



# **ROBERTS GORDON®**

## **INFRARED HEATING**

CORAYVAC® and Unitary Layout and Design

# Heat Loss

## Sizing up a CORAYVAC® System

- Critical Considerations:

- Heat-loss adjustment factor for CRV (.80 with old reflector)
- Heat-loss adjustment factor for CRV (.75 with NEW High Efficiency reflector)
- *Height Adjustment (1% per for over 20')*

# Heat Loss

Heat Loss Tool

Defaults

## Building Survey

### Environment:

Inside Design Temperature:  F

Outside Design Temperature:  F

Temperature Rise:  F

### Dimensions:

Building Length:  ft

Building Width:  ft

Installed Height:  ft

Peak Height:  ft

Eave Height:  ft

Area:  ft<sup>2</sup>

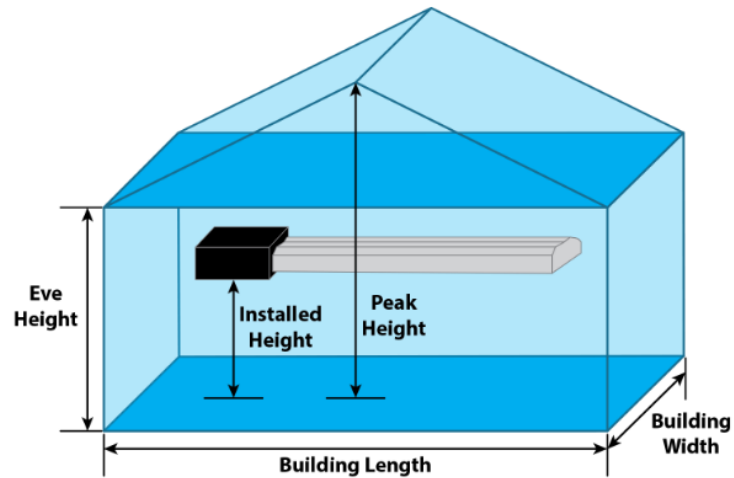
Perimeter:  ft

Volume:  ft<sup>3</sup>

### Ventilation:

Air Changes Per Hour:

Mechanical Exhaust:  CFM



Calculate

Cancel

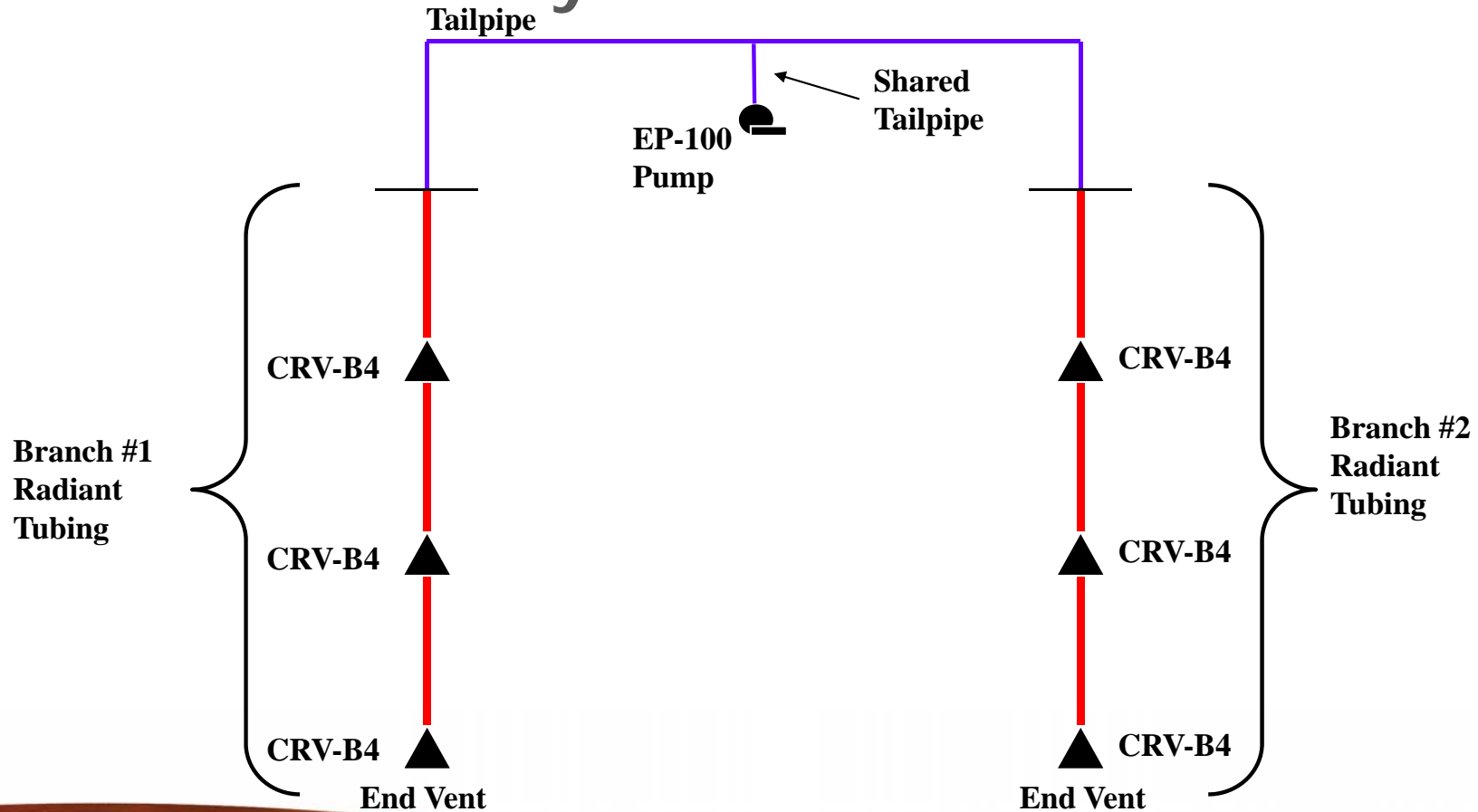
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INFRARED HEATING

