Data 121
12/8/2010

Eclipse ER

Indirect Air Heater

Version 1

Standard Efficiency (1/2" Spacing Heat Exchanger)

Parameter	ER Heater Size (1 through 8) and Burner Size (Small or Large)															
	1		2		3		4		5		6		7		8	
	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large
Maximum Process Air Delivery Temp., °F (°C)	646 (341)	411 (210)	724 (384)	469 (243)	723 (384)	469 (243)	719 (382)	466 (241)	715 (379)	463 (240)	727 (386)	472 (244)	722 (384)	469 (243)	723 (384)	470 (243)
Maximum Process Air Flow Rate, scfm (Nm^3/hr) [1]	2,877 (4537)	4,795 (7562)	3,941 (6215)	6,569 (10360)	5,400 (8516)	9,000 (14194)	7,398 (11668)	12,330 (19446)	10,135 (15984)	16,892 (26641)	13,885 (21899)	23,142 (36498)	19,023 (30002)	31,705 (50003)	26,062 (41102)	43,436 (68504)
Maximum Process Air Pressure Drop, "w.c. (mbar)	2.2 (5.5)	4.5 (11.2)	1.9 (4.7)	3.4 (8.5)	2.0 (5.0)	3.5 (8.7)	2.2 (5.5)	3.9 (9.7)	2.5 (6.2)	4.3 (10.7)	2.4 (6.0)	4.8 (12.0)	2.7 (6.7)	5.4 (13.5)	2.7 (6.7)	5.4 (13.5)
Maximum Heat Transfer, MMBTU/hr (kW)	1.1 (322)	1.3 (381)	1.8 (528)	2.0 (586)	2.4 (703)	2.8 (821)	3.3 (967)	3.8 (1114)	4.5 (1319)	5.2 (1524)	6.2 (1817)	7.2 (2110)	8.5 (2491)	9.8 (2872)	11.7 (3429)	13.5 (3956)
Maximum Burner Firing Demand, MMBTU/hr (kW)	1.3 (381)	1.5 (440)	2.1 (615)	2.4 (703)	2.9 (850)	3.2 (938)	3.9 (1143)	4.4 (1290)	5.3 (1553)	6.0 (1758)	7.4 (2169)	8.4 (2462)	10.1 (2960)	11.4 (3341)	13.8 (4044)	15.6 (4572)
Gas Pressure Requirement into Valve Train	5 psig (350 mbarg)															
Fuel Options	Natural Gas, Propane, Butane (Contact Eclipse for others.)															
Combustion Air Blower Motor Rating, bhp (kW)[2]	3 (3)	5 (4)	5 (4)	7.5 (7.5)	7.5 (7.5)	10 (7.5)	7.5 (7.5)	10 (7.5)	10 (7.5)	20 (15)	20 (15)	25 (22)	25 (22)	25 (22)	25 (22)	30 (30)
Recirculation Air Fan Motor Rating, bhp (kW) [3]	5 (4)		5 (4)		7.5 (7.5)		15 (15)		20 (15)		20 (15)		40 (30)		50 (37)	
Unit Weight, lbs (kg) [4]	6,142 (2786)		7,546 (3423)		11,833 (5367)		13,778 (6250)		16,313 (7400)		19,610 (8895)		24,450 (11090)		30,570 (13866)	

[1] scfm referenced to 70°F at 1 atmosphere (14.696 psia), Nm^3/hr referenced to 0°C at 1 atmosphere (0.9869 bar).

[2] Assuming 230 - 460 VAC / 3 Phase / 60Hz electrical power. Please contact Eclipse for other electrical power options.

[3] Size 8 unit uses two 25 HP (18.5 kW) motors.

[4] All weights are approximate.

- See Design Guide 121, to be used in conjuction with the following curves, to complete design and selection.
- All information is based on laboratory testing with neutral (0.0" w.c.) exhaust conditions.
- All inputs based upon gross calorific values and standard conditions: 1 atmosphere, 70°F (21°C).
- Plumbing of gas will affect accuracy of orifice readings. All information based on general acceptable air and gas piping practices.
- Custom designs incorporating larger units or multiple units are available for needs greater than above maximums.
- Eclipse reserves the right to change the construction and/or configuration of our products at any time without being obliged to adjust earlier supplies accordingly.

ECLIPSE®
Innovative Thermal Solutions

High Efficiency (3/8" Spacing Heat Exchanger)

