ImmersoJet Burner

Model IJ-8
Version 1

IJ-8 Operating Data

Natural Gas, 0.65 s.g. • 15% Excess Air at High Fire • 80% System Efficiency • 1.5" Integral Gas Orifice

English Units	**Burner Input**		**1000's Btu/hr.**	**1000**	**2400**	**3800**	**5200**	**6600**	**8000**
	Air	Static Air Pressure, tap "A" ❶	"w.c.	0.6	5.0	17.5	21.8	24.5	27.0
		Diff. Air Pressure, taps "A" & "D"	"w.c.	Δ0.5	Δ2.5	Δ8.0	Δ8.9	Δ10.0	Δ11.0
		Air Flow	SCFH	11,500	27,600	43,700	59,800	75,900	92,000
	Gas	Static Gas Pressure, tap "B" ❶	"w.c.	0.6	4.5	11.8	16.9	20.5	24.2
		Diff. Gas Pressure , taps "B" & "C"	"w.c.	Δ0.5	Δ1.1	Δ1.8	Δ 2.9	Δ4.5	Δ6.2
		Gas Flow	SCFH	1000	2400	3800	5200	6600	8000
	System	Immersion Tube Backpressure ❷	"w.c.	0.1	2.5	9.5	12.9	14.5	16.0
		Min. Blower Pressure Required ❸	"w.c.	9.6	14.0	26.5	30.8	33.5	36.0
Metric Units	**Burner Input**		**Kw**	**291**	**703**	**1114**	**1524**	**1934**	**2345**
	Air	Static Air Pressure, tap "A" ❶	Pascals	149	1246	4359	5431	6103	6726
		Diff. Air Pressure, taps "A" & "D"	Pascals	Δ125	Δ 623	Δ1993	Δ2217	Δ2491	Δ2740
		Air Flow	$Nm^3/hr.$	308	740	1171	1603	2034	2466
	Gas	Static Gas Pressure, tap "B" ❶	Pascals	149	1121	2939	4210	5107	6028
		Diff. Gas Pressure , taps "B" & "C"	Pascals	Δ125	Δ274	Δ 448	Δ722	Δ1121	Δ1544
		Gas Flow	$Nm^3/hr.$	27	64	102	139	177	214
	System	Immersion Tube Backpressure ❷	Pascals	25	623	2367	3214	3612	3986
		Min. Blower Pressure Required ❸	Pascals	2391	3488	6601	7673	8345	8968
Typical Flue Products		Oxygen	%	12.0	10.2	8.3	6.1	4.0	2.8
		Carbon Dioxide	%	4.9	6.1	7.20	8.3	9.5	10.2

❶ Static pressures are for sizing only. Do not use them for burner set-up or adjustment.

❷ Immersion tube sized for 80% efficiency at 8,000,000 Btu/hr. input (2345 kw) using six 90° or three 180° elbows.

❸ Using the corresponding input as high fire for the system. Includes 9" w.c. drop (2239 Pa) taken across item #5, page 3, to aco ustically
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❹ See Design Guide 330 for more information about typical fuel composition and properties.

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Design Considerations

System Sizing for 80% Efficiency
It is customary to size conventional immersion tubes for 70% efficiency, a reasonable compromise between fuel economy and tube length. However, small bore tubes occupy less tank space than conventional tubes, so their length can easily be increased to provide efficiencies of 80% or more.

Burner Sizing
Determine the net heat output required by the tank.

Divide this by the immersion tube efficiency to find the input required to the immersion tube.

Example: A spray wash tank requires 2,800,000 Btu/hr. output from the immersion tube at high fire. Design efficiency is 80%. Dividing 2,800,000 by 0.8 gives an input to the tube of 3,500,000 Btu/hr.

