CITY OF DE PERE

PROJECT
22-18

COMMUNITY CENTER CIRCULATING PUMP REPLACEMENT

BID DATE:
MAY 19, 2022
@ 1:00 PM

Bid documents, including plans and specifications, are available for download at www.QuestCDN.com. The QuestCDN website can also be accessed through the City website at www.deperewi.gov/projects or by pressing the *Projects* icon at the bottom of any City website page. Download cost is $15 for each contract. Bidders will be charged an additional fee of $30 to submit a bid electronically. Bidding documents may be viewed on the QuestCDN website or at the Municipal Service Center, 925 S. Sixth Street, De Pere, WI 54115.

Bid Tabs must be verified by staff prior to posting and will be available for viewing on the website within 7 days following the bid opening. Award information will be pending until approved by the Common Council.

SECTION 00 01 10

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APRIL 29, 2022 – MAY 6, 2022

CITY OF DE PERE

ADVERTISEMENT TO BID

PROJECT 22-18

COMMUNITY CENTER CIRCULATING PUMP REPLACEMENT

Online bids will be received and accepted for Project 22-18 Community Center Circulating Pump Replacement via the online electronic bidding service through QuestCDN.com, until 1:00 PM, Thursday, May 19, 2022, at which time they will be publicly accepted, displayed and read aloud.

Project 22-18 for which proposals are being sought includes the demolition and installation of hot water circulation pumps, replace boiler pumps, remove water softener, and relocate domestic hot water heater.

Complete digital project bidding documents are available for viewing and/or downloading at www.QuestCDN.com or may be examined at the office of the Director of Public Works. Digital plan documents may be downloaded for $15 by inputting Quest project #8193714 on Quest's Project Search page. Project documents must be downloaded from QuestCDN which will add your company to the Planholder List and allow access to vBid online bidding for the submittal of your bid. Bidders will be charged an additional fee of $30 to submit a bid electronically. The QuestCDN website can also be accessed through the City website at www.deperewi.gov/projects or by pressing the *Projects* icon at the bottom of any City website page. Contact QuestCDN Customer Support at 952-233-1632 or info@questcdn.com for assistance in membership registration, downloading digital project information and vBid online bid submittal questions.

Each proposal shall be accompanied by a bid bond in an amount equal to five percent (5%) of the bid, payable to the City of De Pere, as a guarantee that if the bid is accepted, the bidder will execute a contract and furnish a contract bond as set forth in the General Conditions of the City of De Pere. In case the bidder fails to file such contract and bond, the amount of the bid bond shall be forfeited to the City of De Pere as liquidated damages.

An optional pre-bid meeting will be held on Tuesday, May 12, 2022 at 9:00 AM CST. Prospective bidders, subcontractors, and suppliers wishing to attend should meet at Community Center (Upper Level), 600 Grant Street, De Pere, WI 54115.

The letting of the contract is subject to the provisions of the following Wisconsin Statutes:

Section 62.15 regarding Public Works.

Section 66.0901(3) regarding Prequalification of Contractor.

Each bidder shall pre-qualify by submitting proof of responsibility on forms furnished by the Director of Public Works. Such forms shall be filed with the Director of Public Works no later than 4:00 PM, Monday, May 16, 2022. Prospective bidders who have previously submitted such forms subsequent to January 1, 2022 will not be required to separately submit such form for this project.

The City of De Pere reserves the right to reject any or all bids, to waive any informalities in bidding and to accept any proposal which the Common Council deems most favorable to the interest of the City of De Pere.

Dated this 29th day of April 2022.

Board of Public Works
City of De Pere
Eric Rakers, P.E.
City Engineer

Project 22-18

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

1.1 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

None

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.1 Complete sets of the Bidding documents in the number and for the deposit sum, if any, stated in the Advertisement to Bid may be obtained as stated in the Advertisement for bids.

2.2 Complete sets of Bidding Documents shall be used in preparing Bids; Owner does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.3 Owner, in providing the Bidding Documents on the terms stated in the Advertisement for Bids, does so only for the purpose of obtaining Bids for the Work and does not confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.1 In accordance with Section 66.0901(3), each bidder shall pre-qualify by submitting proof of responsibility on forms furnished by the Director of Public Works. Such forms shall be filed with the Director of Public Works as stated in the Advertisement for Bids. Prospective bidders who have previously submitted such forms after January 1st of this year will not be required to separately submit such form for this project.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA AND SITE

4.1 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in the General Conditions.

4.2 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

A. An optional pre-bid meeting will be held on Thursday, May 12, 2022 at 9:00 AM CST. Prospective bidders, subcontractors, and suppliers wishing to attend should meet at Community Center (Upper Level), 600 Grant Street, De Pere, WI 54115.

4.3 Reference is made to Section 01 10 00: Summary of Work, for work that will be completed and for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other portions thereof related to price) for such other work.

4.4 It is the responsibility of each Bidder before submitting a Bid to:

A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. Obtain and carefully study (or accept consequences of not doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

E. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

F. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

G. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

H. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies, that bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

I. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.5 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and, procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – SITE AND OTHER AREAS

5.1 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 6 – INTERPRETATIONS AND ADDENDA

6.1 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

6.2 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner and Engineer.

ARTICLE 7 – BID SECURITY

7.1 A Bid shall be accompanied by Bid security made payable to Owner in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified check or bank money order or Bid bond (on the form attached) issued by a surety meeting the requirements of the General Conditions. Submittal of a Bid Bond on a form other than the Bid Bond form included in the Bidding Documents may be cause for rejection of Bid. The fully executed bid bond must be uploaded into QuestCDN. If the bidder elects to furnish bid security other than a bid bond, the bid security must be submitted in a sealed envelope enclosed in a separate package plainly marked on the outside with the notation "BID SECURITY" along with the project number and name and addressed to the Board of Public Works of the City of De Pere, Municipal Service Center, 925 S. Sixth Street, De Pere, WI

54115 **prior to the deadline for submission of bids.**

7.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within fifteen (15) days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner per the General Conditions.

7.3 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 8 – CONTRACT TIMES

8.1 The number of days within which, or the dates by which, Milestones are to be achieved and the Work is to be substantially completed and ready for final payment are set forth in the Bid Form and Summary of Work.

ARTICLE 9 – LIQUIDATED DAMAGES

9.1 Provisions for liquidated damages are set forth in the General Conditions.

ARTICLE 10 – SUBSTITUTE AND "OR-EQUAL" ITEMS

10.1 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Bid Form and Summary of Work.

ARTICLE 11 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.1 The Bidder shall submit with the Bid to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

11.2 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposed to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner subject to revocation of such acceptance after the Effective Date of the Agreement.

11.3 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 12 – PREPARATION OF BID

12.1 The Bid form is included with the Bidding documents.

12.2 All blanks on the Bid Form shall be completed by printing in ink or by typewrite and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each alternative, and unit price item listed therein, or the words “No Bid,” “No Change,” or “Not Applicable” entered.

12.3 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporations shall be shown below the seal.

12.4 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

12.5 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

12.6 A Bid by an individual shall show the Bidder’s name and official address.

12.7 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

12.8 All names shall be typed or printed in ink below the signatures.

12.9 The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

12.10 The address and telephone number for communications regarding the Bid shall be shown.

12.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 13 – BASIS OF BID; COMPARISON OF BIDS

13.1 Unit Price

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid Schedule.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accord with the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

ARTICLE 14 – SUBMITTAL OF BID

14.1 A Bid shall be submitted no later than date and time prescribed and at place indicated in Advertisement for Bids and shall be submitted electronically using the QuestCDN online bidding vBid platform. No paper bids will be accepted.

14.2 See Bid Form for a list of documents typically required to be submitted with the Bid.

ARTICLE 15 – MODIFICATION AND WITHDRAWAL OF BID

15.1 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

15.2 If within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 16 – OPENING BIDS

16.1 Bids will be opened as indicated in the Advertisement to Bid. The bid opening can be viewed live via the GoToMeeting information shown below. An abstract of the amounts of the base bids and major alternatives, if any, will be made available to bidders after opening the bids.

The bid opening can be viewed live via GoToMeeting as follows:
Please join my meeting from your computer, tablet or smartphone.

https://meet.goto.com/784419653

You can also dial in using your phone.
(For supported devices, tap a one-touch number below to join instantly.)

United States (Toll Free): 1 877 309 2073
- One-touch: tel:+18773092073,,784419653#

Access Code: 784-419-653

Get the app now and be ready when your first meeting starts: https://meet.goto.com/install

ARTICLE 17 – BIDS REMAIN SUBJECT TO ACCEPTANCE

17.1 All bids will remain subject to acceptance for the period of time stated in the General Conditions, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18 – EVALUATION OF BIDS AND AWARD OF CONTRACT

18.1 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

18.2 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

18.3 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

18.4 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Supplier, and other individuals or entities proposed for those portions of the Work for which the identify of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

18.5 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

18.6 Bidder agrees to waive any claim it has or may have against the Owner and the respective employees arising out of or in connection with the administration, evaluation or recommendation of any Bid.

18.7 If the Contract is to be awarded, Owner will award the Contract to the lowest responsible responsive Bidder whose Bid is in the best interests of the Project.

ARTICLE 19 – CONTRACT SECURITY AND INSURANCE

19.1 The General Conditions set forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds and a certificate of insurance.

ARTICLE 20 – SIGNING OF AGREEMENT

20.1 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within ten (10) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten (10) days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of Drawings with appropriate identification.

END OF SECTION

SECTION 00 41 13

CITY OF DE PERE

BID FORM

PROJECT 22-18

This bid, submitted by the undersigned Bidder to the City of De Pere, in accordance with the Advertisement to Bid, which will be received until 1:00 PM, Thursday May 19, 2022 is to furnish and deliver all materials, and to perform and do all work on the project designated per Section 01 10 00 Summary of Work.

Bidder has examined and carefully prepared the bid from the plans and specifications and has checked the same in detail before submitting said proposal or bid; and that said bidder or bidder's agents, officer or employees have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal or bid.

Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No.	Addendum Date
_____	_____
_____	_____

BASIS OF BID:

Bidder will complete the Work in accordance with the Contract documents for the following price(s):

As stated in the attached Unit Price Bid Schedule.

Unit Prices have been computed in accordance with the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

TOTAL BID PRICE: $_____

ATTACHMENTS TO THIS BID

The following documents are submitted with and made a condition of this Bid:

A. Required Bid Security
B. Unit Price Bid Schedule (Section 00 41 43)
C. Tabulation of Subcontractors (Section 00 43 36)

BID SUBMITTAL

This Bid is submitted by _____ of _____,_____

The Bidder, being duly sworn, does dispose that they are an authorized representative of

Bidder, if Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in Wisconsin is ___/___/___.

Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of first joint venture partner – attach evidence of authority to sign)

Name (typed or printed):_____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By:_____

(Signature of second joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. Manner of signing for each individual, partnership, and corporation that is a party to joint venture should be in manner indicated above.)

Bidder's Business Address _____

_____

Phone No. _____ Fax No. _____

E-mail _____

SUBMITTED on _____, 20____.

State Contractor License No. _____(if applicable)

SECTION 00 41 43

CITY OF DE PERE

PROJECT 22-18

BID SCHEDULE – UNIT PRICE

ITEM	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT BID
SC-01	Demolition of Existing Boiler Circulation Pump System	LS	1	$	$
SC-02	Demolition of Water Softener System	LS	1	$	$
SC-03	Relocate Domestic Hot Water Heater to Old Water Softener Location	LS	1	$	$
SC-04	Installation of New Boiler Circulation Pump System	LS	1	$	$
				TOTAL AMOUNT BID	$

SECTION 00 43 13

CITY OF DE PERE

BID BOND

KNOW ALL MEN BY THESE PRESENTS: That _____,

as Principal, hereinafter called Principal, and _____,

as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called City, in the amount of _____ dollars ($_____) for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presence.

WHEREAS, Principal has made a proposal to the City for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work of Project 22-18 in accordance with drawings and specifications prepared by the Director of Public Works of said City, which proposal is by reference made a part hereof, and is hereinafter referred to as the BID.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall be awarded the contract for said project and Principal shall enter into a contract in accordance with the BID, then this obligation shall be null and void; otherwise it shall remain in full force and effect, provided that:

1. The liability of Surety shall in no event exceed the penalty of this bond.

2. Any suits at law or proceedings, in equity brought or to be brought against Surety to recover any claim hereunder shall be executed within six (6) months from the date of this instrument.

Signed and sealed this _____ day of _____, 20____.

In the presence of:

_____ _____

WITNESS PRINCIPAL (SEAL)

_____ _____

WITNESS SURETY (SEAL)

SECTION 00 43 36

TABULATION OF SUBCONTRACTORS

The following information is submitted which gives the name, business address, and portion of work for each subcontractor that will be used in the work if the bidder is awarded the contract, and no subcontractor doing work in excess of one-half of one percent of the total amount of the bid and who is not listed will be used without the written approval of the Engineer. Additional numbered pages outlining this portion of the proposal may be attached to this page.

PORTION OF WORK	BUSINESS NAME	BUSINESS ADDRESS

SECTION 00 51 00

NOTICE OF AWARD

(Contractor)
(Contractor Name)
(Address)
(Address)

Project Description: 22-18 Community Center Circulating Pump Replacement

The City has considered the proposal submitted by you dated (BID DATE) for the above-described project in response to its Advertisement for Bids dated April 29, 2022 and May 6, 2022.

You are hereby notified that the Common Council of the City of De Pere has accepted your bid of (Contract Amount $_____.00).

You are required to execute the Contract and furnish the required Performance Bond, Payment Bond and Certificates of Insurance within ten (10) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said bonds within ten (10) days from the date of this notice, said City will be entitled to consider all your rights arising out of the City's acceptance of your bid as abandoned and as a forfeiture of your Bid Bond. The City will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the City.

Dated this _____ day of _____2022.

_____
DEPARTMENT OF PUBLIC WORKS

BY: Eric P. Rakers, P.E.
City Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by:

_____, this the _____ day of _____, 20___

By:_____

Title:_____

SECTION 00 52 13

CONTRACT

This Contract, made and entered into this day _____ (date to be affixed by City), by and between (Contractor Name), hereinafter called Contractor, and the City of De Pere, a municipal corporation of the State of Wisconsin, hereinafter called City.

WITNESSETH: That, in consideration of the covenants and agreements herein contained, to be performed by the parties hereto, and of the payments hereinafter agreed to be made, it is mutually agreed as follows:

ARTICLE I - SCOPE OF WORK

The Contractor shall furnish all materials and all equipment and labor necessary, and perform all work shown on the drawings and described in the specifications for the project entitled Project 22-18 Community Center Circulating Pump Replacement, all in accordance with the requirements and provisions of the following documents, which are hereby made a part of this Contract:

(a) Advertisement for Bids, dated April 29, 2022 and May 6, 2022.

(b) Drawings designated for Project 22-18 Community Center Circulating Pump Replacement dated April 29, 2022.

(c) City of De Pere 2022 Construction Specifications.

(d) Special Provisions dated April 29, 2022

(e) Proposal submitted by (Contractor Name) dated Bid Date.

(f) Addenda No. dated

ARTICLE II - TIME OF COMPLETION

(a) The work to be performed under the Contract shall be commenced within (number spelled out) (__) calendar days after receipt of written notice to proceed. The work shall be completed within (Number spelled out) (__) calendar days) or (specific calendar dates) after receipt of Notice to Proceed.

(b) Time is of the essence with respect to the date of completion herein above stated. Failure to complete the work within the number of calendar days stated in this Article, or interim dates included in the work sequence in Section 01 10 00, Summary of Work, including any extensions granted thereto, shall entitle the City to deduct from the monies due the Contractor an amount equal to Update based on 00 70 00 - General Conditions (Page 27)($) per day for each calendar day of delay in the completion of the work. Such amount shall be considered and treated not as a penalty but as liquidated damages, which the City will sustain, by failure of the Contractor to complete the work within the time stated.

ARTICLE III - PAYMENT

(a) The Contract Sum. The City shall pay to the Contractor for the performance of the Contract the amounts determined for the total number of each of the following units of work completed at the unit price stated thereafter. The number of units contained in this schedule is approximate only, and the final payment shall be made for the actual number of units that are incorporated in or made necessary by the work covered by the Contract.

(b) Progress Payments. The City shall make payments on account of the Contract as follows:

1. On not later than the fourth Friday of every month the Contractor shall present to the City an invoice covering an estimate of the amount and proportionate value of the work done as verified by the City under each item of work that has been completed from the start of the job up to and including the fourth Friday of the preceding month, and the value of the work so completed determined in accordance with the schedule of unit prices for such items, together with such supporting evidence as may be required. This invoice shall also include an allowance for the cost of such materials and equipment required in the permanent work as have been delivered to the site but not as yet incorporated in the work.

2. On not later than the third week of the following month, the City shall, after deducting previous payments made, pay to the Contractor 95% of the amount of the approved invoice, retaining 5% of the estimate of work done until 50% of the work has been completed. At 50% completion of the work, the previous retainage shall not yet be paid, but further partial payments shall be made in full to the contractor without additional retainage being taken unless the engineer certifies that the work is not proceeding satisfactorily. If the work is not proceeding satisfactorily, additional amounts may be retained. After substantial completion, an amount retained may be paid to the contractor, keeping retained only such amount as is needed for the remaining work.

3. The Contractor shall notify the City in writing when all work under this Contract has been completed. Upon receipt of such notice the City shall, within a reasonable time, make the final inspection and issue a final certificate stating that the work provided for in this Contract has been completed and is accepted under the terms and conditions thereof, and that the entire balance due the Contractor as noted in said final certificate is due and payable. Before issuance of the final certificate the Contractor shall submit evidence satisfactory to the City that payrolls, material bills, and other indebtedness connected with the work under this Contract have been paid. The City shall make final payment as soon after issuance of the final certificate as practicable.

ARTICLE IV – CONTRACT DOCUMENTS

(a) Contents

1. The Contract documents consist of the following:
   a. This Contract (pages 00 52 13-1 to 0052-13-3, inclusive).
   b. Payment bond (pages 00 61 13-1 to 00 61 13-2, inclusive).
   c. Performance bond (page 00 61 16-1).
   d. General Conditions (pages 00 70 00-1 to 00 70 00-27, inclusive).

e. Specifications as listed in the table of contents of the Project Manual.
f. Drawings consisting of ___ sheets with each sheet bearing the following general title: ___[or] the Drawings listed on attached sheet index.
g. Addenda (numbers ___ to ___ inclusive), dated_____.
h. Exhibits to this Agreement (enumerated as follows):
   1) Contractor's Bid (pages 00 41 13-1 to 00 41 13-3, inclusive).
   2) Bid Schedule – Unit Prices (Pages 00 41 43-1 to 00 41 43- , inclusive).
   3) Proposed Products Form (Page 00 43 33-1).
   4) Tabulation of Subcontractors (page 00 43 36-1).
   5) Documentation submitted by Contractor prior to Notice of Award (00 51 00-1).
i. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
   1) Notice to Proceed (Page 00 55 00-1).
   2) Change Orders.

2. The documents listed in Paragraph (a) Contents, are attached to this Agreement (except as expressly noted otherwise above).

3. There are no Contract Documents other than those listed above in this Article IV.

IN WITNESS WHEREOF, the parties hereto have executed this Contract, the day and year first written above.

_____ _____
(WITNESS) (CONTRACTOR) (SEAL)

_____ BY: _____
(WITNESS)

_____
(TITLE)

BY: _____

_____
(TITLE)

CITY OF DE PERE (SEAL)

Approved as to Form By: _____ (City Attorney)

Sufficient funds are available to provide for the payment of this obligation.

_____
(COMPTROLLER)

BY:_____ BY:_____
(MAYOR) (CITY CLERK)

SECTION 00 55 00

NOTICE TO PROCEED

Date: _____

(CONTRACTOR NAME)
(ADDRESS)
(ADDRESS)

Project Description: 22-18 Community Center Circulating Pump Replacement

You are hereby notified to commence work in accordance with the CONTRACT dated _____, within ten (10) days of this Notice. All work under this contract shall be completed within _____(NUMBER IN WORDS) (__#) consecutive days from the start of construction or _____(DATE) whichever comes first.

_____
Department of Public Works

By: Eric P. Rakers, P.E.
Title: City Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

_____, this _____ day of _____, 20___.
Company Name

_____
Signature

BY: _____
Printed Name

TITLE: _____

SECTION 00 61 13

CITY OF DE PERE

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That (CONTRACTOR NAME), as Principal, hereinafter called Contractor, and _____, as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called the City, for the use and benefit of claimants as herein below defined in the amount _____ _____(CONTRACT AMT. SPELLED OUT) ($_____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ (date to be affixed by City) entered into a contract with City for Project 22-18, in accordance with drawings and specifications prepared by the Director of Public Works of said City, which contract is by reference made a part hereof, and is hereinafter referred to as the CONTRACT.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payments to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the CONTRACT, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with Contractor or with a subcontractor of Contractor for labor, material, or both, used or reasonably required for use in the performance of the contract, labor and material being construed to include that part of water, gas, power, lights, heat, oil, gasoline, telephone service, or rental of equipment directly applicable to the contract.

2. The above named Contractor and Surety hereby jointly and severally agree with the City that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant may sue on this bond for the use of such claimant in the name of the City, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon, provided, however, that the City shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

   a. Unless claimant shall have given written notice to any two of the following: The Contractor, the City, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail, postage prepaid, in an envelope addressed to the Contractor, City, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of Wisconsin, save that such service need not be made by a public officer.

   b. After the expiration of one (1) year following the date on which Contractor ceased work on said CONTRACT.

c. Other than in a state court of competent jurisdiction in and for the County or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens, which may be filed or recorded against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

SIGNED AND SEALED THIS _____ DAY OF _____, 20___.

In Presence of:

_____ _____
(WITNESS) (CONTRACTOR)

_____ _____
(WITNESS) (SURETY)

SECTION 00 61 16

CITY OF DE PERE

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That (CONTRACTOR'S NAME), as Principal, hereinafter called Contractor, and _____, as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called City, in the amount of _____(AMOUNT WRITTEN OUT) ($_____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assign, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ (date to be affixed by City), entered into a contract with the City for Project 22-18, in accordance with drawings and specifications prepared by the Director of Public Works of said City, which contract is by reference made a part hereof, and is hereinafter referred to as the CONTRACT.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly and faithfully perform said CONTRACT, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever Contractor shall be, and declared by the City to be in default under the CONTRACT, the City having performed City's obligations there under, the Surety may promptly remedy the default, or shall promptly

1. Complete the CONTRACT in accordance with its terms and conditions or

2. Obtain a bid or bids for submission to City for completing the CONTRACT in accordance with its terms and conditions, and upon determination by the City and Surety of the lowest responsible bidder, arrange for a contract between such bidder and City make available as work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable by City to Contractor under the CONTRACT and any amendments thereto, less the amount properly paid by City to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the CONTRACT falls due. No right of action shall accrue on this bond to or for the use of any person or corporation other than the owner named herein or the heirs, executors, administrators or successors of City.