# Factors in Burner Selection



- Heat gain and distribution
- Desired Radiant intensity
- Mounting Height
- Flow units
- Required Distance Between Burners
- Tail Pipe Lengths

# CRV System Identification



# Model Number Designation

## CRV-B Series

<u>Input (BTU/Hr.)</u>	<u>Model Number</u>
20,000 (NG Only)	CRV-B-2
40,000	CRV-B-4
60,000	CRV-B-6
80,000	CRV-B-8
90,000	CRV-B-9
100,000	CRV-B-10
110,000 (NG Only)	CRV-B-12A
120,000 (LP Only)	CRV-B-12



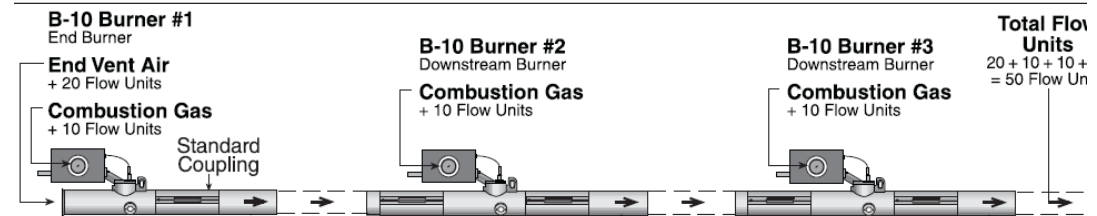
# Firing Rates in Regards to Design Parameters









































Burner Model	B-2	B-4	B-6	B-8	B-9*	B-10	B-12A	B-12
Input (Btu/h) x (1000)	20	40	60	80	90	100	110	120
Flow Units per Burner	2	4	6	8	9	10	12	12
Flow Units per End Vent (minimum flow units entering combustion chamber)	6	10	15	20	15	20	20	20
Maximum Number of Burners per Branch	6	4	4	4	2	4	3	3
Maximum Number of Flow Units per Branch	18	26	39	52	33	60	56	56
Radiant Tube Length (average distance between burners)								
Minimum (ft)	10	12.5	20	20	20	30	35	35
Recommended (ft)	15	20	25	30	30	40	50	50
Maximum (ft)	20	25	35	45	50	60	70	70
Minimum Distance from Burner to Downstream Elbow (ft)	5	5	10	10	10	15	15	15
Suggested Minimum mounting Height (ft)	8	8	8	10	10	15	15	15

\* CRV B-9 requires first downstream tube from burner to be aluminized heat-treated.

Burner Flow Unit: Amount of fuel/air mixture required to produce 10,000 BTU

FIGURE 14: Burner Flow Units



		Burner 1			Burner 2		Burner 3	
Burner #	Burner Firing Rate Btu/h	End Vent Flow Units	Burner #1 Flow Units		Burner #2 Flow Units		Burner #3 Flow Units	Total Flow Units
1	20,000							
2	20,000							
3	20,000							
1	40,000							
2	40,000							
3	40,000							
1	60,000							
2	60,000							
3	60,000							
1	80,000							
2	80,000							
3	80,000							
1	90,000							
2	90,000							
1	100,000							
2	100,000							
3	100,000							
1	120,000 (or 110,000)							
2	120,000 (or 110,000)							
3	120,000 (or 110,000)							
1	120,000							
2	100,000							
3	80,000							



# Allowable Tailpipe Lengths

**Table 4: Allowable Tailpipe Lengths**

	Burner Model						
	B-2	B-4	B-6	B-8	B-9	B-10	B-12/B-12A
<b>Radiant Tube Length (average distance between burners)</b>							
Minimum (ft)	10	12.5	20	25	20	30	35
Recommended (ft)	15	20	25	30	30	40	50
Maximum (ft)	20	25	35	45	50	60	70
<b>Tailpipe length per flow unit</b>							
Minimum (ft) *	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Recommended (ft)	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Maximum (ft)	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Maximum (ft) for EP-100 only	1.7	1.7	1.7	1.7	1.7	1.7	1.7

