40°F / 22.2°C | | | | 50°F / 27.8°C | | | | 60°F / 33.3°C | | | |
|---------------|------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|-----|---------------|------|---------------|-----|---------------|------|
| Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | | Flow Rate | | Pressure Drop | |
| GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa | GPM | L/s | Ft | kPa |
| 389.4 | 24.6 | 25.9 | 77.4 | 259.6 | 16.4 | 11.5 | 34.4 | 194.7 | 12.3 | 6.4 | 19.2 | 155.7 | 9.8 | 4.7 | 13.9 | 129.8 | 8.2 | 3.7 | 10.9 |

| Flow GPM (Boiler) | | | | Temp. Rise (°F) (Boiler**) | | | | Vent Length (Equiv. Ft.) | | | | Air Inlet Length (Equiv. Ft.) | | | |
|-------------------|--|-------|--|----------------------------|--|-----|--|--------------------------|--|-----|--|-------------------------------|--|-----|--|
| Min | | Max | | Min | | Max | | Min | | Max | | Min | | Max | |
| 129.8 | | 389.4 | | 20 | | 60 | | 12 | | 160 | | 0 | | 160 | |

** Min/Max delta t reflects boiler operation at full input. For applications requiring operation above/below these parameters please consult factory.

WATER HEATER HOURLY RECOVERY CAPACITY (GPH & LPH)

| | | | | | | | | | | | |
|-------|-------|------|-------|------|-------|-------|-------|-------|-------|-------|-------|
| 40°F | 22°C | 60°F | 33°C | 80°F | 44°C | 100°F | 56°C | 120°F | 67°C | 140°F | 78°C |
| 11765 | 44471 | 7843 | 29647 | 5882 | 22235 | 4706 | 17788 | 3922 | 14824 | 3361 | 12706 |

Water Heater Min Flow Rates

| Normal (4 to 12) gpg | | | | | | | | Hard (12 to 15) gpg | | | | | | | |
|----------------------|--|------|--|---------------|--|------|--|---------------------|--|------|--|---------------|--|------|--|
| Flow Rate | | | | Pressure Drop | | | | Flow Rate | | | | Pressure Drop | | | |
| gpm | | L/s | | Ft | | kPa | | gpm | | L/s | | Ft | | kPa | |
| 294.7 | | 18.6 | | 14.8 | | 44.2 | | 392.9 | | 24.8 | | 26.4 | | 78.9 | |

REP FIRM _____
SUBMITTED BY _____
JOB NAME _____
ARCHITECT _____
ENGINEER _____
CONTRACTOR _____
DATE _____

TORUS 4000 DUAL FUEL

Category II or Category IV Appliance
 (see Installation and Operation Manual for venting information)



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