Parameter	ER Heater Size (1 through 8) and Burner Size (Small or Large)															
	1		2		3		4		5		6		7		8	
	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large	Small	Large
Maximum Process Air Delivery Temp., °F (°C)	689 (365)	449 (232)	778 (414)	512 (267)	777 (414)	512 (267)	774 (412)	510 (266)	771 (411)	508 (264)	780 (416)	514 (268)	776 (413)	512 (267)	777 (414)	512 (267)
Maximum Process Air Flow Rate, scfm (Nm^3/hr) [1]	2,877 (4537)	4,795 (7562)	3,941 (6215)	6,569 (10360)	5,400 (8516)	9,000 (14194)	7,398 (11668)	12,330 (19446)	10,135 (15984)	16,892 (26641)	13,885 (21899)	23,142 (36498)	19,023 (30002)	31,705 (50003)	26,062 (41102)	43,436 (68504)
Maximum Process Air Pressure Drop, "w.c. (mbar)	2.3 (5.7)	4.5 (11.2)	2.5 (6.2)	4.2 (10.5)	2.6 (6.5)	4.3 (10.7)	2.9 (7.2)	4.8 (12.0)	3.2 (8.0)	5.2 (13.0)	3.1 (7.7)	5.7 (14.2)	3.5 (8.7)	6.3 (15.7)	3.4 (8.5)	6.2 (15.4)
Maximum Heat Transfer, MMBTU/hr (kW)	1.2 (352)	1.4 (410)	2.0 (586)	2.2 (645)	2.7 (791)	3.1 (909)	3.6 (1055)	4.2 (1231)	5.0 (1465)	5.7 (1671)	6.9 (2022)	7.9 (2315)	9.4 (2755)	10.7 (3136)	12.9 (3781)	14.7 (4308)
Maximum Burner Firing Demand, MMBTU/hr (kW)	1.5 (440)	1.7 (498)	2.3 (674)	2.5 (733)	3.1 (909)	3.5 (1026)	4.2 (1231)	4.7 (1377)	5.8 (1700)	6.5 (1905)	8.0 (2345)	8.9 (2608)	10.9 (3194)	12.2 (3575)	15.0 (4396)	16.7 (4894)
Gas Pressure Requirement into Valve Train	5 psig (350 mbarg)															
Fuel Options	Natural Gas, Propane, Butane (Contact Eclipse for others.)															
Combustion Air Blower Motor Rating, bhp (kW)[2]	3 (3)	5 (4)	5 (4)	7.5 (7.5)	7.5 (7.5)	10 (7.5)	7.5 (7.5)	10 (7.5)	10 (7.5)	20 (15)	20 (15)	25 (22)	25 (22)	25 (22)	25 (22)	30 (30)
Recirculation Air Fan Motor Rating, bhp (kW) [3]	5 (4)		5 (4)		7.5 (7.5)		15 (15)		20 (15)		20 (15)		40 (30)		50 (37)	
Unit Weight, lbs (kg) [4]	6,269 (2844)		7,828 (3551)		12,207 (5537)		14,245 (6461)		16,904 (7668)		20,541 (9317)		25,623 (11622)		32,187 (14600)	

[1] scfm referenced to 70°F at 1 atmosphere (14.696 psia), Nm^3/hr referenced to 0°C at 1 atmosphere (0.9869 bar).

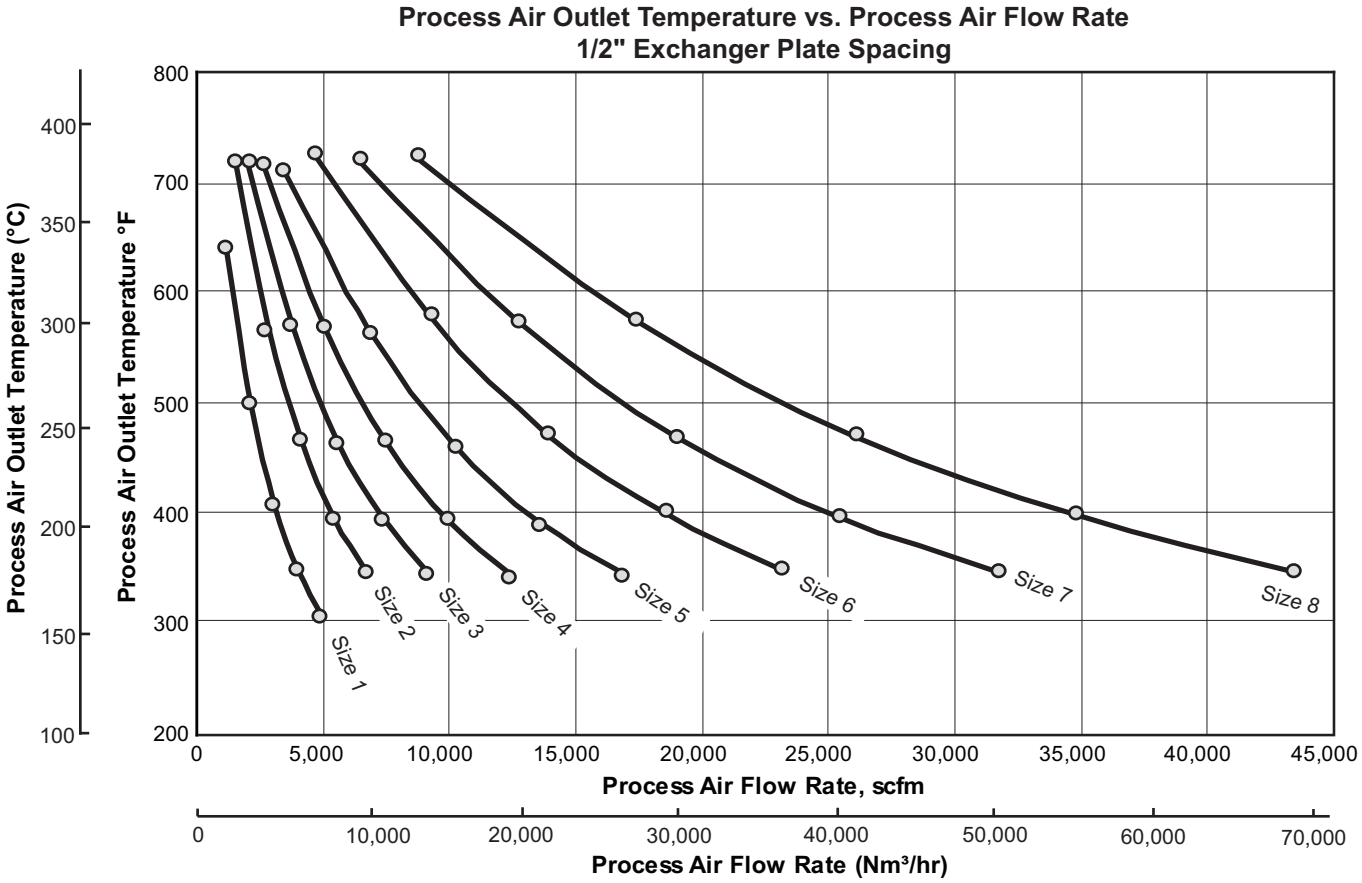
[2] Assuming 230 - 460 VAC / 3 Phase / 60Hz electrical power. Please contact Eclipse for other electrical power options.

