

Hy-Orifice™ - The latest Hydrogen flow meter from GM Flow

GM Flow Measurement Services Ltd are proud to introduce Hy-Orifice™, for a wide range of flow rates and fluid types. Hy-Orifice™ was specifically designed for extremely low flow rate hydrogen gas, but it is equally suited to other gases such as nitrogen, air or natural gas, as well as clean Water, diesel, acids and well scale treatment. By varying the orifice size, differential pressure and flowing pressure transmitter ranges, Hy-Orifice™ can measure from as low as 0.008 g/sec (@ 10 Bar) up to 108 g/sec of Hydrogen (@ 1000 bar). Hy-Orifice™ complements our Hy-Cone™ and Integra-Cone™ flow meters by providing an very low flow range device for extreme pressure applications.



Hy-Orifice™ comes equipped with flow computer, 1000 bar rated differential pressure, static pressure and temperature elements enabling mass and/or liquid flow rate measurements to be achieved.

Working pressures and flow ranges are determined by the customers application, so contact your designated representative for assistance to select the right flow meter for you application.

- △ NPT or Autoclave Threaded Connections
- △ 5 to 10:1 Turndown ratio (depending on accuracy requirements)
- △ Includes required upstream and downstream straight lengths within the meter body
- △ Mono-Block Design - no Welding
- △ Integrated Pressure, Differential Pressure & Temperature Instruments
- △ Corrosion and Erosion Resistant Materials
- △ Simple Operation and Field Inspection/Maintenance
- △ Reliable by Design
- △ Rated to 1000 bar Working Pressure
- △ 316L Stainless Steel as standard

GM Flow Measurement Services Ltd Hy-Orifice™ Selection Table



Instructions for use, (flow rate in g/sec):

- 1) If the flow range is between 0.02 & 108 g/sec, select the 12 mm bore. If smaller, select the 6 mm bore
- 2) For the required working pressure, select the orifice plate size which best covers the required flow range.
- 3) If no single flow range is suitable, contact GM Flow for further advice
- 4) GM Flow will run check calculation, for customer to sign off on, prior to final manufacture

12 mm Bore Hy-Orifice™ Sizing Data. Flow rate in g/Sec

Meter Bore	Hydrogen Flowing Pressure									
12 mm	1000 Bar (14504 PSIG)		750 Bar (10878 PSIG)		500 Bar (7252 PSIG)		250 Bar (3626 PSIG)		100 Bar (1450 PSIG)	
Orifice Size	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)
4.00	2.4 (1)	24.4 (2)	2.2 (1)	22.2 (2)	1.9 (1)	19.3 (2)	1.5 (1)	14.6 (2)	0.98 (1)	6.8 (3)
5.00	3.9 (1)	38.4 (2)	3.5 (1)	35.03 (2)	3.1 (1)	30.4 (2)	2.3 (1)	22.99 (2)	1.5 (1)	10.8 (3)
6.00	5.7 (1)	56.3 (2)	5.2 (1)	51.3 (2)	4.5 (1)	44.5 (2)	3.4 (1)	33.7 (2)	2.3 (1)	15.8 (3)
7.00	7.95 (1)	78.96 (2)	7.3 (1)	72.1 (2)	6.3 (1)	62.5 (2)	4.8 (1)	47.3 (2)	3.2 (1)	22.2 (3)
8.00	10.9 (1)	108.2 (2)	9.98 (1)	98.8 (2)	8.7 (1)	85.6 (2)	6.6 (1)	64.9 (2)	4.4 (1)	30.5 (3)

Meter Bore	Hydrogen Flowing Pressure									
12 mm	75 Bar (1088 PSIG)		50 Bar (725 PSIG)		25 Bar (363 PSIG)		10 Bar (145 PSIG)		5 Bar (72.5 PSIG)	
Orifice Size	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)
4.00	0.85 (1)	5.98 (3)	0.7 (1)	3.5 (4)	0.12 (5)	1.6 (6)	0.07 (7)	0.9 (8)	0.02 (9)	0.2 (10)
5.00	1.3 (1)	9.4 (3)	1.1 (1)	5.5 (4)	0.18 (5)	2.5 (6)	0.1 (7)	1.4 (8)	0.03 (9)	0.3 (10)
6.00	1.98 (1)	13.8 (3)	1.6 (1)	8.1 (4)	0.27 (5)	3.7 (6)	0.15 (7)	2 (8)	0.04 (9)	0.5 (10)
7.00	2.8 (1)	19.4 (3)	2.3 (1)	11.35 (4)	0.38 (5)	5.2 (6)	0.22 (7)	2.8 (8)	0.06 (9)	0.7 (10)
8.00	3.8 (1)	26.6 (3)	3.2 (1)	15.6 (4)	0.53 (5)	7.1 (6)	0.3 (7)	3.9 (8)	0.08 (9)	0.9 (10)

