

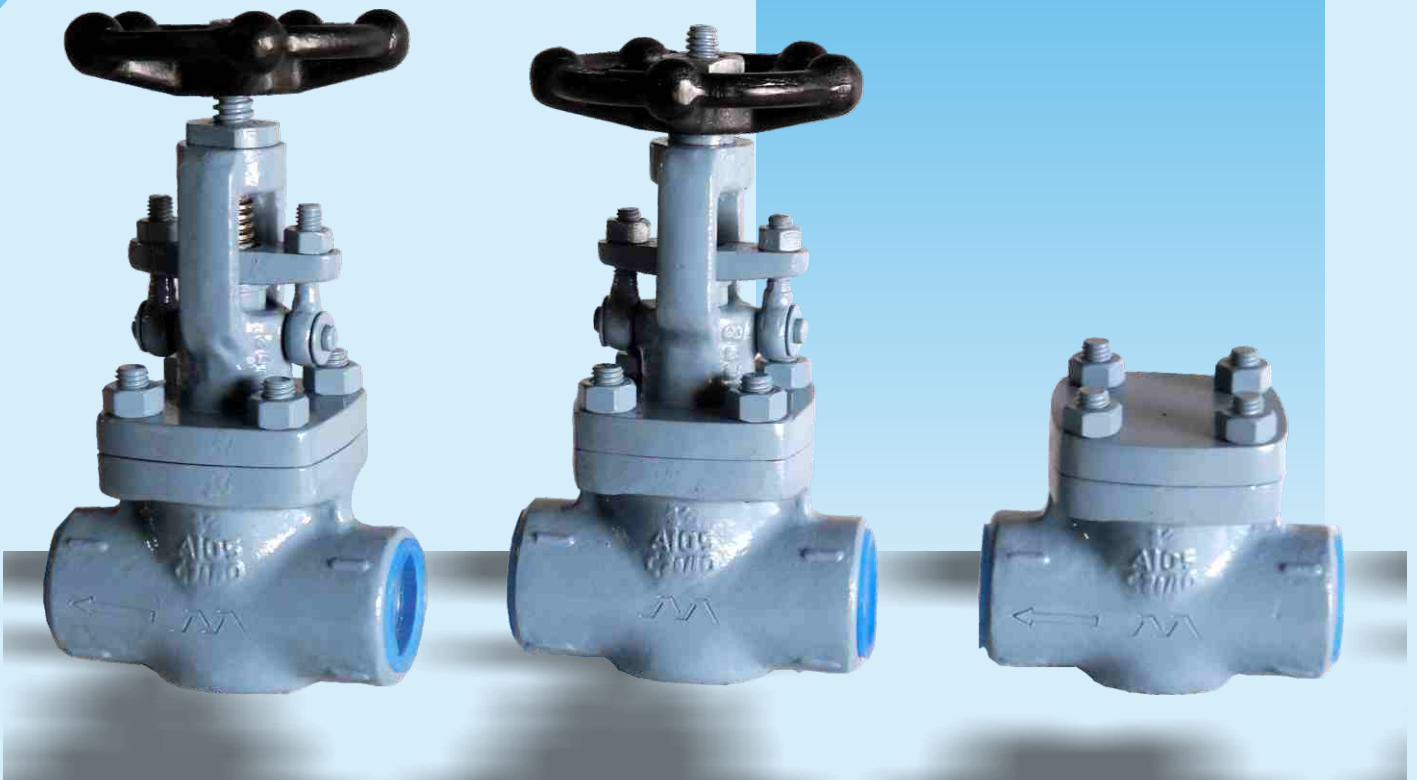


ISO 9001:2008  
RQ91/5900

**MANOHAR**  
**VALVES**

HIGH PERFORMANCE INDUSTRIAL VALVES

# TECHNICAL DETAILS



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## TABLE OF CONTENTS

SL NO	CONTENTS	PAGE NO
1	INTRODUCTION	
2	MANOHAR VALVES MANUFACTURING PROGRAMME	
3	TEST AND INSPECTION METHODS	
4	BODY BONNET MATERIAL	
5	SALIENT FEATURES	
6	TRIM MATERIAL	
7	DETAILS OF VALVES MANUFACTURED BY MV	
7A	ASME#800 BOLTED BONNET/COVER VALVES	
7B	ASME#800 WELDED BONNET/COVER VALVES	
7C	ASME#1500 BOLTED BONNET/COVER VALVES	
7D	ASME#1500 WELDED BONNET/COVER VALVES	
7E	ASME#150,300 & 600 BOLTED BONNET/COVER FLANGED END VALVES	
8	PRESSURE TEMPERATURE RATING	
9	MATERIAL COMPOSITION	
10	SALES DRAWINGS	
10A	ASME#800 BOLTED BONNET GLOBE VALVE (FGL010)	
10B	ASME#800 BOLTED BONNET GATE VALVE (FGT009)	
10C	ASME#800 BOLTED COVER CHECK VALVE (FLC011)	
10D	ASME#1500 BOLTED BONNET GLOBE VALVE (FGL010-1500)	
10E	ASME#1500 BOLTED BONNET GATE VALVE (FGT009-1500)	
10F	ASME#1500 BOLTED COVER CHECK VALVE (FLC011-1500)	
10G	ASME#1500 WELDED BONNET GLOBE VALVE (FGL010-1500WB)	
10H	ASME#1500 WELDED BONNET GATE VALVE (FGT009-1500WB)	
10I	ASME#1500 WELDED COVER CHECK VALVE (FLC011-1500WB)	
10J	ASME#150,300 & 600 BOLTED BONNET GLOBE VALVE FLANGED END (FE-FGLV-015050-RB)	
10K	ASME#150,300 & 600 BOLTED BONNET GATE VALVE FLANGED END (FE-FGTV-015050-RB)	
10L	ASME#150,300 & 600 BOLTED COVER CHECK VALVE FLANGED END (FE-FLCV-015050-RB)	

## INTRODUCTION

We take this opportunity to introduce ourselves as a firm engaged in design and manufacturing of high performance forged steel valves. We offer high pressure range of valves designed to meet any industrial applications. Every activity of Manohar Valves is carefully built to meet greater standards of quality.

The vision of the company is to achieve the excellence in the selected field of service by setting ever rising higher standards. There by bringing the global acclaim to the company and to leave an everlasting positive image in the mind of the people and also to develop a team of highly talented and resourceful personnel who help to achieve this vision.

In addition to that we have been approved by ISO, CE, IBR and NSIC and undergo registrations with international engineering consultants/Corporates.

We are interested to leave our footprints in the power, petroleum, chemicals and refineries etc. ie. High pressure applications

Technology of our product is completely updated. Well trained and experienced team of engineers and technicians are the back bone of Manohar Valves. Thus all flow control problems are encountered in most economic and effective manner.

