

DISPLAY THIS CARD ON PRINCIPAL FRONTAGE OF WORK



CITY OF PORTLAND

BUILDING PERMIT

This is to certify that JANET WID WWII VET RICHARDSON located At 290 BAXTER BLVD

Job ID: 2012-08-4723-HVAC

CBL: 127- A-003-037

has permission to Install Hydrotherm KN4 (Condo Units)

provided that the person or persons, firm or corporation accepting this permit shall comply with all of the provisions of the Statutes of Maine and of the Ordinances of the City of Portland regulating the construction, maintenance and use of the buildings and structures, and of the application on file in the department.

Notification of inspection and written permission procured before this building or part thereof is lathed or otherwise closed-in. 48 HOUR NOTICE IS REQUIRED.

A final inspection must be completed by owner before this building or part thereof is occupied. If a certificate of occupancy is required, it must be

Fire Prevention Officer


Code Enforcement Officer / Plan Reviewer

9-26-12

**THIS CARD MUST BE POSTED ON THE STREET SIDE OF THE PROPERTY
PENALTY FOR REMOVING THIS CARD**

BUILDING PERMIT INSPECTION PROCEDURES

Please call 874-8703 or 874-8693 (ONLY)

or email: buildinginspections@portlandmaine.gov

With the issuance of this permit, the owner, builder or their designee is required to provide adequate notice to the city of Portland Inspections Services for the following inspections. Appointments must be requested 48 to 72 hours in advance of the required inspection. The inspection date will need to be confirmed by this office.

- **Please read the conditions of approval that is attached to this permit!! Contact this office if you have any questions.**
- **Permits expire in 6 months. If the project is not started or ceases for 6 months.**
- **If the inspection requirements are not followed as stated below additional fees may be incurred due to the issuance of a "Stop Work Order" and subsequent release to continue.**

Final Inspection

The project cannot move to the next phase prior to the required inspection and approval to continue, REGARDLESS OF THE NOTICE OF CIRCUMSTANCES.

IF THE PERMIT REQUIRES A CERTIFICATE OF OCCUPANCY, IT MUST BE PAID FOR AND ISSUED TO THE OWNER OR DESIGNEE BEFORE THE SPACE MAY BE OCCUPIED.



PORTLAND MAINE

Strengthening a Remarkable City, Building a Community for Life • www.portlandmaine.gov

Director of Planning and Urban Development
Jeff Levine

Job ID: 2012-08-4723-HVAC

Located At: 290 BAXTER
BLVD

CBL: 127- A-003-037

Conditions of Approval:

Building

1. Application approval based upon information provided by the applicant or design professional. Any deviation from approved plans requires separate review and approval prior to work.
2. The installation must comply with the State of Maine Gas Regulations.
3. The appliance and venting shall be installed in accordance with the UL listing, manufacturer's specifications, and NFPA 211
4. Separate permits are required for any electrical, plumbing, sprinkler, fire alarm, HVAC systems, heating appliances, including pellet/wood stoves, commercial hood exhaust systems and fuel tanks. Separate plans may need to be submitted for approval as a part of this process.

Fire

1. Installation shall comply with City Code Chapter 10.
2. Fuel-fired boilers shall be protected in accordance with NFPA 101, *Life Safety Code*.
3. NFPA 54, *National Fuel Gas Code*;
4. Installation shall comply with NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances*;
5. NFPA 70, *National Electrical Code*; and the manufacturer's published instructions

City of Portland, Maine - Building or Use Permit Application

389 Congress Street, 04101 Tel: (207) 874-8703, FAX: (207) 8716

| | | | |
|---|---|---|---|
| Job No: 2012-08-4723-HVAC | Date Applied: 8/16/2012 | CBL: 127- A-003-037 | |
| Location of Construction: 290 BAXTER BLVD | Owner Name: JANET WID WWII VET RICHARDSON | Owner Address: 290 BAXTER BLVD # A 1 PORTLAND, ME 04101 | Phone: |
| Business Name: | Contractor Name: Mechanical Services, Inc. | Contractor Address: 400 PRESUMPCOT ST PORTLAND MAINE 04103 | Phone: 774-1531 |
| Lessee/Buyer's Name: | Phone: | Permit Type: HVAC | Zone: R-6 |
| Past Use: Entire complex is 54 Residential Condos in 4 Buildings | Proposed Use: Same: 54 Residential Condos in 4 buildings – to install Hydrotherm KN4 | Cost of Work: \$25,000.00 | CEO District: |
| | | Fire Dept: <input checked="" type="checkbox"/> Approved <input type="checkbox"/> Denied <input type="checkbox"/> N/A | Inspection: Use Group: R-2 Type: HVAC MURBEZ '09 |
| Proposed Project Description: Hydrotherm kn4 heating unit in basement | | Signature: <i>Capt. P. Moore</i> | Signature: <i>JMB</i> 9/20/12 |
| Proposed Project Description: Hydrotherm kn4 heating unit in basement | Pedestrian Activities District (P.A.D.) | | |
| Permit Taken By: Gayle | Zoning Approval | | |

| | | | |
|---|---|--|--|
| <p>1. This permit application does not preclude the Applicant(s) from meeting applicable State and Federal Rules.</p> <p>2. Building Permits do not include plumbing, septic or electrical work.</p> <p>3. Building permits are void if work is not started within six (6) months of the date of issuance. False informatin may invalidate a building permit and stop all work.</p> | <p>Special Zone or Reviews</p> <p><input type="checkbox"/> Shoreland</p> <p><input type="checkbox"/> Wetlands</p> <p><input type="checkbox"/> Flood Zone</p> <p><input type="checkbox"/> Subdivision</p> <p><input type="checkbox"/> Site Plan</p> <p><input type="checkbox"/> Maj <input type="checkbox"/> Min <input checked="" type="checkbox"/> MM</p> <p>Date: <i>OK</i> <i>8/22/12</i></p> | <p>Zoning Appeal</p> <p><input type="checkbox"/> Variance</p> <p><input type="checkbox"/> Miscellaneous</p> <p><input type="checkbox"/> Conditional Use</p> <p><input type="checkbox"/> Interpretation</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Denied</p> <p>Date:</p> | <p>Historic Preservation</p> <p><input checked="" type="checkbox"/> Not in Dist or Landmark</p> <p><input type="checkbox"/> Does not Require Review</p> <p><input type="checkbox"/> Requires Review</p> <p><input type="checkbox"/> Approved</p> <p><input type="checkbox"/> Approved w/Conditions</p> <p><input type="checkbox"/> Denied</p> <p>Date: <i>S</i></p> |
| | CERTIFICATION | | |

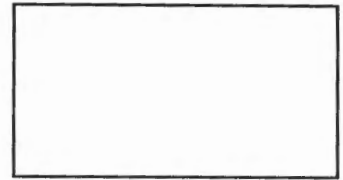
I hereby certify that I am the owner of record of the named property, or that the proposed work is authorized by the owner of record and that I have been authorized by the owner to make this application as his authorized agent and I agree to conform to all applicable laws of this jurisdiction. In addition, if a permit for work described in the application is issued, I certify that the code official's authorized representative shall have the authority to enter all areas covered by such permit at any reasonable hour to enforce the provision of the code(s) applicable to such permit.

| | | | |
|---|---------|------|-------|
| SIGNATURE OF APPLICANT | ADDRESS | DATE | PHONE |
| RESPONSIBLE PERSON IN CHARGE OF WORK, TITLE | | DATE | PHONE |



FILL IN AND SIGN WITH INK

APPLICATION FOR PERMIT HEATING OR POWER EQUIPMENT



2012 08 4723 127 A003 R-6

To the INSPECTOR OF BUILDINGS, PORTLAND, ME.

The undersigned hereby applies for a permit to install the following heating, cooking or power equipment in accordance with the Laws of Maine, the Building Code of the City of Portland, and the following specifications:

Location / CBL 219 BAXTER BOULEVARD Use of Building APARTMENT Date AUG 15 2012
 Name and address of owner of appliance PRINCETON PROPERTIES
115 WESTFORD ST LOWELL, MA 01851
 Installer's name and address MECHANICAL SERVICES, INC
400 PERSONSLOT ST PORTLAND, ME 04103 Telephone 207. 774. 1531

Location of appliance:
 Basement Floor
 Attic Roof

Type of Fuel:
 Gas Oil Solid

Appliance Name: HYDROTHERM KN4

U.L. Approved Yes No

Will appliance be installed in accordance with the manufacture's installation instructions? Yes No

IF NO Explain: _____

The Type of License of Installer:
 Master Plumber # _____
 Solid Fuel # _____
 Oil # _____
 Gas # PNT5515
 Other _____

Type of Chimney:
 Masonry Lined
 Factory built _____
 Metal
 Factory Built U.L. Listing # _____
 Direct Vent
 Type HEAT FAB UL# UL 1738
AL29-4C

Type of Fuel Tank
 Oil
 Gas

Size of Tank N/A

Number of Tanks N/A

Distance from Tank to Center of Flame N/A feet.