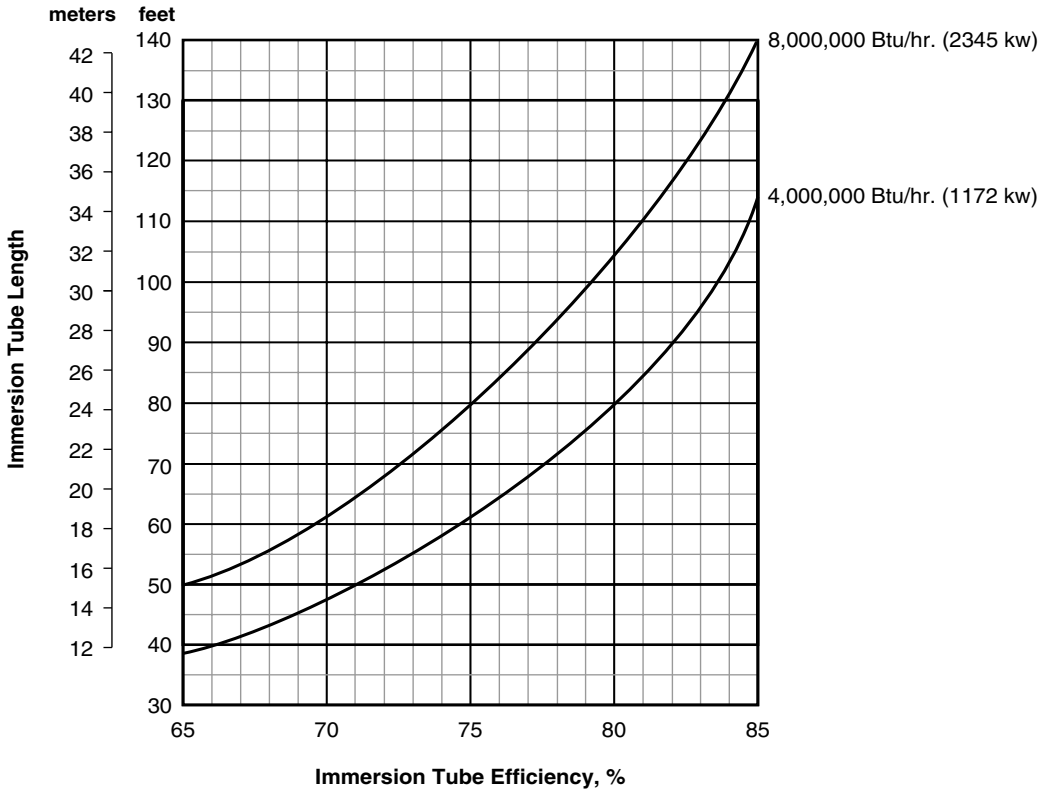
Immersion Tube Design
Tubes sized for 80% efficiency will have low exhaust temperatures, causing condensation to form in them at start-up or during long idling periods. This condensation will normally evaporate after the burner has run at high fire briefly. However, if extended idling periods are expected, provide a condensate drain at the exhaust and slope the immersion tube down away from the burner. Consult Eclipse publication *Info 330* for details.

Small bore immersion tubes can be sized for efficiencies lower than 80% if tank space is extremely limited or if complete freedom from tube condensation is desired.

The graph below shows the immersion tube length required to achieve various efficiencies at two different inputs. Tube length is the total running length measured from the exit (small) end of the combustion chamber. Heat transfer from the chamber itself has been taken into account.

Use the centerline lengths of elbows when computing total pipe runs.

Immersion Tube Length vs. Efficiency



Piping Considerations

Combustion Air Piping
Keep piping pressure losses to a minimum. Adding any elbows to the typical system shown on page 3 may require larger piping, system components, or a larger blower to make up for the additional pressure losses. The chart at right shows high fire air pressure losses that may be expected for elbows of various pipe sizes.

Gas Piping
See chart at right for high fire gas pressure losses for piping elbows.

For convenience, the gas inlet housing may be rotated in 45° increments with respect to the air inlet.

