RAD RADIANT TUBE PLUG-IN RECUPERATOR

WARNING

These instructions are intended for use only by experienced, qualified combustion start-up personnel. Adjustment of this equipment and its components by unqualified personnel can result in fire, explosion, severe personal injury, or even death.

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These instructions are intended to serve as guidelines covering the installation, operation, and maintenance of Hauck equipment. While every attempt has been made to ensure completeness, unforeseen or unspecified applications, details, and variations may preclude covering every possible contingency. **WARNING: TO PREVENT THE POSSIBILITY OF SERIOUS BODILY INJURY, DO NOT USE OR OPERATE ANY EQUIPMENT OR COMPONENT WITH ANY PARTS REMOVED OR ANY PARTS NOT APPROVED BY THE MANUFACTURER.** Should further information be required or desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, contact Hauck Mfg. Co.

WARNING

This equipment is potentially dangerous with the possibility of serious personal injury and property damage. Hauck Manufacturing Company recommends the use of flame supervisory equipment and fuel safety shutoff valves. Furthermore, Hauck urges rigid adherence to National Fire Protection Association (NFPA) standards and insurance underwriter's requirements. Operation and regular preventative maintenance of this equipment should be performed only by properly trained and qualified personnel. Annual review and upgrading of safety equipment is recommended.

A. GENERAL INFORMATION

The Hauck RADimax radiant tube plug-in recuperator is designed to maximize available heat to your combustion system. For use with 6" ID or larger tubes, the Radimax can be installed in U tubes, W tubes, and Trident® tubes. Ideally suited for use with Hauck radiant tube burners with an input up to 700,000 Btu/hr (205kW) and preheated air temperatures up to 900°F (485°C).

B. RECEIVING AND INSPECTION

Upon receipt, check each item on the bill of lading and/or invoice to determine that all equipment has been received. A careful examination of all parts should be made to ascertain if there has been any damage in shipment.

IMPORTANT

If the installation is delayed and the equipment is stored outside, provide adequate protection as dictated by climate and period of exposure. Special care should be given to all motors and bearings, if applicable, to protect them from rain or excessive moisture.