Cost of Work: \$ 24,340

Permit Fee: \$ 293

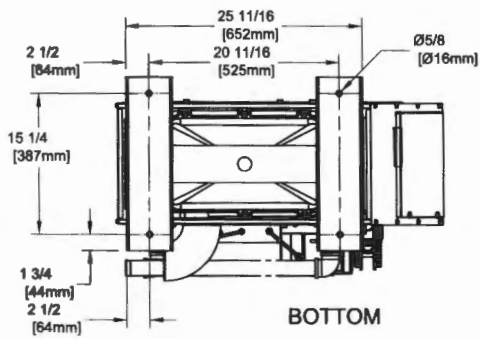
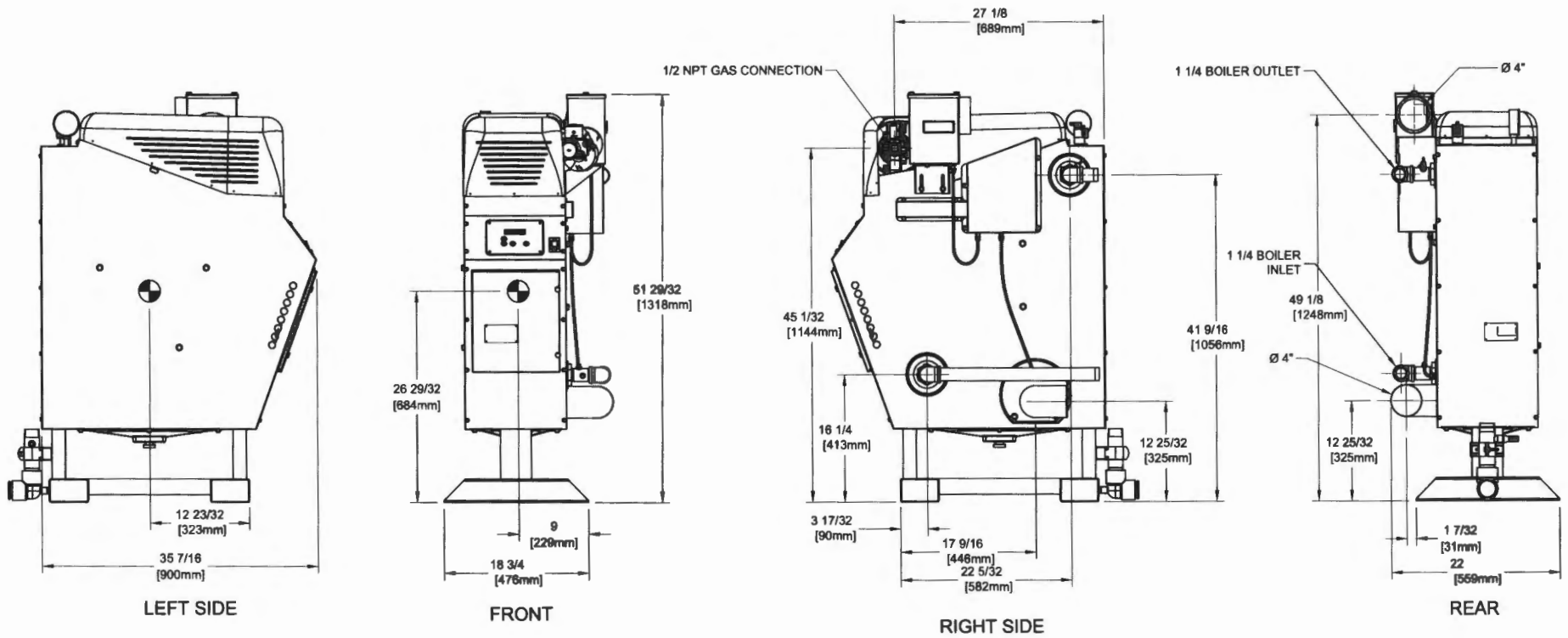
RECEIVED
 AUG 16 2012
 Dept. of Building Inspections
 City of Portland Maine

Approved **Approved with Conditions**
 See attached letter or requirement

Fire: _____
 Ele.: _____
 Bldg.: _____

Inspector's Signature _____ Date Approved _____

Signature of Installer CL Grand MECHANICAL SERVICES, INC



 CENTER OF GRAVITY

NOTE: Dimensions are approximate and should not be used to "rough in" equipment.

*Princeton Properties 4 Buildings
HVAC Load Analysis*

for

Princeton Properties
Back Bay Blvd
Portland, Maine

Elite Software

**CHVAC COMMERCIAL
HVAC LOADS**

Prepared By:
David Clay **PE**
Mechanical Services
400 Presumpscot St.
Portland, Maine 04103
207-774-1531
Monday, July 23, 2012



General Project Data Input

General Project Information

Project file name: C:\Elite\Chvacw32\Projects\Princeton Properties.CHV
 Project title: Princeton Properties 4 Buildings
 Designed by: David Clay
 Project date: 07/23/12
 Project comment: To create a template from an existing project, open the project and select 'File'
 Project location: PORTLAND, MAINE, USA
 Client name: Princeton Properties
 Client address: Back Bay Blvd
 Client city: Portland, Maine
 Company name: Mechanical Services
 Company representative: David Clay
 Company address: 400 Presumpscot St.
 Company city: Portland, Maine 04103
 Company phone: 207-774-1531
 Company fax: 207-774-3837
 Company e-mail address: dclay@mechanicalservices.com
 Company website: mechanicalservices.com

Barometric pressure: 29.875 in.Hg.
 Altitude: 43 feet
 Latitude: 44 Degrees
 Mean daily temperature range: 25 Degrees
 Starting & ending time for HVAC load calculations: 8am - 6pm
 Floor heat loss coefficient: 0.5 Btuh per foot of slab
 Number of unique zones in this project: 1

Building Default Values

Calculations performed: Heating loads only
 Lighting requirements: 1.50 Watts per square foot
 Equipment requirements: 1.00 Watts per square foot
 People sensible load multiplier: 230 Btuh per person
 People latent load multiplier: 190 Btuh per person
 Zone sensible safety factor: 10 %
 Zone latent safety factor: 10 %
 Zone heating safety factor: 10 %
 People diversity factor: 80 %
 Lighting profile number: 0
 Equipment profile number: 0
 People profile number: 0
 Building default ceiling height: 8.0 feet
 Building default wall height: 8.0 feet

Internal Operating Load Profiles (C = 100)

| | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | hr | |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 1 | C | C | C | C | C | C | C | C | C | C | 70 | 70 | 70 | C | C | C | C | C | C | C | C | C | C | C |
| 2 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 3 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 4 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 5 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 6 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 7 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 8 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 9 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |
| 10 | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C | C |



General Project Data Input (cont'd)

Building-Level Design Conditions

| Design Month | Outdoor Dry Bulb | Outdoor Wet Bulb | Indoor Rel.Hum | Indoor Dry Bulb | Grains Diff | In/Outdoor Correction |
|--------------|------------------|------------------|----------------|-----------------|-------------|-----------------------|
| August | 87 | 72 | 50% | 75 | 29.28 | -8 |
| July | 87 | 72 | 50% | 75 | 29.28 | -8 |
| Winter | -3 | | | 72 | | |

Master Roofs

| Roof No. | ASHRAE Roof# | Roof U-Fac | Dark Color | Susp. Ceil |
|----------|--------------|------------|------------|------------|
| 1 | 13 | 0.026 | Yes | No |

Master Walls

| Wall No. | ASHRAE Group | Wall U-Fac | Wall Color |
|----------|--------------|------------|------------|
| 1 | G | 0.091 | M |
| 2 | G | 0.200 | M |

Master Partitions

| Partition No. | Partition U-Factor | Cool T-D | Heat T-D |
|---------------|--------------------|----------|----------|
| 1 | 0.200 | 0 | 10 |
| 2 | 0.200 | 10 | 10 |

Master Glass

| Glass No. | Summer U-Factor | Winter U-Factor | Glass Shd.Coef. | Interior Shading | Interior Shd.Coef | Room Const | Glass Width | Glass Height |
|-----------|-----------------|-----------------|-----------------|------------------|-------------------|------------|-------------|--------------|
| 1 | 0.560 | 0.490 | 0.800 | 4 | 0.000 | L | 1.000 | 1.000 |

Air Handler Input

Air Handler Number 1 Input Data

Name: Building 1-4 Boiler
 Terminal type: Constant Volume
 Method for CV: Sum of Peaks
 Supply fan type: Package fan
 Calculations performed: Heating loads only
 Excess supply air: Reserve
 Occurrences: 1
 People profile number: 0
 Lighting profile number: 0
 Equipment profile number: 0
 Exhaust may not exceed supply air: No
 Leaving heating coil temp (deg.F): 95.0
 Leaving cooling coil temp (deg.F): 55.0
 Cooling coil CFM: 0
 Misc. Btuh gain - supply side: 0
 Misc. Btuh gain - return side: 0
 Combined fan & motor efficiency: 65
 Static pressure across fan (in.wg.): 2.20
 Summer supply duct temp rise (deg.F): 0.000
 Summer return duct temp rise (deg.F): 0.000
 Winter supply duct temp drop (deg.F): 0.000
 Winter return duct temp drop (deg.F): 0.000
 Chilled water temp difference (deg.F): 10.000
 Hot water temp difference (deg.F): 20.000
 Cooling ventilation: 0 AC/Hr
 Cooling infiltration: 0.5 AC/Hr
 Heating ventilation: 0 AC/Hr
 Heating infiltration: 0.5 AC/Hr
 Pretreated outside air: none
 Pretreated air Summer DB (deg.F): 0
 Pretreated air Summer WB (deg.F): 0
 Pretreated air Winter DB (deg.F): 0

| Design Month | Outdoor Dry Bulb | Outdoor Wet Bulb | Indoor Rel.Hum | Indoor Dry Bulb | Grains Diff | In/Outdoor Correction |
|--------------|------------------|------------------|----------------|-----------------|-------------|-----------------------|
| August | 87 | 72 | 50% | 75 | 29.28 | -8 |
| July | 87 | 72 | 50% | 75 | 29.28 | -8 |
| Winter | -3 | | | 72 | | |



Zone Input

Zone 1: Buildings 1-4 (5476 sq.ft) (Group 1)

| | | | |
|----------------------------------|-------|------------------------------------|-------|
| Air Handler number: | 1 | Zone occurrences: | 1 |
| Zone length: (feet) | 74.00 | Zone width (feet): | 74.00 |
| Lighting Watts: | 8,214 | Equipment Watts: | 5,476 |
| Number of people in zone: | 55 | People profile number: | 0 |
| Lighting profile number: | 0 | Equipment profile number: | 0 |
| Ceiling height (feet): | 18 | Heating safety factor (%): | 10 |
| Sensible safety factor (%): | 10 | Latent safety factor (%): | 10 |
| Sensible heat per person (Btuh): | 230 | Latent heat per person (Btuh): | 190 |
| Cooling ventilation method: | AC/Hr | Cooling ventilation value: | 0.000 |
| Cooling infiltration method: | AC/Hr | Cooling infiltration value: | 0.500 |
| Heating ventilation method: | AC/Hr | Heating ventilation value: | 0.000 |
| Heating infiltration method: | AC/Hr | Heating infiltration value: | 0.500 |
| Winter exhaust air CFM: | 0 | Summer exhaust air CFM: | 0 |
| Minimum supply CFM: | 0 | Latent Btuh equipment load: | 0 |
| Ceil. exposed to plenum (sq.ft): | 5,476 | Exposed floor slab perimeter (ft): | 0 |