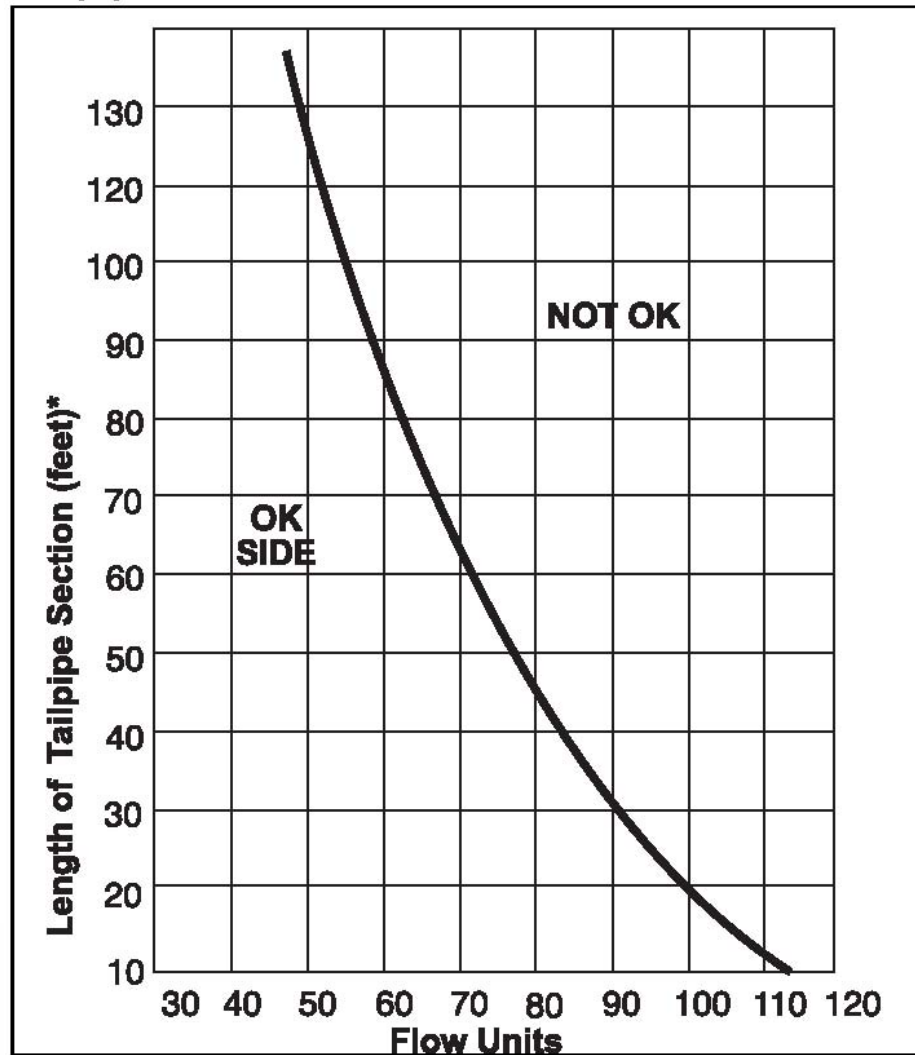
\*Minimum tailpipe lengths can only be used if radiant tube length is recommended or greater.

# Pump Capacity at Altitude

**Table 2: Pump Capacity**

Installed Altitude		Maximum Flow Units		
Feet Above Sea Level	Meters Above Sea Level	EP-100	EP-200 Series	EP-300 Series
0' - 2000'	0 m - 609 m	66	112	224
2001' - 3000'	610 m - 914 m	63	105	215
3001' - 4000'	915 m - 1219 m	60	100	206
4001' - 5000'	1220 m - 1524 m	57	95	197
5001' - 6000'	1525 m - 1828 m	54	90	188
6001' - 7000'	1829 m - 2134 m	51	84	180
7001' - 8000'	2135 m - 2438 m	48	80	170
8001' - 9000'	2439 m - 2743 m	45	75	161