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

In the Presence of:

_____ _____
(WITNESS) (CONTRACTOR) (SEAL)

_____ _____
(WITNESS) (SURETY) (SEAL)

SECTION 00 62 76

APPLICATION FOR PAYMENT

Contractor's Application for Payment No.

Application Period:	Application Date:
Owner: City of De Pere	Contractor:
	Contractor's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
Total	$0.00	$0.00
NET CHANGE BY CHANGE ORDERS:		$0.00

1.	ORIGINAL CONTRACT PRICE:.....	
2.	Net change by Change Orders and Written Amendments (+ or -):.....	$0.00
3.	CURRENT CONTRACT PRICE (Line 1 plus Line 2):.....	$0.00
4.	Total completed and stored to date Column H on Progress Estimate:.....	$0.00
5.	Retainage (per Agreement):	
a.	Work Completed - Column H (95% up to 50% of Contract or 2.5% of 100% of Contract)	$0.00
6.	AMOUNT ELIGIBLE TO DATE (Line 4 minus 5).....	$0.00
7.	LESS PREVIOUS PAYMENTS (Line 6 from prior Application).....	$0.00
8.	AMOUNT DUE THIS APPLICATION (Line 6 minus Line 7).....	$0.00

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that:(1) all previous progress payments received from Owner on account of Work done under Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by the Application for Payment is in accordance with the Contract Documents and is not defective.

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ _____
(Contractor) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ _____
(Owner) (Date)

SECTION 00 65 16

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project:	
Owner:	Owner's Contract No.:
Contractor:	

This [tentative] [definitive] Certificate of Substantial Completion applies to:
☐All Work under the Contract Documents: ☐The following specified portions of the Work:

_____
Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Contractor and Engineer, and found to be substantially complete. The Date of Substantial completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer Date

Accepted by Contractor Date

SECTION 01 10 00

SUMMARY OF WORK

PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes
   1. References
   2. Work Covered by the Contract Documents
   3. Work Sequence/Schedule
   4. Use of Premises
   5. Warranty
   6. Miscellaneous Provisions

1.2 REFERENCES

A. General Specifications. The work under this contract shall be in accordance with the City of De Pere, 2022 Construction Specifications and these Special Provisions and plans, and the latest edition of the Wisconsin Department of Transportation Standards Specifications for Highway and Structure Construction, where referenced in the City Specifications.

B. Definitions. Any reference to the "state" or the "department" in said Standard Specifications shall mean the "City of De Pere" for the purposes of this contract.

C. Industry Standards
   1. Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
   2. Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
   3. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
   4. The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements.
   5. Each section of the specifications generally includes a list of reference standards normally referred to in that respective section. The purpose of this list is to furnish the Contractor with a list of standards normally used for outlining the quality control desired on the project.

The lists are not intended to be complete or all inclusive, but only a general reference of standards that are regularly referred to.

6. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

1.3 WORK COVERED BY THE CONTRACT DOCUMENTS

A. Project Identification
   1. Project Location
      a. Community Center
         600 Grant Street
         De Pere, WI 54115
   2. Work will be performed under the following prime contract:
      a. Project 22-18 Community Center Circulating Pump Replacement

B. The Work includes:
   1. Demolition of existing boiler circulation pump system
   2. Demolition of water softener system
   3. Relocation of domestic hot water heater to old softener location
   4. Insulation of new boiler pump system

1.4 WORK SEQUENCE/SCHEDULE

A. Project shall be completed by May 31, 2023. Work started in 2022 shall be completed by November 1, 2022 to prevent disruption to the Community Center heating systems over the cold weather months.

B. Conduct construction activities to maintain access to business throughout construction. Access to premises shall not disrupt business operations.

C. All work is to be completed during normal building operation hours of Monday thru Thursday 7:30 AM to 5:00 PM and Friday 7:30 AM to 11:30 AM.

D. Coordinate all repairs with Maintenance Supervisor, Thomas Blohowiak at 920-639-1336.

1.5 USE OF PREMISES

A. Contractor shall have full use of the premises for construction operations, including use of the Project Site, as allowed by law, ordinances, permits, easement agreements and the Contract documents.

B. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of the Project.

C. Provide protection and safekeeping of material and products stored on or off the premises.

D. Move any stored material or products which interfere with operations of Owner or other Contractors.

1.6 WARRANTY

A. The Contractor warrants and guarantees to the City that all work shall be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects will be given to the Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this proposal.

B. If within one (1) year after the date of contract work completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents or by a special provision of the Contract Documents, any work is found to be defective, the Contractor shall comply in accordance with the City's written instructions. These written instructions will include either correcting such defective work or, if it has been rejected by the City, removing it from the site and replacing it with non-defective work. If the Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk or loss or damage, the City may have the defective work corrected or the rejected work removed and replaced. All direct and indirect costs of correction or removal and replacement of defective work, including compensation for additional professional services, shall be paid by the Contractor.

1.7 MISCELLANEOUS PROVISIONS

A. Adhere to the special provisions as listed in the appendices.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 22 05

MEASUREMENT AND PAYMENT SPECIAL CONSTRUCTION

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes:

	Bid Item No.
1. Demolition of Existing Fixtures	SC-01 & SC-02
2. Relocation of Hot Water Heater	SC-03
3. Installation of New Boilers	SC-04

B. Unit Prices include:
   1. Defined work for each Unit Price Item which will provide a functionally complete Project when combined with all unit price items. If there are specific work items which the Contractor believes are not identified in any Unit Price Item, but is required to provide a functionally complete Project, then the identified specific work items shall be included in the appropriate Unit Price Item.
   2. The method of measurement for payment.
   3. The price per unit for payment.

1.2 GENERAL WORK ITEMS

A. Include with the appropriate Unit Price Item the following work items which are common to the Unit Price Items for special construction.

B. If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.
   1. Loading, hauling and disposing of surplus material.
   2. Protection of work area.
   3. Clean work area after completion.
   4. Maintenance, protection, replacement and/or repair of facilities not designated for alteration on the Site beyond the limits identified.
   5. Dust control.
   6. Regulatory requirements.
   7. Quality assurance and quality control testing and inspections.
   8. Shop drawings and other submittals.

1.3 DEMOLITION OF EXISTING FIXTURES

A. The unit price for Demolition of Existing Fixtures work includes:
   1. General Work Items of Article 1.2.
   2. Removal of boilers and associated appurtenances per the plans and specifications.

3. Removal of water softeners and associated appurtenances per the plans and specifications.

B. Measurement for payment will not be made.

C. The unit of measurement for payment is lump sum.

1.4 RELOCATION OF HOT WATER HEATER

A. The unit price for Relocation of Hot Water Heater work includes:
   1. General Work Items of Article 1.2.
   2. Removal of existing water heater and associated appurtenances per the plans and specifications.
   3. Reinstallation of existing water heater at the location designated in the plans and specifications.

B. Measurement of payment will not be made.

C. The unit of measurement for payment is lump sum.

1.5 INSTALLATION OF NEW BOILERS

A. The unit price for Installation of New Boilers work includes:
   1. General Work Items of Article 1.2.
   2. Installation of new boiler system and associated appurtenances per the plans and specifications.

B. Measurement of payment will not be made.

C. The unit of measurement for payment is lump sum.

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

A. This section includes:
   1. Administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

A. Unit Price work will be the Schedule of Values used as the basis for reviewing Applications for Payment.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as recommended by the Engineer and approved by Owner.

B. The date for each progress payment should be the 3rd Wednesday of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends the 4th Friday of the Month.

C. Use forms provided by Engineer for Applications for Payment. Sample copy of the Application for Payment and Continuation Sheet is included in Section 00 62 76.

D. Application Preparation Procedures
   1. When requested by the Contractor, the Engineer will determine the actual quantities and classifications of Unit Price Work performed.
      a. Preliminary determinations will be reviewed with the Contractor before completing Application for Payment.
      b. Engineer will complete the Application for Payment based on Engineer's decision on actual quantities and classifications.
      c. Engineer will submit three original copies of Application for Payment to Contractor for certification of all three original copies.
      d. Contractor shall submit signed Application for payment to Owner for approval within time frame agreed to at the Preconstruction Conference.
   2. If payment is requested for materials and equipment not incorporated in the Work, then the following shall be submitted with the Application for Payment:
      a. Evidence that materials and equipment are suitably stored at the site or at another location agreed to in writing.

b. A bill of sale, invoice, or other documentation warranting that the materials and equipment are free and clear of all liens.
c. Evidence that the materials and equipment are covered by property insurance.

3. Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor.

E. With each Application for Payment, submit waivers of liens from subcontractors and suppliers for the construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested before deduction for retainage on each item.
2. When an application shows completion for an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work shall submit waivers.
4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application.
5. Submit waivers of lien on forms executed in a manner acceptable to Owner.

F. The following administrative actions and submittals shall precede or coincide with submittal of first Application for Payment:
1. List of subcontractors.
2. Schedule of Values (For Lump Sum Work).
3. Contractor's construction schedule.

G. Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. Consent of Surety to Final Payment.
5. Final lien waivers as evidence that claims have been settled.
6. Final liquidated damages settlement statement.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for submittals:
   1. Progress Schedule.
   2. Schedule of Shop Drawings and Sample Submittals.
   3. Shop Drawings.

B. Failure to meet Submittal requirements to the satisfaction of the Engineer will constitute unsatisfactory performance of the work in accordance with the Contract Documents, therefore, the Engineer may recommend to the Owner that all or a portion of payments requested during the corresponding pay period be withheld until these requirements are met.

1.2 SUBMITTAL PROCEDURES

A. Coordination: Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
   1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
   2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.
      a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
   3. To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for re-submittals.
      a. Allow two weeks for initial submittal.
      b. Allow two weeks for reprocessing each submittal.
      c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
   1. Assign a reference number to each submittal and re-submittal.
   2. Provide a space approximately four (4) by five (5) inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
   3. Include the following information on the label for processing and recording action taken.

a. Project name.
b. Date.
c. Name and address of the Engineer.
d. Name and address of the Contractor.
e. Name and address of the subcontractor.
f. Name and address of the supplier.
g. Name of the manufacturer.
h. Number and title of appropriate Specification Section.
i. Drawing number and detail references, as appropriate.

4. Each submittal shall be stamped by the Contractor indicating that submittal was reviewed for conformance with the Contract Documents. The Engineer will not accept unstamped submittals.

C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal to the Engineer. The Engineer will not accept submittals received from sources other than the Contractor.
1. On the transmittal, record relevant information and requests for Engineer action. On a form, or separate sheet, record deviations from Contract Document requirements, including variations, limitations, and justifications. Include Contractor's certification that information complies with Contract Document requirements.

1.3 CONTRACTOR'S PROGRESS SCHEDULE

A. Prepare and submit to the Engineer within 10 (ten) days after the Effective Date of the Agreement, four copies of a preliminary progress schedule of the work activities from Notice to Proceed until Substantial Completion.
1. Provide sufficient detail of the work activities comprising the schedule to assure adequate planning and execution of the work, such that in the judgment of the Engineer, it provides an appropriate basis for monitoring and evaluation of the progress of the work. A work activity is defined as an activity which requires substantial time and resources (manpower, equipment, and/or material) to complete and must be performed before the contract is considered complete.
2. The schedule shall indicate the sequence of work activities. Identify each activity with a description, start date, completion date and duration. Include, but do not limit to the following items, as appropriate to this contract:
a. Shop drawing review by the Engineer.
b. Excavation and grading.
c. Asphalt and concrete placement sequence.
d. Restoration.
e. Construction of various segments of utilities.
f. Subcontractor's items of work.
g. Allowance for inclement weather.
h. Contract interfaces, date of Substantial Completion.
i. Interfacing and sequencing with existing facilities and utilities.

j. Sequencing of major construction activities.
k. Milestones and completion dates.

B. Distribution: Following response to the initial submittal, print and distribute copies of the revised construction schedule to the Engineer, Subcontractors, and other parties required to comply with scheduled dates. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

C. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

D. Punch List: Prepare and submit to the Engineer within ten (10) days after substantial completion a detailed progress schedule for outstanding work and punch list items.

1.4 SCHEDULE OF SHOP DRAWINGS AND SAMPLE SUBMITTALS

A. Submit four (4) hard copies or electronic copies of preliminary submittal schedule in accordance with the General Conditions of the Contract and as follows:
1. Coordinate submittal schedule with the subcontractors, Schedule of Values, and of products as well as the Contractor's Progress Schedule.
2. Prepare the schedule in chronological order. Provide the following information:
a. Scheduled date for the first submittal.
b. Related Section number.
c. Submittal category (Shop Drawings, Product Data, or Samples).
d. Name of the subcontractor.
e. Description of the part of the work covered.
f. Scheduled date for the Engineer's final release or approval.

B. Distribution: Following response to the initial submittal, print and distribute copies of the revised construction schedule to the Engineer, Subcontractors, and other parties required to comply with scheduled dates. Post copies in the field office. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.

C. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.5 SHOP DRAWINGS

A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or

copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

B. Collect product data into a single submittal for each element of construction of system. Product data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
   1. Mark each copy to show actual product to be provided. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
      a. Manufacturer's printed recommendations.
      b. Compliance with trade association standards.
      c. Compliance with recognized testing agency standards.
      d. Application of testing agency labels and seals.
      e. Notation of dimensions verified by field measurement.
      f. Notation of coordination requirements.

C. Do not use shop drawings without an appropriate final stamp indicating action taken.

D. Submittals: Submit four (4) copies of each required submittal. The Engineer will retain two (2) copies, and return the others to the Contractor marked with action taken and corrections or modifications required.

E. Distribution: Furnish copies of reviewed submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms. Maintain one copy at the project site for reference.
   1. Do not proceed with installation until a copy of the Shop drawing is in the Installer's possession.
   2. Do not permit use of unmarked copies of the Shop Drawing in connection with construction.

1.6 ENGINEER'S ACTION

A. Except for submittals for the record or information, where action and return is required, the Engineer will review each submittal, mark to indicate action taken, and return promptly. The Engineer will stamp each submittal with a uniform action stamp. The Engineer will mark the stamp appropriately to indicate the action taken, as follows:
   1. "No Exceptions Taken": The work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
   2. "Make Corrections Noted": The work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.

3. "Amend and Resubmit": Do not proceed with work covered by the submittal. Resubmit without delay. Do not use, or allow others to use, submittals marked "Amend and Resubmit" at the Project Site or elsewhere where work is in progress.
4. "Rejected – See Remarks": Do not proceed with work covered by the submittal. Resubmit without delay. Do not use, or allow others to use, submittals marked "Rejected and Resubmit" at the Project Site or elsewhere where work is in progress.

B. Unsolicited Submittals: The Engineer will return unsolicited submittals to the sender without action.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

EXHIBIT A

PLANS

PUMP SCHEDULE

TAG	SERVES	MANUFACTURE	SERIES	MODEL	GPM	HEAD FT. W.C.	MOTOR HP	VOLTS	PHASE	NOTES
P-3	SYSTEM PUMP	ARMSTRONG	DESIGN ENVELOPE	4300-0205H-003.0	145	49	3	208	3	1
P-4	SYSTEM PUMP	ARMSTRONG	DESIGN ENVELOPE	4300-0205H-003.0	145	49	3	208	3	1
BP-1	BOILER PUMP	ARMSTRONG	4360	4360-2B-4P	80	20'	1	208	3	1, 2
BP-2	BOILER PUMP	ARMSTRONG	4360	4360-2B-4P	80	20'	1	208	3	1, 2
SSF-1	SIDE STREAM FILTER	ARMSTRONG	E.2	E15.2	14	20'	1/4	120	1	4, 5

NOTE:
1. ARMSTRONG FTV-3FS FLO TREX VALVE
2. ARMSTRONG 2.5" FLO TREX VALVE
3. NEED RELAY FOR BOILER PUMP - PUMP AMPS TO HIGH FOR BOILER
4. 1-1/4" CIRCUIT BALANCING VALVE
5. 1-1/2" CHECK VALVE

EXPANSION TANK SCHEDULE

TAG	SERVES	MANUFACTURE	MODEL	TANK VOLUME	FITTING SIZE	DIAMETER	LENGTH
ET-1	HEATING SYSTEM	JOHN WOOD CO.	JAER-23-605	35 GAL.	1-1/2"	14"	55-1/2"

AIR SEPARATOR SCHEDULE

TAG	SERVES	MANUFACTURE	MODEL	DESCRIPTION	CONNECTION SIZE	DIAMETER	HEIGHT
AS-1	CENTRAL HEATING SYSTEM	CALEFFI	NA546100AM	DIRT, AIR & MAGNETIC SEPARATOR	4" FLANGE	8-5/8"	34-1/2"

GENERAL NOTES

- ALL WORK SHALL BE REVIEWED WITH OWNER
- DRAWINGS ARE FOR REFERENCE -
- INSTALLATION PER MANUFACTURE'S INSTALLATION MANUAL
- INSTALLATION PER ALL STATE CODES
- MECHANICAL CONTRACTOR SHALL PROVIDE COMPLETE CONTRACTING SERVICES INCLUDING ALL HVAC WORK, DDC/BAS WORK, ELECTRICAL AND GENERAL CONSTRUCTION.
- MECHANICAL CONTRACTOR TO PROVIDE A SCHEDULE FROM START THROUGH COMPLETION
- PROPERLY SIZED GAS REGULATOR FOR BOILERS.
- SYSTEM TREATMENT BY HVAC CONTRACTOR - MUST RECORED ALL INFORMATION FLUSH SYSTEM, CLEAN SYSTEM, FLUSH SYSTEM, TREATMENT & INHIBITORS.
- ALL WORK SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF COMPLETION.
- FACTORY START UP AND OWNER TRAINING.
- INSTALL WELLS FOR BOILERS AND BUILDING AUTOMATIO SYSTEM - PER MANUFACTURES INSTALLATION & BUILDING OWNER
- MECHANICAL CONTRACTOR TO PROVIDE SUBMITTALS, START UP & WATER TREATMENT REPORTS AND O & M MANUALS

STATE OF WISCONISIN BUILDING, ENERGY & MECHANICAL CODES & REGULATIONS

BUILDING CODE:
2015 INTERNATIONAL BUILDING CODE WITH STATE OF WISCONSIN AMENDMENTS

ENERGY CONSERVATION CODE:
2015 INTERNATIONAL ENERGY CONSERVATION CODE WITH STATE OF WISCONSIN AMENDMENTS SPS 363 ENERGY CONSERVATION CODE

MECHANICAL CODE:
2015 INTERNATIONAL MECHANICAL CODE WITH WISCONSIN STATE OF WISCONSIN AMENDMENTS

FUEL CODE:
2015 INTERNATIONAL FUEL GAS CODE WITH STAT OF WISCONSIN AMENDMENTS

FIRE CODE:
2015 INTERNATION FIRE CODE WITH STAT OF WISCONSIN AMENDMENTS

LIFE SAFETY CODE:
NFPA 101

MINIMUM PIPE INSULATION

FLUID	NOMINAL PIPE DIAMETER	
	≤1.5"	≥1.5
Steam	R-5.5	R-11.1
Hot Water	R-5.5	R-7.4
Chilled Water, Brine or Refrigerant	R-5.5	R-5.5

DRAWINGS ARE GENERAL OUTLINE - ALL CONTRACTORS TO FOLLOW ALL STATE OF WISCONSIN AND LOCAL CODES

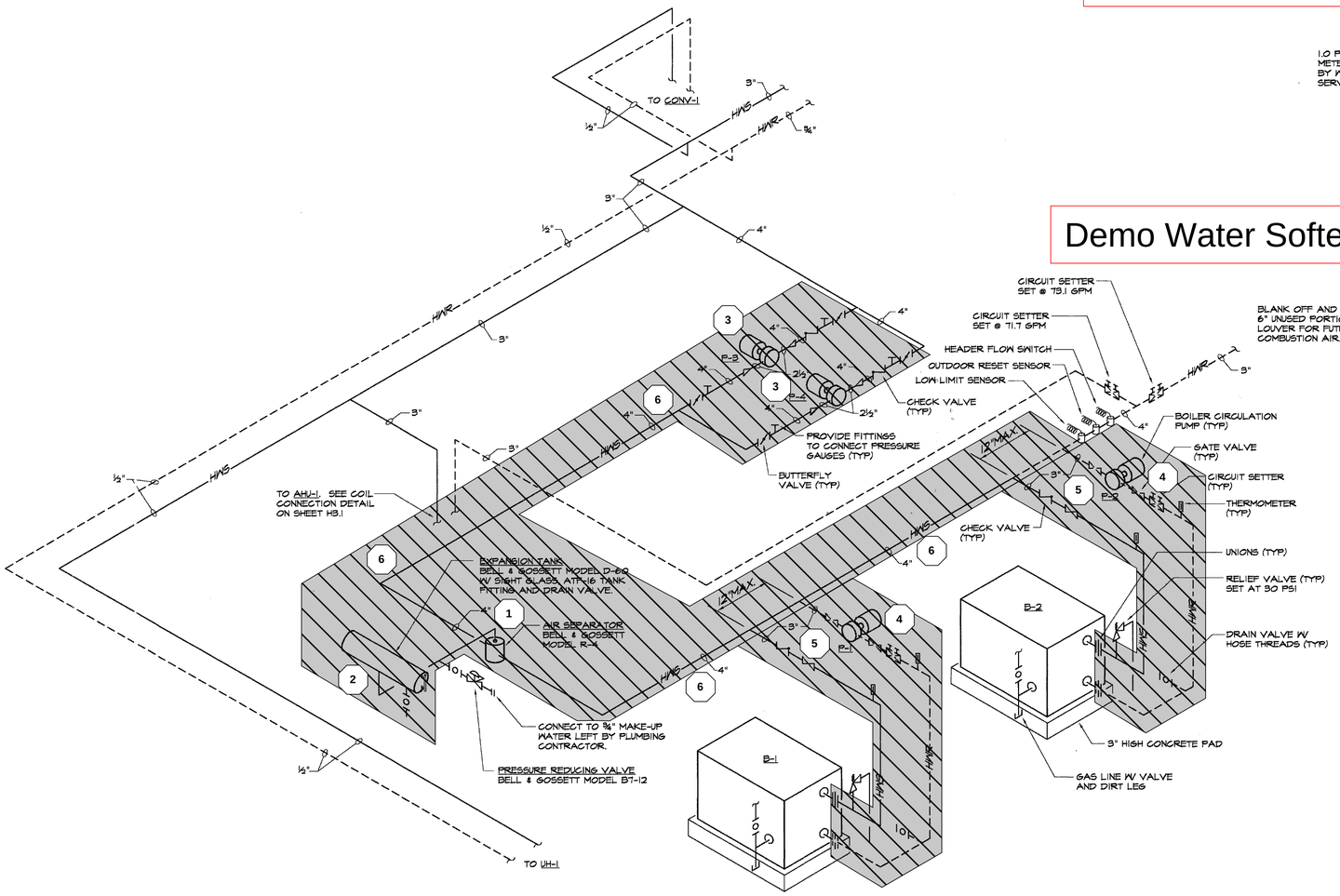
DE PERE COMMUNITY CENTER

NEW HOT WATER SYSTEM AIR CONTROL & PUMPS
600 GRANT STREET
DE PERE, WI 54115

M-0
TITLE PAGE

Move Water Heater To Where Water Softener Was Located The New Expansion Tank Will Go In Water Heater Spot