Heating loads only are calculated for this zone.

| Roof | Type | ASHRAE# | U-Factor | Dark | Length | Width | Area | Susp.Ceil |
|------|------|---------|----------|------|--------|-------|---------|-----------|
| 1 | 1 | 13 | 0.026 | Yes | 74.00 | 74.00 | 5,476.0 | No |

| Part | Type | U-Factor | Cool TD | Heat TD | Height | Width | Area |
|------|------|----------|---------|---------|--------|-------|---------|
| 2 | 1 | 0.2 | 0.000 | 10.000 | 74.00 | 74.00 | 5,476.0 |

| Wall | Type | ASHRAE# | U-Factor | Color | Height | Width | Area | Direction |
|------|------|---------|----------|-------|--------|--------|---------|-----------|
| 1 | 1 | G | 0.091 | M | 18.00 | 432.00 | 7,776.0 | N |
| 3 | 2 | G | 0.200 | M | 7.00 | 24.00 | 168.0 | N |

| Glass | Type | S.U-F. | Shd C. | Height | Width | Quan | Area | Shade | Tilt | Ref |
|-------|------|--------|--------|--------|-------|---------------|---------|-------|------|-----|
| 1 | 1 | 0.560 | 0.800 | 1.00 | 1.00 | 1,340.00 0 | 1,340.0 | 0 | 0 | 1 |



Building Envelope Report

Envelope Report Using Summer U-Factors

| Material Types | | Gross Area | Glass Area | Net Area | -U- Factor | Area x U-Factor | Average U-Factor |
|----------------|---|------------|------------|----------|------------|-----------------|------------------|
| Roof | 1 | 5,476.0 | 0.0 | 5,476.0 | 0.026 | 142.376 | 0.026 |
| Tot.Roof | | 5,476.0 | 0.0 | 5,476.0 | N/A | 142.376 | 0.026 |
| Wall | 1 | 7,776.0 | 1,340.0 | 6,436.0 | 0.091 | 585.676 | 0.091 |
| Wall | 2 | 168.0 | 0.0 | 168.0 | 0.200 | 33.600 | 0.200 |
| Tot.Wall | | 7,944.0 | 1,340.0 | 6,604.0 | N/A | 619.276 | 0.094 |
| Glass | 1 | 1,340.0 | N/A | 1,340.0 | 0.560 | 750.400 | 0.560 |
| Tot.Glass | | 1,340.0 | N/A | 1,340.0 | N/A | 750.400 | 0.560 |
| Totals | | | | 13,420.0 | | 1,512.052 | 0.113 |

| Wall Direction | Wall Area | Glass Area | Wall Net Area | Wall Avg U-Factor | Glass Avg U-Factor | Glass Avg Shd.Coef |
|----------------|-----------|------------|---------------|-------------------|--------------------|--------------------|
| N | 7,944.0 | 1,340.0 | 6,604.0 | 0.094 | 0.560 | 0.800 |
| NE | 0.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 |
| E | 0.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 |
| SE | 0.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 |
| S | 0.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 |
| SW | 0.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 |
| W | 0.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 |
| NW | 0.0 | 0.0 | 0.0 | 0.000 | 0.000 | 0.000 |
| Totals | 7,944.0 | 1,340.0 | 6,604.0 | 0.094 | 0.560 | 0.800 |



Building Summary Loads

Building peaks in July at 6pm.

| Bldg Load Descriptions | Area Quan | Sen Loss | %Tot Loss | Lat Gain | Sen Gain | Net Gain | %Net Gain |
|------------------------|-----------|----------------|---------------|----------|----------|----------|-------------|
| Roof | 5,476 | 11,746 | 5.81 | 0 | 0 | 0 | 0.00 |
| Wall | 6,604 | 51,090 | 25.28 | 0 | 0 | 0 | 0.00 |
| Glass | 1,340 | 54,170 | 26.80 | 0 | 0 | 0 | 0.00 |
| Floor Slab | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Skin Loads | | 117,006 | 57.89 | 0 | 0 | 0 | 0.00 |
| Lighting | 8,214 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Equipment | 5,476 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| People | 44 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Partition | 5,476 | 12,047 | 5.96 | 0 | 0 | 0 | 0.00 |
| Cool. Pret. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Heat. Pret. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Cool. Vent. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Heat. Vent. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Cool. Infil. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Heat. Infil. | 821 | 73,073 | 36.15 | 0 | 0 | 0 | 0.00 |
| Draw-Thru Fan | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Blow-Thru Fan | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Reserve Cap. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Reheat Cap. | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Supply Duct | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Return Duct | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Misc. Supply | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Misc. Return | 0 | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Building Totals | | 202,126 | 100.00 | 0 | 0 | 0 | 0.00 |

| Building Summary | Sen Loss | %Tot Loss | Lat Gain | Sen Gain | Net Gain | %Net Gain |
|------------------------|----------------|---------------|----------|----------|----------|-------------|
| Ventilation | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Infiltration | 73,073 | 36.15 | 0 | 0 | 0 | 0.00 |
| Pretreated Air | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Zone Loads | 129,053 | 63.85 | 0 | 0 | 0 | 0.00 |
| Plenum Loads | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Fan & Duct Loads | 0 | 0.00 | 0 | 0 | 0 | 0.00 |
| Building Totals | 202,126 | 100.00 | 0 | 0 | 0 | 0.00 |

| | | |
|--|---------|------------|
| Total Building Supply Air (based on a 23° TD): | 8,150 | CFM |
| Total Building Vent. Air (0.00% of Supply): | 0 | CFM |
| Total Conditioned Air Space: | 5,476 | Sq.ft |
| Supply Air Per Unit Area: | 1.4883 | CFM/Sq.ft |
| Area Per Cooling Capacity: | 0.0000 | Sq.ft/Ton |
| Cooling Capacity Per Area: | 0.0000 | Tons/Sq.ft |
| Total Heating Required With Outside Air: | 202,126 | Btuh |
| Total Cooling Required With Outside Air: | 0.00 | Tons |

Air Handler #1 - Building 1-4 Boiler - Summary Loads

| Zn No | Description Peak Time | Area People Volume | Htg.Loss Htg.CFM CFM/Sqft | Sen.Gain Clg.CFM CFM/Sqft | Lat.Gain S.Exh W.Exh | Htg.O.A. Req.CFM Act.CFM | Clg.O.A. Req.CFM Act.CFM |
|-------|--------------------------|--------------------------|---------------------------------|---------------------------------|----------------------------|--------------------------------|--------------------------------|
|-------|--------------------------|--------------------------|---------------------------------|---------------------------------|----------------------------|--------------------------------|--------------------------------|

| | | | | | | | |
|---|---------------------------|-----------------------|--------------------------|----------------|-------------|----------------|----------------|
| 1 | Buildings 1-4 6pm July | 5,476 55 98,568 | 202,126 8,150 1.49 | 0 0 0.00 | 0 0 0 | None 0 0 | None 0 0 |
|---|---------------------------|-----------------------|--------------------------|----------------|-------------|----------------|----------------|

Runout duct size: 0in. dia, Diffusers: 1, CFM/runout: 0, Velocity: 0.0 ft/min, Pressure drop: 0.000 in.wg./100ft

| | | | | | | | |
|-------------------|--|--------|---------|------|---|---|---|
| Zone Peak Totals: | | 5,476 | 202,126 | 0 | 0 | | |
| Total Zones: 1 | | 55 | 8,150 | 0 | 0 | 0 | 0 |
| Unique Zones: 1 | | 98,568 | 1.49 | 0.00 | 0 | 0 | 0 |

Main trunk duct size: 39in. h x 38in. w, Velocity: 847.1 ft/min, Pressure drop: 0.025 in.wg./100ft

Air Handler #1 - Building 1-4 Boiler - Total Load Summary

Air Handler Description: Building 1-4 Boiler Constant Volume - Sum of Peaks
 Sensible Heat Ratio: 0.00 --- This system occurs 1 time(s) in the building. ---

Air System Peak Time: 6pm in July.
 Outdoor Conditions: 82° DB, 71° WB, 95.52 grains

Because of the diversity in zone, plenum and ventilation loads, the zone sensible peak time in (None) at 6pm is different from the total system peak time, hence the air system CFM was computed using a zone sensible load of 0.