C. CAPACITES

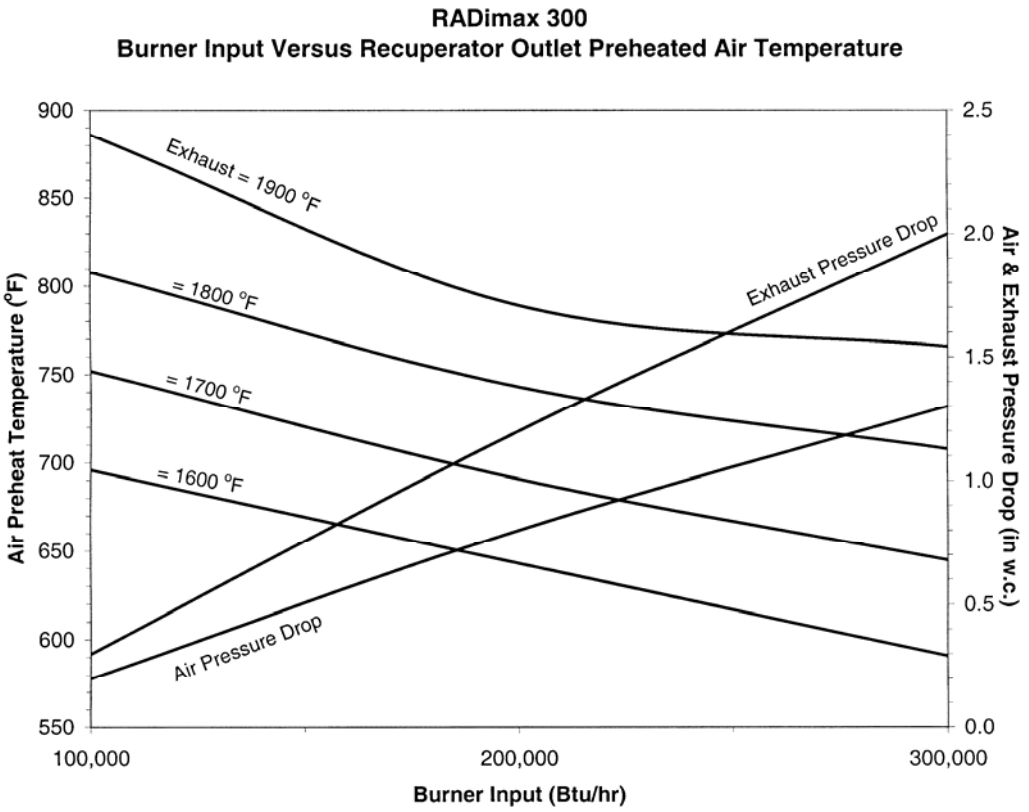

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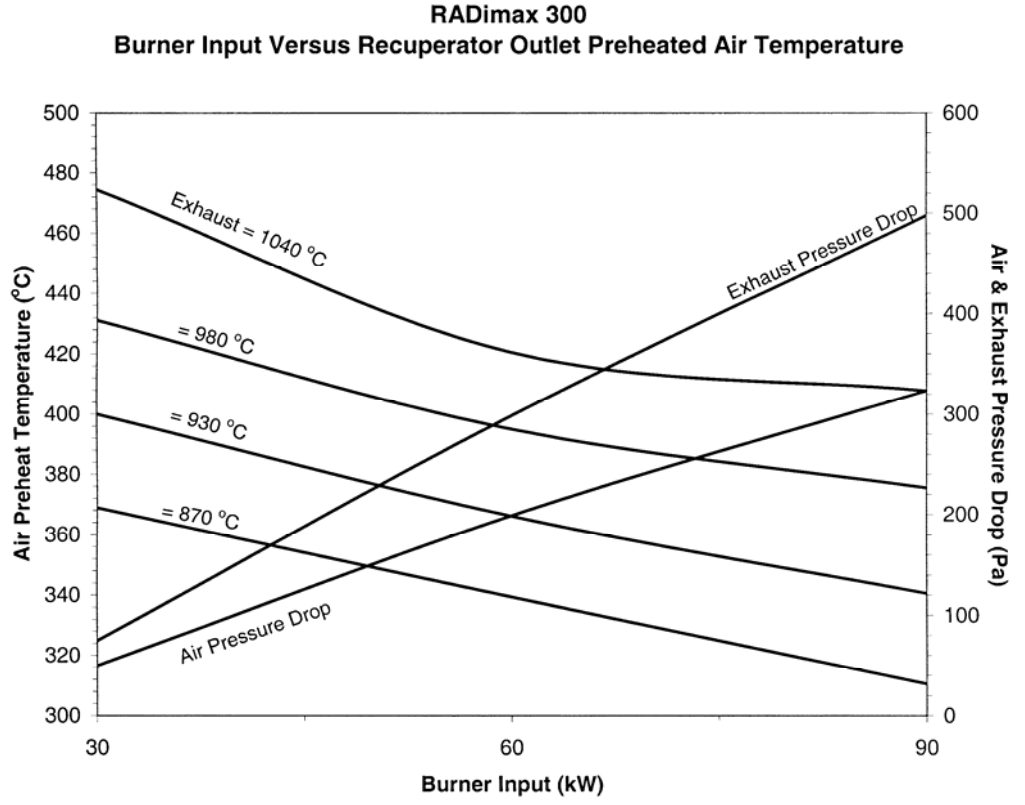
Figure 1. RAD 300 Performance Curves