Instructions for use, (flow rate in g/sec):

- 1) If the flow range is between 0.06 & 389 Kg/Hour, select the 12 mm bore. If smaller, select the 6 mm bore
- 2) For the required working pressure, select the orifice plate size which best covers the required flow range.
- 3) If no single flow range is suitable, contact GM Flow for further advice
- 4) GM Flow will run check calculation, for customer to sign off on, prior to final manufacture

12 mm Bore Hy-Orifice™ Sizing Data. Flow rate in Kg/Hour

Meter Bore	Hydrogen Flowing Pressure									
12 mm	1000 Bar (14504 PSIG)		750 Bar (10878 PSIG)		500 Bar (7252 PSIG)		250 Bar (3626 PSIG)		100 Bar (1450 PSIG)	
Orifice Size	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)
4.00	8.8 (1)	87.7 (2)	8.04 (1)	80.01 (2)	6.98 (1)	69.4 (2)	5.3 (1)	52.5 (2)	3.5 (1)	24.6 (3)
5.00	13.9 (1)	138.2 (2)	12.7 (1)	126.1 (2)	11 (1)	109.3 (2)	8.3 (1)	82.8 (2)	5.5 (1)	38.8 (3)
6.00	20.4 (1)	202.6 (2)	18.6 (1)	184.9 (2)	16.1 (1)	160.2 (2)	12.2 (1)	121.3 (2)	8.1 (1)	56.9 (3)
7.00	28.6 (1)	284.2 (2)	26.1 (1)	259.4 (2)	22.7 (1)	224.9 (2)	17.2 (1)	170.3 (2)	11.4 (1)	79.9 (3)
8.00	39.3 (1)	389.7 (2)	35.9 (1)	355.6 (2)	31.2 (1)	308.3 (2)	23.6 (1)	233.5 (2)	15.7 (1)	109.6 (3)

Meter Bore	Hydrogen Flowing Pressure									
12 mm	75 Bar (1088 PSIG)		50 Bar (725 PSIG)		25 Bar (363 PSIG)		10 Bar (145 PSIG)		5 Bar (72.5 PSIG)	
Orifice Size	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)
4.00	3.1 (1)	21.5 (3)	2.5 (1)	12.6 (4)	0.4 (5)	5.7 (6)	0.2 (7)	3.1 (8)	0.06 (9)	0.8 (10)
5.00	4.8 (1)	33.9 (3)	4.01 (1)	19.8 (4)	0.7 (5)	9.1 (6)	0.37 (7)	4.97 (8)	0.1 (9)	1.2 (10)
6.00	7.1 (1)	49.7 (3)	5.9 (1)	29.1 (4)	0.98 (5)	13.3 (6)	0.55 (7)	7.3 (8)	0.15 (9)	1.7 (10)
7.00	10.01 (1)	69.8 (3)	8.3 (1)	40.9 (4)	1.4 (5)	18.7 (6)	0.8 (7)	10.2 (8)	0.21 (9)	2.5 (10)
8.00	13.8 (1)	95.8 (3)	11.4 (1)	56.1 (4)	1.9 (5)	25.7 (6)	1.1 (7)	14.1 (8)	0.29 (9)	3.4 (10)

- (1) 10 mBar Differential Pressure
- (2) 1000 mBar Differential Pressure
- (3) 500 mBar Differential Pressure
- (4) 250 mBar Differential Pressure
- (5) 0.5 mBar Differential Pressure
- (6) 100 mBar Differential Pressure
- (7) 0.35 mBar Differential Pressure
- (8) 70 mBar Differential Pressure
- (9) 0.035 mBar Differential Pressure
- (10) 7.0 mBar Differential Pressure
- (11) 1.25 mBar Differential Pressure
- (12) 125 mBar Differential Pressure
- (13) 0.25 mBar Differential Pressure
- (14) 25 mBar Differential Pressure

GM Flow Measurement Services Ltd
Hy-Orifice™ Selection Table



Instructions for use, (flow rate in g/sec):

