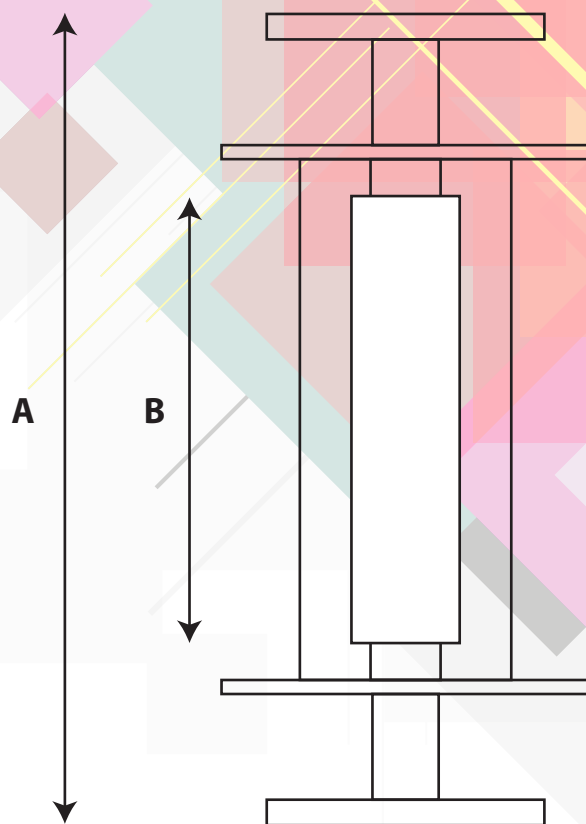


CALIBRATION JAR

PIE also manufactures Calibration Jars for calibration of pumps. These provide an accurate pump calibration of higher pump flow rates. The jar is installed between the suction side of the pump and the tank. The flow rate of the pump is checked by closing the valve between the tank and the jar and observing the level change in the jar for one minute. Flanges and other metal parts are manufactured in SS 316, SS 304 or Carbon steel. Gauge is made of good quality borosilicate glass. The jar may be provided with a shield for ensuring maximum safety in the event of glass failure. Jar connections can be provided with NPT or raised face flanged connection as per the clients requirements. Calibration jars are available in capacities of 250ml, 300ml, 500ml, 750ml, 1000ml and 1250ml. Other sizes are available on request.



SPECIFICATIONS:

Model No.	Gauge volume (ml)	Face to face A (mm)	Visible length B (mm)	Volume per graduation (in ml)
250 *	250	392.8	222.8	20
300*	300	437.3	267.3	20
500*	500	514.3	344.3	25
750*	750	686.5	516.5	50
1000*	1000	368.9	198.9	100
1250*	1250	418.7	248.7	100

*Use suffix S for screwed connection or F for flanged connection

The above specifications are for reference. Customization may be done as per clients' requirements.



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GAUGES VALVES

SERIES 10 LT:

These valves are of straight body type and are primarily used for tubular type level gauges for low pressure & temperature applications. PTFE valve cone at the stem tip ensures zero leakage when closed. Standard connections are as follows:

Vessel: $\frac{3}{4}$ " NPT male ; Drain: $\frac{3}{4}$ " NPT female ; Gauge: $\frac{3}{8}$ " NPT female

OPTIONAL CONNECTIONS:

Vessel: $\frac{1}{2}$ " NPT male ; Vent and Drain: $\frac{1}{4}$ " NPT plugged

SERIES 10S:

This series of valves is manufactured using drop forged steel bodies, stainless steel trim with a variety of connection options. They are equipped with union gauge connections which permits simple installation and easy access to ball check arrangement.

SERIES 10U:

This series of valve have a union bonnet, regrindable and renewable seat, stem back seating arrangement and completely rust proofed parts for longer service life. Union gauge connection enables the valve to be turned to any desired angle for ease of installation and maintenance.

SERIES 10B:

This series of valves are designed with a bolted bonnet, stainless steel ball check, stem back seating and straight/ offset construction. These can be furnished with union gauge connection for easy installation and maintenance of the connected gauge.