Q783 Metric

Figure 2. RAD 300 Metric Performance Curves

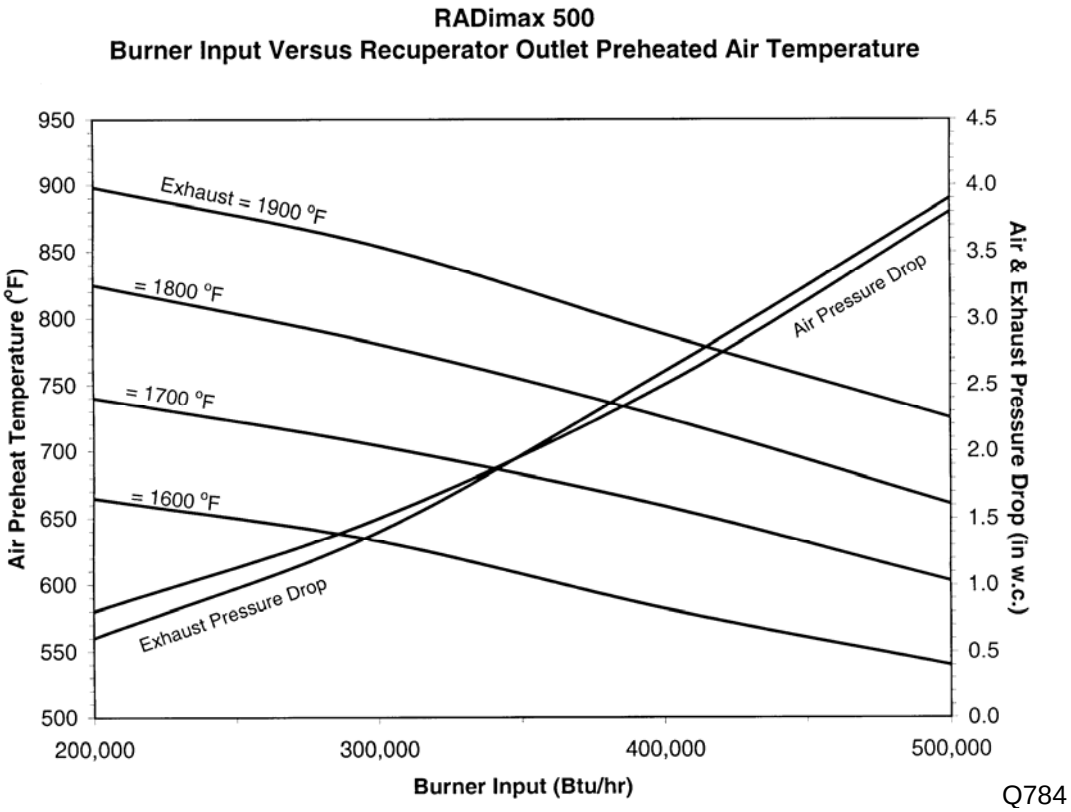


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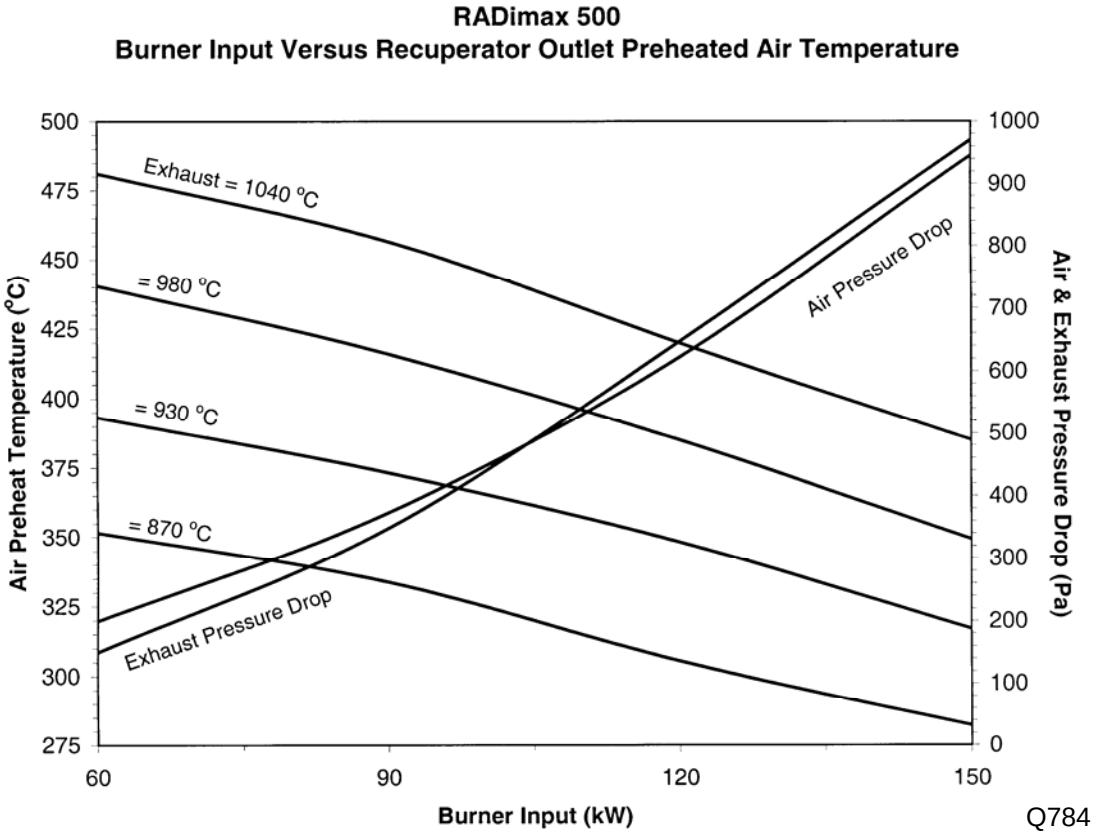
Figure 3. RAD 500 Performance Curves



