Request for Quotes
City and Borough of Wrangell
Public Safety Building – Oil-Fired Boiler Installation

INVITATION TO SUBMIT QUOTE

Notice is hereby given that the City and Borough of Wrangell, Alaska will receive quotes for the installation of the project entitled Public Safety Building – Oil-Fired Boiler Installation.

The Contract Documents may be downloaded free of charge on the City & Borough of Wrangell website (www.wrangell.com) under the Bids and RFPs section. Downloading Contract Documents from the City & Borough of Wrangell's website requires registration with the Capital Facilities Director in order to be placed on the Plan Holders List and to ensure receipt of subsequent Addenda. Failure to register may adversely affect your proposal. It is the Offeror's responsibility to ensure that they have received all Addenda affecting this Solicitation. To be registered, contact the Capital Facilities Department at 907-874-3902; Capital Facilities Office, 106 Second Street, Wrangell, Alaska 99929; or at aal-haddad@wrangell.com.

DESCRIPTION OF WORK. WORK consists of all activities necessary to install complete one owner-furnished sectional boiler with power burner and associated mechanical and electrical accessories in the Wrangell Public Safety Building. The Owner's Estimate for all work is approximately $10,000.

SITE OF WORK. The WORK is located in the Public Safety Building in Wrangell, Alaska.

COMPLETION OF WORK. Following the Notice to Proceed, the OWNER will open the work site to the CONTRACTOR. Substantial completion must be reached by April 30, 2019.

BIDDING, CONTRACT, or TECHNICAL QUESTIONS. All communications relative to this WORK, prior to receiving Quotes, shall be directed to: Amber Al-Haddad, Capital Facilities Director, Telephone: (907) 874-3902, Email: aal-haddad@wrangell.com

RECEIPT OF QUOTES. Quotes will be received by the City and Borough of Wrangell, Post Office Box 531, Wrangell, Alaska 99929, or located at the Capital Facilities Office, 106 Second Street, Wrangell, Alaska 99929, or by email to aal-haddad@wrangell.com until **2:00 PM prevailing time on March 14, 2019**. Receiving date and time may be changed to a later date or time via Addendum. Clearly mark on the outside of the envelope "Request for Quotes, Public Safety Building – Oil-Fired Boiler Installation". Proposals may not be withdrawn for 60 days following date of opening.

CONTRACTOR'S LICENSE. All contractors are required to have a current Alaska Contractor's License and a current Alaska Business License prior to award.

QUOTE TO REMAIN OPEN. The Proposer shall guarantee the Quote for a period of 60 calendar days from the date of Quote due date. Any component of the Quote, including additive alternates, may be awarded anytime during the 60 days.

OWNER'S RIGHTS RESERVED. The OWNER reserves the right to reject any or all Quotes, to waive any informality in a Quote, and to make award to the lowest responsive, responsible Proposer as it may best serve the interests of the OWNER.

INSTRUCTIONS TO PROPOSERS

A. Quotes will be received by the Capital Facilities Department until March 14, 2019 at 2:00 PM, prevailing time. Quotes may be mailed, hand-delivered or emailed to aal-haddad@wrangell.com.

B. Quotes must be typewritten or completed with pen and ink, signed by the Proposer or their authorized representative.

C. The Price shall include everything necessary for the fulfillment of the contract, including, but not limited to, furnishing all labor, materials and equipment, except as may be provided otherwise in the Contract Documents. In the event of a difference between a price in words and a price in figures for the same Quote, the words shall prevail as the quoted price.

D. Any questions concerning the existing conditions and/or the contract conditions contained herein shall be submitted, in writing, prior to the date for Quote submittal. Questions regarding this solicitation shall be directed to Amber Al-Haddad, Email: aal-haddad@wrangell.com, Telephone 907-874-3902.

E. Indemnification: To the fullest extent permitted by law, Contractor, its Subcontractors, employees suppliers, and agents shall indemnify, defend, and hold harmless the Owner and their employees and agents again and from all claims and liability arising under, by reason of or accidentally to the Contract or any performance of the work, but not from sole negligence or willful misconduct of the Owner.

F. Insurance Amounts. The limits of liability for the insurance required by this project shall provide coverage for not less than the following amounts, or greater where required by Laws and Regulations:

1. Workers' Compensation: (under Paragraph 5.2C.1 of the General Conditions) as in accordance with AS 23.30.045:

   a. State: Statutory
   b. Employers Liability:

Bodily Injury by Accident:	$100,000.00	Each Accident
Bodily Injury by Disease:	$100,000.00	Each Employee
Bodily Injury by Disease:	$500,000.00	Policy Limit

   c. CONTRACTOR agrees to waive all rights of subrogation against the OWNER for work performed under Contract.

2. Commercial General Liability: (under Paragraph 5.2C.2 of the General Conditions):
   a. Combined Single Limit

i.	General Policy	$2,000,000.00	Each Occurrence
		$3,000,000.00	Annual Aggregate
ii.	Products/Completed Operations	$2,000,000.00	Each Occurrence

		$3,000,000.00	Annual Aggregate
iii.	Personal Injury	$2,000,000.00	Each Occurrence
iv.	Commercial Automobile Liability: (under Paragraph 5.2C.3 of the General Conditions) including Owned, Hired, and Non-Owned Vehicles: Combined Single Limit, Bodily Injury and Property Damage	$1,000,000.00	

3. Policies shall also specify insurance provided by CONTRACTOR will be considered primary and not contributory to any other insurance available to the OWNER.

4. All policies will provide for 30-days written notice prior to any cancellation or nonrenewal of insurance policies required under Contract except in the event of no-payment of premium where 10 Days is permissible.

5. The OWNER shall be named as an "Additional Insured" under all liability coverages listed in this Section, except for workers' compensation insurance. CONTRACTOR shall furnish OWNER a certificate from the insurer showing the OWNER as an Additional Insured within ten (10) days of the CONTRACTOR receiving the Notice to Proceed. Failure of the CONTRACTOR to fully and strictly comply with this Section shall constitute a default and a material breach of the Agreement and Contract documents.

G. All CONTRACTORs or Subcontractors who perform work on a public construction contract for the OWNER, with a contract amount of $25,000 or greater, shall file a certified payroll with Alaska Department of Labor, according to the Alaska Labor Standards, Reporting, and Prevailing Wage Rate Determination:

State of Alaska, Department of Labor, Laborers' and Mechanics' Minimum Rates of Pay, AS 36.05.010 and AS 36.05.050, Wage and Hour Administration Pamphlet No. 600, the latest edition published by the State of Alaska, Department of Labor inclusive, are made a part of this contract by reference.

The CONTRACTOR is responsible for contacting the Alaska Department of Labor to determine compliance with current regulations. Required reporting during contract, to be provided by every CONTRACTOR and Subcontractor:

H. A Local Bidder Preference shall apply to all City and Borough of Wrangell procurements, except when restricted by state or federal regulations. To be considered a qualifying Bidder, Bidder shall meet the requirements of the Local Bidder Preference ordinance, according to WMC 5.10.040 (D). The Owner may request documentation to support entries made on this form.

The Wrangell Municipal Code (WMC) Article 5.10.040, Section D. LOCAL BIDDER PREFERENCE AWARD reads:

1. Unless contrary to federal or state law or regulation, or as otherwise provided in section (D)(2) of this section, a contract for, or purchase of, supplies, materials, equipment, contractual services, or public improvements shall be awarded to a local Bidder where the Bid by such local Bidder is in all material

respects comparable to the lowest responsible nonlocal Bid, and if the amount Bid by such local Bidder does not exceed the lowest responsible nonlocal Bid by more than:

a. Five percent of the amount Bid by the lowest responsible nonlocal Bidder if that nonlocal Bidder's Bid is $1,000,000 or less;
b. Three percent of the amount Bid by the lowest responsible nonlocal Bidder if that nonlocal Bidder's Bid is $1,000,001 or more.

2. This preference shall not be interpreted to mean that the borough is precluded from making the purchase from whatever source is most advantageous to the borough after considering all factors in the public interest even when the price bid by the local Bidder satisfies subsection (D)(1)(a) or (b) of this section.

3. "Local Bidder" for purposes of the section shall mean a Bidder who:

a. Holds a current Alaska business license;
b. Submits a Bid for goods or services under the name appearing on the person's current Alaska business license;
c. Has maintained a place of business within the boundaries of the borough for a period of six months immediately preceding the date of the Bid;
d. Is not delinquent in the payment of any utilities, taxes, charges or assessments owing to the borough on account of that business;
e. Is incorporated or qualified to do business under the laws of Alaska with its principal place of business in the borough, is a proprietorship and the proprietor is a resident of the borough, or is a partnership and all partners are residents of the City and Borough of Wrangell;
f. If a joint venture, all joint venture partners must qualify under subsection (D)(3)(a) through (e) of this section;
g. The manager may require such documentation or verification by the person claiming to be a local Bidder as is deemed necessary to establish the requirements of this section.

I. Permits and Inspections.

1. The CONTRACTOR is responsible for all WORK associated with meeting any local, state, and/or federal permit requirements.

2. The CONTRACTOR is responsible for filing the State of Alaska's Notification of New Boiler Installation for Mechanical Inspection with the division of Labor Standards and Safety.

J. Subcontracting. Contractor will provide all services necessary to complete this project and provide a fully operating boiler system. Contractor assumes all risk, liability and supervisory responsibilities for the actions and performance of all subcontractors used by the Contractor in providing services under this contract. Contractor will ensure all Subcontractors comply with the same terms as set forth in this contract, including insurance coverages that match or exceed the coverage detailed in this contract.

K. Award of Contract. The successful Proposer will be determined on the basis of the lowest total of the Quote, as deemed in the best interest of the OWNER.

L. Execution of Agreement. The Proposer to whom the award is made shall execute a written Agreement with the Owner on the Agreement form included herein and shall secure all insurance and furnish all certificates and bonds required by these contract documents. Failure or refusal to enter into the Agreement shall be just cause for annulment of the award, and the Owner may award the contract to the second lowest responsive and responsible Proposer.

M. Security Program.

1. The CONTRACTOR shall protect WORK, existing premises and OWNER's operations from theft, vandalism, and unauthorized entry. The Contractor shall also:
   a. Coordinate security with OWNER's operations at job mobilization.
   b. Maintain program throughout construction period until OWNER's occupancy.
   c. Control entry of persons and vehicles into project construction site and existing facilities.
   d. Allow entry on the construction site only to authorized persons with proper identification and clearance.
   e. Coordinate access of OWNER's personnel to site in coordination with CONTRACTOR's security forces.
   f. The OWNER will control entrance of persons and vehicles related to OWNER's operations.

N. Report Errors and Discrepancies. If CONTRACTOR, in the course of implementing the boiler system, find errors or omissions in the plans, if shall be the Contractor's duty to immediately inform the Borough in writing with a request for clarification or resolution. Any work done after such discovery, until authorized by the Borough, shall be done at the Contractor's risk.

O. Cleanup and Site Restoration. The WORK under this Section includes providing all supervision, labor, materials, tools and equipment necessary for final clean up and restoration of all areas disturbed by construction activities, to a condition equal to, or better than, before construction started. This does not include clean up or restoration incidental to, or directly provided for by, other construction items.

1. Daily, the Contractor shall at all times keep the property free from rubbish and debris. It is the responsibility of the Contractor to legally and properly dispose of all debris.
2. Daily, the Contractor shall clean all areas of scrap materials; dirt, dust and debris generated in performance of the service at the time the service is provided and lawfully dispose of.
3. The Contractor must not use the trash can, dumpsters or any other Owner property without prior authorization.
4. Public restrooms must not be used for washing of tools and equipment, nor may the stools or sinks be used to dispose of chemicals.
5. The CONTRACTOR shall clean up all sites disturbed during construction of the project. This includes removal of all construction equipment, disposal of all excess materials, disposal of all rubbish and debris.

P. Project Closeout.

1. Final Cleanup. The CONTRACTOR shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, construction equipment and tools used during construction. Final acceptance of the WORK by the OWNER will be withheld until the CONTRACTOR has satisfactorily complied with the foregoing requirements for final clean-up of the project site.
2. Final Submittals. The CONTRACTOR, prior to requesting final payment, shall obtain and submit the following items to the OWNER:
3. Written guarantees, where required.
4. Maintenance stock items; extra materials, special tools, as required.
5. Completed record drawings and O&M manuals or any Contractor-provided materials.
6. Releases from all parties who are entitled to claims against the subject Project, property, or improvement pursuant to the provisions of law.
7. Completed Certificate of Compliance and Release for all contractors involved in the WORK. Submit the original signed document to the OWNER.
8. The CONTRACTOR shall comply with the maintenance and guarantee requirements contained in Article 13 of the General Conditions.
9. The CONTRACTOR shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the CONTRACTOR fails to make such repairs or replacements promptly, the OWNER reserves the right to do the WORK and the CONTRACTOR and his surety shall be liable to the OWNER for the cost thereof.

Q. Protection and Restoration of Existing Facilities and Utilities. The CONTRACTOR shall protect all existing utilities and improvements not designated for removal and shall restore damaged or temporarily relocated utilities and improvements to a condition equal to or better than they were prior to such damage or temporary relocation, all in accordance with requirements of the Contract Documents.

2. The CONTRACTOR shall protect all Utilities and other improvements which may be impaired during construction operations. It shall be the CONTRACTOR's responsibility to ascertain the actual location of all existing utilities and other improvements that will be encountered in its construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.
3. Maintaining in Service: All power, telephone, communication wires and cables encountered along the line of the WORK shall remain continuously in service during all the operations under the Contract, unless other arrangements satisfactory to the OWNER are made of said services. The CONTRACTOR shall be responsible for and shall repair all damage due to its operations.
4. Approval of Repairs: All repairs to a damaged utility or improvement are subject to inspection and approval by an authorized representative of the utility or improvement OWNER before being concealed by other work.

SPECIAL CONDITIONS

A. All participating Contractors are required to contact the Owner to arrange for a project site visit at the Public Safety Building, Wrangell, Alaska, and familiarize themselves with the existing conditions and the work necessary to meet the scope of work under this RFQ.

B. Regulatory Requirements and Work Standards – All work conducted must be in accordance with local, state, and federal regulations for Boiler and their controls.

C. Measurement and Payment. Payment for furnishing the work shall be made at the unit prices specified in the successful Proposer's Quote Schedule. This payment shall include all labor, materials and equipment necessary to furnish and construct the required mechanical and electrical work and all incidentals necessary.

D. Progress Payments. The Contractor may submit to the Owner progress payments no more than every two weeks by submitting an Application for Payment filled out and signed by the Contractor covering the work completed as of the date of the Application and accompanied by such supporting documentation.

SCOPE OF WORK / SPECIFICATIONS / EXECUTION

1) Introduction

A. This scope of work requires the Contractor to replace one Owner-furnished oil-fired boiler and associated accessories and controls at the Wrangell Public Safety Building.
B. The Owner has removed and disposed of the original oil-fired boiler, piping, controls, supports and all related accessories.
C. Contractor shall take delivery of Owner-furnished Weil-McLain Series 2, type 688 cast iron sectional boiler with Power Flame Model WCR2 power burner, install and perform initial testing of the replacement boiler system and provide evidence that the replacement boiler is fully operable and permitted by the State of Alaska.
D. The planned drawings of the mechanical room and the boiler configuration are found in Appendix A to this RFQ.
E. Detailed product and installation specifications for the new boiler system are found in Appendix B to this RFQ.

2) General Requirements

A. Install one owner furnished, low pressure, wet base, Weil –McLain Series 2, type 688 cast iron sectional boiler with a Power Blame Model WCR2 power burner that pressurizes the firebox and operate under forced and balanced draft at a minimum of 85.6% Oil Thermal efficiency.

B. Upon contract award, Contractor will procure all necessary installation materials and supplies.
C. Contractor shall assemble and install boiler-burner unit in compliance with manufacturer's installation instructions. All work must be done in a neat and workman like manner.
   i) Weil-McLain 688 boiler with burner capable of burning No. 2 fuel oil.
   ii) Boiler-burner unit Field assembled (standard).
   iii) No. 2 fuel oil.
   iv) Water
   v) Forced draft.
D. Installation of new boiler will include connections to existing mechanical and electrical infrastructure.
E. Regulatory Requirements
   i) Boiler and controls to comply with applicable regulations.
F. Submittals
   i) Submit hydronic piping shop drawings and product data. All replacement piping to be copper to match existing system piping.
   ii) Submit control shop drawings for interface with the existing Model WEB-601 w/AX-EMB Niagara controller.
   iii) Boiler Circulator Pump – Sized at 80 gpm, 10.0 ft head 3450 RPM ½ HP, 120V/60Hz/1 ph. Design basis – TACO 2400.

3) Product

A. Boiler foundation: Contractor to construct concrete foundation to support the boiler.

B. Boiler trim: All electrical components to be of high quality and bear the U.L. label.
   i) Water boiler controls furnished:
      (1) Combination low temperature limit (operating) and manual reset high temperature limit control.
      (2) Low temperature limit set according to system design. High temperature limit set at least 20°F higher than the low limit.
      (3) Combination pressure-temperature gauge with dial clearly marked and easy to read.
      (4) ASME certified pressure relief valve, set to relieve at 30 PSIG. Optional relief valves available up to and including maximum allowable pressure. Side outlet discharge type; contractor to pipe outlet to existing, adjacent floor drain.
C. Low water cut-off for water boiler:
   i) Boiler to be furnished with U.L. labeled low water cut-off with ASME working pressure rating equal to the ASME rating of the relief valve.
   ii) Do not use quick-connect fittings on boiler.
   iii) Install cut-off according to manufacturer's instructions.
   iv) Locate so burner shuts down if boiler water level falls below allowable safe waterline.

4) Burner construction, features and requirements:

A. Burner fuel supply system and Power Flame burner installation to conform to burner manufacturer's installation instructions and applicable codes.

B. Burner motor characteristics: 120/60/1
C. Control characteristics 120/60/1.
D. Burner fuel –No. 2 fuel oil.
E. Code - standard boiler, CSD-1, FM, IRI
F. Burner to have U.L. label(s) supplied by the burner manufacturer.
G. Burner designed to ensure high efficiency and good performance under forced draft conditions with 0.1" W.C. positive pressure at the flue collar.
H. Burner to be adjusted to provide 9.5 to 10.0% CO_2 for gas and/or 11.5 to 12% CO_2 with zero smoke for oil firing.
I. Burner manufactured by: Power-Flame
J. Burner operating mode: low-high-off
K. Panel options – power on/fuel on light is standard on all burner(s) with panels.

i) Call for heat
ii) Ignition On
iii) Pilot Failure
iv) Low Water
v) Flame Failure
vi) Silencing Switch
vii) Control Fuse and Holder
viii) Post Purge Timer
ix) Alarm Bell

5) Start-up and Service

A. In order to accommodate the operational needs of the various building tenants, heating system shut downs, as well as electrical service interruptions, must be kept to a minimum and scheduled with the Owner, in advance.
B. At a minimum, the scope of work for electrical connections includes connection of burner, high limit thermostats, low water cutoff, and operating controls. Electrical connection work should be performed by a licensed electrician, following the manufacturer's installation instructions, national electrical code and local codes.
C. Contractor is required to perform hydronic testing at 100 PSIG for 2 hours with no pressure drop on new piping only.
D. The Contractor shall obtain the services of a factory-authorized agent to provide burner light off and adjustment. The start-up agent shall provide a burner light-off report as written proof that the burner was adjusted to optimum performance.
E. The Contractor shall provide a one-year workmanship warranty after start-up.

6) Site Cleanup

a. The WORK under this Section includes providing all supervision, labor, materials, tools and equipment necessary for final clean up and restoration of all areas disturbed by construction

activities, to a condition equal to, or better than, before construction started. This does not include clean up or restoration incidental to, or directly provided for by, other construction items.

b. Daily, the Contractor shall at all times keep the property free from rubbish and debris, as well as dirt, dust and debris generated in performance of the service. It is the responsibility of the Contractor to legally and properly dispose of all debris.
c. The Contractor must not use the trash can, dumpsters or any other Owner property without prior authorization.
d. Public restrooms must not be used for washing of tools and equipment, nor may the stools or sinks be used to dispose of chemicals.
e. The Contractor shall clean up all sites disturbed during construction of the project. This includes removal of all construction equipment, disposal of all excess materials, disposal of all rubbish and debris.

QUOTE

Project: PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION

1. The undersigned Proposer offers and agrees, if this Quote is accepted, to enter into an Agreement with the Owner to perform the work as described in the contract documents entitled *Request for Quote, City and Borough of Wrangell, PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION.*
2. Proposer accepts all of the terms and conditions of the contract documents, including without limitations, those in the Invitation to Quote.
3. This Quote will remain open for sixty (60) days, as stipulated in the Request for Quote.
4. Proposer has familiarized itself with the nature and extent of the contract documents, the work, the site, and locality where the work is to be performed, the legal requirements, and the conditions affecting cost and performance of the work.
5. Proposer agrees to complete the work required under the contract documents within the time stipulated and accepts payment in full based on the contract price named in the Quote.
6. Proposer has examined the contract documents in full, including the following Addenda, receipt of which is hereby acknowledged by the undersigned:

Addenda No.	Date Issued	Addendum No.	Date Issued
_____	_____	_____	_____

7. A Local Bidder Preference of five percent (5%) __X__ will, ___ will not be utilized on this project.
8. QUOTE SCHEDULE:

PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION

Pay Item Description	Pay Unit	Approximate Quantity	Unit Price		Amount	
			Dollars	Cents	Dollars	Cents
Mobilization	LS	1				
Boiler Installation	LS	1				
Electrical Connections	LS	1				

TOTAL PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION QUOTE AMOUNT IN FIGURES: $ _____

TOTAL PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION QUOTE AMOUNT IN WORDS: _____

9. Proposer has read this Quote and agrees to the conditions as stated herein by providing their signature in the space provided below.

Dated:	_____	Proposer:	_____ (Company Name)
Contractor's License No.:	_____	By:	_____ (Signature in Ink)
Telephone No.:	_____	Printed Name:	_____
		Title:	_____
Email Address:	_____	Address:	_____ (Street or P.O. Box)
			_____ (City, State, Zip)

AGREEMENT

PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION

THIS AGREEMENT is between THE CITY & BOROUGH OF WRANGELL (hereinafter called OWNER) and _____ (hereinafter called CONTRACTOR) OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK.

CONTRACTOR shall complete the WORK as specified or as indicated under the Quote Schedule of the OWNER's Contract Documents entitled **PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION**

A. The WORK consists of all activities necessary to install, complete for final operation, one, owner-furnished, low pressure, wet base, Weil –McLain Series 2, type 688 cast iron sectional boiler with a Power Blame Model WCR2 power burner that pressurize the firebox and operate under forced and balanced draft according to design.

ARTICLE 2. CONTRACT COMPLETION TIME.

Substantial completion by April 30, 2019.

ARTICLE 3. DATE OF AGREEMENT

The date of this Agreement will be the later of the date of the Borough Manager signature on page three of this section and the signature of the CONTRACTOR authorized representative.

ARTICLE 4. LIQUIDATED DAMAGES.

OWNER and the CONTRACTOR recognize that time is of the essence of this Agreement and that the OWNER will suffer financial loss if the WORK is not completed within the time specified in Article 2 herein, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They also recognize the delays, expense, and difficulties involved in proving in a legal preceding the actual damages suffered by the OWNER if the WORK is not completed on time. Accordingly, instead of requiring any such proof, the OWNER and the CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) the CONTRACTOR shall pay the OWNER $500.00 for each Calendar Day that expires after the substantial completion time specified in Article 2 above. The amount of liquidated damages specified above is agreed to be a reasonable estimate based on all facts known as of the date of this Agreement.

ARTICLE 5. CONTRACT PRICE.

OWNER shall pay CONTRACTOR for completion of the WORK in accordance with the Contract Documents in the amount set forth in the Quote Schedule. The CONTRACTOR agrees to accept as full and complete payment for all WORK to be done in this contract for **PUBLIC SAFETY BUILDING – OIL-FIRED BOILER INSTALLATION** those Unit Price amounts as set forth in the Quote Schedule in the Contract

Documents for this Project.

The total amount of this contract shall be $_____, except as adjusted in accordance with the provisions of the Contract Documents.

ARTICLE 6. PAYMENT PROCEDURES.

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the OWNER as provided in the General Conditions.

Progress payments will be paid in full in accordance with Article 14 of the General Conditions until ninety (90) percent of the Contract Price has been paid. The remaining ten (10) percent of the Contract Price may be retained, in accordance with applicable Alaska State Statutes, until final inspection, completion, and acceptance of the Project by the OWNER.

ARTICLE 7. CONTRACT DOCUMENTS.

The Contract Documents which comprise the entire Agreement between OWNER and CONTRACTOR concerning the WORK consist of this Agreement and the following sections of the Contract Documents:

- Request for Quote
- Quote Schedule
- General Conditions
- Appendix A - PDC Engineers' M1.0 drawing Wrangell Public Safety Building, Piping Replacement
- Appendix B - Weil-McLean 88, Water & Steam Boilers – Series 2, Boiler Manual
- Addenda numbers ___ to ____, inclusive.
- Change Orders which may be delivered or issued after the Date of the Agreement and which are not attached hereto

There are no Contract Documents other than those listed in this Article 7. The Contract Documents may only be amended by Change Order as provided in Paragraph 3.3 of the General Conditions.

ARTICLE 8. MISCELLANEOUS.

Terms used in this Agreement, which are defined in Article 1 of the General Conditions, will have the meanings indicated in the General Conditions.

No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation monies that may become due and monies that are due may not be assigned without such written consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents. CONTRACTOR understands and agrees that the Borough will not accept any assignment of this Contract to an LLC unless all the members of the LLC sign as guarantors of performance of this Contract.

OWNER and CONTRACTOR each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents. This Agreement shall be governed by the laws of the State of Alaska. The Superior Court for the State of Alaska, First Judicial District at Wrangell, Alaska, shall be the exclusive jurisdiction and venue for any action of any kind an any nature arising out of or relating to this Agreement and all Contract documents or for any action of any kind and any nature arising out of or related to the performance of non-performance of the CONTRACTOR, and CONTRACTOR'S employees, subcontractors, consultants and representatives.

The CONTRACTOR acknowledges that the CONTRACTOR has read and understands the terms of this Agreement and the terms and conditions of all the Contract documents listed in this Agreement and has had the opportunity to review the Agreement with counsel of his/her choice, and is executing this Agreement of his/her own free will. CONTRACTOR acknowledges and agrees that CONTRACTOR is not relying on any representations by any Borough employee, the Mayor, an assembly member, the borough attorney, the borough manager or any consultant of the Borough in deciding to enter this Agreement and perform this project.

IN WITNESS WHEREOF, OWNER and CONTRACTOR have caused this Agreement to be executed on the date listed below by OWNER.

OWNER:

City and Borough of Wrangell

(Signature)

By: Lisa Von Bargen, Borough Manager
(Printed Name)

Date:

OWNER's address for giving notices:

P.O. Box 531

Wrangell, Alaska 99929

907-874-2381 907-874-3952
(Telephone) (Fax)

CONTRACTOR:

(Company Name)

(Signature)

By:
(Printed Name, Authority or Title)

Date:

CONTRACTOR's address for giving notices:

(Telephone) (Fax)

(E-mail address)

Contractor License No.

PUBLIC SAFETY – OIL-FIRED BOILER INSTALLATION
GENERAL CONDITIONS

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PUBLIC SAFETY – OIL-FIRED BOILER INSTALLATION
GENERAL CONDITIONS

ARTICLE 1 DEFINITIONS

Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof. Where an entire word is capitalized in the definitions and is found not capitalized in the Contract Documents it has the ordinary dictionary definition.

Addenda - Written or graphic instruments issued prior to the opening of Bids which make additions, deletions, or revisions to the Contract Documents.

Agreement - The written contract between the OWNER and the CONTRACTOR covering the WORK to be performed; other documents are attached to the Agreement and made a part thereof as listed out in the Agreement.

Application for Payment - The form furnished by the ENGINEER which is to be used by the CONTRACTOR to request progress or final payment and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

Asbestos - Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

Bid - The offer or proposal of the Bidder submitted on the prescribed form setting forth the price or prices for the WORK.

Bonds - Bid, Performance, and Payment Bonds and other instruments which protect against loss due to inability or refusal of the CONTRACTOR to perform its contract.

Project Manager - The authorized representative of the City and Borough of Wrangell, as OWNER, who is responsible for administration of the contract.

Change Order - A document recommended by the ENGINEER, which is signed by the CONTRACTOR and the OWNER and authorizes an addition, deletion, or revision in the WORK, or an adjustment in the Contract Price or the Contract Time, issued on or after the Effective Date of the Agreement.

Contract Documents - The Table of Contents, Notice Inviting Bids, Instructions to Bidders, Bid Forms (including the Bid, Bid Schedule(s), Information Required of Bidder, Bid Bond, and all required certificates and affidavits), Agreement, Performance Bond, Payment Bond, General Conditions, Supplementary General Conditions, Technical Specifications, Drawings, Permits, and all Addenda, and Change Orders executed pursuant to the provisions of the Contract Documents.

Contract Price - The total monies payable by the OWNER to the CONTRACTOR under the terms and conditions of the Contract Documents.

Contract Time - The number of successive calendar days stated in the Contract Documents for the completion of the WORK.

CONTRACTOR - The individual, partnership, corporation, joint-venture or other legal entity with whom the OWNER has executed the Agreement.

Day - A calendar day of 24 hours measured from midnight to the next midnight.
Defective WORK - WORK that is unsatisfactory, faulty, or deficient; or that does not conform to the Contract Documents; or that does not meet the requirements of any inspection, reference standard, test, or approval referred to in the Contract Documents; or WORK that has been damaged prior to the ENGINEER's recommendation of final payment.

Drawings - The Drawings, plans, maps, profiles, diagrams, and other graphic representations which indicate the character, location, nature, extent, and scope of the WORK and which have been prepared by the ENGINEER and are referred to in the Contract Documents. Shop Drawings are not within the meaning of this paragraph.

Effective Date of the Agreement - The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

Engineer of Record - The individual, partnership, corporation, joint-venture or other legal entity named as such in the Contract Documents.

ENGINEER - The ENGINEER is the firm or person(s) selected by the OWNER to perform the duties of project inspection and management. Wrangell will inform the CONTRACTOR of the identity of the ENGINEER at or before the Notice to Proceed.

Field Order - A written order issued by the ENGINEER which may or may not involve a change in the WORK.

General Requirements - Division 1 of the Technical Specifications.

Hazardous Waste - The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 9603) as amended from time to time.

Holidays - Legal holidays occur on:

1. New Year's Day - January 1
2. Martin Luther King's Birthday - Third Monday in January
3. President's Day - Third Monday in February
4. Seward's Day - Last Monday in March
5. Memorial Day - Last Monday in May
6. Independence Day - July 4
7. Labor Day - First Monday in September
8. Alaska Day - October 18
9. Veteran's Day - November 11
10. Thanksgiving Day - Fourth Thursday and the following Friday in November
11. Christmas Day – December 25

If any holiday listed above falls on a Saturday, Saturday and the preceding Friday are both legal holidays. If the holiday should fall on a Sunday, Sunday and the following Monday are both legal holidays.

Inspector - The authorized representative of the ENGINEER assigned to make detailed inspections for conformance to the Contract Documents. Any reference to the Resident Project Representative in this document shall mean the Inspector.

Laws and Regulations; Laws or Regulations - Any and all applicable laws, rules, regulations, ordinances, codes, and/or orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

Mechanic's Lien - A form of security, an interest in real property, which is held to secure the payment of an obligation. When referred to in these Contract Documents, "Mechanic's Lien" or "lien" means "Stop Notice".

Milestone - A principal event specified in the Contract Documents relating to an intermediate completion date of a portion of the WORK, or a period of time within which the portion of the WORK should be performed prior to Substantial Completion of all the WORK.

Notice of Intent to Award - The written notice by the OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the requirements listed therein, within the time specified, the OWNER will enter into an Agreement.

Notice of Award - The written notice by the OWNER to the apparent successful bidder stating that the apparent successful bidder has complied with all conditions for award of the contract.

Notice of Substantial Completion - A form signed by the ENGINEER and the CONTRACTOR recommending to the OWNER that the WORK is Substantially Complete and fixing the date of Substantial Completion. After acceptance of the WORK by the OWNER's governing body, the form is signed by the OWNER and filed with the County Recorder. This filing starts the 30 day lien filing period on the WORK.

Notice to Proceed - The written notice issued by the OWNER to the CONTRACTOR authorizing the CONTRACTOR to proceed with the WORK and establishing the date of commencement of the Contract Time.

OWNER - The City and Borough of Wrangell, acting through its legally designated officials, officers, or employees.

Partial Utilization - Use by the OWNER or a substantially completed part of the WORK for the purpose for which it is intended prior to Substantial Completion of all the WORK.

PCB's - Polychlorinated biphenyls.

Permittee – Contractor.

Petroleum - Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Wastes and crude oils.

Project - The total construction of which the WORK to be provided under the Contract Documents may be the whole, or a part as indicated elsewhere in the Contract Documents.

Radioactive Material - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

Shop Drawings - All Drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for the CONTRACTOR and submitted by the CONTRACTOR, to the ENGINEER, to illustrate some portion of WORK.

Specifications - (Same definition as for Technical Specifications hereinafter).

Stop Notice - A legal remedy for Subcontractors and suppliers who contribute to public works, but who are not paid for their WORK, which secures payment from construction funds possessed by the OWNER. For public property, the Stop Notice remedy is designed to substitute for mechanic's lien rights.

