

Variable Flow Oil Burner Nozzles

Type "BPS" BY-PASSING

Type BPS by-passing nozzles are designed to produce variable flow rates using a single nozzle. The flow of oil into the swirl chamber of the nozzle is by-passed through a return flow orifice in the nozzle distributor (disc) and a fraction of the flow is returned to the storage tank. When the by-pass valve is closed, the nozzle acts as a simplex atomizing nozzle at its rated capacity. As the by-pass valve is opened, flow through the nozzle orifice is reduced with the balance of the oil returning to the tank.

Application:

- Commercial and industrial combustion.

Materials/Construction:

- Body and disc: Type 416 Stainless Steel.
- Stem and adapter: brass.
- Strainers: 120 mesh, 304 s.s. up to 10 gph
60 mesh, 304 s.s. over 10 gph

Availability/Spray Angles:

- Flow rates: 0.85 GPH TO 50.0 GPH
- Spray angles: 45°, 60°, 80°
- Spray pattern: semi-solid, "universal".

Rating and Tolerances:

- Flow rates: +/-5% from nominal rating @ 100 psig operating pressure, with by-pass valve closed.
- Spray angles: +5°/-0° from nominal rating @ 100 psig operating pressure, with by-pass valve closed.
- Test fluid: viscosity 35 SSU, specific gravity .825 @ 60°F.

Features:

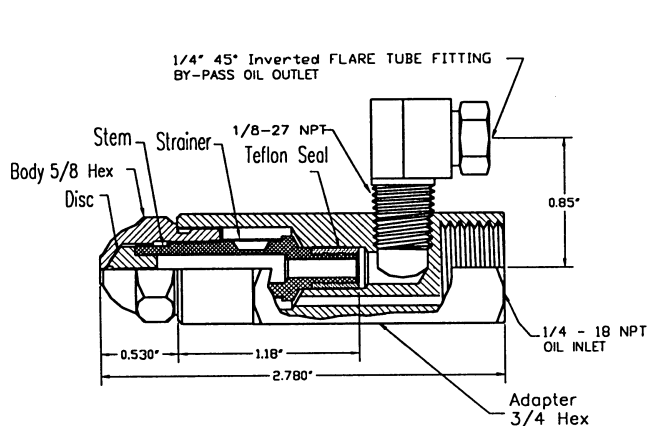
- Accurate, predictable flow rates due to linear and uniform relationship between by-pass pressure and orifice flow.
- Less than 5° fluctuation in spray angle over entire operating (turn down) range.
- Turn down ratios between 3:1 and 4:1
- Variable flow rate with a constant supply pressure
- Fine atomization over entire flow range.
- Flow curves and data for each nominal flow rate are available upon request

Ordering Information:

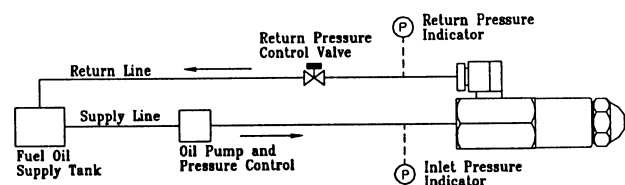
- The part number represents the nominal flow rate, the spray angle and the nozzle type "BPS"
- **Example: 12.00 GPH - 60° - BPS**

CHART SHOWING FLOW RATES AT VARIOUS OPERATING PRESSURES ON REVERSE SIDE.

By-Pass Nozzle Assembly



Installation Schematic



Installation:

A pressure regulating valve is used to control the By-Pass pressure. With the by-pass valve fully closed the nozzle discharges at nominal flow rate. The nozzle flow rate is adjusted by controlling the By-Pass Pressure.