Summer: Exhaust controls outside air, ----- Winter: Exhaust controls outside air.

| | | |
|------------------------------|--------------|--------------|
| Zone Space sensible loss: | 129,053 Btuh | |
| Infiltration sensible loss: | 73,073 Btuh | 821 CFM |
| Outside Air sensible loss: | 0 Btuh | 0 CFM |
| Supply Duct sensible loss: | 0 Btuh | |
| Return Duct sensible loss: | 0 Btuh | |
| Return Plenum sensible loss: | 0 Btuh | |
| Total System sensible loss: | | 202,126 Btuh |

| | |
|--|-----------|
| Heating Supply Air: $202,126 / (.998 \times 1.08 \times 23) =$ | 8,150 CFM |
| Winter Vent Outside Air (0.0% of supply) = | 0 CFM |

| | | |
|---|--------|--------|
| Zone space sensible gain: | 0 Btuh | |
| Infiltration sensible gain: | 0 Btuh | |
| Draw-thru fan sensible gain: | 0 Btuh | |
| Supply duct sensible gain: | 0 Btuh | |
| Reserve sensible gain: | 0 Btuh | |
| Total sensible gain on supply side of coil: | | 0 Btuh |

| | |
|--|-------|
| Cooling Supply Air: $0 / (.998 \times 1.1 \times 0) =$ | 0 CFM |
| Summer Vent Outside Air (0.0% of supply) = | 0 CFM |

| | | |
|---|--------|--------|
| Return duct sensible gain: | 0 Btuh | |
| Return plenum sensible gain: | 0 Btuh | |
| Outside air sensible gain: | 0 Btuh | 0 CFM |
| Blow-thru fan sensible gain: | 0 Btuh | |
| Total sensible gain on return side of coil: | | 0 Btuh |
| Total sensible gain on air handling system: | | 0 Btuh |

| | | |
|---|--------|--------|
| Zone space latent gain: | 0 Btuh | |
| Infiltration latent gain: | 0 Btuh | |
| Outside air latent gain: | 0 Btuh | |
| Total latent gain on air handling system: | | 0 Btuh |
| Total system sensible and latent gain: | | 0 Btuh |

Circle 10

| | |
|---|-----------|
| Total Air Handler Supply Air (based on a 23° TD): | 8,150 CFM |
| Total Air Handler Vent. Air (0.00% of Supply): | 0 CFM |

| | |
|------------------------------|-------------------|
| Total Conditioned Air Space: | 5,476 Sq.ft |
| Supply Air Per Unit Area: | 1.4883 CFM/Sq.ft |
| Area Per Cooling Capacity: | 0.0000 Sq.ft/Ton |
| Cooling Capacity Per Area: | 0.0000 Tons/Sq.ft |

| | |
|--|--------------|
| Total Heating Required With Outside Air: | 202,126 Btuh |
| Total Cooling Required With Outside Air: | 0.00 Tons |

Zone Detailed Loads (At Zone Peak Times)

| Load Description | Unit Quan | -SC- CFAC | CLTD SHGF | U.Fac -CLF- | Sen. Gain | Lat. Gain | Htg. Mult. | Htg. Loss |
|--|-----------|-----------|-----------|-------------|-----------|-----------|------------|-----------|
| Zone 1-Buildings 1-4 peaks (sensible) in July at 6pm, Air Handler 1 (Building 1-4 Boiler), Group 1, 74.0 x 74.0 | | | | | | | | |
| Roof-1-13-No.Clg-D | 5,476 | 1.00 | 29.0 | 0.026 | 0 | | 1.950 | 10,678 |
| Wall-1-N-G-M | 6,436 | 0.83 | 14.1 | 0.091 | 0 | | 6.825 | 43,926 |
| Wall-3-N-G-M | 168 | 0.83 | 14.1 | 0.200 | 0 | | 15.000 | 2,520 |
| Partition-2-1 | 5476 | | 0/10 | 0.200 | 0 | | 2.000 | 10,952 |
| Gls-N-1-0-Tran | 1,340.0 | 1.000 | 5 | 0.560 | 0 | | 36.750 | 49,245 |
| 0%S-0-L-UNS-Solar | 1,340.0 | 0.800 | 37 | 0.550 | 0 | | | |
| Cool. Infil.AC/hr | 0 | | | | 0 | 0 | | |
| Heat. Infil.AC/hr | 821 | | | | | | 80.874 | 66,430 |
| Sub-total | | | | | 0 | 0 | | 183,751 |
| Safety factors: | | | | | +10% | +10% | | +10% |
| Total w/ safety factors: | | | | | 0 | 0 | | 202,126 |



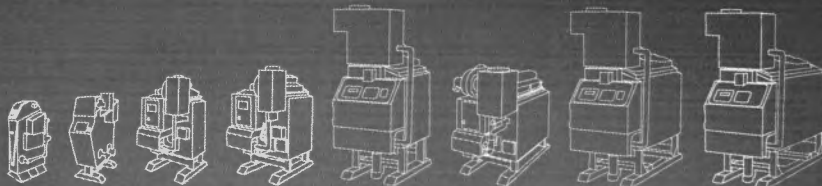
GET MORE

KN-SERIES GAS-FIRED CONDENSING CAST-IRON BOILERS WITH HEATNET INTEGRATED BOILER MANAGEMENT SYSTEM DELIVER ENVIRONMENTALLY FRIENDLY SOLUTIONS FOR ANY SIZE COMMERCIAL CHALLENGE, WITH INDUSTRY-PROVEN DURABILITY, RELIABILITY AND PERFORMANCE.



AND LEAVE LESS

HydroTherm®
KN SERIES



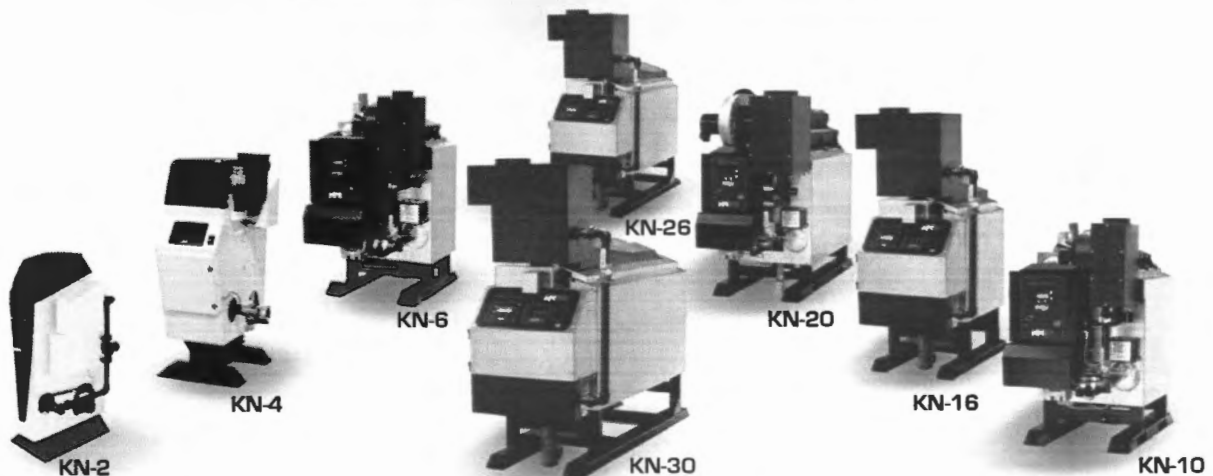
MADE IN THE USA

Installing KN-fidence

with Our Complete Line of Gas-Fired High-Efficiency Condensing Cast-Iron Boilers

In today's commercial hydronics market, size does matter—the volume of the public space in a building; the boiler's mechanical room footprint; and the level of emissions a unit releases all have to be considered. So how do architects, engineers, contractors, and building owners get the big-time performance needed to tackle any size commercial application while reducing their impact on the environment?

The KN-Series is purposefully engineered to be big and little where it matters most. Our boilers are specially designed to generate 200,000 - 3,000,000 BTUs and adapt to changes in the operating environment—with minimal moving parts and a small footprint—while retaining high efficiency. The HeatNet Integrated Boiler Control Platform constantly monitors performance, allowing our boilers to operate at up to 99% efficiency with high system turndown. Coupled with low NO_x and CO₂ emissions, as well as significant reduction in energy consumption, the KN-Series' complete line of condensing, cast-iron boilers is an environmentally friendly, cost-effective option for every application.





Greener Way to Go

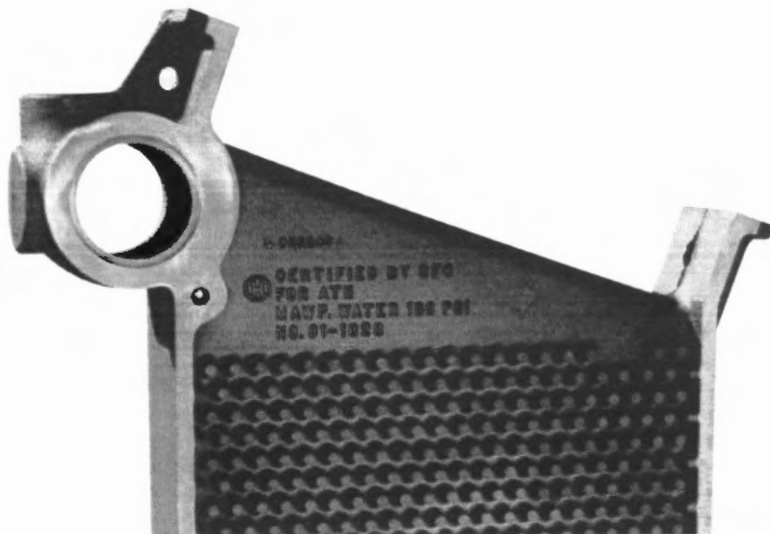
Fabrication to application, KN-Series boilers are an environmentally friendly option for your light commercial and commercial installations. Our specially designed cast-iron heat exchangers are manufactured utilizing over 90% post-consumer recycled materials and are completely recyclable themselves! Once installed, boilers operate at up to 99% efficiency, while producing low NOx and CO₂.

- **Completely assembled boilers in total use over 80% post-consumer recycled materials**
- **Plastic components made from 40% post-consumer recycled materials**
- **LEED Certified**
- **92.7% AHRI Certified thermal efficiency on all models with up to 99% maximum at full turndown**

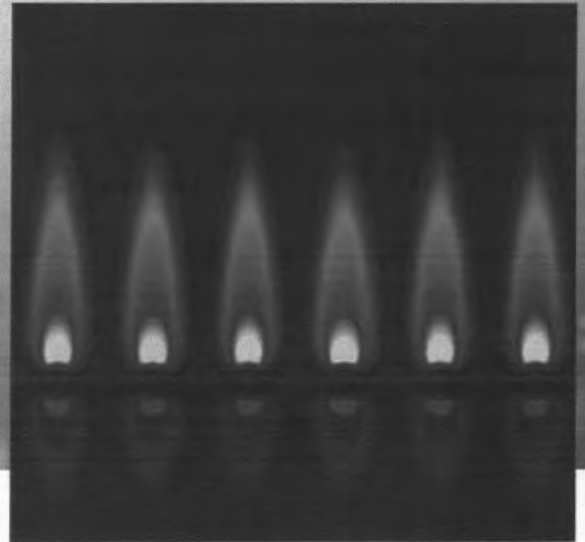
Cast-Iron Revival

Cast-iron brings more to the table than you'd expect. The key to the KN-Series revolutionary design is our high-mass, durable, cast-iron heat exchanger, which holds heat energy longer than traditional materials used in condensing boilers. Its superior longevity and reliability helps increase its cost effectiveness, in terms of installation, maintenance and energy consumption.