Q784 Metric

Figure 4. RAD 500 Metric Performance Curves

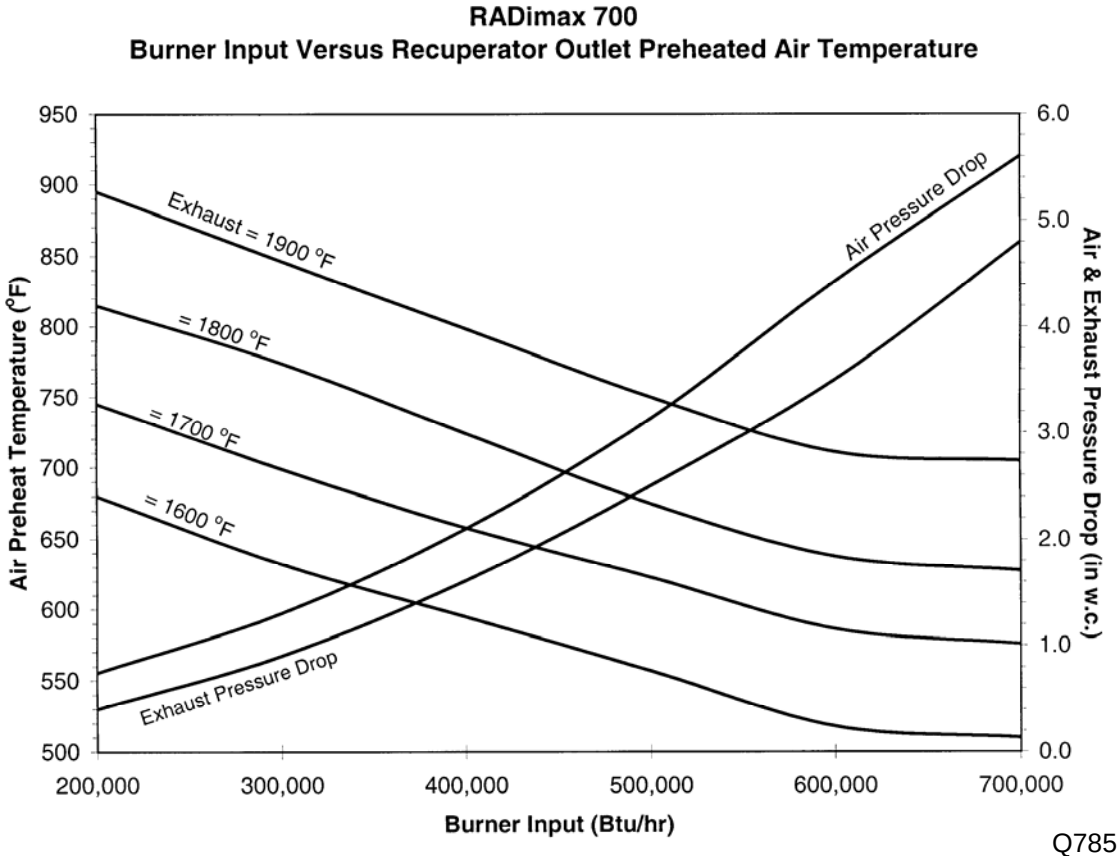


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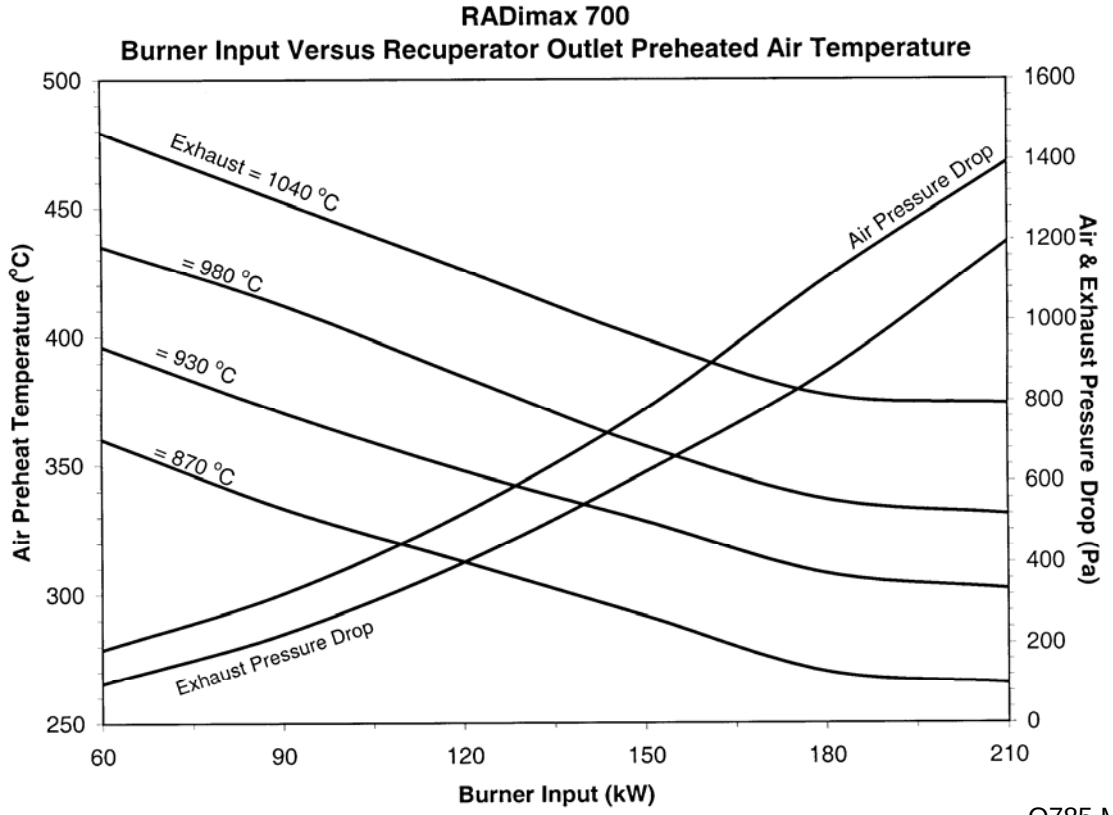
Figure 5. RAD 700 Performance Curves



Q785 Metric

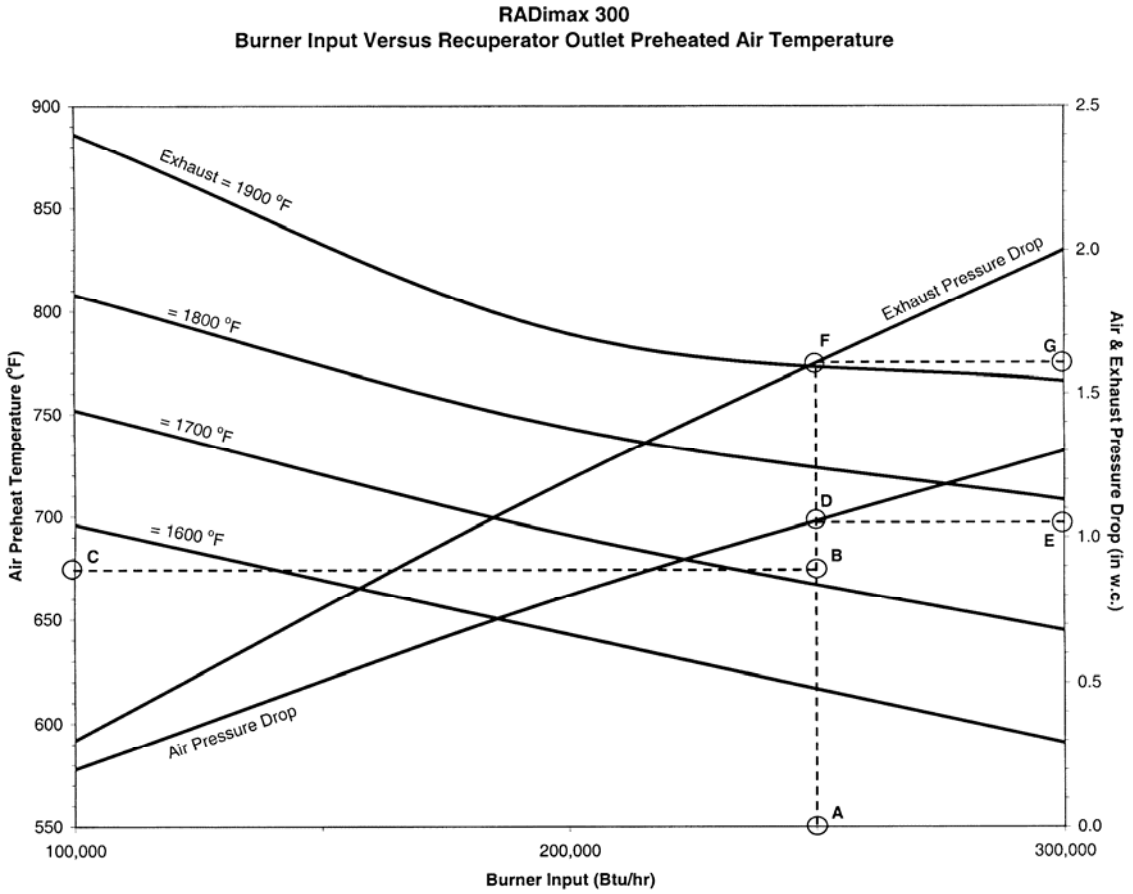
Figure 6. RAD 700 Metric Performance Curves