# Vacuum Loss For 4" Shared Tailpipe

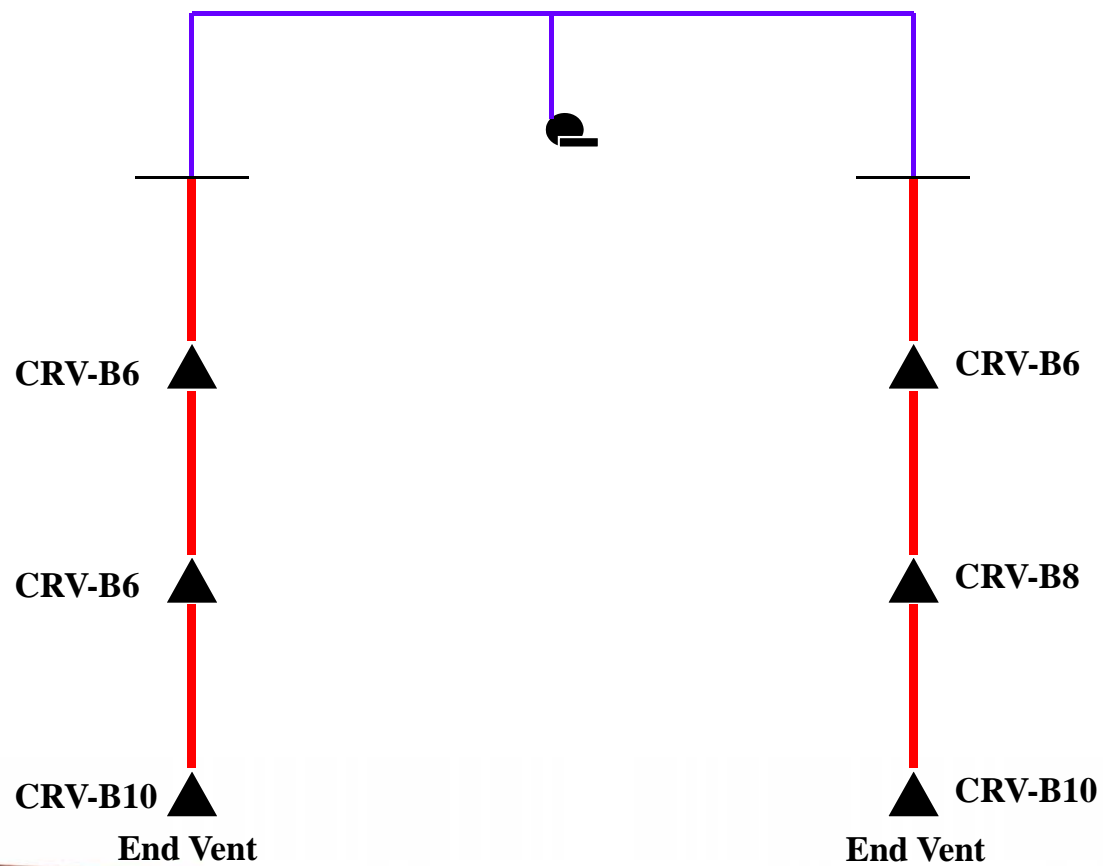


# Clearances to Combustibles

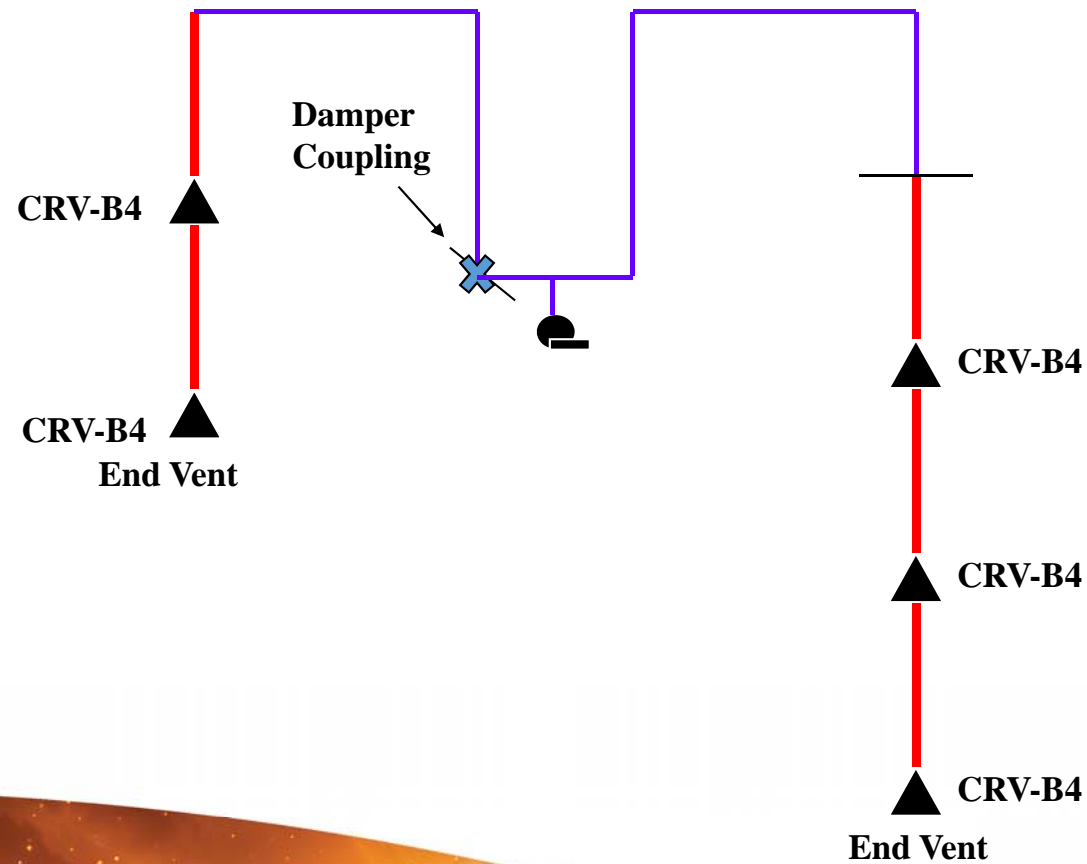
Have non-stationary items been considered when laying out heaters? See Installation, Operation and Service Manual.

- ✓ Garage Doors – Do not place heaters above areas occupied by open overhead doors
- ✓ Vehicle Lifts – Do not place heaters directly above lifts, since clearances diminish as the lift rises
- ✓ Movable Cranes – Shielding may be required above movable (or even stationary) cranes

# Mixing Burners



# Uneven Branches





# Infrared Distribution:

FIGURE 11: Radiant Distribution (Average Coverage)

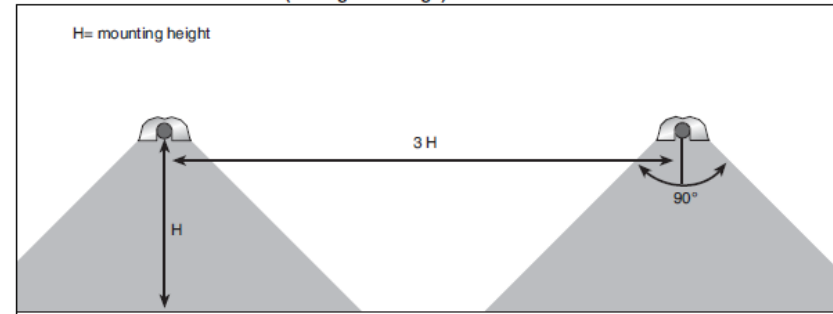


FIGURE 12: Radiant Distribution (Increased Coverage)