- 1) If the flow range is between 0.02 & 108 g/sec, select the 12 mm bore. If smaller, select the 6 mm bore
- 2) For the required working pressure, select the orifice plate size which best covers the required flow range.
- 3) If no single flow range is suitable, contact GM Flow for further advice
- 4) GM Flow will run check calculation, for customer to sign off on, prior to final manufacture

6 mm Bore Hy-Orifice™ Sizing Data. Flow rate in g/Sec

Meter Bore	Hydrogen Flowing Pressure									
6 mm	1000 Bar (14504 PSIG)		750 Bar (10878 PSIG)		500 Bar (7252 PSIG)		250 Bar (3626 PSIG)		100 Bar (1450 PSIG)	
Orifice Size	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)
1.00	0.15 (1)	1.53 (2)	0.14 (1)	1.39 (2)	0.12 (1)	1.21 (2)	0.093 (1)	0.91 (2)	0.062 (1)	0.61 (3)
2.00	0.62 (1)	6.1 (2)	0.56 (1)	5.57 (2)	0.49 (1)	4.83 (2)	0.37 (1)	3.66 (2)	0.25 (1)	2.42 (3)
3.00	1.42 (1)	14.1 (2)	1.3 (1)	12.87 (2)	1.13 (1)	11.15 (2)	0.86 (1)	8.45 (2)	0.57 (1)	5.59 (3)
4.0	2.75 (1)	27.12 (2)	2.51 (1)	24.75 (2)	2.18 (1)	21.46 (2)	1.65 (1)	16.26 (2)	1.1 (1)	10.77 (3)

Meter Bore	Hydrogen Flowing Pressure									
6 mm	75 Bar (1088 PSIG)		50 Bar (725 PSIG)		25 Bar (363 PSIG)		10 Bar (145 PSIG)		5 Bar (72.5 PSIG)	
Orifice Size	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)	Min Rate (g/sec)	Max Rate (g/sec)
1.00	0.054 (1)	0.37 (3)	0.045 (1)	0.22 (4)	0.012 (11)	0.11 (12)	0.008 (11)	0.07 (12)	0.003 (13)	0.02 (14)
2.00	0.215 (1)	1.5 (3)	0.178 (1)	0.88 (4)	0.047 (11)	0.45 (12)	0.031 (11)	0.29 (12)	0.011 (13)	0.1 (14)
3.00	0.498 (1)	3.47 (3)	0.412 (1)	2.03 (4)	0.108 (11)	1.04 (12)	0.072 (11)	0.68 (12)	0.026 (13)	0.23 (14)
4.0	0.964 (1)	6.68 (3)	0.798 (1)	3.91 (4)	0.211 (11)	2 (12)	0.141 (11)	1.31 (12)	0.052 (13)	0.44 (14)

Instructions for use, (flow rate in g/sec):

- 1) If the flow range is between 0.02 & 108 g/sec, select the 12 mm bore. If smaller, select the 6 mm bore
- 2) For the required working pressure, select the orifice plate size which best covers the required flow range.
- 3) If no single flow range is suitable, contact GM Flow for further advice
- 4) GM Flow will run check calculation, for customer to sign off on, prior to final manufacture

6 mm Bore Hy-Orifice™ Sizing Data. Flow rate in Kg/Hour

Meter Bore	Hydrogen Flowing Pressure									
6 mm	1000 Bar (14504 PSIG)		750 Bar (10878 PSIG)		500 Bar (7252 PSIG)		250 Bar (3626 PSIG)		100 Bar (1450 PSIG)	
Orifice Size	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)
1.00	0.55 (1)	5.49 (2)	0.51 (1)	5.01 (2)	0.4 (1)	4.3 (2)	0.33 (1)	3.3 (2)	0.22 (1)	2.2 (3)
2.00	2.21 (1)	21.98 (2)	2.02 (1)	20.05 (2)	1.8 (1)	17.4 (2)	1.3 (1)	13.2 (2)	0.89 (1)	8.7 (3)
3.00	5.12 (1)	50.75 (2)	4.67 (1)	46.32 (2)	4.1 (1)	40.2 (2)	3.1 (1)	30.4 (2)	2.05 (1)	20.1 (3)
4.0	9.88 (1)	97.63 (2)	9.03 (1)	89.11 (2)	7.8 (1)	77.3 (2)	5.95 (1)	58.5 (2)	8.78 (1)	38.8 (3)