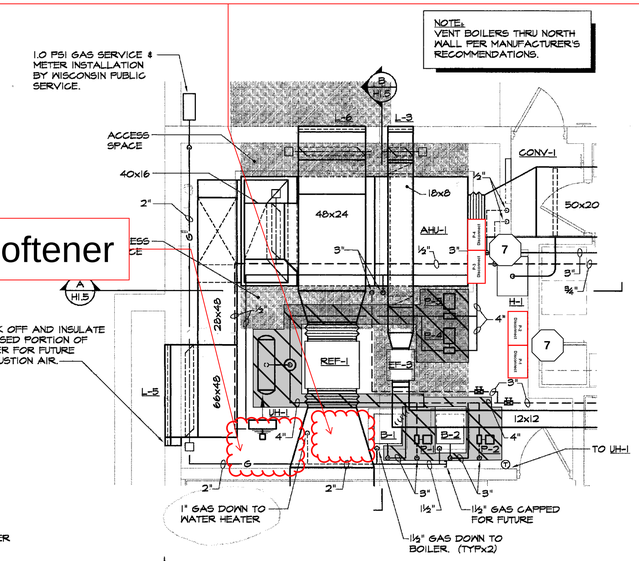
Demo Water Softener



= Demo

BOILER PIPING ISOMETRIC

SCALE: NONE



ENLARGED SCALE MECHANICAL ROOM PLAN

SCALE: 1/4" = 1'-0"

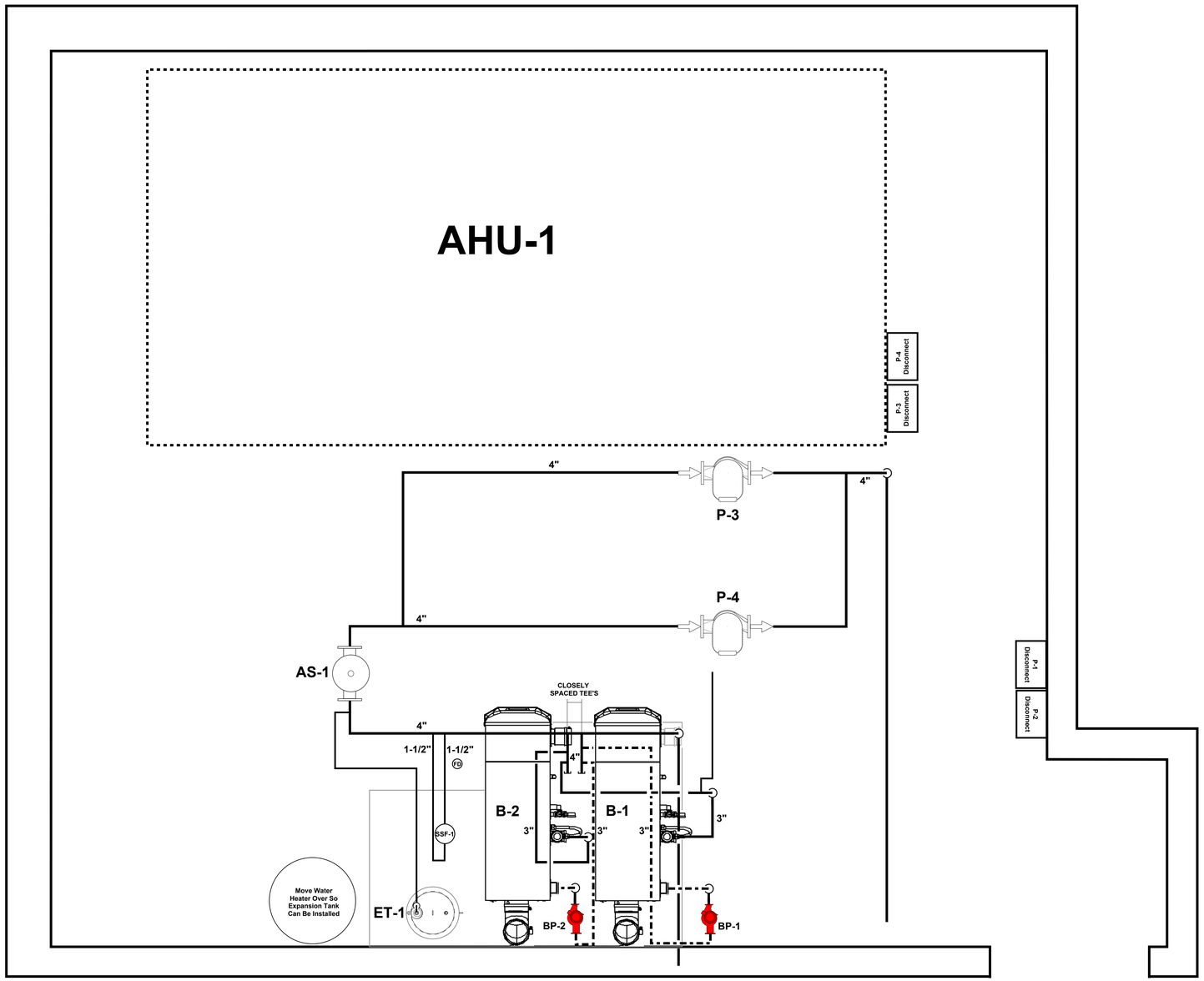
= Demo

1. AIR SEPARATOR AS-1
2. EXPANSION TANK ET-1
3. HOT WATER SYSTEM PUMPS P-3 & P-4
4. BOILER PUMPS BP-1 & BP-2
5. B-1 & B-2 3" PRIMARY PIPING
6. 4" SECONDARY PIPING
7. ELECTRICAL PUMP DISCONNECTS BP-1, BP-2, P-3 & P-4
8. WATER SOFTENER

DRAWINGS ARE GENERAL OUTLINE - ALL CONTRACTORS TO FOLLOW ALL STATE OF WISCONSIN AND LOCAL CODES

DE PERE COMMUNITY CENTER
NEW HOT WATER SYSTEM AIR CONTROL & PUMPS
600 GRANT STREET
DE PERE, WI 54115

M-1
DEMO PLAN

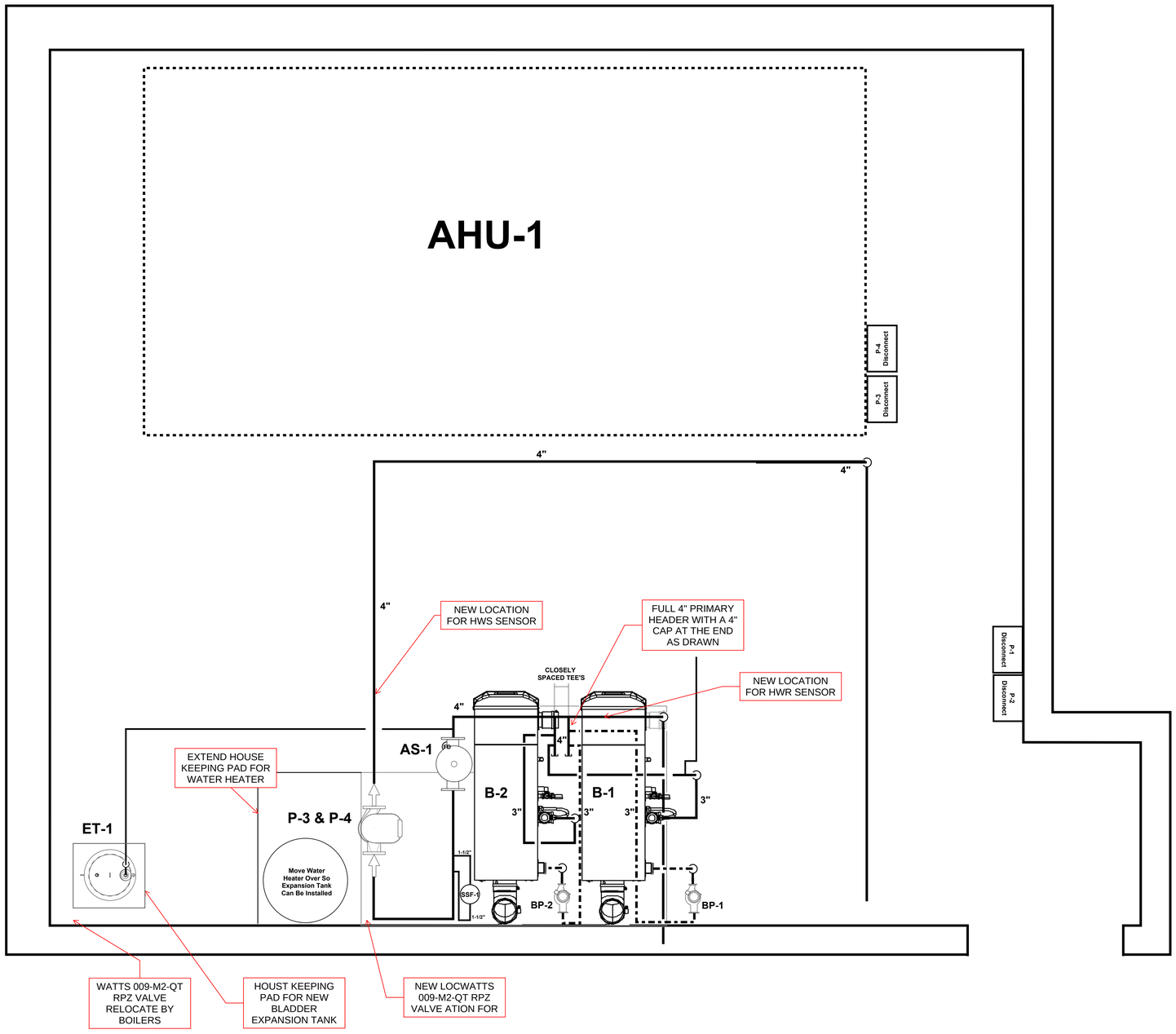


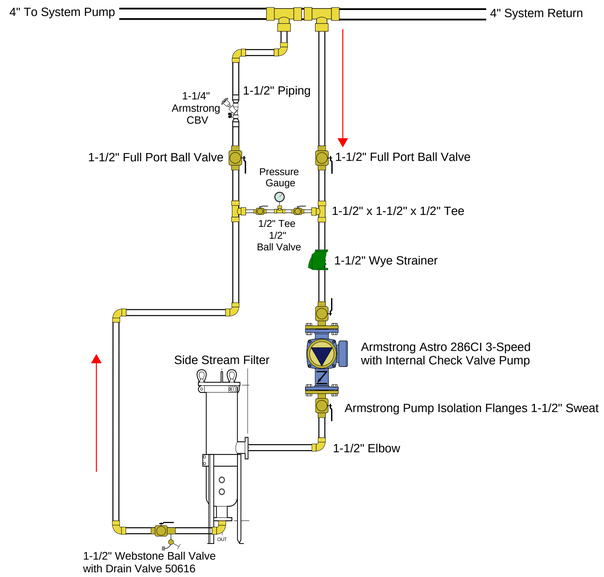
DRAWINGS ARE GENERAL OUTLINE - ALL CONTRACTORS TO FOLLOW ALL STATE OF WISCONSIN AND LOCAL CODES

DE PERE COMMUNITY CENTER

NEW HOT WATER SYSTEM AIR CONTROL & PUMPS
600 GRANT STREET
DE PERE, WI 54115

M-2
NEW AIR CONTROL & PUMP INSTALL





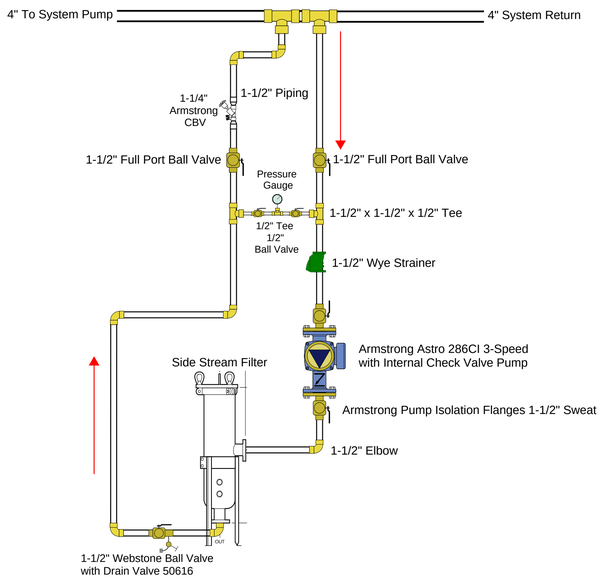
DRAWINGS ARE GENERAL OUTLINE - ALL CONTRACTORS TO FOLLOW ALL STATE OF WISCONSIN AND LOCAL CODES

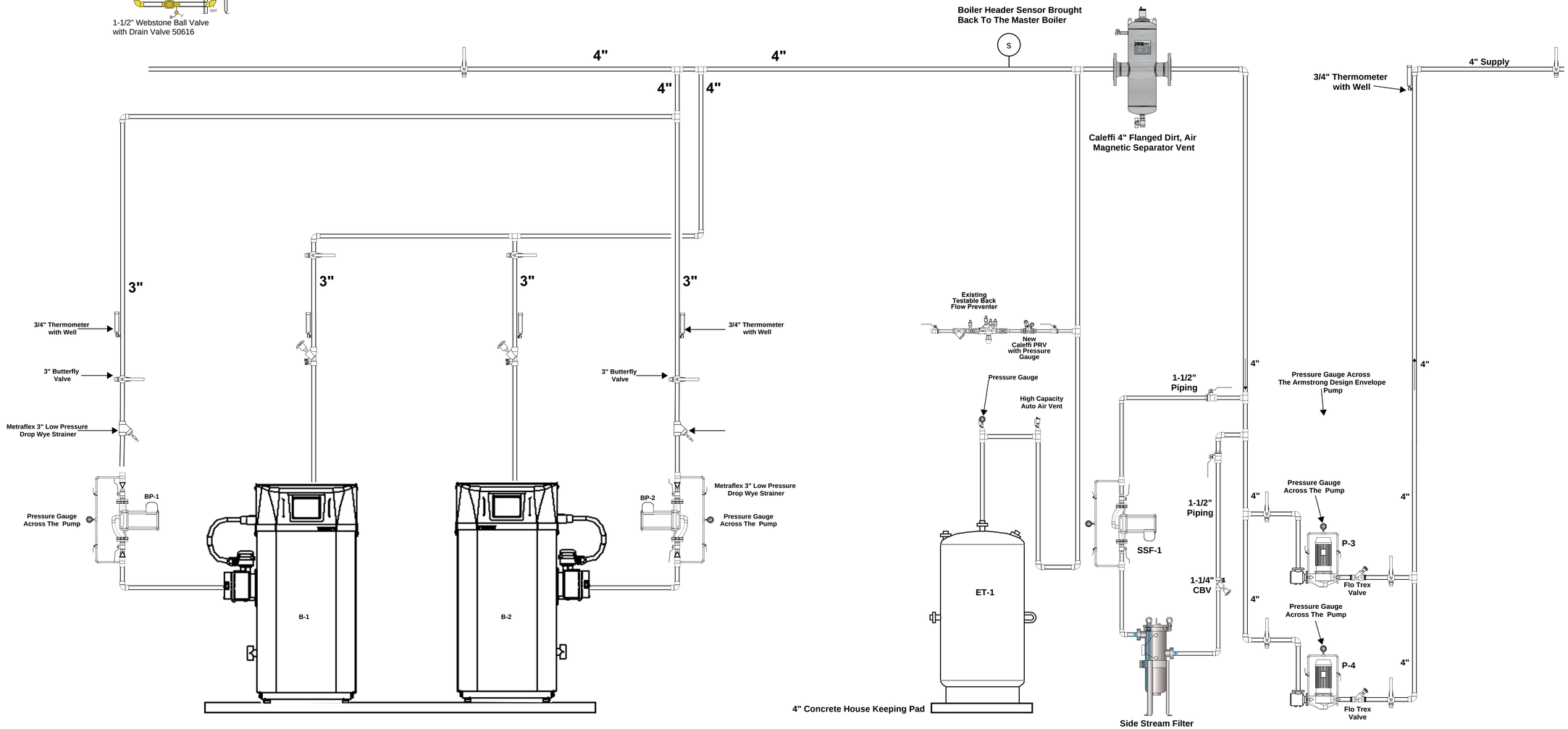
DE PERE COMMUNITY CENTER

NEW HOT WATER SYSTEM AIR CONTROL & PUMPS

600 GRANT STREET
DE PERE, WI 54115

M-1
NEW AIR CONTROL & PUMP INSTALL





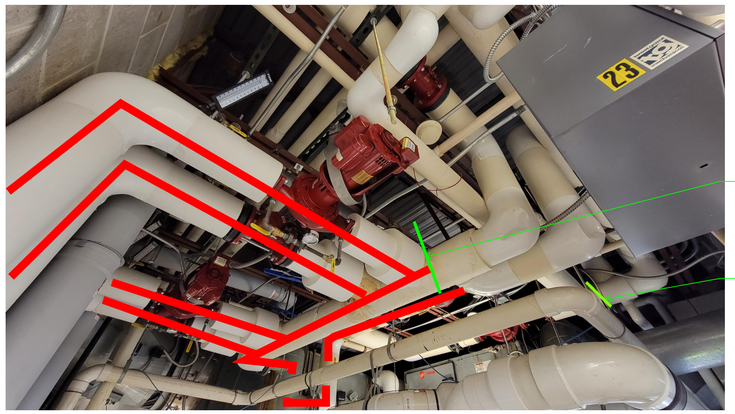
DRAWING IS NOT TO SCALE

DRAWINGS ARE GENERAL OUTLINE - ALL CONTRACTORS TO FOLLOW ALL STATE OF WISCONSIN AND LOCAL CODES

DE PERE COMMUNITY CENTER

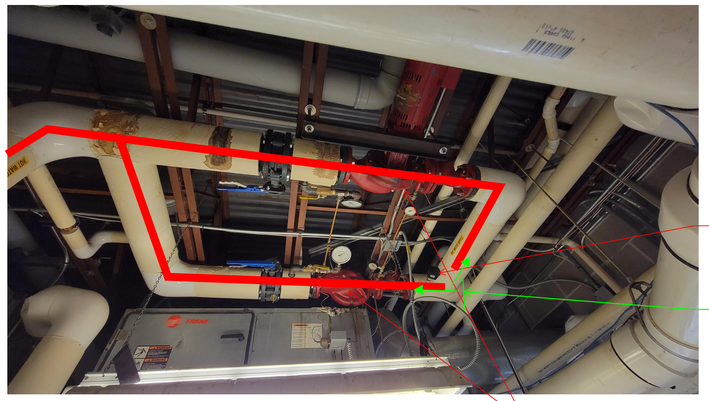
NEW HOT WATER SYSTEM AIR CONTROL & PUMPS
600 GRANT STREET
DE PERE, WI 54115

M-3
NEW PIPING DETAILS



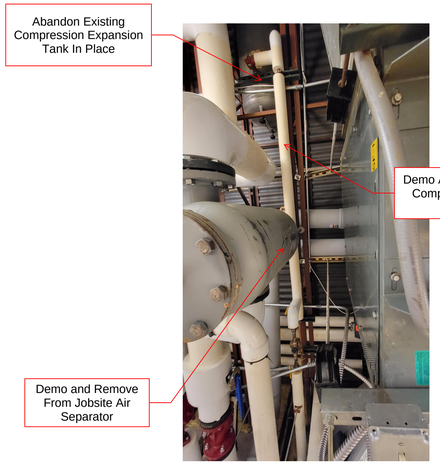
DEMO BOILER PIPING PUMPS, TRIPLE DUTY VALVES

REMOVE & REINSTALL HOT WATER SENSOR IN SECONDARY PIPING



DEMO CENTRAL HEATING SYSTEM SECONDARY PUMPS & ASSOCIATED PIPING

BOILER PIPING PUMPS, TRIPLE DUTY VALVES



DEMO AIR SEPARATOR & COMPRESSION EXPANSION TANK

RELOCATE TESTABLE RPZ VALVE

WATER HEATER & WATER SOFTENER

DRAWINGS ARE GENERAL OUTLINE - ALL CONTRACTORS TO FOLLOW ALL STATE OF WISCONSIN AND LOCAL CODES

DE PERE COMMUNITY CENTER

NEW HOT WATER SYSTEM AIR CONTROL & PUMPS

600 GRANT STREET
DE PERE, WI 54115

MD-2
DEMO PAGE

EXHIBIT B

ARMSTRONG PUMP SPECIFICATIONS

ARMSTRONG

TYPICAL SPECIFICATION
Series 4360 & 4380 – Close Coupled Vertical In-Line Pumps

1.0 PUMPS - CLOSE COUPLED VERTICAL IN-LINE

1.1 Provide Armstrong single stage, single suction Vertical In-Line type pumps, with rising head to shut off pump characteristics. Refer to the schedule for pump flows and heads and motor speed, efficiency, enclosure and power requirements.

1.2 The pumps shall be Armstrong Series 4360 or Series 4380 motor mounted Vertical In-Line.

1.3 Pump Construction:

Series 4360:

1. Pump casing shall be cast iron, suitable for 175 psi (1206 kPa) working pressure at 140°F (60°C). The casing shall be hydro-statically tested to 150% maximum working pressure.
   The casing shall be radially split to allow removal of the rotating element without disturbing the pipe connections.
   The casing shall be provided with NPT threaded companion flanges, for the appropriate pump size, with gaskets and hardware.

2. Pump impeller shall be fully enclosed type. The impeller shall be keyed and secured to the pump shaft by stainless steel fittings.

3. The pump shaft shall be a stainless steel stub shaft for frame 56 motors. The steel motor shaft shall be enclosed by a bronze shaft sleeve, on other motor frame sizes.

4. Mechanical Seal shall be single spring inside type with Carbon and Ceramic faces, EPDM elastomer, stainless steel spring and hardware. Provide factory installed seal vent line, piped from the seal area to the pump suction connection.

Series 4380:

1. Pump casing shall be cast iron, suitable for 175 psi (1206 kPa) working pressure at 140°F (60°C). Ductile iron pump casings are suitable for pressures to 250 psi (1724 kPa). The casing shall be hydrostatically tested to 150% maximum working pressure.
   The casing shall be radially split to allow removal of the rotating element without disturbing the pipe connections.
   The casing suction and discharge connections shall be the same size and shall be provided with drilled and tapped seal vent and pressure gauge connections.

2. Pump impeller shall be bronze, fully enclosed type. Impeller shall be dynamically balanced.

3. A bronze shaft sleeve, extending the full length of the mechanical seal area, shall be provided.

4. Mechanical Seal shall be single spring inside type with carbon against Ceramic faces. EPDM elastomer with stainless steel spring and hardware shall be provided. Seal vent line shall be factory installed and shall be piped from the seal area to the pump suction connection.