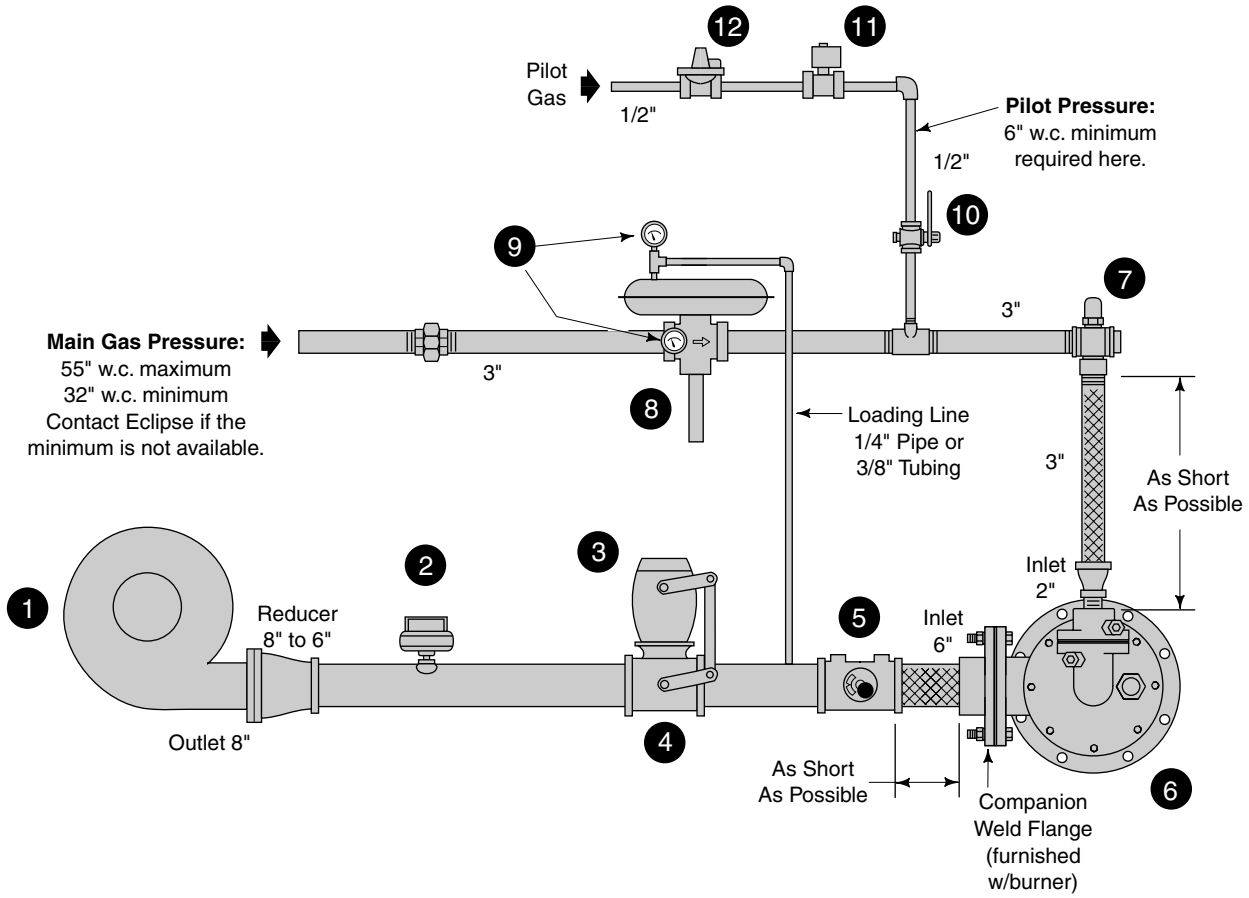
90˚ Elbow Pressure Drops*

	Pipe Size	Loss Per 90˚ Elbow
Air	6"	4.0" w.c.
	8"	1.4" w.c.
Gas	2"	1.3" w.c.
	3"	0.3" w.c.

* At maximum input, page 1.