C. CAPACITES (Continued)

SELECTION

The performance of a RADimax radiant tube plug-in recuperator is based on two basic criteria; burner input and exhaust temperature. An example is presented below for a RADimax 300 to show how performance is determined from the respective performance curves.

Example: An existing radiant tube burner fires into a U-tube at a rate of 250,000 Btu/hr (73kW). The measured exhaust gas temperature leaving the U-tube is 1710°F (932°C). Using the chart below, determine the potential Air Preheat Temperature, and the Air and Exhaust Pressure Drops that would result by installing a Hauck RADimax 300 radiant tube plug-in recuperator.



Air Preheat Temperature

A. Locate Burner Input of 250,000 Btu/hr (73 kW) on the x-axis.
B. Move vertically up the graph to intersect on Exhaust temperature of 1710°F (932°C).
C. Move vertically to the left y-axis and read the scale which corresponds to an Air Preheat Temperature of 675°F (360°C).

Air Pressure Drop

A. Locate Burner Input of 250,000 Btu/hr (73 kW) on the x-axis.
D. Move vertically up the graph until you intersect the Air Pressure Drop line.
E. Move horizontally to the right y-axis and read the scale which corresponds to an Air Pressure Drop of 1.1"wc (275 Pa).

CAPACITIES (Continued)

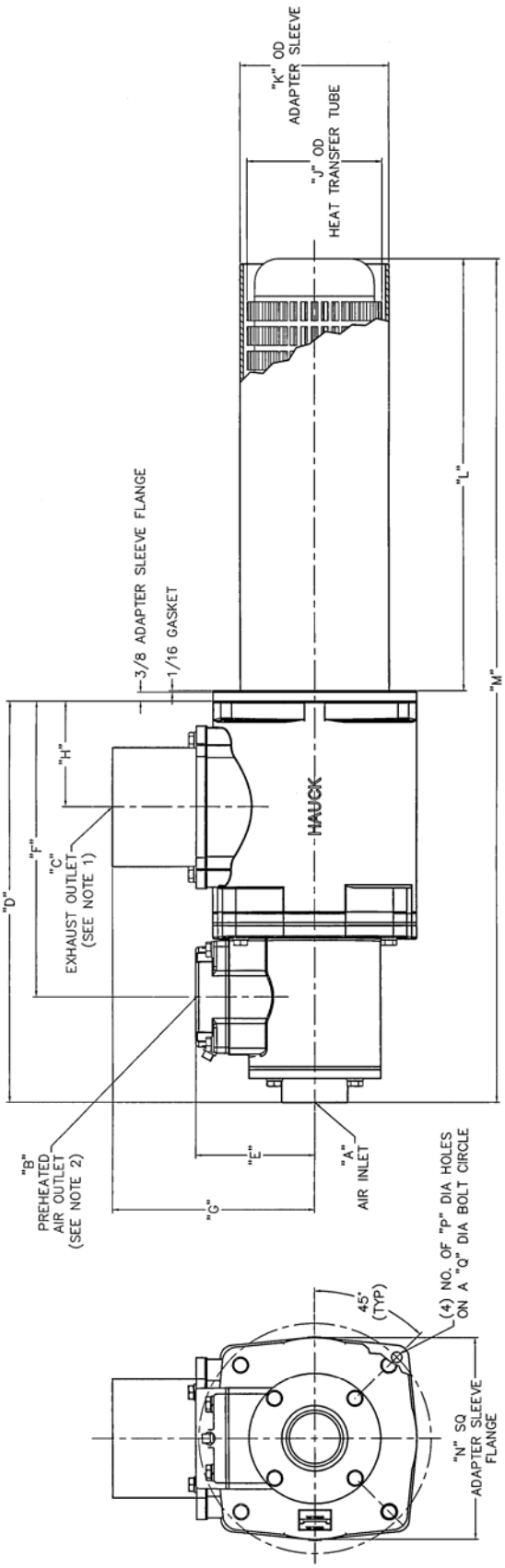
Exhaust Pressure Drop

A. Locate Burner Input of 250,000 Btu/hr (73 kW) on the x-axis.
F. Move vertically up the graph until you intersect the Exhaust Pressure Drop line.
G. Move horizontally to the right y-axis and read the scale which corresponds to an Exhaust Pressure Drop of 1.6"wc (400 Pa).