Sub-Consultant - The individual, partnership, corporation, joint-venture or other legal entity having a direct contract with ENGINEER, or with any of its Consultants to furnish services with respect to the Project.

Subcontractor - An individual, partnership, corporation, joint-venture or other legal entity having a direct contract with the CONTRACTOR, or with any of its Subcontractors, for the performance of a part of the WORK at the site.

Substantial Completion - Refers to when the WORK has progressed to the point where, in the opinion of the ENGINEER as evidenced by Notice of Completion as applicable, it is sufficiently complete, in accordance with the Contract Documents, so that the WORK can be utilized for the purposes for which it is intended; or if no such notice is issued, when final payment is due in accordance with Paragraph 14.8. The terms "substantially complete" and "substantially completed" as applied to any WORK refer to substantial completion thereof.

Supplementary General Conditions (SGC) - The part of the Contract Documents which make additions, deletions, or revisions to these General Conditions.

Supplier - A manufacturer, fabricator, supplier, distributor, materialman, or vendor.

Technical Specifications - Divisions 1 through 16 of the Contract Documents consisting of the General Requirements and written technical descriptions of products and execution of the WORK.

Underground Utilities - All pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities which have been installed underground to furnish any of the following services or materials: water, sewage and drainage removal, electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, traffic, or other control systems.

WORK - The entire completed construction or the various separately identifiable parts thereof required to be furnished under the Contract Documents. WORK is the result of performing, or furnishing labor and furnishing and incorporating materials and equipment into the construction, and performing or furnishing services and furnishing documents, all as required by the Contract Documents.

ARTICLE 2 PRELIMINARY MATTERS

2.1 DELIVERY OF BONDS/INSURANCE CERTIFICATES. When the CONTRACTOR delivers the signed Agreements to the OWNER, the CONTRACTOR shall also deliver to the OWNER such Bonds and Insurance Policies and Certificates as the CONTRACTOR may be required to furnish in accordance with the Contract Documents.

2.2 COPIES OF DOCUMENTS. The OWNER shall furnish to the CONTRACTOR the required number of copies of the Contract Documents specified in the Supplementary General Conditions.

2.3 COMMENCEMENT OF CONTRACT TIME; NOTICE TO PROCEED. The Contract Time will start to run on the commencement date stated in the Notice to Proceed.

2.4 STARTING THE WORK

A. The CONTRACTOR shall begin to perform the WORK within 10 days after the commencement date stated in the Notice to Proceed, but no WORK shall be done at the site prior to the commencement date, including mobilization.

B. Before undertaking each part of the WORK, the CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. The CONTRACTOR shall promptly report in writing to the ENGINEER any conflict, error, or discrepancy which the CONTRACTOR may discover and shall obtain a written interpretation or clarification from the ENGINEER before proceeding with any WORK affected thereby.

C. The CONTRACTOR shall submit to the ENGINEER for review those documents called for under Section 01300 - Contractor Submittals in the General Requirements.

2.5 PRE-CONSTRUCTION CONFERENCE. The CONTRACTOR is required to attend a Pre-Construction Conference. This conference will be attended by the ENGINEER and others as appropriate in order to discuss the WORK in accordance with the applicable procedures specified in the General Requirements, Section 01010 - Summary of Work in the General Requirements.

ARTICLE 3 CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 INTENT

A. The Contract Documents comprise the entire Agreement between the OWNER and the CONTRACTOR concerning the WORK. The Contract Documents shall be construed as a whole in accordance with Alaska Law.

B. It is the intent of the Contract Documents to describe the WORK, functionally complete, to be constructed in accordance with the Contract Documents. Any work, materials, or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for. When words or phrases which have a well-known technical or construction industry or trade meaning are used to describe work, materials, or equipment such words or phrases shall be interpreted in accordance with that meaning, unless a definition has been provided in Article 1 of the General Conditions. Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the OWNER, the CONTRACTOR, or the

ENGINEER or any of their consultants, agents, or employees from those set forth in the Contract Documents.

C. If, during the performance of the WORK, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the WORK or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, the CONTRACTOR shall report it to the ENGINEER in writing at once, and the CONTRACTOR shall not proceed with the WORK affected thereby (except in an emergency as authorized by the ENGINEER) until a clarification field order, or Change Order to the Contract Documents has been issued.

3.2 ORDER OF PRECEDENCE OF CONTRACT DOCUMENTS

A. In resolving conflicts resulting from, errors, or discrepancies in any of the Contract Documents, the order of precedence shall be as follows:

1. Permits from other agencies as may be required by law, excepting the definition of "PERMITEE" in these permits.
2. Field Orders
3. Change Orders
4. ENGINEER's written interpretations and clarifications.
5. Agreement
6. Addenda
7. CONTRACTOR's Bid (Bid Form)
8. Supplementary General Conditions
9. Notice Inviting Bids
10. Instructions to Bidders
11. General Conditions
12. Technical Specifications
13. Drawings

B. With reference to the Drawings the order of precedence is as follows:

1. Figures govern over scaled dimensions
2. Detail Drawings govern over general Drawings
3. Addenda/ Change Order drawings govern over Contract Drawings
4. Contract Drawings govern over standard drawings

3.3 AMENDING AND SUPPLEMENTING CONTRACT DOCUMENTS. The Contract Documents may be amended to provide for additions, deletions, and revisions in the WORK or to modify the terms and conditions thereof by a Change Order (pursuant to Article 10 CHANGES IN THE WORK).

3.4 REUSE OF DOCUMENTS. Neither the CONTRACTOR, nor any Subcontractor or Supplier, nor any other person or organization performing any of the WORK under a contract with the OWNER shall have or acquire any title to or ownership rights in any of the Drawings, Technical Specifications, or other documents used on the WORK, and they shall not reuse any of them on the extensions of the Project or any other project without written consent of the OWNER.

ARTICLE 4 AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

4.1 AVAILABILITY OF LANDS. The OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the WORK is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of the CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by the OWNER, unless otherwise provided in the Contract Documents. Nothing contained in the Contract Documents shall be interpreted as giving the CONTRACTOR exclusive occupancy of the lands or rights-of-way provided. The CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment; provided, that the CONTRACTOR shall not enter upon nor use any property not under the control of the OWNER until a written temporary construction easement, lease or other appropriate agreement has been executed by the CONTRACTOR and the property owner, and a copy of said agreement furnished to the ENGINEER prior to said use; and, neither the OWNER nor the ENGINEER shall be liable for any claims or damages resulting from the CONTRACTOR's unauthorized trespass or use of any such properties.

4.2 PHYSICAL CONDITIONS - SUBSURFACE AND EXISTING STRUCTURES

4.3 DIFFERING SITE CONDITIONS

A. The CONTRACTOR shall promptly upon discovery (but in no event later than 14 days thereafter) and before the following conditions are disturbed, notify the ENGINEER, in writing of any:

1. Material that the CONTRACTOR believes may be material that is hazardous waste, as defined in Article 1 of these General Conditions, or asbestos, PCB's, petroleum or any other substance or material posing a threat to human or to the environment.
2. Subsurface or latent physical conditions at the site differing from those indicated in the reports referenced in SGC 4.2 Physical Conditions.
3. Unknown physical conditions at the site of any unusual nature, differing materially from those physical conditions ordinarily encountered in the area of project and generally recognized as inherent in the area of the project and as ordinarily encountered and inherent in WORK of the character provided for in the contract. Weather conditions specifically do not constitute any change condition under this section.

B. The OWNER shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the CONTRACTOR's cost of, or the time required for, performance of any part of the WORK shall issue a Change Order under the procedures described in the contract.

C. In the event that a dispute arises between the OWNER and the CONTRACTOR whether the conditions materially differ, or involved hazardous waste or other materials listed above, or cause a decrease or increase in the CONTRACTOR's cost of, or time required for, performance of any part of the WORK, the CONTRACTOR shall not be excused from any scheduled completion date provided for by the contract, but shall proceed with all WORK to be performed under the contract. The CONTRACTOR and OWNER shall retain

any and all rights provided either by contract or by Law which pertain to the resolution of disputes and protests between the contracting parties.

4.4 PHYSICAL CONDITIONS - UNDERGROUND UTILITIES

A. Indicated. The information and data indicated in the Contract Documents with respect to existing Underground Utilities at or contiguous to the site are based on information and data furnished to the OWNER or the ENGINEER by the owners of such Underground Utilities or by others. Unless it is expressly provided in the Supplementary General Conditions and/or Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements, the OWNER and the ENGINEER shall not be responsible for the accuracy or completeness of any such information or data, and the CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Utilities indicated in the Contract Documents, for coordination of the WORK with the owners of such Underground Utilities during construction, for the safety and protection thereof and repairing any damage thereto resulting from the WORK, the cost of which will be considered as having been included in the Contract Price.

B. Not Indicated. If an Underground Utility is uncovered or revealed at or contiguous to the site which was not indicated in the Contract Documents and which the CONTRACTOR could not reasonably have been expected to be aware of, the CONTRACTOR shall identify the owner of such Underground Utility and give written notice thereof to that owner and shall notify the ENGINEER in accordance with the requirements of the Supplementary General Conditions and Section 01530 - Protection and Restoration of Existing Facilities of the General Requirements.

4.5 REFERENCE POINTS

A. The ENGINEER will provide one bench mark, near or on the site of the WORK, and will provide two points near or on the site to establish a base line for use by the CONTRACTOR for alignment control. Unless otherwise specified in the General Requirements, the CONTRACTOR shall furnish all other lines, grades, and bench marks required for proper execution of the WORK.

B. The CONTRACTOR shall preserve all bench marks, stakes, and other survey marks, and in case of their removal or destruction by its own employees or by its Subcontractor's employees, the CONTRACTOR shall be responsible for the accurate replacement of such reference points by personnel qualified under the Alaska Statute governing the licensing of Architects, Engineers, and Land Surveyors.

ARTICLE 5 BONDS AND INSURANCE

5.1 PERFORMANCE, PAYMENT, AND OTHER BONDS

A. The CONTRACTOR shall furnish, when required, Performance and Payment Bonds on forms provided by the OWNER for the penal sums of 100% of the amount of the Bid award. The surety on each bond may be any corporation or partnership authorized to do business in the State of Alaska as an insurer under AS 21.09. These bonds shall remain in effect for 12 months after the date of final payment and until all obligations and liens under this contract have been satisfied. The CONTRACTOR shall also furnish such other Bonds

as are required by the Supplementary General Conditions. All Bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

B. If the surety on any Bond furnished by the CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the WORK is located, the CONTRACTOR shall within 7 days thereafter substitute another Bond and Surety, which must be acceptable to the OWNER.

C. All Bonds required by the Contract Documents to be purchased and maintained by CONTRACTOR shall be obtained from surety companies that are duly licensed or authorized in the State of Alaska to issue Bonds for the limits so required. Such surety companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions. The City Manager may, on behalf of the OWNER, notify the surety of any potential default or liability.

5.2 INSURANCE

A. The CONTRACTOR shall purchase and maintain the insurance required under this paragraph. Such insurance shall include the specific coverages set out herein and be written for not less than the limits of liability and coverages provided in the Supplementary General Conditions, or required by law, whichever are greater. All insurance shall be maintained continuously during the life of the Agreement up to the date of Final Completion and at all times thereafter when the CONTRACTOR may be correcting, removing, or replacing Defective WORK in accordance with Paragraph 13.6, but the CONTRACTOR's liabilities under this Agreement shall not be deemed limited in any way to the insurance coverage required.

B. All insurance required by the Contract Documents to be purchased and maintained by the CONTRACTOR shall be obtained from insurance companies that are duly licensed or authorized in the State of Alaska to issue insurance policies for the limits and coverages so required. Such insurance companies shall have a current Best's Rating of at least an "A" (Excellent) general policy holder's rating and a Class VII financial size category and shall also meet such additional requirements and qualifications as may be provided in the Supplementary General Conditions.

C. The City and Borough of Wrangell shall be listed as an additional insured on the CONTRACTOR'S general liability insurance policy and the CONTRACTOR'S pollution liability policy. CONTRACTOR shall furnish certificates to the Borough of such insurance and showing the Borough as an additional insured within ten days of receiving the Notice to Proceed. Failure to comply with this provision constitutes a material breach and default of the Agreement.

ARTICLE 6 CONTRACTOR'S RESPONSIBILITIES

6.1 SUPERVISION AND SUPERINTENDENCE

A. The CONTRACTOR shall supervise, inspect, and direct the WORK competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the WORK in accordance with the Contract Documents. The CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incidental thereto. The CONTRACTOR shall be responsible to see that the completed WORK complies accurately with the Contract Documents.

B. The CONTRACTOR shall designate in writing and keep on the WORK site at all times during its progress a technically qualified, English-speaking superintendent, who is an employee of the CONTRACTOR and who shall not be replaced without written notice to the OWNER and the ENGINEER. The superintendent will be the CONTRACTOR's representative at the site and shall have authority to act on behalf of the CONTRACTOR. All communications given to the superintendent shall be as binding as if given to the CONTRACTOR. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER and the ENGINEER only.

C. The CONTRACTOR's superintendent shall be present at the site of the WORK at all times while WORK is in progress. Failure to observe this requirement shall be considered suspension of the WORK by the CONTRACTOR until such time as such superintendent is again present at the site.

6.2 LABOR, MATERIALS, AND EQUIPMENT

A. The CONTRACTOR shall provide competent, suitably qualified personnel to survey and lay out the WORK and perform construction as required by the Contract Documents. The CONTRACTOR shall furnish, erect, maintain, and remove the construction plant and any temporary works as may be required. The CONTRACTOR shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the WORK or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all WORK at the site shall be performed during regular working hours, and the CONTRACTOR will not permit overtime work or the performance of work on Saturday, Sunday, or any legal holiday without the OWNER's written consent. The CONTRACTOR shall apply for this consent through the ENGINEER.

B. Except as otherwise provided in this Paragraph, the CONTRACTOR shall receive no additional compensation for overtime work, i.e., work in excess of 8 hours in any one calendar day or 40 hours in any one calendar week, even though such overtime work may be required under emergency conditions and may be ordered by the ENGINEER in writing. Additional compensation will be paid the CONTRACTOR for overtime work only in the event extra work is ordered by the ENGINEER and the Change Order specifically authorizes the use of overtime work and then only to such extent as overtime wages are regularly being paid by the CONTRACTOR for overtime work of a similar nature in the same locality.

C. All costs of inspection and testing performed during overtime work by the CONTRACTOR which is allowed solely for the convenience of the CONTRACTOR shall be borne by the

CONTRACTOR. The OWNER shall have the authority to deduct the cost of all such inspection and testing from any partial payments otherwise due to the CONTRACTOR.

D. Unless otherwise specified in the Contract Documents, the CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up, and completion of the WORK, including all mobilization and demobilization.

E. All materials and equipment to be incorporated into the WORK shall be of good quality and new, except as otherwise provided in the Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of the OWNER. If required by the ENGINEER, the CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with the instructions of the applicable Supplier except as otherwise provided in the Contract Documents; but no provisions of any such instructions will be effective to assign to the ENGINEER, or any of the ENGINEER consultants, agents, or employees, any duty or authority to supervise or direct the furnishing or performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraphs 9.9C and 9.9D.

F. The CONTRACTOR shall at all times employ sufficient labor and equipment for prosecuting the several classes of WORK to full completion in the manner and time set forth in and required by these specifications. All workers shall have sufficient skill and experience to perform property the WORK assigned to them. Workers engaged in special WORK, or skilled WORK, shall have sufficient experience in such WORK and in the operation of the equipment required to perform all WORK, properly and satisfactorily.

G. Any person employed by the CONTRACTOR or by any Subcontractor who, in the opinion of the ENGINEER, does not perform the WORK in a proper and skillful manner, or is intemperate or disorderly shall, at the written request of the ENGINEER, be removed forthwith by the CONTRACTOR or Subcontractor employing such person, and shall not be employed again in any portion of the WORK without the approval of the ENGINEER. Should the CONTRACTOR fail to remove such person or persons as required above, or fail to furnish suitable and sufficient personnel for the proper prosecution of the WORK, the ENGINEER may suspend the WORK by written notice until such orders are complied with.

6.3 ADJUSTING PROGRESS SCHEDULE. The CONTRACTOR shall submit monthly updates of the progress schedule to the ENGINEER for acceptance in accordance with the provisions in Section 01300 - Contractor Submittals in the General Requirements.

6.4 SUBSTITUTES OR “OR-EQUAL” ITEMS. The CONTRACTOR shall submit proposed substitutes or “or-equal” items in accordance with the provisions in Section 01300 - Contractor Submittals in the General Requirements.

6.5 CONCERNING SUBCONTRACTORS, SUPPLIERS, AND OTHERS.

A. The CONTRACTOR shall be responsible to the OWNER and the ENGINEER for the acts and omissions of its Subcontractors and their employees to the same extent as CONTRACTOR is responsible for the acts and omissions of its own employees. Nothing contained in this Paragraph shall create any contractual relationship between any Subcontractor and the OWNER or the ENGINEER nor relieve the CONTRACTOR of any liability or obligation under the Agreement and Contract documents.

B. The CONTRACTOR shall perform not less than 40% of the WORK with its own forces (i.e., without subcontracting). The 40% requirement shall be understood to mean that the CONTRACTOR shall perform, with its own organization, WORK amounting to at least 40% of the awarded contract amount. The 40% requirement will be calculated based upon the total of the subcontract amounts submitted for contract award, and any other information requested by the OWNER from the apparent low bidder.

6.6 PERMITS

A. Unless otherwise provided in the Supplementary General Conditions, the CONTRACTOR shall obtain and pay for all construction permits and licenses from the agencies having jurisdiction, including the furnishing of insurance and bonds if required by such agencies. The enforcement of such requirements under this contract shall not be made the basis for claims for additional compensation. The OWNER shall assist the CONTRACTOR, when necessary, in obtaining such permits and licenses. The CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the WORK, which are applicable at the time of opening of Bids. The CONTRACTOR shall pay all charges of utility owners for connections to the WORK.

B. These Contract Documents may require that the WORK be performed within the conditions and/or requirements of local, state and/or federal permits. These permits may be bound within the Contract Documents, included within the Contract Documents by reference, or included as part of the WORK, as designated in this Section. The CONTRACTOR is responsible for completing the WORK required for compliance with all permit requirements; this WORK is incidental to other items in the Contract Documents. Any reference to the “permittee” in the permits shall mean the CONTRACTOR. If any permits were acquired by the OWNER, this action was done to expedite the start of construction. If the CONTRACTOR does not complete the WORK within the specified permit window, the CONTRACTOR shall be responsible for the permit extension, and for completing any additional requirements placed upon the permit.

C. These Contract Documents may require that the WORK be performed within the conditions and/or requirements of local, state and/or federal permits. These permits may be bound within the Contract Documents, included within the Contract Documents by reference, or included as part of the WORK, as designated in Section 00700 – General Conditions, Article 6.6 - PERMITS. The CONTRACTOR is responsible for completing the WORK required for compliance with all permit requirements; this WORK is incidental to other items in the Contract Documents. Any reference to the “permittee” in the permits shall mean the CONTRACTOR. If any permits were acquired by the OWNER, this action was done to expedite the start of construction. If the CONTRACTOR does not complete the WORK within the specified permit window, the CONTRACTOR shall be responsible for the permit extension, and for completing any additional requirements placed upon the permit.

D. The OWNER shall apply for, and obtain, the necessary building permit for this project, however, the CONTRACTOR is responsible for scheduling and coordinating all necessary inspections. All other provisions of this Section remain in effect.

6.7 PATENT FEES AND ROYALTIES. The CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the WORK or the incorporation in the WORK of any invention, design, process, product, software or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the WORK and if to the actual knowledge of the OWNER or the ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by the OWNER in the Contract Documents. The CONTRACTOR shall indemnify, defend and hold harmless the OWNER and the ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses, and expenses (including attorneys' fees and court costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the WORK or resulting from the incorporation in the WORK of any invention, design, process, product, or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

6.8 LAWS AND REGULATIONS. The CONTRACTOR shall observe and comply with all federal, state, and local laws, ordinances, codes, orders, and regulations which in any manner affect those engaged or employed on the WORK, the materials used in the WORK, or the conduct of the WORK. If any discrepancy or inconsistency should be discovered in this contract in relation to any such law, ordinance, code, order, or regulation, the CONTRACTOR shall report the same in writing to the ENGINEER. The CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, and their officers, agents, and employees against all claims or liability arising from violation of any such law, ordinance, code, order, or regulation, whether by CONTRACTOR or by its employees, Subcontractors, or third parties. Any particular law or regulation specified or referred to elsewhere in the Contract Documents shall not in any way limit the obligation of the CONTRACTOR to comply with all other provisions of federal, state, and local laws and regulations.

The OWNER may, per AS 36.30, audit the CONTRACTOR's or Subcontractor(s) records that are related to the cost or pricing data for this contract, all related Change Orders, and/or contract modifications.

6.9 TAXES. The CONTRACTOR shall pay all sales, consumer, use, and other similar taxes required to be paid by the CONTRACTOR in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the WORK.

6.10 USE OF PREMISES. The CONTRACTOR shall confine construction equipment, the storage of materials and equipment, and the operations of workers to (1) the Project site, (2) the land and areas identified in and permitted by the Contract Documents, and (3) the other land and areas permitted by Laws and Regulations, rights-of-way, permits, leases and easements. The CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the WORK. Should any claim be made against the OWNER or the ENGINEER by any such owner or occupant because of the performance of the WORK, the CONTRACTOR shall promptly attempt to settle

with such other party by agreement or otherwise resolve the claim through litigation. The CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify, defend, and hold the OWNER and the ENGINEER harmless from and against all claims, damages, losses, and expenses (including, but not limited to, fees of engineers attorneys, and other professionals and court costs) arising directly, indirectly, or consequentially out of any action, legal or equitable, brought by any such owner or occupant against the OWNER, the ENGINEER, their Consultants, Sub-consultants, and the officers, directors, employees and agents of each and any of them to the extent caused by or based upon the CONTRACTOR's performance or non-performance of the WORK.

6.11 SAFETY AND PROTECTION

A. The CONTRACTOR shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the WORK. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all employees on the WORK and other persons and organizations who may be affected thereby;
2. all the WORK and materials and equipment to be incorporated therein, whether in storage on or off the site; and
3. other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

B. The CONTRACTOR shall comply with all applicable Laws and Regulations whether referred to herein or not) of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss and shall erect and maintain all necessary safeguards for such safety and protection. The CONTRACTOR shall notify owners of adjacent property and utilities when prosecution of the WORK may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. The CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and program.

D. Materials that contain hazardous substances or mixtures may be required on the WORK. A Material Safety Data Sheet shall be requested by the CONTRACTOR from the manufacturer of any hazardous product used.

E. Material usage shall be accomplished with strict adherence to all safety requirements and all manufacturer's warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.

F. The CONTRACTOR shall be responsible for coordinating communications on any exchange of Material Safety Data Sheets or other hazardous material information that is required to be made available to, or exchanged between, or among, employers at the site in accordance with Laws or Regulations.

G. The CONTRACTOR shall notify the ENGINEER if it considers a specified product or its intended usage to be unsafe. This notification must be given to the ENGINEER prior to the product being ordered, or if provided by some other party, prior to the product being incorporated in the WORK.

6.12 SHOP DRAWINGS AND SAMPLES

A. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the CONTRACTOR shall submit to the ENGINEER for review, all Shop Drawings in accordance with Section 01300 - Contractor Submittals in the General Requirements.

B. The Contractor shall also submit to the ENGINEER for review all samples in accordance with Section 01300 - Contractor Submittals in the General Requirements.

C. Before submittal of each shop drawing or sample, the CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the WORK and the Contract Documents.

6.13 CONTINUING THE WORK. The CONTRACTOR shall carry on the WORK and adhere to the progress schedule during all disputes or disagreements with the OWNER. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as the CONTRACTOR and the OWNER may otherwise agree in writing.

6.14 INDEMNIFICATION

A. To the fullest extent permitted by the laws of the State of Alaska, the CONTRACTOR shall indemnify, defend, and hold harmless the OWNER, the ENGINEER, their Consultants, Sub-consultants and the officers, assembly members, mayor, directors, employees, and agents of each and any of them, against and from all claims, actions, damages, and liability of any kind and any nature arising out of or related to in way any acts or omissions of the CONTRACTOR, including death, and including in any administrative action by any federal or state agency, except where the claim or action alleges willful misconduct of the OWNER and the ENGINEER. Such indemnification by the CONTRACTOR shall include but not be limited to the following:

1. Liability or claims resulting directly or indirectly from the negligence or carelessness of the CONTRACTOR, its employees, or agents in the performance of the WORK, or non-performance of the WORK, or in guarding or maintaining the same, or from any improper materials, implements, or appliances used in its construction, or by or on account of any act or omission of the CONTRACTOR, its employees, agents, or third parties;
2. Liability or claims arising directly or indirectly from bodily injury, occupational sickness or disease, or death of the CONTRACTOR’s or Subcontractor’s own employees engaged in the WORK resulting in actions brought by or on behalf of such employees against the OWNER, and the ENGINEER;

3. Liability or claims arising directly or indirectly from or based on the violation of any federal, state or local law, ordinance, regulation, order, or decree, whether by the CONTRACTOR, its employees, or agents;
4. Liability or claims arising directly or indirectly from the use or manufacture by the CONTRACTOR, its employees, or agents in the performance of this contract of any copyrighted or non-copyrighted composition, secret process, patented or non-patented invention, computer software, article, or appliance, unless otherwise specifically stipulated in this contract.
5. Liability or claims arising directly or indirectly from the breach of any warranties, whether express or implied, made to the OWNER or any other parties by the CONTRACTOR, its employees, or agents;
6. Liabilities or claims arising directly or indirectly from the willful or criminal misconduct of the CONTRACTOR, its employees, or agents; and,
7. Liabilities or claims arising directly or indirectly from any breach of the obligations of the CONTRACTOR in the Agreement and all Contract documents.

B. The CONTRACTOR shall reimburse the ENGINEER and the OWNER for all costs and expenses, (including but not limited to fees and charges of engineers, attorneys, experts, and other professionals and court costs including all costs of appeals) incurred by the OWNER, and the ENGINEER in enforcing the provisions of this Paragraph 6.14.

C. The indemnification obligation under this Paragraph 6.14 shall not be limited in any way by any limitation of the amount or type of damages, compensation, or benefits payable by or for the CONTRACTOR or any such Subcontractor or other person or organization under workers' compensation acts, disability benefit acts, or other employee benefit acts.

6.15 CONTRACTOR'S DAILY REPORTS. The CONTRACTOR shall complete a daily report indicating total manpower for each construction trade, major equipment on site, each Subcontractor's manpower, weather conditions, etc., involved in the performance of the WORK. The daily report shall be completed on forms provided by the ENGINEER and shall be submitted to the ENGINEER at the conclusion of each work day. The report should comment on the daily progress and status of the WORK within each major component of the WORK. These components will be decided by the ENGINEER.

6.16 ASSIGNMENT OF CONTRACT. The CONTRACTOR shall not assign, sublet, sell, transfer, or otherwise dispose of the contract or any portion thereof, or its right, title, or interest therein, or obligations thereunder, without the written consent of the OWNER except as imposed by law. If the CONTRACTOR violates this provision, the contract may be terminated at the sole option of the OWNER. In such event, the OWNER shall be relieved of all liability and obligations to the CONTRACTOR and to its assignee or transferee, growing out of such termination.

6.17 CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES. It is understood that any turn-on or turn-off, line locates and any other work or assistance necessary by the OWNER, will be at the CONTRACTOR's expense unless otherwise stated in the bid documents. All cost must be agreed to prior to any related actions, and will be considered incidental to the project cost. Billing to the CONTRACTOR will be direct from the OWNER.

6.18 OPERATING WATER SYSTEM VALVES

A. The CONTRACTOR shall submit a written request, to the ENGINEER, for approval to operate any valve on any in-service section of the City water system. The request must be submitted at least 24-hours prior to operating any valves. The request shall specifically identify each valve to be operated, the time of operation, and the operation to be performed. The CONTRACTOR shall obtain the written approval of the ENGINEER for any scheduled operation before operating any valve.

B. The CONTRACTOR shall be responsible for all damages, both direct and consequential, to the OWNER or any other party, caused by unauthorized operation of any valve of the City water system.

6.19 CONTRACTOR'S WORK SCHEDULE LIMITATIONS. City and Borough of Wrangell Noise Ordinance. The noise loudness measured at the boundary line of the premises used for industrial activities shall not exceed 90 decibels between the hours of 7:00 AM and 8:00 PM on weekdays and the hours of 10:00 AM and 8:00 PM on weekends and holidays, and 40 decibels at other hours, unless a permit shall first be obtained from the OWNER. Such permit shall be issued by the OWNER only upon a determination that such operation during hours not otherwise permitted hereunder is necessary and will not result in unreasonable disturbance to surrounding residents.

ARTICLE 7 OTHER WORK

7.1 RELATED WORK AT SITE

A. The OWNER may perform other work related to the Project at the site by the OWNER's own forces, have other work performed by utility owners, or let other direct contracts therefor which may contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to the CONTRACTOR prior to starting any such other work.

B. The CONTRACTOR shall afford each other contractor who is a party to such a direct contract and each utility owner (or the OWNER, if the OWNER is performing the additional work with the OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the WORK with theirs. The CONTRACTOR shall do all cutting, fitting, and patching of the WORK that may be required to make its several parts come together properly and integrate with such other work. The CONTRACTOR shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of the ENGINEER and the others whose work will be affected.

C. If the proper execution or results of any part of the CONTRACTOR's WORK depends upon the work of any such other contractor or utility owner (or OWNER), the CONTRACTOR shall inspect and report to the ENGINEER in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for such proper execution and results. The CONTRACTOR's failure to report such delays, defects, or deficiencies will constitute an acceptance of the other work as fit and proper for integration with the CONTRACTOR's WORK except for latent or nonapparent defects and deficiencies in the other work.

7.2 COORDINATION. If the OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary General Conditions, and the specific matters to be covered by such authority and responsibility will be itemized and the extent of such authority and responsibilities will be provided in the Supplementary General Conditions.

ARTICLE 8 OWNER'S RESPONSIBILITIES

8.1 COMMUNICATIONS

A. The OWNER shall issue all its communications to the CONTRACTOR through the ENGINEER.

B. The CONTRACTOR shall issue all its communications to the OWNER through the ENGINEER.

8.2 PAYMENTS. The OWNER shall make payments to the CONTRACTOR as provided in Paragraphs 14.5, 14.8, 14.9 and 14.10.

8.3 LANDS, EASEMENTS, AND SURVEYS. The OWNER's duties in respect of providing lands and easements and providing surveys to establish reference points are set forth in Paragraphs 4.1 and 4.5.

8.4 CHANGE ORDERS. The OWNER shall execute Change Orders as indicated in Paragraph 10.1F.

8.5 INSPECTIONS AND TESTS. The OWNER's responsibility in respect of inspections, tests, and approvals is set forth in Paragraph 13.3.

8.6 SUSPENSION OF WORK. In connection with the OWNER's right to stop WORK or suspend WORK, see Paragraphs 13.4 and 15.1.

8.7 TERMINATION OF AGREEMENT. Paragraphs 15.2 and 15.3 detail the OWNER's right to terminate services of the CONTRACTOR.

ARTICLE 9 ENGINEER'S STATUS DURING CONSTRUCTION

9.1 OWNER'S REPRESENTATIVE. The ENGINEER will be the OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of the ENGINEER as the OWNER's representative during construction are set forth in the Contract Documents.

9.2 VISITS TO SITE. The ENGINEER will make visits to the site during construction to observe the progress and quality of the WORK and to determine, in general, if the WORK is proceeding in accordance with the Contract Documents. Exhaustive or continuous on-site inspections to check the quality or quantity of the WORK will not be required of the ENGINEER. The ENGINEER will not, during such visits, or as a result of such observations of the CONTRACTOR's WORK in progress, supervise, direct, or have control over the CONTRACTOR's WORK.

9.3 PROJECT REPRESENTATION. The ENGINEER may furnish an Inspector to assist in observing the performance of the WORK. The duties, responsibilities, and limitations of authority are as follows:

A. Duties, Responsibilities and Limitations of Authority of Inspector

General. The Inspector, who is the ENGINEER's Agent, will act as directed by and under the supervision of the ENGINEER and will confer with the ENGINEER regarding its actions. The Inspector's dealings in matters pertaining to the on-site WORK shall, in general, be only with the ENGINEER and the CONTRACTOR, and dealings with Subcontractors shall only be through or with the full knowledge of the CONTRACTOR. Written communication with the OWNER will be only through or as directed by the ENGINEER.