1.4 Motor power requirements shown on the pump schedule are the minimum acceptable and have been sized for continuous operation without exceeding the full load nameplate rating over the entire pump curve, exclusive of service factor.

S. A. Armstrong Limited
23 Bertrand Avenue
Toronto, Ontario
Canada, M1L 2P3
T: 416-755-2291
F: 416-759-9101

Armstrong Pumps Inc.
93 East Avenue
North Tonawanda, New York
U.S.A. 14120-6594
T: 716-693-8813
F: 716-693-8970

Armstrong Integrated Limited
Wenlock Way
Manchester
United Kingdom, M12 5JL
T: +44 (0) 8444 145 145
F: +44 (0) 8444 145 146

Design Envelope 4300 & 4380 1/3hp – 10hp

Typical Specifications

File No: 100.196
Date: Nov 15, 2021
Supersedes: 100.196
Date: Mar 18, 2021

1. GENERAL

1.1. SUMMARY OF WORK

A. This Section specifies single stage, single suction type, close coupled vertical inline design pumps with integrated intelligent controls.

1.2. RELATED REQUIREMENTS

1.2.1. Section [23 05 29 – Hangers and Supports for HVAC Piping and Equipment: pump supports].

1.2.2. Section [23 05 48 – Vibration and Seismic Controls for HVAC: vibration isolation and seismic restraints].

1.2.3. Section [26 05 00 – Common Work Results for Electrical: electrical connections].

1.3. REFERENCE STANDARDS

1.3.1. American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME).

1.3.1.1. ANSI/ASME B16.5- [2009], Pipe Flanges and Flanged Fittings: NPS ½ through NPS 24 Metric/Inch Standard.

1.3.2. American National Standards Institute/International Electrical Commission (ANSI/IEC).

1.3.2.1. IEC 60529- [2004], Degrees of Protection Provided by Enclosures (IP Code).

1.3.3. American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE).

1.3.3.1. ASHRAE 90.1- [2007], Energy Standard for Buildings except Low-Rise Residential Buildings.

1.3.3.2. ASHRAE 189.1P- [2009], Standard for the Design of High-Performance Green Buildings except Low-Rise Residential Buildings.

1.3.4. ASTM International (ASTM).

1.3.4.1. ASTM A48/A48M- [2003 (2008)], Standard Specification for Gray Iron Castings.

1.3.4.2. ASTM A536- [1984 (2009)], Standard Specification for Ductile Iron Castings.

1.3.4.3. ASTM A582/A582M- [2005], Standard Specification for Free-Machining Stainless Steel Bars.

1.3.4.4. ASTM B584- [2011], Standard Specification for Copper Alloy Sand Castings for General Applications.

1.3.4.5. ASTM A743 CF8M Standard Specification for Type 316 Stainless Steel Castings.

1.3.4.6. ASTM A351 CF8M Standard Specification for Type 316 Stainless Steel Bars

1.3.5. CSA International (CSA).

1.3.5.1. CAN/CSA C22.2 No.108- [2001 (R2010)], Liquid Pumps.

1.3.6. German Institute for Standardization (DIN).

1.3.6.1. DIN EN 61800-3- [2004], Adjustable Speed Electrical Power Drive Systems - Part 3: EMC Requirements and Specific Test Methods.

1.3.7. Institute of Electrical and Electronics Engineers (IEEE).

1.3.7.1. IEEE 519- [1992], Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems.

1.3.8. National Electrical and Manufacturers Association (NEMA).

1.3.8.1. NEMA MG-1 Standard- [2009, Revision 2010], Motors and Generators, Revision 1.

1.3.9. Underwriter's Laboratories (UL).

1.3.9.1. UL 778- [2011], Motor-Operated Water Pumps.

1.3.10. US Green Building Council (USGBC).

1.3.10.1. LEED® NC Version 2.2- [2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package for New Construction and Major Renovations.

1.3.11. NSF/ANSI – Pure Drinking Water & Low Lead Laws

1.3.11.1. NSF/ANSI-61 Annex G

1.3.11.2. NSF/ANSI-372

1.3.11.3. California Health and Safety Code 116875

1.3.11.4. Assembly Bill 1953

1.4. ADMINISTRATIVE REQUIREMENTS

1.4.1. Co-ordination: Co-ordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays.

1.4.2. Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and one week prior to commencing work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.

1.4.2.1. Comply with Section 01 31 19 Project Meetings and co-ordinate with other similar pre- installation meetings.

1.4.2.2. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:

1.4.2.2.1. Owner;

1.4.2.2.2. Consultant;

1.4.2.2.3. Mechanical Subcontractor;

1.4.2.2.4. Manufacturer's Technical Representative.

1.4.2.3. Ensure meeting agenda includes review of methods and procedures related to hydronic pump installation including co-ordination with related work.

1.4.2.4. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

1.5. ACTION AND INFORMATIONAL SUBMITTALS

1.5.1. Make submittals in accordance with Contract Conditions and Section 01 33 00 Submittal Procedures.

1.5.2. Product Data: Submit product data including manufacturer's literature for hydronic pump, controls, components and accessories, indicating compliance with specified requirements and material characteristics.

1.5.2.1. Submit list on pump manufacturer's letterhead of materials, components and accessories to be incorporated into Work.

1.5.2.2. Include pump performance curves indication where project pumps appear in curve range with pre-defined performance envelope showing optimum efficiency region.

1.5.2.3. Include product names, types and series numbers.

1.5.2.4. Include contact information for manufacturer and their representative for this Project.

1.5.2.4.1. Include information on costs for wiring of pump to motor, and wiring pump mounted (internal/external) or remotely mounted differential pressure sensor(s). Also include costs for piping and commissioning of differential pressure sensor(s).

1.5.3. Shop Drawings: Submit shop drawings indicating dimensions and materials for pump components and controls

1.5.3.1. Show pump and control enclosure dimensions on shop drawings.

1.5.3.2. Include control system wiring diagrams.

1.5.4. Test Reports:

1.5.4.1. Submit test reports with each Design Envelope pump showing compliance with specified performance characteristics and physical properties including structural performance by conducting a vibration sweep over the speed range, while still in the test rig piping.

1.5.4.2. Test reports shall also detail the accuracy of the controls flow and head readout, compared with the test rig calibrated instruments.

1.5.5. Field Reports: Submit manufacturer's field reports within 3 days of each manufacturer representative's site visit and inspection.

1.5.6. Sustainable Design (LEED).

1.5.6.1. LEED Submittals: In accordance with Section [01 35 21 – LEED Requirements].

1.5.7. Installer Qualifications:

1.5.7.1. Submit [verification of manufacturer's approval of installer] [letter verifying installer's experience with work similar to work of this Section].

1.6. CLOSEOUT SUBMITTALS

1.6.1. Operation and Maintenance Data: Supply maintenance data including marked performance curves for each hydronic pump for incorporation into manual specified in Section 01 78 00 Closeout Submittals.

1.6.2. Sustainable Design Closeout Documentation (LEED).

1.6.2.1. Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates for work of this Section demonstrating percentage of construction wastes which were recycled.

1.6.2.2. Submit verification from recycling facility showing receipt of materials.

1.6.3. Record Documentation: In accordance with Section 01 78 00 Closeout Submittals.

1.6.3.1. List materials used in hydronic pump work.

1.6.3.1.1. Include marked up performance curves for each pump.

1.6.3.2. Warranty: Submit warranty documents specified.

1.7. QUALITY ASSURANCE

1.7.1. The pump and controls shall be integrated by the manufacturer in the factory, including assembly, wiring, programming and testing. Sensorless data, for all suitable pumping unit, shall be mapped in the integrated controls using tested performance measurements for each specific pump. Actual flow reading on site is to be available digitally for the BMS and on the controls local touchscreen. The use of catalog data for Sensorless data mapping will not be acceptable.

1.7.2. The complete pump and control package shall be Underwriter's Laboratories listed and carry UL778 approval

1.7.3. Sustainability Standards Certification (LEED).

1.7.3.1. LEED NC Version 2.2 submittals: In accordance with Section [01 35 21 LEED Requirements].

1.7.4. Stainless Steel Type 316 units shall be NSF/ANSI 61 & 372 listed and labeled

1.7.5. A test report shall accompany each pumping unit shipped to site. The test report shall contain:

1.7.5.1. Test compliance with specified performance characteristics and physical properties including structural performance by conducting a vibration sweep over the speed range, while still in the test rig piping.

1.7.5.2. Test reports shall also detail the accuracy of the controls flow and head readout, compared with the test rig calibrated instruments.

1.8. DELIVERY STORAGE AND HANDLING

1.8.1. Delivery and Requirements:

1.8.1.1. Deliver material in accordance with Section 01 61 00 Common Product Requirements.

1.8.1.2. Deliver materials and components in manufacturer's original packaging with identification labels intact and in sizes to suit project.

1.8.1.2.1. Include manufacturer's name, job number, pump location, and pump model and series numbers on identification labels.

1.8.2. Storage and Handling Requirements: Store materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.8.2.1. Exercise care to avoid damage during unloading and storing.

1.8.2.2. Leave pump port protection plates in place until pumps are ready to connect to piping.

1.8.2.3. Do not place cable slings around pump shaft or integrated control enclosure.

1.8.3. Packaging Waste Management:

1.8.3.1. Separate and recycle waste packaging materials in accordance with Section 01 74 19 Construction Waste Management and Disposal.

1.8.3.2. Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.

1.8.3.3. Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling [in accordance with Waste Management Plan].

1.9. FIELD CONDITIONS

1.9.1. Ambient Temperature: [113 ˚F] [45˚C] maximum at [sea level] [up to [3,300 feet] [1,000m] above sea level]. Refer to I&O Manual for specific temperature rating by frame size

1.9.2. Relative Humidity: [95] % maximum.

1.10. WARRANTY

1.10.1. Project Warranty: Refer to Contract Conditions for project warranty provisions.

1.10.2. Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.

1.10.3. Warranty period: [18] months from date of shipment, or [12] months from date of installation, whichever comes first. To receive an additional [6] months of standard coverage, Owner may register the pump unit at http://armstrongfluidtechnology.com/registration

2. PRODUCTS

2.1. MANUFACTURER

2.1.1. Armstrong Fluid Technology, 23 Bertrand Avenue, Toronto, Ontario, M1L 2P3, Canada, Phone: (416) 755 2291, FAX: (416) 759-9101, e-mail: info@armstrongfluidtechnology.com. URL: www.armstrongfluidtechnology.com.

2.1.2. Armstrong Fluid Technology, 93 East Avenue, North Tonawanda, New York, 14120-6594, U.S.A, Phone: (716) 693-8813, FAX: (716) 693-8970, e-mail: info@armstrongfluidtechnology.com. URL: www.armstrongfluidtechnology.com.

2.2. DESCRIPTION

2.2.1. Single stage, single suction type, vertical inline design pump with integrated intelligent controls.

2.2.1.1. Seals: close-coupled serviceable without disturbing the piping connections.

2.2.1.2. Include casing drain plug and ¼ inch suction and discharge gauge ports.

2.2.2. Acceptable Material: ARMSTRONG, 4380 Design Envelope Pump.

2.3. DESIGN CRITERIA

2.3.1. Design pump for variable flow applications and selected for hydraulic design conditions and minimum system pressure with sensorless load Demand Based control

2.3.1.1. Select hydraulic design conditions and minimum pressure with pressure sensor across most remote load.

2.3.1.2. For Sensorless control the operating control curve shall be quadratic with adjustable minimum head setting

2.3.2. Meet or exceed energy saving requirements of ASHRAE 90.1[2010] [2013] by pump selection, based on optimum performance at part load, to save 70% of design flow energy at 50% part-load

2.3.3. Design pumping units to UL STD 778 & CSA STD C22.2 No.108

2.3.4. Design Stainless Steel Type 316 units to NSF/ANSI 61 & 372

2.4. MATERIALS

2.4.1. Casing: Ductile iron ASTM A536 Grade 65-45-12, e-coated

2.4.1.1. Test casing to 150 % maximum working pressure.

2.4.1.2. Ensure casing is radially split to allow for removal of rotating element without disturbing pipe connections.

2.4.1.3. Cast iron casing wetted surfaces shall be e-coated to prevent seizing of impeller to casing after periods of inactivity.

2.4.1.4. Drill and tap casing for gauge ports on both suction and discharge connections.

2.4.1.5. Drill and tap casing at lowest point for drain port.

2.4.2. Impeller: To ASTM A743 CF8M, Stainless Steel Type 316, fully enclosed and dynamically balanced to ANSI G6.3 and fitted to shaft with key. Use two-plane balancing when installed impeller diameter is less than 6 times impeller width.

2.4.3. Pump Shafts:

2.4.3.1. [4380] Close-coupled: Steel motor shaft with Stub Shaft: Stainless steel to ASTM A276, Type 316

2.4.4. Flanges: To ANSI/ASME B16.5, Class 125.

2.4.5. Flush Line: 3/8 inch braided stainless steel complete with vent.

2.4.6. Casing O-ring: EPDM.

2.4.7. Mechanical Seal: Non-potable, Type AB2 outside balanced seal design and rated to 200˚F maximum

2.4.7.1. Rotating face: Resin bonded carbon

2.4.7.2. Stationary face: Sintered Silicon Carbide

2.4.7.3. Seal rotating hardware: Stainless Steel

2.4.7.4. Secondary / shaft seal elastomer: Viton®

2.4.8. Mechanical Seal: [Potable] [Non-potable], Type 2A inside single spring seal design and rated to [200˚F] [250˚F] maximum

2.4.8.1. Rotating face: [Resin bonded carbon] [Antimony loaded carbon] [Sintered Silicon Carbide]

2.4.8.2. Stationary face: Sintered Silicon Carbide

2.4.8.3. Seal rotating hardware: Stainless Steel

2.4.8.4. Secondary / shaft seal elastomer: EPDM

2.5. MOTOR

2.5.1. Permanent Magnet Motor: To IE5 efficiency

2.5.1.1. Horsepower: [_____] HP.

2.5.1.2. Enclosure: TEFC.

2.5.1.3. Efficiency: IE5 efficiency To IEC 60034-30-1

2.5.1.4. Power supply: 200 – 240, 60 Hertz

2.6. PUMP CONTROLS

2.6.1. Control: Integrated with UL type 12 minimum enclosure rating, [sensorless] controls complete with [fused disconnect switch] and menu-driven graphical touchscreen interface.

2.6.1.1. Provide near unity displacement power factor (cos Ø) without need for external power factor correction capacitors at all loads and speeds using VVC-PWM type integrated controls

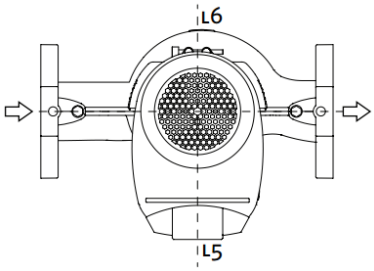
2.6.1.1.1. Incorporate DC link reactors for reduction of mains borne harmonic currents and DC link ripple current to increase DC link capacitor lifetime.

2.6.1.1.2. Fit RFI filters as standard to ensure integrated controls meets low emission and immunity requirements.

2.6.1.1.3. Ensure additional 3 % AC line reactor is available for controls with saturating (nonlinear) DC link reactors.

2.6.1.2. Minimum system pressure to be maintained: [_____] [feet] [psig] head

2.6.1.3. Orientation: L5.



2.6.1.4. Protocol: BACnet™ MS/TP

2.6.1.5. Sensorless override for BAS/BMS control signal.

2.6.1.6. Closed loop PID control

2.6.1.7. Enclosure: UL Type 12

2.6.1.8. EMI/RFI Control: Integrated filter designed to DIN EN61800-3.

2.6.1.9. Harmonic suppression: Equivalent 5% impedance AC line reactor) to mitigate harmonics to support IEEE 519 system requirements.

2.6.1.10. Cooling: Fan cooled, surface cooling.

2.6.1.11. Ambient working conditions: [14˚F to +113˚F], up to [3300] feet above sea level. Refer to I&O Manual for specific temperature rating by frame size.

2.6.1.12. Analog I/O: 2 inputs minimum, 1 output minimum. Output can be configured for voltage or current.

2.6.1.13. Digital I/O: 2 inputs minimum, 2 outputs minimum. Outputs can be configured as inputs.

2.6.1.14. Pulse inputs: 2 programmable minimum.

2.6.1.15. Relay outputs: 2 programmable minimum.

2.6.1.16. Communications ports: 1- RS485.

2.6.1.17. One volt free contact.

2.6.1.18. Auto alarm reset.

2.6.2. Software: Ensure software for sensorless control includes automatic speed control in variable volume systems without need for pump mounted (internal/external) or remotely mounted differential pressure sensor.

2.6.2.1. Operating mode under sensorless control: Quadratic Pressure Control (QPC).

2.6.2.1.1. Ensure head reduction with reducing flow conforms to quadratic control curve.

2.6.2.1.2. Head at zero flow: [40] % minimum of design duty head.

2.6.2.2. Linear or Proportional Pressure Control without sensor is unacceptable.

2.6.2.3. Ensure control mode setting and minimum/maximum head set points are user adjustable using built-in programming interface.

2.6.2.4. Ensure integrated control software is capable of controlling pump performance for non-overloading power at every point of operation.

2.6.2.5. Ensure integrated control software is capable of flow rate display and data output of ± 5% accuracy to BAS/BMS.

2.6.2.6. Ensure the controls can display and digitally transmit real-time flow & values

2.6.3. Include energy monitoring log function to ASHRAE 189.1P.

2.6.4. For multiple pump configuration ensure [duty/standby] [parallel Sensorless pump control with best efficiency staging] is applied

2.6.5. Parallel pump staging will be provided without the use of BAS / BMS and speed / frequency based staging shall not be acceptable and a locally mounted logic controller shall be used for best efficiency staging of up to 4 parallel pumps.

2.6.6. Parallel pump speed control shall be achieved without the need for differential pressure sensors either in the mechanical room or remotely installed in the system.

2.6.7. The Parallel Sensorless Pump Controller will have in-built redundancy features including:

2.6.7.1. 'Daisy-chained' power connection to each pump controller

2.6.7.2. Controller 'offline' operational protection preventing loss of system flow

2.6.8. Energy Performance Bundle: [Yes] [No]

2.6.8.1. Auto-flow balancing - Automatically determines control curve between design flow at on-site system head, and minimum (zero-head) flow for energy savings

2.6.8.2. Maximum flow control – Limits flow rate to pre-set maximum for potential energy savings

Maximum flow rate: [_____] [gpm] [L/s]

2.6.9. Protection Bundle: Yes

2.6.9.1. Minimum flow control – Attempts to maintain flow rate to pre-set minimum to protect equipment in system

Minimum flow rate: [_____] [gpm] [L/s]

2.6.9.2. Bypass valve control – Actuates a bypass valve to protect flow sensitive equipment if pre-set minimum flow rate is reached

2.7. PUMP MOTOR AND CONTROLS PROTECTION

2.7.1. Include protection as follows:

2.7.1.1. Motor phase to phase fault.

2.7.1.2. Motor phase to ground fault.

2.7.1.3. Loss of supply phase.

2.7.1.4. Over voltage.

2.7.1.5. Under voltage.

2.7.1.6. Motor over temperature.

2.7.1.7. Inverter overload.

2.7.1.8. Over current

2.7.2. Ensure controls run automatic motor adaptation (AMA) for superior motor protection and control.

2.8. FABRICATION

2.8.1. Install integrated controls on each pump for use with BAS/BMS for energy logging to ASHRAE 189.1P.

2.8.2. Pre-program integrated intelligent controls for each pump before pump leaves factory.

2.8.2.1. Install flush / vent line in factory.

2.8.2.1.1. Ensure flush / vent line runs from seal chamber to [pump discharge] [pump suction].

2.8.2.2. Mark pumps and controls with coordinated identification.

2.9. ACCESSORIES

2.9.1. Pipe Flanges: To ANSI/ASME B16.5, Class [150] [300].

2.9.2. Hangers and Supports: in accordance with Section [23 05 29 – Hangers and Supports for HVAC Piping and Equipment].

2.9.3. Vibration isolators, neoprene isolation pads in accordance with Section [23 05 48 – Vibration and Seismic Controls for HVAC].

2.9.3.1. Acceptable Material: ARMSTRONG, SG.

2.9.4. Triple Duty Valve: [Cast iron] [Ductile iron] valve body, tight shut-off, spring - closure type silent non-slam check valve with effective throttling design capability.

2.9.4.1. Valve stem: Stainless steel with flat surfaces for adjustment with open-end wrench.

2.9.4.2. Acceptable Material: ARMSTRONG, Model FTV Flo-Trex Combination Valve.

2.9.5. Pressure Gauges: 4½ inch diameter sized to meet system pressure requirements.

2.10. PRODUCT SUBSTITUTIONS

2.10.1. Substitutions: [In accordance with Section 01 23 13 - Product Substitution Procedures] [No substitutions permitted].

2.10.1.1. Ensure materials and installation costs are supplied by single manufacturer.

3. EXECUTION

3.1. INSTALLERS

3.1.1. Use only installers with 2 years minimum experience in work similar to work of this Section.

3.2. EXAMINATION

3.2.1. Verification of Conditions: Verify that conditions of piping previously installed under other Sections or Contracts are acceptable for pump installation in accordance with manufacturer's written recommendations.

3.2.1.1. Visually inspect piping, piping configuration and piping location in presence of Consultant.

3.2.1.2. Inform Consultant of unacceptable conditions immediately upon discovery.

3.2.1.3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.3. PREPARATION

3.3.1. Weld pipe flanges to piping system for installation of pump.

3.3.1.1. Ensure suction and discharge pipe flanges are aligned and square to pipe.

3.4. INSTALLATION

3.4.1. Install pumps level in accordance with pump manufacturer's written recommendations

3.4.2. Ensure that pump is pipe-mounted and free to float with any movement, expansion and contraction of piping system.

3.4.2.1. Support pump using floor mounted saddle as required.

3.4.2.2. For vertical in-line pumps supported from structure, ensure no pipe strain is imposed on pump flanges.

3.4.2.3. Use vibration isolators, neoprene isolation pads to meet project conditions in accordance with Section [23 05 48 – Vibration and Seismic Controls for HVAC].

3.4.3. Install Flo-Trex valve [At [90Deg – Discharge up only] [180Deg - Straight] after recommended length (2D min) of spool piece on discharge connection from pump] [vertically-up after long radius elbow off pump discharge valve]

3.4.4. Install suction guides on pump suction connection.

3.4.5. Install pressure gauges on suction and discharge pump connections.

3.4.6. Install hangers and supports in accordance with Section [23 05 29 – Hangers and Supports for HVAC Piping and Equipment].

3.4.6.1. Adjust hangers and supports after pump is installed to ensure proper support.

3.4.7. Align pipe flanges with pump flanges and bolt together in accordance with pump manufacturer's written recommendations.

3.4.8. Connect pumps and integrated control system to electrical distribution system to IEEE regulations and with authority having jurisdiction in accordance with Section [26 05 00 – Common Work Results for Electrical].