NOTE

Prior to installation of a Radimax radiant tube plug-in recuperator, it is important to verify that the existing or new combustion air blower/fan will be adequate to overcome the added air and exhaust piping pressure losses. Contact Hauck to verify adequacy of the combustion air supply system, and for analysis of system efficiency and fuel savings.

D. DIMENSIONS

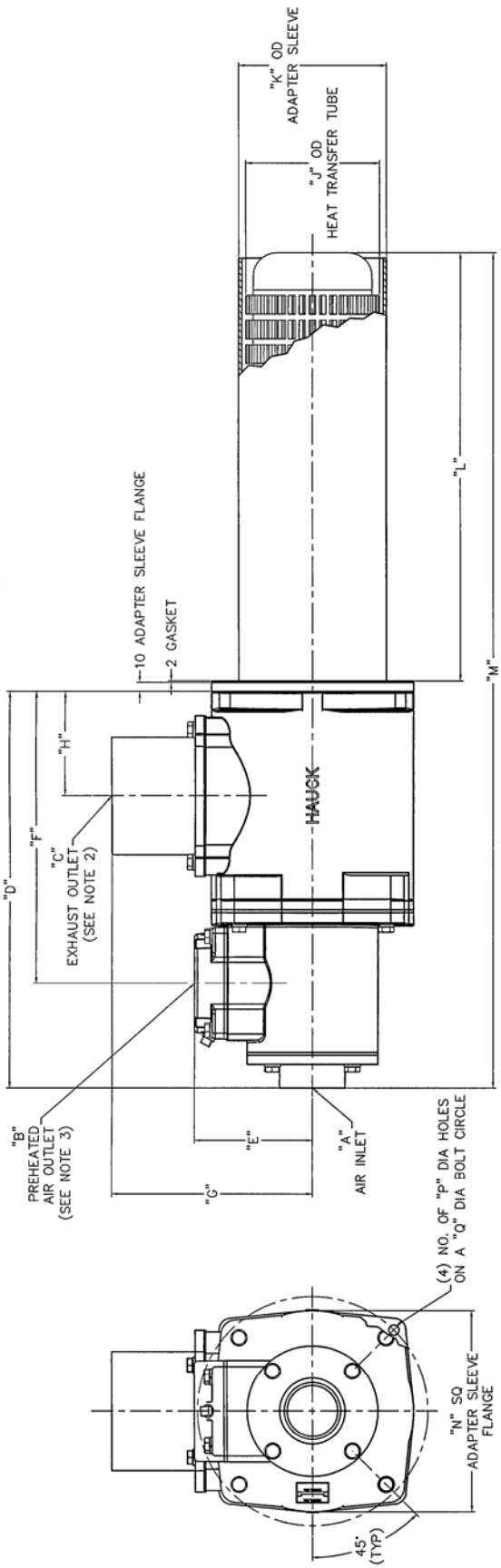


MODEL NO.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	APPROX NET WT.
RAD 300	1 1/2 NPS	2 NPT	2 1/2 NPS	16 11/16	4 7/8	12 5/16	7 7/16	4 7/16	5 5/8	6 7/32	13 13/16	30 7/8	8 1/2	7/16	9 11/16	95 LB
RAD 500	2 NPS	2 1/2 NPT	4 NPS	16 11/16	4 7/8	12 5/16	8 7/16	4 7/15	5 5/8	6 7/32	18 1/8	35 1/4	8 1/2	7/16	9 11/16	100 LB
RAD 700	2 1/2 NPS	3 NPT	4 NPS	17 1/4	4 7/8	12 5/16	8 7/16	4 7/15	5 5/8	6 23/32	20 3/16	37 7/8	8 1/2	7/16	9 11/16	105 LB

Y7972
(NOT TO SCALE)

NOTES:
1. PREFERRED EXHAUST OUTLET MOUNTING SHOWN @ 12 O'CLOCK POSITION AND OPTIONAL MOUNTING @ 3 OR 9 O'CLOCK POSITION; 6 O'CLOCK MOUNTING IS NOT RECOMMENDED. SPECIFY MOUNTING POSITION ON ORDER.
2. PREHEATED AIR OUTLET MOUNTING AVAILABLE @ 3, 6, 9 OR 12 O'CLOCK POSITION. SPECIFY MOUNTING POSITION ON ORDER.
3. ADAPTER SLEEVE AND GASKET REQUIRED FOR RADIANT TUBES WITH AN I.D. GREATER THAN "K" DIMENSION; CONSULT HAUCK.

Figure 7. Dimensions



MODEL NO.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	APPROX NET WT.
RAD 300	1 1/2 NPS	2 NPT	2 1/2 NPS	424	124	313	189	113	143	158	351	784	216	11	246	43 KG
RAD 500	2 NPS	2 1/2 NPT	4 NPS	424	124	313	214	113	143	158	460	895	216	11	246	45 KG
RAD 700	2 1/2 NPS	3 NPT	4 NPS	438	124	313	214	113	143	171	513	962	216	11	246	48 KG

Y7972 METRIC
(NOT TO SCALE)

NOTES:
1. DIMENSIONS ARE IN MM.
2. PREFERRED EXHAUST OUTLET MOUNTING SHOWN @ 12 O'CLOCK POSITION AND OPTIONAL MOUNTING @ 3 OR 9 O'CLOCK POSITION; 6 O'CLOCK MOUNTING IS NOT RECOMMENDED. SPECIFY MOUNTING POSITION ON ORDER.
3. PREHEATED AIR OUTLET MOUNTING AVAILABLE @ 3, 6, 9 OR 12 O'CLOCK POSITION. SPECIFY MOUNTING POSITION ON ORDER.
4. ADAPTER SLEEVE AND GASKET REQUIRED FOR RADIANT TUBES WITH AN I.D. GREATER THAN "K" DIMENSION; CONSULT HAUCK.