Duties and Responsibilities. The Inspector will:

1. Review the progress schedule, list of Shop Drawing submittals and schedule of values prepared by the CONTRACTOR and consult with the ENGINEER concerning their acceptability.
2. Attend pre-construction conferences. Arrange a schedule of progress meetings and other job conferences as required in consultation with the ENGINEER and notify those expected to attend in advance. Attend meetings and maintain and circulate copies of minutes thereof.
3. Serve as the ENGINEER's liaison with the CONTRACTOR, working principally through the CONTRACTOR's superintendent and assist said superintendent in understanding the intent of the Contract Documents. Assist the ENGINEER in serving as the OWNER's liaison with the CONTRACTOR when the CONTRACTOR's operations affect the OWNER's on-site operations.
4. As requested by the ENGINEER, assist in obtaining from the OWNER additional details or information, when required at the site for proper execution of the WORK.
5. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by the CONTRACTOR and notify the ENGINEER of their availability for examination.
6. Conduct on-site observations of the WORK in progress to assist the ENGINEER in determining if the WORK is proceeding in accordance with the Contract Documents.
7. Report to the ENGINEER whenever the Inspector believes that any WORK is unsatisfactory, faulty, or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspection, tests or approval required to be made or has been damaged prior to final payment; and advise the ENGINEER when the Inspector believes WORK should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection, or approval.
8. Verify that the tests, equipment, and systems startups and operating and maintenance instruction are conducted as required by the Contract Documents and in presence of the required personnel, and that the CONTRACTOR maintains adequate records thereof; observe, record and report to the ENGINEER appropriate details relative to the test procedures and start-ups.
9. Accompany visiting inspectors representing public or other agencies having jurisdiction over the WORK, record the outcome of these inspections, and report to the ENGINEER.

10. Transmit to the CONTRACTOR the ENGINEER's clarifications and interpretations of the Contract Documents.
11. Consider and evaluate the CONTRACTOR's suggestions for modifications in the Contract Documents and report them with recommendations to the ENGINEER.
12. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and sample submittals, reproductions of original Contract Documents including all addenda, Change Orders, field orders, additional Drawings issued subsequent to the execution of the contract, the ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other related documents.
13. Keep a diary or log book, recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list all project visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of performing and observing test procedures. Send copies to the ENGINEER.
14. Record names, addresses, and telephone numbers of the CONTRACTOR, Subcontractors, and major suppliers of materials and equipment.
15. Furnish the ENGINEER with periodic reports as required of progress of the WORK and the CONTRACTOR's compliance with the accepted progress schedule and schedule of CONTRACTOR submittals.
16. Consult with the ENGINEER in advance of scheduled major tests, inspections, or start of important phases of the WORK.
17. Report immediately to the ENGINEER upon the occurrence of any accident.
18. Review applications for payment with the CONTRACTOR for compliance with the established procedure for their submittal and forward them with recommendations to the ENGINEER, noting particularly their relation to the schedule of values, WORK completed, and materials and equipment delivered at the site but not incorporated in the WORK.
19. During the course of the WORK, verify that certificates, maintenance and operation manuals, and other data required to be assembled and furnished by the CONTRACTOR are applicable to the items actually installed; and deliver this material to the ENGINEER for its review and forwarding to the OWNER prior to final acceptance of the WORK.
20. Before the ENGINEER prepares a Certificate of Substantial Completion/Notice of completion, as applicable, review the CONTRACTOR's punch list items requiring completion or correction and add any items that CONTRACTOR has omitted.
21. Conduct final inspection in the company of the ENGINEER, the OWNER, and the CONTRACTOR, and prepare a final punch list of items to be completed or corrected.
22. Verify that all items on the punch list have been completed or corrected and make recommendations to the ENGINEER concerning acceptance.

Limitations of Authority. Except upon written instruction of the ENGINEER, the Inspector:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute material or equipment.
2. Shall not exceed limitations on the ENGINEER's authority as set forth in the Contract Documents.
3. Shall not undertake any of the responsibilities of the CONTRACTOR, Subcontractors or CONTRACTOR's superintendent, or expedite the WORK.

4. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences, or procedures of construction unless such is specifically called for in the Contract Documents.
5. Shall not advise on or issue directions as to safety precautions and programs in connection with the WORK.

9.4 CLARIFICATIONS AND INTERPRETATIONS. The ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of Drawings or otherwise) as the ENGINEER may determine necessary, which shall be consistent with, or reasonably inferred from, the overall intent of the Contract Documents.

9.5 AUTHORIZED VARIATIONS IN WORK. The ENGINEER may authorize variations in the WORK from the requirements of the Contract Documents. These may be accomplished by a Field Order and will require the CONTRACTOR to perform the WORK involved in a manner that minimizes the impact to the WORK and the contract completion date. If the CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time, the CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

9.6 REJECTING DEFECTIVE WORK. The ENGINEER will have authority to reject WORK which the ENGINEER believes to be defective and will also have authority to require special inspection or testing of the WORK as provided in Paragraph 13.3G, whether or not the WORK is fabricated, installed, or completed.

9.7 CONTRACTOR SUBMITTALS, CHANGE ORDERS, AND PAYMENTS

A. In accordance with the procedures set forth in the General Requirements, the ENGINEER will review all CONTRACTOR submittals, including Shop Drawings, samples, substitutes, or “or equal” items, etc., in order to determine if the items covered by the submittals will, after installation or incorporation in the WORK, conform to the requirements of the Contract Documents and be compatible with the design concept of the completed project as a functioning whole as indicated by the Contract Documents. The ENGINEER’s review will not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto.

B. In connection with the ENGINEER’s responsibilities as to Change Orders, see Articles 10, 11, and 12.

C. In connection with the ENGINEER’s responsibilities in respect of Applications for Payment, see Article 14.

9.8 DECISIONS ON DISPUTES

A. The ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the WORK thereunder. Claims, disputes, and other matters relating to the acceptability of the WORK; the interpretation of the requirements of the Contract Documents pertaining to the performance of the WORK; and those claims under Articles 11 and 12 in respect to changes in the Contract Price or Contract Time will be referred initially to the ENGINEER in writing with a request for formal decision in accordance with this paragraph, which the ENGINEER will render in writing

within 30 days of receipt of the request. Written notice of each such claim, dispute, and other matter will be delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise thereto. Written supporting data will be submitted to the ENGINEER within 60 days after such occurrence unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim. The failure of the CONTRACTOR to provide all supporting documentation for the claim shall result in the denial of the claim and the waiver of the claim by the CONTRACTOR.

B. The rendering of a decision by the ENGINEER with respect to any such claim, dispute, or other matter (except any which have been waived by the making or acceptance of final payment as provided in Paragraph 14.12) will be a condition precedent to any exercise by the OWNER or the CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Law or Regulations in respect of any such claim, dispute, or other matter.

9.9 LIMITATION ON ENGINEER'S RESPONSIBILITIES

A. Neither the ENGINEER's authority to act under this Article or other provisions of the Contract Documents nor any decision made by the ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the ENGINEER to the CONTRACTOR, any Subcontractor, any Supplier, any surety for any of them, or any other person or organization performing any of the WORK.

B. Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as reviewed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of the ENGINEER as to the WORK, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the WORK for compliance with the requirements of the Contract Documents, and conformance with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents, unless there is a specific statement indicating otherwise. The use of any such term or adjective shall not be effective to assign to the ENGINEER any duty or authority to supervise or direct the performance of the WORK or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.9C or 9.9D.

C. The ENGINEER will not supervise, direct, control, or have authority over or be responsible for the CONTRACTOR's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of the CONTRACTOR to comply with Laws and Regulations, applicable to the performance of the WORK. The ENGINEER will not be responsible for the CONTRACTOR's failure to perform the WORK in accordance with the Contract Documents, except where the failure of the CONTRACTOR is the result of negligent acts or omissions of the ENGINEER in the ENGINEER's performance of its obligations.

D. The ENGINEER will not be responsible for the acts or omissions of the CONTRACTOR nor of any Subcontractor, supplier, or any other person or organization performing any of the WORK.

ARTICLE 10 CHANGES IN THE WORK

10.1 GENERAL

A. Without invalidating the Agreement and without notice to any surety, the OWNER may at any time or from time to time, order additions, deletions, or revisions in the WORK; these will be authorized by a written Field Order and/or a Change Order issued by the ENGINEER.

B. If the CONTRACTOR believes that it is entitled to an increase or decrease in the Contract Price, or an extension or shortening in the Contract Time as the result of a Field Order, a claim may be made as provided in Articles 11 and 12.

C. If the OWNER and CONTRACTOR agree on the value of any work, or the amount of Contract Time that should be allowed as a result of a Field Order, upon receiving written notice from the ENGINEER, the CONTRACTOR shall proceed so as to minimize the impact on and delays to the work pending the issuance of a Change Order.

D. If the OWNER and the CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Field Order, the ENGINEER can direct the CONTRACTOR to proceed on the basis of Time and Materials so as to minimize the impact on and delays to WORK, and a claim may be made therefor as provided in Articles 11 and 12.

E. The CONTRACTOR shall not be entitled to an increase in the Contract Price nor an extension of the Contract Time with respect to any work performed that is not required by the Contract Documents as amended, modified, supplemented by Change Order, except in the case of an emergency and except in the case of uncovering work as provided in Paragraph 13.3G.

F. The OWNER and the CONTRACTOR shall execute appropriate Change Orders covering:

1. changes in the WORK which are ordered by the OWNER pursuant to Paragraph 10.1A;
2. changes required because of acceptance of Defective WORK under Paragraph 13.7;
3. changes in the Contract Price or Contract Time which are agreed to by the parties; or
4. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by the ENGINEER pursuant to Paragraph 9.8.

G. If notice of any change is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be the CONTRACTOR's responsibility, and the amount of each applicable Bond shall be adjusted accordingly.

10.2 ALLOWABLE QUANTITY VARIATIONS

A. In the event of an increase or decrease in Bid item quantity of a unit price contract, the total amount of WORK actually done or materials or equipment furnished shall be paid for

according to the unit bid price established for such WORK under the Contract Documents, wherever such unit price has been established; provided, that an adjustment in the Contract Price may be made for changes which result in an increase or decrease in excess of 25% of the estimated quantity of any major item of the WORK. Major Item is defined as any bid item amount that is ten percent (10%) or more of the total contract amount.

B. In the event a part of the WORK is to be entirely eliminated and no lump sum or unit price is named in the Contract Documents to cover such eliminated work, the price of the eliminated work shall be agreed upon in writing by the OWNER and the CONTRACTOR. If the OWNER and the CONTRACTOR fail to agree upon the price of the eliminated work, the price shall be determined in accordance with the provisions of Article 11.

ARTICLE 11 CHANGE OF CONTRACT PRICE

11.1 GENERAL

A. The Contract Price constitutes the total compensation payable to the CONTRACTOR for performing the WORK. All duties, responsibilities, and obligations assigned to or undertaken by the CONTRACTOR to complete the WORK shall be at its expense without change in the Contract Price.

B. The Contract Price may only be changed by a Change Order approved by the Borough Assembly. Any claim for an increase in the Contract Price shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 7 days) after the start of the occurrence or the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with all supporting documentation and data shall be delivered within 14 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR's written statement that the amount claimed covers all known amounts (direct, indirect, and consequential) to which the CONTRACTOR is entitled as a result of the occurrence or event. All claims for adjustment in the Contract Price shall be determined by the ENGINEER in accordance with Paragraph 9.8A if the OWNER and the CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this Paragraph 11.1B.

C. The value of any work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved. Unit prices not specified in the contract documents shall be determined by the unit price for that item or items in the CONTRACTOR'S bid.
2. By mutual acceptance of a lump sum, which may, but is not required to, include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.4.
3. On the basis of the cost of work (determined as provided in Paragraphs 11.3) plus a CONTRACTOR's fee for overhead and profit (determined as provided in Paragraph 11.4).

11.2 COSTS RELATING TO WEATHER. The CONTRACTOR shall have no claims against the OWNER for damages for any injury to WORK, materials, or equipment, resulting from the action of the elements. If, however, in the opinion of the ENGINEER, the CONTRACTOR has made all reasonable efforts to protect the materials, equipment and work, the CONTRACTOR may be granted a reasonable extension of Contract Time to make proper repairs, renewals, and replacements of the work, materials, or equipment.

11.3 COST OF WORK (BASED ON TIME AND MATERIALS)

A. General. The term "cost of work" means the sum of all costs actually and necessarily incurred and paid by the CONTRACTOR for labor, materials, and equipment in the proper performance of extra work. Except as otherwise may be agreed to in writing by the OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project; shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.5 EXCLUDED COSTS.

B. Labor. The costs of labor will be the actual cost for wages prevailing for each craft or type of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, worker's compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. Labor costs for equipment operators and helpers shall be paid only when such costs are not included in the invoice for equipment rental. The labor costs for forepersons shall be proportioned to all of their assigned work and only that applicable to extra work shall be paid. Non-direct labor costs including superintendence shall be considered part of the mark-up set out in paragraph 11.4.

C. Materials. The cost of materials reported shall be at invoice or lowest current price at which materials are locally available and delivered to the job in the quantities involved, plus the cost of freight, delivery and storage, subject to the following:

1. Trade discounts available to the purchaser shall be credited to the OWNER notwithstanding the fact that such discounts may not have been taken by the CONTRACTOR.
2. For materials secured by other than a direct purchase and direct billing to the purchaser, the cost shall be deemed to be the price paid to the actual supplier as determined by the ENGINEER. Mark-up except for actual costs incurred in the handling of such materials will not be allowed.
3. Payment for materials from sources owned wholly or in part by the purchaser shall not exceed the price paid by the purchaser for similar materials from said sources on extra work items or the current wholesale price for such materials delivered to the work site, whichever price is lower.
4. If in the opinion of the ENGINEER the cost of material is excessive, or the CONTRACTOR does not furnish satisfactory evidence of the cost of such material, then the cost shall be deemed to be the lowest current wholesale price for the quantity concerned delivered to the work site less trade discount. The OWNER reserves the right to furnish materials for the extra work and no claim shall be allowed by the CONTRACTOR for costs and profit on such materials.

D. Equipment. The CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the Supplementary General Conditions. Such rental rate will be used to compute payments for equipment whether the equipment is under the CONTRACTOR's control through direct ownership, leasing, renting, or another method of acquisition. The rental rate to be applied for use of each item of equipment shall be the rate resulting in the least total cost to the OWNER for the total period of use. If it is deemed necessary by the CONTRACTOR to use equipment not listed in the publication specified in the Supplementary General Conditions, an equitable rental rate for the equipment will be established by the ENGINEER. The CONTRACTOR may furnish cost data which might assist the ENGINEER in the establishment of the rental rate. The CONTRACTOR shall not be entitled for any rental rate for equipment the use of which would have necessary to provide the unit of work and which should have been included in the CONTRACTOR'S bid price for that unit of work.

1. All equipment shall, in the opinion of the ENGINEER, be in good working condition and suitable for the purpose for which the equipment is to be used.
2. Before construction equipment is used on the extra work, the CONTRACTOR shall plainly stencil or stamp an identifying number thereon at a conspicuous location, and shall furnish to the ENGINEER, in duplicate, a description of the equipment and its identifying number.
3. Unless otherwise specified, manufacturer's ratings and manufacturer approved modifications shall be used to classify equipment for the determination of applicable rental rates. Equipment which has no direct power unit shall be powered by a unit of at least the minimum rating recommended by the manufacturer.
4. Individual pieces of equipment or tools having a replacement value of $200 or less, whether or not consumed by use, shall be considered to be small tools and no payment will be made therefor.
5. Rental time will not be allowed while equipment is inoperative due to breakdowns.
6. Equipment Rental Rates. Unless otherwise agreed in writing, the CONTRACTOR will be paid for the use of equipment at the rental rate listed for such equipment specified in the current edition of the following reference publication: "Rental Rate Blue Book" as published by Dataquest (a company of the Dunn and Bradstreet Corporation), 1290 Ridder Park Drive, San Jose, CA 95131, telephone number (800) 227-8444.

E. Equipment on the Work Site. The rental time to be paid for equipment on the work site shall be the time the equipment is in productive operation on the extra work being performed and, in addition, shall include the time required to move the equipment to the location of the extra work and return it to the original location or to another location requiring no more time than that required to return it to its original location; except, that moving time will not be paid if the equipment is used on other than the extra work, even though located at the site of the extra work, or if it was not necessary to move equipment from another location to the site. Loading and transporting costs will be allowed, in lieu of moving time, when the equipment is moved by means other than its own power, except that no payment will be made for loading and transporting costs when the equipment is used at the site of the extra work on other than the extra work. The following shall be used in computing the rental time of equipment on the work site.

1. When hourly rates are listed, any part of an hour less than 30 minutes of operation shall be considered to be 1/2-hour of operation, and any part of an hour in excess of 30 minutes will be considered one hour of operation.
2. When daily rates are listed, any part of a day less than 4 hours operation shall be considered to be 1/2-day of operation. When owner-operated equipment is used to perform extra work to be paid for on a time and materials basis, the CONTRACTOR will be paid for the equipment and operator, as set forth in Paragraphs (3), (4), and (5), following.
3. Payment for the equipment will be made in accordance with the provisions in Paragraph 11.3D, herein.
4. Payment for the cost of labor and subsistence or travel allowance will be made at the rates paid by the CONTRACTOR to other workers operating similar equipment already on the work site, or in the absence of such labor, established by collective bargaining agreements for the type of worker and location of the extra work, whether or not the operator is actually covered by such an agreement. A labor surcharge will be added to the cost of labor described herein in accordance with the provisions of Paragraph 11.3B, herein, which surcharge shall constitute full compensation for payments imposed by state and federal laws and all other payments made to or on behalf of workers other than actual wages.
5. To the direct cost of equipment rental and labor, computed as provided herein, will be added the allowances for equipment rental and labor as provided in Paragraph 11.4, herein.

F. Specialty Work. Specialty work is defined as that work characterized by extraordinary complexity, sophistication, or innovation or a combination of the foregoing attributes which are unique to the construction industry. The following shall apply in making estimates for payment for specialty work:

1. Any bid item of WORK to be classified as Specialty Work shall be listed as such in the Supplementary General Conditions. Specialty work shall be performed by an entity especially skilled in the work to be performed. After validation of invoices and determination of market values by the ENGINEER, invoices for specialty work based upon the current fair market value thereof may be accepted without complete itemization of labor, material, and equipment rental costs.
2. When the CONTRACTOR is required to perform work necessitating special fabrication or machining process in a fabrication or a machine shop facility away from the job site, the charges for that portion of the work performed at the off-site facility may, by agreement, be accepted as specialty work and accordingly, the invoices for the work may be accepted without detailed itemization.
3. All invoices for specialty work will be adjusted by deducting all trade discounts offered or available, whether the discounts were taken or not. In lieu of the allowances for overhead and profit specified in Paragraph 11.4, herein, an allowance of 5 percent will be added to invoices for specialty work.

G. Sureties. All work performed hereunder shall be subject to all of the provisions of the Contract Documents and the CONTRACTOR's sureties shall be bound with reference thereto as under the original Agreement. Copies of all amendments to surety bonds or supplemental surety bonds shall be submitted to the OWNER for review prior to the performance of any work hereunder.

11.4 CONTRACTOR'S FEE

A. Extra work ordered on the basis of time and materials will be paid for at the actual necessary cost as determined by the ENGINEER, plus allowances for overhead and profit. The allowance for overhead and profit shall include full compensation for superintendence, bond and insurance premiums, taxes, field office expense, extended overhead, home office overhead, and all other items of expense or cost not included in the cost of labor, materials, or equipment provided for under Paragraph 11.3. The allowance for overhead and profit will be made in accordance with the following schedule:

Actual Overhead and Profit Allowance	
Labor	15 percent
Materials	10 percent
Equipment	10 percent

To the sum of the costs and mark-ups provided for in this Article, one percent shall be added as compensation for bonding.

B. It is understood that labor, materials, and equipment may be furnished by the CONTRACTOR or by the Subcontractor on behalf of the CONTRACTOR. When all or any part of the extra work is performed by a Subcontractor, the allowance specified herein shall be applied to the labor, materials, and equipment costs of the Subcontractor, to which the CONTRACTOR may add 5 percent of the Subcontractor's total cost for the extra work. Regardless of the number of hierarchical tiers of Subcontractors, the 5 percent increase above the Subcontractor's total cost which includes the allowances for overhead and profit specified herein may be applied one time only.

11.5 EXCLUDED COSTS. The term Cost of the Work shall not include any of the following:

A. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, estimators, attorneys' auditors, accountants, purchasing and contracting agents, expenditures, timekeepers, clerks and other personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the work, or not specifically covered by paragraph 11.3, all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

B. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

C. Any part of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

D. Cost of premiums for all bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by paragraph 11.4 above).

E. Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of Defective WORK, disposal of materials or equipment wrongly supplied and making good any damage to property.

F. Other overhead or general expense costs of any kind and the cost of any item not specifically and expressly included in paragraph 11.4.

G. Equipment rental cost for equipment that would be needed to perform the unit of work as reflected in the bid price for that unit of work.

H. Mobilization or demobilization for equipment that would necessarily have been used to perform that unit of work as reflected in the bid price for that unit of work.

ARTICLE 12 CHANGE OF CONTRACT TIME

12.1 GENERAL

A. The Contract Time may only be changed by a Change Order. Any claim for an extension of the Contract Time (or Milestones) shall be based on written notice delivered by the CONTRACTOR to the ENGINEER promptly (but in no event later than 30 days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within 60 days after such occurrence (unless the ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the CONTRACTOR'S written statement that the adjustment claimed is the entire adjustment to which the CONTRACTOR has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by the ENGINEER in accordance with Paragraph 9.8 if the OWNER and the CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this Paragraph 12.1A. An increase in Contract Time does not mean that the Contractor is due an increase in Contract Price. Only Compensable time extensions will result in an increase in Contract Price.

B. All time limits stated in the Contract Documents are of the essence of the Agreement. OWNER reserves the right to direct CONTRACTOR to accelerate his work, at no cost to OWNER, if CONTRACTOR fails to maintain contract schedule.

C. Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost on the critical path of the project due to such delay if a claim is made therefor as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, unprecedented weather conditions or acts of God. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

D. Where CONTRACTOR is prevented from completing any part of the WORK within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost on the critical path of the project due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall the OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization, or to any surety for or employee or agent of any of them, for damages arising

out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

12.2 EXTENSIONS OF TIME FOR DELAY DUE TO WEATHER. Contract Time may be extended by the ENGINEER because of delays in completion of the WORK due to unusually severe weather, provided that the CONTRACTOR shall, within 10 days of the beginning of any such delay, notify the ENGINEER in writing of the cause of delay and request an extension of Contract Time. The ENGINEER will ascertain the facts and the extent of the delay and extend the time for completing the work when, in the ENGINEER's judgment, the findings of fact justify such an extension. Unprecedented, abnormal, or unusually severe weather will be defined as an event, or events, with a greater than 50-year recurrence interval, as determined by the National Weather Service, or equivalent State or Federal agency

ARTICLE 13 WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

13.1 WARRANTY AND GUARANTEE. The CONTRACTOR warrants and guarantees to the OWNER and the ENGINEER that all work will be in accordance with the Contract Documents and will not be defective. Prompt notice of defects known to the OWNER or ENGINEER shall be given to the CONTRACTOR. All defective work, whether or not in place, may be rejected, corrected, or accepted as provided in this Article 13.

13.2 ACCESS TO WORK. OWNER, ENGINEER, their Consultants, sub-consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

13.3 TESTS AND INSPECTIONS

A. The CONTRACTOR shall give the ENGINEER timely notice of readiness of the WORK for all required inspections, tests, or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

B. If Laws or Regulations of any public body having jurisdiction other than the OWNER require any WORK to specifically be inspected, tested, or approved, the CONTRACTOR shall pay all costs in connection therewith. The CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the OWNER's or the ENGINEER's acceptance of a Supplier of materials or equipment proposed as a substitution or (or-equal) to be incorporated in the WORK, or of materials or equipment submitted for review prior to the CONTRACTOR's purchase thereof for incorporation in the WORK. The cost of all inspections, tests, and approvals in addition to the above which are required by the Contract Documents shall be paid by the OWNER (unless otherwise specified).

C. The ENGINEER will make, or have made, such inspections and tests as the ENGINEER deems necessary to see that the WORK is being accomplished in accordance with the

requirements of the Contract Documents. Unless otherwise specified in the Supplementary General Conditions, the cost of such inspection and testing will be borne by the OWNER. In the event such inspections or tests reveal non-compliance with the requirements of the Contract Documents, the CONTRACTOR shall bear the cost of corrective measures deemed necessary by the ENGINEER, as well as the cost of subsequent reinspection and retesting. Neither observations by the ENGINEER nor inspections, tests, or approvals by others shall relieve the CONTRACTOR from the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

D. All inspections, tests, or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to the ENGINEER and the CONTRACTOR.

E. If any work (including the work of others) that is to be inspected, tested, or approved is covered without written concurrence of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for observation. Such uncovering shall be at the CONTRACTOR's expense unless the CONTRACTOR has given the ENGINEER timely notice of the CONTRACTOR's intention to perform such test or to cover the same and the ENGINEER has not acted with reasonable promptness in response to such notice.

F. If any WORK is covered contrary to the written request of the ENGINEER, it must, if requested by the ENGINEER, be uncovered for the ENGINEER's observation and recovered at the CONTRACTOR's expense.

G. If the ENGINEER considers it necessary or advisable that covered WORK be observed by the ENGINEER or inspected or tested by others, the CONTRACTOR, at the ENGINEER's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, material, and equipment. If it is found that such work is defective, the CONTRACTOR shall bear all direct, indirect, and consequential costs and damages of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction, including but not limited to fees and charges of engineers, attorneys, and other professionals. However, if such work is not found to be defective, the CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, the CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

13.4 OWNER MAY STOP THE WORK. If the WORK is defective, or the CONTRACTOR fails to perform work in such a way that the completed WORK will conform to the Contract Documents, the OWNER may order the CONTRACTOR to stop the WORK, or any portion thereof, until the cause for such order has been eliminated; however, this right of the OWNER to stop the WORK shall not give rise to any duty on the part of the OWNER to exercise this right for the benefit of the CONTRACTOR or any other party.

13.5 CORRECTION OR REMOVAL OF DEFECTIVE WORK. If required by the ENGINEER, the CONTRACTOR shall promptly, either correct all defective work, whether or not fabricated, installed, or completed, or, if the WORK has been rejected by the ENGINEER, remove it from the site and replace it with non-defective work. The CONTRACTOR shall bear all direct, indirect and

consequential costs and damages of such correction or removal, including but not limited to fees and charges of engineers, attorneys, and other professionals made necessary thereby.

13.6 ONE YEAR CORRECTION PERIOD

A. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any work is found to be defective, the CONTRACTOR shall promptly, without cost to the OWNER and in accordance with OWNER's written notification, (i) correct such Defective WORK, or, if it has been rejected by the OWNER, remove it from the site and replace it with non-defective work, and (ii) satisfactorily correct or remove and replace any damage to other work of others resulting therefrom. If the CONTRACTOR does not promptly comply with such notification, or in an emergency where delay would cause serious risk of loss or damage, the OWNER may have the Defective WORK corrected or the rejected WORK removed and replaced, and all direct, indirect, and consequential costs and damages of such removal and replacement including but not limited to fees and charges of engineers, attorneys and other professionals will be paid by the CONTRACTOR.

B. Where Defective WORK (and damage to other WORK resulting therefrom) has been corrected, removed or replaced under this paragraph 13.6, the correction period hereunder with respect to such WORK will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

13.7 ACCEPTANCE OF DEFECTIVE WORK. If, instead of requiring correction or removal and replacement of defective work, the OWNER prefers to accept the WORK, the OWNER may do so. The CONTRACTOR shall bear all direct, indirect, and consequential costs attributable to the OWNER's evaluation of and determination to accept such defective work. If any such acceptance occurs prior to final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the WORK, and the OWNER shall be entitled to an appropriate decrease in the Contract Price.

ARTICLE 14 PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 SCHEDULE OF VALUES (LUMP SUM PRICE BREAKDOWN). The schedule of values or lump sum price breakdown established as provided in the General Requirements shall serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the ENGINEER.

14.2 UNIT PRICE BID SCHEDULE. Progress payments on account of Unit Price work will be based on the number of units completed.

14.3 APPLICATION FOR PROGRESS PAYMENT

A. Unless otherwise prescribed by law, on the 25th of each month, the CONTRACTOR shall submit to the ENGINEER for review, an Application for Payment filled out and signed by the CONTRACTOR covering the WORK completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

B. The Application for Payment shall identify, as a sub-total, the amount of the CONTRACTOR'S Total Earnings to Date, plus the Value of Materials Stored at the Site which have not yet been incorporated in the WORK, and less a deductive adjustment for materials installed which were not previously incorporated in the WORK, but for which payment was allowed under the provisions for payment for Materials Stored at the Site, but not yet incorporated in the WORK.

C. Each Application for Payment shall be submitted with an updated Progress Schedule, as required in Section 01300 Contractor Submittals. Each Application for Payment will also be accompanied by Contractor and Subcontractor certified payroll reports for periods covered by the period covered by the Application for Payment.

D. The Net Payment Due the CONTRACTOR shall be the above-mentioned subtotal from which shall be deducted the total amount of all previous payments made to the CONTRACTOR. Progress payments will be paid in full in accordance with Article 14 of the General Conditions until 90% of the Contract Price has been paid. The remaining 10% of the Contract Price amount may be withheld until:

1. final inspection has been made;
2. completion of the project; and
3. acceptance of the project by the OWNER.

E. The Value of Materials Stored at the Site shall be an amount equal to the specified percent of the value of such materials as set forth in the Supplementary General Conditions. Said amount shall be based upon the value of all acceptable materials and equipment not incorporated in the WORK but delivered and suitably stored at the site or at another location agreed to in writing; provided, each such individual item has a value of more than $5,000.00 and will become a permanent part of the WORK. The Application for Payment shall also be accompanied by an invoice (including shipping), a certification that the materials meet the applicable contract specifications, and any evidence required by the OWNER that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the OWNER's interest therein, all of which will be satisfactory to the OWNER. Payment for materials will not constitute final acceptance. It shall be the CONTRACTOR's responsibility to protect the material from damage, theft, loss, or peril while in storage. Unless otherwise prescribed by law, the Value of Materials Stored at the Site shall be paid at the invoice amount up to a maximum of 100% of the Contract Price for those items.

14.4 CONTRACTOR'S WARRANTY OF TITLE. The CONTRACTOR warrants and guarantees that title to all work, materials, and equipment covered by an Application for Payment, whether incorporated in the WORK or not, will pass to the OWNER no later than the time of payment free and clear of all liens.

14.5 REVIEW OF APPLICATIONS FOR PROGRESS PAYMENT

A. The ENGINEER will, within 7 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to the OWNER, or return the Application to the CONTRACTOR indicating in writing the ENGINEER's reasons for refusing to recommend payment. In the later case, the CONTRACTOR may make the necessary corrections and resubmit the Application, at

which point the 7 days for ENGINEER review will begin again. If the ENGINEER still disagrees with a portion of the Application, it will submit the Application recommending the undisputed portion of the Application to the OWNER for payment and provide reasons for recommending non-payment of the disputed amount. Thirty days after presentation of the Application for Payment with the ENGINEER's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.5B) become due and when due will be paid by the OWNER to the CONTRACTOR.

B. The OWNER may refuse to make payment of the full amount recommended by the ENGINEER because claims have been made against the OWNER on account of the CONTRACTOR's performance of the WORK or Liens have been filed in connection with the WORK or there are other items entitling the OWNER to a credit against the amount recommended, but the OWNER must give the CONTRACTOR written notice within 7 days (with a copy to the ENGINEER) stating the reasons for such action.

14.6 PARTIAL UTILIZATION

A. The OWNER shall have the right to utilize or place into service any item of equipment or other usable portion of the WORK prior to completion of the WORK. Whenever the OWNER plans to exercise said right, the CONTRACTOR will be notified in writing by the OWNER, identifying the specific portion or portions of the WORK to be so utilized or otherwise placed into service.

B. It shall be understood by the CONTRACTOR that until such written notification is issued, all responsibility for care and maintenance of all of the WORK shall be borne by the CONTRACTOR. Upon issuance of said written notice of partial utilization, the OWNER will accept responsibility for the protection and maintenance of all such items or portions of the WORK described in the written notice.

C. The CONTRACTOR shall retain full responsibility for satisfactory completion of the WORK, regardless of whether a portion thereof has been partially utilized by the OWNER and the CONTRACTOR's one year correction period shall commence only after the date of Substantial Completion for the WORK.

14.7 SUBSTANTIAL COMPLETION. When the CONTRACTOR considers the WORK ready for its intended use the CONTRACTOR shall notify the OWNER and the ENGINEER in writing that the WORK is substantially complete. The CONTRACTOR will attach to this request a list of all work items that remain to be completed and a request that the ENGINEER prepare a Notice of Completion. Within a reasonable time thereafter, the OWNER, the CONTRACTOR, and the ENGINEER shall make an inspection of the WORK to determine the status of completion. If the ENGINEER does not consider the WORK substantially complete, or the list of remaining work items to be comprehensive, the ENGINEER will notify the CONTRACTOR in writing giving the reasons therefor. If the ENGINEER considers the WORK substantially complete, the ENGINEER will prepare and deliver to the OWNER, for its execution and recording, the Notice of Completion signed by the ENGINEER and CONTRACTOR, which shall fix the date of Substantial Completion.

14.8 FINAL APPLICATION FOR PAYMENT. After the CONTRACTOR has completed all of the remaining work items referred to in Paragraph 14.7 and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, contract releases, record as-

built documents (as provided in the General Requirements) and other documents, all as required by the Contract Documents, and after the ENGINEER has indicated that the WORK is acceptable, the CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to the OWNER) of all liens arising out of or filed in connection with the WORK.

14.9 FINAL PAYMENT AND ACCEPTANCE

A. If, on the basis of the ENGINEER's observation of the WORK during construction and final inspection, and the ENGINEER's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, the ENGINEER is satisfied that the WORK has been completed and the CONTRACTOR's other obligations under the Contract Documents have been fulfilled, the ENGINEER will, within 14 days after receipt of the final Application for Payment, indicate in writing the ENGINEER's recommendation of payment and present the Application to the OWNER for payment.