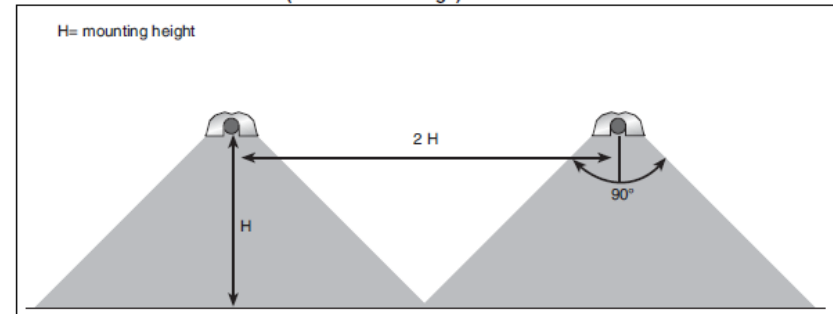
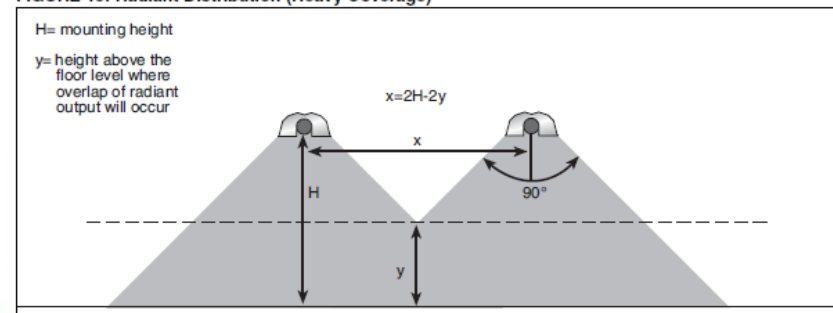
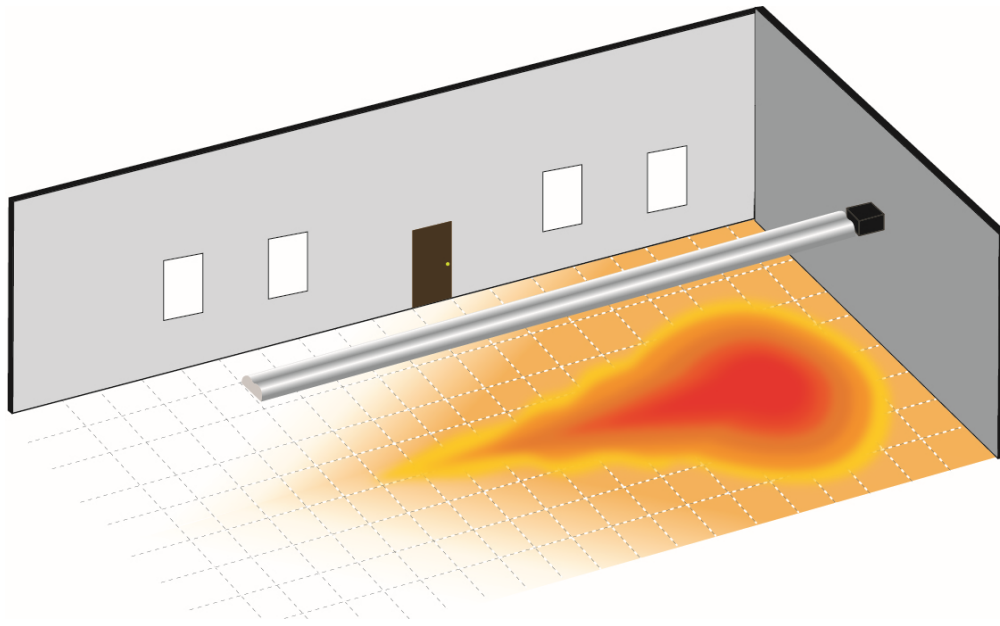


FIGURE 13: Radiant Distribution (Heavy Coverage)