3.4.8.1. Include wiring to most remote sensor in system where applicable.

3.4.8.1.1. Do not run pumps dry to check rotation.

3.5. FIELD QUALITY CONTROL

3.5.1. Field Inspection: Coordinate field inspection in accordance with Section [01 45 00 Quality Control].

3.5.2. Manufacturer's Services:

3.5.2.1. Coordinate manufacturer's services with Section [01 45 00 - Quality Control].

3.5.2.1.1. Have manufacturer review work involved in handling, installation, protection, and cleaning of hydronic pumps and components, and submit written reports in acceptable format to verify compliance of Work with Contract conditions.

3.5.2.2. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation review in accordance with manufacturer's instructions.

3.5.2.2.1. Report any inconsistencies from manufacturer's recommendations immediately to Consultant.

3.5.2.3. Schedule site visits to review work at stages listed:

3.5.2.3.1. After delivery and storage of pumps, controls and components, and when preparatory work on which Work of this Section depends is complete, but before installation begins.

3.5.2.3.2. Upon completion of Work, after cleaning is carried out.

3.5.2.3.3. Obtain reports within three days of review and submit immediately to Consultant.

3.6. COMMISSIONING

3.6.1. Validate alignment, rotation, motor current draw, flows and pressures in accordance with Section [23 08 00 – Commissioning of HVAC].

3.6.2. On-site commissioning of Design Envelope Pumps and Pump Manager [Yes] [No]

3.7. CLEANING

3.7.1. Progress Cleaning: Perform cleanup as work progresses [in accordance with Section 01 74 00 Cleaning and Waste Management].

3.7.1.1. Leave work area clean end of each day.

3.7.2. Final leaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 00 – Cleaning and Waste Management].

3.7.3. Waste Management:

3.7.3.1. Co-ordinate recycling of waste materials with 01 74 19 Construction Waste Management and Disposal.

3.7.3.2. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.

3.7.3.3. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.8. PROTECTION

3.8.1. Protect installed products and components from damage during construction.

3.8.2. Repair damage to adjacent materials caused by hydronic pump installation.

3.8.3. Pump Manager [building owners are to go to http://armstrongfluidtechnology.com/registration to activate].

END OF SECTION 23 21 23 – HYDRONIC PUMPS

Submittal

Ref. #: SQFNU000990_1

Design Envelope Close-Coupled Vertical In-Line Pump

Model: Series Design Envelope Sensorless 4380 0205-003.0

Project name:	De Pere Community Center	**Representative:**	Dave Le May
Location:		**Phone number:**	920.462.5108
Date submitted:	3/29/2022 6:02 AM	**e-mail:**	dlemay@gohpp.com
Engineer:		**Submitted by:**	Le May, Dave

Application design data

Tag number:	P-3 & P-4	Configuration:	Single
Service:	CENTRAL HEATING SYSTEM	Suction pressure:	0 ft
Location:	BOILER ROOM	Fluid:	Non-Potable Fluid - Water
Qty:	2	Operating temperature:	60 °F
Total system flow:	145 USgpm	Duty flow per pump:	145 USgpm
System head:	49 ft	Viscosity:	31 SSU
Environment:	Indoors	Specific gravity:	1.0000
Total dissolved solids:	0 ppm	Safety factor % flow:	0 %
Efficiency at Design:	78.68 %	Safety factor % head:	0 %
NPSHR:	7.2 ft	Absorbed Power/BHP:	2.28 hp
Min. maintained system pressure*:	19.6 ft	Impeller diameter:	4.97 in
Standby qty:	0	Pump/motor run qty:	1
PEIvl:	0.43	ERvl:	57
Outlet velocity:	13.86 ft/s		

*If minimum maintained system pressure is not known, default is 40% of design head.

Materials of construction

Construction:	Low Pressure Ductile Iron	Impeller:	316 Stainless Steel
Rating:	ANSI-125	Casing o-ring:	EPDM
Connections:	Inlet: 2in, Outlet: 2in	Flush line:	Braided Stainless Steel
Casing (volute):	Ductile Iron, E-coated	Stub shaft:	316 Stainless Steel

Mechanical seal data

Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS) ****:	2000 PPM

Electrical data

Supplier:	Armstrong	Insulation class:	Class F Insulation
Size:	3 hp	Motor type:	Permanent Magnet
Frame size:	IEC90	Efficiency:	IE5
Enclosure:	TEFC	Power supply:	208/3/60
Operating speed @ 100% flow:	2824 rpm	Operating speed @ 50% flow***:	1959 rpm

***Based on minimum pressure setting of 40% of design head

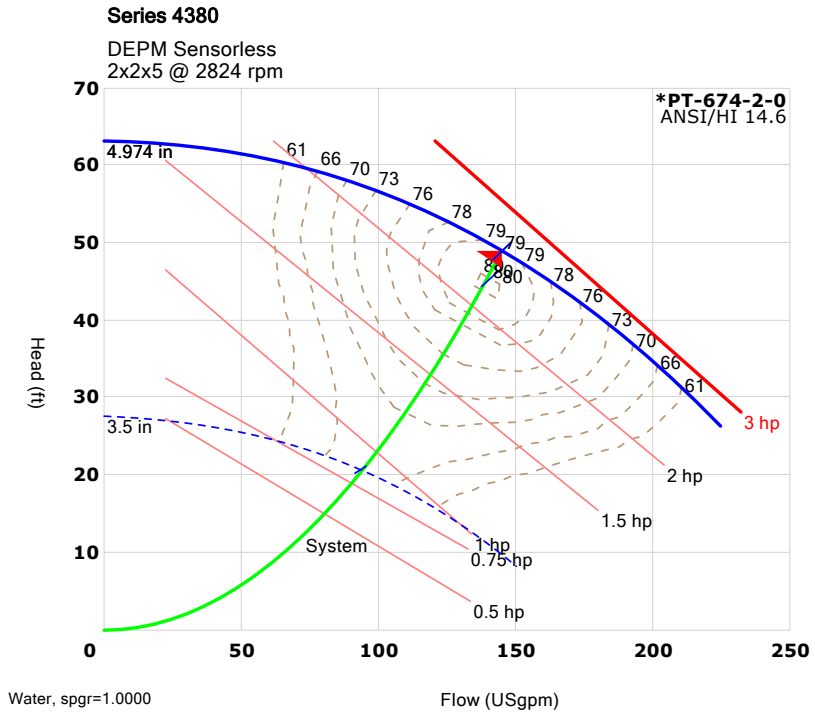
****Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

DEPM controller data

Sensorless control:	Yes-Quadratic press control	Communication port:	RS 485
Communication protocol (*):	Default Field Reconfigurable	Analog inputs:	2 (current or voltage)
Enclosure:	UL Type 12/IP55	Analog outputs:	1 (current or voltage)
Fused disconnect switch:	Loose Supply	Digital inputs:	2 (programmable)
Control orientation:	L5	Digital outputs:	2 (programmable)
Expansion card:	None	Cooling:	Not Applicable
Absorbed Power/BHP at 50% load/flow and 55% of design head:	1.25 hp	Ambient temperature:	14˚F to 113˚F (up to 3280 ft elevation)
Meets ASHRAE 90.1:	Yes	EMI/RFI control:	Integrated filter to meet EN61800-3

(*): If Default - Field reconfigurable is selected, Default from factory will be BACnet MS/TP and can be reconfigured in the field.

Performance curve

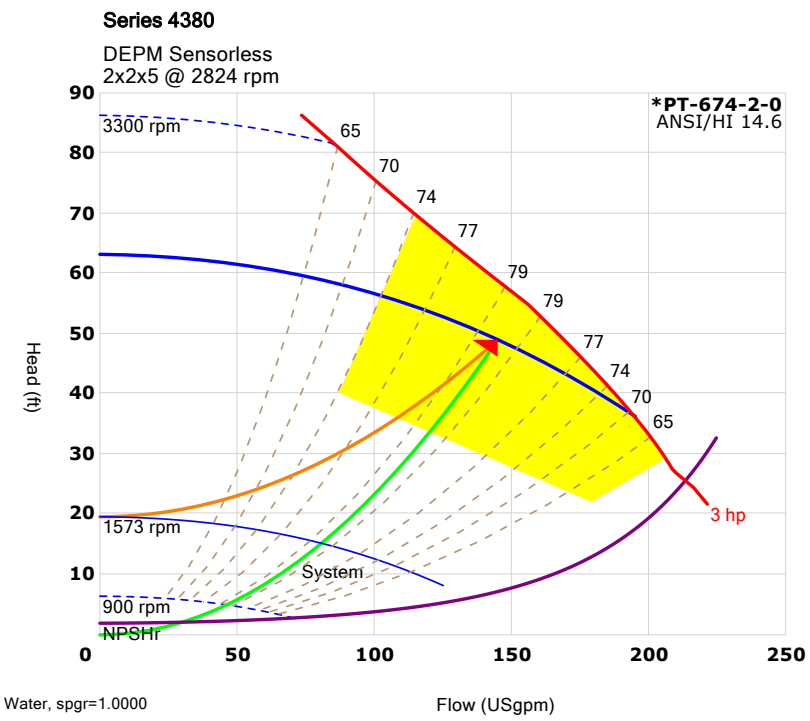


----Admin Data----
Tag Num: P-3 & P-4
Service: CENTRAL HEATING SYSTEM
Location: BOILER ROOM

----Motor Data----
Motor Size: 3 hp

----Design Duty Points---
Flow: 145 USgpm
Head: 49 ft
Impeller: 4.97 in

----Performance Data---
- **NPSHR: 7.2 ft**
- **Eff. @ Design: 78.68 %**
- **Absorbed Power/BHP @ Design: 2.28 hp**
- **Mtr Capability @ Rated Spd: 2.59 hp**
- **BEP @ Design Imp: 78.7 % @ 147.19 USgpm**
- **%maximp.range: 100.00%**
- **Outlet velocity: 13.86 ft/s**
- **Op. Speed: 3000 rpm**



--Control Data—

1. Hmax @ 2354 rpm:
NPSHR: 7.2 ft
Intersection Pt: 145 usgpm @ 49 ft
bhp=2.28 hp, eff=78.68 %%, %bepq=99 %%

2. Control (QPC) @ 2574 rpm:
NPSHR: 5.45 ft
Intersection Pt: 126.88 USgpm @ 42.11 ft
bhp=1.72 hp, eff=78.57%, %bepq=94.24%

3. Control (QPC) @ 2323 rpm:
NPSHR: 3.9 ft
Intersection Pt: 107.3 USgpm @ 35.7 ft
bhp=1.24 hp, eff=77.97%, %bepq=88.01%

4. Control (QPC) @ 2073 rpm:
NPSHR: 2.56 ft
Intersection Pt: 85.55 USgpm @ 29.83 ft
bhp=0.85 hp, eff=76.18%, %bepq=78.5%

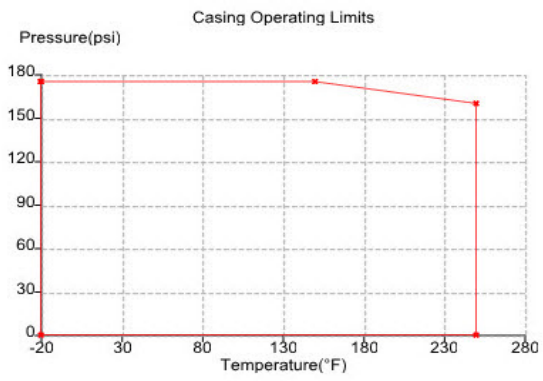
5. Control (QPC) @ 1823 rpm:
NPSHR: 1.47 ft
Intersection Pt: 59.45 USgpm @ 24.54 ft
bhp=0.52 hp, eff=70.57%, %bepq=61.95%

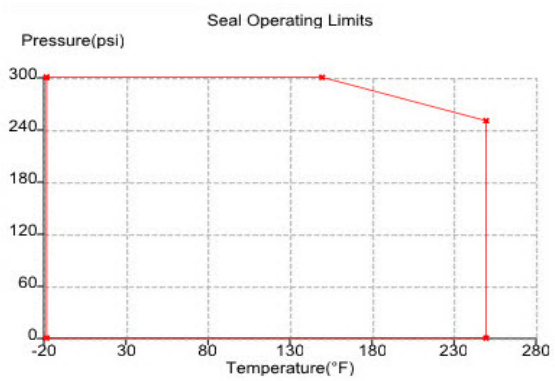
6. Hmin: 19.6 ft 1573 rpm:
NPSHR: 0.6 ft
Intersection Pt: 0 USgpm @ 19.6 ft
(Head Q Min) Setting= 40% Hmax

Design envelope pumping unit capability

Operating point	Flow	Head	Efficiency
Full capability at 100% design flow	145 USgpm	58.83 ft	78.34%
Design point	145 USgpm	49 ft	78.68 %
50% average flow (with default load profile)	72.5 USgpm	26.95 ft	74.08 %

Operating limits (temperature - pressure)





Maximum pressure: 175 psi

Maximum temperature: 250 F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Options

Sensorless bundle:	Yes	DEPC Parallel sensorless:	No
Energy performance bundle:	No	Protection bundle:	No
Dual season setup:	No	Zone optimization bundle:	No

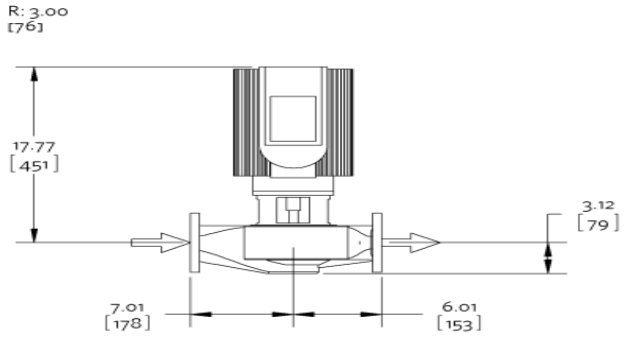
Cooling		Heating	
Q1:	N/A	Q2:	N/A
H1:	N/A	H2:	N/A
H1 min:	N/A	H2 min:	N/A
Maximum flow:	N/A	Minimum flow:	N/A

Optional Services

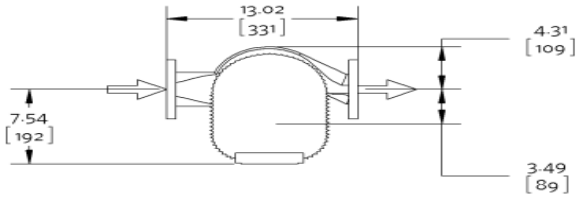
On-site pump commissioning:	Cost not Included	Extended warranty:	No
Pump manager:	Yes	Include spare parts qty:	0

Dimensional data (not for construction)

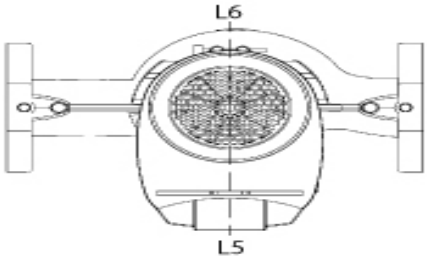
Side view



Top view



Weight: 75.53 lb [34.26 kg], Units of measure: inches [millimeters]
- Not to scale
- R = minimum lifting clearance required above motor
- Coupling guard and flush line (not shown) are supplied
- Tolerance of ± 0.125 inch (± 3 mm) should be used
- For certified dimensions, please contact your Armstrong representative
- Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports



Connection details

Connection	Size	Rating	OD	Bolt quantity*	BCD	Bolt size
Inlet	2	ANSI-125	6.00	4	4.75	0.625
Outlet	2	ANSI-125	6.00	4	4.75	0.625

*Equally spaced straddling centreline

Flow Readout Accuracy

The Design Envelope model selected will provide flow reading on the pump touchscreen & digitally for the BMS. The flow readout will be factory tested to ensure ± 5% accuracy.

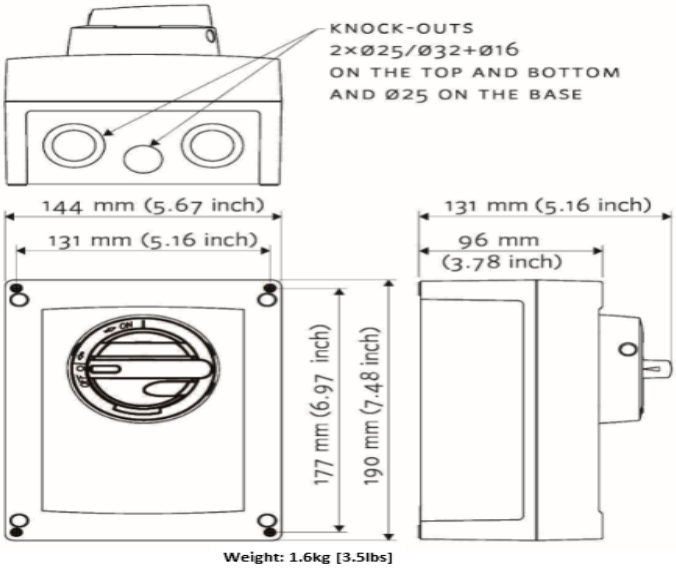
Special instructions

Reference Motor Specification AES 05007.
UL STD 778 & CSA STD C22.2 no.108 certified

Selected options

Testing: No Test Certification Required
Seal Environment Accessories: None
Fused Disconnect: Loose Supply
Space Heater: No
Sensorless Bundle: Sensorless control
Constant flow control
Constant pressure control
Flow readout

Fused Disconnect Switches for wall mounting:


KNOCK-OUTS
2×Ø25/Ø32+Ø16
ON THE TOP AND BOTTOM
AND Ø25 ON THE BASE
144 mm (5.67 inch)
131 mm (5.16 inch)
131 mm (5.16 inch)
96 mm
(3.78 inch)
177 mm (6.97 inch)
190 mm (7.48 inch)
OFF
ON
Weight: 1.6kg [3.5lbs]

Submittal

Ref. #: SQFNU000990_1

close-coupled vertical in-line 4360 pump

Model: Series 4360 - 1.25B - 2p - 1.5 hp - (Factory Choice Motor)

Project name:	De Pere Community Center	**Representative:**	Dave Le May
Location:		**Phone number:**	920.462.5108
Date submitted:	3/29/2022 6:02 AM	**e-mail:**	dlemay@gohpp.com
Engineer:		**Submitted by:**	Le May, Dave

Application design data

Tag number:	P-1 & P-2	Configuration:	Single
Service:		Suction pressure:	0 ft
Location:		Fluid:	Non-Potable Fluid - Water
Qty:	2	Operating temperature:	60 °F
Total system flow:	50 USgpm	Duty flow per pump:	50 USgpm
System head:	45 ft	Viscosity:	31 SSU
Total dissolved solids:	0 ppm	Specific gravity:	1.0000
NPSHR:	11.79 ft	Absorbed Power/BHP:	0.96 hp
%Mtr Safety*:	55.89%	Efficiency at Design:	59.05 %
Outlet velocity:	10.73 ft/s	Impeller diameter:	4.13 in
PEIcl:	0.985065779	ERcl:	1.493422125
Standby qty:	0	Pump/motor run qty:	1

*Motor safety factor above duty point.

Materials of construction

Construction:	Bronze Fitted	Impeller:	Bronze
Rating:	ANSI-125	Casing gasket:	Confined Non-Asbestos Fiber
Connections:	Inlet: 1.25 in, Outlet: 1.25 in	Flush line:	Braided Stainless Steel
Casing (volute):	Cast Iron	Shaft sleeve:	316 Stainless Steel

Mechanical seal data

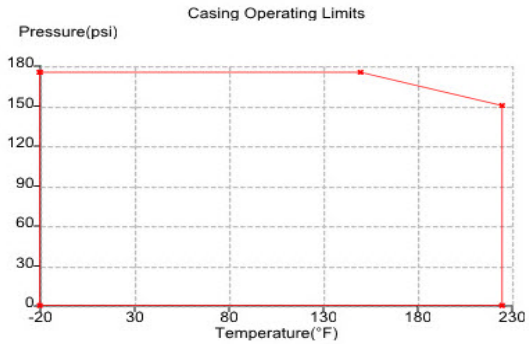
Seal type:	Inside Single Spring	Rotating face:	Resin Bonded Carbon
Manufacturer code:	C-ssc L EPSS 2A	Stationary seat:	Sintered Silicon Carbide
Springs:	Stainless Steel	Secondary seal:	EPDM
Rotating hardware:	Stainless Steel	Maximum total dissolved solids (TDS)*:	2000 PPM

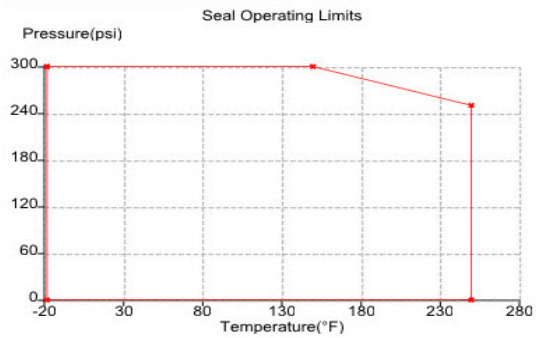
*Note: Please ensure proper seal is selected by inputting Total Dissolved Solids (TDS) in PPM in ADEPT if water quality is poor at site. Also select Flush Line Filter or Cyclone Separator if there are other contaminants in the fluid.

Electrical data

Supplier:	Factory Choice	Insulation class:	Class B Insulation
Frame size:	56C	Motor type:	Induction
Speed:	3520 rpm	Size:	1.5 hp
Enclosure:	ODP	Efficiency:	NEMA Premium 12.12
Power supply:	208/3/60		

Operating limits (temperature - pressure)



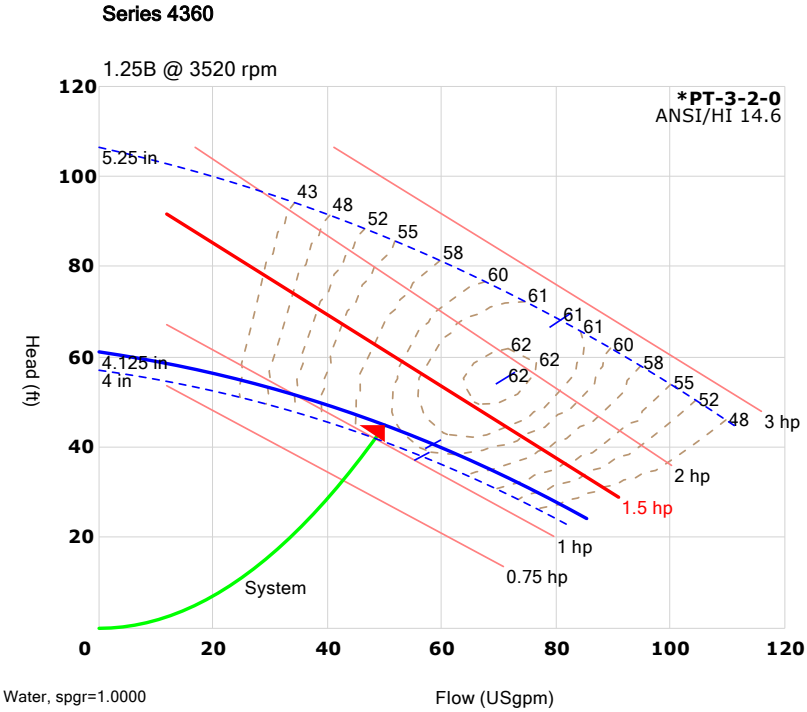


Maximum pressure: 175psi

Maximum temperature: 225F

All Pump casings are hydrostatically tested to requirements of ANSI/HI 14.6 standard.