B. After acceptance of the WORK by the OWNER's governing body, the OWNER will make final payment to the CONTRACTOR of the amount remaining after deducting all prior payments and all amounts to be kept or retained under the provisions of the Contract Documents, including the following items:

1. Liquidated damages, as applicable.
2. Two times the value of outstanding items of correction work or punch list items yet uncompleted or uncorrected, as applicable. All such work shall be completed or corrected to the satisfaction of the OWNER within the time stated on the Notice of Completion, otherwise the CONTRACTOR does hereby waive any and all claims to all monies withheld by the OWNER to cover the value of all such uncompleted or uncorrected items.

14.10 RELEASE OF RETAINAGE AND OTHER DEDUCTIONS

A. After executing the necessary documents to initiate the lien period, and not more than 45 days thereafter (based on a 30-day lien filing period and 15-day processing time), the OWNER will release to the CONTRACTOR the retainage funds withheld pursuant to the Agreement, less any deductions to cover pending claims against the OWNER pursuant to Paragraph 14.5B.

B. After filing of the necessary documents to initiate the lien period, the CONTRACTOR shall have 30 days to complete any outstanding items of correction work remaining to be completed or corrected as listed on a final punch list made a part of the Notice of Completion. Upon expiration of the 45 days, referred to in Paragraph 14.10A, the amounts withheld pursuant to the provisions of Paragraph 14.9B herein, for all remaining work items will be returned to the CONTRACTOR; provided, that said work has been completed or corrected to the satisfaction of the OWNER within said 30 days. Otherwise, the CONTRACTOR does hereby waive any and all claims for all monies withheld by the OWNER under the Contract to cover 2 times the value of such remaining uncompleted or uncorrected items.

14.11 CONTRACTOR'S CONTINUING OBLIGATION. The CONTRACTOR's obligation to perform and complete the WORK in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the ENGINEER, nor the issuance of a Notice of Completion, nor any payment by the OWNER to the CONTRACTOR under the Contract Documents, nor any use or occupancy of the WORK or any part thereof by the OWNER, nor any act of acceptance by the OWNER nor any failure to do so, nor any review of a Shop Drawing or sample submittal, will constitute an acceptance of work not in accordance with the Contract Documents or a release of the CONTRACTOR's obligation to perform the WORK in accordance with the Contract Documents.

14.12 FINAL PAYMENT TERMINATES LIABILITY OF OWNER. Final payment is defined as the last progress payment made to the CONTRACTOR for earned funds, less monies withheld as applicable, pursuant to Paragraph 14.10A. The acceptance by the CONTRACTOR of the final payment referred to in Paragraph 14.9 herein, shall be a release of the OWNER and its agents from all claims of liability to the CONTRACTOR for anything done or furnished for, or relating to, the WORK or for any act of neglect of the OWNER or of any person relating to or affecting the WORK, except demands against the OWNER for the remainder, if any, of the amounts kept or retained under the provisions of Paragraph 14.9 herein; and excepting pending, unresolved claims filed prior to the date of the Notice of Completion.

ARTICLE 15 SUSPENSION OF WORK AND TERMINATION

15.1 SUSPENSION OF WORK BY OWNER. The OWNER, acting through the ENGINEER, may, at any time and without cause, suspend the WORK or any portion thereof for a period of not more than 90 days by notice in writing to the CONTRACTOR. The CONTRACTOR shall resume the WORK on receipt from the ENGINEER of a notice of resumption of work. The CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if the CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

15.2 TERMINATION OF AGREEMENT BY OWNER (CONTRACTOR DEFAULT)

A. In the event of default by the CONTRACTOR, the OWNER may give 10 days written notice to the CONTRACTOR of OWNER's intent to terminate the Agreement and provide the CONTRACTOR an opportunity to remedy the conditions constituting the default. It shall be considered a default by the CONTRACTOR whenever CONTRACTOR shall: (1) declare bankruptcy, become insolvent, or assign its assets for the benefit of its creditors; (2) fail to provide materials or quality of work meeting the requirements of the Contract Documents; (3) disregard or violate provisions of the Contract Documents or ENGINEER's instructions; (4) fail to prosecute the WORK according to the approved progress schedule; or, (5) fail to provide a qualified superintendent, competent workers, or materials or equipment meeting the requirements of the Contract Documents; or 5) breach any of the material terms of the Agreement or the Contract documents. If the CONTRACTOR fails to remedy the conditions constituting default within the time allowed, the OWNER may then issue the Notice of Termination.

B. In the event the Agreement is terminated in accordance with Paragraph 15.2A, herein, the OWNER may take possession of the WORK and may complete the WORK by whatever method or means the OWNER may select. The cost of completing the WORK shall be deducted from the balance which would have been due the CONTRACTOR had the

Agreement not been terminated and the WORK completed in accordance with the Contract Documents. If such cost exceeds the balance which would have been due, the CONTRACTOR shall pay the excess amount to the OWNER. If such cost is less than the balance which would have been due, the CONTRACTOR shall not have claim to the difference.

15.3 TERMINATION OF AGREEMENT BY OWNER (FOR CONVENIENCE). The OWNER may terminate the Agreement at any time in its sole discretion in the best interests of the City and Borough of Wrangell. In such a case, the CONTRACTOR shall have no claims against the OWNER except: (1) for the value of work performed up to the date the Agreement is terminated, which shall be based on the CONTRACTOR'S bid price for all units of work performed and in no circumstances shall exceed the bid price for each unit of work actually performed; and, (2) for the cost of materials and equipment on hand, in transit, or on definite commitment, as of the date the Agreement is terminated which would be needed in the WORK and which meet the requirements of the Contract Documents. The value of work performed and the cost of materials and equipment delivered to the site, as mentioned above, shall be determined by the ENGINEER in accordance with the procedure prescribed for the making of the final application for payment and payment under Paragraphs 14.8 and 14.9.

15.4 TERMINATION OF AGREEMENT BY CONTRACTOR. The CONTRACTOR may terminate the Agreement upon 10 days written notice to the OWNER, whenever: 1) the WORK has been suspended under the provisions of Paragraph 15.1, herein, for more than 90 consecutive days through no fault or negligence of the CONTRACTOR, and notice to resume work or to terminate the Agreement has not been received from the OWNER within this time period; or, 2) the OWNER should fail to pay the CONTRACTOR any monies due him as approved for payment by the ENGINEER in accordance with the terms of the Contract Documents and within 60 days after presentation to the OWNER by the CONTRACTOR of a request therefor, unless within the 10-day period the OWNER shall have remedied the condition upon which the payment delay was based. In the event of such termination, the CONTRACTOR shall have no claims against the OWNER except for those claims specifically enumerated in Paragraph 15.3, herein, and as determined in accordance with the requirements of that paragraph.

ARTICLE 16 MISCELLANEOUS

16.1 GIVING NOTICE. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice. E-mail shall not constitute written notice.

16.2 RIGHTS IN AND USE OF MATERIALS FOUND ON THE WORK

A. The CONTRACTOR may use on the Project, with ENGINEER's approval, such stone, gravel, sand, or other material determined suitable by the ENGINEER, as may be found in the excavation. The CONTRACTOR will be paid for the excavation of such material at the corresponding contract unit price. No additional payment will be made for utilizing the material from excavation as borrow, or select borrow.

B. The CONTRACTOR shall replace, at its own expense, with other acceptable material, all of that portion of the excavated material so removed and used which was needed for use

on the project. No charge for the materials so used will be made against the CONTRACTOR except that the CONTRACTOR shall be responsible for payment of any royalties required.

C. The CONTRACTOR shall not excavate or remove any material from within the Project location which is not within the grading limits, as indicated by the slope and grade lines, without written authorization from the ENGINEER.

D. In the event the CONTRACTOR has processed materials from OWNER-furnished sources in excess of the quantities required for performance of this contract, including any waste material produced as a by-product, the OWNER may retain possession of such materials without obligation to reimburse the CONTRACTOR for the cost of their production. When such materials are in a stockpile, the ENGINEER may require: That it remain in stockpile; the CONTRACTOR level such stockpile(s); or that the CONTRACTOR remove such materials and restore the premises to a satisfactory condition at the CONTRACTOR's expense. This provision shall not preclude the OWNER from arranging with the CONTRACTOR to produce material over and above the contract needs, payment for which shall be by written agreement between the OWNER and the CONTRACTOR.

E. Unless otherwise provided, the material from any existing old structure may be used temporarily by the CONTRACTOR in the erection of the new structure. Such material shall not be cut or otherwise damaged except with the approval of the ENGINEER.

16.3 RIGHT TO AUDIT. If the CONTRACTOR submits a claim to the OWNER for additional compensation, the OWNER shall have the right, as a condition to considering the claim, and as a basis for evaluation of the claim, and until the claim has been settled, to audit the CONTRACTOR's books to the extent they are relevant. This right shall include the right to examine books, records, documents, and other evidence and accounting procedures and practices, sufficient to discover and verify all direct and indirect costs of whatever nature claimed to have been incurred or anticipated to be incurred and for which the claim has been submitted. The right to audit shall include the right to inspect the CONTRACTOR's plants, or such parts thereof, as may be or have been engaged in the performance of the WORK. The CONTRACTOR further agrees that the right to audit encompasses all subcontracts and is binding upon Subcontractors. The rights to examine and inspect herein provided for shall be exercisable through such representatives as the OWNER deems desirable during the CONTRACTOR's normal business hours at the office of the CONTRACTOR. The CONTRACTOR shall make available to the OWNER for auditing, all relevant accounting records and documents, and other financial data, and upon request, shall submit true copies of requested records to the OWNER.

16.4 ARCHAEOLOGICAL OR HISTORICAL DISCOVERIES. When the CONTRACTOR's operation encounters prehistoric artifacts, burials, remains of dwelling sites, paleontological remains, such as shell heaps, land or sea mammal bones or tusks, or other items of historical significance, the CONTRACTOR shall cease operations immediately and notify the ENGINEER. No artifacts or specimens shall be further disturbed or removed from the ground and no further operations shall be performed at the site until so directed. Should the ENGINEER order suspension of the CONTRACTOR's operations in order to protect an archaeological or historical finding, or order the CONTRACTOR to perform extra work, such order(s) shall be covered by an appropriate contract change document.

16.5 CONSTRUCTION OVER OR ADJACENT TO NAVIGABLE WATERS. All work over, on, or adjacent to navigable waters shall be so conducted that free navigation of the waterways will not be interfered with and the existing navigable depths will not be impaired, except as allowed by permit issued the U.S. Coast Guard and/or the U.S. Army Corps of Engineers, as applicable.

16.6 GRATUITY AND CONFLICT OF INTEREST. The CONTRACTOR agrees to not extend any loan, gratuity or gift of money of any form whatsoever to any employee or elected official of the OWNER.

16.7 SUITS OF LAW CONCERNING THE WORK

A. The Superior Court for the State of Alaska, First Judicial District at Wrangell, Alaska, shall be the exclusive jurisdiction and venue for any action of any kind an any nature arising out of or relating to this Agreement and all Contract documents or for any action of any kind and any nature arising out of or related to the performance of non-performance of the CONTRATOR, and CONTRACTOR'S employees, subcontractors, consultants and representatives.

B. If one of the questions at issue is the satisfactory performance of the work by the CONTRACTOR and should the appropriate court of law judge the work of the CONTRACTOR to be unsatisfactory, then the CONTRACTOR (or the CONTRACTOR's surety) shall reimburse the OWNER for all legal and all other expenses (as may be allowed and set by the court) incurred by the OWNER because of the suit of the law and, further, it is agreed that the OWNER may deduct such expense from any sum or sums then, or any that become due the CONTRACTOR under the contract.

16.8 CERTIFIED PAYROLLS

A. All CONTRACTORs or Subcontractor who perform work on a public construction contract for the OWNER shall file a certified payroll with the Alaska Department of Labor before Friday of each week that covers the preceding week (Section 14-2-4 ACLA 1949; am Section 4 ch 142 SLA 1972).

B. In lieu of submitting the State payroll form, the CONTRACTOR's standard payroll form may be submitted, provided it contains the information required by AS 36.05.040 and a statement that the CONTRACTOR is complying with AS 36.10.010.

C. A CONTRACTOR or Subcontractor, who performs work on public construction in the State, as defined by AS 36.95.010(3), shall pay not less than the current prevailing rate of wages as issued by the Alaska Department of Labor before the end of the pay period. (AS 36.05.010).

16.9 PREVAILING WAGE RATES

A. Wage rates for Laborers and Mechanics on Public Contracts, AS 36.05.070. The CONTRACTOR, or Subcontractors, shall pay all employees unconditionally and not less than once a week. Wages may not be less than those stated in Paragraph 16.8C, regardless of the contractual relationship between the CONTRACTOR or Subcontractors and laborers, mechanics, or field surveyors. The scale of wages to be paid shall be posted by the CONTRACTOR in a prominent, easily accessible place at the site of the WORK.

B. Failure to Pay Agreed Wages, AS 36.05.080. If it is found that a laborer, mechanic, or field surveyor employed by the CONTRACTOR or Subcontractor has been, or is being, paid a rate or wages less than the established rate, the OWNER may, by written notice, terminate the CONTRACTOR or Subcontractors right to proceed with the work. The OWNER may prosecute the work to completion by contract or otherwise, and the CONTRACTOR and sureties will be held liable to the OWNER for excess costs for completing the WORK. (Section 2 ch 52 SLA 1959).

F. Listing CONTRACTOR's Who Violate Contracts, AS 36.05.090. In addition, a list giving the names of persons who have disregarded the rights of their employees shall be distributed to all departments of State government and all political subdivisions. No person appearing on this list, and no firm, corporation, partnership or association in which the person has an interest, may work as a CONTRACTOR or Subcontractor on a public construction contract for the State, or a political subdivision of the state, until three years after the date of publication of the list. (Section 3 ch 52 SLA 1959; am Section 9 ch 142 SLA).

16.10 EMPLOYMENT REFERENCE. Workers employed in the execution of the contract by the CONTRACTOR or by any Subcontractor under this contract shall not be required or permitted to labor more than 8 hours a day or 40 hours per week in violation of the provisions of the Alaska Wage and Hour Act, Section 23.10.060.

16.11 COST REDUCTION INCENTIVE

A. At any time within 45 days after the date of the Notice of Award, the CONTRACTOR may submit to the ENGINEER in writing, proposals for modifying the plans, specifications, or other requirements of this contract for the sole purpose of reducing the total cost of construction. The cost reduction proposal shall not impair in any manner the essential functions or characteristics of the project, including but not limited to, service life, economy of operation, ease of maintenance, desired appearance or design and safety standards.

B. The cost reduction proposal shall contain the following information:

1. Description of both the existing contract requirements for performing the WORK and the proposed changes.
2. An itemization of the contract requirements that must be changed if the proposal is adopted.
3. A detailed estimate of the time required and the cost of performing the WORK under both the existing contract and the proposed change.
4. A statement of the date by which the CONTRACTOR must receive the decision from the OWNER on the cost reduction proposal.
5. The contract items of WORK affected by the proposed changes including any quantity variations.
6. A description and estimate of costs the OWNER may incur in implementing the proposed changes, such as test and evaluation and operating and support costs.
7. A prediction of any effects the proposed change would have on future operations and maintenance costs to the OWNER.

C. The provisions of this section shall not be construed to require the OWNER to consider any cost reduction proposal which may be submitted; nor will the OWNER be liable to the CONTRACTOR for failure to accept or act upon any cost reduction proposal submitted, or for delays to the work attributable to the consideration or implementation of any such proposal.

D. If a cost reduction proposal is similar to a change in the plans or specifications for the project under consideration by the OWNER at the time the proposal is submitted, the OWNER will not accept such proposal and reserves the right to make such changes without compensation to the CONTRACTOR under the provisions of this section.

E. The CONTRACTOR shall continue to perform the work in accordance with the requirements of the contract until an executed Change Order incorporating the cost reduction proposal has been issued. If any executed Change Order has not been issued by the date upon which the CONTRACTOR's cost reduction proposal specifies that a decision should be made by the OWNER, in writing, the cost reduction proposal shall be considered rejected.

F. The OWNER shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in Contract Time and construction costs resulting from the adoption of all or any part of such proposal. Should the CONTRACTOR disagree with OWNER's decision on the cost reduction proposal, there is no further consideration. The OWNER reserves the right to make final determination.

G. If the CONTRACTOR's cost reduction proposal is accepted in whole or in part, such acceptance will be made by a contract Change Order, which specifically states that the change is executed pursuant to this cost reduction proposal section. Such Change Order shall incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect and shall include any conditions upon which the OWNER's approval is based, if such approval is conditional. The Change Order shall also describe the estimated net savings in the cost of performing the work attributable to the cost reduction proposal, and shall further provide that the contract cost be adjusted by crediting the OWNER with the estimated net savings amount.

H. Acceptance of the cost reduction proposal and performance of the work does not extend the time of completion of the contract, unless specifically provided in the Change Order authorizing the use of the submitted proposal. Should the adoption of the cost reduction proposal result in a Contract Time savings, the total Contract Time shall be reduced by an amount equal to the time savings realized.

I. The amount specified to the CONTRACTOR in the Change Order accepted in the cost reduction proposal shall constitute full compensation for the performance of WORK. No claims for additional costs as a result of the changes specified in the cost reduction proposal shall be allowed.

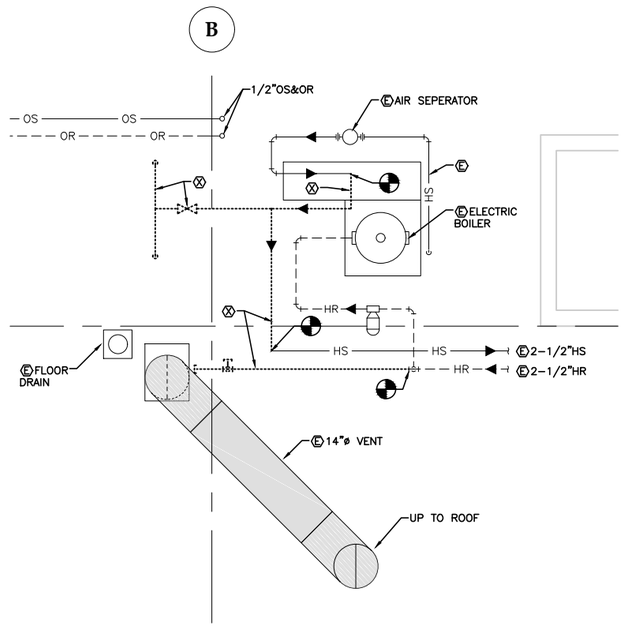
J. The OWNER reserves the right to adopt and utilize any approved cost reduction proposal for general use on any contract administered when it is determined suitable for such application. Cost reduction proposals identical, similar, or previously submitted will not be accepted for consideration if acceptance and compensation has previously been approved.

The OWNER reserves the right to use all or part of any cost reduction proposal without obligation or compensation of any kind to the CONTRACTOR.

K. The CONTRACTOR shall bear the costs, if any, to revise all bonds and insurance requirements for the project, to include the cost reduction WORK.

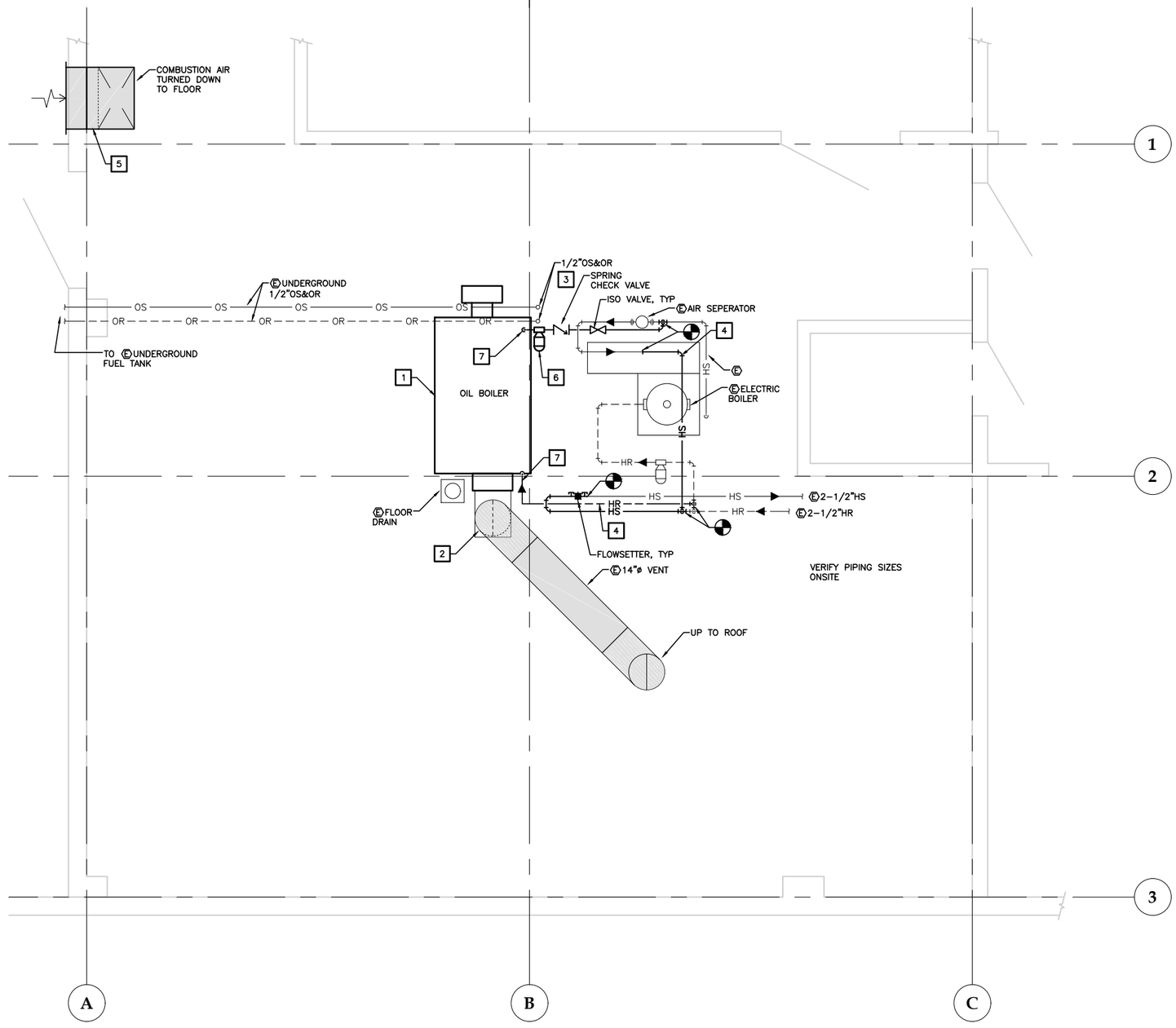
END OF SECTION

APPENDIX A - PUBLIC SAFETY BUILDING OIL-FIRED BOILER INSTALLATION



1 FLOOR PLAN - DEMOLITION

SCALE: 0 1' 2' 4'



2 FLOOR PLAN - RENOVATION

SCALE: 0 1' 2' 4'

PROJECT NORTH

CONSTRUCTION NOTES:

1. OWNER SUPPLIED, CONTRACTOR INSTALLED WEIL-MCLAIN OIL FIRED BOILER.
2. EXISTING 14"ø EXHAUST VENT. REPLACE DOUBLE WALL "TEE" TO MATCH NEW BOILER SIZE AND ELEVATION.
3. CONNECT 1/2"FOS FOR LINES TO NEW BURNER.
4. MODIFY PIPING TO ACCOMODATE A PRIMARY/SECONDARY LOOP SYSTEM FOR HEATING HOT WATER.
5. REMOVE DAMPER ON COMBUSTION AIR.
6. SELECT AND INSTALL A NEW PRIMARY CIRCULATOR PUMP FOR THE NEW OIL FIRED BOILER.
7. INSTALL DIELECTRIC UNION IN PIPING.

No.	Date	Item

REVISIONS

PDC ENGINEERS
PLAN • DESIGN • CONSTRUCT
1028 Aurora Drive, Fairbanks, Alaska 99709
907.452.1414 | AECC605

PROJECT :
WRANGELL PUBLIC SAFETY PIPING REPLACEMENT
WRANGELL, ALASKA

SHEET TITLE :
FLOOR PLAN

DESIGN	AM
DRAWN	KB
CHECKED	DM
DATE	JUNE 2017
PROJECT No.	17160JM/M-566
SHEET NUMBER	M1.0
M1 OF X SHEETS	

WEIL-McLAIN®

88

Water & steam boilers – Series 2

for use with Gas, Light Oil, & Gas/Light Oil – Fired Burners

Boiler Manual

- Installation
- Maintenance
- Startup
- Parts

For additional information, refer to . .

Burner specification and data sheets

for burners pre-tested with model 88 boilers

C US

WARNING This manual must only be used by a qualified heating installer/service technician. Read all instructions before installing. Follow all instructions in proper order. Failure to comply could result in severe personal injury, death or substantial property damage.

NOTICE When calling or writing about the boiler—Please have the boiler model number from the boiler rating label and the CP number from the boiler jacket.

INSTALLER Consider piping and installation when determining boiler location.
Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee.

USER . . . . This manual is for use only by your qualified heating installer/service technician. Boiler and burner must be installed by a qualified service technician. We recommend regular service by a qualified service technician, at least annually.

Part No. 550-100-068/0215

Read before proceeding

Hazard Definitions

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning the life of the product.

⚠ DANGER Indicates presence of hazards that **will cause severe** personal injury, death or substantial property damage if ignored.

⚠ WARNING Indicates presence of hazards that **can cause severe** personal injury, death or substantial property damage if ignored.

⚠ CAUTION Indicates presence of hazards that **will or can cause minor** personal injury, death or substantial property damage if ignored.

NOTICE Indicates special instructions on installation, operation or maintenance that are important but not related to personal injury.

Read before proceeding:

⚠ WARNING Read all instructions before installing. Failure to follow all instructions in proper order can cause severe personal injury, death or substantial property damage.

⚠ WARNING Do not use petroleum-based cleaning or sealing components in boiler system. Severe damage to system components can result, causing substantial property damage.

⚠ WARNING **Propane boilers only** — Your propane supplier mixes an odorant with the propane to make its presence detectable. In some instances, the odorant can fade and the gas may no longer have an odor.

- Propane gas can accumulate at floor level. Smell near the floor for the gas odorant or any unusual odor. If you suspect a leak, do not attempt to light the burner.
- Use caution when attempting to light a propane burner (or pilot burner). This should be done by a qualified service technician, particularly if flame outages (or pilot outages) are common.
- Periodically check the odorant level of your gas.
- Inspect boiler and system at least yearly to make sure all gas piping is leak-tight.
- Consult your propane supplier regarding installation of a gas leak detector. There are some products on the market intended for this purpose. Your supplier may be able to suggest an appropriate device.

Contents

Before installing boiler

Installation must comply with —

1. State, provincial and local plumbing, heating and electrical codes.
2. Regulations of servicing utilities.
3. ASME Section IV, Low Pressure Boiler and Pressure Vessel Code.
4. National Fuel Gas Code, ANSI/NFPA 54, when applicable.
5. National codes where applicable.

Before selecting boiler location

1. Check for nearby connections to:
   a. Fuel supply.
   b. Electrical power.
   c. System water or steam piping.
   d. Venting systems - see page 29.
   e. Combustion and ventilation air supply — see page 5.
2. Check area around boiler. Remove any combustible materials, gasoline and other flammable vapors and liquids.

⚠WARNING Failure to keep boiler area clear and free of combustible materials, gasoline and other flammable liquids and vapors can result in severe personal injury, death and substantial property damage.

Provide clearance around boiler

1. Provide minimum clearances to combustible materials:
   - **Boiler top** — 24 inches.
   - **Boiler front** — 48 inches.
   - **Boiler flue** — 9 inches.
   - **Boiler rear** — 9 inches.
   - **Boiler sides** — 6 inches.
   - **Single-wall vent pipe** – 18 inches.
   - **Double-wall vent pipe** – refer to vent pipe manufacturer's recommendations for vent pipe clearances.
2. Boiler may be installed on combustible flooring.
3. See page 36 for boiler dimensions.

NOTICE Flue pipe/breeching clearances take precedence over jacket clearances.

4. Provide minimum clearances for servicing:
   - **Left side** — for cleaning and tankless heater removal – 39 inches.
   - **Rear** — for breeching — 36 inches.
   - Allow sufficient space on remaining sides for cleaning, servicing and burner installation. See burner literature for length and recommended service clearances.

Lay a foundation, if needed

1. Floor construction and condition must be suitable for weight of boiler when filled with water. See page 35 for approximate boiler operating weight.
2. A level concrete or brick foundation, constructed per Figure 1 and Figure 2 is required when:
   a. A floor could possibly become flooded.
   b. Non-level conditions exist.

Figure 1 Boiler foundation, when required

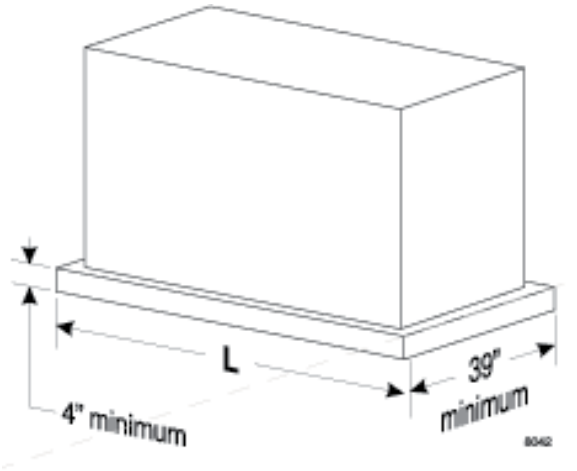


Figure 2 Boiler foundation (see Figure 1)

Boiler model number	Length, L, minimum (inches)
488	33
588	41
688	49
788	57
888	65
988	73
1088	81
1188	89
1288	97
1388	105
1488	113
1588	121
1688	129
1788	137
1888	145

Before installing boiler *(continued)*

Combustion and ventilation air openings

⚠WARNING Adequate combustion and ventilation air must be provided to assure proper combustion and prevent possibility of flue gas leakage and carbon monoxide emissions, causing severe personal injury or death.

Do not install an exhaust fan in boiler room. Incorrect burner operation can result.

When combustion and ventilation air enters through side wall openings, ensure that the openings comply with the requirements of Figure 3 and Figure 4.

Opening sizes must comply with state, provincial or local codes. In the absence of local requirements, use the National Fuel Gas Code, ANSI/NFPA 54). The following information is taken from ANSI/NFPA 54. For details and information not addressed below, refer to the standard.

Figure 3 Combustion and ventilation air openings — Boiler room below grade

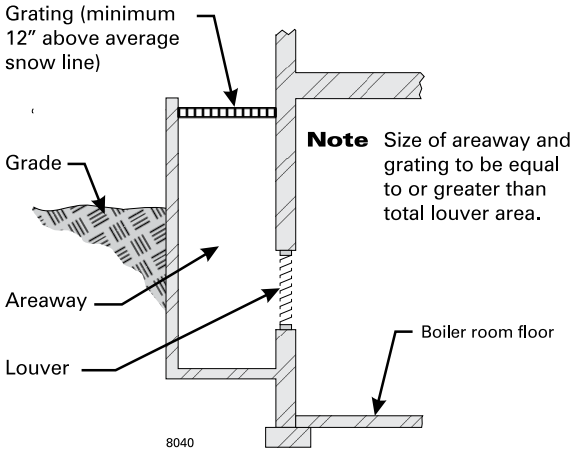
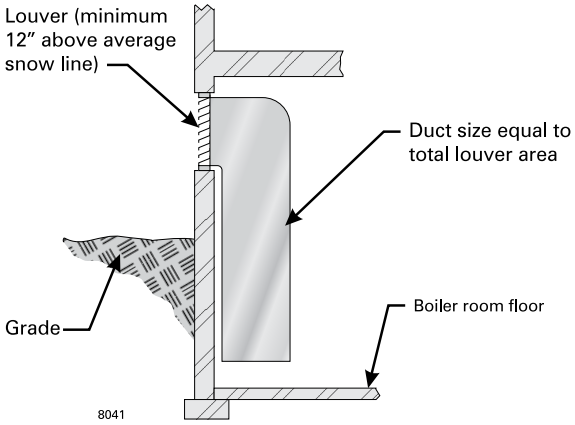


Figure 4 Combustion and ventilation air openings — Boiler room partially or completely above grade



Combustion air openings to inside

Required volume of interior spaces

ANSI/NFPA 54 allows combustion air to be supplied through openings to interior spaces **if the volume of the connected interior spaces meets the minimum volume required by the standard**.

The minimum volume of interior spaces can be taken as 50 cubic feet per 1,000 Btuh of all appliances in the spaces, or the minimum volume can be calculated using the formulas given in ANSI/NFPA 54. Exception: If the air infiltration rate for the spaces is known to be less than 0.40 air changes per hour, the minimum volume must be calculated as specified in the standard.