PRESSURE RATINGS:

MODEL	1000 F	7500 F
SERIES 10S	2400 LBS	1400 LBS
SERIES 10U	4000 LBS	1500 LBS
SERIES 10B	4000 LBS	1500 LBS
SERIES 10 LT	100 LBS	NA

MATERIAL OF CONSTRUCTION:

SERIES 10LT

PART NAME	MOC
Valve body	A-105/ F-316L
Valve washer	Teflon
Stem	SS-304
Stem packing washer	SS-316
Stem packing	Grafoil
Packing nut	Steel
Handwheel	Zinc
Stem nut	Steel
Ball Check	SS-316
Ball check stop	SS-304
Washer	SS-304
Glass packing	EPDM
Packing gland	Steel
Glass packing nut	Steel
Mounting clamp	Steel
Plug	Steel

SERIES 10S

PART NAME	MOC
Valve body	A-105/ F-316L
Spindle	SS-316L
Gland stopper	SS-316
Packing ring	Graphite
Gland follower	SS-316
Gland nut	Steel
Handwheel	WCB
Handwheel nut	Steel
Ball	SS-316
Ball stopper	SS-304
Tail piece	Steel
Union nut	Steel



SERIES 10U

PART NAME	MOC
Valve body	A-105/ F-316L
Renewable seat	SS-316
Spindle	SS-316L
Gland stopper	SS-316
Packing ring	Graphite
Gland follower	SS-316
Gland nut	Steel
Handwheel	WCB
Bonnet nut	Steel
Bonnet	steel
Handwheel nut	Steel
Ball	SS-316
Ball stopper	SS-304
Tail piece	Steel
Union nut	Steel

SERIES 10B

PART NAME	MOC
Valve body	A-105/ F-316L
Renewable seat	SS-316
Spindle	SS-316L
Bonnet gasket	SP wound or SS 316+ Grafoil
Bonnet	A-105/ F-316L
Gland stopper	SS-316
Packing ring	Graphite
Gland follower	SS-316
Gland nut	Steel
Handwheel	WCB
Bonnet nut	A-194 GR. 2H
Bonnet stud	A-193 GR. B7
Handwheel nut	Steel
Ball	SS-316
Ball stopper	SS-304
Tail piece	Steel
Union nut	Steel

STANDARD FEATURES for Series 10S, 10B and 10 U valves

BACKSEATING STEM:

When the valve is opened to its limit, the stem seats against the bonnet allowing the valve to be repacked while under pressure.

STRAIGHT BODY OR OFFSET BODY PATTERN:

In the straight body pattern, the gauge, drain and vessel connections are on intersecting centerlines.

In the offset body pattern, the centerline of the gauge and the drain connections are offset by 22mm from the centerline of the vessel connections.

UNION GAUGE CONNECTION:

The union gauge connection allows a top and bottom connected gauge to be turned to any desired angle for convenient visibility. It also enables the removal of the gauge without removing the valves.

Standard connections:

Vessel: ¾" NPT male

Drain: ½" NPT female

Gauge: ½" NPT female

Optional connections are also available on request.

SAFETY SHUT-OFF:

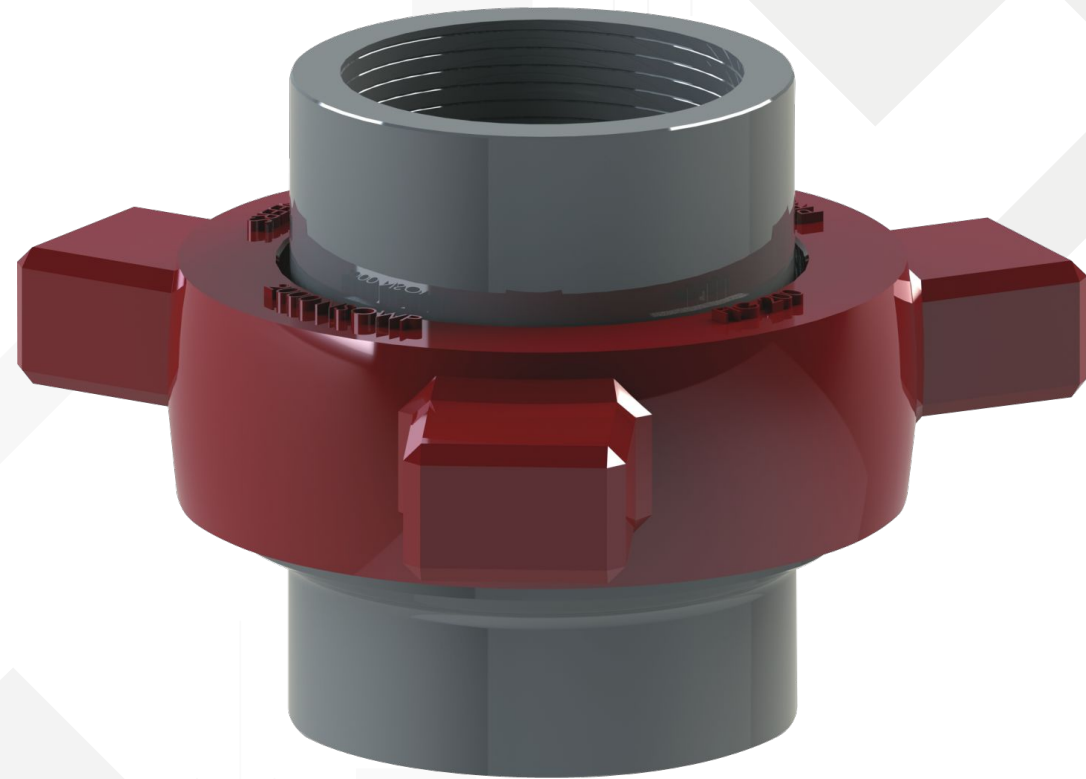
Valves may be provided with stainless steel ball check which instantaneously shuts off flow of the medium being gauged in the event of glass failure. The ball operates upstream from the seat and can be furnished for vacuum seating if required.