We request you to give us an opportunity to serve you. Please feel free to contact for further clarifications.

MANUFACTURING RANGE												
DESIGN STANDARD AND WALL THICKNESS	STANDARD	VALVE TYPE	ASME CLASS	END CONNECTION	15	20	25	32	40	50		
	API602 ISO 15761	GATE VALVE BOLTED BONNET SOLID WEDGE	150	FLANGED END	✓	✓	✓	✓	✓	✓	✓	
				SOCKET WELD END								
				SCREWED END								
				BUTT WELD END								
	API602 ISO 15761		300	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓
				SOCKET WELD END								
				SCREWED END								
				BUTT WELD END								
	API602 ISO 15761		600	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓
SOCKET WELD END												
SCREWED END												
BUTT WELD END												
API602 ISO 15761	800	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓		
		SOCKET WELD END	✓	✓	✓	✓	✓	✓	✓			
		SCREWED END	✓	✓	✓	✓	✓	✓	✓			
		BUTT WELD END	✓	✓	✓	✓	✓	✓	✓			
API602 ISO 15761 B16.34	1500	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓		
		SOCKET WELD END	✓	✓	✓	✓	✓	✓	✓			
		SCREWED END	✓	✓	✓	✓	✓	✓	✓			
		BUTT WELD END	✓	✓	✓	✓	✓	✓	✓			
API 602 ISO15761	GATE VALVE WELDED BONNET SOLID WEDGE	150	FLANGED END	✓	✓	✓	✓	✓	✓	✓		
			SOCKET WELD END									
			SCREWED END									
			BUTT WELD END									
API 602 ISO15761		300	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓	
			SOCKET WELD END									
			SCREWED END									
			BUTT WELD END									
API 602 ISO15761		600	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓	
			SOCKET WELD END									
	SCREWED END											
	BUTT WELD END											
API 602 ISO15761	800	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓		
		SOCKET WELD END	✓	✓	✓	✓	✓	✓	✓			
		SCREWED END	✓	✓	✓	✓	✓	✓	✓			
		BUTT WELD END	✓	✓	✓	✓	✓	✓	✓			
API 602 ISO15761 B16.34	1500	FLANGED END	✓	✓	✓	✓	✓	✓	✓	✓		
		SOCKET WELD END	✓	✓	✓	✓	✓	✓	✓			
		SCREWED END	✓	✓	✓	✓	✓	✓	✓			
		BUTT WELD END	✓	✓	✓	✓	✓	✓	✓			

MANUFACTURING RANGE										
DESIGN STANDARD AND WALL THICKNESS	STANDARD	VALVE TYPE	ASME CLASS	END CONNECTION	15	20	25	32	40	50
	API602 ISO 15761	GLOBE VALVE BOLTED BONNET SOLID WEDGE	150	FLANGED END	√	√	√	√	√	√
				SOCKET WELD END						
				SCREWED END						
	BUTT WELD END									
	300		FLANGED END	√	√	√	√	√	√	
			SOCKET WELD END							
			SCREWED END							
	BUTT WELD END									
	600		FLANGED END	√	√	√	√	√	√	
			SOCKET WELD END							
		SCREWED END								
	BUTT WELD END									
	800	FLANGED END								
		SOCKET WELD END	√	√	√	√	√	√		
		SCREWED END	√	√	√	√	√	√		
		BUTT WELD END	√	√	√	√	√	√		
	1500	FLANGED END	√	√	√	√	√	√	√	√
		SOCKET WELD END	√	√	√	√	√	√		
		SCREWED END	√	√	√	√	√	√		
		BUTT WELD END	√	√	√	√	√	√		
	API 602 ISO15761	GLOBE VALVE WELDED BONNET SOLID WEDGE	150	FLANGED END	√	√	√	√	√	√
				SOCKET WELD END						
				SCREWED END						
	BUTT WELD END									
	300		FLANGED END	√	√	√	√	√	√	
			SOCKET WELD END							
			SCREWED END							
	BUTT WELD END									
	600		FLANGED END	√	√	√	√	√	√	
			SOCKET WELD END							
		SCREWED END								
	BUTT WELD END									
	800	FLANGED END								
		SOCKET WELD END	√	√	√	√	√	√		
		SCREWED END	√	√	√	√	√	√		
		BUTT WELD END	√	√	√	√	√	√		
	1500	FLANGED END	√	√	√	√	√	√	√	√
		SOCKET WELD END	√	√	√	√	√	√		
		SCREWED END	√	√	√	√	√	√		
		BUTT WELD END	√	√	√	√	√	√		

MANUFACTURING RANGE										
DESIGN STANDARD AND WALL THICKNESS	STANDARD	VALVE TYPE	ASME CLASS	END CONNECTION	15	20	25	32	40	50
	API602 ISO 15761	GLOBE VALVE BOLTED BONNET	150	FLANGED END	√	√	√	√	√	√
				SOCKET WELD END						
	SCREWED END									
	BUTT WELD END									
	300		FLANGED END	√	√	√	√	√	√	
			SOCKET WELD END							
			SCREWED END							
			BUTT WELD END							
	600		FLANGED END	√	√	√	√	√	√	
			SOCKET WELD END							
		SCREWED END								
		BUTT WELD END								
	800	FLANGED END	√	√	√	√	√	√		
		SOCKET WELD END	√	√	√	√	√	√		
		SCREWED END	√	√	√	√	√	√		
		BUTT WELD END	√	√	√	√	√	√		
	1500	FLANGED END	√	√	√	√	√	√		
		SOCKET WELD END	√	√	√	√	√	√		
		SCREWED END	√	√	√	√	√	√		
		BUTT WELD END	√	√	√	√	√	√		
API 602 ISO15761	GLOBE VALVE WELDED BONNET	150	FLANGED END	√	√	√	√	√	√	
			SOCKET WELD END							
SCREWED END										
BUTT WELD END										
300		FLANGED END	√	√	√	√	√	√		
		SOCKET WELD END								
		SCREWED END								
		BUTT WELD END								
600		FLANGED END	√	√	√	√	√	√		
		SOCKET WELD END								
	SCREWED END									
	BUTT WELD END									
800	FLANGED END	√	√	√	√	√	√			
	SOCKET WELD END	√	√	√	√	√	√			
	SCREWED END	√	√	√	√	√	√			
	BUTT WELD END	√	√	√	√	√	√			
API 602 ISO15761 B16.34	1500	FLANGED END	√	√	√	√	√			
		SOCKET WELD END	√	√	√	√				
		SCREWED END	√	√	√	√				
		BUTT WELD END	√	√	√	√				