Figure 8. Metric Dimensions

E. INSTALLATION

NOTE

The RADimax recuperator should be mounted with the end of the finned recuperator section flush with the inside wall of the furnace (see Figure 9). Depending on furnace wall thickness and mounting, a spool piece may be required. For radiant tubes with an I.D. greater than 6 inches (152 mm), an adapter sleeve must be installed; consult Hauck.

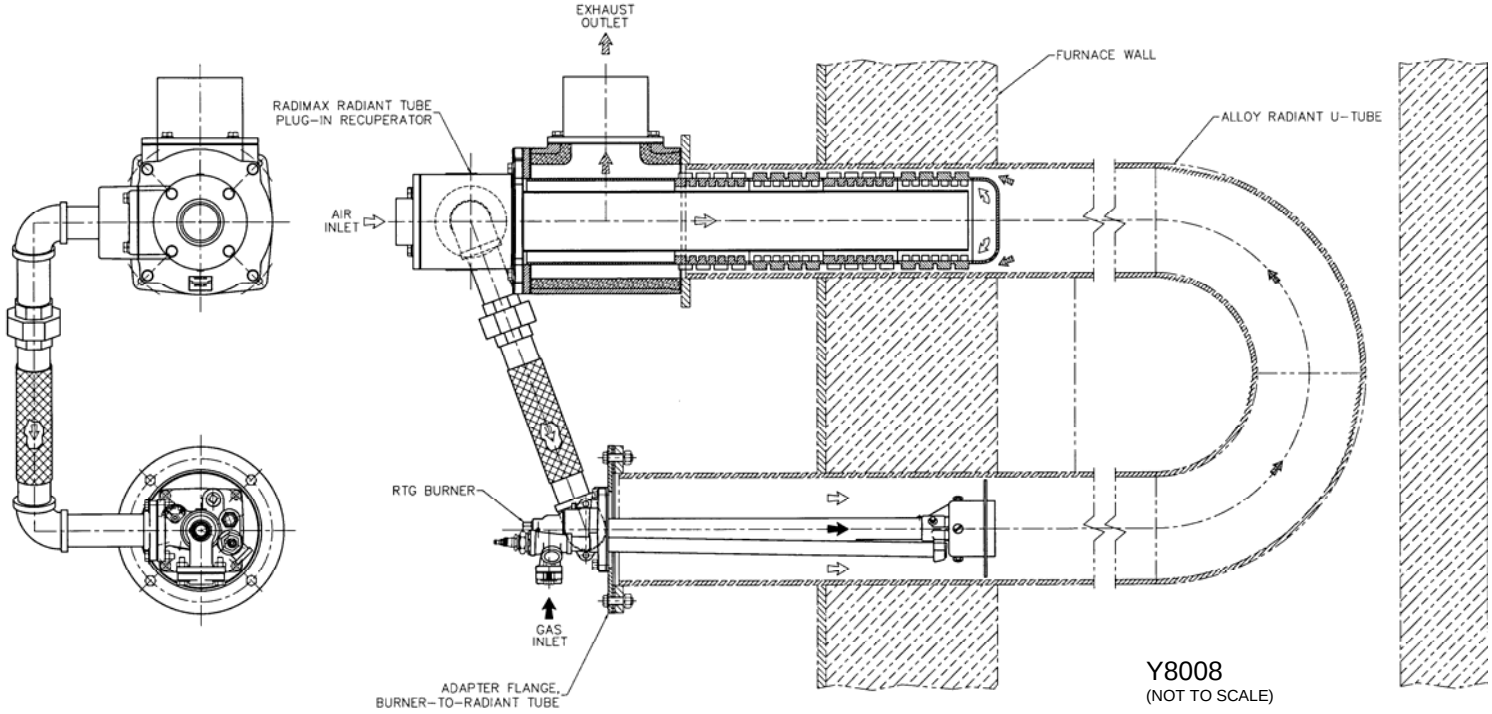


Figure 9. Typical Installation of RADimax Radiant Tube Plug-In Recuperator

The exhaust gas and preheated air outlets can be aligned in multiple orientations, independently of each other. This feature of the RADimax recuperator allows ease in piping and retrofitting, and eliminates the need for additional elbows, which increase pressure drop. The exhaust and preheated air outlets are oriented per order to simplify installation. If necessary, these outlets can be reoriented in the field as outlined below (see Figure 10).

1. For radiant tubes with an I.D. greater than 6 inches (152 mm), install the adapter gasket (11) onto the radiant tube exhaust leg mounting flange or spool piece (if applicable), and insert the adapter sleeve (12).

2. Install the exhaust body gasket (11) onto the adapter sleeve (if applicable), or the radiant tube exhaust leg mounting flange or spool piece (if applicable). Mount the RADimax radiant tube plug-in recuperator by securing the exhaust body (8) onto the radiant tube exhaust leg mounting flange or spool piece with appropriately sized nuts, bolts, and washers. Ensure that the exhaust outlet is located in the proper orientation. If the preheated air outlet is properly oriented in relation to the exhaust outlet, proceed to step 4.