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HAMMER UNION

Hammer Unions are high-pressure threaded or welded connections with two, halves a threaded female half and a wing male half with swivel nut that fit together and seal upon turning and then hammering the nut half together with the threaded half. These type of hammer unions are commonly used in oilfield and industrial applications to seal two pieces of pipe or hose together by making a connection via threads or welds.

We offer a full line of union swivel connections to fit a variety of applications. Hammer unions come in N.P.T. threaded-style and welded-style and are made of heavy duty steel for tough and long lasting use. Hammer unions can also be treated for use with sour gas H2S service upon request. (Sour Service Models according to NACE MR-01-75)

Hammer Union Reference Chart

	Pressure Rating(psi)		Nominal pipe size									
	Standard service		1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	
MODEL	COLD WORKING	TEST	25	32	40	50	65	80	100	125	150	
100	1000	1500				✓	✓	✓	✓		✓	
200	2000	3000	✓	✓	✓	✓	✓	✓	✓		✓	

MODEL 100 HAMMER UNION - Threaded

Nominal pipe Size:	1", 2", 2-1/2", 3", 4", 6", 8", 10"
Pressure Rating:	1,000 psi cwp; 1,500 psi test
Connections Type:	pipeline thread, API thread, butt-weld
Component Parts:	Nut, Male Stub, Female Stub, Seal Ring
Recommended service:	Manifold and line connection.

Hammer Union (Series 100 - Threaded) Features:

Pressure-tight make-up with hammer, economical, low-pressure union.

MODEL 200 HAMMER UNION - Threaded

Nominal pipe Size	1", 1-1/2", 2", 2-1/2", 3", 4", 5", 6", 8", 10"
Pressure Rating	2,000 psi CWP; 3,000 psi test
Connections Type	pipeline thread, API thread, butt-weld
Component Parts	Nut, Male Stub, Female Stub, Seal Ring
Recommended service	General-service manifolds and lines

Hammer Union (Series 200 - Threaded) Features:

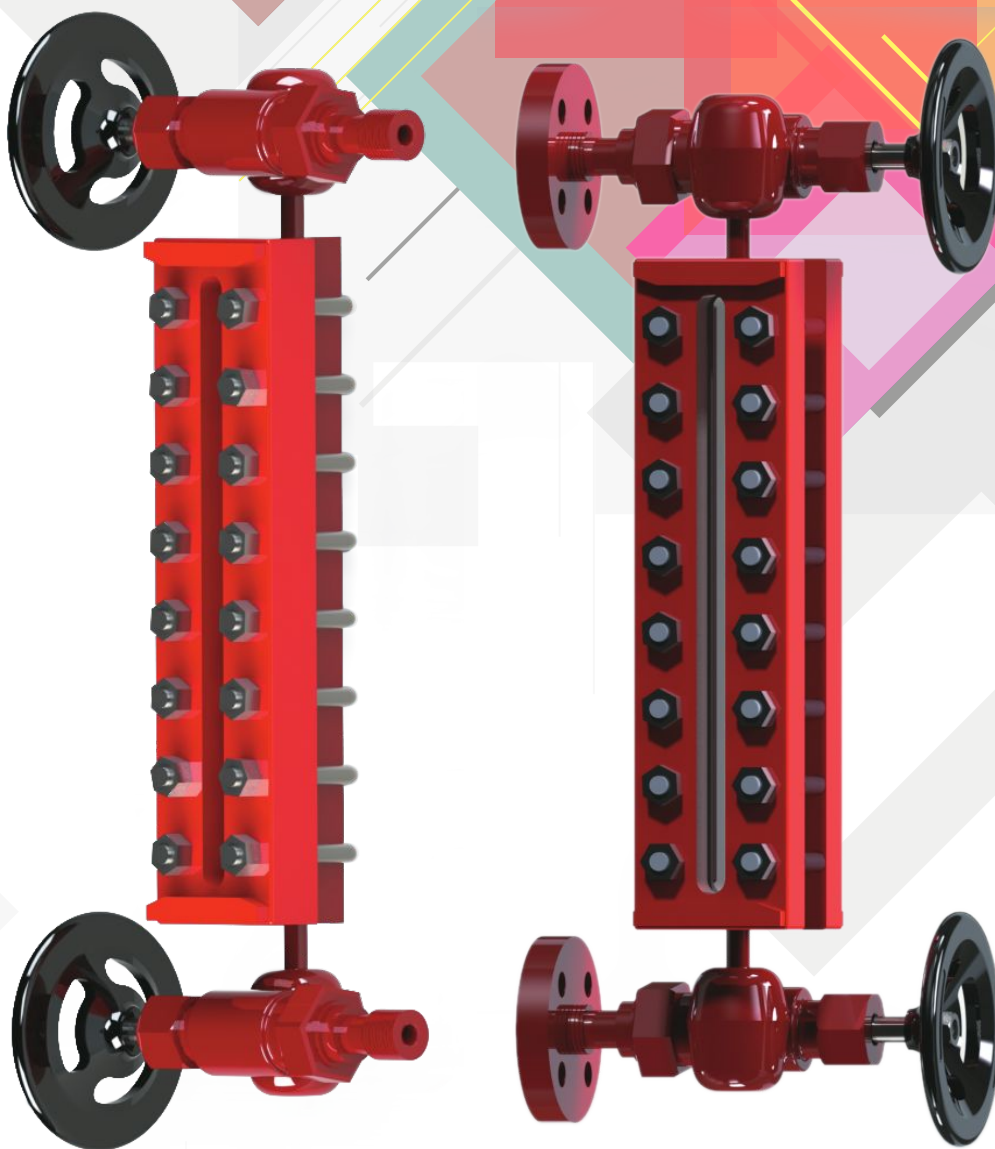
Economical, general-purpose union, Butt-weld available



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LEVEL GAUGES

SERIES G: GENERAL PURPOSE

Main chamber is constructed using machined solid bar of either carbon steel, SS 316 or SS 316 L grade steel. Similar materials are used for cover plates. These gauges are available in both reflex and transparent models made of toughened glass secured using gaskets and chrome-molybdenum nuts and bolts.

SERIES H: HEAVY DUTY

These gauges are manufactured using solid bar steel machined for making liquid chamber. Cover plates are fitted over the liquid chamber using special nuts and bolts. Recessed gasket seats ensure leak proof seal between the liquid chamber and the glass. All metal surfaces are rust-proofed.

SERIES T: TUBULAR GAUGES

Tubular gauges are suitable for low pressure processes. Also used in boiler drum application. These gauges comprise of a borosilicate glass tube fitted with an offset isolating valve on each end for tank connection. PIE series 10 LT valves are supplied along with these gauges. The maximum permitted working pressure varies with length.

SERIES W: WELDPAD GAUGES

These are flat glass liquid level gauges designed to become an integral part of the vessel. They are available in both reflex and transparent types. Reflex glasses are used where liquid level reading is the only requirement. Transparent gauges are used where it is required to see into the vessel or for interface application. These gauges are available with flat back or radiused back.