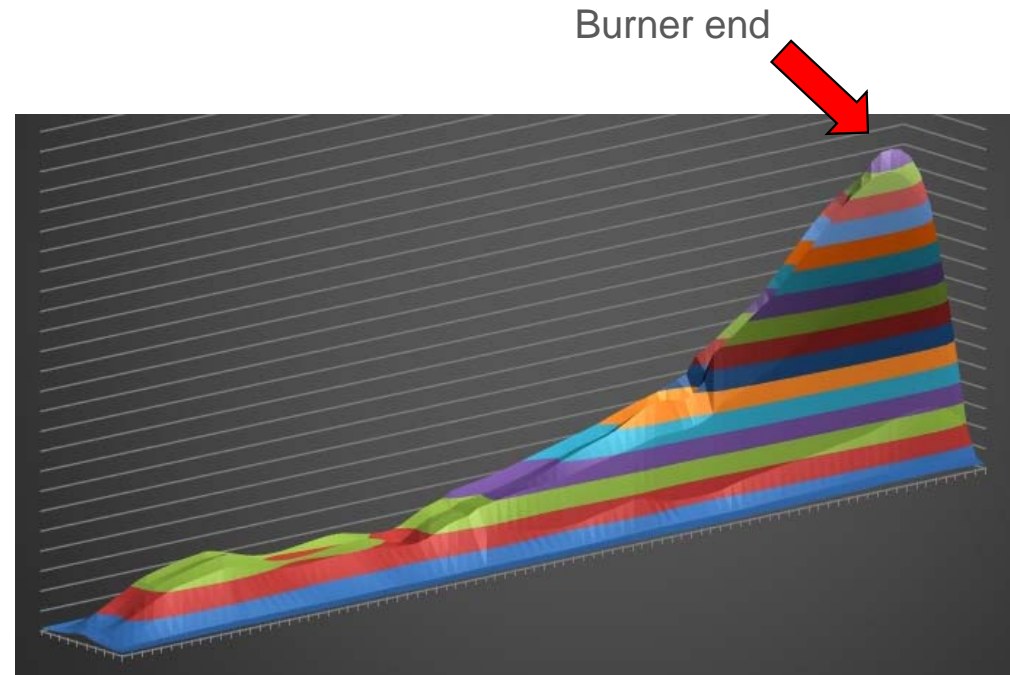


# UNITARY LAYOUT CONSIDERATIONS

# THE TEAR DROP

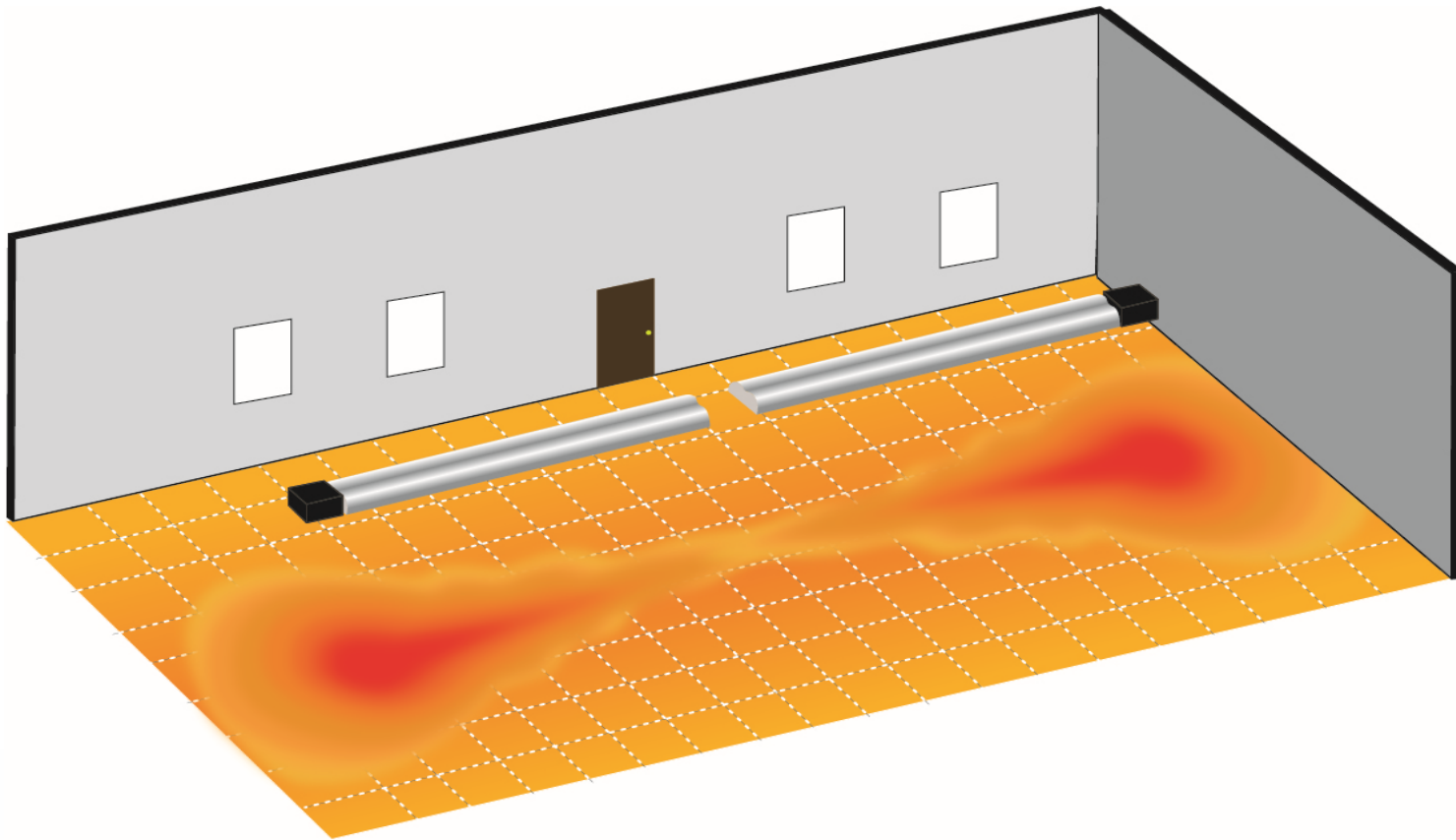


Upside Down Tear Drop  
Heat Pattern

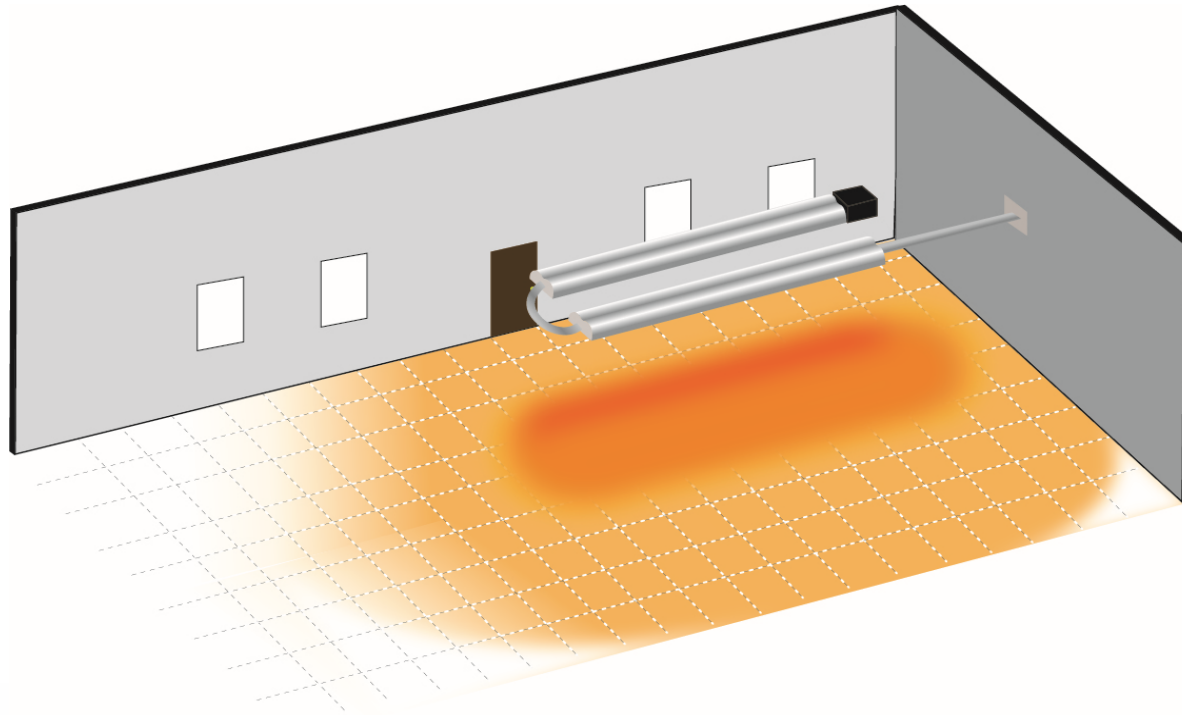


100,000 BTU/h – 30'  
Radiant Heat Output

# PROPER LAYOUT AND DESIGN



# RADIANT DISTRIBUTION WITH A SINGLE UNIT (U-TUBE)

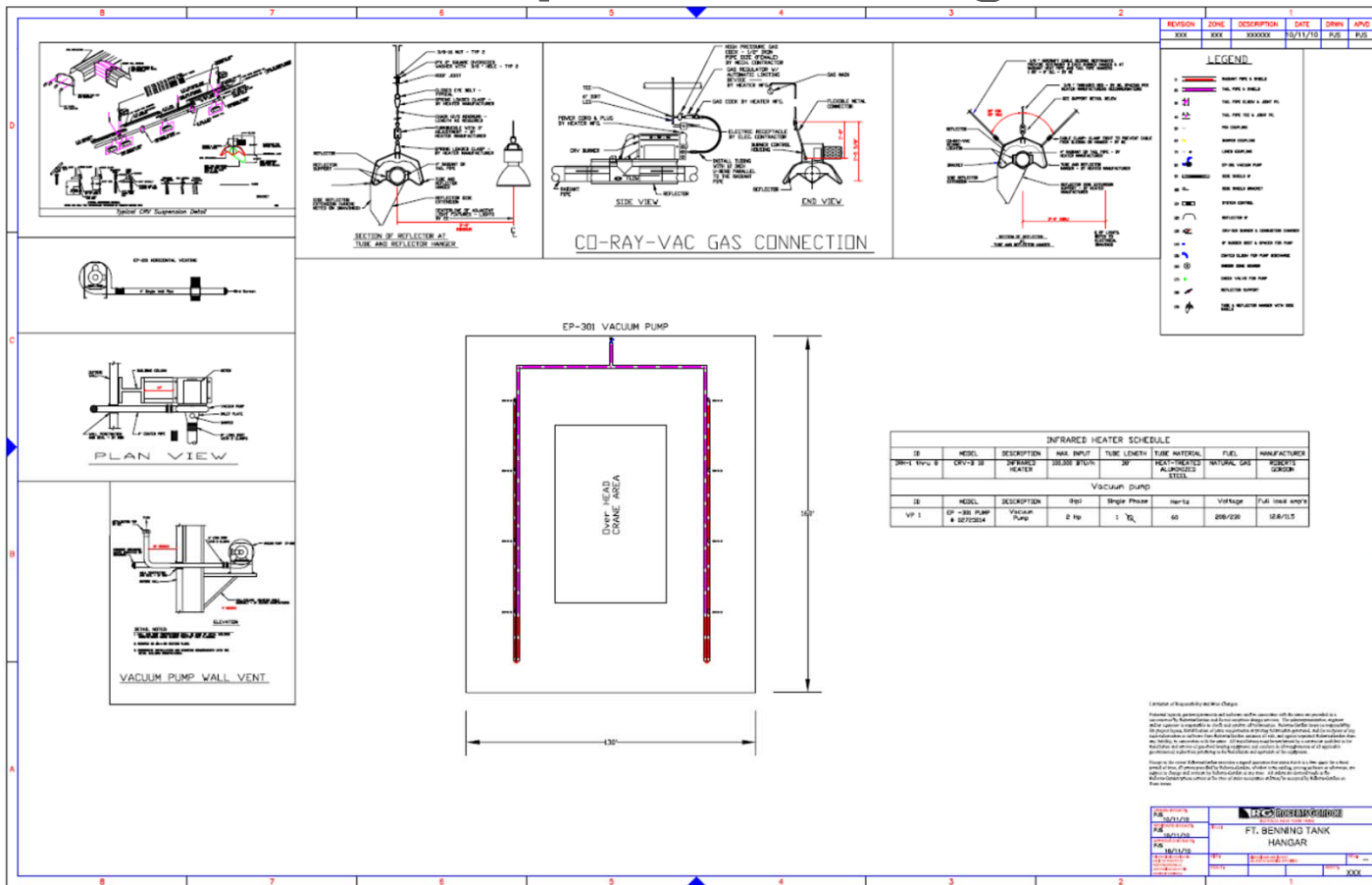