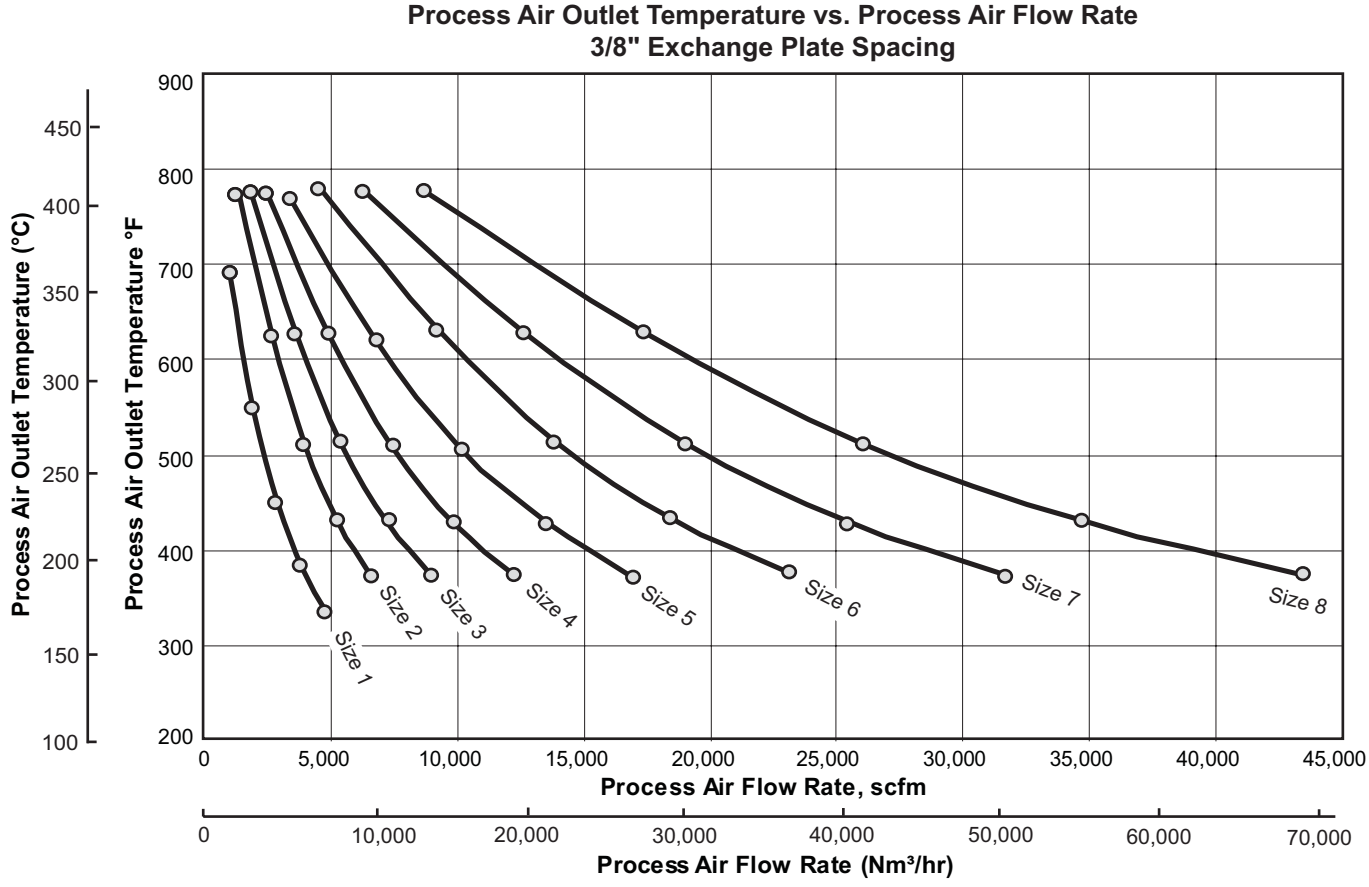
[3] Size 8 unit uses two 25 HP (18.5 kW) motors.

[4] All weights are approximate.