- **5 times the wall thickness of stainless steel and aluminum**
- **Accepts 10:1 range of water flows (Variable Volume Systems)**
- **100 PSI maximum working pressure**



Tru-Flow™ Fuel/Air Coupling



Responsive to changing conditions and able to adapt to the unexpected, Tru-Flow™ Fuel/Air Coupling helps keep KN-Series boilers running cleanly and efficiently. This unique control system constantly measures the combustion air and fine-tunes the amount of fuel being released to match, ensuring the proper mixture at all firing rates.

Working in conjunction with the integrated HeatNet boiler management system, Tru-Flow helps match load conditions to boiler output, providing efficiencies of up to 99% with full burner modulation. Tru-Flow constantly regulates the flow of both fuel and air to achieve an optimal one-to-one fuel mixture, and automatically adjusts itself if one of the flows is compromised, ensuring continuous safe and reliable operation.

Made in the USA



From raw materials to the state-of-the-art digital control system, the complete KN-Series product offering is proudly manufactured at our facility in Boyertown, Pennsylvania. Utilizing decades of foundry and manufacturing expertise, KN-Series boilers are cast, machined, wired, and assembled to the tightest tolerances possible, resulting in a finished product that's all American in terms of innovation, reliability, and craftsmanship.



Integrated Boiler Management System

Intelligence Built In

HeatNet, Hydrotherm's proprietary integrated boiler management system, is the driving force behind Hydrotherm's energy optimization philosophy for its high-efficiency equipment. HeatNet is designed for precise system control and is standard on all KN-Series boilers.

Through continuous monitoring of several system characteristics, including boiler temperatures, limit circuit inputs, and overall system demands, HeatNet modulates boiler firing rates to maximize turndown ratios to maintain peak efficiency regardless of the load.

Versatile

In addition to maintaining peak efficiency in our stand-alone boilers, HeatNet can operate as part of a multi-boiler Master/Member network of up to 16 boilers, where typical Master/Member systems using 2, 3, 4 or 5 boiler configurations can see total turndown ratio of 10, 15, 20, or even 25:1 or more depending on the number of units in the application.

HeatNet can also function as a boiler management system, incorporating a mix of both condensing and non-condensing boilers, or in base-load applications with existing boilers, eliminating the need for costly additional third-party, wall-mounted control platforms.

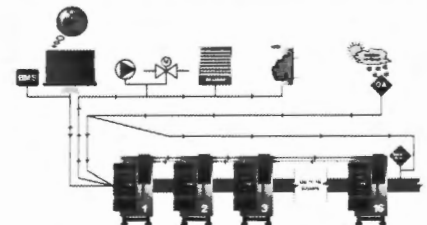
HeatNet "learns" the optimal firing rates of a given application, thereby determining the system's load for maximum energy efficiency. The variable control settings for Mod/Max firing rates allow technicians to adjust the maximum firing rates, enabling all boilers to run at extremely efficient levels until all units in the sequence have fired. HeatNet keeps the firing rate as low as possible, taking advantage of increased efficiencies at lower inputs. Boiler firing rotations can be programmed for First On/First Off, First On/Last Off or "True Rotation." HeatNet also modulates the local boiler pump for Primary/Secondary systems, ensuring optimum boiler Delta T.

Straightforward

HeatNet's intuitive interface, with plug-and-play connections, speeds the installation, set-up, and diagnostic process for technicians. HeatNet's electronics are conveniently located in a self-contained control enclosure, with all internal components and terminal blocks easily accessible. The standard HeatNet control uses a Modbus protocol with optional processor boards for BACnet- and Lon Works-based building management systems. Its proprietary design allows for seamless flash drive or laptop-driven updateable firmware, adding continuous value and boiler system control without physical control platform updates that can make some equipment obsolete.



HeatNet 'On Board' Control, working in conjunction with the BMS, provides multi-function control of KN-Series boilers, circulator pumps, motorized or on/off isolation valves, combustion air louvers/dampers, domestic hot water storage tanks and outdoor air reset.



Made With Savings in Mind

The KN-Series is engineered to make installation and maintenance simple, straightforward, and fast—saving you both time and money. KN boilers come factory packaged, ready to perform at their peak right out of the box.

- **Compact footprint accommodates standard doorways; smaller mechanical rooms**
- **Down-fire design for easy access to all components**
- **HeatNet's simple menu and plain text display speed diagnostics and set-up**
- **CO₂ levels adjust with turn of a metric allen key (low fire) and slide damper (high fire)**
- **Self-contained 8,000 BTU pilot with interrupted spark ignition and air-cooled UV sensors; requires no field adjustment**
- **21-year thermal shock warranty**

Versatility by Design

Modern applications call for flexibility. The KN-Series was designed to accommodate real-world challenges, providing versatility in configurations, piping, and ventilation.

- **Operate as a single unit or part of larger Master/Member network (up to 16)**
- **Flexible modulation of 10, 15, 20 or even 25:1 based on 2, 3, 4 or 5 boiler unit networks; up to 16 units**
- **Ideal for front-end loading configurations**
- **Variable volume water flow, up to 10:1 range, minimizing piping**
- **No inlet water temperature limitations**
- **Low pressure drops through heat exchanger capable of Delta Ts of 20 – 100° with single-pump system piping (reverse return) or primary/secondary piping**
- **Accommodates numerous venting configurations, including Category II and IV**
- **Combustion air obtained from fresh air intake or mechanical room**

Seattle University

Case study compliments of:
Columbia Hydronics Company – Vancouver, WA

At Seattle University, sustainability is serious business. You won't find plastic water bottles on their campus – they are banned. You will find over 200 compost bins that turn 52,000 pounds of pre-consumer food waste into



compost annually. 100% of campus natural gas use is offset through a manure-to-power project which captures methane gas from a Washington dairy farm and burns it in an on-site generator to produce electricity.

The University is dedicated to the design, construction, and operation of green resource-efficient buildings that meet LEED Gold standards. All buildings are carbon neutral. They have completely shed their carbon footprint.

One boiler plant consists of (7) KN-20 boilers that have reduced their carbon output by a substantial



18 percent and have saved an estimated \$138,000 per year in energy expenses.

With this new KN boiler

heating loop, the university has cut their carbon footprint by two million pounds annually. An equivalent alternative would be to cover their soccer field with solar panels 8.6 times to get the same reductions in carbon at a cost of \$11 million – about eight times the new heating loop's cost.

Hydrotherm is proud to contribute to Seattle University's effort to be a leader in our nations sustainability cause.

KN2
SERIES

200,000 BTUs



The Energy Star-rated KN-2 boiler is ideally suited for residential and light commercial needs, including new construction and retrofits. With a maximum of 200,000 BTUs and modulation down to 40,000 BTUs minimum, the KN-2 can be used for a variety of applications—such as hydronic space heat, radiant heat and snow melt—with the same levels of efficiency and durability as the larger units.



Case Study



St. Peter's Church Case study compliments of: TLA, Inc - Richmond VA

It seems only fitting that one of America's oldest and most historically significant churches choose a boiler with such commitment to American manufacturing. Built in 1701, St. Peter's Church of New Kent County, Virginia is designated the "First Church of the First First-Lady." It is the church in which Martha Custis was baptized, confirmed and married to Colonel George Washington. Looking to replace 50-year-old boilers, the still active and thriving parish, was immediately impressed by the high efficiency and longevity offered by the cast-iron KN-Series boilers. Two KN-2 boilers provide ample heat for the church, offices and parish hall while allowing better system turndown for the low load conditions typical with the fluctuating use of the buildings throughout the week.

KN-2 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|-----|-----|
| Gas pressure, inches W.C. | 6 | | |
| Voltage, 120 V | | | |
| Flow, GPM | | 3.7 | 36 |
| Temperature rise, °F | | 20 | 100 |
| Flue length, equiv. ft | | 0 | 100 |
| Air inlet length, equiv. ft | | 0 | 100 |
| Water volume, gals | 2.8 | | |
| Flue diameter, in | 3 | | |
| Current, amps | 2.5 | | |
| Cv, GPM @ 1psid | 20 | | |
| Boiler HP | 5.5 | | |
| Input MBH | 199 | | |
| Output MBH | 185 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data max | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 1 1/4" | | |
| Height | 51 1/8" | | |
| Length | 17 3/16" | | |
| Width | 28 3/8" | | |
| LBS | 540 lbs | | |

The KN-4's Delta T capabilities and fully modulating 400,000 BTUs make this unit ideal for addressing the challenges of the growing radiant heat and snow melt markets. KN-4's small vent size allows you to utilize existing vent work as a chase for the new equipment in retrofit applications. And its small footprint makes incorporating its power into the design of new constructions simple.



KN-4 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|-----|-----|
| Gas pressure, inches W.C. | 6 | | |
| Voltage, 120 V | | | |
| Flow, GPM | | 7.4 | 72 |
| Temperature rise, °F | | 20 | 100 |
| Flue length, equiv. ft | | 0 | 100 |
| Air inlet length, equiv. ft | | 0 | 100 |
| Water volume, gals | 5.6 | | |
| Flue diameter, in | 4 | | |
| Current, amps | 5 | | |
| Cv, GPM @ 1psid | 40 | | |
| Boiler HP | 11 | | |
| Input MBH | 399 | | |
| Output MBH | 369 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data max | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 1 1/4" | | |
| Height | 51 29/32" | | |
| Length | 22" | | |
| Width | 35 7/16" | | |
| LBS | 780 lbs | | |

Case Study



Gordon H Mansfield Veterans Community
Case study compliments of:
Sweeney Rogers Geraghty Corporation – Raynham, MA

KN-Series boilers are an integral part of a plan to help veterans go from homeless to homeowner. In a first-of-its-kind project by Soldier On, a nonprofit organization working with veterans, money usually paid as debt service on the housing loan for the debt-free limited equity cooperative is instead deposited into an owner account. Each veteran then receives his share of any money left over after the cooperative center pays for all bills. The village, which is LEED-certifiable, utilizes 5 Hydrotherm KN-4 boilers for their heat and domestic hot water. The KN-Series boilers are so efficient that the veterans are able to receive back about 40% of their monthly payment. The veterans can then choose to invest or place that money into a savings account to help them get their lives back on track.