Flow Rates And Available Sizes

100 psig operating pressure

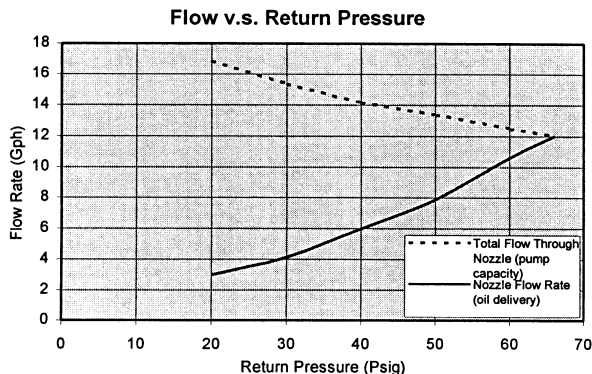
Nozzle Size	Flow Rate (Gph) at various return line pressures (Psig)						Pump Capacity Gph
	20	30	40	50	60	closed	
0.85	0.27	0.33	0.40	0.50	0.61	0.85	0.97
1.00	0.32	0.42	0.51	0.61	0.71	1.00	1.13
1.20	0.42	0.55	0.68	0.83	1.02	1.20	1.44
1.35	0.45	0.62	0.80	0.98	1.17	1.35	1.64
1.65	0.62	0.85	1.11	1.40	-	1.65	1.99
3.00	1.06	1.37	1.85	2.48	-	3.00	3.91
3.50	1.32	1.62	2.11	2.77	3.39	3.50	4.74
4.00	1.53	1.85	2.37	3.01	3.61	4.00	5.08
4.50	1.05	1.51	2.11	2.71	3.25	4.50	5.92
5.00	1.63	2.04	2.81	3.57	4.47	5.00	6.78
5.50	1.36	1.79	2.52	3.28	4.25	5.50	7.70
6.00	1.67	2.37	3.25	4.35	5.61	6.00	8.21
6.50	1.71	2.26	3.36	4.64	5.87	6.50	8.97
7.00	1.80	2.32	3.27	4.47	5.78	7.00	9.58
7.50	2.45	3.13	4.50	6.00	-	7.50	9.60
8.00	1.79	2.47	3.64	5.14	6.93	8.00	11.29
9.00	2.06	2.84	4.16	5.70	7.89	9.00	13.25
9.50	2.67	3.61	5.23	7.38	-	9.50	12.54
10.00	2.20	2.80	4.24	6.05	8.26	10.00	14.89
10.50	2.92	3.57	5.03	6.69	8.87	10.50	14.60
11.00	2.99	3.66	5.17	7.17	9.52	11.00	15.99
11.50	2.74	3.64	5.69	7.92	10.68	11.50	16.40
12.00	2.99	4.11	5.99	7.89	10.61	12.00	16.84
12.50	3.37	4.36	6.40	8.60	11.43	12.50	18.31
13.00	3.23	4.16	5.96	8.19	10.79	13.00	19.00
13.50	3.34	4.64	6.61	9.19	12.52	13.50	18.78
14.00	2.78	3.76	5.74	8.55	11.05	14.00	21.79
14.50	2.87	3.98	5.88	8.53	11.33	14.50	21.96
15.00	3.39	4.58	6.79	9.97	13.12	15.00	22.39
16.00	3.90	5.55	8.15	11.39	14.47	16.00	21.82
17.00	3.66	5.01	7.26	10.61	13.64	17.00	25.97
17.50	4.48	5.77	8.31	11.47	14.30	17.50	25.14
18.00	5.57	7.09	9.27	11.97	15.11	18.00	24.46
19.00	4.23	6.09	8.93	12.61	16.37	19.00	27.50
19.50	4.99	7.63	11.13	15.35	19.19	19.50	26.35
20.00	5.20	7.81	11.59	16.22	-	20.00	26.37
21.00	6.27	8.52	12.05	16.45	20.61	21.00	26.62
21.50	6.30	8.29	11.22	16.26	20.74	21.50	27.99
22.00	6.70	9.08	12.14	16.29	20.64	22.00	27.64
24.00	7.29	10.08	13.50	18.12	23.16	24.00	30.37
26.00	7.76	10.42	13.68	18.53	23.28	26.00	32.14
28.00	8.75	11.97	15.47	19.98	24.74	28.00	34.36
30.00	10.90	14.03	17.72	21.79	27.73	30.00	37.01
32.00	12.28	15.55	19.23	24.24	30.37	32.00	38.47
35.00	13.20	16.56	20.18	24.66	30.05	35.00	44.33
40.00	16.52	20.29	24.50	29.38	37.15	40.00	47.92
45.00	22.96	26.82	31.37	36.79	43.91	45.00	53.89
50.00	26.68	31.33	36.65	43.78	-	50.00	56.30