Performance curve



----Admin Data----
Tag Num: P-1 & P-2
Service:
Location:

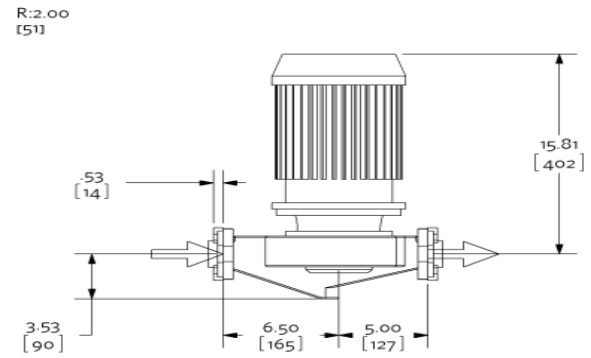
----Motor Data----
Motor Size: 1.5 hp

----Design Duty Points---
Flow: 50 USgpm
Head: 45 ft
Impeller: 4.13 in

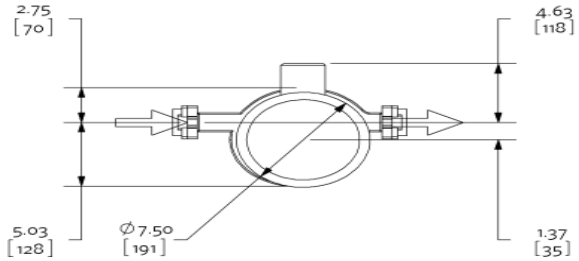
----Performance Data---
- **NPSHR: 11.79 ft**
- **Eff. @ Design: 59.05 %**
- **Absorbed Power/BHP @ Design: 0.96 hp**
- **Mtr Capability @ Rated Spd: 1.5 hp**
- **Motor safety factor: 55.89%**
- **BEP @ Design Imp: 59.9 % @ 58.76 USgpm**
- **%maximp.range: 9.96%**
- **Outlet velocity: 10.73 ft/s**

Dimensional data (not for construction)

Side view



Top view



Inverter motor type: Inverter duty

Weight: 38 lb [17.24 kg], Units of measure: inches [millimeters]

- Not to scale
- Tolerance of ± 0.125 inch (± 3 mm) should be used
- For certified dimensions, please contact your Armstrong representative
- Pump equipped with casing drain plug and ¼ inch NPT suction and discharge gauge ports

Connection details

Connection	Size	Rating	Type
Inlet	1.25	NPT	Female
Outlet	1.25	NPT	Female

Special instructions

Reference Motor Specification AES 05007.
This selection is non-compliant with sensorless quadratic curve control, but will indicate flow and pressure, and can operate in constant pressure and constant flow modes when flow is less than best efficiency point flow at that speed.
Pump (Factory Choice Motor)

Selected options

Testing: No Test Certification Required
Seal Environment Accessories: None
Pre-Wired Control Bridge: No
Space Heater: No
Motor Thermistor: No Thermistors
Wye-Delta Starting: No

Submittal

Ref. #: SQFNU000990_1

Flo-trex valve

Model: FTV-2TS-Flo-Trex Valve-Straight

Project name:	De Pere Community Center	**Representative:**	Dave Le May
Location:		**Phone number:**	920.462.5108
Date submitted:	3/29/2022 6:02 AM	**e-mail:**	dlemay@gohpp.com
Engineer:		**Submitted by:**	Le May, Dave

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
P-1 & P-2	1	FTV-2TS	2 in	Straight	NPT	50 USgpm	3.5 ft	N/A

*at design flow

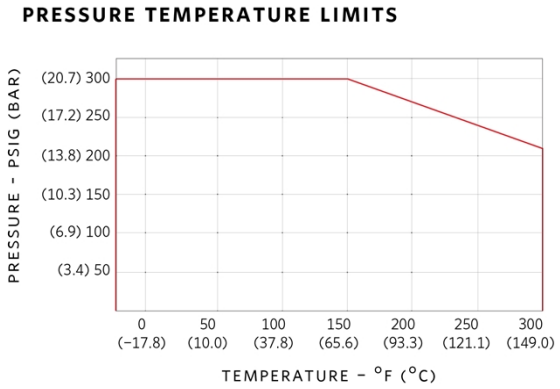
Materials of construction

FTV-2TS-Flo-Trex Valve-Straight

Body:	304 Stainless Steel	Spring:	304 Stainless Steel
Disc:	Brass	O rings:	EPDM
Seat:	Not Applicable	2 metering ports:	Brass Body with EPDM Check and Gasketed Cap
Stem:	Brass	2 drain tappings:	1/4in NPT with SS 304 Plug

Operating limits (temperature - pressure)

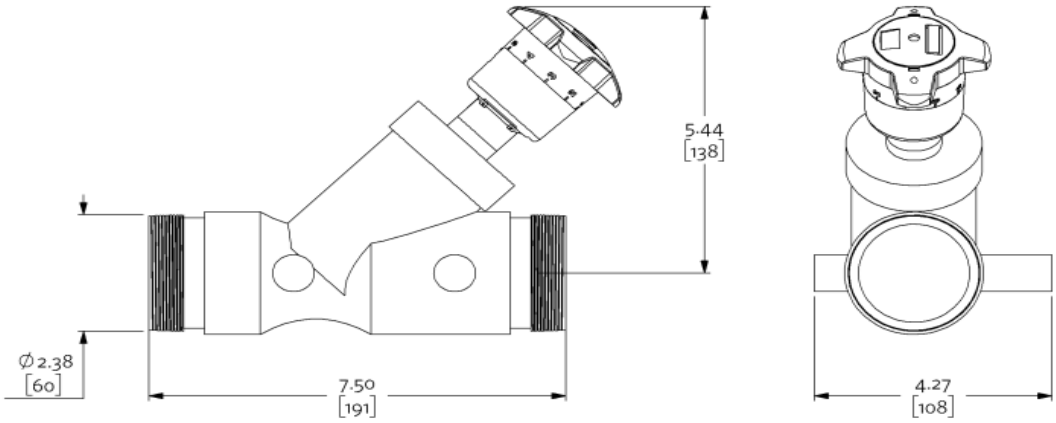
FTV-2TS-Flo-Trex Valve-Straight



Maximum pressure: 300 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-2TS-Flo-Trex Valve-Straight	Weight: 6 lb [2.72 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFNU000990_1

Flo-trex valve

Model: FTV-4FS-Flo-Trex Valve-ANSI-125-Straight

Project name:	De Pere Community Center	**Representative:**	Dave Le May
Location:		**Phone number:**	920.462.5108
Date submitted:	3/29/2022 6:02 AM	**e-mail:**	dlemay@gohpp.com
Engineer:		**Submitted by:**	Le May, Dave

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
P-3 & P-4	2	FTV-4FS	4 in	Straight	Flanged	145 USgpm	2.8 ft	N/A

*at design flow

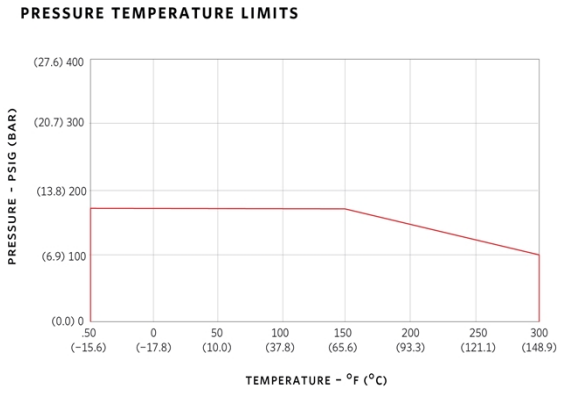
Materials of construction

FTV-4FS-Flo-Trex Valve-ANSI-125-Straight

Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

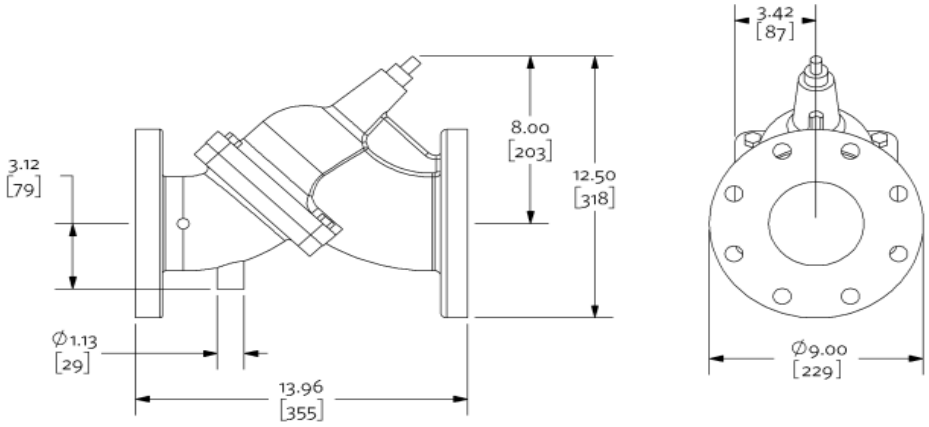
FTV-4FS-Flo-Trex Valve-ANSI-125-Straight



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-4FS-Flo-Trex Valve-ANSI-125-Straight	Weight: 59 lb [26.76 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

Submittal

Ref. #: SQFNU000990_1

Flo-trex valve

Model: FTV-3FS-Flo-Trex Valve-ANSI-125-Straight

Project name:	De Pere Community Center	**Representative:**	Dave Le May
Location:		**Phone number:**	920.462.5108
Date submitted:	3/29/2022 6:02 AM	**e-mail:**	dlemay@gohpp.com
Engineer:		**Submitted by:**	Le May, Dave

Application design data

Tag	Qty	Model	Size Inlet/Outlet	Config	Pipe Type	Design flowrate	Pressure Drop*	Associated pump
P-1 & P-2	1	FTV-3FS	3 in	Straight	Flanged	76 USgpm	3 ft	N/A

*at design flow

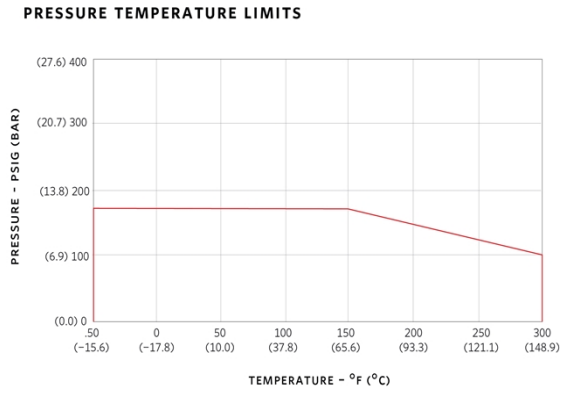
Materials of construction

FTV-3FS-Flo-Trex Valve-ANSI-125-Straight

Body:	Cast Iron	Spring:	302 Stainless Steel
Disc:	Brass	O rings:	BUNA N
Seat:	EPDM	2 metering ports:	NPT Brass Body with EPT Check and Gasketed Cap
Stem:	416 Stainless Steel	2 drain tappings:	1/4in with Brass Plug

Operating limits (temperature - pressure)

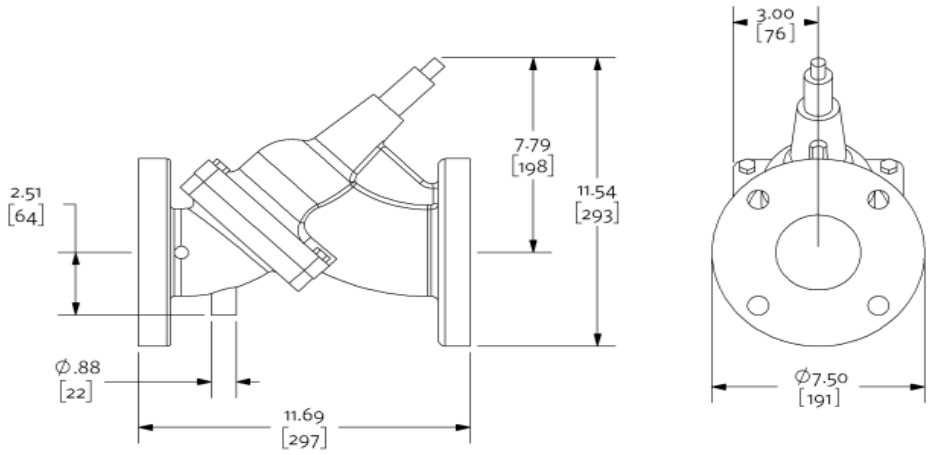
FTV-3FS-Flo-Trex Valve-ANSI-125-Straight



Maximum pressure: 175 psi
Maximum temperature: 300 F

Dimensional data (not for construction)

Model: FTV-3FS-Flo-Trex Valve-ANSI-125-Straight	Weight: 39 lb [17.69 kg]
Side view	Front view



Not to scale
Units of measure: inches [millimeters]
Tolerance of +/- 0.125 inch (+/- 3 mm) should be used
For certified dimensions, please contact your Armstrong representative

EXHIBIT C

JOHN WOOD EXPANSION TANK SPECIFICATIONS

THE JOHN WOOD COMPANY

www.johnwood.com

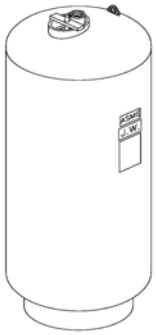
SUBMITTAL

Form 620

Job Name: **De Pere Community Center**		
Job No:	JWC Representative: **Heat & Power Products Inc.**	
Tag No.: **ET-1**	Submitted By:	Date:
Engineer:	Approved By:	Date:
Contractor:	Order No.:	Date:

JAER Series

ASME Bladder Type Expansion Tanks With Top Connection / Type IV Not for Potable Water Systems



APPLICATION

- JAER Series precharged bladder type expansion tanks are designed to absorb the expansion forces of heating or cooling system water to maintain the proper system pressurization.
- By holding the system water in the replaceable bladder, the JAER Series tanks eliminate problems such as tank corrosion and water-logging.

DESIGN PRESSURE AND TEMPERATURE

- Maximum design pressure:
  JAER-23-601 to 607: 150 PSI (1035 kPa)
  JAER-23-608 to 610, 668: 125 PSI (862 kPa)
- 175, 200, 250 & 300 PSI available upon request
- Maximum design temperature: 240° F (115° C)

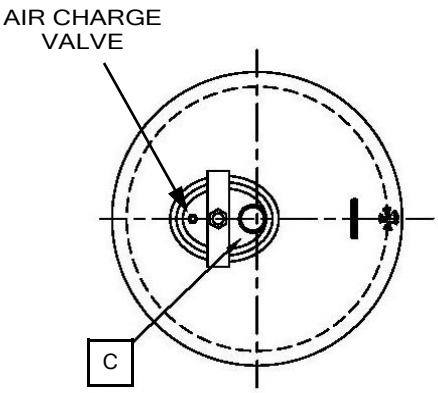
SPECIFICATIONS

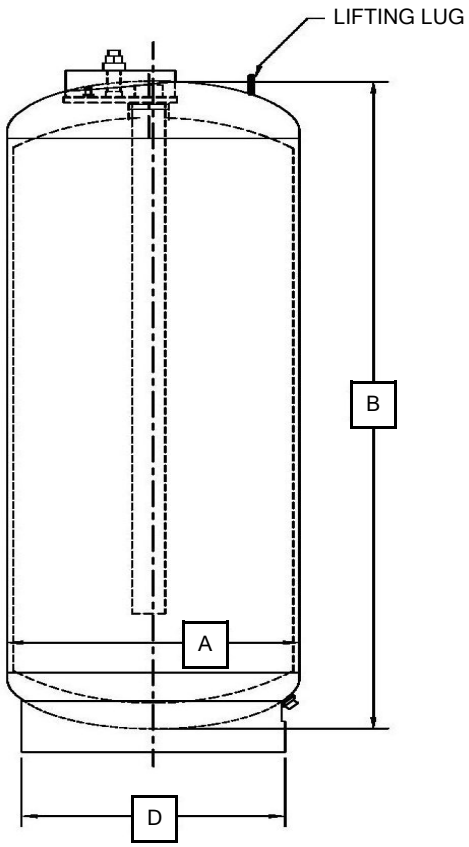
- Designed and built in accordance with the ASME BPV Code Section VIII, Division 1
- Installation: vertical or horizontal
- Shell: Carbon Steel with exterior gray primer finish
- System connection: top mounted Carbon Steel MNPT connection with flexible internal flow tube
- Replaceable bladder: high quality butyl rubber
- Full acceptance bladder
- Maximum acceptance volume is approximately 90% of the tank capacity
- Suitable for use in systems containing glycol
- Air charge valve: ¼" Schrader charging valve, top mounted with protective guard
- Maximum precharge pressure with standard flow tube: 80 PSI (optional high precharge flow tube is required for precharge pressures above 80 PSI – not included with the standard design)
- Standard factory precharge: 12 PSI

TYPICAL DESIGN SPECIFICATION

Furnish and install as shown on plans John Wood Model No. JAER-23-_____ (_____ gallon / _____ liter) ASME precharged vertical / horizontal steel expansion tank with replaceable heavy duty butyl rubber bladder. The tank shall have a top mounted ____" MNPT system connection and a charging valve connection (Schrader valve) with full guard to facilitate on-site charging of the tank to meet system requirements. The tank shall be fitted with a lifting lug and a base designed for vertical installation or saddles for horizontal installation. The tank must be designed and constructed in accordance with the ASME Boiler and Pressure Vessel Code Section VIII, Division I, with a stamped MAWP of _____PSI (_____ kPa) and a maximum design temperature of 240°F (115°C).

JAER Series / Type IV





OPTIONS
☐ High Precharge Flow Tube (required for pre-charge pressures above 80 PSI; suitable for vertical installations only)
☐ California Code Sight Glass
☐ Seismic Design

MODEL NUMBER	CODE SYMBOL	MAWP	TANK VOLUME		A DIAMETER		B OVERHEADS		C SYS CONN	D BASE DIAMETER		TANK WEIGHT	
	UM/U	PSIG	GAL	L	IN	MM	IN	MM	INCH (MNPT)	IN	MM	LBS	KG
*JAER-23-601	UM	150	10	40	12	305	22	559	1	8⅝	219	50	23
*JAER-23-602	UM	150	15	60	12	305	33½	851	1	8⅝	219	65	30
*JAER-23-603	UM	150	24	90	12	305	52	1321	1	8⅝	219	90	41
*JAER-23-604	UM	150	30	110	14	356	48	1219	1	8⅝	219	90	41
*JAER-23-605	UM	150	35	130	14	356	55½	1410	1	8⅝	219	100	45
*JAER-23-606	U	150	40	150	14	356	62¼	1581	1	8⅝	219	115	52
*JAER-23-607	U	150	60	230	16	406	72⅜	1838	1½	11½	292	155	70
*JAER-23-608	U	125	80	300	20	508	63¼	1607	1½	18	457	175	79
*JAER-23-668	U	125	105	400	24	610	56	1422	1½	18	457	225	102
*JAER-23-609	U	125	120	450	24	610	66	1676	1½	18	457	260	118
*JAER-23-610	U	125	135	500	24	610	72	1829	1½	18	457	275	125

Dimensions are approximate and subject to change
Dimensions should not be used for pre-piping
Weights are approximate
*Stock model

EXHIBIT D

CALEFFI MAGNETIC AIR AND DIRT SEPARATOR SPECIFICATIONS

DISCAL DIRTMAG®
magnetic air and dirt separator

NA546M ASME Steel series: 2 - 6 inch

Submittal Data 02920.2 NA — Issue Date 04/2017

Application

The Caleffi DISCALDIRTMAG® magnetic air and dirt separator incorporates three important functions for hydronic systems: air separation, dirt separation and ferrous impurity separation. An internal screen element facilitates the coalescing and capture of micro-bubbles to facilitate high performance automatic air removal, while concurrently causing the capture of non-ferrous debris particles down to 5 micron size. A powerful magnetic field induced by rare-earth neodymium magnets facilitates the capture of ferrous impurities such as iron oxide down to microscopic size thus delivering 2½ times the ferrous impurity removal performance of standard air and dirt separators.

Typical Specification

Furnish and install on the plans and described herein, a Caleffi DISCAL DIRTMAG® magnetic air and dirt separator as manufactured by Caleffi. Each separator must be designed with a side drain valve, blowdown drain valve, and automatic air vent. The separator design must include a large internal volume, and a stainless steel internal element to automatically remove all dirt present in the system with particle separating capacity to 5µm (0.2 mil), and a stack of neodymium rare-earth magnets inside a brass dry-well, removable for purging, with up to 100% ferrous impurities, including magnetite, separation efficiency. The separator must be ASME Registered, see below, and shall be a Caleffi model NA546AM or approved equal. (See product instructions for specific installation information.)

Technical Data

Materials

Body:	epoxy resin coated steel
Internal element:	stainless steel
Seals:	EPDM
Drain valves:	brass
Magnet:	neodymium rare-earth
Magnet probe dry-well:	brass

Performance

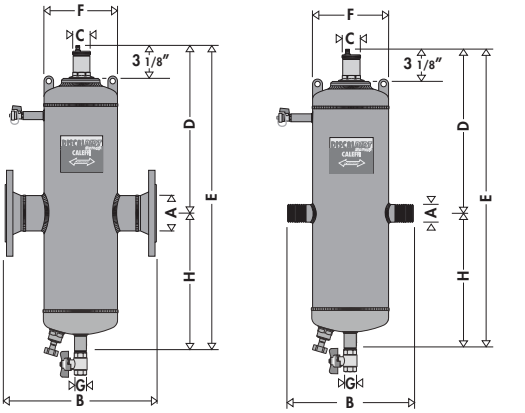
Suitable Fluids:	water, glycol solution
Max. percentage of glycol:	50%
Max. working pressure:	150 psi (10 bar)
Temperature range (vessel):	32 - 270°F (0–132°C)
Air separation efficiency:	100% removal to microbubble level
Particle separation capacity:	to 5 µm (0.2 mil)
Ferrous impurities separation efficiency:	up to 100% removal
Connections:	
flanged:	2 1/2" - 6" ANSI B16.5 150 CLASS RF
threaded:	2" NPT male
drain valve:	1" NPT

Agency approval

NA546_M series designed and built in accordance with Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code and tagged, registered with the National Board of Boiler and Pressure Vessel Inspector, and CRN registered, stamped for 150 psi (10 bar) working pressure, with ASME U stamp.