**WE CAN DO IT FOR YOU!**

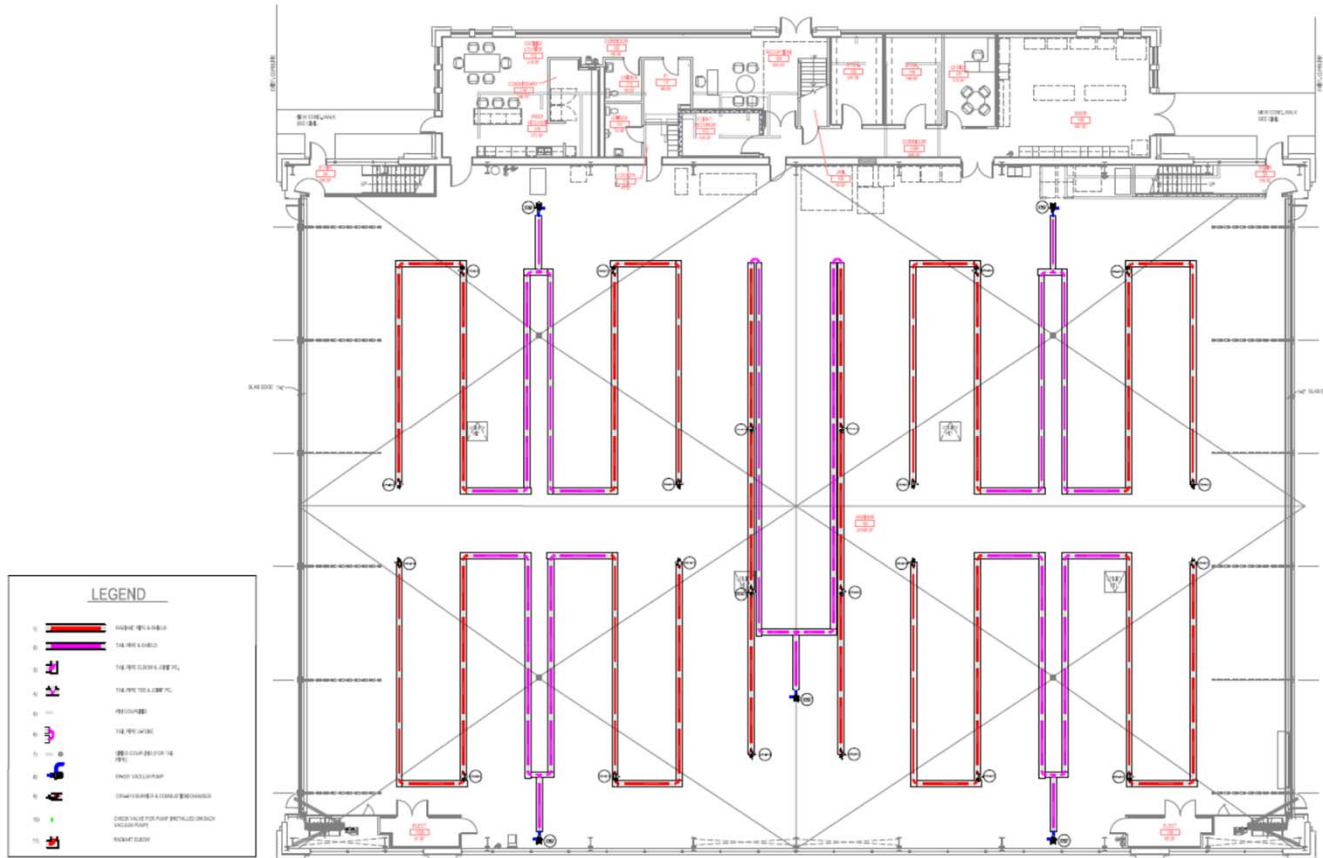
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# Sample Drawings



# Sample Drawings



# SELECT A SYSTEM VIA ACE INTERFACE

# Heat-Loss / Selection

**System Layouts**

Adjusted Heat Loss: 703,725 BtuhTotal Capacity: 1,800,000 Btuh

Remaining Capacity: 0 Btuh