3. If field piping necessitates reorientation of the preheated air outlet in relation to the exhaust outlet, remove the four screws and washers (15 & 16) that secure the hot air outlet body (3) and the flange of the heat transfer tube (13) to the exhaust body assembly (8). Rotate only the hot air outlet body (3) to the required orientation and reinstall the four screws and washers (15 & 16).

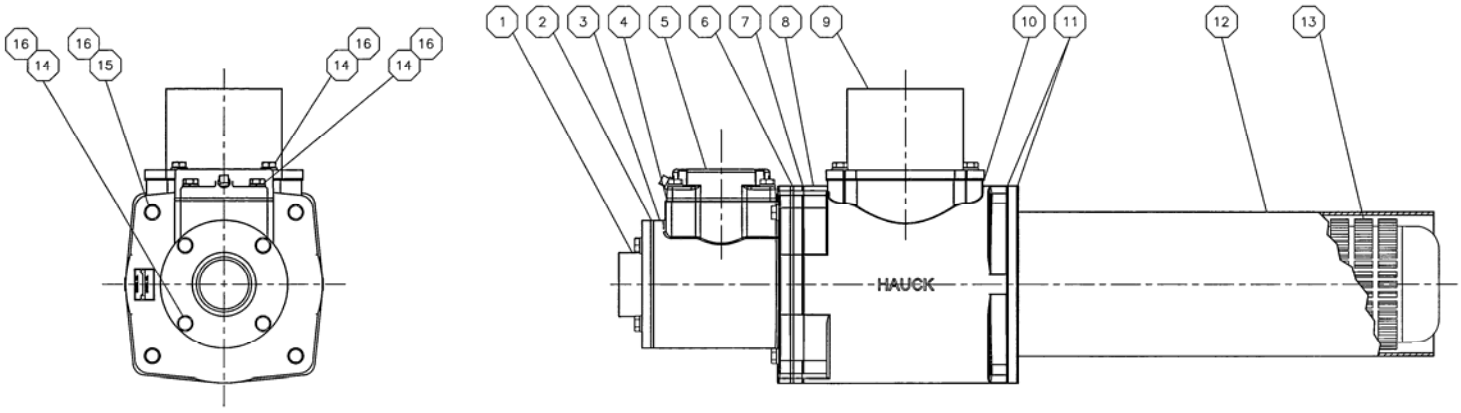


Figure 10. Components Identification for Installation/Maintenance

4. Ensure that all screws, nuts and washers are secure, and all gaskets are properly seated.

5. Install air piping to the air inlet tubing assembly (1), preheated air piping from the hot air outlet body (3) to the burner, and exhaust piping from the exhaust outlet flange assembly (9) to the exhaust ducting. Avoid using pipe reducers and extra fittings whenever possible to minimize additional pressure losses.

> **NOTE**
> Incorporate flexible hose/pipe connectors or expansion joints into the air, preheated air and exhaust piping to minimize mechanical and thermal stress transferred onto the recuperator.

6. Insulate piping from the recuperator. Insulate preheated air piping from the recuperator to the burner, exhaust piping from the recuperator to the exhaust ducting, and recuperator spool piece (if applicable) with a minimum 1 inch (25 mm) thick ceramic fiber insulation (or equivalent). **Do not insulate the burner or the recuperator.**

F. MAINTENANCE

The RADimax radiant tube plug-in recuperator has no moving parts. However, periodic inspection should be performed to check the condition of components that are exposed to high temperatures (see Figure 10).

1. Disconnect air piping from the air inlet tubing assembly (1) and preheated air piping from the hot air outlet body (3).

2. Remove the four screws and washers (15 & 16) that secure the hot air outlet body (3) and the flange of the heat transfer tube (13) to the exhaust body assembly (8).

> **NOTE**
> When removing or installing the heat transfer tube assembly, use caution to keep the tube as parallel as possible to the exhaust leg tube to avoid damaging the vacuum formed insulation in the exhaust body.

3. Remove the heat transfer tube (13).

4. Inspect the outer finned sections and end cap of the heat transfer tube (13), and (if applicable) the inside diameter of the adapter sleeve (12) for scale build-up, etc. If excessive, utilize a wire brush to remove build-up.

5. Inspect the exhaust body assembly insulation for signs of damage. If damaged, consult Hauck concerning repair or replacement options.

6. Inspect the exhaust body tube mounting gasket (7) and replace if necessary.

7. Carefully reinstall the heat transfer tube (13) into the exhaust body assembly (8).

8. Inspect the hot air body tube mounting gasket (6) and replace if necessary.

9. Install the hot air outlet body (3) onto the flange of the heat transfer tube with the four screws and washers (15 & 16).

10. Reconnect air piping to the air inlet tubing assembly (1) and preheated air piping to the hot air outlet body (3).

G. RECOMMENDED SPARE PARTS LIST

Item	Qty.	Part Number	Description
1	*	See Parts List	Heat Transfer Tube
2	*	402753	Gasket, Air Body Tube Mounting
3	*	402757	Gasket, Exhaust Body Tube Mounting
4	*	See Parts List	Sleeve, Adapter (If Applicable)

* - Quantity dependent upon number of recuperators installed, consult Hauck.

Table 1. Recommended Spare Parts