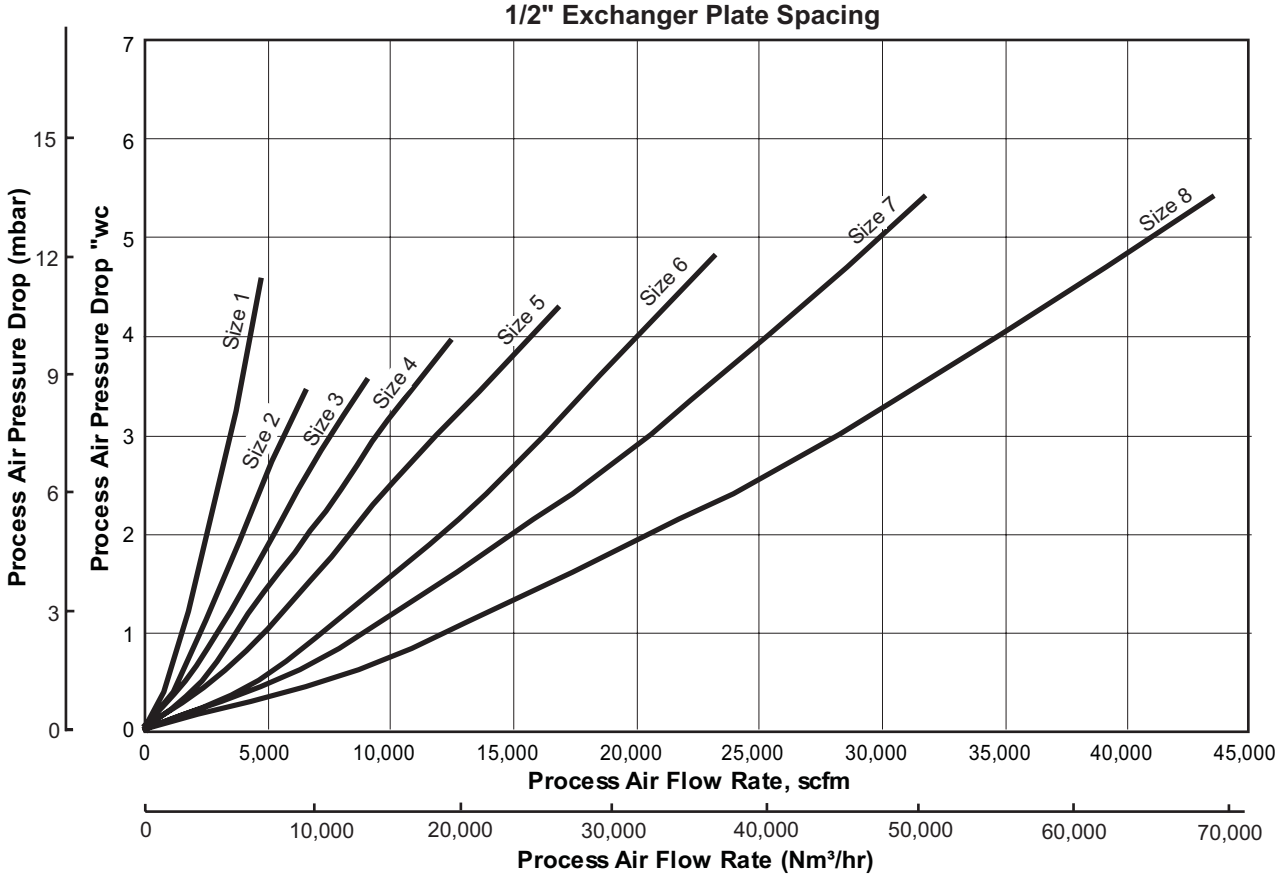
- See Design Guide 121, to be used in conjuction with the following curves, to complete design and selection.
- All information is based on laboratory testing with neutral (0.0" w.c.) exhaust conditions.
- All inputs based upon gross calorific values and standard conditions: 1 atmosphere, 70°F (21°C).
- Plumbing of gas will affect accuracy of orifice readings. All information based on general acceptable air and gas piping practices.
- Custom designs incorporating larger units or multiple units are available for needs greater than above maximums.
- Eclipse reserves the right to change the construction and/or configuration of our products at any time without being obliged to adjust earlier supplies accordingly.

- The performance curves below assume the following:
  - Fuel is natural gas
  - Burners are operated at 50% excess air
  - System elevation is at sea level
  - Process air enters ER Heater at 70°F (21°C), dry