MANUFACTURING RANGE											
DESIGN STANDARD AND WALL THICKNESS	STANDARD	VALVE TYPE	ASME CLASS	END CONNECTION	15	20	25	32	40	50	
	API602 ISO 15761	LIFT CHECK VALVE BOLTED COVER SPRING LOADED	150	FLANGED END	√	√	√	√	√	√	√
				SOCKET WELD END							
				SCREWED END							
				BUTT WELD END							
	API602 ISO 15761	LIFT CHECK VALVE BOLTED COVER SPRING LOADED	300	FLANGED END	√	√	√	√	√	√	√
				SOCKET WELD END							
				SCREWED END							
				BUTT WELD END							
	API602 ISO 15761	LIFT CHECK VALVE BOLTED COVER SPRING LOADED	600	FLANGED END	√	√	√	√	√	√	√
SOCKET WELD END											
SCREWED END											
BUTT WELD END											
API602 ISO 15761	LIFT CHECK VALVE BOLTED COVER SPRING LOADED	800	FLANGED END	√	√	√	√	√	√	√	
			SOCKET WELD END	√	√	√	√	√	√		
			SCREWED END	√	√	√	√	√	√		
			BUTT WELD END	√	√	√	√	√	√		
API602 ISO 15761 B16.34	LIFT CHECK VALVE BOLTED COVER SPRING LOADED	1500	FLANGED END	√	√	√	√	√	√	√	
			SOCKET WELD END	√	√	√	√	√	√		
			SCREWED END	√	√	√	√	√	√		
			BUTT WELD END	√	√	√	√	√	√		
API 602 ISO15761	LIFT CHECK VALVE WELDED COVER SPRING LOADED	150	FLANGED END	√	√	√	√	√	√	√	
			SOCKET WELD END								
			SCREWED END								
			BUTT WELD END								
API 602 ISO15761	LIFT CHECK VALVE WELDED COVER SPRING LOADED	300	FLANGED END	√	√	√	√	√	√	√	
			SOCKET WELD END								
			SCREWED END								
			BUTT WELD END								
API 602 ISO15761	LIFT CHECK VALVE WELDED COVER SPRING LOADED	600	FLANGED END	√	√	√	√	√	√	√	
			SOCKET WELD END								
			SCREWED END								
			BUTT WELD END								
API 602 ISO15761	LIFT CHECK VALVE WELDED COVER SPRING LOADED	800	FLANGED END	√	√	√	√	√	√	√	
			SOCKET WELD END	√	√	√	√	√	√		
			SCREWED END	√	√	√	√	√	√		
			BUTT WELD END	√	√	√	√	√	√		
API 602 ISO15761 B16.34	LIFT CHECK VALVE WELDED COVER SPRING LOADED	1500	FLANGED END	√	√	√	√	√	√	√	
			SOCKET WELD END	√	√	√	√	√	√		
			SCREWED END	√	√	√	√	√	√		
			BUTT WELD END	√	√	√	√	√	√		

Test / Inspection	Method	Acceptance Criteria
Visual Inspection		MSS SP55
Chemical Analysis	ASTM E350	Relevant ASTM
Mechanical Properties	ASTM A370	Relevant ASTM
Radiographic Inspection	ASME B16.34	ASME B16.34
Magnetic Particle Inspection	ASTM E709	ASME B16.34
Liquid Penetrant Inspection	ASTM E165	ASME B16.34
Ultrasonic Inspection	ASTM A388	ASME B16.34
Positive Material Identification (PMI)	Vacuum emission spectrometer	Customer specification
Inter Granular Corrossion Test	ASTM A262:2002	Relevant ASTM
Pressure Testing*	API 602/API 598/ B S 6755 Part I	API 602/API 598/ B S 6755 Part I
Dimensional Inspection		Valve Standard

ASME CLASS	Hydrostatic Test Pressure			Pneumatic low pressure closure test pressure in kg/cm2
	in kg/cm2			
	Shell	Hydro Seat	Back Seat	
150	30.5	22.4	22.4	7
300	77.4	57.1	57.1	7
600	154.9	116.2	116.2	7
800	210	155	155	7
1500	398	287	287	7

\* Every valve manufactured at Manohar Valves under goes pressure testing as per the requirements of API-598 and BS 6755 part and the respective test certificate will be issued.



To suite to the different applications Manohar Valves offers variety of Body and Bonnet materials for its Forged Steel Valves such as Carbon Steel, Alloy Steels and Stainless Steels. For other material of Constructions refer to Manohar Valves.

**BODY/BONNET MATERIALS**

ASME CLASS	A105	F304	F304L	F316	F316L	LF2	F11	F22
150	√	√	√	√	√	√	√	√
300	√	√	√	√	√	√	√	√
600	√	√	√	√	√	√	√	√
800	√	√	√	√	√	√	√	√
1500	√	√	√	√	√	√	√	√

### API-602 FORGED STEEL GATE, GLOBE AND CHECK VALVES

- Ø Manohar make Gate globe and check valves are rugged, compact and sturdy in construction.
- Ø Bolted Body – Bonnet design for class 800 valves
- Ø Welded Body – Bonnet design for Class 1500 and Class 2500 valves
- Ø For 800 class valves SS spiral wound gasket with graphite filler is provided to ensure maximum protection against leaks.
- Ø Moulded graphite rings and braided end rings with inconel corrosion inhibitor to ensure lower emission and fire safety
- Ø Burnished Stem to ensure lower operating torque
- Ø Metal to metal seating ensures high temperature and high pressure capabilities .
- Ø All valves are supplied with back seating arrangement.
- Ø Self aligning type gland design
- Ø Spring loaded design of lift check valves ensures suitability for non horizontal applications too.
- Ø Valves with NACE MR -0175 can be offered
- Ø Valves with IBR certification can be offered .
- Ø Stallite overlay for seating surfaces for high temperature applications .
- Ø Weld on Flange valves for class 150, 300 and Class 600 pressure rating.

TRIM NO (API 602)	VALVE TYPE	STEM MATERIAL	SEATING SURFACE	
			DISC/WEDGE	BODY SEAT
1	GATE, GLOBE AND CHECK	ASTM A 479 TYPE 410	13% Cr STEEL	13% Cr STEEL
5	GATE, GLOBE AND CHECK	ASTM A 479 TYPE 410	HF	HF
8	GATE, GLOBE AND CHECK	ASTM A 479 TYPE 410	13% Cr STEEL	HF
2	GATE, GLOBE AND CHECK	ASTM A 276 TYPE 304	ASTM A351 Gr CF8	SS-304
10	GATE, GLOBE AND CHECK	ASTM A 276 TYPE 316	ASTM A351 Gr CF8M	SS-316
12	GATE, GLOBE AND CHECK	ASTM A 276 TYPE 316	ASTM A351 Gr CF8M	HF
15	GATE, GLOBE AND CHECK	ASTM A 276 TYPE 304	ASTM A351 Gr CF8 + HF	HF
16	GATE, GLOBE AND CHECK	ASTM A 276 TYPE 316	ASTM A351 Gr CF8M + HF	HF