Meter Bore	Hydrogen Flowing Pressure									
6 mm	75 Bar (1088 PSIG)		50 Bar (725 PSIG)		25 Bar (363 PSIG)		10 Bar (145 PSIG)		5 Bar (72.5 PSIG)	
Orifice Size	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)	Min Rate (Kg/Hr)	Max Rate (Kg/Hr)
1.00	0.19 (1)	1.35 (3)	0.16 (1)	0.79 (4)	0.04 (11)	0.4 (12)	0.03 (11)	0.27 (12)	0.01 (13)	0.09 (14)
2.00	0.78 (1)	5.4 (3)	0.64 (1)	3.16 (4)	0.17 (11)	1.61 (12)	0.11 (11)	1.06 (12)	0.04 (13)	0.36 (14)
3.00	1.79 (1)	12.5 (3)	1.48 (1)	7.3 (4)	0.39 (11)	3.73 (12)	0.26 (11)	2.44 (12)	0.09 (13)	0.82 (14)
4.0	3.47 (1)	24.04 (3)	2.87 (1)	14.1 (4)	0.76 (11)	7.21 (12)	0.51 (11)	4.72 (12)	0.19 (13)	1.6 (14)

- (1) 10 mBar Differential Pressure
- (2) 1000 mBar Differential Pressure
- (3) 500 mBar Differential Pressure
- (4) 250 mBar Differential Pressure
- (5) 0.5 mBar Differential Pressure
- (6) 100 mBar Differential Pressure
- (7) 0.35 mBar Differential Pressure
- (8) 70 mBar Differential Pressure
- (9) 0.035 mBar Differential Pressure
- (10) 7.0 mBar Differential Pressure
- (11) 1.25 mBar Differential Pressure
- (12) 125 mBar Differential Pressure
- (13) 0.25 mBar Differential Pressure
- (14) 25 mBar Differential Pressure

Built entirely from 316L SS Hy-Orifice™ provides a tough, accurate, corrosion and erosion resistant flow measurement technique, which is easy and safe to operate, even by inexperienced personnel.*

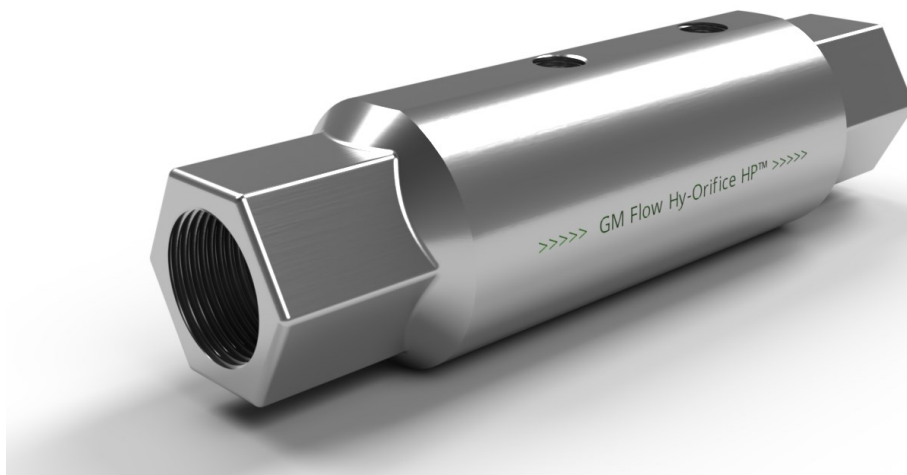
Utilising NPT or Autoclave end connections and offering a range of between 0.5 and 8 mm orifice sizes.

Hy-Orifice™ offers a quick, easy and compact installation with flow computer, differential and flowing pressure, and temperature transmitters already attached, ready to measure any flow rate within the ranges quoted.

Hy-Orifice™ includes high and low pressure ports and the required upstream and downstream straight lengths, built into the meter body. Simply plumb it into your line, attach 24 VDC power supply and start to measure instantly.

* Other Materials on Request.

Size	End Connections	Working Pressure	Dimensions
6 mm LP	3/4" x 14 TPI NPT Fem	320 Bar	48 mm Dia x 175 mm Long
6 mm HP	1" MP Autoclave	1035 Bar	62 mm Dia x 220 mm Long
12 mm LP	1 1/4 In NPT 11.5 TPI	320 Bar	72 mm Dia x 315 mm Long
12 mm HP	1 1/2 In MP Autoclave	1035 Bar	96 mm Dia x 374 mm Long



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