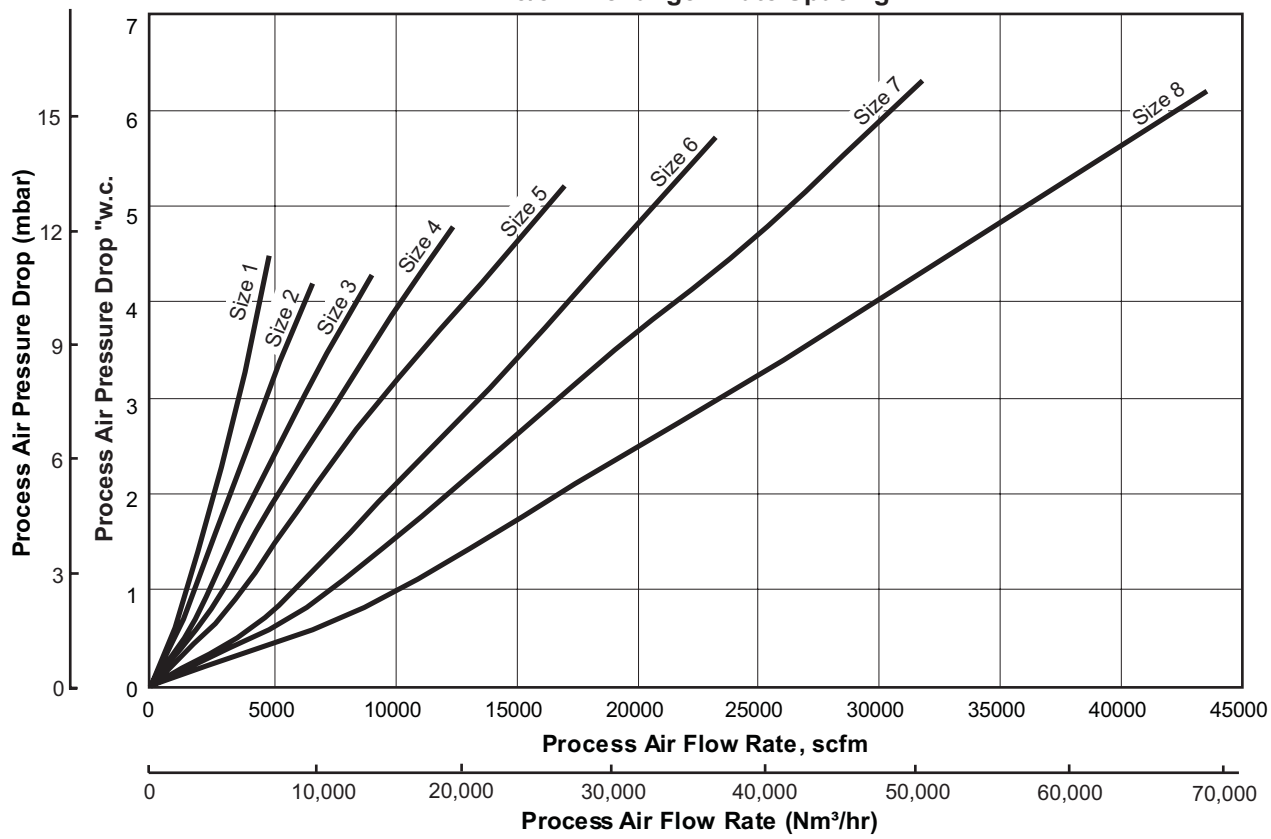

Process Air Outlet Temperature vs. Process Air Flow Rate
1/2" Exchanger Plate Spacing
Process Air Outlet Temperature (°C)
Process Air Outlet Temperature °F
Size 1
Size 2
Size 3
Size 4
Size 5
Size 6
Size 7
Size 8
Process Air Flow Rate, scfm
Process Air Flow Rate (Nm³/hr)

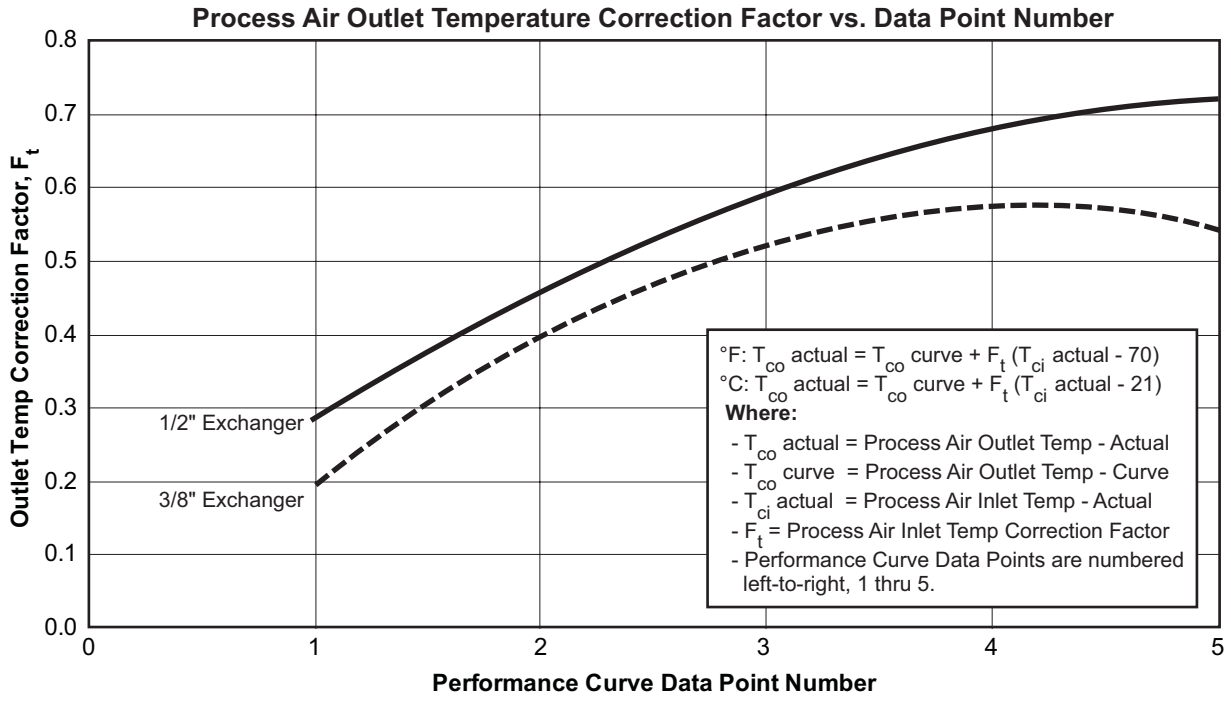

Process Air Outlet Temperature vs. Process Air Flow Rate
3/8" Exchange Plate Spacing
Process Air Outlet Temperature (°C)
Process Air Outlet Temperature °F
Size 1
Size 2
Size 3
Size 4
Size 5
Size 6
Size 7
Size 8
Process Air Flow Rate, scfm
Process Air Flow Rate (Nm³/hr)