**NOTE: HF= HARD FACED WITH COBALT-CHROMIUM-TUNGSTEN ALLOY (STALLITE#6)**

**MANOHAR MAKE FORGED STEEL VALVES ARE OFFERED WITH TRIM MATERIALS AS SHOWN IN THE ABOVE TABLE TO SUITE VARIETY OF APPLICATIONS.**

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	BOLTED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 800# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	24
40	28	24*
50	36	30*
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		
<b>* FLOW PASSAGE DIAMETER OF 40MM AND 50MM VALVES IS SLIGHTY LESSER THAN THE STANDARD</b>		

MINIMUM THICKNESS FOR VALVE BODIES AND BONNETS			
DN	Minimum wall thickness in mm for 800# as per API-602	ACTUAL	
		BODY	BONNET
8	3.1	4.3	6.00
10	3.3	4.3	6.00
15	4.1	4.3	6.00
20	4.8	5.2	5.50
25	5.6	5.9	7.00
32	5.8	6.3	7.00
40	6.1	6.3	7.00
50	7.1	9.5	8.00

NOTE: ALL DIMENSIONS ARE IN MM

SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 800# as per API-602		ACTUAL	
	Dia	Depth	Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
50	61.2	16	61.2	16

NOTE: ALL DIMENSIONS ARE IN MM

SOCKET AND THREADED END MINIMUM WALL THICKNESS		
DN	Minimum wall thickness in mm for 800# as per API-602	ACTUAL
8	3.3	9.9
10	3.6	8.2
15	4.1	6.1
20	4.3	6.4
25	5.1	7.5
32	5.3	12.6
40	5.8	9.6
50	6.9	9.4

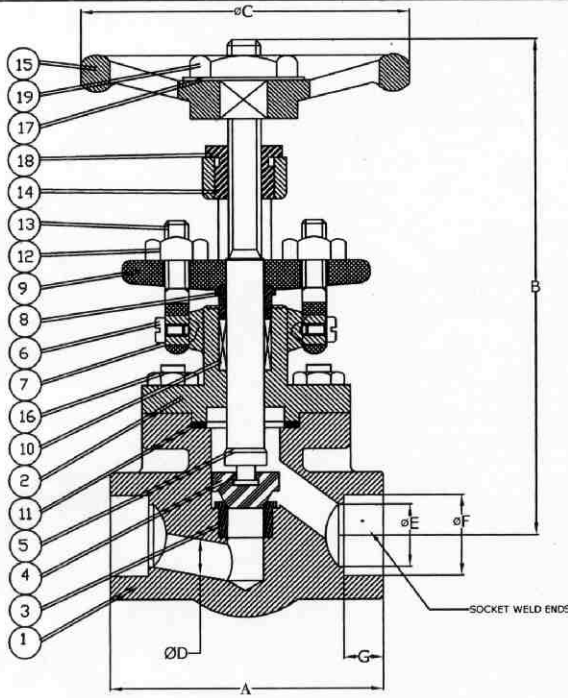
NOTE: ALL DIMENSIONS ARE IN MM

MINIMUM STEM DIAMETER			
DN	Minimum stem diameter in mm for 800# as per API-602		ACTUAL
8	7		10
10	7		10
15	8.5		10
20	9.5		11
25	11		11
	11		11
32	12.5		16
40	14		16
50	15.5		16
NOTE: ALL DIMENSIONS ARE IN MM			
MINIMUM UN COMPRESSED PACKING HEIGHT			
DN	Minimum uncompressed packing height for 800# as per API-602		ACTUAL
8	12		20
10	12		20
15	15		20
20	15		21
25	25		25
32	25		32.5
40	28		32.5
50	28		32.5
NOTE: ALL DIMENSIONS ARE IN MM			
MINIMUM C/S AREA OF BODY & BONNET BOLTING			
DN	Minimum body bonnet bolting c/s area requirement as per API-602	ACTUAL	Bolt Size x number of bolts
8	100.82	314.2	M10 x 4
10	100.82	314.2	M10 x 4
15	100.82	314.2	M10 x 4
20	111.72	314.2	M10 x 4
25	181.61	314.2	M10 x 4
32	351.97	452.45	M12 x 4
40	351.97	452.45	M12 x 4
50	424.8	452.45	M12 x 4
NOTE: ALL DIMENSIONS ARE IN SQ MM			

**FORGED-STEEL GLOBE VALVE REDUCED BORE**

DATE= 10 APRIL 2008

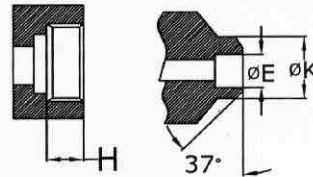
DRG No FGL010



PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A479 GR SS410
04	Disc	CA 15
05	Stem	ASTM A479 GR SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A479 GR SS410
09	Gland flange	MS IS2062
10	Packing	Graphite
11	Gasket	SPW+304 FILLED WITH GRAFOIL
12	Eye bolt nut	Steel IS:1367
13	Eye bolt/Stud	Steel IS:1367
14	Yoke bush	SG-400/12
15	Handwheel	Malleable Iron IS:2108
16	Stud/Nut	A 193 Gr.B7/ A194 Gr.2H
17	Name plate	Stainless Steel
18	Lock nut	Steel Galvanised
19	Handwheel nut	Steel

DESIGN STD: API 602/BS EN ISO: 15761  
 TESTING STD: BS: 6755 PART-1/API: 598

CLASS		800							
SIZE		8	10	15	20	25	32	40*	50*
A		88	88	88	92	106	128	128	140
B	OPEN	170	170	170	185	194	283	283	292
	CLOSE	160	160	160	170	176	252	252	254
ØC		110	110	110	110	110	170	170	170
ØD		6.4	6.4	9.0	12.0	17.0	24.0	24.0	30.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9	52.5
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1	49.3
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0	42.9
ØF		14.2	17.6	21.8	27.2	33.9	42.7	48.8	61.2
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0	16.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0	22.0
ØK		14.1	17.5	23.0	28.0	35.0	44.0	50.0	62.0
Vt kgs APPROX		2.6	2.6	2.5	2.8	3.7	6.3	8.5	10.6



SCREWED ENDS

BUTT WELD ENDS

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 40/80/160
- 3) SCREWED ENDS TO BSP } BS:21/IS:554  
 BSPT- }  
 NPT:ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) \* FOR SIZE 40 AND 50mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
- 7) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A182	A182	A217	A351	A351	A276	A276	A276	A182	A182
SPECN	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
HYDRO	SHELL	210
	SEAT	152
STATIC	BACKSEAT	152
	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	BOLTED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>COMPLIANCE STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 800# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	23
40	28	28
50	36	36
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		