PRESSURE- TEMPERATURE RATING FOR LEVEL GAUGES										
Number of Windows (Max. Pressure in Bars)										
	Temp Deg C	1	2	3	4	5	6	7	8	9
SERIES G	TRANSPARENT (Series GT)									
	40	136	125	119	107	102	91	85	75	67
	95	120	121	115	105	99	90	80	72	65
	150	120	113	104	100	90	82	75	67	60
	205	115	108	100	92	85	78	70	63	58
	260	104	100	91	85	78	70	65	58	51
	316	92	86	80	75	70	63	57	50	46
	REFLEX (Series GR)									
	40	204	200	185	177	170	160	151	144	136
	95	193	186	178	170	160	151	143	136	130
	150	182	173	167	158	150	142	135	128	120
	205	170	161	155	145	140	132	125	117	110
	260	155	147	140	134	126	120	112	106	100
	316	138	132	126	120	113	105	100	95	90
SERIES H	TRANSPARENT (Series HT)									
	40	206	200	188	180	170	163	155	144	136
	95	196	190	180	170	160	155	146	140	130
	150	190	174	168	160	153	145	136	130	120
	205	174	165	160	151	145	136	130	120	115
	260	160	153	149	140	132	126	120	113	104
	316	141	135	128	123	118	112	105	99	92
	REFLEX (Series HR)									
	40	275	265	257	247	240	227	220	212	206
	95	260	253	246	235	229	220	213	205	195
	150	246	237	230	223	215	205	197	191	183
	205	228	220	212	205	200	191	185	175	170
	260	210	202	196	188	185	175	170	161	155
	316	190	185	178	170	165	160	152	145	140
SERIES W	Series WR or WF									
	40	205	200	190	180	170	162	152	143	136
	95	195	190	180	171	161	155	145	140	130
	150	190	175	170	160	153	145	137	130	120
	205	173	165	160	151	145	137	130	120	115
	260	160	155	138	140	132	125	120	112	105
	316	141	135	157	123	117	110	103	100	92

PRESSURE- TEMPERATURE RATING FOR TUBULAR LEVEL GAUGES (Series T)

Single glass length (mm)	Maximum hydro test pressure for:	
	Temp upto 65°C with no corrosion BAR	Steam boiler services upto 218°C BARS
200	7	10
250	7	10
300	7	10
350	7	10
400	7	10
450	7	10
500	7	10
600	7	10

STANDARD VISIBLE LENGTH CHART DIMENSIONS AND WEIGHT



SIZE NO.	VISIBLE LENGTH	NORMAL LENGTH	WEIGHT	
			REFLEX	TRANS.
11 -*	95	133	3.6	5.5
12 -*	121	159	4.1	6.4
13 -*	146	210	5.0	7.7
14 -*	171	235	5.5	7.7
15 -*	200	264	6.4	9.5
16 -*	232	295	7.3	10.9
17 -*	260	324	8.2	12.3
18 -*	302	365	9.1	13.6
19 -*	321	384	9.5	14.5
23 -*	330	394	10.0	15.0
24 -*	381	445	11.4	17.3
25 -*	438	502	12.7	19.5
26 -*	502	565	14.5	22.2
27 -*	559	622	15.9	24.5
28 -*	641	705	18.2	27.7
29 -*	679	743	19.5	29.0
36 -*	772	835	21.8	33.0
37 -*	857	921	24.0	36.3
38 -*	981	1045	27.2	41.7
39 -*	1038	1102	29.0	44.0
47 -*	1156	1219	31.8	48.5
48 -*	1321	1384	36.3	55.4
49 -*	1397	1461	38.5	58.5
57 -*	1454	1518	39.6	60.8
58 -*	1661	1724	45.5	69.0
59 -*	1756	1819	48.0	73.1
68 -*	2000	2064	55.1	82.6
69 -*	2115	2178	57.5	87.7
78 -*	2340	2403	65.5	96.2
79 -*	2473	2537	67.0	102.3
88 -*	2680	2743	74.7	109.8
89 -*	2832	2896	78.4	116.9
98 -*	3020	3083	83.8	123.4
99 -*	3191	3229	87.5	125.4

*- Replace with R for Reflex and T for Transparent

All dimensions in millimeters

All weights in kilograms

Support brackets are provided on all gauges consisting of 5 sections or more

All information stated above is approximate and is given for guidance only.

***PTFE/ PFA lined level gauges shall be manufactured upon Client's request.**



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NEEDLE VALVES

PIE offers a complete range cost effective, reliable and safe instrument valves. Valves are constructed from bar stock and forged materials in stainless steel 316 and 316L. Other materials are available on request. PTFE or grafoil packings are available depending on pressure and temperature rating.