Typical Single Burner Immerso-Jet System

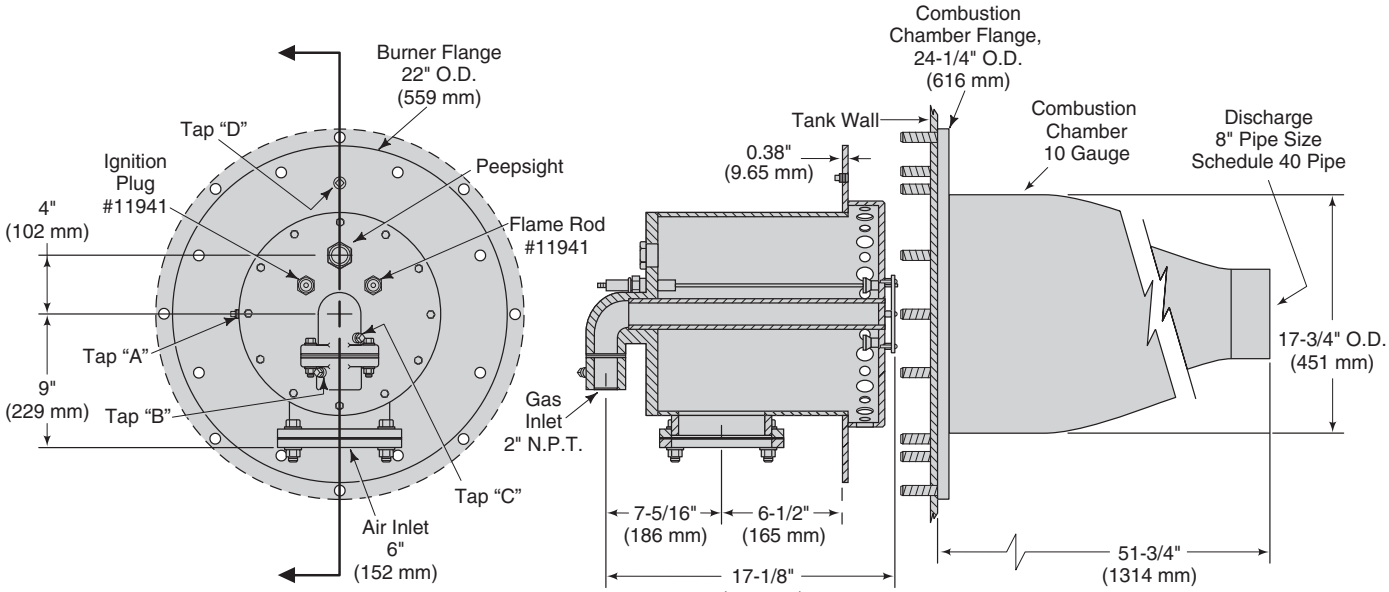
Sized for a high fire input of 8,000,000 Btu/hr.



Leave at least 6" below item 8 for adjustment.

Item	Description	Pipe Size	Eclipse Part #	Eclipse Bulletin
1	Blower, SMJ 8823-15, 40" w.c. @ 92,000 SCFH	8"	202775-1	610
	with 15 HP motor (included)	---	11220	610
	Inlet filter (optional)	---	200754	614
2	Air flow switch, JD-2 with 24" spring	---	16928-1	840
3	Air control motor w/mounting kit	---	---	720
4	Automatic butterfly valve, Eclipse 24 BV-A8D	6"	500998	720
5	Manual butterfly valve, Eclipse 24 BV	6"	500915	720
6	Immerso-Jet Burner, IJ-8	---	113047	330
7	Adjusting valve, Eclipse 1212-62 ALO-R	3"	302012	728
8	Proportionator, Eclipse 112 ABP	3"	500628	740
9	Pressure gauge or hose cock	---	---	710, 940
10	Adjustable pilot cock	1/2"	10267	732
11	Pilot solenoid	1/2"	---	760
12	Pilot regulator	1/2"	---	680

Dimensions



NOTE: All taps are 1/8" N.P.T.

Notes

1. Flame rod and ignition plug positions are interchangeable. Do not mount them on the bottom port of the burner, as condensation may collect there and cause nuisance shutdowns.

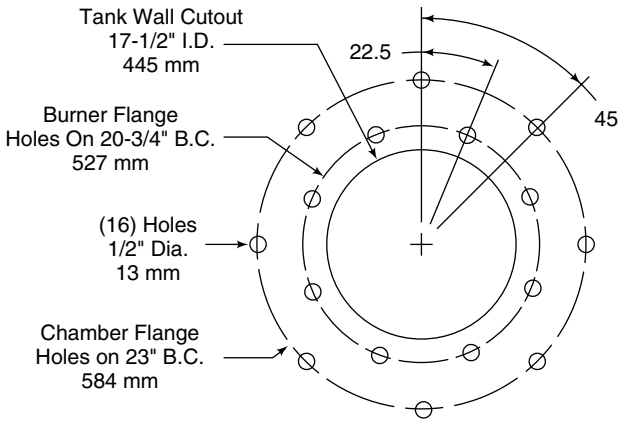
2. Specify mild steel or stainless steel for the combustion chamber and discharge pipe.

3. Bolt the outer circle of mounting studs on the combustion chamber through holes drilled in the tank wall. Bolt the inner circle of studs to the burner mounting flange through holes drilled in the tank wall. See the "Tank Wall Layout" at right. Use a sealing compound on the liquid side of the tank suitable for the liquid and temperatures being used. Consult a local vendor for recommendations.

   To weld rather than bolt the chamber to the tank wall, grind off the outer ring of studs from the chamber flange. Do not use a gasket between the chamber flange and the tank wall.

4. For convenience in piping, the gas inlet housing may be rotated in 45° increments with respect to the air inlet.

Tank Wall Layout



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