MINIMUM WALL THICKNESS FOR VALVE BODIES AND BONNETS				
DN	Minimum wall thickness in mm for 800# as per API-602		ACTUAL	
			BODY	BONNET
8	3.1		4.2	6.00
10	3.3		4.2	6.00
15	4.1		4.2	6.00
20	4.8		5	5.50
25	5.6		5.8	8.00
32	5.8		6.8	7.00
40	6.1		6.8	7.00
50	7.1		10.6	8.00
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 800# as per API-602		ACTUAL	
			Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
50	61.2	16	61.2	16
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET THREADED END MINIMUM WALL THICKNESS				
DN	Minimum wall thickness in mm for 800# as per API-602		ACTUAL	
8	3.3		9.9	
10	3.6		8.2	
15	4.1		6.1	
20	4.3		6.4	
25	5.1		7.5	
32	5.3		12.6	
40	5.8		9.6	
50	6.9		9.4	
NOTE: ALL DIMENSIONS ARE IN MM				

<b>WEAR TRAVEL DISTANCE FOR GATE VALVE DISCS</b>		
<b>DN</b>	<b>Minimum wear travel distance as per API-602</b>	<b>ACTUAL</b>
8≤DN≤20	1	3
25≤DN≤32	1.5	3
40≤DN≤60	2	3

NOTE: ALL DIMENSIONS ARE IN MM

<b>MINIMUM STEM DIAMETER</b>		
<b>DN</b>	<b>Minimum stem diameter in mm for 800# as per API-602</b>	<b>ACTUAL</b>
8	7	10
10	7	10
15	8.5	10
20	9.5	11
25	11	11
32	12.5	16
40	14	16
50	15.5	16

NOTE: ALL DIMENSIONS ARE IN MM

<b>MINIMUM UNCOMPRESSED PACKING HEIGHT</b>		
<b>DN</b>	<b>Minimum uncompressed packing height for 800# as per API-602</b>	<b>ACTUAL</b>
8	12	20
10	12	20
15	15	20
20	15	21
25	25	25
32	25	32.5
40	28	32.5
50	28	32.5

NOTE: ALL DIMENSIONS ARE IN MM

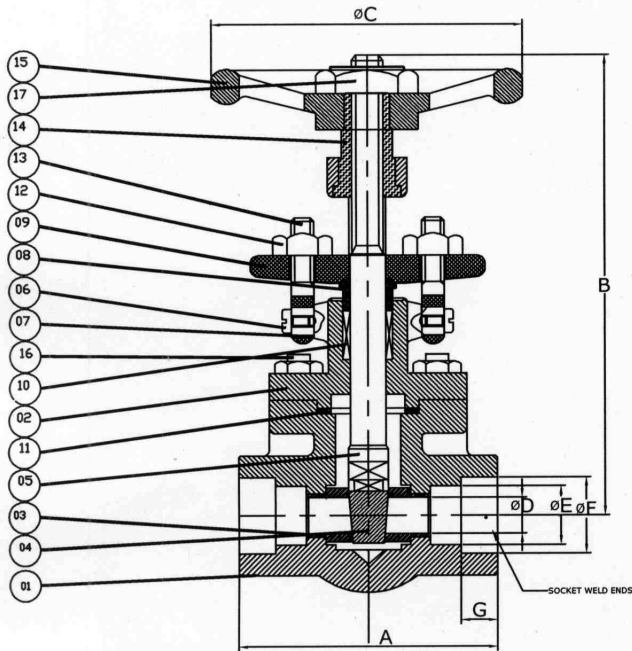
<b>MINIMUM C/S AREA OF BODY BONNET BOLTING</b>			
<b>DN</b>	<b>Minimum body bonnet bolting c/s area requirement as per API-602</b>	<b>ACTUAL</b>	<b>Bolt Size x number of bolts</b>
8	100.82	314.2	M10 x 4
10	100.82	314.2	M10 x 4
15	100.82	314.2	M10 x 4
20	111.72	314.2	M10 x 4
25	181.61	314.2	M10 x 4
32	351.97	452.45	M12 x 4
40	351.97	452.45	M12 x 4
50	424.8	452.45	M12 x 4

NOTE: ALL DIMENSIONS ARE IN SQ MM

**FORGED-STEEL GATE VALVE REDUCED BORE**

DATE = 10 APRIL 2008

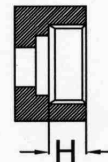
DRG No FGT009



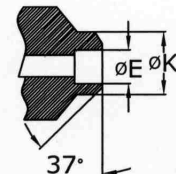
PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A479 GR SS410
04	Wedge	CA 15
05	Stem	ASTM A479 GR SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A479 GR SS410
09	Gland flange	MS IS2062
10	Packing	Graphite
11	Gasket	SPW+304 FILLED WITH GRAFOIL
12	Eye bolt nut	Steel IS1367
13	Eye bolt/Stud	Steel IS 1367
14	Yoke sleeve	SG-400/12
15	Handwheel	Malleable iron IS:2108
16	Stud/Nut	A 193 Gr.B7/ A194 Gr.2H
17	Handwheel nut	Steel

 DESIGN STD: A P I: 602/BS EN ISO: 15761  
 TESTING STD: API: 598/BS: 6755 PART-1

CLASS	800								
	SIZE	8	10	15	20	25	32	40	50
$\phi A$		88	88	88	92	106	128	128	140
B	OPEN	167	167	167	177	194	268	268	280
	CLOSE	154	154	154	162	171	233	233	240
$\phi C$		110	110	110	110	110	170	170	170
$\phi D$		6.4	6.4	9.0	12.0	17.0	24.0	28.0	36.0
$\phi E$	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9	52.5
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1	49.3
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0	42.9
$\phi F$		14.2	17.6	21.8	27.2	33.9	42.7	48.8	61.2
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0	16.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0	22.0
$\phi K$		14.1	17.5	23.0	28.0	35.0	44.0	50.0	62.0
Wt kgs. APPROX		2.4	2.4	2.3	2.7	3.5	7.8	8.0	10.0



SCREWED ENDS



BUTT WELD ENDS

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP
  - BSPT } BS:21/IS:554
  - NPT } ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN		F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
	SHELL	210
HYDRD		
STATIC	SEAT	152
	BACKSEAT	152
AIR	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	BOLTED COVER OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 800# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	24
40	28	24*
50	36	30*
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		
* FLOW PASSAGE WAY FOR 40MM AND 50MM VALVES ARE SLIGHTLY LESSER THAN THE STANDARD		