MODEL	INLET CONNECTION	OUTLET CONNECTION
PIE-ISO-FF	1/4" NPT female	1/4" NPT female
	3/8" NPT female	3/8" NPT female
	1/2" NPT female	1/2" NPT female
	3/4" NPT female	1/2" NPT female
	3/4" NPT female	3/4" NPT female
PIE-ISO-MF	1/4" NPT male	1/4" NPT female
	3/8" NPT male	3/8" NPT female
	1/2" NPT male	1/2" NPT female

MODEL	INLET CONNECTION	OUTLET CONNECTION
PIE-SFC-FF	1/8" NPT female	1/8" NPT female
	1/4" NPT female	1/4" NPT female
PIE-SFC-MF	1/8" NPT male	1/8" NPT female
	1/4" NPT male	1/4" NPT female
PIE-SFC-MM	1/8" NPT male	1/8" NPT male
	1/4" NPT male	1/4" NPT male

PRESSURE /TEMPERATURE RATINGS:

Valves with PTFE packing- 6000 psi @ 100° C

4000 psi @ 200° C

Valves with grafoil packing 6000 psi @ 100° C

3000 psi @ 450° C

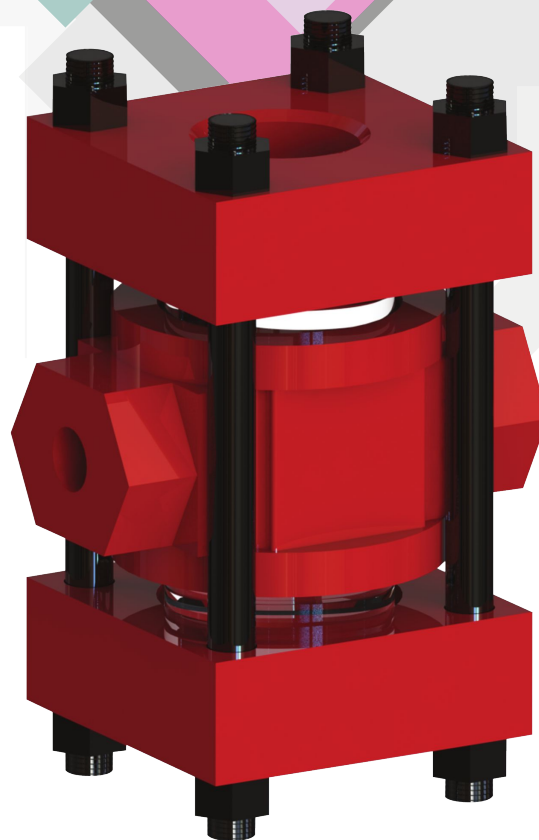
Grafoil packing is recommended for higher temperatures.



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SIGHT FLOW INDICATORS

Sight flow indicators provide an efficient way of checking the flow of fluids through pipelines. The main chamber is constructed of casting developed from either carbon steel, SS 316 or SS 316L grade material. Toughened glass, special gaskets and rust proof nuts and bolts ensure efficient and long service.

PIE Sight Flow Indicators are available in 3 models :

ROTARY TYPE – SERIES 10*

Best suited for lines carrying dark solutions where direction of rotor indicates flow direction. Recommended for any flow direction.

FLAPPER TYPE – SERIES 20*

Best suited for lines carrying transparent or slightly opaque solutions where position of the hinged flap indicates variation in flow rate. Recommended for horizontal and vertically upwards flow direction.

DRIP TYPE – SERIES 30*

Best suited for lines having intermittent flow where flow can be seen through the dripping. Recommended for downward vertical flow.

*Use suffix S for Screw end connection i.e. 10S, 20S or 30S

*Use suffix F for Flange end connection i.e. 10F, 20F or 30F

Screw end connection indicators are available for pipe size 1/2" through 2" with pressure rating of 150 PSIG.

TYPE- 10S- 20S- 30S- 150 PSIG

PIPE SIZE		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
DIMENSIONS (mm)	L	95	95	108	140	140	158
	D	31	31	32	55	55	63

Flange end connection indicators are available for pipe size 1/2" through 8" with pressure rating of 150 and 300 PSIG as per the requirement.

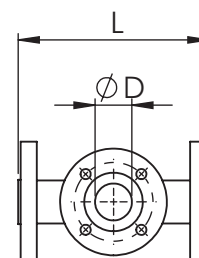
TYPE- 10F- 20F- 30F- 300 PSIG

PIPE SIZE	DIMENSIONS (mm)	
	L	D
1/2" & 3/4"	150	25
1"	175	32
1 1/2"	190	48
2"	219	50
2 1/2" & 3"	289	81
4"	336	108
6"	543	140
8"	585	140

TYPE- 10F- 20F- 30F- 150 PSIG

PIPE SIZE	DIMENSIONS (mm)	
	L	D
1/2" & 3/4"	117	29
1"	143	32
1 1/2"	165	48
2"	200	50
2 1/2" & 3"	239	81
4"	280	111
6"	365	175
8"	415	214

***PTFE/ PFA lined sight glasses shall be manufactured upon Client's request.**



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