REFERENCE DOCUMENTATION: Technical Brochure 1287

Dimensions



NOTE: Drawing may not reflect the actual size of the separator

Code	A	B	C	D	E	F	G	H	Cap. (gal)	Wt. (lb)	Wt. (kg)
NA546050TM	2"	13"	2 3/16"	14 9/16"	28 1/4"	6 5/8"	1"	13 11/16"	3.6	31	14.0
NA546060AM	2½"	13¾"	2 3/16"	14 9/16"	28 1/4"	6 5/8"	1"	13 11/16"	3.6	45	20.4
NA546080AM	3"	18 3/8"	2 3/16"	17"	34½"	8 5/8"	1"	17½"	7.6	76	34.5
NA546100AM	4"	18½"	2 3/16"	17"	34½"	8 5/8"	1"	17½"	7.8	81	36.7
NA546120AM	5"	25"	2 3/16"	21 1/16"	46 11/16"	12¾"	1"	25 5/8"	22.4	184	83.5
NA546150AM	6"	25"	2 3/16"	21 1/16"	46 11/16"	12¾"	1"	25 5/8"	23.0	191	86.6

*These models are ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspector and CRN pending. Consult Caleffi.

		FLOW RATE					
	Size	2"	2½"	3"	4"	5"	6"
4.0 f/s	GPM	39	60	90	160	245	355
10.0 f/s	GPM	100	155	220	400	615	880
	Cv	87	174	208	324	520	832

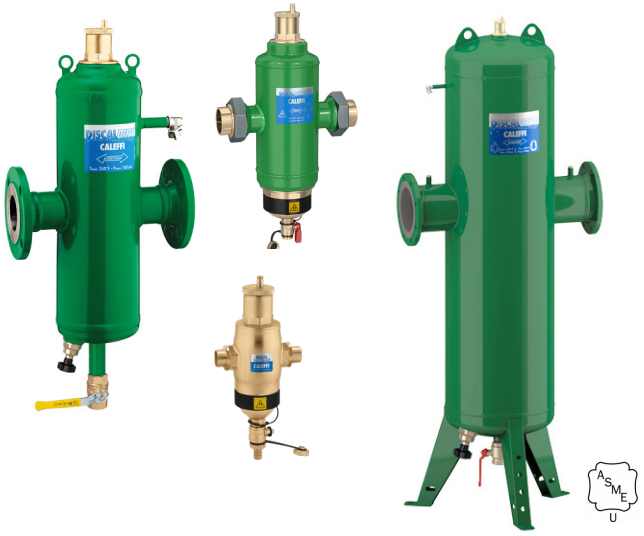
Job name	De Pere Community Center	Size	4"
Job location	De Pere, WI	Quantity	1
Engineer		Approval	
Mechanical contractor		Service	Hot Water System
Contractor's P.O. No.		Tag No.	AS-1
Representative	Heat & Power Products	Notes	

Caleffi North America, Inc. 3883 West Milwaukee Road / Milwaukee, WI 53208
Tel: 414-238-2360 / Fax: 414-238-2366 / www.caleffi.com

DISCAL*DIRTMAG*®
magnetic air and dirt separator

5461–NA546_M series

01287/21.1 NA
Replaces 01287/21 NA



Function

The Caleffi DISCALDIRTMAG® magnetic air and dirt separator incorporates three important functions for hydronic systems: air separation, dirt separation and ferrous impurity separation. An internal screen element facilitates the coalescing and capture of micro-bubbles to facilitate high performance automatic air removal, while concurrently causing the capture of non-ferrous debris particles down to 5 micron size. A powerful magnetic field induced by rare-earth neodymium magnets facilitates the capture of ferrous impurities such as iron oxide down to microscopic size thus delivering 2½ times the ferrous impurity removal performance of standard air and dirt separators.

The DISCALDIRTMAG saves on system installation and maintenance costs as three devices are combined into one. Additionally, all captured debris is blown down through the purge valve without taking the system offline.The circulation of fully de-aerated and cleaned water enables the equipment to operate under optimum conditions, free from noise, corrosion, or mechanical damage.

Insulation shells are available separately for field installation on the brass DISCALDIRTMAG.

Product range

5461 series DISCALDIRTMAG air and dirt separator with magnet in brass.....connections 1", 1¼" sweat & press, 1" NPT male
5461 series DISCALDIRTMAG air and dirt separator with magnet in steel.....connections 1½" and 2" sweat, NPT female and press union
NA546_M series DISCALDIRTMAG air and dirt separator with magnet in steel, ASME.....connections 2½" to 14" ANSI flanged, 2" NPT threaded
-CRN approval for 2" – 12" sizes; consult factory for 14" sizes.

Technical specifications

Brass body magnetic air and dirt separators

Materials

- body:	brass
- dirt separation chamber:	brass
- air vent body:	brass
- internal element:	glass reinforced nylon, PA66GF30
- air vent float:	PP
- air vent float guide pin:	stainless steel
- air vent float linkages:	stainless steel
- spring:	stainless steel
- seals:	peroxide-cured EPDM
- bottom drain shut-off valve:	brass
- magnet:	neodymium rare-earth

Performance

Suitable fluids:	water, glycol solution
Max. percentage of glycol:	50%
Max. working pressure:	150 psi (10 bar)
Temperature range:	32–250°F (0–120°C)
Air separation efficiency:	100% removal to microbubble level
Particle separation capacity:	to 5 µm (0.2 mil)
Ferrous impurities separation efficiency:	up to 100% removal

Connections

- main:	1", 1¼" sweat & press; 1" NPT male
- drain shut-off valve:	¾" garden hose (GHT)

Steel body magnetic air and dirt separators

Materials

- body:	epoxy resin coated steel
- air vent body:	brass
- mesh internal element:	(NA546_M) stainless steel (5461) stainless steel
- air vent float:	PP
- air vent float guide pin:	stainless steel
- air vent float linkages:	stainless steel
- spring:	stainless steel
- seals:	peroxide-cured EPDM
- bottom drain shut-off valve:	brass
- side drain shut-off valve:	brass
- magnet:	neodymium rare-earth
- magnet probe drywell (M series):	brass

Performance

Suitable fluids:	water, glycol solution
Max. percentage of glycol:	50%
Max. working pressure:	150 psi (10 bar)
Temperature range (vessel):	(M series): 32–270°F (0–132°C) (5461 series:): 32-230°F (0–110°C)
Air separation efficiency:	100% removal to microbubble level
Particle separation capacity:	to 5 µm (0.2 mil)
Ferrous impurities separation efficiency:	up to 100% removal

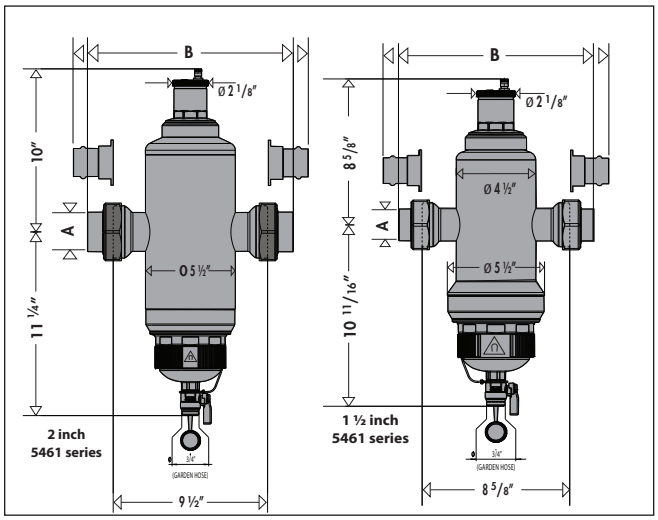
Connections

- flanged:	2½"–14" ANSI B16.5 150 CLASS RF
- threaded:	(M series) 2" NPT male (5461) 1½" & 2" NPT female union
- sweat:	(5461) 1½" & 2" sweat union
- press:	(5461) 1½" & 2" press union
- bottom drain valve:	2"–6": 1" NPT female 8"–14": 2" NPT female 5461 series: ¾" garden hose connection
- side drain shut-off valve (NA546_M only):	¾" GHT
- thermo well tap (8 " only):	
-inlet/outlet flanges:	½" NPT female
- lay length (press connection):	size 1½ inch: 11 ¾" size 2 inch: 12 ⅞"

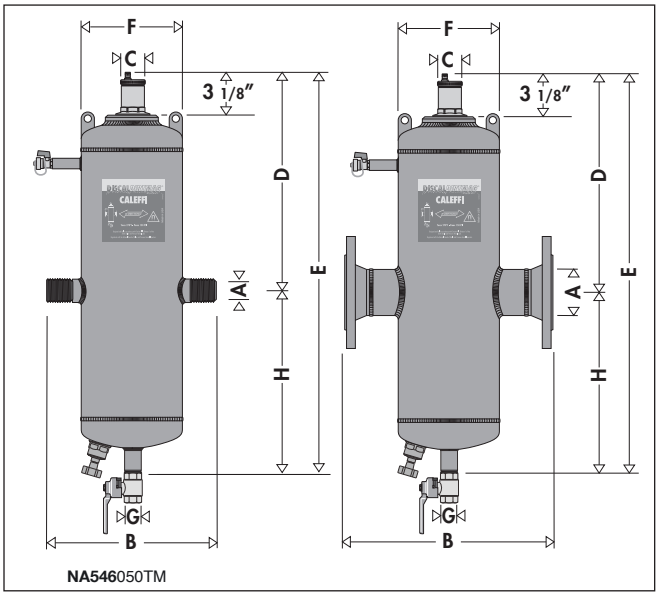
Agency approval

NA546_M series designed and built in accordance with Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code and tagged, registered with the National Board of Boiler and Pressure Vessel Inspector, and CRN registered, stamped for 150 psi (10 bar) working pressure, with ASME U stamp.14" is CRN pending, consult Caleffi.

Dimensions



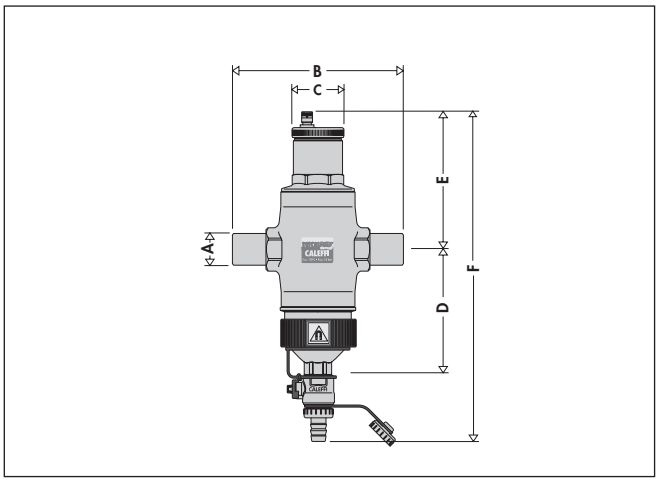
Code	A	B	Wt (lb)	Flow (gpm)	Cv
546198A	1½" sweat	11 ¼"	22	22	50
546108A	1½" NPT female	11 1/8"	22	22	50
546168A	1½" press	14 5/8"	22	22	50
546199A	2" sweat	12 ½"	23	39	79
546109A	2" NPT female	12"	23	39	79
546169A	2" press	15 ¾"	23	39	79



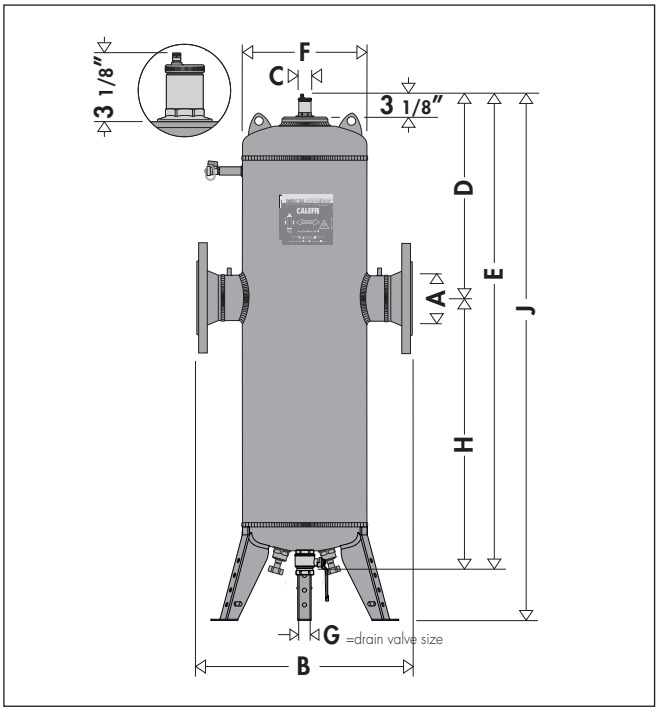
Code	A	B	C	D	E	F	G	H	Cap. (gal)	Wt. (lb)	Wt. (kg)
NA546050TM	2"	13"	2 3/16"	14 9/16"	28¼"	6 5/8"	1"	13 11/16"	3.6	31	14.0
NA546060AM	2½"	13¾"	2 3/16"	14 9/16"	28¼"	6 5/8"	1"	13 11/16"	3.6	45	20.4
NA546080AM	3"	18 3/8"	2 3/16"	17"	34½"	8 5/8"	1"	17½"	7.6	76	34.5
NA546100AM	4"	18½"	2 3/16"	17"	34½"	8 5/8"	1"	17½"	7.8	81	36.7
NA546120AM	5"	25"	2 3/16"	21 1/16"	46 11/16"	12¾"	1"	25 5/8"	22.4	184	83.5
NA546150AM	6"	25"	2 3/16"	21 1/16"	46 11/16"	12¾"	1"	25 5/8"	23.0	191	86.6

These models are ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspector and CRN registered. Consult Caleffi.

NOTE: Drawings may not reflect the actual size of the separators.



Code	Connec-tions	A	B	C	D	E	F	Wt. (lb)	Wt. (kg)
546196A	Sweat	1"	7 3/8"	2 1/8"	5"	5½"	12¾"	8.5	3.9
546197A	Sweat	1¼"	6 3/16"	2 1/8"	5"	5½"	12¾"	8.5	3.9
546116A	NPT male	1"	7 3/8"	2 1/8"	5"	5½"	12¾"	8.5	3.9
546166A	Press	1"	8½"	2 1/8"	5"	5½"	12¾"	8.5	3.9
546167A	Press	1¼"	8 7/16"	2 1/8"	5"	5½"	12¾"	8.5	3.9



Code	A	B	C	D	E	F	G	H	J	Cap. (gal)	Wt. (lb)	Wt. (kg)
NA546200AM	8"	35½"	2 3/16"	35 3/16"	82 7/8"	20"	2"	47¾"	94¾"	95	365	165
NA546250AM	10"	41¾"	2 3/16"	39 1/8"	91 11/16"	26"	2"	52 9/16"	103 5/8"	175	565	256
NA546300AM	12"	46½"	2 3/16"	41 11/16"	98 9/16"	30"	2"	56 7/8"	110½"	255	835	379
NA546350AM	14"	48"	2 3/16"	46 7/8"	112"	36"	2"	65 5/32"	123 7/8"	420	960	435

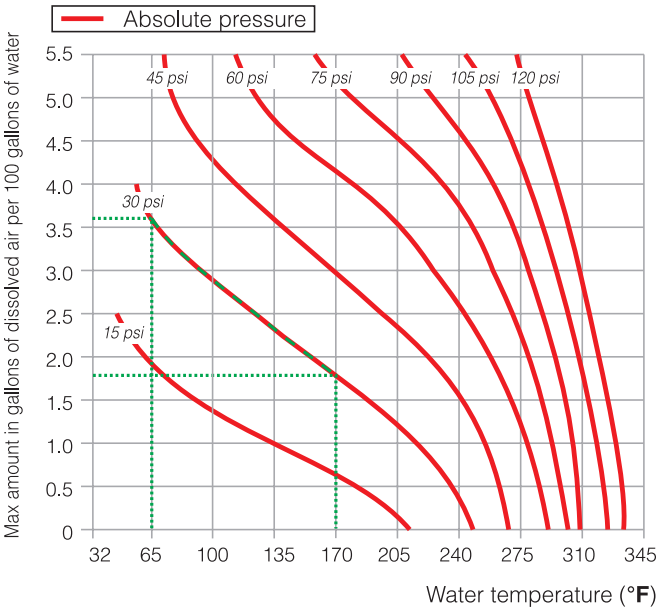
These models are ASME tagged and registered with the National Board of Boiler and Pressure Vessel Inspector and CRN registered. 14" is CRN pending, consult Caleffi.

The process of air formation

The amount of air which can remain dissolved in a water solution is a function of pressure and temperature. This relationship is governed by Henry's law and the graph demonstrates the physical phenomenon of the air release from water. As an example, at a constant absolute pressure of 30 psi (2 bar), if the water is heated from 65°F (18°C) to 170°F (75°C), the amount of air released by the solution is equal to 1.8 gallons of air per 100 gallons of water. According to this law it can be seen that the amount of air released increases with temperature rise and pressure reduction. The air comes in the form of micro-bubbles of diameters in the order of tenths of a millmeter.

In heating and cooling systems there are specific points where this process of formation of micro-bubbles takes place continuously in the boiler and in any device which operates under conditions of cavitation.

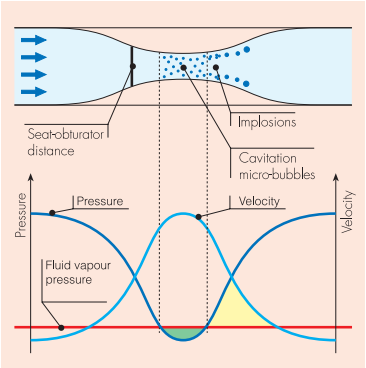
Solubility of air in water



Cavitation and micro-bubbles

Micro-bubbles develop where the fluid velocity is very high with the corresponding reduction in pressure. These points are typically pump impellers and valve ports.

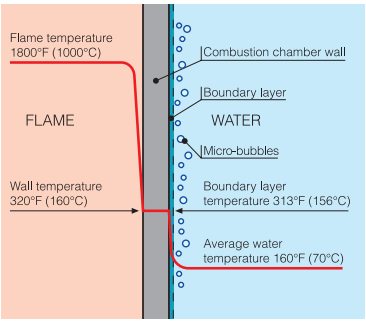
These air and vapor micro-bubbles, the formation of which is enhanced in the case of non-deaerated water, may subsequently implode due to the cavitation phenomenon.



Boiler micro-bubbles

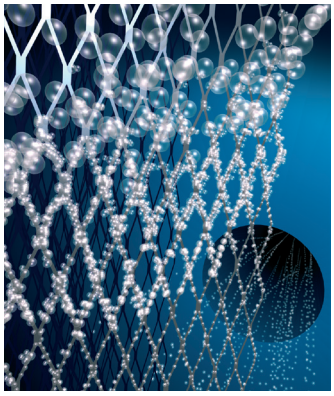
Micro-bubbles are formed continuously on the surface separating the water from the combustion chamber due to the fluid temperature. This air, carried by the water, collects in the critical points of the circuit from where it must be removed.

Some of this air is reabsorbed in the presence of colder surfaces.



Operating principle

Microbubble air separation

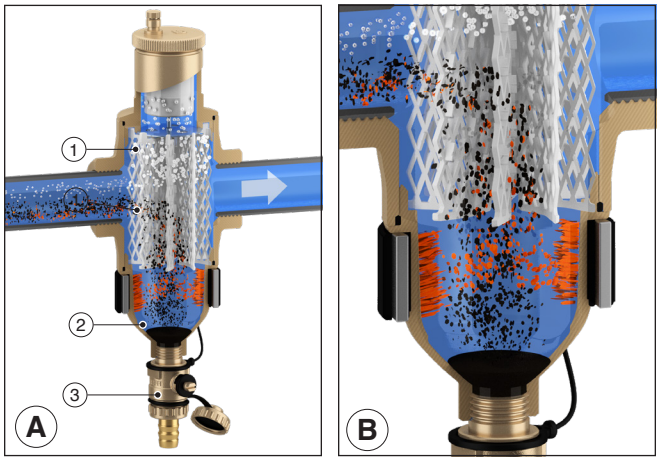


The air and dirt separator uses the combined action of several physical principles. The active part is the internal element (1) and consists of a glass-reinforced nylon mesh for the brass DISCALDIRTMAG, or for the steel DISCALDIRTMAG an assembly of concentric metal mesh (stainless steel) surfaces. These elements create the whirling movement required to facilitate the release of micro-bubbles and their adhesion to these surfaces.

The bubbles, fusing with each other, increase in volume until the hydrostatic thrust is such as to overcome the adhesion force to the structure. They rise towards the top of the unit from which they are released through a float-operated automatic air vent valve.

Microparticle dirt separation

The dirt separating action performed by the same internal element (1) offers little resistance to the flowing medium while ensuring dirt separation. The particles collide with the concentric diamond pattern mesh surfaces and then settle to the bottom in the dirt collection chamber (2), and not by filtration unlike mesh stainers; which, over time, get progressively clogged. By contrast, the DISCALDIRT®'s low-velocity zone dirt separator function efficiently removes the particles to as small as 5µm (0.2 mil) with very low head loss. The dirt can then be removed through the bottom drain port (3).

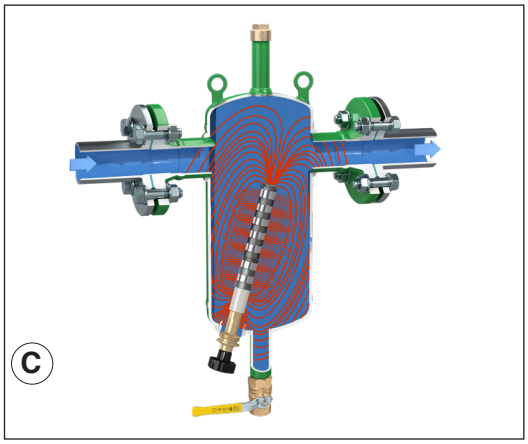


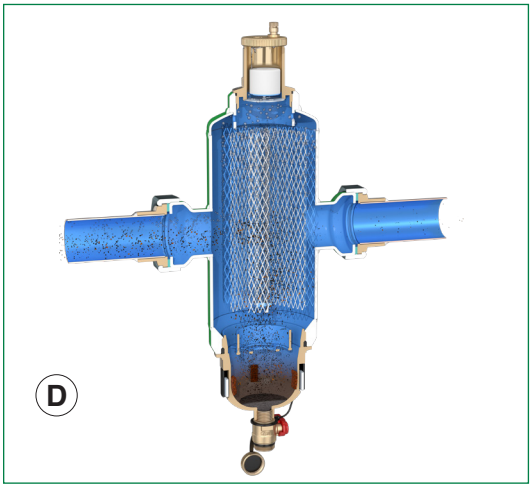
Ferrous impurities separation

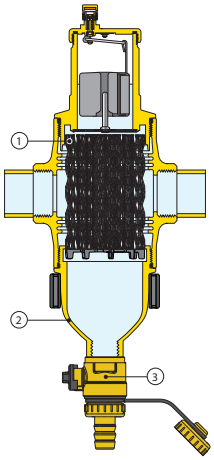
Non-ferrous and ferrous impurities, including magnetite, in hydronic systems can deposit onto heat exchanger surfaces and accumulate in pump cavities causing reduced thermal efficiency and premature wear. The small and often microscopic magnetic particles, called magnetite, form when iron or steel corrodes. Highly abrasive, the extremely fine particles are difficult to remove by traditional means. DISCALDIRTMAG separators offer highly efficient separation of typical dirt as well as magnetite. The versatile DISCALDIRTMAG magnetic air and dirt separator removes both ferrous and non-ferrous impurities continuously. In addition to removing typical dirt particles with an internal element in a low-velocity-zone chamber, the DISCALDIRTMAG features a powerful removable magnet below the flow line for fast and effective capture of ferrous impurities.The magnet removes up to 100% of the ferrous impurities, including magnetite, that can form in a hydronic system.