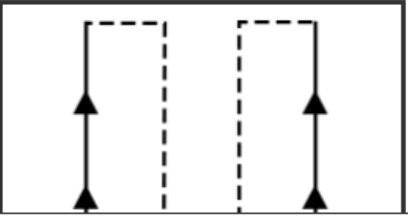
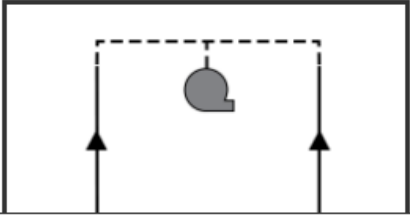
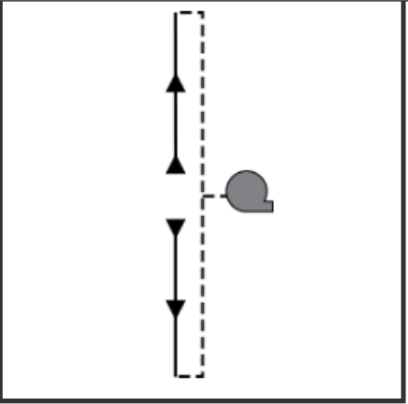
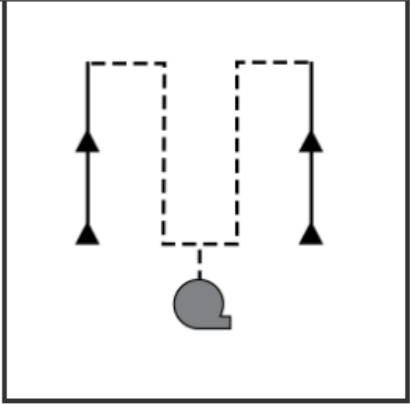
Selected Layout

Burner Size: B-2

Number of Layouts: 1

Add LayoutRemove Last Layout

Selected Layout	Capacity	Burner	Qty
6 burner U design	600,000	B-10	3



4 burner W design4 burner, 4 elbow design

Thank You!

*Questions?*