Inside air opening sizes and locations

For spaces that provide the minimum volume required by ANSI/NFPA 54, the air openings must be sized per the following:

Combining spaces on the same story — Each opening shall have a minimum free area of 1 in^2/1000 Btuh (2200 mm^2/kW) of the total input rating of all appliances in the space but not less than 100 in^2 (0.06 m^2). One opening shall commence within 12 inches (300 mm) of the top, and one opening shall commence within 12 inches (300 mm) of the bottom, of the enclosure. The minimum dimension of air openings shall be not less than 3 inches (80 mm).

Combining spaces in different stories — The volumes of spaces in different stories shall be considered as communicating spaces where such spaces are connected by one or more openings in doors or floors having a total minimum free area of 2 in^2/1000 Btuh (4400 mm^2/kW) of total input rating of all appliances.

Combustion air openings to outside

Outdoor combustion air can be taken through permanent openings (TWO or ONE), as described in the following. The minimum dimension of air openings shall not be less than 3 inches (80 mm).

Outside openings: TWO permanent openings method

Two permanent openings, one commencing within 12 inches (300 mm) of the top and one commencing within 12 inches (300 mm) of the bottom of the enclosure shall be provided. The openings shall communicate directly, or by ducts, with the outdoors or spaces that

Before installing boiler *(continued)*

freely communicate with the outdoors, as follows:

- Where directly communicating with the outdoors or where communicating to the outdoors through vertical ducts, each opening shall have a minimum free area of 1 in^2/4000 Btuh (550 mm^2/kW) of total input rating of all appliances in the enclosure.
- Where communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of 1 in^2/2000 Btuh (1100 mm^2/kW) of total input rating of all appliances in the enclosure.

Outside openings: ONE permanent opening method

One permanent opening, commencing within 12 inches (300 mm) of the top of the enclosure, shall be provided. The appliance shall have clearances of at least 1 in. (25 mm) from the sides and back and 6 inches (150 mm) from the front of the appliance. The opening shall directly communicate with the outdoors or shall communicate through a vertical or horizontal duct to the outdoors or spaces that freely communicate with the outdoors and shall have a minimum free area of the following:

(1) 1 in^2/3000 Btu/hr (700 mm^2 per kW) of the total input rating of all appliances located in the enclosure, and . . .

(2) Not less than the sum of the areas of all vent connectors in the space.

Combustion air — combination indoor and outdoor openings

ANSI/NFPA 54 allows combustion air to be taken from a combination of openings to outside and to interior spaces. Follow all requirements of the standard to determine the minimum volume of interior spaces and to calculate minimum sizes of openings.

Engineered Installations

Engineered combustion air installations shall provide an adequate supply of combustion, ventilation, and dilution air and shall he approved by the authority having jurisdiction.

Mechanical Combustion Air Supply

Where all combustion air is provided by a mechanical air supply system, the combustion air shall be supplied from outdoors at the minimum rate of 0.35 ft^3/minute per 1000 Btuh (0.034 m^3/min per kW) for all appliances located within the space.

- Where exhaust fans are installed in the building, additional air shall be provided to replace the exhausted air.
- Each of the appliances served shall be interlocked to the mechanical air supply system to prevent main burner operation where the mechanical air supply system is not in operation.
- Where combustion air is provided by the building's mechanical ventilation system, the system shall provide the specified combustion air rate in addition to the required ventilation air.

Louvers, Grilles, and Screens.

The required size of openings for combustion, ventilation, and dilution air shall be based on the **net free area** of each opening.

Where the free area through a design of louver or grille or screen is known, it shall be used in calculating the size opening required to provide the free area specified.

Where the louver and grille design and free area are not known, it shall be assumed that wood louvers will have 25 percent free area, and metal louvers and grilles will have 75 percent free area.

Non-motorized louvers and grilles shall be fixed in the open position.

Minimum screen mesh size

Screens shall not be smaller than ¼ inch mesh.

Motorized louvers

Motorized louvers shall be interlocked with the appliance so they are proven in the full open position prior to main burner ignition and during main burner operation. Means shall be proved to prevent the main burner from igniting should the louver fail to open during burner startup, and to shut down the main burner if the louvers close during burner operation.

Set boiler in place

⚠WARNING Ensure the equipment and cables used for lifting are designed to handle the load. See Figure 5 for approximate weights of model 88 section assemblies. Failure to comply can result in severe personal injury, death or substantial property damage.

NOTICE Cables used for lifting are NOT provided by Weil-McLain.

For packaged boiler:

1. Remove top jacket panels. Set aside until after boiler is piped.

⚠WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions on "Handling ceramic fiber and fiberglass materials," page 34 of this manual. Failure to comply could result in severe personal injury.

2. Remove lag screws (2 in front, 2 in rear) from shipping rails.
3. Remove boiler from skid. See Figure 5 for lifting weight.
   - Using crane — hook middle of each cable to eye of crane.
   - Using hoist — hook middle of each cable to hoist. Raise boiler off skid. Use pipe rollers under skid angles to roll boiler.
4. Place boiler in final position. Center boiler on foundation, if used.
5. Level boiler. Shim under skid angles, if necessary.
6. Cut off cables.

⚠WARNING Cables are not intended for long-term usage. Cables may corrode inside boiler, weakening their lifting strength. Failure to remove cables can result in severe personal injury, death or substantial property damage.

7. Proceed to "Perform hydrostatic pressure test," page 11.

For block assembly:

1. Remove lag screws (2 in front, 2 in rear) from shipping rails.
2. Remove boiler from skid. See Figure 5 for lifting weight.
   - Using crane – attach free end of cables to eye of crane.
   - Using hoist – attach free end of cables to hoist. Raise boiler off skid. Use pipe rollers under steel skid angles to roll boiler.
3. Place boiler in final position. Center boiler on foundation, if used.
4. Level boiler. Shim under skid angles, if necessary.
5. Cut off cables.

⚠WARNING Cables are not intended for long-term usage. Cables may corrode inside boiler, weakening their lifting strength. Failure to remove cables can result in severe personal injury, death or substantial property damage.

6. Inspect block assembly for disjointed sections. Check gas-tight seal of flue collector hood and cleanout plates.

Figure 5 Section assembly lifting weights

Boiler model number	Approximate lifting weight (pounds)	Minimum sling length — (from crane hook to boiler lifting lugs)
488	2928	2' 6"
588	3490	3' 0"
688	4152	4' 0"
788	4714	4' 6"
888	5276	5' 0"
988	5838	6' 0"
1088	6400	6' 6"
1188	7062	7' 0"
1288	7624	8' 0"
1388	8186	8' 6"
1488	8748	9' 0"
1588	9310	10' 0"
1688	9872	10' 6"
1788	10,584	11' 0"
1888	11,146	12' 0"

⚠WARNING Gas tight seal must be maintained to prevent possible flue gas leakage and carbon monoxide emissions, resulting in severe personal injury or death.

   a. Check inside section assembly for any light passing through unsealed areas.
   b. Mark all unsealed areas.
   c. At unsealed areas, check for:
      - Damaged gaskets.
      - Sealing rope not in place.
      - Loose bolts or nuts.
   d. Correct all conditions and repeat step b. If unsealed areas still exist, contact your Weil-McLain distributor or sales office before continuing installation.

7. Proceed to "Perform hydrostatic pressure test," page 11.

Assembling the block

⚠WARNING Sections are top heavy. Unbolted sections may fall if not supported, resulting in severe personal injury or death.

Prepare and position back section

1. Apply ⅛" continuous bead of sealing rope adhesive in sealing rope grooves. See Figure 6. **Do not get any adhesive on machined port surfaces**.
2. Place ½" sealing rope in groove. Around curves, grasp at 1" intervals and push together. Do not stretch.

⚠WARNING Do not pre-cut rope. Gas tight seal must be maintained to prevent possibility of flue gas leakage and carbon monoxide emissions, causing severe personal injury or death. Cut rope as each section is completed.

3. Remove any grit from port machined surfaces with clean rag.

⚠WARNING Do not use petroleum-based cleaning or sealing compounds in boiler system. Severe damage to system components can result, causing substantial property damage.

4. Place 9" and 6" sealing rings in appropriate port openings. See Figure 6. If sealing ring slips out of groove, stretch ring gently for several seconds, then reposition in groove.
5. Apply continuous bead of silicone sealant no larger than 1/16" around entire outside edge of **outer** machined surface of port. Refer to Figure 7. **Do not apply silicone sealant on, next to or under sealing ring**.

⚠WARNING Silicone sealant applied as specified above prevents unburned oil vapors from coming in contact with sealing ring. Vapor contact can damage rings, resulting in severe damage to boiler and substantial property damage.

6. Hoist back section upright. Then temporarily screw a 6-inch threaded pipe at least 36 inches long into the lower (return) tapping.
7. Hoist the section and put into position.
8. Place a block under the 6-inch pipe to hold the back section upright and plumb.

⚠CAUTION The back section must be plumb before installing other sections to ensure the block will assemble correctly.

9. The 6-inch support pipe and block can be removed after several sections have been installed, and the assembly is stable.
10. Install intermediate sections as described on the following page.

Figure 6 Sealing rope installation

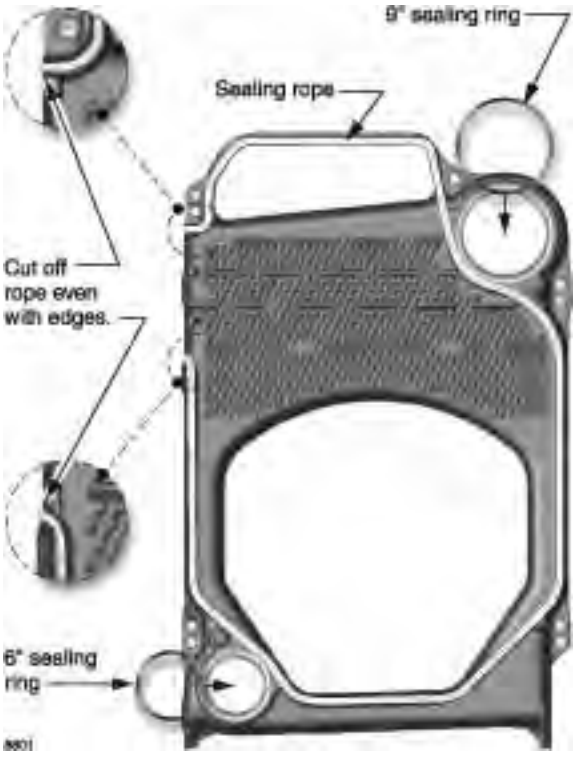


Figure 7 Silicone sealant

Assembling the block

WARNING Sections are top heavy. Unbolted sections may fall if not supported, resulting in severe personal injury or death.

Install intermediate sections

1. Remove and discard $^3/_8$" diameter shipping tie rods.
2. Remove grit from port machined surfaces with clean rag.

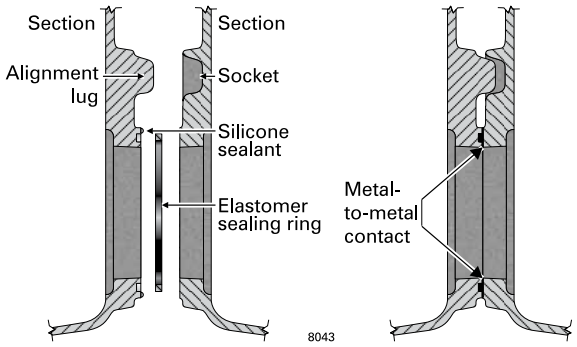
WARNING Do not use petroleum-based cleaning or sealing compounds in boiler system. Severe damage to system components can result, causing substantial property damage.

3. Position intermediate section so aligning lugs fit into sockets of next section. See Figure 8.
4. Install TI (tankless intermediate) and SI (supply intermediate) sections (when used) in order shown in Figure 9, page 10.
5. Draw sections together until metal-to-metal contact is made around machined port openings (see Figure 8):
   a. Oil threads on 4 draw rods. Install washer and nut on end to be tightened. Use nut only on other end.
   b. Uniformly draw sections together, starting at washer/nut end.

NOTICE Important — Leave an equal amount of thread on each end of the draw rod. This is needed to allow securing the jacket support brackets in place.

   c. Draw rods should be torqued to a range of 100 to 120 ft-lbs. Do not back off draw rods.
   d. Metal-to-metal contact will be achieved around port openings. See Figure 8. If gap occurs, it should be no greater than .032". Check with feeler gauge.
   e. If, for any reason, gap around machined port opening exceeds .032", check for rope extending from rope grooves, dirt on port openings or sockets, or misaligned lugs. If corrections are made and gap still exists, contact your Weil-McLain distributor or sales office before continuing installation.

Figure 8 Sealing ring installation and port alignment



CAUTION After erecting first intermediate section, check both sections for plumb. Failure to plumb sections can cause misaligned piping and breeching, possibly resulting in property damage.

6. Repeat steps 1-5.
7. Check each section for proper sealing rope position before proceeding to next section.

WARNING Failure to position sealing rope properly can cause boiler to not seal gas-tight. Gas tight seal prevents possible flue gas leakage and carbon monoxide emissions, resulting in severe personal injury or death.

8. Install remaining intermediate sections and front section using the same procedure.

If using tankless heater (TI) sections

- Install tankless heaters and gaskets or heater cover plates and gaskets. Use $^3/_8$" x $^3/_4$" studs, washers and nuts.

Assembling the block *(continued)*

Figure 9 Section arrangement

Boiler model number **W** = water **S** = steam	Max. number of tankless heaters	Section arrangement (all heaters must be on left side of boiler) **F** = front / **B** = back / **I** = Intermediate **TI** = tankless intermediate **SI** = supply intermediate (steam only) "**I**" can be substituted for "**TI**" sections
488 W&S	1	**F • TI • I • B**
588 W&S	2	**F • TI • I • TI • B**
688 W&S	2	**F • TI • I • TI • I • B**
788 W&S	3	**F • TI • I • TI • I • TI • B**
888 W&S	3	**F • TI • I • TI • I • TI • I • B**
988 W&S	4	**F • TI • I • TI • I • TI • I • TI • B**
1088 W&S	4	**F • TI • I • TI • I • TI • I • TI • I • B**
1188 W&S	5	**F • TI • I • TI • I • TI • I • TI • I • TI • B**
1288 W	5	**F • TI • I • TI • I • TI • I • TI • I • TI • I • B**
1288 S	4	**F • TI • I • TI • I • SI • I • TI • I • TI • I • B**
1388 W	6	**F • TI • I • TI • I • TI • I • TI • I • TI • I • TI • B**
1388 S	6	**F • TI • I • TI • I • TI • SI • TI • I • TI • I • TI • B**
1488 W	6	**F • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • B**
1488 S	5	**F • TI • I • TI • I • TI • I • SI • I • TI • I • TI • I • B**
1588 W	7	**F • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • TI • B**
1588 S	7	**F • TI • I • TI • I • TI • I • TI • SI • TI • I • TI • I • TI • B**
1688 W	7	**F • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • B**
1688 S	7	**F • TI • I • TI • I • TI • SI • TI • I • TI • I • TI • I • TI • I • B**
1788 W	8	**F • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • TI • B**
1788 S	8	**F • TI • I • TI • SI • TI • I • TI • I • TI • SI • TI • I • TI • I • TI • B**
1888 W	8	**F • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • TI • I • B**
1888 S	6	**F • TI • I • TI • I • SI • I • TI • I • TI • I • SI • I • TI • I • TI • I • B**

Perform hydrostatic pressure test

Prepare boiler and test:

1. See Figure 10 and Figure 11 for tapping locations. Install:
   a. Boiler drain (not furnished).
   b. Water pressure gauge — for test only. Be sure gauge can handle test pressure — see step 3.
   c. Air vent in upper tapping (K).
2. Plug remaining tappings.

⚠CAUTION Do not pressure test with any control installed. Damage to control can occur due to overpressure.

3. Fill boiler. Vent all air. Pressure test at least 10 minutes at a pressure not less than the following:
   a. **Steam** boiler: **Between 45 and 55 psig**.
   b. **Water** boiler: **1½ times maximum allowable working pressure** (MAWP) stamped on the boiler nameplate, located on boiler jacket front panel.

NOTICE Do not exceed above test pressures by more than 10 psig.

⚠WARNING Do not leave boiler unattended. Cold water fill could expand and cause excessive pressure, resulting in severe personal injury, death or substantial property damage.

4. Check for maintained gauge pressure and leaks. Repair if found.

⚠WARNING Leaks must be repaired at once. Failure to do so can damage boiler, resulting in substantial property damage.

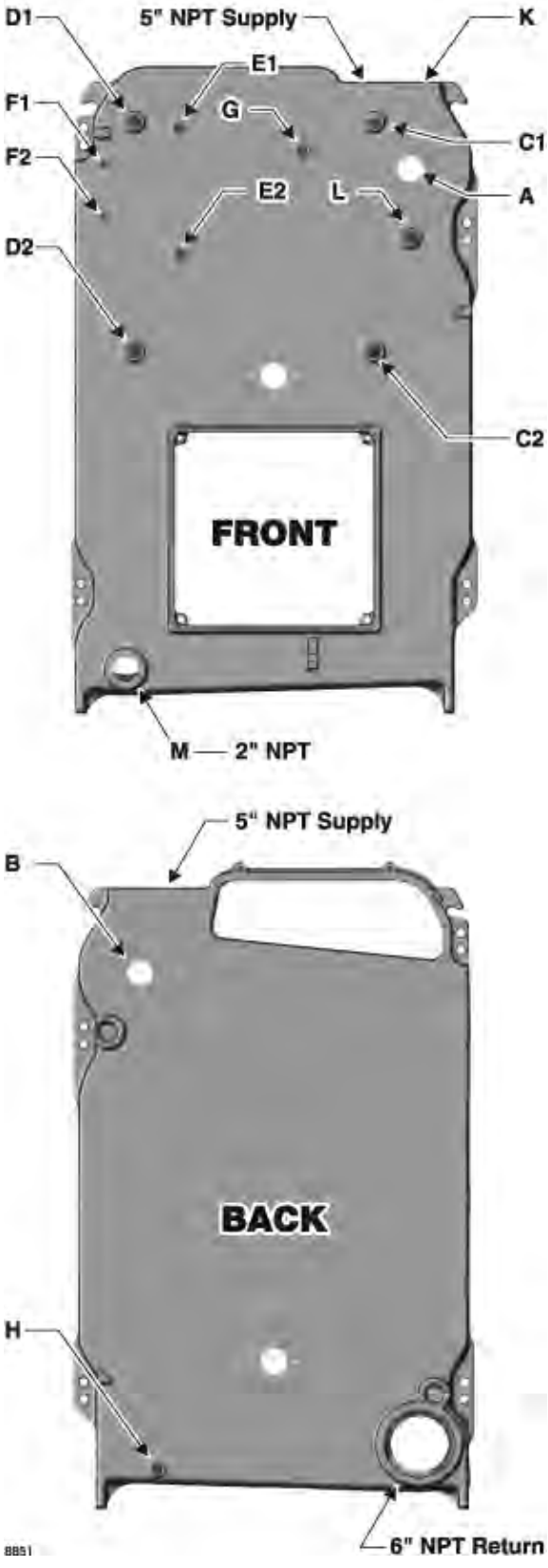
⚠WARNING Do not use petroleum-based cleaning or sealing compounds in boiler system. Severe damage to system components can result, causing substantial property damage.

5. Drain boiler and remove air vent, boiler drain and gauge. Remove plugs from tappings that will be used for controls and accessories.

Figure 10 Boiler tapping locations and sizes (see Figure 11)

Location	Size	Steam	Water
A	2"	Steam relief valve and/or Skim tapping	High limit Manual reset limit
B	2"	Steam relief valve	Water relief valve
L	1"	Secondary probe LWCO	Not used — Plug
C1 & C2	1"	Low water cut-offs	Alternate low water cut-offs
C1		—	Combination high and low limit control
D1 & D2	1"	Alternate low water cut-offs	Firing rate temperature control (when used) Low water cut-offs
E1 & E2	½"	Gauge glass	—
F1 & F2	⅜"	Try cock tappings	—
G	¾"	Pressure limit control, Pressure operating control and pressure gauge, Firing rate pressure control (when used)	Combination pressure–temperature gauge
H	¾"	Boiler drain (see Figure 17, page 15, for system blow-off (drain) valve locations and sizes	Boiler drain
K	1"	—	Piping to compression tank or automatic air vent
M	2"	Blowdown/drain	—

Figure 11 Boiler tappings



Complete block assembly

Install burner mounting plate on front section

1. Install four ½" x 3½" studs to secure burner mounting plate to section:
   a. Thread and lock together two nuts on rounded end of stud. Thread flat end of stud into one of four holes located around opening.
   b. Remove nuts.
   c. Repeat steps a and b for remaining studs.
2. Install burner mounting plate:
   a. Apply ⅛" continuous bead of sealing rope adhesive in groove around opening in section.
   b. Position ½" sealing rope in groove. Overlap ends at least one inch.
   c. Install burner mounting plate with part number and the word, "**UP,**" positioned at top. Use ½" washers and nuts.

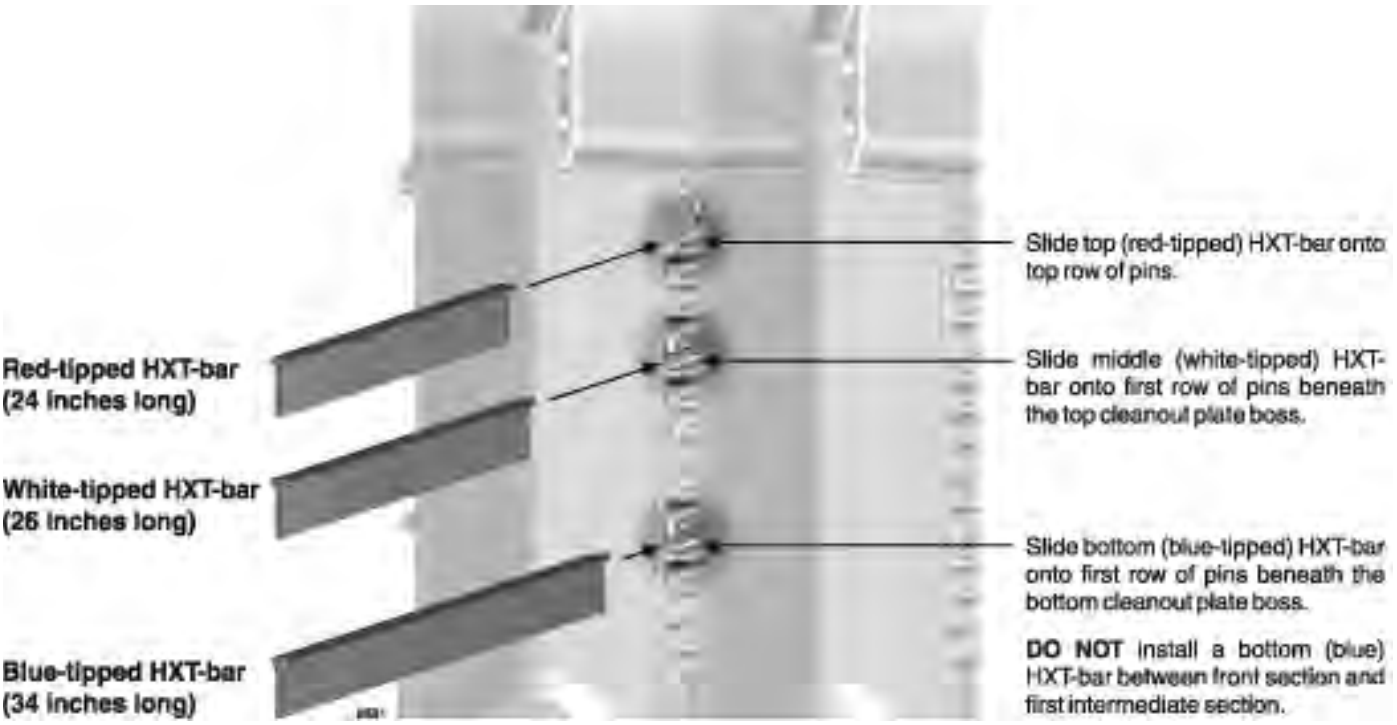
Install observation port assemblies on front and back sections

1. Install front observation port assembly:
   a. Apply ⅛" continuous bead of sealing rope adhesive in groove on observation port.
   b. Position ⅜" sealing rope in groove.
   c. Secure assembly to section. Use 10-32 x ¾" truss-head screws.
2. Repeat above steps for back observation port assembly.

Insert HXT-bars

1. See Figure 12, page 12.
2. Flue HXT-bars are identified by painted ends. They must be inserted as shown, with the HXT-bars in the sequence:
   - **Top** position
     - **red**-tipped, HXT-bar 24 inches long — place on the top row of pins.
   - **Middle** position
     - **white**-tipped HXT-bar, 26 inches long — place on the first row of pins below the top clean-out plate boss.
   - **Bottom** position
     - **blue**-tipped HXT-bar, 34 inches long — place on the first row of pins below the bottom cleanout plate boss.

Figure 12 Insert HXT-bars through cleanout openings as shown below (omit the bottom, blue-tipped, HXT-bar in the opening between the front section and the first intermediate section)



Complete block assembly *(continued)*

NOTICE DO NOT insert a bottom HXT-bar into the opening between the FRONT section and the first intermediate section.

3. To remove flue HXT-bars when required to clean the boiler flueways, grab the end of each HXT-bar with pliers and pull straight out. Clean HXT-bars and replace as shown in Figure 12, page 12.

Install cleanout plates

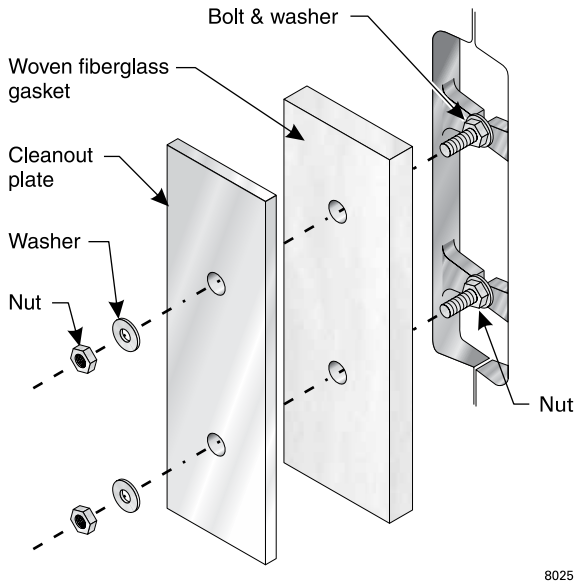
⚠WARNING Cleanout plates must be installed gas-tight to prevent possibility of flue gas leakage and carbon monoxide emissions, resulting in severe personal injury or death.

1. See Figure 13.
2. Position two ¼" x 1¾" carriage bolts in cleanout opening, between the cleanout plate bosses, as shown. Secure with washers and nuts.
3. Place woven fiberglass gasket over carriage bolts.
4. Mount cleanout plate over opening. Secure with nuts and washers.
5. Repeat steps 1 through 3 for remaining cleanout plates.

Install draft hood collar

1. Install ⅛" continuous bead of sealing rope adhesive in groove on draft hood collar.
2. Position ½" sealing rope in groove. Overlap ends of rope at least 1 inch.
3. Mount collar over flueway outlet on back section. Secure with ½ x 1½" hex head cap screws and washers.

Figure 13 Cleanout plate assembly



⚠WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions on page 34 of this manual. Failure to comply could result in severe personal injury.

Connect water boiler piping

General water piping information

1. System water supply and return piping should be installed and piping connections attached to boiler before erecting jacket or installing controls.
2. Do not pipe in through supply and out through return. This creates reverse water flow through boiler that must not be used.
3. When installing in a system in which return water temperature can drop below 140°F, apply the by-pass piping with by-pass pump as shown in .

Install piping

Install piping as shown in Figure 14, page 14 and Figure 18, page 15 (if applicable) for single boilers. For multiple boilers, see Figure 19, page 15.

⚠CAUTION Improperly piped systems or undersized piping can contribute to erratic boiler operation and possible boiler or system damage.

1. Connect supply and return piping:
   a. Size according to tables below.
      - For **known flow rates or higher flow rate** (less than 20°F temperature rise) through boiler, see Figure 15.
      - For **unknown flow rates**, size piping per Figure 17, page 15, using 20°F temperature rise through boiler.

⚠WARNING Flow at higher rates than shown in the tables in this manual for given pipe sizes can damage the boiler, causing substantial property damage.

   b. Locate circulator in supply piping.
   c. For return piping, use full diameter pipe for 10 times that diameter before making any reduction. For example, a 4-inch return should not be reduced any closer to boiler return tapping than 40 inches.
   d. Install system blow-off (drain) valve in lowest part of return piping close to boiler. ASME minimum size requirements are given in Figure 17, page 15.
2. Install expansion tank:
   a. **Closed type** – connect to 1" tapping "K" (see page 11). Use 1" NPT piping. Any horizontal piping must pitch up toward tank at least 1 inch per each 5 feet of piping.
   b. **Diaphragm type** – Refer to tank manufacturer's literature for location. Install automatic air vent in "K" tapping.
   c. Connect cold water fill to expansion tank piping. Figure 14 shows typical piping when using a closed type tank. Connect to the same location as the expansion tank connects to the system when using a diaphragm type tank.
   d. Also shown are recommended valves and water meter, when used. Water meter will detect added make-up water, indicating leaks in system.

Figure 14 Water boiler piping, typical

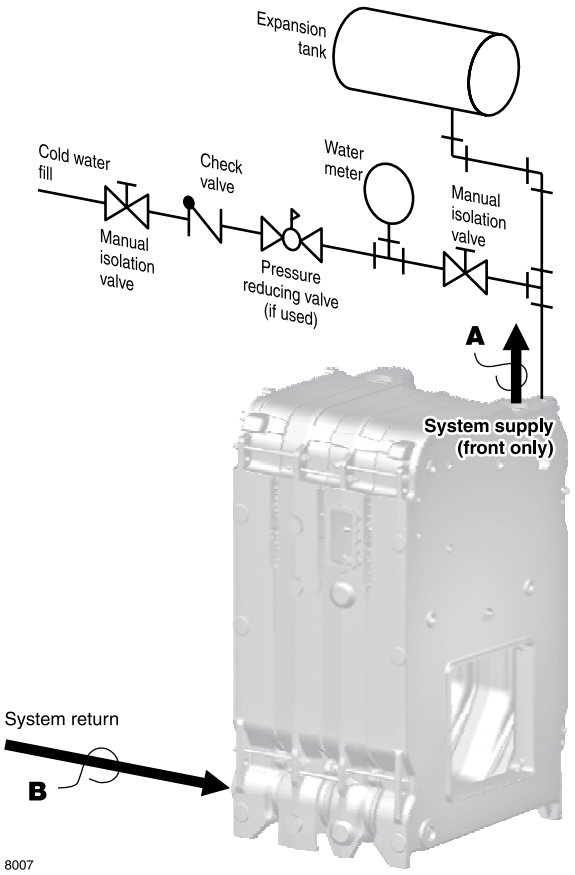


Figure 15 Recommended minimum pipe sizes for known flow rates (note 1)

Water flow rate GPM	Supply pipe size A	Return pipe size B
Up to 35	2"	2"
36–50	2½"	2½"
51–77	3"	3"
78–142	4"	4"
143–237	5"	5"
238–404	6" (note 2)	6"

Note 1 High temperature rise through boiler is permissible when boiler piping connections are sized per this table. **Intermittent** flow at **high** velocities may damage any boiler.

Note 2 6-inch piping requires nipples and 5" x 6" reducing couplings (provided with 1288 through 1888 boilers only). The total pressure drop through the 1888 boiler using the nipple and reducing coupling will not exceed ¼ PSI. For smaller boilers, the pressure drop will be less.

Connect water boiler piping *(continued)*

Figure 16 Recommended minimum pipe sizes when flow rate is not known (see Figure 14, page 14) (note 1)

Boiler model	Supply pipe size A	Return pipe size B
488	3"	3"
588 – 788	4"	4"
888 – 1188	5"	5"
1288 – 1888	6" (note 2)	6" (note 2)

Note 1 Pipe sizes are based on a 20°F temperature rise through the boiler. For applications with higher flow rates (lower temperature rise), determine the flow rate and use Figure 15, page 14 to size the piping.

Note 2 6-inch piping requires nipples and 5" x 6" reducing couplings (provided with 1288 through 1888 boilers only). The total pressure drop through the 1888 boiler using the nipple and reducing coupling will not exceed ¼ PSI. For smaller boilers, the pressure drop will be less.

Figure 17 ASME blowoff/drain valve size

Boiler model	Minimum blow-off valve size
488 – 588	1"
688 – 1088	1¼"
1188 – 1888	1½"

Piping multiple boilers

1. See Figure 18. (Expansion tanks, relief valves and other accessories are required, but omitted from the illustration for simplicity.)
2. The boiler piping circuits are referred to as the secondary circuits in the following.
3. The legend for Figure 18 and boiler pump sizing recommendations follow:

A Size boiler pump GPM based on the following:

a. **Temp rise = Operating limit temp – Return water temp**

b. **GPM = Boiler Gross Output, Btuh / Temperature rise x 500**

c. Calculate only secondary (boiler) piping circuit resistance. Allow for head loss through the boiler equal to three 90 degree elbows of secondary pipe size.

d. Operate each boiler and its pump with a Weil-McLain boiler control panel.

e. Size secondary (boiler) circuit piping using the flow rate ranges given in Figure 17, page 15.