KN6
SERIES

600,000 BTUS



In addition to 600,000 BTUs in a compact footprint, the KN-6's fully modulating cast-iron design and condensing efficiency make it ideally suited to handle the modern demands of today's commercial building applications, including corporate office facilities. With its low fuel consumption and intelligent onboard controls, the KN-6 is an environmentally friendly choice for your next project.



Case Study



Missouri Air National Guard, 139th Air Lift Wing – St. Joseph, MO Case study compliments of: Comfort Sales Agency - Edwardsville, MO

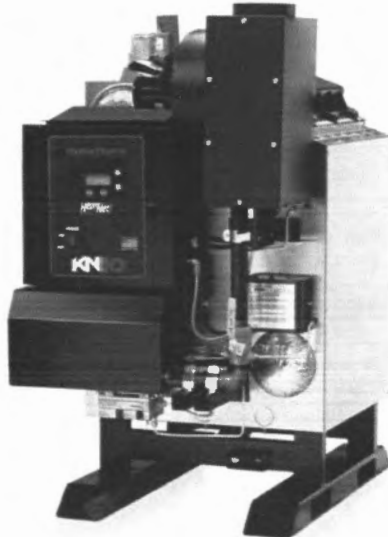
The Missouri Air National Guard has a long-standing history with the quality and reliability of Hydrotherm boilers. Hydrotherm was first chosen to replace the boilers after the flood of 1992 which required all the equipment on base to be replaced. After nearly two decades of solid performance the Missouri Air National Guard chose to update their equipment once again with Hydrotherm. This time, three KN-6 boilers were selected for space heat of Building 25 which houses the dining hall, medical and security forces. The boilers communicate via Hydrotherm's integrated HeatNet control platform through a BacNet Building Management System which monitors and controls the entire base including over twenty other KN-Series boilers. The Missouri Air National Guard has relied on Hydrotherm boilers for two decades, thanks to the product support, quality and reliability of the product.

KN-6 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|-----|-----|
| Gas pressure, inches W.C. | 6 | | |
| Voltage, 120 V | | | |
| Flow, GPM | | 11 | 100 |
| Temperature rise, °F | | 11* | 100 |
| Flue length, equiv. ft | | 6 | 80 |
| Air inlet length, equiv. ft | | 6 | 80 |
| Water volume, gals | 8.4 | | |
| Flue diameter, in | 5 | | |
| Current, amps | 5 | | |
| Cv, GPM @ 1 psid | 60 | | |
| Boiler HP | 16.6 | | |
| Input MBH | 600 | | |
| Output MBH | 556 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data max | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 3" | | |
| Height | 59 1/8" | | |
| Length | 36 3/4" | | |
| Width | 29 1/2" | | |
| LBS | 1080 lbs | | |

*Delta t must not drop below 20°F when boiler return temperature is above 120°F.

Producing 1,000,000 BTUs, the KN-10 is engineered to meet the low fuel use, low installation cost, and small footprint demands of today's commercial boiler market. Like all boilers in the KN-Series, the KN-10 combines the condition-tolerant and heat-retaining characteristics of cast iron with the fuel savings of full-modulation condensing performance, resulting in one of the most innovative boilers on the market.

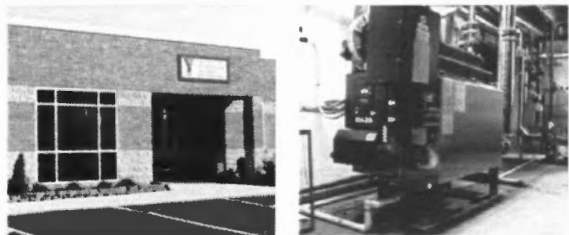


KN-10 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|------|-----|
| Gas pressure, inches W.C. | 6 | | |
| Voltage, 120 V 1ph 60hz | | | |
| Flow, GPM | | 18.6 | 150 |
| Temperature rise, °F | | 12* | 100 |
| Flue length, equiv. ft | | 6 | 80 |
| Air inlet length, equiv. ft | | 6 | 80 |
| Water volume, gals | 14 | | |
| Flue diameter, in | 6 | | |
| Current, amps | 8 | | |
| Cv, GPM @ 1psid | 100 | | |
| Boiler HP | 27.7 | | |
| Input MBH | 1000 | | |
| Output MBH | 927 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data max | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 3" | | |
| Height | 58 25/32" | | |
| Length | 43 11/16" | | |
| Width | 29 7/16" | | |
| LBS | 1440 lbs | | |

*Delta t must not drop below 20°F when boiler return temperature is above 120°F.

Case Study

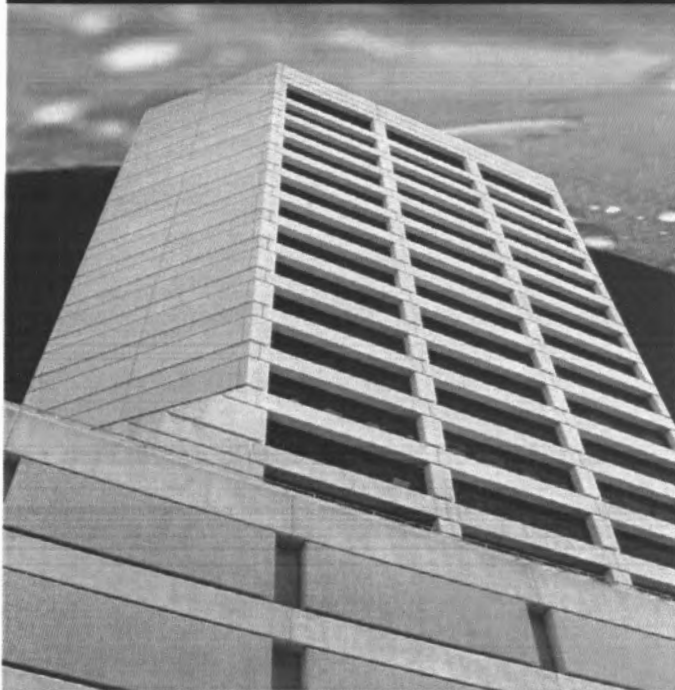


Madison YMCA

Case study compliments of:
Roberts Mechanical Equipment Co. – Garfield Heights, OH

The top priority in updating the heating system at the Madison YMCA was clear - low maintenance with the highest possible efficiency and rugged durability.

A single KN-10 along with a larger KN-20 and a simple pump package met their needs perfectly. Fully utilizing HeatNet, the loads of four very dissimilar zones – air handler, baseboard, pool heat and reheat – with drastically different seasonal requirements, are easily satisfied. Critical to the success of the application was the KN's system flexibility especially its 10:1 system modulation and its ability to handle variable volume flows. The quick delivery, ease of installation and high system efficiency allowed the YMCA to realize energy savings of nearly 40% in their first season.

KN
SERIES **16****1,600,000 BTUs**

The KN-16 joins the proven foundation of KN-Series boilers, combining superior longevity and reliability with maximum efficiencies and serviceability. Hydrotherm's engineers have streamlined the KN's powerful design, producing the most versatile boiler available today.

Built on the rock solid foundation of a high efficiency, fully condensing cast-iron heat exchanger, KN-Series boilers address the wants and needs of today's demanding system applications. Its state-of-the art HeatNet control platform and Tru-Flow "whirlwind" blower and gas valve package replace traditional expensive VFD's while delivering pinpoint modulation insuring maximum performance at all firing rates.

The latest addition to the KN-Series of boilers, the KN-16 produces 1,600,000 BTUs, while maintaining the features that have made the KN-Series boiler the most recognized appliance in the commercial boiler industry – long lasting durability and ultra-high condensing efficiencies all in a compact footprint.

The KN-16 is built to meet the most challenging demands of today's condensing commercial boiler market.

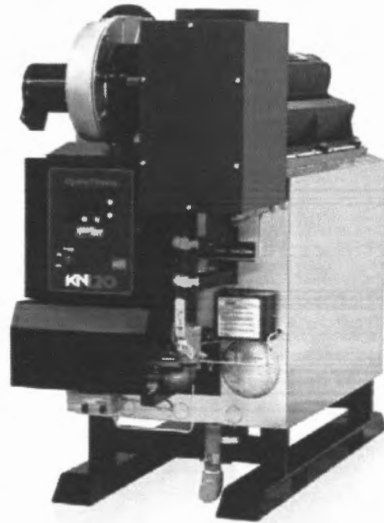


KN-16 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|-----|-----|
| Gas pressure, inches W.C. | 9" | | |
| Voltage, 208/230 V 1ph | | | |
| Flow, GPM | | 30 | 240 |
| Temperature rise, °F | | 12* | 100 |
| Flue length, equiv. ft | | 6 | 120 |
| Air inlet length, equiv. ft | | 0 | 120 |
| Water volume, gals | 22.4 | | |
| Flue diameter, in | 6 | | |
| Current, amps | 6.5 | | |
| Cv, GPM @ 1psid | 160 | | |
| Boiler HP | 44.3 | | |
| Input MBH | 1600 | | |
| Output MBH | 1483 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data max | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 3" | | |
| Height | 74 1/16" | | |
| Length | 56 15/16" | | |
| Width | 33" | | |
| LBS | 2160 lbs | | |

*Delta t must not drop below 20°F when boiler return temperature is above 120°F.