300 psig operating pressure

Nozzle Size	Flow Rate (Gph) at various return line pressures (Psig)						Pump Capacity Gph
	70	90	120	150	180	closed	
0.85	0.48	0.57	0.71	0.90	1.10	1.39	1.67
1.00	0.54	0.69	0.84	0.96	1.21	1.54	1.78
1.20	0.84	0.98	1.22	1.50	1.79	2.01	2.36
1.35	0.82	1.03	1.33	1.71	2.06	2.24	2.70
1.65	1.23	1.50	1.96	2.45	-	2.65	3.22
3.00	1.64	2.16	3.07	4.16	-	4.94	6.47
3.50	2.02	2.53	3.45	4.63	5.40	5.81	7.89
4.00	2.31	2.85	3.74	4.92	6.21	6.61	8.59
4.50	1.67	2.34	3.31	4.40	5.47	7.32	9.62
5.00	2.12	2.79	4.42	5.94	7.72	8.53	11.77
5.50	1.62	2.38	3.85	5.26	7.02	8.96	13.34
6.00	2.11	3.11	5.06	7.01	9.47	10.17	14.18
6.50	2.46	3.40	5.29	7.59	9.93	10.80	14.89
7.00	2.64	3.49	5.05	7.12	9.67	11.49	17.07
7.50	4.05	4.83	7.12	10.05	12.51	12.62	16.02
8.00	2.49	3.48	5.52	8.26	11.62	13.30	18.97
9.00	3.04	3.80	5.96	8.93	12.54	15.17	23.28
9.50	3.82	5.09	8.03	11.97	-	15.88	21.43
10.00	3.36	4.08	6.38	9.56	13.81	17.23	26.02
10.50	3.72	5.35	8.03	11.43	15.09	17.55	23.80
11.00	4.75	5.48	7.93	11.39	15.68	19.28	27.76
11.50	4.51	5.47	8.48	12.80	17.79	19.99	28.63
12.00	4.77	5.98	9.11	13.02	18.11	20.10	29.41
12.50	5.11	6.07	8.93	13.42	18.55	21.59	32.23
13.00	5.18	6.14	8.88	12.95	17.77	22.25	33.24
13.50	5.55	6.79	10.49	14.84	21.02	23.28	32.95
14.00	4.37	5.62	8.46	13.33	18.85	23.98	37.82
14.50	4.71	5.96	9.17	14.12	18.48	24.55	37.35
15.00	5.40	6.84	10.39	15.64	21.78	25.99	38.85
16.00	16.11	7.59	11.92	18.26	24.94	26.75	38.88
17.00	6.03	7.70	11.45	16.90	23.42	29.00	44.69
17.50	6.86	8.45	12.20	18.10	24.40	29.22	43.46
18.00	8.39	11.17	15.31	19.97	25.71	29.76	41.97
19.00	7.09	9.11	14.07	20.23	27.78	32.43	47.22
19.50	8.72	11.36	17.07	24.33	32.09	33.42	44.84
20.00	9.22	12.10	18.35	26.46	34.11	35.18	45.24
21.00	10.74	13.05	18.82	26.18	34.81	36.37	46.05
21.50	10.45	12.76	18.41	25.77	35.24	37.00	47.96
22.00	11.14	13.58	19.64	25.93	34.74	37.25	48.80
24.00	12.23	15.11	21.72	29.65	39.01	41.62	53.10
26.00	12.60	15.79	22.12	29.52	38.63	42.38	55.82
28.00	15.54	17.94	23.84	31.63	41.70	46.03	59.36
30.00	18.00	21.58	28.28	35.86	46.34	49.30	63.69
32.00	20.17	23.90	31.25	40.34	50.91	53.02	66.15
35.00	22.50	26.10	32.79	40.75	50.67	57.31	75.40
40.00	27.73	31.94	39.14	49.34	60.99	65.28	81.49
45.00	39.73	43.77	51.54	61.95	73.07	74.60	92.30
50.00	46.07	51.26	60.77	73.73	-	82.95	96.19

The dash (-) shows that the pressure with the return valve closed is lower than the pressure in the column heading (i.e. 60 psig).

Typical Flow Curve for Hago By-Pass Nozzles



As is indicated by the solid line, this curve illustrates the nearly linear relationship between flow through the nozzle orifice (oil delivery) and by-pass pressure. The dashed line shows the total flow through the system (oil delivered plus returned). This is the minimum pump capacity that is required at a given pressure setting. **These graphs are available for each nominal flow rate upon request.**

HAGO PRECISION SPRAY NOZZLES
100% Tested 100% Guaranteed
100% Stainless Steel