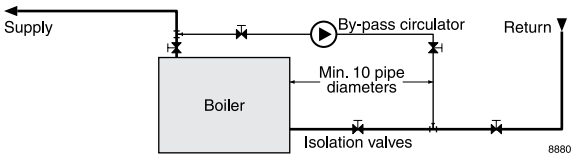
B Primary pump GPM and head calculation should not include secondary boiler circuits. Primary pump can operate continuously during heating season.

C Connection to primary circuit — Space 12" maximum or as close as practical.

D Check valve.

E Hand valve.

Figure 18 By-pass piping for return water less than 140°F



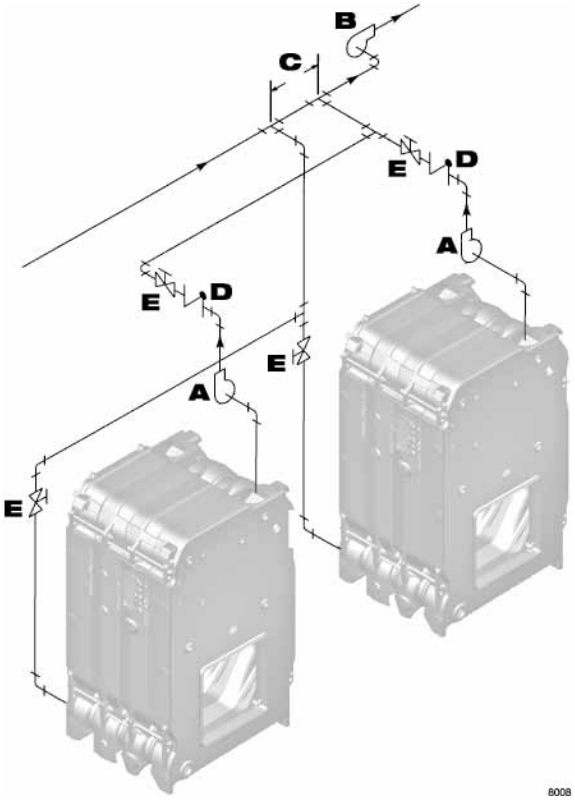
By-pass circulator sizing:

1. Size system circulator as required. Determine GPM and head requirements.
2. Provide a by-pass circulator for EACH boiler. The flow rate for each by-pass circulator will be:

   Flow = ¼ x (System circulator GPM) ÷ (# of boilers)

3. All circulators must run at the same time.
4. Example: For a 1,000,000 Btuh single boiler, with system temperature drop of 20°F:
   - System GPM = 1,000,000 ÷ 20 ÷ 500 = 100 GPM
   - By-pass GPM = ¼ x 100 GPM = 25 GPM
   - Determine by-pass circuit head loss for pipe size and fittings used.
5. In most applications, a standard booster pump should be adequate.

Figure 19 Multiple water boiler piping



Connect steam boiler piping

General steam piping information:

1. Hartford loop piping arrangement and wet return are required for steam boilers. Use the Hartford loop for both pumped-return and gravity-return systems.
2. Maintain 24-inch minimum from waterline to bottom of header (63" from bottom of section).
3. When using condensate receiver, feed pump must be energized by boiler-mounted pump controller.
4. Install piping:
   a. Install piping as shown on page 17 through page 18 for single boilers. See page 19 for additional requirements when piping multiple boilers.
   b. Return pipe sizing.
      - Pumped return — Size return piping by pump.
      - Gravity return — Size gravity return same as Hartford loop equalizer pipe size.
   c. Drain valve — Install system drain valve in lowest part of return piping close to boiler. See Figure 17, page 15, for sizing.
   d. Cold water fill piping — Connect cold water fill piping as shown in Figure 20. Also shown are recommended valves and water meter, if used. Water meter will detect added makeup water, indicating leaks in system.
   e. Condensate return piping:
      - Satisfactory operation of any steam heating system depends on adequate return of condensate to maintain steady water level.
      - Avoid adding excessive amounts of raw make-up water.
      - Where condensate return is not adequate, a low water cutoff with pump control, condensate receiver, and condensate boiler feed pump should be installed.
      - See Figure 21 for piping and Figure 22 for sizing.

Figure 20 Cold water fill piping

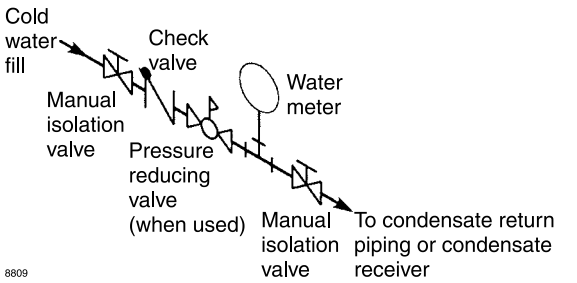


Figure 21 Condensate piping to boiler

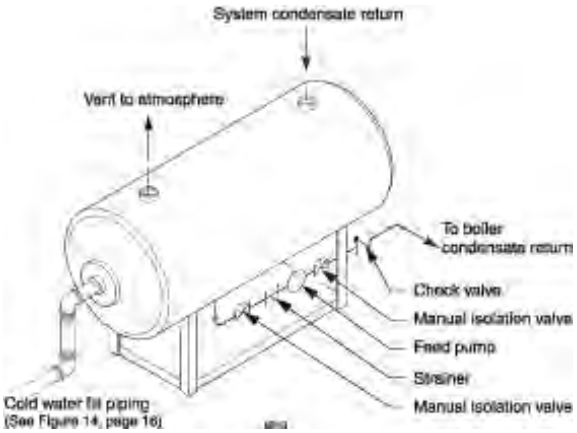


Figure 22 Condensate receiver capacity required

Boiler model number	AHRI gross output (lbs steam per hour)	Gallons condensate per hour	Minimum condensate receiver capacity (gallons) (Note 1)				Recommended condensate feed pump capacity GPM at 15 PSI
			15-minute boiler operation	30-minute boiler operation	45-minute boiler operation	60-minute boiler operation	
488	810	97	29	58	87	116	3.2
488R	794	95	28	57	85	114	3.1
588	1084	130	39	78	117	156	4.3
688	1358	163	49	98	147	196	5.4
788	1632	195	59	117	176	234	6.5
888	1904	228	68	137	205	273	7.6
988	2170	261	78	157	235	313	8.7
988R	1991	239	72	145	217	289	8.0
1088	2452	294	88	176	265	353	9.8
1088R	2304	277	83	166	249	332	9.2
1188	2724	327	98	196	294	392	10.9
1288	3000	360	108	216	324	432	12.0
1388	3270	392	117	235	353	470	13.1
1488	3550	426	127	255	383	511	14.2
1588	3820	458	137	274	412	550	15.3
1688	4090	490	147	294	441	588	16.4
1688R	3980	478	143	287	430	574	15.9
1788	4370	524	157	314	471	629	14.5
1888	4640	557	167	334	501	668	18.6

Note 1 — Maximum time to when condensate returns to boiler — the longer the time for condensate to return, the larger the receiver must be.

Connect steam boiler piping *(continued)*

⚠CAUTION Improperly piped systems or undersized piping can contribute to erratic boiler operation and possible boiler or system damage. Piping system must be installed as shown, using pipe sizes shown. Pipe sizes shown are for two-pipe, pumped-return systems. Adjust pipe sizing as needed when connecting to gravity-return systems. Consult local Weil-McLain distributor or sales office before installing alternate piping.

Steam boiler piping guidelines

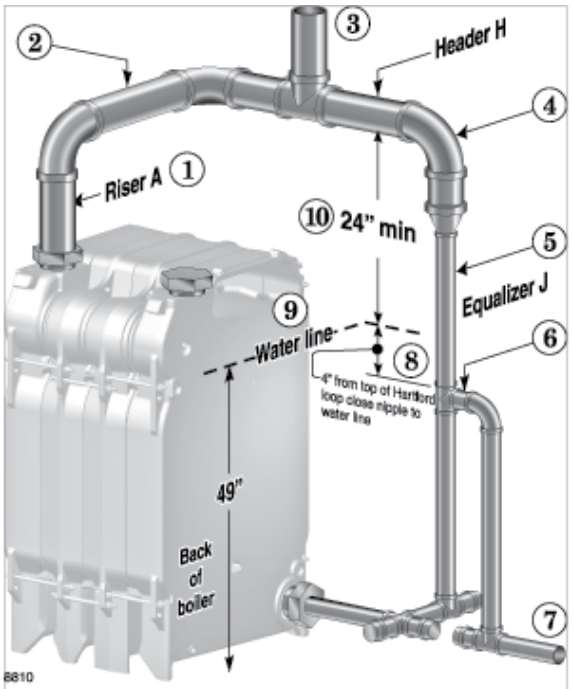
Minimum height of header above water line must be 24 inches

⚠WARNING The boiler header must always be at least **24 inches** above the water line, as shown in all steam boiler piping diagrams. Installing the pipe lower will result in increased water carryover to the system, resulting in potential serious damage to system components and oxygen corrosion due to excess make-up water.

Hartford loop piping for all steam boilers

1. You must install the system supply pipe between the equalizer elbow and the last boiler riser pipe connection to the header. This assists in separating water from the steam as it turns upward into the steam supply pipe.
2. Locate the top of the Hartford loop return nipple at least 4 inches below the water line, as shown.

Figure 23 Model 488 through 688 steam (1 riser)



Pipe Dimensions	Model	Riser A	Header H	Equalizer J
	488	4"	4"	2½"
	588 & 688	5"	5"	2½"

Drawing legend & notes

(Figure 23 through Figure 26)

1 Riser pipes (one for each supply intermediate section)

2 Horizontal pipes needed to offset the header to allow for expansion and contraction of the header

3 Steam supply must be located between last riser connection and equalizer elbow

4 Equalizer elbow — full size or reducing

5 Equalizer pipe

6 Close nipple at Hartford loop tee to reduce water hammer potential

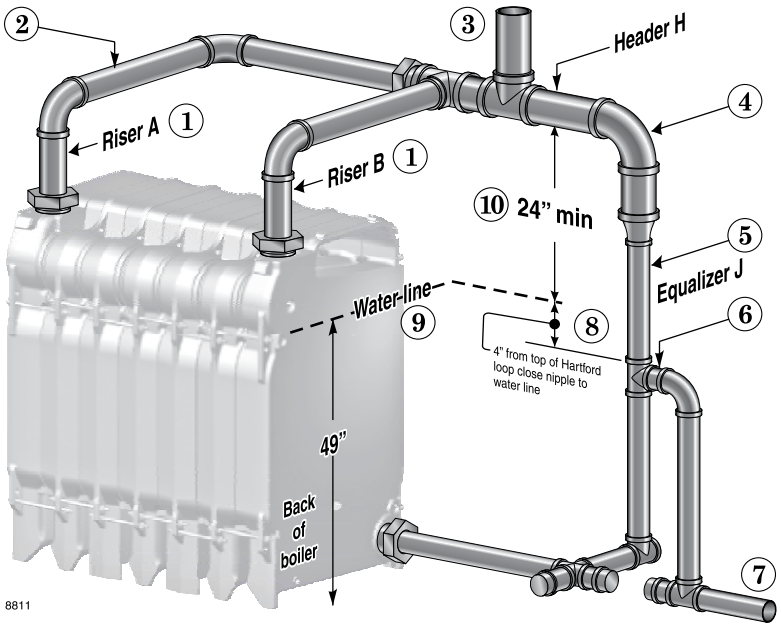
7 Condensate return line (gravity or pumped)

8 Minimum 4 inches between water line and top of Hartford loop return nipple

9 Boiler water line — all automatic water level controls must be set to maintain this level

10 Minimum 24 inches between water line and bottom of header

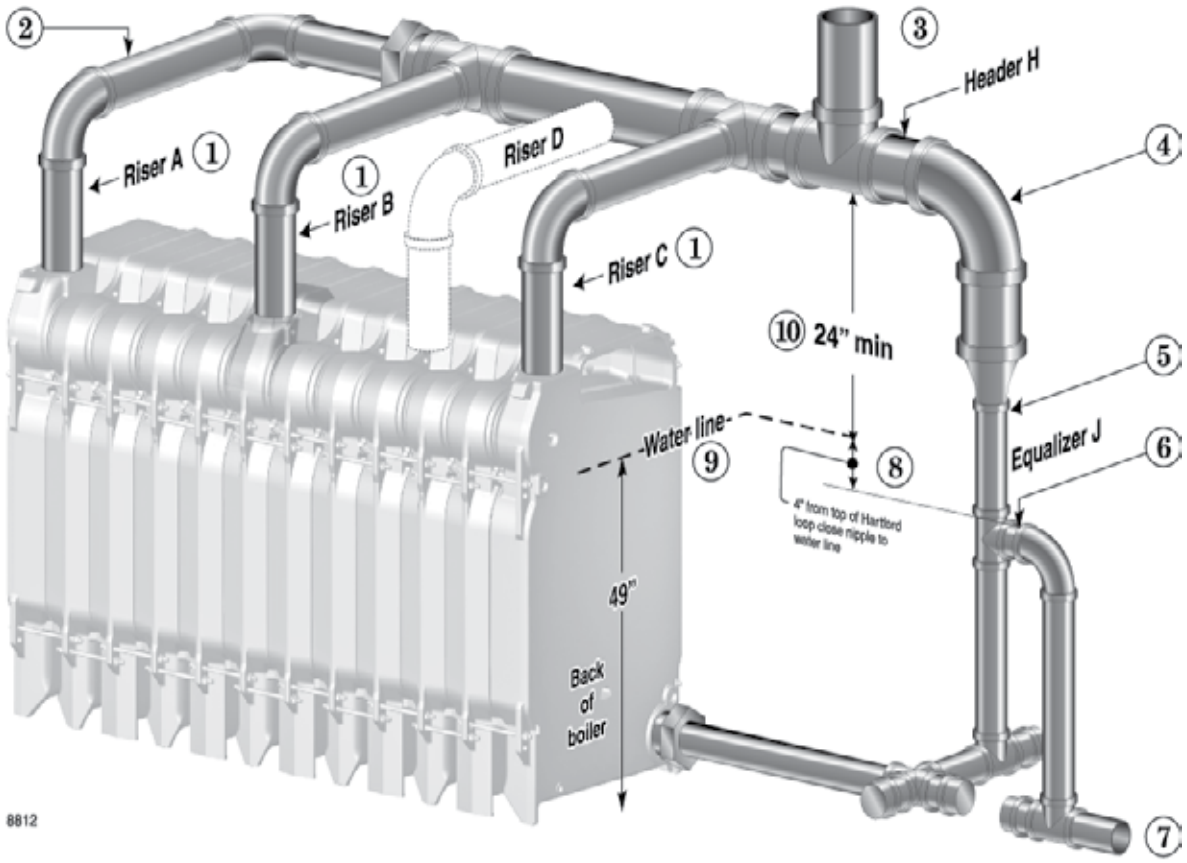
Figure 24 Model 788 through 1188 steam (2 risers required)



Pipe Dimensions	Model	Riser A	Riser B	Header H	Equalizer J
	788	4"	4"	6"	2½"
	888	5"	5"	6"	2½"
	988 & 1088	5"	5"	8"	2½"
	1188	5"	5"	8"	4"

Connect steam boiler piping *(continued)*

Figure 25 Model 1288 through 1888 steam (3 or 4 risers required)



	Model	Riser A	Riser B	Riser C	Riser D	Header H	Equalizer J
Pipe Dimensions	1288 – 1488	5"	5"	5"	NA	8"	4"
	1588 – 1688	5"	5"	5"	NA	10"	4"
	1788 – 1888	5"	5"	5"	5"	10"	4"

Drawing legend & notes

(Figure 23 through Figure 26)

1 Riser pipes (one for each supply intermediate section)

2 Horizontal pipes needed to offset the header to allow for expansion and contraction of the header

3 Steam supply must be located between last riser connection and equalizer elbow

4 Equalizer elbow — full size or reducing

5 Equalizer pipe

6 Close nipple at Hartford loop tee to reduce water hammer potential

7 Condensate return line (gravity or pumped)

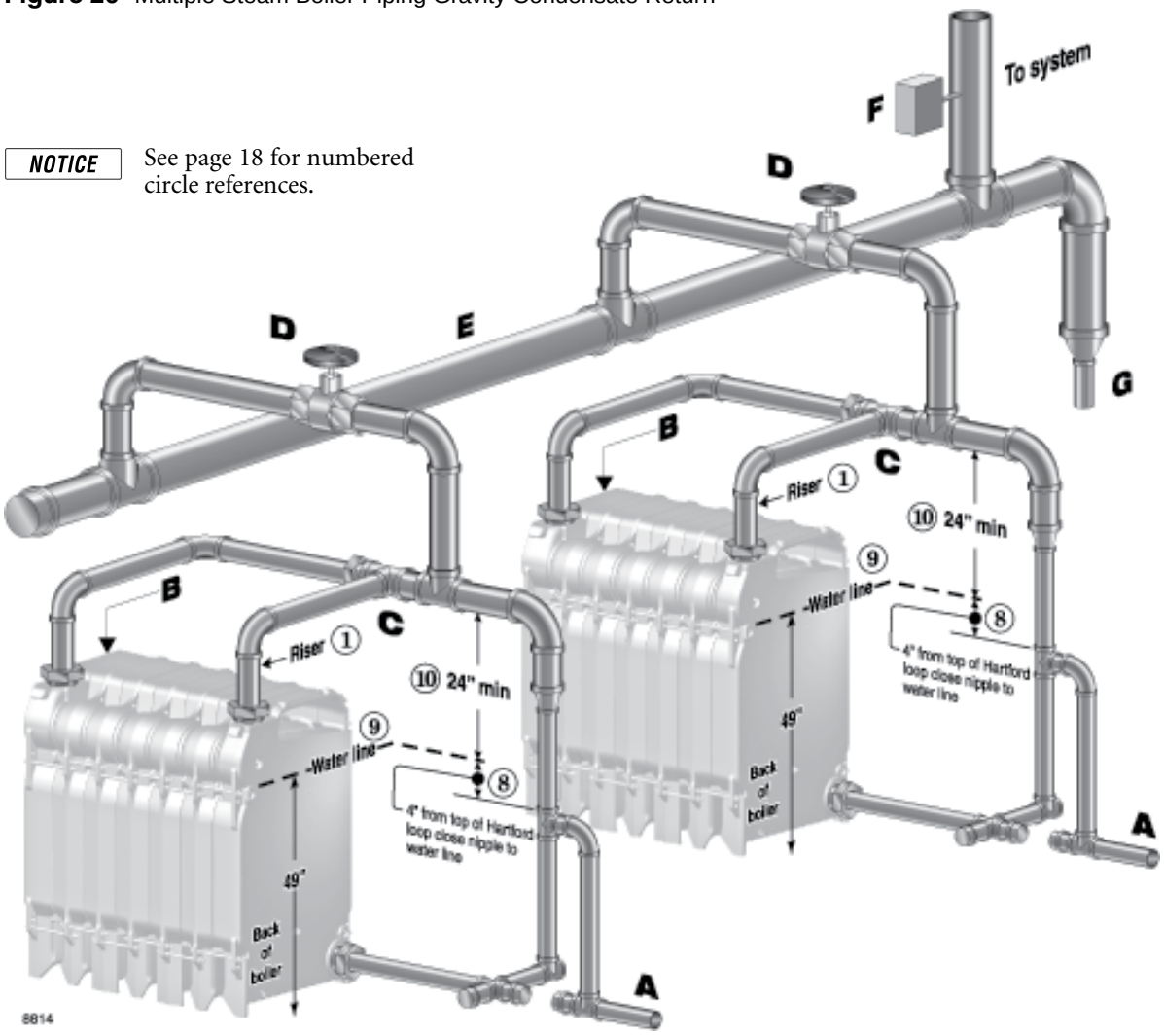
8 Minimum 4 inches between water line and top of Hartford loop return nipple

9 Boiler water line — all automatic water level controls must be set to maintain this level

10 Minimum 24 inches between water line and bottom of header

Connect steam boiler piping *(continued)*

Figure 26 Multiple Steam Boiler Piping Gravity Condensate Return



NOTICE See page 18 for numbered circle references.

A Pipe as shown for gravity return systems, connecting point **A** to the wet gravity return.

- For pumped-return systems, install boiler water level control on each boiler with body mark at level indicated in Figure 42, page 28. Provide at point **A** either:
- Separate feed pumps and check valves for each boiler, or . . .
- Single feed pump, with separate solenoid valve for each boiler.

B For pumped-return systems, install a combination float and thermostatic trap on each boiler to prevent flooding of one boiler while other boiler is firing. Install trap in skim tapping (see Figure 39, page 27). Connect traps to condensate receiver.

Gravity-return systems are self-levelling if the wet returns are piped to the common system wet return.

C Install boiler piping as shown in the preceding pages of this manual.

D Install stop valves per ASME code requirements.

- For pump-return systems, if using automatic steam valves, use only slow-opening automatic valves. Use a Weil-McLain Boiler Control System (such as a BCP panel) to open each steam valve automatically before firing burner.

E Construct common supply drop header with pipe size at least same size as largest boiler header size.

F Use:

- A Weil-McLain Boiler Control System (such as a BCP panel) with header-mounted pressure control(s) to sequence boilers, or . . .
- A steam pressure controller.

G Install drip line in common supply drop header.

- Gravity-return: Pipe drip line to wet return.
- Pumped-return: Use combination float and thermostatic trap and drain to condensate receiver.

Install jacket

Before installing jacket

WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions on page 34 of this manual. Failure to comply could result in severe personal injury.

1. These parts **must be on boiler**:
   a. Plugs for unused tappings
   b. Supply and return piping and steam supply header
   c. Cleanout plates
   d. Tankless heaters (when used), tankless heater cover plates (when used), tankless heater piping (when used)
   e. Flue damper assembly
   f. Observation port assemblies
2. These parts **may be on boiler**:
   a. Burner mounting plate
3. These parts **must be off boiler**:
   a. Water or steam gauge
   b. Limit control and low water cutoff
   c. Gauge glass and gauge glass cocks, tri-cocks
   d. Drain cock

Remove jacket parts from cartons

1. Locate jacket cartons.
2. Remove jacket parts from cartons as needed. Leave in cartons as long as possible to avoid damage.
3. Jacket parts are in the boxes listed below:

Part	Box label descriptions
Jacket screws (in jacket corner boxes)	included in **CRNR** boxes
Jacket support brackets & hex nuts	**BKT**
Jacket side support channels, upper & lower	included in **TRM/CHNL** boxes
Jacket front/rear support channels, upper & lower	**COM**
Jacket front panel	**PNL-F**
Jacket back panel	**PNL-B**
Jacket side and top panels	**L / R / T**
Jacket corners	**CRNR**
Jacket trim	**TRM/CHNL**

Install support brackets/channels

1. Place upper and lower support brackets over draw rods as shown in Figure 29, page 21. Place the brackets on the sections as given in Figure 27. Sections are numbered from front to back.
2. Fasten each bracket loosely using two 5/8" nuts screwed onto the ends of the tie rods as shown.

NOTICE Models 488 through 988 do not require lower support brackets. Only upper brackets are required.

Fasten all nuts and screws loosely during assembly to allow adjustment after all jacket frame parts are installed.

Figure 27 Place support brackets as listed below

Boiler	Upper brackets on sections:	Lower brackets on sections:
488	2, 3	None
588	2, 4	None
688	2, 5	None
788	2, 6	None
888	3, 6	None
988	2, 5, 8	None
1088	3, 6, 9	6
1188	3, 6, 9	6
1288	3, 7, 10	7
1388	3, 7, 11	7
1488	3, 7, 10, 13	7
1588	2, 5, 8, 11, 14	8
1688	2, 5, 9, 12, 15	9
1788	2, 5, 9, 13, 16	9
1888	2, 6, 10, 14, 17	10

3. Attach the upper channels to the upper supports as shown in callouts ①, ② and ⑥, Figure 29, page 21. Use two #10 x ½" screws at each bracket. Models 988 and larger have two-piece channels.
   - The side channels are labelled **A** and **B** in Figure 29. Figure 28 gives the lengths of the side channel parts for each model.
   - The channels at the boiler front and rear are part numbers 426400030 & 426400031, respectively.

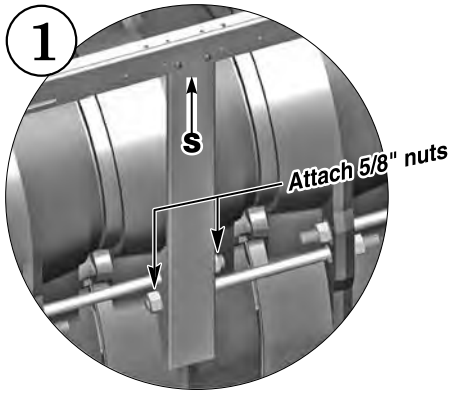
Figure 28 Upper and lower side channel lengths

Boiler	Upper channel lengths (inches)		Lower channel lengths (inches)	
	A	B	A	B
488	30	NA	26	NA
588	38	NA	34	NA
688	46	NA	42	NA
788	54	NA	50	NA
888	62	NA	58	NA
988	35	35	66	NA
1088	43	35	40	34
1188	43	43	40	42
1288	51	43	48	42
1388	51	51	48	50
1488	51	59	48	58
1588	59	59	56	58
1688	67	59	64	58
1788	67	67	64	66
1888	71	71	72	66

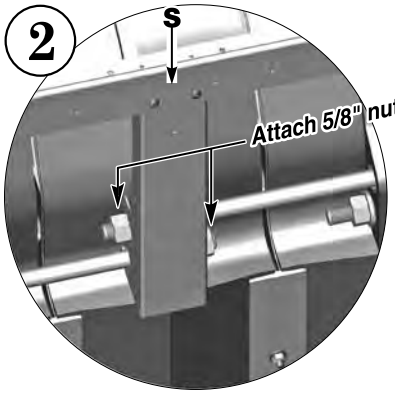
4. Attach the four jacket corners to the upper channels as shown in callout ⑥, Figure 29, page 21. Corner part numbers are: 426400054 (front left), 055 (front right), 056 (back left), and 057 (back right).
5. Attach the lower side, front and rear channels to the jacket corners as shown in callouts ④ and ⑤ of Figure 29, page 21. Models 1088 and larger have two-piece side channels. The channels are labelled **A** and **B** in Figure 29. Figure 28 gives the lengths of these parts for each model. Front and rear lower channels are part numbers 426400032 and 426400033.

Install jacket *(continued)*

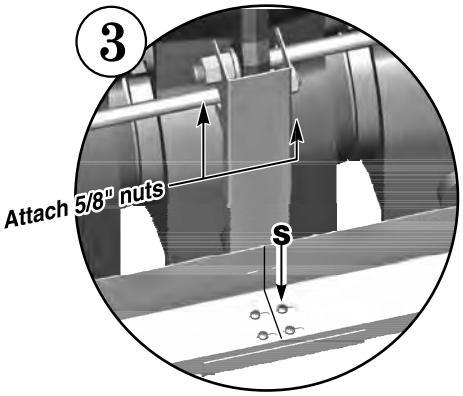
Figure 29 Installing jacket support brackets, support channels and corners *(piping and other components omitted for clarity)*



Upper right support bracket

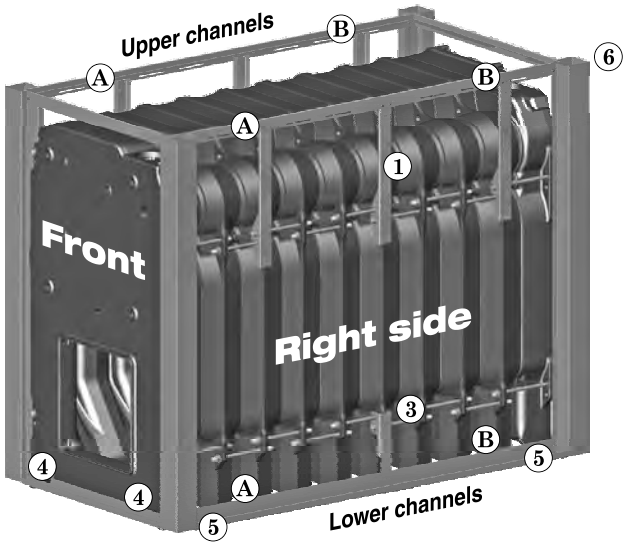


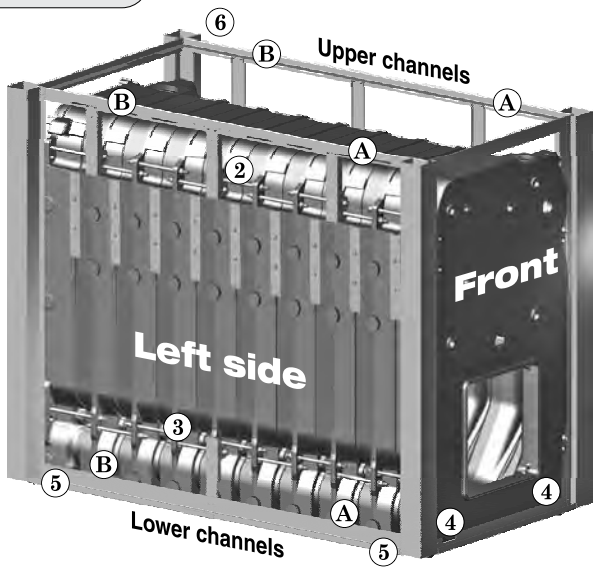
Upper left support bracket

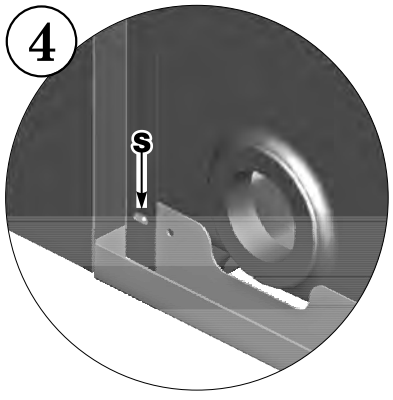


Lower support brackets

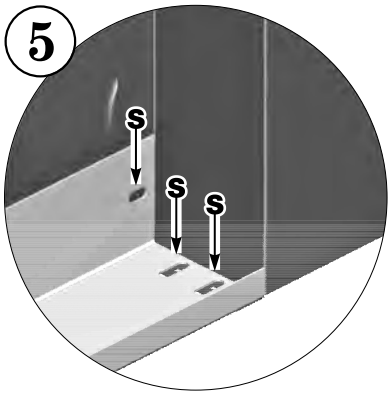
S = Insert #10 x ½" Phillips pan head screws
A, B = Side channel pieces, front and rear



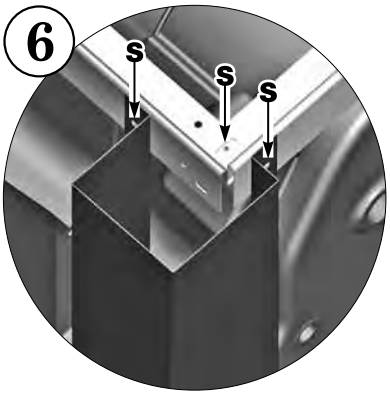




Corner attachments to lower front and rear channels



Corner attachments to lower channels



Corner attachments to upper channels

Install jacket *(continued)*

Install jacket front and back panels

1. Slide the jacket front and back panels down over the top channels and into the bottom channels as shown in Figure 30.
2. Slide the upper and lower channels as needed to square up the fit.

Install jacket side panels

1. Remove jacket side panels from cartons.
2. Before installing side panels, square up the jacket support rails.
   - Place any of the jacket side panels on the rails as shown in Figure 30.
   - Butt the side panel against the jacket corner panel.
   - Push/pull on the upper and lower channels until the fit-up of the side panel, corner panel and channels is square.
   - Place a jacket top panel in position against the jacket front panel to ensure the top alignment is square. Adjust the jacket support rails forward or backward if needed for square alignment.
   - Tighten the 5/8-inch nuts on the upper (and lower) support brackets.
   - Tighten the screws securing the upper and lower rails to the support brackets.
   - Tighten the screws securing the front and back panels to the rails.
3. Apply all jacket side panels in the order shown in Figure 32.
   - Remove jacket knockouts as required for tankless heaters and tankless heater openings.
   - Note that panel sequence is not important for boilers not equipped with tankless heater intermediate sections.

Install jacket top panels

1. Place jacket top panels as shown in Figure 33, page 24.
   - Remove knockouts for riser pipes and air bleed piping (front section) using tin snips.