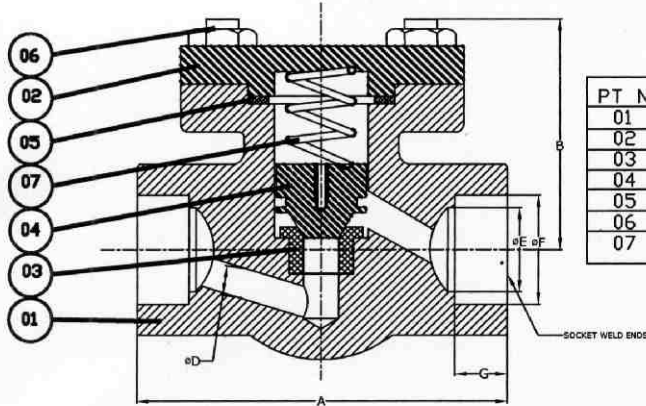
MINIMUM WALL THICKNESS FOR VALVE BODIES AND COVERS				
DN	Minimum wall thickness in mm for 800# as per API-602		ACTUAL	
			BODY	COVER
8	3.1		4.3	8
10	3.3		4.3	8
15	4.1		4.3	8
20	4.8		5.2	10
25	5.6		5.9	10
32	5.8		6.3	12
40	6.1		6.3	12
50	7.1		9.5	13
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 800# as per API-602		ACTUAL	
			Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
50	61.2	16	61.2	16
NOTE: ALL DIMENSIONS ARE IN MM				

<b>SOCKET THREADED END MINIMUM WALL THICKNESS</b>			
<b>DN</b>	<b>Minimum wall thickness in mm for 800# as per API-602</b>		<b>ACTUAL</b>
8	3.3		9.9
10	3.6		8.2
15	4.1		6.1
20	4.3		6.4
25	5.1		7.5
32	5.3		12.6
40	5.8		9.6
50	6.9		9.4
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>			
<b>MINIMUM C/S AREA OF BODY COVER BOLTING</b>			
<b>DN</b>	<b>Minimum body bonnet bolting c/s area requirement as per API-602</b>	<b>ACTUAL</b>	<b>Bolt Size x number of bolts</b>
8	100.82	314.2	M10 x 4
10	100.82	314.2	M10 x 4
15	100.82	314.2	M10 x 4
20	111.72	314.2	M10 x 4
25	181.61	314.2	M10 x 4
32	351.97	452.45	M12 x 4
40	351.97	452.45	M12 x 4
50	424.8	452.45	M12 x 4
<b>NOTE: ALL DIMENSIONS ARE IN SQ MM</b>			

**FORGED-STEEL CHECK VALVE REDUCED BORE**

DATE= 11 APRIL 2008

DRG No FLC011



PT No	PART NAME	MATERIAL
01	BoDY	A105
02	Cover	A105
03	Seat ring	SS 410
04	Disc	CA15
05	Gasket	SPW+304 FILLED WITH GRAFOIL
06	Stud/Nut	A193 Gr B7/A 194 Gr 2H
07	Spring	SS 316

 DESIGN STD: API 602/BS EN ISO: 15761  
 TESTING STD: BS: 6755 PART-1/API: 598

CLASS	800								
	SIZE	8	10	15	20	25	32	40*	50*
A		88	88	88	92	106	128	128	140
B (APPRDX)		57	57	57	65	72	109	109	112
ØD		6.4	6.4	9.0	12.0	17.0	24.0	24.0	30.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9	52.5
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1	49.3
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0	42.9
ØF		14.2	17.6	21.8	27.2	33.9	42.7	48.8	61.2
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0	16.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0	22.0
ØK		14.1	17.5	23.0	28.0	35.0	44.0	50.0	62.0
Wt kgs. APPRDX		1.7	1.7	1.62	2.03	2.67	6.0	6.2	8.9

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP
  - BSPT } BS:21/IS:554
  - BSPT }
  - NPT:ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) \* FOR SIZE 40 AND 50mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
- 7) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN		F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
HYDRO	SHELL	210
STATIC	SEAT	152

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	WELDED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 800# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	24
40	28	24*
50	36	30*
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		
* FLOW PASSAGE DIAMETER OF 40MM AND 50MM VALVES IS SLIGHTY LESSER THAN THE STANDARD		



MINIMUM THICKNESS FOR VALVE BODIES AND BONNETS			
DN	Minimum wall thickness in mm for 800# as per API-602	ACTUAL	
		BODY	BONNET
8	3.1	4.3	6.00
10	3.3	4.3	6.00
15	4.1	4.3	6.00
20	4.8	5.2	5.50
25	5.6	5.9	7.00
32	5.8	6.3	7.00
40	6.1	6.3	7.00
50	7.1	9.5	8.00

NOTE: ALL DIMENSIONS ARE IN MM

SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 800# as per API-602		ACTUAL	
	Dia	Depth	Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
50	61.2	16	61.2	16

NOTE: ALL DIMENSIONS ARE IN MM

SOCKET AND THREADED END MINIMUM WALL THICKNESS		
DN	Minimum wall thickness in mm for 800# as per API-602	ACTUAL
8	3.3	9.9
10	3.6	8.2
15	4.1	6.1
20	4.3	6.4
25	5.1	7.5
32	5.3	12.6
40	5.8	9.6
50	6.9	9.4

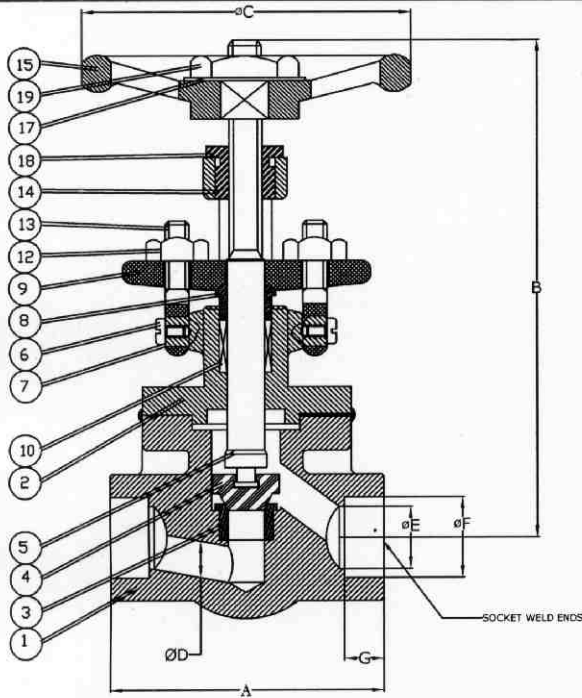
NOTE: ALL DIMENSIONS ARE IN MM

MINIMUM STEM DIAMETER		
DN	Minimum stem diameter in mm for 800# as per API-602	ACTUAL
8	7	10
10	7	10
15	8.5	10
20	9.5	11
25	11	11
25	11	11
32	12.5	16
40	14	16
50	15.5	16
NOTE: ALL DIMENSIONS ARE IN MM		
MINIMUM UN COMPRESSED PACKING HEIGHT		
DN	Minimum uncompressed packing height for 800# as per API-602	ACTUAL
8	12	20
10	12	20
15	15	20
20	15	21
25	25	25
32	25	32.5
40	28	32.5
50	28	32.5
NOTE: ALL DIMENSIONS ARE IN MM		