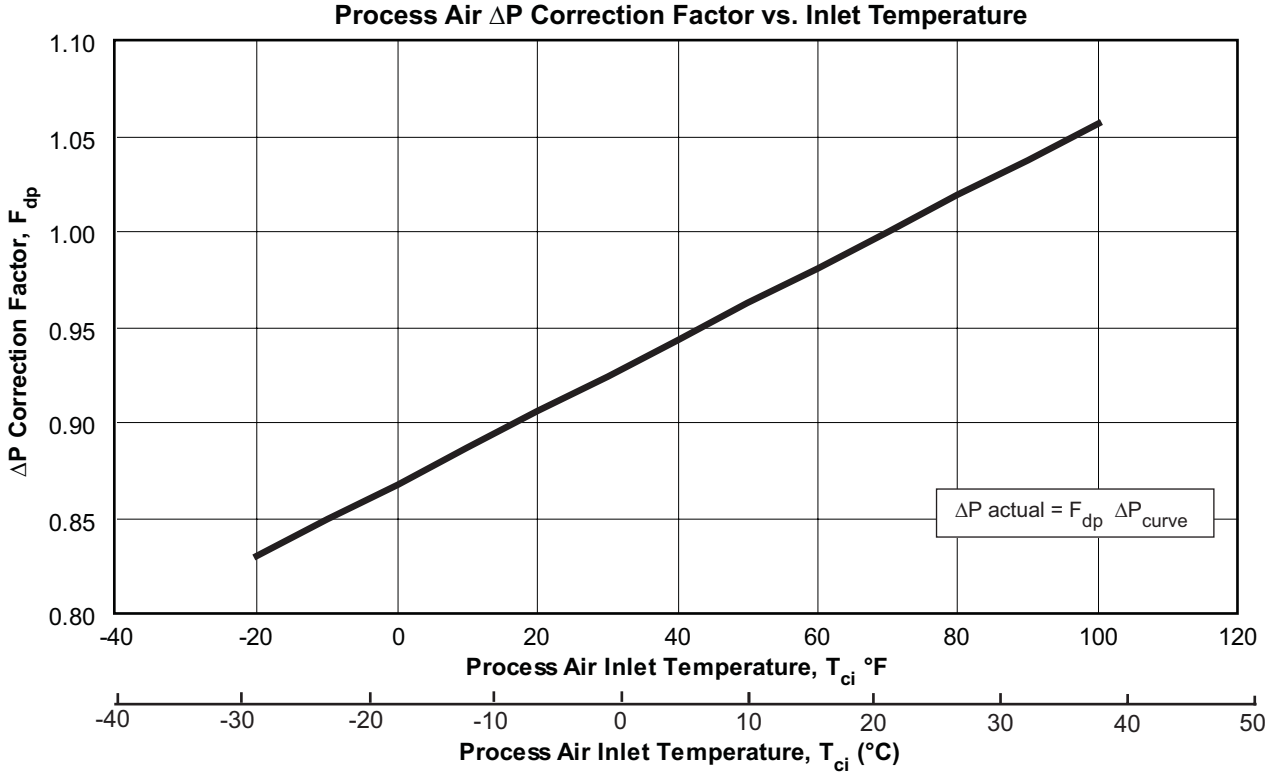
Process Air Pressure Drop vs. Process Air Flow Rate
1/2" Exchanger Plate Spacing



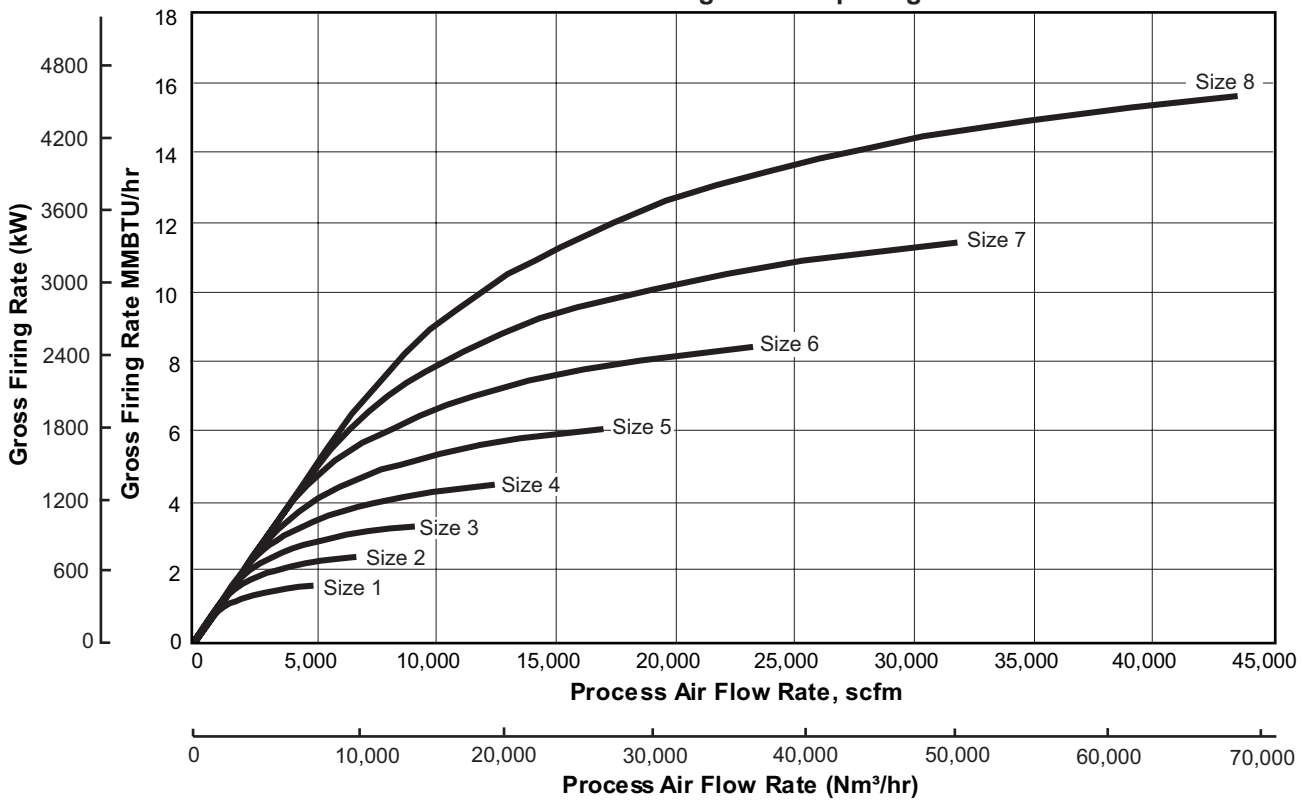
Process Air Pressure Drop vs. Process Air Flow Rate
3/8" Exchanger Plate Spacing