Install jacket trim

2. Press jacket trim down over the front and side jacket panels as shown in Figure 31.

Figure 30 Installing (removing) jacket front, rear and side panels

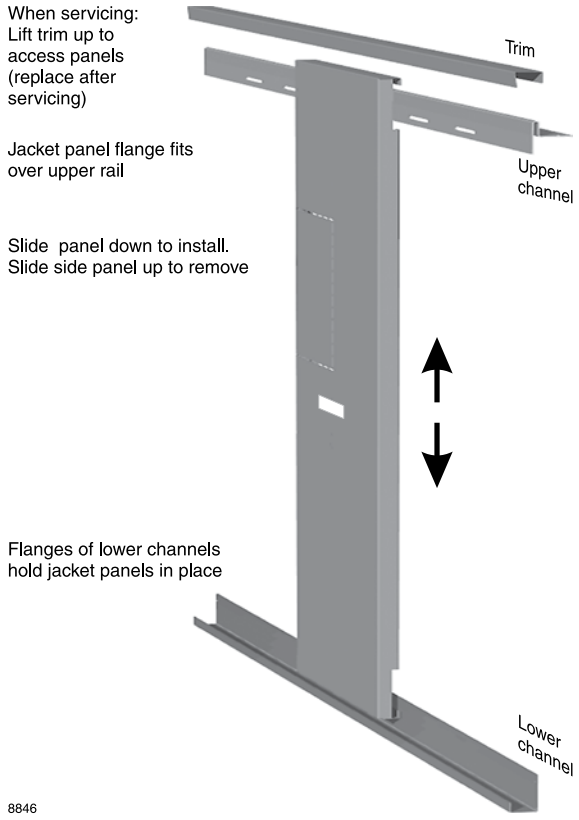
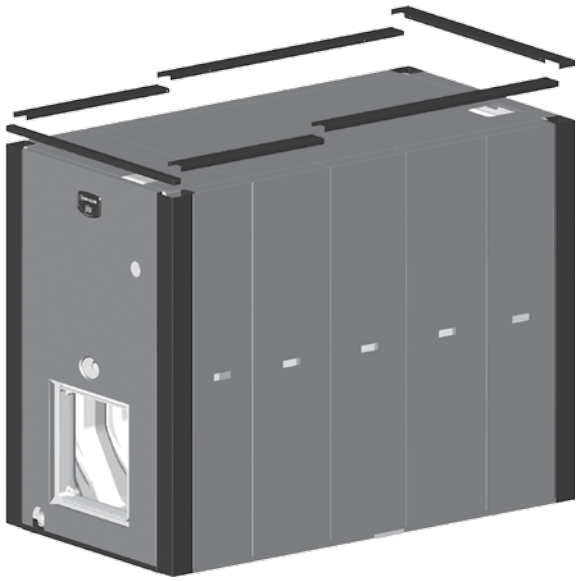
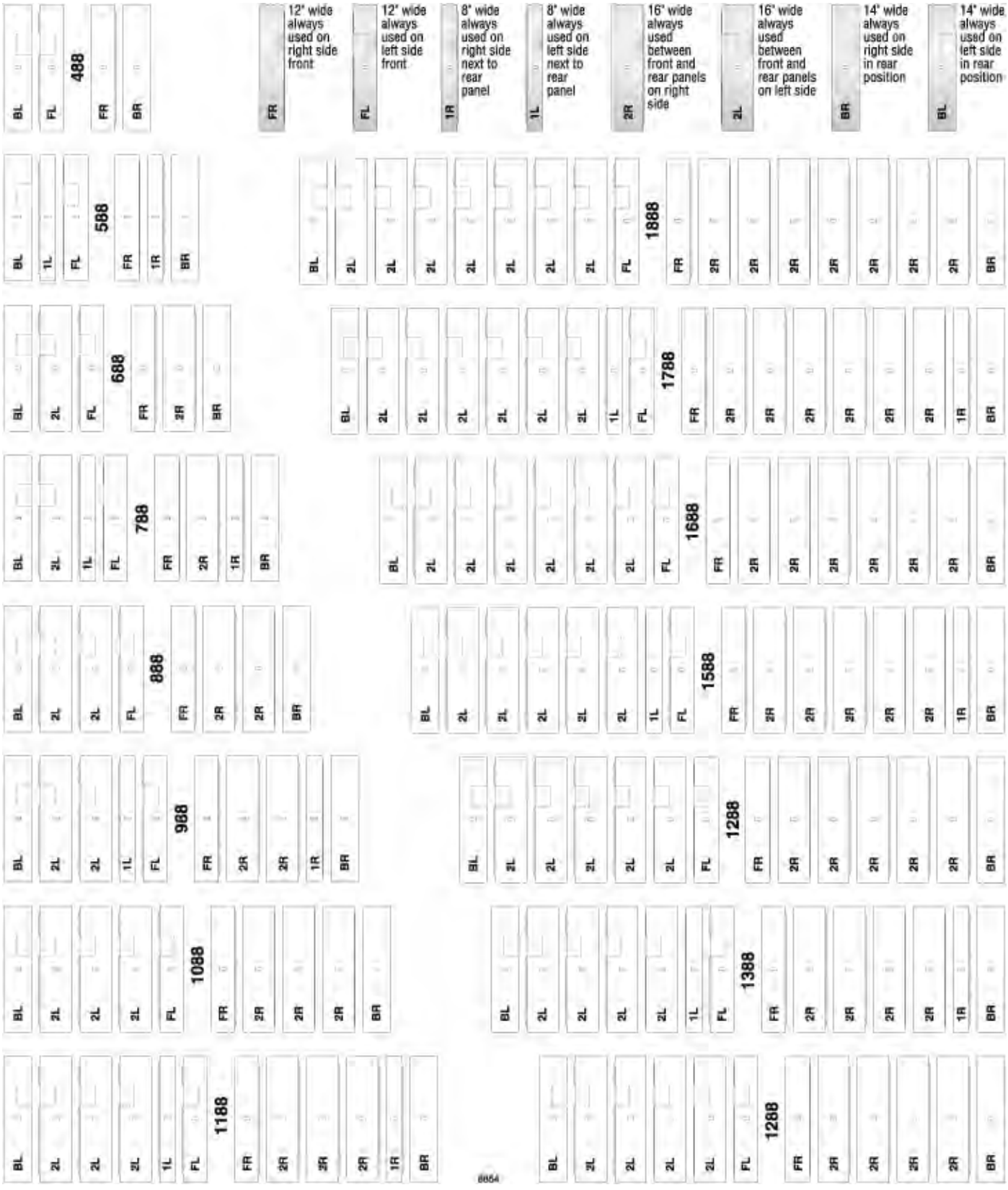


Figure 31 Press jacket trim down over jacket front, rear and side panels



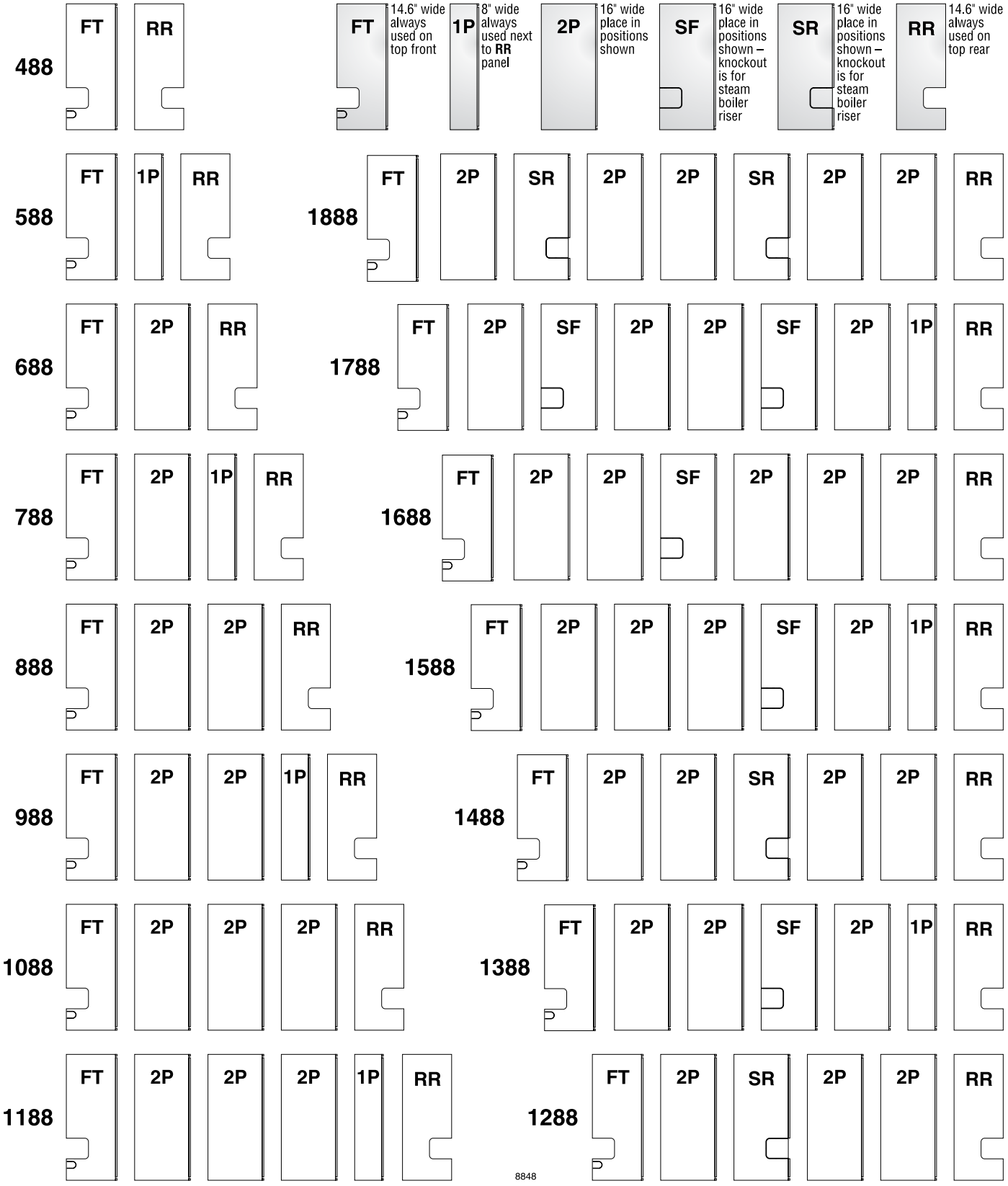
Install jacket *(continued)*

Figure 32 Jacket side panel placement



Install jacket *(continued)*

Figure 33 Jacket top panel placement



Pipe tankless heaters

⚠ DANGER **Hot water can scald!**

Consumer Product Safety Commission and some states recommend domestic hot water temperature of 130°F or less.

When installing an automatic mixing valve, selection and installation **must** comply with valve manufacturer's recommendations and instructions.

Water heated to a temperature suitable for clothes washing, dish washing and other sanitizing needs will scald and cause injury.

Children, elderly, infirm or physically handicapped persons are more likely to be injured by hot water. Never leave them unattended in or near a bathtub, shower or sink. Never allow small children to use a hot water faucet or draw their own bath. If anyone using hot water in the building fits this description, or if state laws or local codes require certain water temperatures at hot water faucets, take special precautions:

— Install automatic mixing valve set according to those standards.

— Use lowest practical temperature setting.

— Check water temperature immediately after first heating cycle and after any adjustment.

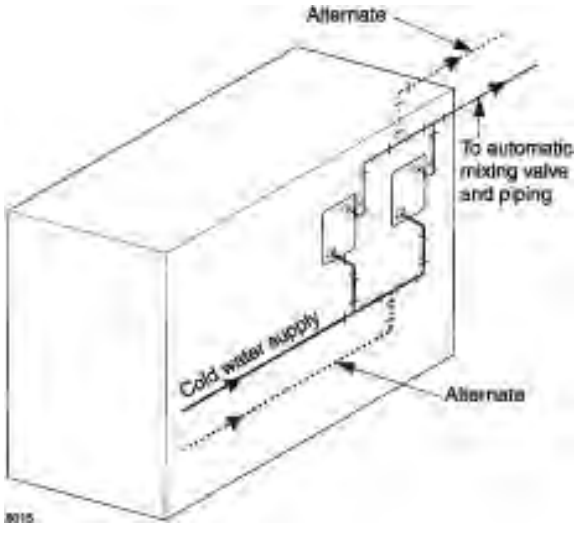
To pipe tankless heaters:

1. See Figure 35.
2. Size piping no smaller than heater inlet and outlet.
3. Automatic mixing valve must be installed. See Figure 35. Follow manufacturer's instructions to install.
4. Flow regulating valve must be installed. Size according to continuous draw of heater. See Figure 34. Follow manufacturer's instructions to install.
5. Operating control with small adjustable differential scale is recommended. Install in temperature control tapping in heater plate.
6. Multiple tankless heaters (see Figure 35):
   a. Use cold water supply header with individual risers to each heater. Size header by increasing one pipe size for each additional heater.
   b. Use hot water outlet header with individual risers to each heater. Size header by increasing one pipe size for each additional heater.
   c. Do not pipe multiple heaters in series.
7. In hard water areas, soften cold domestic water supply to heaters to prevent lime build-up.

Figure 34 Tankless heater ratings (Weil-McLain ratings)

Heater number	Intermittent draw – GPM (note 2)	Continuous draw GPM (notes 1, 2)	Inlet and outlet tappings
820	8.5	8.0	¾"
Note 1	GPM based on 40–140°F DHW with boiler water at 200°F		
Note 2	Based on continuous draw with no recovery period		

Figure 35 Tankless Heater Piping



Install water boiler controls

Install controls:

1. Install furnished controls per Figure 37 and Figure 36.

⚠WARNING Failure to properly install, pipe and wire boiler controls can result in severe damage to boiler, building and personnel; and is not covered by boiler warranty.

2. Relief valve must be installed with spindle in vertical position. Use fittings provided with boiler. Do not make any other connection in that piping.

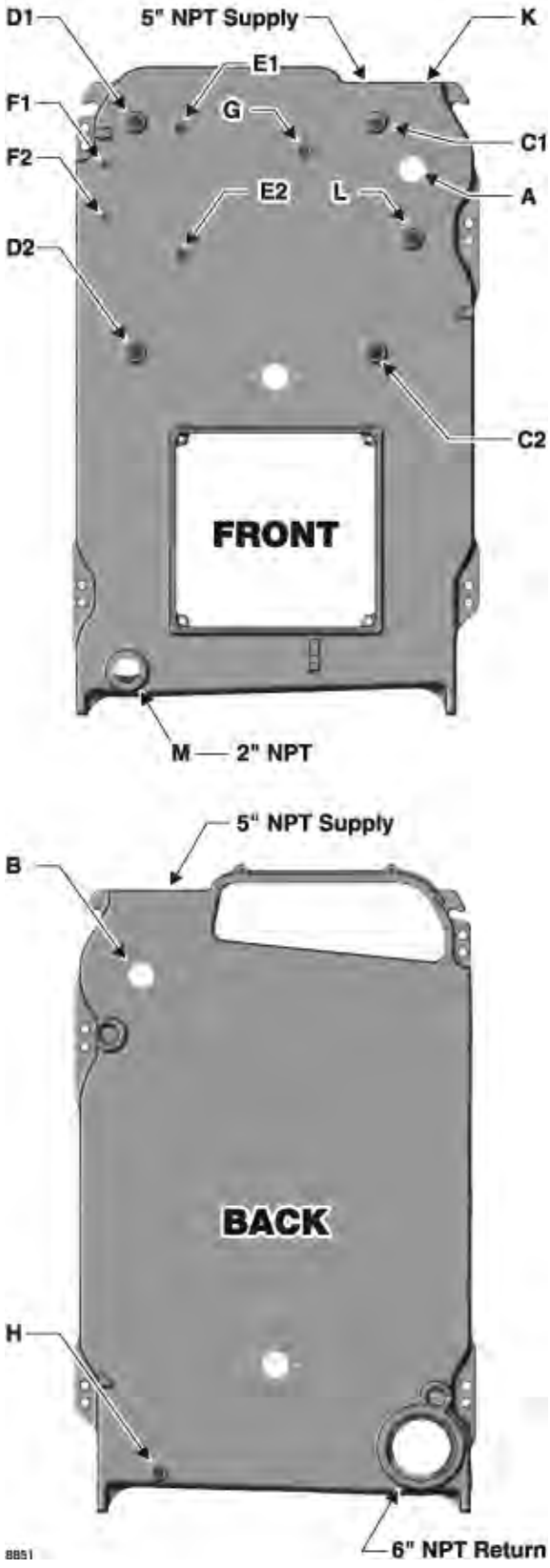
⚠WARNING Relief valve discharge line must be piped using rigid material suitable for 375°F, threaded one end, near floor close to drain to eliminate potential of severe burns. Do not pipe to any area where freezing could occur. Do not plug, valve or place any obstruction in discharge line.

3. When installing low water cut-off
   a. Must be installed if boiler is located above radiation level.
   b. May be required on water boilers by certain state, local or territorial codes or insurance companies.
   c. Install low water cutoff designed for water installations where shown in Figure 37 and Figure 36.
4. If installation is to comply with ASME installation requirements, an additional high temperature limit is needed. Purchase and install in supply line between boiler and isolation valve or in tapping "**A**."
5. Dual limit control settings:
   a. Low – set according to design requirements.
   b. High – at least 20° higher than low limit, 240°F maximum.
6. Install optional controls per control manufacturer's instructions.

Figure 37 Water control tappings (see Figure 36)

Location	Size	Function
A	2"	High limit Manual reset limit
B	2"	Water relief valve
L	1"	Not used — plug
C1 & C2	1"	Alternate low water cut-offs
C1		Combination high and low limit control
D1 & D2	1"	Firing rate temperature control (when used) Low water cut-offs
E1 & E2	½"	—
F1 & F2	⅜"	—
G	¾"	Combination pressure–temperature gauge
H	¾"	Boiler drain
K	1"	Piping to compression tank or automatic air vent
M	2"	Drain

Figure 36 Water control locations



Install steam boiler controls

Install controls:

1. Install controls where shown in Figure 38 and Figure 39.

⚠WARNING Failure to properly install, pipe and wire boiler controls can result in severe damage to boiler, building and personnel; and is not covered by boiler warranty.

a. Install steam pressure operating and high limit controls and pressure gauge. See Figure 38, Figure 39 and Figure 40, page 28. Pressure limit control settings:
   - **Low** – set according to design requirements.
   - **High** – set at least 2 psi higher than low limit, 15 psi maximum.

b. Relief valve must be installed with spindle in vertical position. Use fittings provided with boiler. Do not make any other connection in that piping.

⚠WARNING Pipe relief valve discharge through vertical piping to atmosphere. Use rigid material suitable for 375°F, threaded one end only. Install drain pan elbow to drain condensate. Pipe near floor close to floor drain to eliminate potential of severe burns. Do not pipe to any area where freezing could occur. Do not plug, valve or place any obstruction in discharge line.

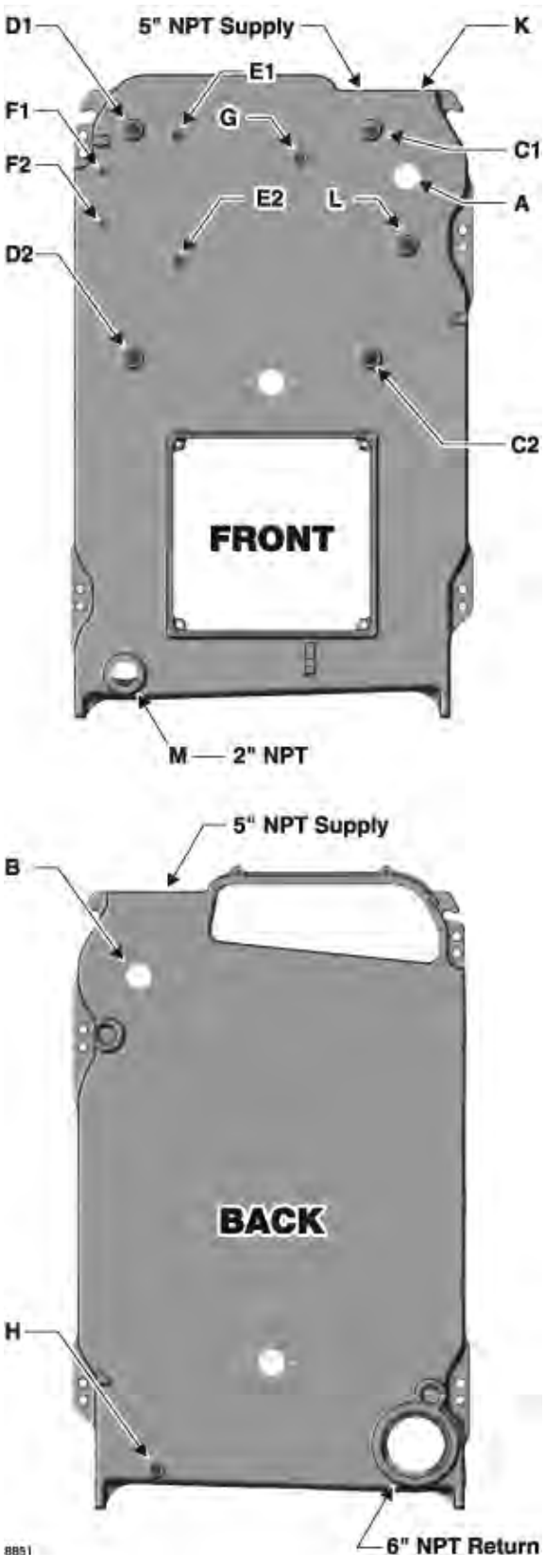
c. Install water level controls and gauge glass per Figure 38, Figure 39 and Figure 42, page 28.
   - Fittings for controls to be furnished by others.
   - If water level control is not shown in Figure 41, page 28, locate casting mark on control and install per manufacturer's instructions.

NOTICE Do not use water level controls with quick hook-up fittings. Nuisance shutdowns will occur.

Figure 38 Steam control tappings (see Figure 39)

Location	Size	Function
A	2"	Steam relief valve and/or Skim tapping
B	2"	Steam relief valve
L	1"	Secondary probe low water cut-off
C1 & C2	1"	Low water cut-offs (see Figure 42, page 28)
C1		—
D1 & D2	1"	Alternate low water cut-offs (see Figure 42, page 28)
E1 & E2	½"	Gauge glass
F1 & F2	⅜"	Try cock tappings
G	¾"	Pressure limit control, Pressure operating control and pressure gauge, Firing rate pressure control (when used)
H	¾"	Boiler drain (see Figure 17, page 15, for system blow-off (drain) valve locations and sizes
K	1"	—
M	2"	Blowdown/drain

Figure 39 Steam control locations



Install steam boiler controls *(continued)*

Figure 40 Steam control siphon and fittings

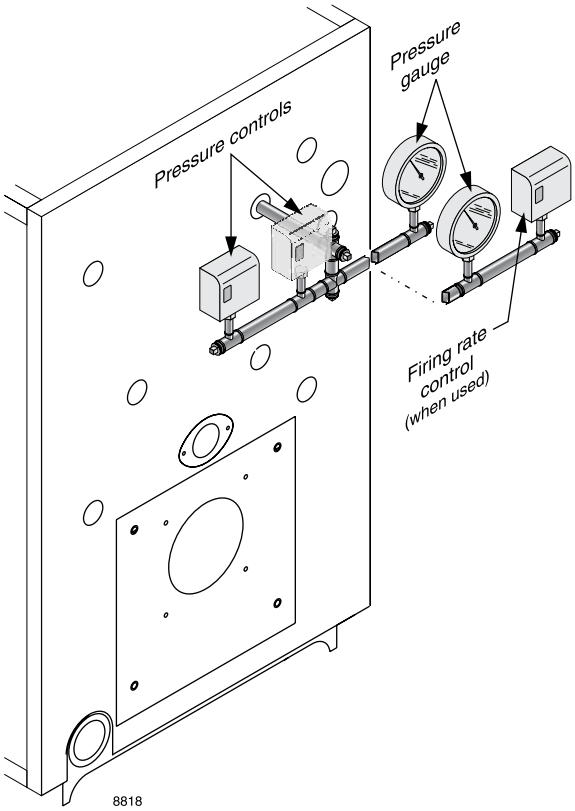


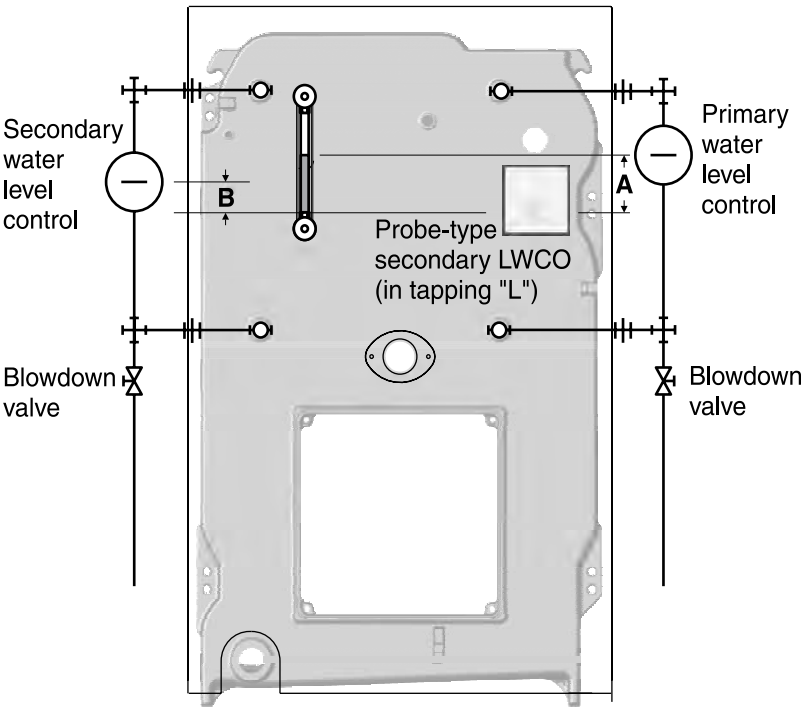
Figure 41 Float-type water level control locations

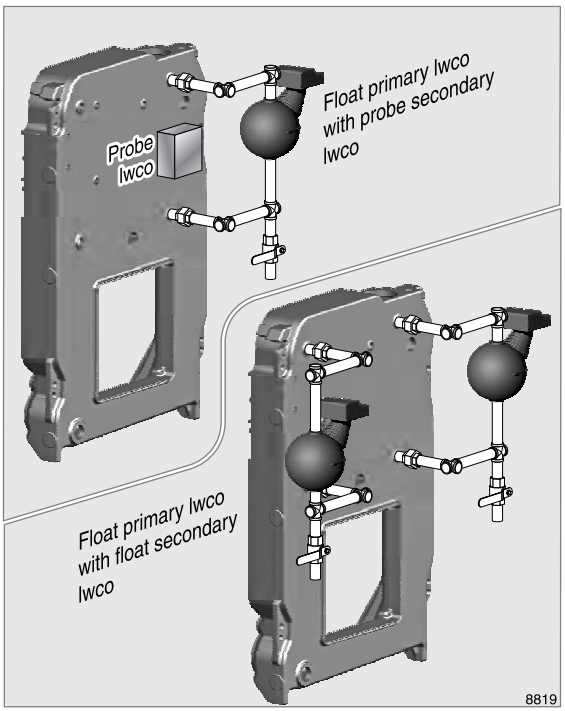
Primary water level control	Casting line height above bottom of gauge glass	Back-up water level control	Casting line height above bottom of gauge glass
Note 1	**"A"**	Notes 1, 2	**"B"**
61, 63	¼"	**None**	—
	1½"	**61, 63**	½"
150MD, 157MD (see Note 3)	2⅜"	**None**	—
	2"	**150**	¼"
	2⅜"	**61, 63**	¼"
	2⅜"	**51-2 & 51-S-2**	¼"
93, 193, 94 (see Note 3)	2"	**None**	—
	2"	**93, 193, 94**	¼"
	2"	**61, 63**	¼"
	2"	**51-2 & 51-S-2**	¼"
51-2 & 51-S-2 (see Note 3)	1"to 1¼"	**None**	—

Notes:

1. Other manufacturer's controls providing similar function may be used, if properly located and selected.
2. Use low water cut-off function only. Pump controller function must only be handled by the primary control.
3. When pump control is used with feedwater tank, install pump control on boiler and make-up water feeder on tank. Use separate low water cutoff on boiler when back-up is needed. Do not install combination low water cutoff and feeder as back-up control on boiler. Feeder will operate before pump control operates.

Figure 42 Water level control locations (see Figure 41)





Connect breeching and venting systems

General venting information

1. Model 88 boilers operate with positive overfire pressure. Adjust damper assembly (see Figure 49, page 33) during burner start-up to achieve 0.1" W.C. positive pressure at damper sample hole.

Select type of venting system

Forced draft

- Boiler, breeching and stub vent operate at positive pressure. Entire system must be gas-tight to prevent leaks. Stub vent height must be limited to prevent negative draft with 3-foot minimum stub vent height above roof. See Figure 44 and Figure 46.

Balanced draft

- Boiler operates with positive pressure overfire. Chimney **may** provide excess draft which may require a barometric draft control installed and set to provide minimum draft to maintain 0.1" positive pressure at flue collar. Minimum chimney height above roof is 3 feet. See Figure 45 and Figure 47.

Construct metal breeching:

1. See Figure 43 for minimum breeching diameter.
2. Select material type and thickness in compliance with local codes.

⚠WARNING Conventional flue pipe should not be used as it could leak flue gases and carbon monoxide emissions through seams and joints, resulting in severe personal injury or death.

3. Refer to ASHRAE Guide for chimney and breeching calculations and construction and lining.

⚠WARNING Long horizontal breechings, excessive number of tees and elbows or other obstructions restricting combustion gas flow can result in possibility of condensation, flue gas leakage and carbon monoxide emissions, causing severe personal injury or death.

Figure 43 Minimum breeching diameter

Boiler model	AHRI vent or liner diameter (inches)		Boiler flue collar dimensions (inches)
	Forced draft	Balanced draft	
488	10	12	10 round
588	10	15	10 round
688	12	15	10 round
788	12	18	12 round
888	14	18	12 round
988	14	18	14 round
1088	14	21	14 round
1188	16	21	14 round
1288	16	21	14 round
1388	16	24	14 round
1488	18	24	16 round
1588	18	24	16 round
1688	18	24	16 round
1788	18	24	16⅛ x 19⅞ oval
1888	20	27	16⅛ x 19⅞ oval

Connect breeching and venting systems

Figure 44 Stub vent – forced draft — single boiler

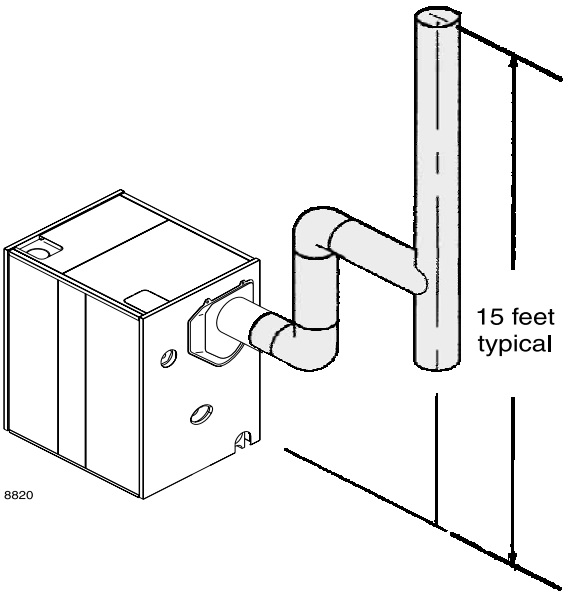


Figure 45 Conventional chimney – balanced draft with barometric draft control when required — single boiler

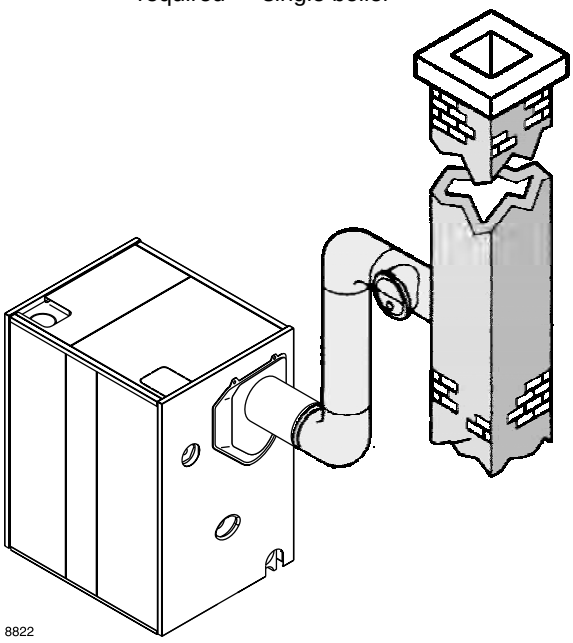


Figure 46 Stub vent – forced draft — multiple boilers

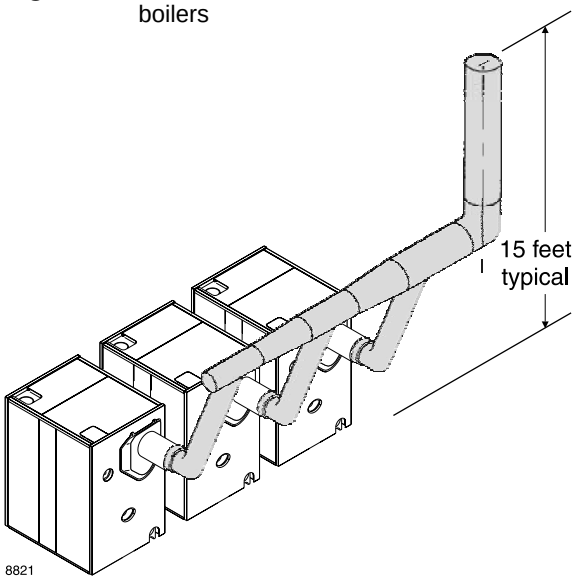
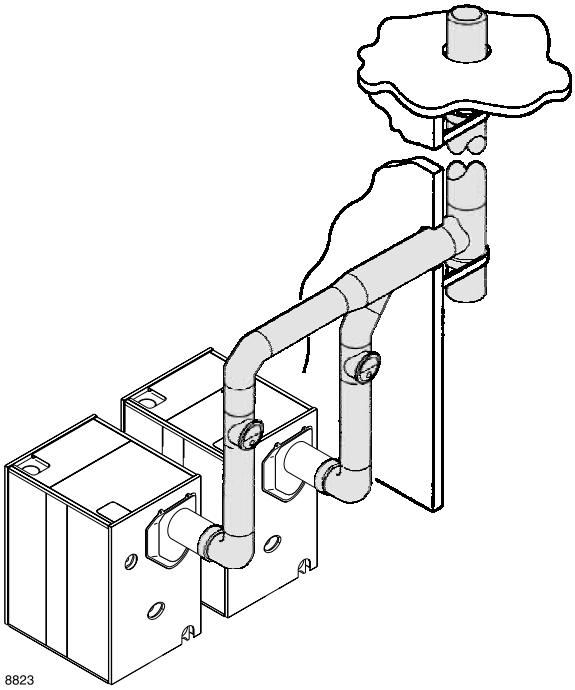


Figure 47 Conventional chimney – balanced draft with barometric draft control when required — multiple boilers



Install burner & wiring and fill system

To install burner

1. Unpack burner.
2. Place gasket around air tube and against burner mounting flange. If sealing rope is used, apply 1/8" continuous bead of rope adhesive around burner mounting flange and apply sealing rope to make gas-tight seal.
3. Mount burner into opening in burner mounting plate.