At 2,000,000 BTUs, the KN-20 can perform in some of the harshest environmental conditions, including the Barrow Observatory, just outside Barrow Point, AK. Its durable, reliable, cast-iron design and full-modulation condensing performance, coupled with low fuel consumption, low installation cost, and small footprint, make this boiler ideally suited for your next big project.



KN-20 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|-----|-----|
| Gas pressure, inches W.C. | 6 | | |
| Voltage, 208/230 V 1ph | | | |
| Flow, GPM | | 37 | 300 |
| Temperature rise, °F | | 12* | 100 |
| Flue length, equiv. ft | | 6 | 80 |
| Air inlet length, equiv. ft | | 6 | 80 |
| Water volume, gals | 28 | | |
| Flue diameter, in | 8 | | |
| Current, amps | 11 | | |
| Cv, GPM @ 1psid | 190 | | |
| Boiler HP | 55.4 | | |
| Input MBH | 1999 | | |
| Output MBH | 1853 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data max | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 3" | | |
| Height | 63 5/8" | | |
| Length | 66" | | |
| Width | 28 7/8" | | |
| LBS | 2480 lbs | | |

*Delta t must not drop below 20°F when boiler return temperature is above 120°F.

Case Study



Knoxville Convention

Case study compliments of:
W.C. Rouse & Son, Inc - Greensboro, NC

Knoxville, Tennessee is known for its hospitality. After The Knoxville Convention Center recently went through a multiple phase energy upgrade including water, lighting, and a complete renovation of the central energy plant, the city just got even friendlier. The 500,000 square-foot facility offers 120,000 square feet of exhibit space and meeting rooms and can host up to 1,850 people at one time. Nationally acclaimed energy management company, Ameresco replaced their old hydronic system which consisted of two 500hp firetube boilers with ten KN-20 Series units with HeatNet controls. Utilizing outdoor reset with the HeatNet control system, the convention center can now bring on as few or as many boilers needed to maintain comfort throughout the building. Gas usage at the Knoxville Convention Center is now kept to a minimum, while guest's comfort and energy savings are maximized.

KN^{SERIES} 26 2,600,000 BTUs



The KN-26 takes all of the successful attributes of the KN-30 boiler and incorporates them into a smaller size. The same tried and true system versatility and durability seen on all KN-Series boilers holds true for the KN-26. From single boiler applications to multiple boiler master/member networks controlled thru the HeatNet integrated control platform the KN-Series is the most versatile boiler for all types of applications including today's variable volume systems.

Premium efficiencies with high system turndown and low emissions make the KN-Series line of condensing cast-iron boilers the most cost effective option for every application.

Joining the KN-16 as the latest addition to the growing family of the KN-Series boilers, the KN-26 produces 2,600,000 BTUs, while maintaining the features that have made the KN-Series boiler the most recognized appliance in the commercial boiler industry – long lasting durability and ultra-high condensing efficiencies all in a compact footprint.

The KN-26 puts the final piece into the most complete line of condensing boilers on the market. KN-Series boilers are built to meet the most challenging demands of today's condensing commercial boiler applications.

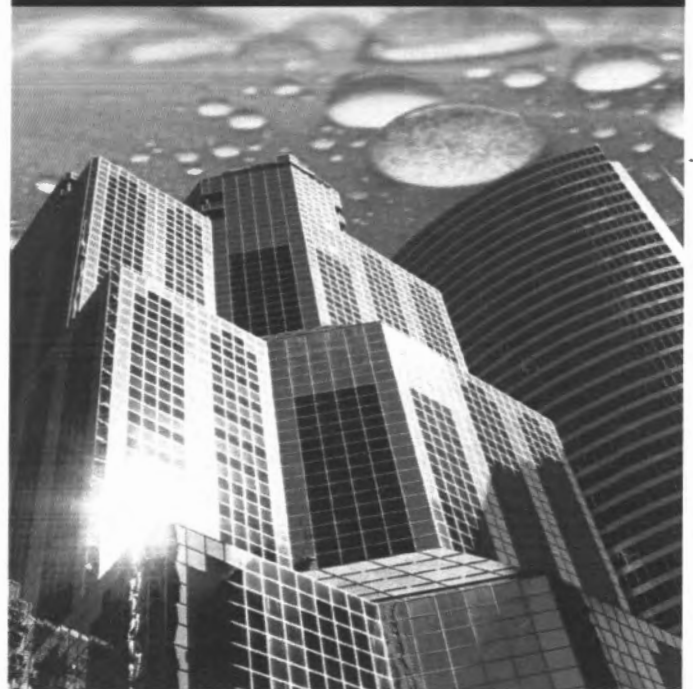


KN-26 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|-------|-----|
| Gas pressure, inches W.C. | 9" | | |
| Voltage, 208/230 V 3ph | | | |
| Flow, GPM | | 48 | 380 |
| Temperature rise, °F | | 12.5* | 100 |
| Flue length, equiv. ft | | 6 | 120 |
| Air inlet length, equiv. ft | | 0 | 120 |
| Water volume, gals | 36.4 | | |
| Flue diameter, in | 8 | | |
| Current, amps | 5.8 | | |
| Cv, GPM @ 1psid | 240 | | |
| Boiler HP | 72 | | |
| Input MBH | 2600 | | |
| Output MBH | 2410 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data max | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 4" | | |
| Height | 74 1/32" | | |
| Length | 79 3/4" | | |
| Width | 34" | | |
| LBS | 3120 lbs | | |

*Delta t must not drop below 20°F when boiler return temperature is above 120°F.

The largest of the KN-Series of boilers, the KN-30 produces 3,000,000 BTUs, while maintaining the features that KN boilers are recognized for—the long-lasting durability of cast-iron and the efficiency of condensing boilers, all in a compact footprint. The KN-30 is built to meet the largest, most challenging demands of today's condensing commercial boiler market.



KN-30 Specifications

| | Nominal | Min | Max |
|-----------------------------|----------------|-----|-----|
| Gas pressure, inches W.C. | 9 | | |
| Voltage, 208/230 V 3ph | | | |
| Flow, GPM | | 55 | 450 |
| Temperature rise, °F | | 12* | 100 |
| Flue length, equiv. ft | | 6 | 120 |
| Air inlet length, equiv. ft | | 0 | 120 |
| Water volume, gals | 42 | | |
| Flue diameter, in | 8 | | |
| Current, amps | 6.5 | | |
| Cv, GPM @ 1psid | 278 | | |
| Boiler HP | 83.1 | | |
| Input MBH | 3000 | | |
| Output MBH | 2781 | | |
| Fuel type | Nat. Gas / LP | | |
| ASME design data mex | 100PSI / 250°F | | |
| Supply/Return Pipe Size | 4" | | |
| Height | 74 1/32" | | |
| Length | 87 1/8" | | |
| Width | 34" | | |
| LBS | 3500 lbs | | |

*Delta t must not drop below 20°F when boiler return temperature is above 120°F.

Boiler Overview



Sun Valley Resort

Case study compliments of:
Columbia Hydronics Company - Vancouver, WA

Overlooking the beautiful Big Wood River, the River Run Day Lodge and nearby River Run Plaza Idaho's Sun Valley Resort is surrounded by nearly 64,000 square feet of walkway. Operating 24 hours a day, seven days a week, the energy usage alone for the snowmelt system is massive. Add the lodge with its soaring 40 foot ceilings and shopping plaza, and it is no surprise that they were looking to replace their old inefficient boilers with ultra-efficient KN-Series boilers. Three KN-30 boilers supply the 9 million BTU's required for the entire area. Replacing their older boiler system with efficiencies in the range of 75%, it is estimated that the KN boilers are providing an hourly savings of 3,364 MBTU/h. At an average of \$1.10 per therm, the resort is saving \$888 per day or \$26,664 per month during peak season.

Hybrid Boiler Systems

The concept of "hybrid", "base-load" or even "mixed-boiler" configurations is simple. Lower the upfront equipment cost of a condensing boiler plant by incorporating less expensive conventional equipment while optimizing the operational range of both in a specific application.

Of critical importance for any hybrid system is the sizing of the units. Meeting total BTU requirements with a combination of condensing and non-condensing units optimizes overall system performance by allowing condensing units to run exclusively on warmer days minimizing fuel usage with the non-condensing units running on high-load colder days.

Geographic location and the use of BIN hour temperature charts would ultimately determine the appropriate sizing of your condensing versus non-condensing boiler equipment.

Sizing

There are 2 key components that must play a part in optimizing a hybrid system application: outdoor reset control and the understanding of the performance band of condensing boilers (flue gas and return water temperatures below dew point of 130°) versus non-condensing boilers with varying boiler water loop temperatures.

Using BIN hour temperature charts we can determine that on average properly sized condensing units will run 74% of the time in full condensing mode which covers 40% of the buildings "Design Heating Load" thus leaving only 26% of run time in non-condensing mode**.

The highest efficiency units will run in condensing mode 74% of the time, maximizing efficiency while still providing equipment redundancy at a substantially reduced cost.

How to Control

HeatNet, Mestek's proprietary integrated boiler control platform makes boiler to boiler communication in all types of applications including hybrid designs with both high mass and low mass units seamless while optimizing system efficiency by prioritizing the firing rotation of all boilers in the sequence (up to 16 units) both condensing and non-condensing.

** Hypothetical scenario assuming a 4,500 MBH design load from which 40% (1800 MBH) can be concluded to be condensing with the remaining 2700 MBH being non-condensing. Varies depending on specific BIN data per geographic region.