Process Air Outlet Temperature Correction Factor vs. Data Point Number
Outlet Temp Correction Factor, F_t
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
Performance Curve Data Point Number
1/2" Exchanger
3/8" Exchanger
°F: T_{co} actual = T_{co} curve + F_t (T_{ci} actual - 70)
°C: T_{co} actual = T_{co} curve + F_t (T_{ci} actual - 21)
Where:
- T_{co} actual = Process Air Outlet Temp - Actual
- T_{co} curve = Process Air Outlet Temp - Curve
- T_{ci} actual = Process Air Inlet Temp - Actual
- F_t = Process Air Inlet Temp Correction Factor
- Performance Curve Data Points are numbered left-to-right, 1 thru 5.


Process Air ΔP Correction Factor vs. Inlet Temperature
ΔP Correction Factor, F_{dp}
1.10
1.05
1.00
0.95
0.90
0.85
0.80
-40
-20
0
20
40
60
80
100
120
Process Air Inlet Temperature, T_{ci} °F
-40
-30
-20
-10
0
10
20
30
40
50
Process Air Inlet Temperature, T_{ci} (°C)
ΔP actual = F_{dp} ΔP_{curve}

Burner Firing Rate vs. Process Air Flow Rate
1/2" Exchanger Plate Spacing



Burner Firing Rate vs. Process Air Flow Rate
3/8" Exchanger Plate Spacing

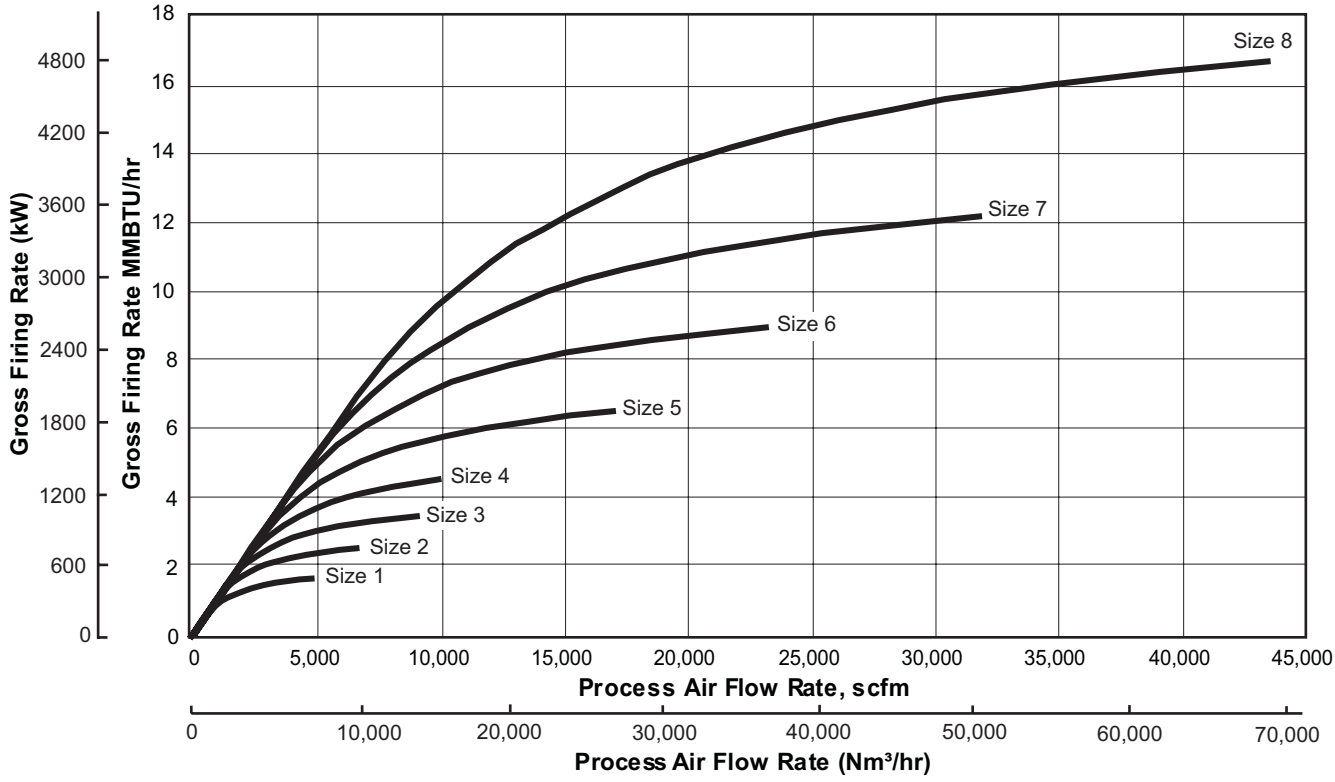
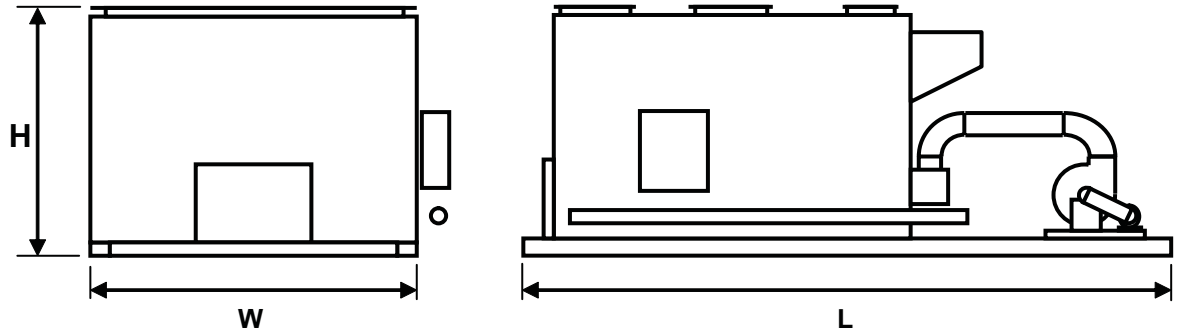