⚠CAUTION Maintain gas-tight seal between burner mounting flange and plate to prevent damage to air tube.

4. Level burner using burner support brackets where required.
5. Secure with furnished bolts.
6. Retain burner information packet. Keep with boiler.

To wire burner and boiler controls

⚠WARNING Electric shock hazard. Can cause severe personal injury or death if power source is not disconnected before installing or servicing boiler and burner.

1. Install all wiring in compliance with:
   - National Electrical Code ANSI/NFPA 70.
   - Any additional national, state, or local codes.
2. Follow burner manual and wiring diagram found in burner information packet.
3. Use #14 AWG wire for operating and safety circuit wiring.
4. Where burner motor voltage differs from control voltage, supply proper voltage to each. Size fused disconnects and conductors per National Electrical Code ANSI/NFPA 70.

Determine if water treatment is needed (water boilers only)

⚠WARNING Do not use petroleum-based cleaning or sealing compounds in boiler system. Severe damage to system components can result, causing substantial property damage.

Continual make-up water will reduce boiler life. Minerals can build up in sections, reducing heat transfer, overheating cast iron and causing section failure.

For unusually hard water areas or low pH conditions (less than 7.0) consult local water treatment company. Provide a water softener for make-up water if hardness exceeds 7 grains.

Freeze protection (when used) (water boilers only)

1. Use antifreeze especially made for hydronic systems. Inhibited propylene glycol is recommended.

⚠WARNING Do not use automotive, ethylene glycol or undiluted antifreeze. Severe personal injury or death can result.

2. 50% solution provides protection to about -30°F.
3. Local codes may require back-flow preventer or actual disconnect from city water supply.
4. Determine quantity according to system water content. Boiler water content is listed in "Ratings," page 35. Percent of solution will affect sizing of heat distribution units, circulator and expansion tank.
5. Follow antifreeze manufacturer's instructions.

To fill water boilers

1. Close manual air vents and drain cocks.
2. Fill to correct system pressure. Correct pressure will vary with each installation.
3. Starting on lowest floor, open air vents one at a time until water squirts out. Close vent. Repeat with remaining vents.
4. Refill boiler to correct pressure.

To fill steam boilers

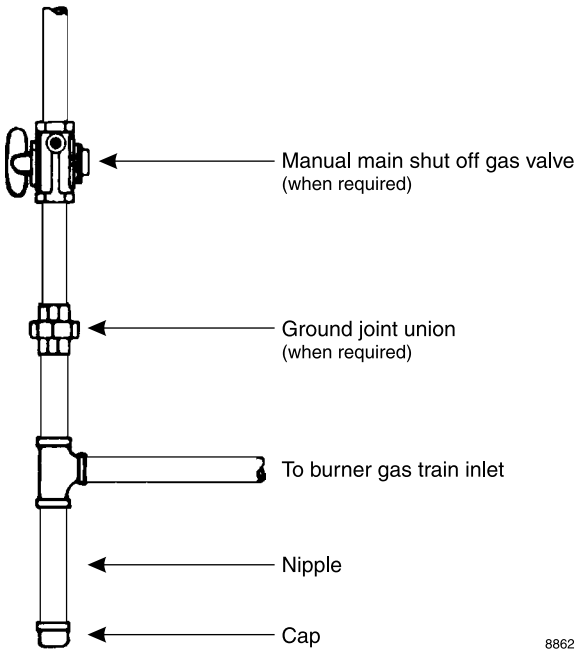
1. Do not fill (except for leakage test) until boiler is ready to be fired.
2. Fill to normal waterline, halfway up gauge glass.
3. Recommend boiler water pH 7.0 to 8.5.

Install fuel piping

Gas piping

1. In sizing the gas piping, the following factors should be considered:
   a. Diameter and length of the gas supply piping.
   b. Number of fittings.
   c. Maximum gas consumption (including any possible future expansion).
   d. Allowable loss in gas pressure from the gas meter outlet to the boiler.
2. Minimum inlet natural gas pressure required at manual main shut-off valve — see the burner manual and material list.
3. Follow good piping practices.
4. Pipe joint compound (pipe dope) must be resistant to the corrosive action of liquefied petroleum gases and applied sparingly only to the male threads of pipe joints.
5. A ground joint union must be installed in the piping to provide for servicing. The supply piping must include a manual shut-off valve and sediment trap. See Figure 48.
6. Piping must be supported by hangers, not by the burner or its accessories.
7. Purge all air from the supply piping.
8. All gas piping must be tested for leaks after installation. Use soap suds mixture only.

Figure 48 Gas supply piping



Fuel oil piping

⚠ DANGER To prevent oil flow in case of oil line breakage:

- Use anti-syphon device when any part of the oil tank is above burner level.
- Use check valve in suction line on burner side of manual shut-off valve nearest tank when top of fuel oil tank is below burner level.

Failure to comply could result in fuel leakage or fire, causing potential severe personal injury, death or substantial property damage.

1. A two-pipe fuel oil piping system is required for all installations.
2. Supply and return lines must enter tank from top, extending to within 4 to 6 inches from bottom of tank.
3. Use oil filter sized for fuel pump suction gear capacity.
4. Install oil filter.

⚠ CAUTION Do not install filter outside or close to an outside wall.

5. Use continuous copper tubing to reduce possible piping leaks and to ensure reliable seal when oil piping is buried.
6. Use flare fittings, not compression fittings.

⚠ DANGER **Fire hazard** — DO NOT USE soldered fittings. No safe repair can be made.

7. Follow good piping practices.
8. Pipe joint compound (pipe dope) must be resistant to corrosive action of fuel oil. Apply sparingly only to male threads of pipe joints.
9. Supply and return piping should be sized to design conditions, but not less than ½" O.D. continuous copper tubing.
10. Auxiliary fuel oil pump is recommended when suction line lift exceeds 12 feet.
11. Install swing joints so they will tighten as buried tank settles to prevent fuel line breakage.
12. Where iron pipe is required by local codes, make swing joints with nipples and elbows several inches long on both suction and return line. Locate close to tank.
13. Install manual shut-off valve in suction line piping near burner and where piping enters building from outside tank.
14. Pitch suction line piping toward fuel tank.
15. Provide tee and plug at highest point in suction line to release air from suction line and aid in priming.

Make final adjustments

Adjust burner and damper assembly:

1. Lock flue damper OPEN (Figure 49).

⚠WARNING Make final burner adjustments using combustion test equipment to assure proper operation. Do not fire boiler without water. Sections will overheat, damaging boiler and resulting in severe property damage.

2. Refer to burner manual for start-up and service.
3. Let burner advance to high fire. Heat boiler to design conditions.
4. Using combustion test equipment, adjust burner for:
   a. 12% (± ¼%) CO_2 for No. 2 fuel oil, 0 smoke.
   b. 9 – 10% CO_2 natural gas; CO in flue gas not to exceed 50 ppm (0.01%).
   c. **Flue gas temperature no lower than 330°F.**

NOTICE On some applications, if draft conditions or burner characteristics cause the burner flame pattern to impinge on the combustion chamber wall, you may notice pinging sounds from the boiler. Adjust the burner if possible to redirect the flame. If this does not work, contact your boiler supplier or Weil-McLain to obtain an optional combustion chamber kit (see page 38 for contents).

5. Adjust flue collar damper (Figure 49) to ensure 0.1" W.C. positive pressure at test opening.
6. Tighten screws to secure in position.
7. Plug test opening with 1/8" plug provided with flue collar/damper assembly.
8. Adjust barometric draft control, when used, to design conditions.
9. Repeat steps 4 through 6. Adjust as required.

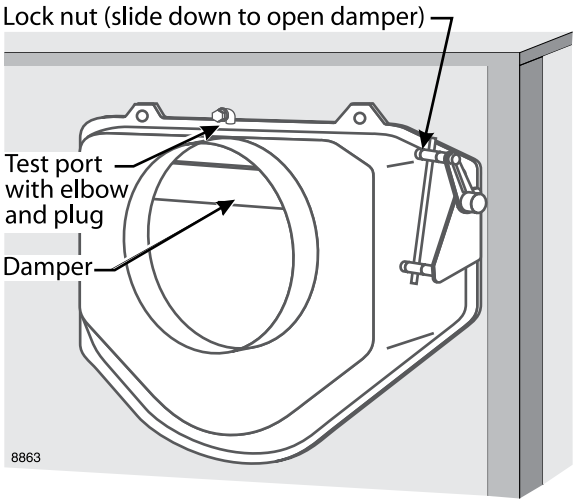
Skim steam boilers:

NOTICE Clean all newly installed steam boilers to remove oil. Failure to properly clean can result in violent water level fluctuations, water passing into steam mains, or high maintenance costs on strainers, traps and vents. Skim boiler only. Do not clean old piping or leaks can occur.

⚠WARNING Do not use petroleum-based cleaning or sealing compounds in boiler system. Severe damage to system components can result, causing substantial property damage.

1. Remove 2" plug from skim tapping "**A**" (see Figure 38, page 27).
2. Provide 2" skim piping from tapping to floor drain.
3. Raise waterline to midpoint of skim piping.
4. Fire burner to maintain temperature below steaming rate during skimming process.
5. Feed in water to maintain water level.
6. Cycle burner ON/OFF as needed to prevent rise in steam pressure.
7. Continue skimming until discharge is clear. This may take several hours.

Figure 49 Flue collar/damper assembly



8. Drain boiler.
9. While boiler is warm, **but not hot**, flush all interior surfaces under full pressure until drain water runs clear.
10. Remove skim piping.
11. Re-insert plug at boiler skim tapping.
12. Close drain cock.
13. Fill with fresh water to normal water line.
14. Start burner and steam for 15 minutes to remove dissolved gases.
15. Stop burner.
16. Check traps and air vents for proper operation.

Check boiler for gas-tight seal:

⚠WARNING Boiler must be sealed gas-tight to prevent possible flue gas leakage and carbon monoxide emissions, resulting in severe personal injury or death.

1. Remove boiler jacket side and top panels.

⚠WARNING The boiler contains ceramic fiber and fiberglass materials. Use care when handling these materials per instructions on **page 34** of this manual. Failure to comply could result in severe personal injury.

2. Start burner. Observe all sealing points and chalk mark any not gas-tight.
3. To seal all chalk-marked areas:
   a. Use silicone sealant on section flueways.
   b. Check gaskets and sealing rope placement.
4. Reinstall all jacket panels.

Handling ceramic fiber and fiberglass materials

REMOVAL OF FRONT PLATE OR CLEANOUT PLATE MATERIALS

⚠WARNING The burner front plate and cleanout plate gaskets contain ceramic fiber materials. Ceramic fibers can be converted to cristobalite in very high temperature applications. The International Agency for Research on Cancer (IARC) has concluded, "Crystalline silica inhaled in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (Group 1).":

- Avoid breathing dust and contact with skin and eyes.
  - Use NIOSH certified dust respirator (N95). This type of respirator is based on the OSHA requirements for cristobalite at the time this document was written. Other types of respirators may be needed depending on the job site conditions. Current NIOSH recommendations can be found on the NIOSH web site at http://www.cdc.gov/niosh/homepage.html. NIOSH approved respirators, manufacturers, and phone numbers are also listed on this web site.
  - Wear long-sleeved, loose fitting clothing, gloves, and eye protection.
- Apply enough water to the combustion chamber lining or base insulation to prevent airborne dust.
- Remove combustion chamber lining or base insulation from the boiler and place it in a plastic bag for disposal.
- Wash potentially contaminated clothes separately from other clothing. Rinse clothes washer thoroughly.

NIOSH stated First Aid.

- Eye: Irrigate immediately.
- Breathing: Fresh air.

REMOVAL OR INSTALLATION OF FIBERGLASS WOOL:

⚠WARNING This product contains fiberglass jacket insulation and ceramic fiber materials in jacket insulation, burner front plate insulation and cleanout plate gaskets. Airborne fibers from these materials have been listed by the State of California as a possible cause of cancer through inhalation.

- Avoid breathing dust and contact with skin and eyes.
  - Use NIOSH certified dust respirator (N95). This type of respirator is based on the OSHA requirements for fiberglass wool at the time this document was written. Other types of respirators may be needed depending on the job site conditions. Current NIOSH recommendations can be found on the NIOSH web site at http://www.cdc.gov/niosh/homepage.html. NIOSH approved respirators, manufacturers, and phone numbers are also listed on this web site.
  - Wear long-sleeved, loose fitting clothing, gloves, and eye protection.
- Operations such as sawing, blowing, tear out, and spraying may generate airborne fiber concentration requiring additional protection.
- Wash potentially contaminated clothes separately from other clothing. Rinse clothes washer thoroughly.

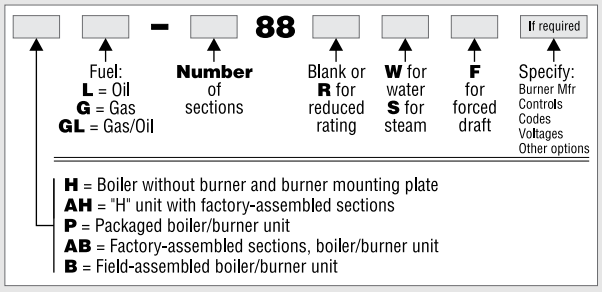
NIOSH stated First Aid.

- Eye: Irrigate immediately.
- Breathing: Fresh air.

Ratings

Boiler model number	AHRI burner capacity		Gross AHRI output		Net AHRI ratings			AHRI Certified Ratings: Combustion efficiency		Thermal efficiency		Boiler H.P.	Net firebox volume	Flue gas volume	Flue outlet dia.	Boiler water content	Packaged boiler weight
	Light oil GPH	Gas MBH	Steam MBH	Water MBH	Steam Sq. Ft	Steam MBH	Water MBH	Oil	Gas	Oil	Gas		Cubic feet	CFM	Inches	Gallons	Pounds
Notes: 1, 10	2, 3	2, 4	5, 6	5, 6	8	8	8	%	%	%	%	—	—	7	—	—	—
488R	6.9	996	827	833	2,583	620	719	87.5	84.8	85.6	83.1	24.7	11.02	376	10	109	2,860
488	7.0	1,010	839	844	2,621	629	730	87.5	84.8	85.6	83.1	25.1	11.02	370	10	109	2,860
588	9.4	1,356	1,126	1,135	3,521	845	979	87.0	84.4	85.6	83.1	33.6	14.45	507	10	132	3,340
688	11.8	1,701	1,413	1,424	4,469	1,072	1,229	86.7	84.1	85.6	83.1	42.2	18.08	639	10	155	3,820
788	14.2	2,046	1,700	1,713	5,463	1,311	1,478	86.5	83.9	85.6	83.1	50.8	21.61	772	12	178	4,345
788R	--	1999	1661	1673	5,463	1279	1,444	--	84.0	--	83.1	50.8	21.61	772	12	178	4,345
888	16.6	2,382	1,987	1,994	6,427	1,543	1,728	86.3	83.7	85.6	83.1	59.4	25.14	906	12	201	4,925
988R	17.2	2,482	2,062	2,080	6,671	1,601	1,793	86.2	83.7	85.6	83.1	61.6	28.67	1,031	14	224	5,600
988	18.8	2,737	2,274	2,294	7,358	1,766	1,977	86.2	83.7	85.6	83.1	67.9	28.67	954	14	224	5,600
1088R	20.0	2,887	2,399	2,419	7,763	1,863	2,086	86.2	83.6	85.6	83.1	71.7	32.20	1,184	14	247	6,130
1088	21.5	3,082	2,561	2,583	8,283	1,988	2,227	86.2	83.6	85.6	83.1	76.5	32.20	1,101	14	247	6,130
1188	23.5	3,428	2,848	2,873	9,213	2,211	2,477	86.1	83.5	85.7	83.1	85.1	35.76	1,299	14	270	6,695
1288	26.0	3,773	3,135	3,162	10,147	2,434	2,726	86.0	83.5	85.7	83.1	93.7	39.26	1,443	14	293	7,260
1388	28.5	4,119	3,422	3,456	11,071	2,657	2,976	86.0	84.4	85.7	83.1	102.2	42.79	1,588	14	316	7,890
1488	31.0	4,464	3,709	3,745	12,000	2,880	3,225	86.0	83.4	85.7	83.1	110.8	46.32	1,735	16	339	8,410
1588	33.0	4,809	3,996	4,035	12,925	3,102	3,475	85.9	83.3	85.7	83.1	119.4	49.85	1,854	16	362	9,005
1688R	34.5	4,979	4,137	4,182	13,383	3,212	3,597	85.9	83.3	85.7	83.1	123.6	53.38	2,003	16	385	9,525
1688	35.5	5,155	4,283	4,330	13,854	3,325	3,724	85.9	83.3	85.7	83.1	127.9	53.38	1,945	16	385	9,525
1788	38.0	5,494	4,570	4,615	14,783	3,548	3,974	85.9	83.3	85.7	83.1	136.5	56.91	2,152	18 *	408	9,780
1888	40.5	5,845	4,857	4,910	15,713	3,771	4,223	85.9	83.3	85.7	83.1	145.1	60.44	2,303	18 *	431	10,775

1. See below to specify complete model number.



2. Burner input based on maximum of 2,000 feet altitude. For other altitudes, consult Weil-McLain distributor/agent or sales office.
3. No. 2 fuel oil — Commercial Standard Spec CS75-56. Heating value of oil = 140,000 Btu per gallon.
4. Gas pressure required at burner gas train inlet for rated burner input; based on 1,000 Btu per cubic foot natural gas, specific gravity of 0.60. Refer to burner manual for required pressure.
5. Gross AHRI ratings have been determined under the AHRI provision governing forced draft boiler-burner units.
6. Flue gas volume at outlet temperature.
7. Net AHRI ratings are based on net installed radiation of sufficient quantity for the requirements of the building. Nothing need be added for normal piping and pick-up. Water ratings are based on a piping and pick-up allowance of 1.15. Steam ratings are based on the following allowances: 488 – 588 = 1.333; 688 = 1.323; 788 = 1.301; 888 = 1.289; 988 – 1888 = 1.288. An additional allowance should be made for gravity hot water systems or for unusual piping and pick-up loads. Consult local Weil-McLain distributor/agent or sales office.
8. With 0.10" W.C. positive pressure at flue collar.
9. Water boilers tested for 80 PSIG, ASME water working pressure. Steam boilers tested for 15 PSIG, ASME steam working pressure.

* Flue collar connection is oval, 16⅛" x 19⅞"

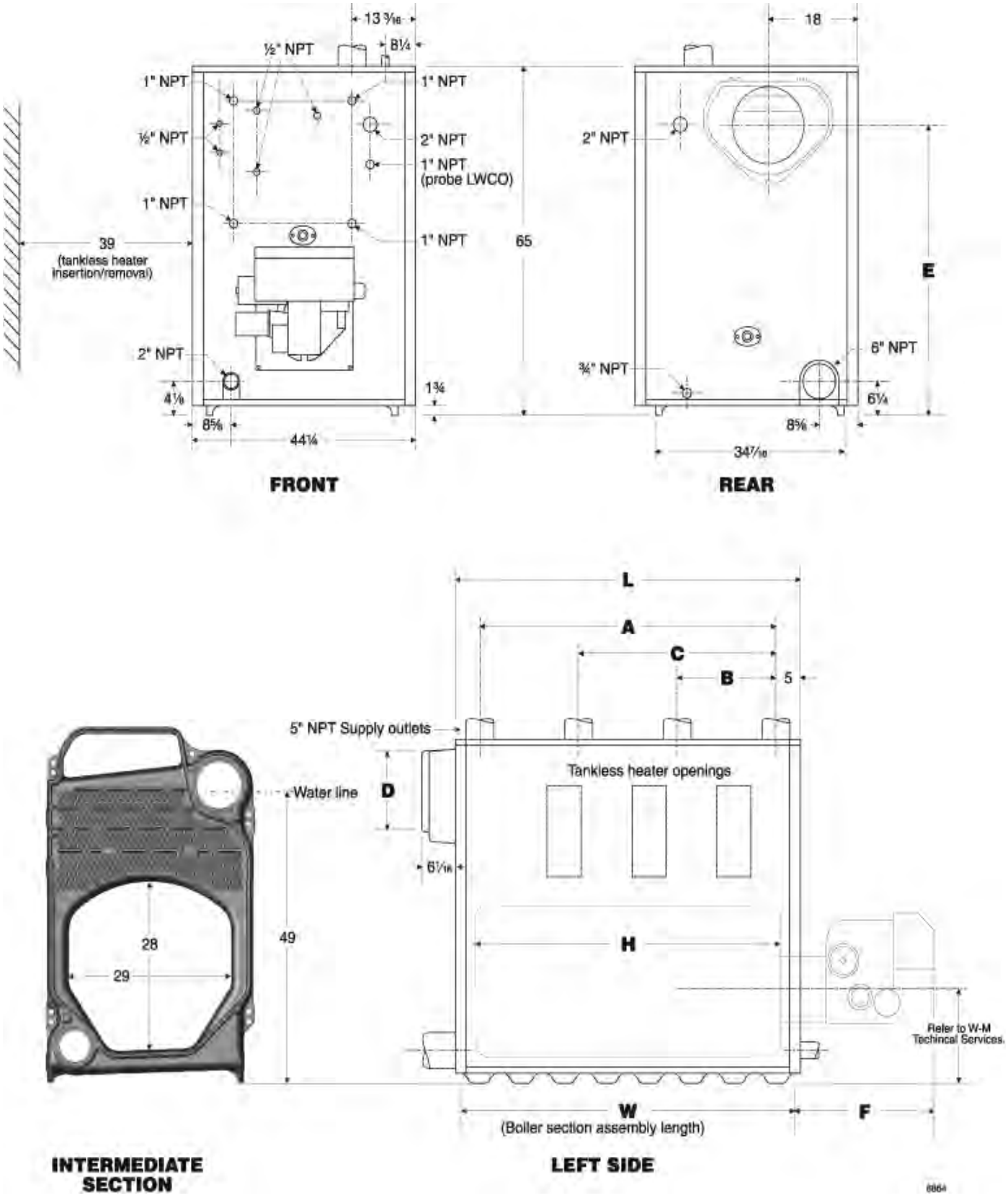
Dimensions

Dimensions (inches)								
Model	**A**	**B**	**C**	**D**	**E**	**L**	**W**	**H**
488	23	—	—	10	54 ¾	34 ¾	30	23 ⅜
588	31	—	—	10	54 ¾	42 ¾	38	31 ⅜
688	39	—	—	10	54 ¾	50 ¾	46	39 ⅜
788	47	—	—	12	53 ¾	58 ¾	54	47 ⅜
888	55	—	—	12	53 ¾	66 ¾	62	55 ⅜
988	63	—	—	14	52 ¾	74 ¾	70	63 ⅜
1088	71	—	—	14	52 ¾	82 ¾	78	71 ⅜
1188	79	—	—	14	52 ¾	90 ¾	86	79 ⅜
1288	87	39 ½	—	14	52 ¾	98 ¾	94	87 ⅜
1388	95	47 ½	—	14	52 ¾	106 ¾	102	95 ⅜
1488	103	55 ½	—	16	51 ¾	114 ¾	110	103 ⅜
1588	111	63 ½	—	16	51 ¾	122 ¾	118	111 ⅜
1688	119	47 ½	—	16	51 ¾	130 ¾	126	119 ⅜
1788	127	31 ½	79 ½	16⅛" x 19⅞" oval	51 ¾	138 ¾	134	127 ⅜
1888	135	39 ½	87 ½		51 ¾	146 ¾	142	135 ⅜

Model	**Supply & return tappings**				**Burner lengths (Dimension F)**				
	Supply tappings (No. & size)		**Return tappings (No. & size)**		**Carlin**	**Riello**	**Power-Flame**	**Beckett Oil**	**Beckett Gas**
	Steam	**Water**	**Steam**	**Water**					
488R	2 – 5"	2 – 5"	1 – 6"	1 – 6"	21	33	31	21	29
488	2 – 5"	2 – 5"	1 – 6"	1 – 6"	21	33	31	21	30
588	2 – 5"	2 – 5"	1 – 6"	1 – 6"	21	33	31	21	30
688	2 – 5"	2 – 5"	1 – 6"	1 – 6"	21	33	34	22	30
788	2 – 5"	2 – 5"	1 – 6"	1 – 6"	21	33	34	22	30
888	2 – 5"	2 – 5"	1 – 6"	1 – 6"	21	49	34	22	30
988R	2 – 5"	2 – 5"	1 – 6"	1 – 6"	21	49	34	22	30
988	2 – 5"	2 – 5"	1 – 6"	1 – 6"	26	49	34	22	30
1088R	2 – 5"	2 – 5"	1 – 6"	1 – 6"	26	49	34	22	30
1088	2 – 5"	2 – 5"	1 – 6"	1 – 6"	26	49	34	22	30
1188	2 – 5"	2 – 5"	1 – 6"	1 – 6"	26	49	39	23	30
1288	3 – 5"	2 – 5"	1 – 6"	1 – 6"	26	49	39	23	30
1388	3 – 5"	2 – 5"	1 – 6"	1 – 6"	26	49	39	23	30
1488	3 – 5"	2 – 5"	1 – 6"	1 – 6"	26	49	39	—	30
1588	3 – 5"	2 – 5"	1 – 6"	1 – 6"	—	49	39	—	—
1688R	3 – 5"	2 – 5"	1 – 6"	1 – 6"	—	49	39	—	—
1688	3 – 5"	2 – 5"	1 – 6"	1 – 6"	—	49	39	—	—
1788	4 – 5"	2 – 5"	1 – 6"	1 – 6"	—	49	44	—	—
1888	4 – 5"	2 – 5"	1 – 6"	1 – 6"	—	56	44	—	—

Dimensions *(continued)*

Figure 50 Dimensions (see lettered dimensions on opposite page)

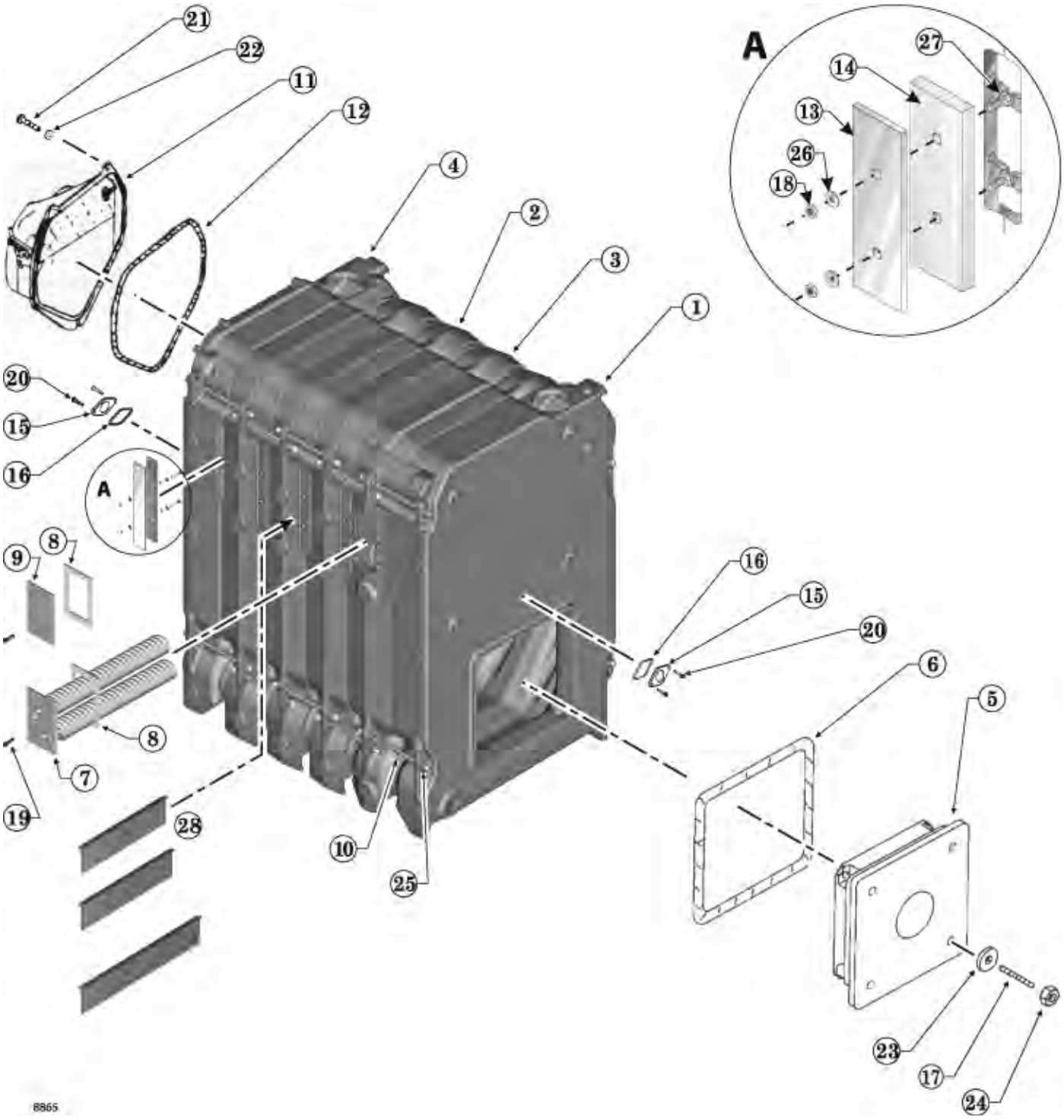


Parts

Item	Description	Part number
1	Front sections (8823)	316-301-210
2	Regular intermediate section (8825)	316-301-212
3	Tankless intermediate section (8826)	316-301-214
4	Back section (8828)	316-301-211
—	Supply intermediate section (8824) (not shown)	316-301-213
—	Section replacement kit (includes rope seals, rope adhesive and sealant for one joint)	386-300-213
5	Burner mounting plate	Order for specific burner
6	Sealing rope — ½" (7 feet per burner plate)	590-735-140
7	Tankless heater, when used, number 820	590-291-909
8	Heater gasket	590-317-579
9	Heater cover plate	450-030-934
10	Draw rod 5/8"-11UNC-2A x 13" (apply to front and rear sections)	560-134-505
11	Draft hood collar assembly (includes damper collar, damper, damper quadrant, locking plate, swivel, brackets and rope) a. 10-inch — 488 through 688 b. 12-inch — 788 and 888 c. 14-inch — 988 through 1388 d. 16-inch — 1488 through 1688 e. 18-inch — 1788 and 1888 f. Quadrant for flue collar g. Damper blade h. Damper locking plate	 340-004-606 340-004-607 340-004-608 340-004-609 340-004-612 330-056-634 460-003-646 563-530-784
12	Sealing rope ½" (6 feet for flue collar)	590-735-140
13	Cleanout plate	450-030-965
14	Woven fiberglass gasket for cleanout plate	590-317-305
15	Observation port assembly (includes frame, rope, gasket, plugs and sight glass) (2 per boiler) a. Assembly b. Sight glass only c. Washer gasket for sight glass (2⅛ x 1¼ x ⅛ inches)	 383-600-099 591-419-199 590-317-580
16	Sealing rope, ⅜" (1 foot per observation port)	590-317-150
17	Burner mounting plate studs (½ x 3½ inches)	Obtain locally
18	Cleanout plate nut, ¼"	Obtain locally
19	Cap screw, ½–13 x ¾"	Obtain locally
20	Observation port screw, 10–32 x 1½"	Obtain locally
21	Flue collar cap screw, ½" x 1½"	Obtain locally
22	Flue collar washer, 11⁄16"	Obtain locally
23	Burner mounting plate washer, ½"	Obtain locally
24	Burner mounting plate nut, ½"	Obtain locally
25	Draw rod nut, ⅝"	Obtain locally
26	Cleanout plate washer, ¼"	Obtain locally
27	Cleanout plate carriage bolt, ¼" x 1¾"	Obtain locally
28	HXT-bars (see Figure 12, page 12, for installation and placement details for HXT-bars) d. 3-flueway kit (includes 3 sets of bars) e. 2-flueway kit (includes 2 sets of bars)	 416-400-130 416-400-131
Not shown	Combustion chamber liner kit (optional) — includes ceramic fiber blanket for left side wall plus water glass adhesive — see page 33. Consult your local Weil-McLain sales office for details.	Contact local Weil-McLain sales office

Parts *(continued)*

Figure 51 Parts



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