### FORGED-STEEL GLOBE VALVE REDUCED BORE

DATE= 10 APRIL 2008

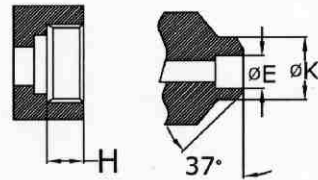
DRG No:FGL010WB



PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A 479 SS410
04	Disc	ASTM A 217 GR CA 15
05	Stem	ASTM A 479 SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A 479 SS410
09	Gland flange	MS IS2062
10	Packing	Graphite
12	Eye bolt nut	Steel IS1367
13	Eye bolt	Steel IS 1367
14	Yoke bush	SG-400/12
15	Handwheel	Malleable Iron IS:2108
17	Name plate	Stainless Steel
18	Lock nut	Steel Galvanised
19	Handwheel nut	Steel

DESIGN STD: API 602/BS EN ISO: 15761  
TESTING STD: BS: 6755 PART-1/API: 598

CLASS		800							
SIZE		8	10	15	20	25	32	40*	50*
B	OPEN	170	170	170	185	194	283	283	292
	CLOSE	160	160	160	170	176	252	252	254
APPROX									
ØC		110	110	110	110	110	170	170	170
ØD		6.4	6.4	9.0	12.0	17.0	24.0	24.0	30.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9	52.5
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1	49.3
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0	42.9
ØF		14.2	17.6	21.8	27.2	33.9	42.7	48.8	61.2
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0	16.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0	22.0
ØK		14.1	17.5	23.0	28.0	35.0	44.0	50.0	62.0
Wtkgs.APPROX		2.6	2.6	2.5	2.8	3.7	8.3	8.5	10.6



SCREWED ENDS      BUTT WELD ENDS

- NOTES:
- DIMENSION A AS PER MANUFACTURERS STD.
  - SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
  - SCREWED ENDS TO BSP } BS:21/IS:554  
BSPT }  
NPT:ANSI B 1.20.1
  - BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
  - TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
  - \* FOR SIZE 40mm AND 50mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
  - ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A182	A182	A217	A351	A351	A276	A276	A276	A276	A182
SPECN	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
HYDRO	SHELL	210
	SEAT	152
STATIC	BACKSEAT	152
	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	WELDED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 800# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	23
40	28	28
50	36	36
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		

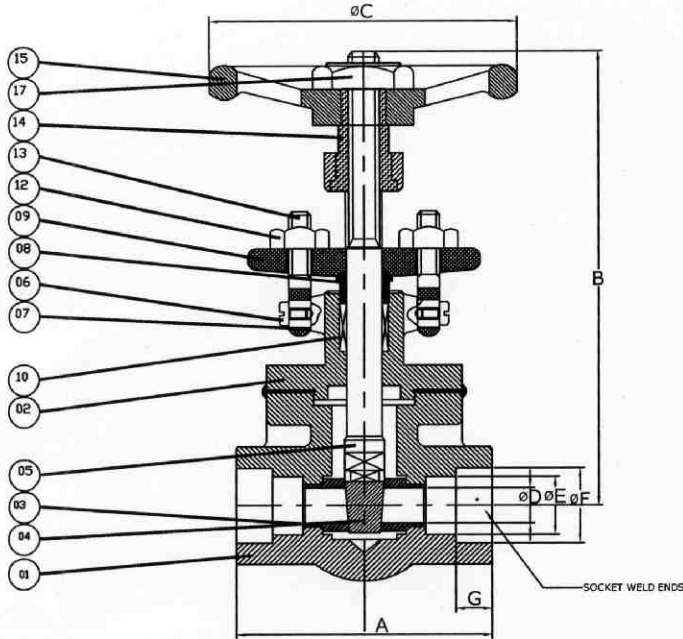
MINIMUM WALL THICKNESS FOR VALVE BODIES AND BONNETS				
DN	Minimum wall thickness in mm for 800# as per API-602		ACTUAL	
			BODY	BONNET
8	3.1		4.2	6.00
10	3.3		4.2	6.00
15	4.1		4.2	6.00
20	4.8		5	5.50
25	5.6		5.8	8.00
32	5.8		6.8	7.00
40	6.1		6.8	7.00
50	7.1		10.6	8.00
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 800# as per API-602		ACTUAL	
			Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
50	61.2	16	61.2	16
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET THREADED END MINIMUM WALL THICKNESS				
DN	Minimum wall thickness in mm for 800# as per API-602		ACTUAL	
8	3.3		9.9	
10	3.6		8.2	
15	4.1		6.1	
20	4.3		6.4	
25	5.1		7.5	
32	5.3		12.6	
40	5.8		9.6	
50	6.9		9.4	
NOTE: ALL DIMENSIONS ARE IN MM				

WEAR TRAVEL DISTANCE FOR GATE VALV E DISCS		
DN	Minimum wear travel distance as per API-602	ACTUAL
8≤DN≤20	1	3
25≤DN≤32	1.5	3
40≤DN≤60	2	3
NOTE: ALL DIMENSIONS ARE IN MM		
MINIMUM STEM DIAMETER		
DN	Minimum stem diameter in mm for 800# as per API-602	ACTUAL
8	7	10
10	7	10
15	8.5	10
20	9.5	11
25	11	11
32	12.5	16
40	14	16
50	15.5	16
NOTE: ALL DIMENSIONS ARE IN MM		
MINIMUM UNCOMPRESSED PACKING HEIGHT		
DN	Minimum uncompressed packing height for 800# as per API-602	ACTUAL
8	12	20
10	12	20
15	15	20
20	15	21
25	25	25
32	25	32.5
40	28	32.5
50	28	32.5
NOTE: ALL DIMENSIONS ARE IN MM		

# FORGED-STEEL GATE VALVE REDUCED BORE

DATE = 10 APRIL 2008

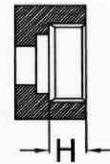
DRG No FGT009WB



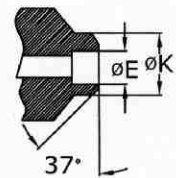
PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A479 SS410
04	Wedge	ASTM A217 GR CA 15
05	Stem	ASTM A479 SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A479 SS410
09	Gland flange	IS 2062
10	Packing	Graphite
12	Eye bolt nut	Steel IS:1367
13	Eye bolt	Steel IS:1367
14	Yoke sleeve	SG-400/12
15	Handwheel	Malleable Iron IS:2108
17	Handwheel nut	Steel