For the 5461 brass and steel DISCALDIRTMAG (A,B,D), the ferrous impurities are captured by a strong neodymium rare-earth magnetic field created by a powerful removable magnet around the body below the flow line.

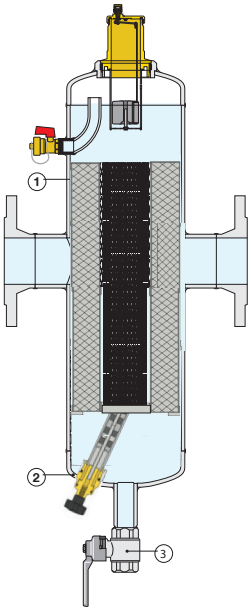
For the steel DISCALDIRTMAG NA546_M series (C), the ferrous impurities are captured by a concentrated magnetic field created by a stack of neodymium rare-earth magnets positioned inside a brass dry-well below the flow stream.







Brass DISCALDIRTMAG



Steel DISCALDIRTMAG NA546_M series

Construction details

The DISCALDIRTMAG air and dirt separator is designed to be maintained and cleaned without removing it from system piping.

The automatic air vent, located at the top of the device, has a long chamber for float movement (2). This prevents any impurities in the water from reaching the seal seat. The corrosion resistant stainless steel pinned linkage and PP float can be accessed by removing the upper cover (1). The stainless steel float guide pin (4) prevents the float from jamming against the inside housing, sticking due to accumulating residue in the flowing fluids, in non-vertical installations or from boiler or chiller residue buildup.

Unscrew the top part of the casing (3) to clean the entire air venting system.

The air venting system in the brass DISCALDIRTMAG and steel DISCALDIRTMAG air and dirt separators features a pinned float.

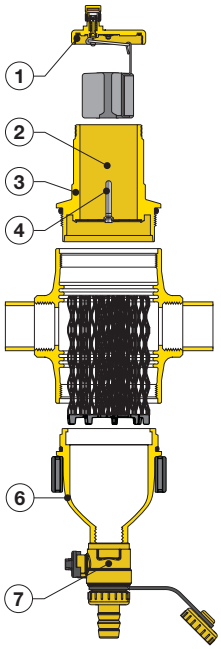
Steel DISCALDIRTMAG air and dirt separators with flanged and threaded connections have an integral side drain port with shutoff valve, code 538402 FD (5), which has two functions:

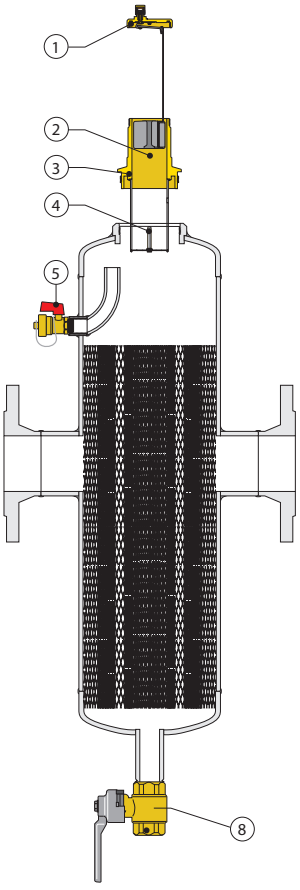
1. Air removal while filling the system during system commissioning.

2. Debris removal that float within the air separator.

The drain valve (code NA39753 - 1 inch or code NA59600 - 2 inch) installed on the drain pipe at the base of the steel DISCALDIRTMAG air and dirt separator (8) can be used to remove any debris that has settled at the bottom of the separator, even while the system is in operation. To inspect the internal element of brass DISCALDIRTMAG air and dirt separators, unscrew the large dirt separation chamber (6) with a 26 mm hexagon wrench. The internal element can be removed for cleaning. Additionally, the brass air and dirt separators have a lever operated shut-off drain valve code 538402 FD, and ¾" garden hose attachment with plug (7), to drain accumulated debris as needed.

Brass DISCALDIRTMAG



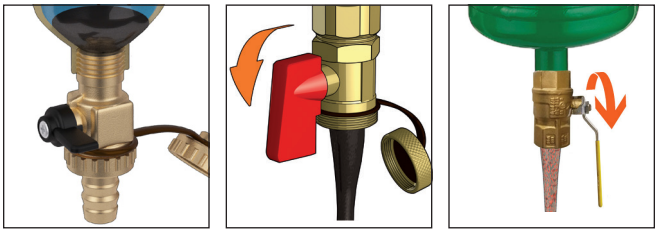


Steel DISCALDIRTMAG

Draining off dirt and ferrous impurities

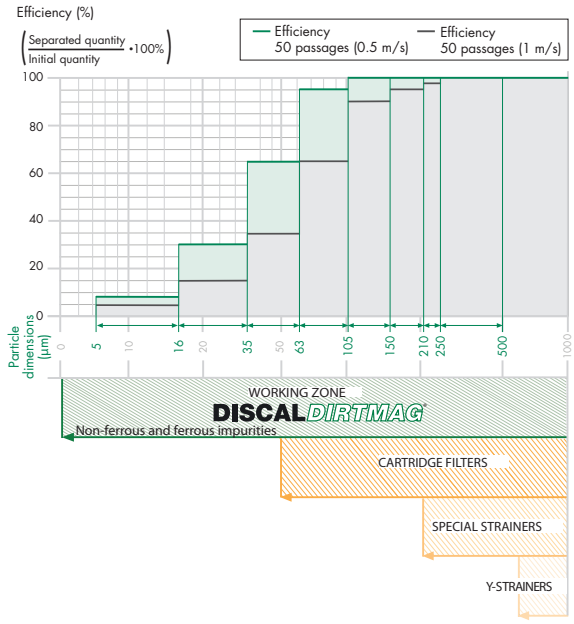
The dirt separator collection chamber has a drain valve. Using the handle provided it is possible to drain off the accumulated dirt particles even with the system in operation.

For the brass DISCALDIRTMAG, captured ferrous impurities are easily flushed by unclamping the magnetic collar and purging.



To purge the ferrous impurities in the steel DISCALDIRTMAG, the flexible magnetic stack is removed from the brass dry-well and, with the system still running, the drain valve is opened. Aided by the system pressure, the dirt and ferrous impurities, including magnetite, flushes out quickly and effectively.

Particle separation rating – dirt separator efficiency



Separation efficiency

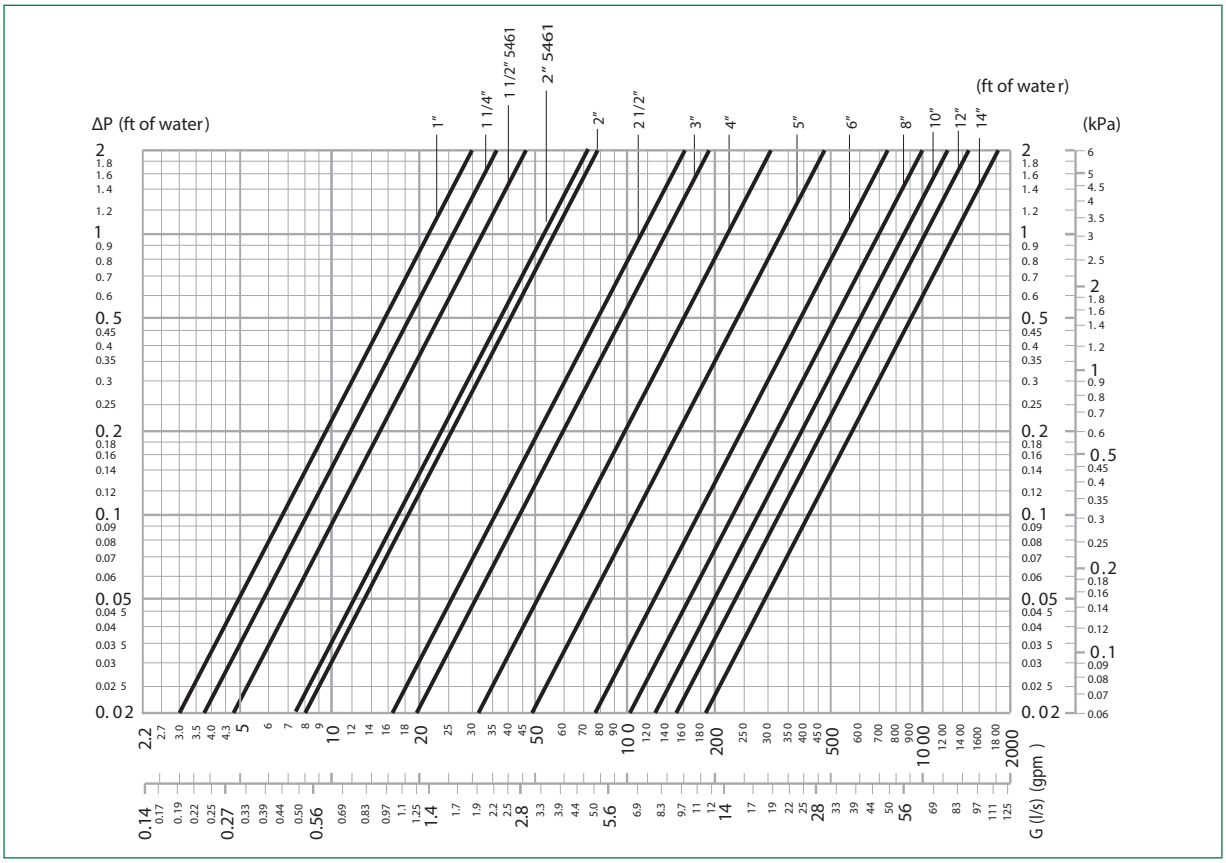
The capacity for separating the impurities in the medium circulating in the closed circuits of the systems basically depends on three parameters:

1) It increases as the size and mass of the particle increase. The larger and heavier particles drop before the lighter ones.
2) It increases as the speed decreases. If the speed decreases, there is a calm zone inside the dirt separator and the particles separate more easily.
3) It increases as the number of recirculations increases. The medium in the circuit, flowing through the dirt separator a number of times during operation, is subjected to a progressive action of separation, until the impurities are completely removed.

The special design of the internal element in the Caleffi DISCALDIRTMAG magnetic air and dirt separators, are able to completely separate the impurities in the circuit down to a minimum particle size of 5 µm (0.2 mil), including 100% ferrous impurities.

The particle separation — dirt separator efficiency graph (left) illustrates how DISCALDIRTMAG quickly separates nearly all the impurities. After only 50 circulations, approximately one day of operation, up to 100% is effectively removed from the circuit for particles of diameter greater than 100 µm (3.9 mil) and on average up to 80% taking account of the smallest particles. The continual passing of the medium during normal operation of the system gradually leads to complete dirt removal.

Hydraulic characteristics



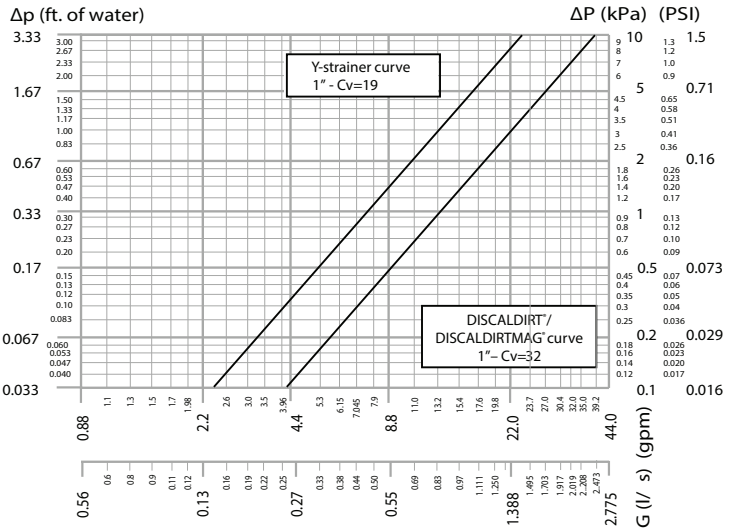
ft of water x .433 = psi

		Brass		Steel union		Steel flanged body									
	Size	**1"**	**1¼"**	**1½"**	**2"**	**2"**	**2 ½"**	**3"**	**4"**	**5"**	**6"**	**8"**	**10"**	**12"**	**14"**
4.0 f/s	GPM	10	15	22	39	39	60	90	160	245	355	625	980	1,410	1,920
	l/s	0.63	0.95	1.04	2.5	2.5	4.0	6.0	10	15	22	40	62	89	121
10.0 f/s	GPM			55	98	100	155	220	400	615	880	1,570	2,450	3,525	4,800
	l/s			3.5	6.2	6.3	9.8	14	25	39	55	99	155	222	303
	Cv	32	40	50	79	87	174	208	324	520	832	1,109	1,387	1,664	1,967

Comparison of head losses: air and dirt separator to Y-strainers

Y-strainers entrap dirt within a basket made of stainless steel or brass mesh, selected for the size of the largest particle. Particles smaller than the mesh size may pass through. On most Y-strainers, the basket must be removed periodically to clear the trapped debris. As the debris collects in the basket, flow is impeded resulting in increasing pressure drop and therefore higher head loss. The dirt separation function in the DISCALDIRTMAG performs exactly as it does in the DIRTMAG®, utilizing the low-velocity-zone principle. The flow velocity of fluid flowing into the dirt separation chamber is greatly reduced causing the entrained dirt particles to drop due to their density.

The internal element provides surfaces that assist in separating dirt particles and guide them downward to ultimately settle to the bottom of the separator. The dirt separator only creates about 25% of the pressure drop of a comparable sized, clean basket strainer, depending on mesh size and amount of filtered debris. These head losses are not affected by the amount of dirt collected.



Insulation shells

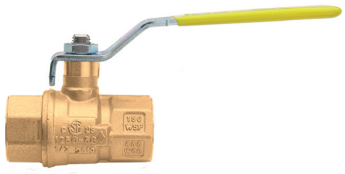
The brass DISCALDIRTMAG 5461 series can be supplied with the optional insulated cover, code CBN546002 series (purchased separately), to minimize heat loss.

Technical specifications

Material:		closed cell expanded PE-X
Thickness:		25/64" (10 mm)
Density:	- inner part	1.9 lb/ft³ (30 kg/m³)
	- outer part:	5.0 lb/ft³ (80 kg/m³)
Thermal conductivity (DIN 52612):		
	- at 32°F (0°C):	0.263 BTU·in/hr·ft²·°F (0.038 W/(m·K)
	- at 104°F (40°C):	0.312 BTU·in/hr·ft²·°F (0.045 W/(m·K)
Coefficient of resistance to water vapor (DIN 52615):		>1,300
Working temperature range:		32–230°F (0–110°C)
Reaction to fire (DIN 4102):		CLASS B2

Replacement parts

Drain valves (5) & (7), code 538402 FD. Drain valves (8), separator sizes 2" - 6", code NA39753; separator sizes 8"- 14", code NA59600.



Code	Size
CBN546002	1", 1¼" Brass 546 only
CBN546118	1½" Steel 5461 only
CBN546119	2" Steel 5461 only

Removing insulation and draining impurities

1. Remove the insulation by taking off the bottom casing of the collection chamber first, and if necessary, the top insulation casing later.
2. Remove the magnetic ring containing the magnets, that during operation attracted the ferrous particles.
3. Flush out the ferrous and nonferrous debris by turning the handle to open the drain valve.
4. When finished, replace the insulation shells.

A replacement air vent assembly for the brass and steel DISCALDIRTMAG 5461 series is code 59829; for the steel DISCALDIRTMAG NA546_M series is code 59756.

59829

59756

The moving parts that control air venting are accessed simply by removing the upper cover. Replacement cap and float assembly for all versions of the brass and steel DISCALDIRTMAG5461 series is code F39807.

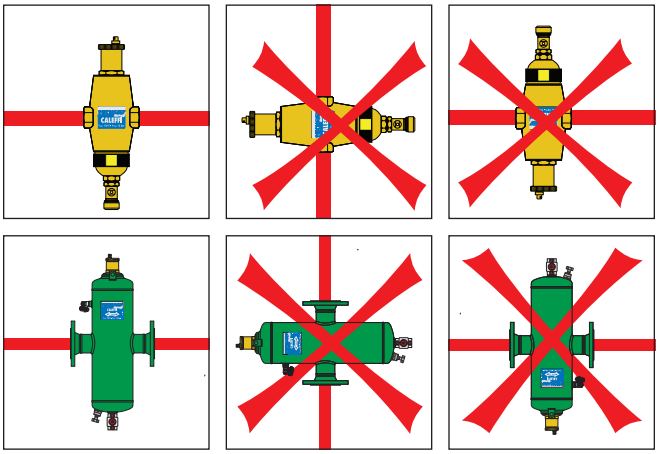
F39807

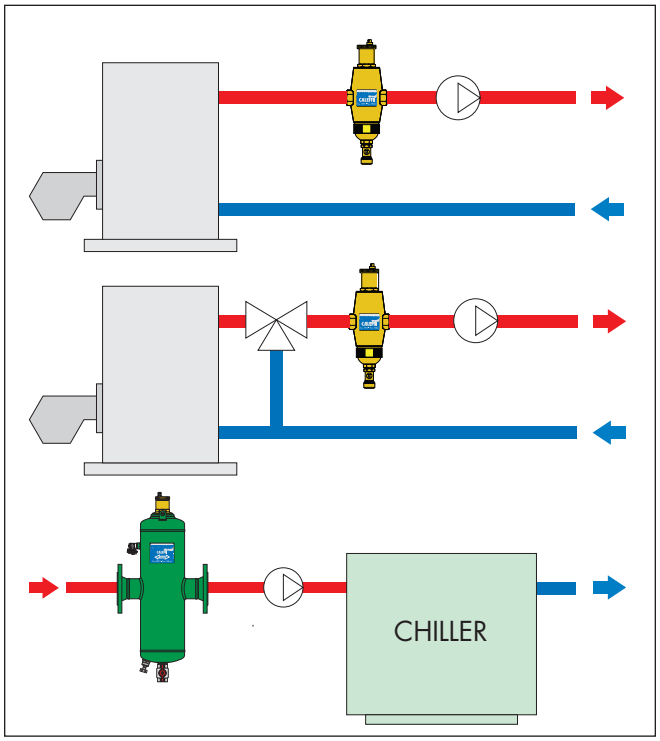
When cleaning, simply unscrew the portion of the body containing the automatic air vent.

Installation

DISCALDIRTMAG units may be used in both heating and cooling systems, to ensure continuous air and dirt elimination. The units should be installed after the boiler and on the pump suction side, as these are the points where the formation of micro-bubbles is greatest.

DISCALDIRTMAG air and dirt separators must be installed vertically. In installation conditions where inspection is not possible, it is recommended that the venting valve cap is replaced by a Caleffi part number R59681 hygroscopic safety vent. The standard replacement cap code number is 59199.





SPECIFICATION SUMMARIES

5461 series DISCALDIRTMAG – brass with sweat and NPT connections

Air and dirt separator with magnet complete with brass automatic air vent containing pinned float. Connections for horizontal pipes, sweat and press connections for 1" and 1¼" sizes, NPT male connection for 1". Brass body and dirt separation chamber with an external removable magnet belt, neodymium rare-earth. Peroxide-cured EPDM seals. Glass reinforced nylon PA66G30 internal mesh element, removable for cleaning. PP float. Stainless steel float linkages. Stainless steel float guide pin. Maximum working pressure, 150 psi (10 bar). Temperature range 32 to 250°F (0 to 120°C). Glycol maximum 50%. Air separation efficiency: 100% removal to micro-bubble level. Particle separation capacity: to 5 µm (0.2 mil). Ferrous impurites separation efficiency: up to 100% removal. Brass drain shut-off valve with ¾" garden hose connection. Pre-formed insulation shells available for field installation.

5461 series DISCALDIRTMAG – steel with union sweat, NPT and press connections

Air and dirt separator with magnet complete with automatic air vent containing pinned float. Connections for horizontal piples, sweat union for 1½" and 2" sizes, NPT female union for 1½" and 2" sizes, and press union for 1½" and 2" sizes. Epoxy resin coated steel body with an external removable magnet belt, neodymium rare-earth. Peroxide-cured EPDM seal. Stainless steel internal mesh element. PP float. Stainless steel float linkages. Stainless steel float guide pin. Maximum working pressure, 150 psi (10 bar). Temperature range 32 to 230°F (0 to 110°C). Glycol maximum 50%. Air separation efficiency: 100% removal to micro-bubble level. Particle separation capacity: to 5 µm (0.2 mil). Ferrous impurites separation efficiency: up to 100% removal. Brass drain shut-off valve with ¾" garden hose connection.

NA546_M series DISCALDIRTMAG –flanged and NPT steel, ASME & CRN

Air and dirt separator with magnet, brass side drain valve and automatic air vent with pinned float. Flanged ANSI B16.5 CLASS 150 RF connections from 2½" to 14", and 2" NPT threaded connections, for horizontal pipes. Epoxy resin coated steel body with brass drywell for external removable neodymium rare-earth magnet, (quantity one for 2" - 2½" sizes-code 49684A, quantity one for 3" - 6" sizes-code 49685A, quantity three for 8" - 14" sizes-code F0000349) included. Peroxide-cured EPDM seal. Stainless steel internal mesh element. PP float. Stainless steel float linkages. Stainless steel float guide pin. Supplied with lever-operated drain ball valve brass body with 1" NPT female connection for separator sizes 2" - 6"- code NA39753; 2" NPT female connection for separator sizes 8" - 14", code NA59600. Side drain port supplied with integral brass shutoff valve, code 538402 FD, and ¾" garden hose connection. For separator size 8"- 14" only thermometer pocket well on inlet/outlet flanges ½" NPT female. Maximum working pressure, 150 psi (10 bar). Vessel working temperature range 32 to 270°F (0 to 132°C). Glycol maximum 50%. Air separation efficiency: 100% removal to microbubble level. Particle separation capacity: to 5 µm (0.2 mil). Ferrous impurities separation efficiency: up to 100% removal. The separator is designed and built in accordance Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code and tagged and registered with the National Board of Boiler and Pressure Vessel Inspector, and CRN registered (size 14" pending, contact Caleffi), and stamped for 150 psi (10 bar) working pressure, with ASME U stamp.

CALEFFI Hydronic Solutions

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