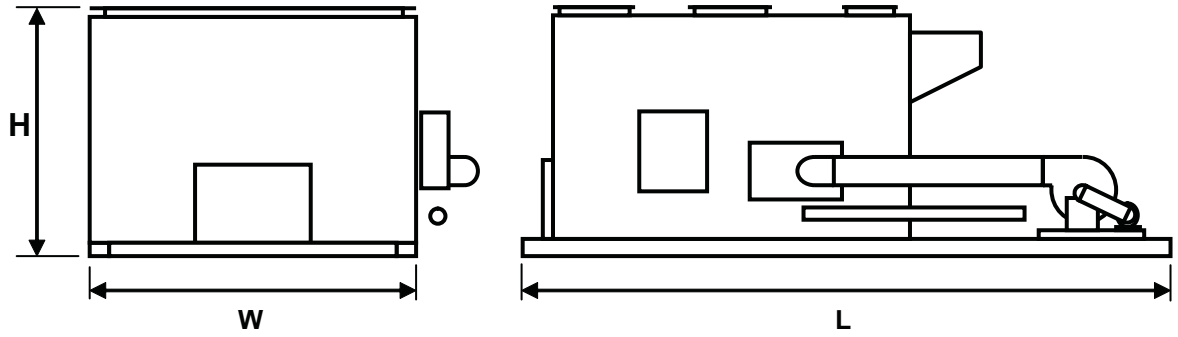
Table 1 Burner Options								
ER Heater Size	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Small Burner								
Maximum Demand, MMBTU/hr	1.5	2.3	3.1	4.2	5.8	8.0	10.9	15.0
Maximum Demand, kW	440	674	909	1231	1700	2345	3194	4396
Winnox Burner with Package Blower	WX0200	WX0300	WX0400	WX0500	WX0600	WX0850	N/A	N/A
Winnox Burner with External Blower	N/A	N/A	N/A	N/A	N/A	N/A	WX0850	N/A
Minnox Burner with External Blower	625 CCS	750 CCS	1000 CCS-T	1250 CCS-T	1750 CCS-T	2500 CCS-T	3250 CCS-T	4500 CCS-T
Large Burner								
Maximum Demand, MMBTU/hr	1.7	2.5	3.5	4.7	6.5	8.9	12.2	16.7
Maximum Demand, kW	498	733	1026	1377	1905	2608	3575	4894
Winnox Burner with Package Blower	WX0300	WX0400	WX0500	WX0600	WX0850	N/A	N/A	N/A
Winnox Burner with External Blower	N/A	N/A	N/A	N/A	N/A	WX0850	N/A	N/A
Minnox Burner with External Blower	750 CCS	1000 CCS-T	1500 CCS-T	1750 CCS-T	2500 CCS-T	3250 CCS-T	4500 CCS-T	6000 CCS-T

Dimensions

System Using Winnox Burners (Low Emissions)



System Using Minnox Burners (Ultra Low Emissions)



Size	Length L Inches (m)	Width W Inches (m)	Height H Inches (m)
1	177 (4.49)	41 (1.04)	98 (2.49)
2	198 (5.03)	44 (1.12)	102 (2.59)
3	209 (5.31)	52 (1.32)	113 (2.87)
4	226 (5.74)	60 (1.52)	115 (2.92)
5	239 (6.07)	72 (1.83)	119 (3.02)
6	255 (6.48)	84 (2.13)	139 (3.53)
7	268 (6.81)	103 (2.62)	139 (3.53)
8	275 (6.98)	136 (3.45)	139 (3.53)

Offered By:
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