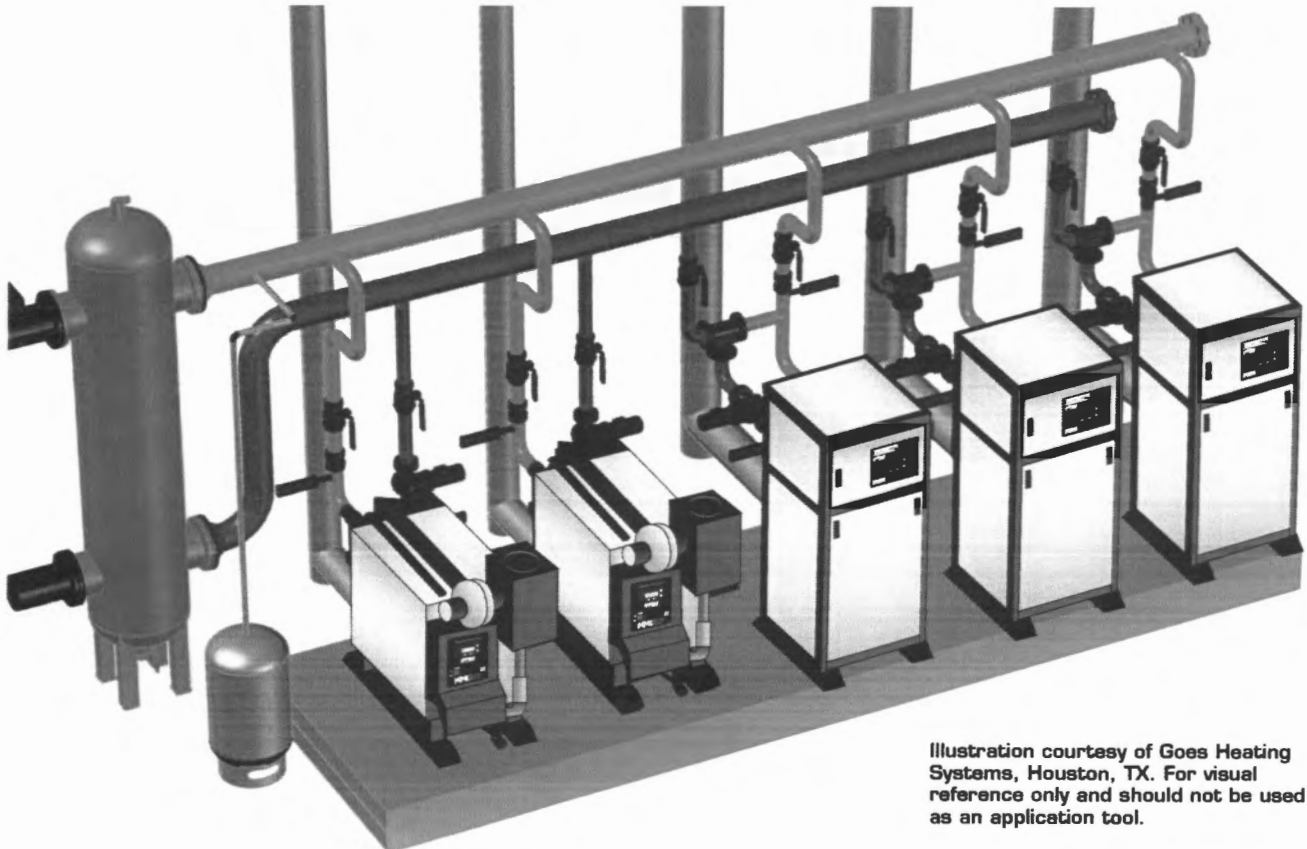
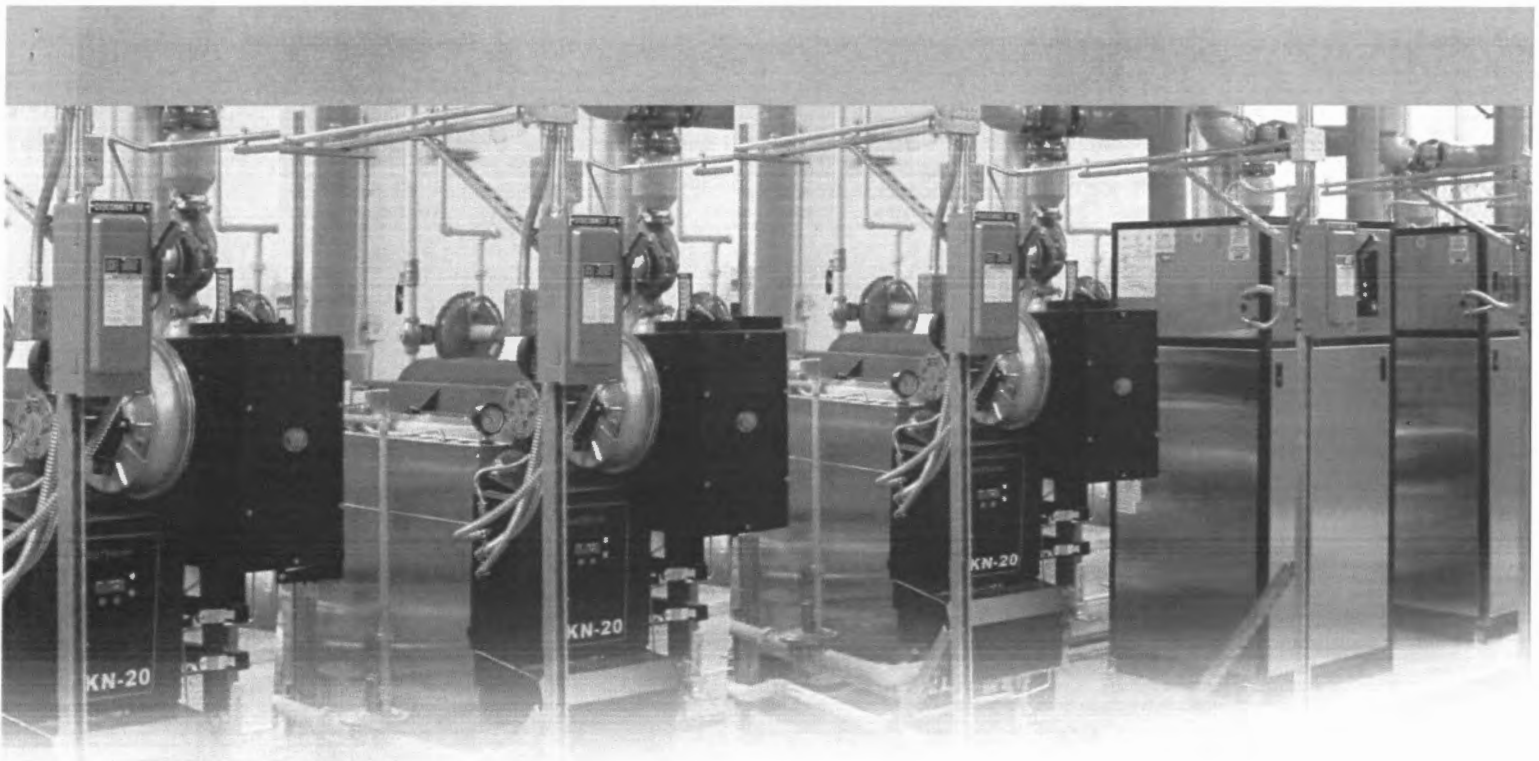
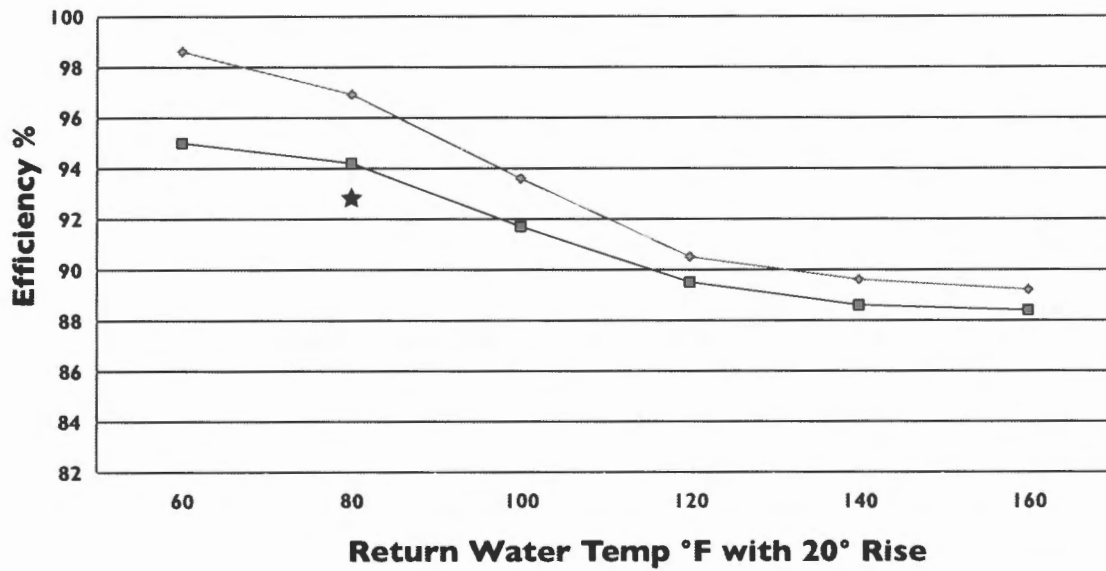


Illustration courtesy of Goes Heating Systems, Houston, TX. For visual reference only and should not be used as an application tool.



KN Series
Annual Mean Thermal Efficiency



- ★ - AHRI Certified 92.7% Efficient
- - Annual Mean Thermal Efficiency is a calculated average utilizing cumulative run hours and corresponding load. (ASHRAE Degree Day & BIN Method/Fundamentals 19.17)
- ◆ - Maximum Modulation Efficiency (Low Fire)

Contact Info:

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Receipts Details:

Tender Information: Check , BusinessName: Mechanical Services, Check Number: 4859
Tender Amount: 270.00

Receipt Header:

Cashier Id: gguertin
Receipt Date: 8/16/2012
Receipt Number: 47162

Receipt Details:

| | | | |
|---|--------|----------------|-----------|
| Referance ID: | 7666 | Fee Type: | BP-Constr |
| Receipt Number: | 0 | Payment Date: | |
| Transaction Amount: | 270.00 | Charge Amount: | 270.00 |
| Job ID: Job ID: 2012-08-4723-HVAC - Hydrotherm kn4 heating unit in basement | | | |
| Additional Comments: 290 Baxter, Mechanical services | | | |

Thank You for your Payment!