DESIGN STD: A P I: 602/BS EN ISO: 15761  
 TESTING STD: API: 598/BS: 6755 PART-1

CLASS	800							
SIZE	8	10	15	20	25	32	40	50
$\phi A$	88	88	88	92	106	128	128	140
B APPROX	OPEN	167	167	167	177	194	268	280
	CLOSE	154	154	154	162	171	233	240
$\phi C$	110	110	110	110	110	170	170	170
$\phi D$	6.4	6.4	9.0	12.0	17.0	24.0	28.0	36.0
$\phi E$	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0
$\phi F$	14.2	17.6	21.8	27.2	33.9	42.7	48.8	61.2
G	10.0	10.0	10.0	13.0	13.0	13.0	13.0	16.0
H	10.2	10.4	13.5	14.5	17.3	20.0	21.0	22.0
$\phi K$	14.1	17.5	23.0	28.0	35.0	44.0	50.0	62.0
Wt kgs APPROX	2.4	2.4	2.3	2.7	3.5	7.8	8.0	10.0



SCREWED ENDS



BUTT WELD ENDS

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP } BS:21/IS:554  
 BSPT }  
 NPT/ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A182	A182	A217	A351	A351	A276	A276	A276	A276	A182
SPECN	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
HYDRD	SHELL	210
	SEAT	152
STATIC	BACKSEAT	152
	SEAT	7
AIR	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

ASME CLASS 800 FORGED STEEL WELDED BONNET GATE VALVE

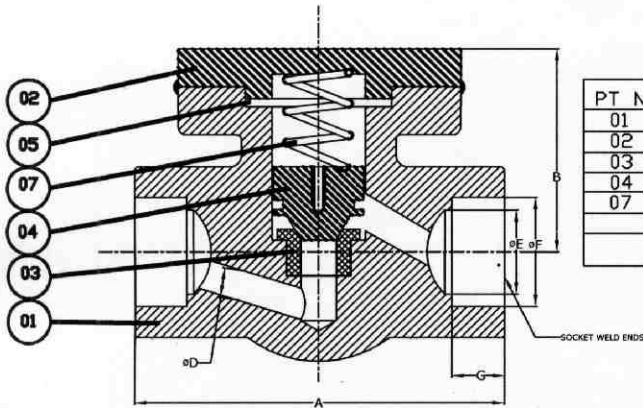
<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	WELDED COVER TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 800# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	24
40	28	24*
50	36	30*
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		
<b>* FLOW PASSAGE WAY FOR 40MM AND 50MM VALVES ARE SLIGHTLY LESSER THAN THE STANDARD</b>		



MINIMUM WALL THICKNESS FOR VALVE BODIES AND COVERS				
DN	Minimum wall thickness in mm for 800# as per API-602		ACTUAL	
			BODY	COVER
8	3.1		4.3	8
10	3.3		4.3	8
15	4.1		4.3	8
20	4.8		5.2	10
25	5.6		5.9	10
32	5.8		6.3	12
40	6.1		6.3	12
50	7.1		9.5	13
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 800# as per API-602		ACTUAL	
	Dia	Depth	Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
50	61.2	16	61.2	16
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET & THREADED END MINIMUM WALL THICKNESS				
DN	Minimum wall thickness in mm for 800# as per API-602		ACTUAL	
8	3.3		9.9	
10	3.6		8.2	
15	4.1		6.1	
20	4.3		6.4	
25	5.1		7.5	
32	5.3		12.6	
40	5.8		9.6	
50	6.9		9.4	
NOTE: ALL DIMENSIONS ARE IN MM				

**FORGED-STEEL CHECK VALVE REDUCED BORE**

DATE= 11 APRIL 2008 DRG No FLC011WB



PT No	PART NAME	MATERIAL
01	Body	ASTM A105
02	Cover	ASTM A105
03	Seat ring	ASTM A479 SS410
04	Disc	ASTM A217 GR CA15
07	Spring	SS 316

 DESIGN STD: API 602/BS EN ISO: 15761  
 TESTING STD: BS: 6755 PART-1/API: 598

CLASS		800							
SIZE		8	10	15	20	25	32	40*	50*
A		88	88	88	92	106	128	128	140
B (APPRDX)		57	57	57	65	72	109	109	112
ØD		6.4	6.4	9.0	12.0	17.0	24.0	24.0	30.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9	52.5
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1	49.3
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0	42.9
ØF		14.2	17.6	21.8	27.2	33.9	42.7	48.8	61.2
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0	16.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0	22.0
ØK		14.1	17.5	23.0	28.0	35.0	44.0	50.0	62.0
Wtkgs.APPRDX		1.7	1.7	1.62	2.03	2.67	6.0	6.2	8.9

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP
  - BSPT } BS:21/IS:554
  - NPT } ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) \* FOR SIZE 40mm AND 50mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
- 7) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN		F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURES BAR		
HYDRO	SHELL	210
STATIC	SEAT	152

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

<b>SIZE RANGE:</b>	15MM TO 40MM	
<b>TYPE:</b>	WELDED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 1500# as per API-602	ACTUAL
8	5	5.00
10	5	5.00
15	8	8.00
20	9	9.00
25	14	14.00
32	20	20.00
40	25	25.00
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		

MINIMUM THICKNESS FOR VALVE BODIES AND BONNETS				
DN	Minimum wall thickness in mm for 1500# as per B16.34		ACTUAL	
			BODY	BONNET
8	3.5		8.80	5.50
10	3.5		8.80	5.50
15	4.1		7.80	5.50
20	4.2		10.70	8.00
25	5.3		11.50	7.00
32	6.3		13.80	8.00
40	7.2		17.00	8.00
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 1500# as per API-602		ACTUAL	
			Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET AND THREADED END MINIMUM WALL THICKNESS				
DN	Minimum wall thickness in mm for 1500# as per API-602		ACTUAL	
8	4.1		12.90	
10	4.3		11.20	
15	5.3		9.10	
20	6.1		10.40	
25	6.9		17.00	
32	8.1		18.60	
40	8.9		15.60	
NOTE: ALL DIMENSIONS ARE IN MM				

MINIMUM STEM DIAMETER		
DN	Minimum stem diameter in mm for 1500# as per API-602	ACTUAL
8	10	11.00
10	10	11.00
15	10	11.00
20	11	12.50
25	11	11.00
25	14	16.00
32	15.5	16.00
40	15.5	16.00

NOTE: ALL DIMENSIONS ARE IN MM

MINIMUM UN COMPRESSED PACKING HEIGHT		
DN	Minimum uncompressed packing height for 1500# as per API-602	ACTUAL
8	22	22.00
10	22	22.00
15	22	22.00
20	25	25.00
25	30	32.50
32	38	38.00
40	38	38.00

NOTE: ALL DIMENSIONS ARE IN MM

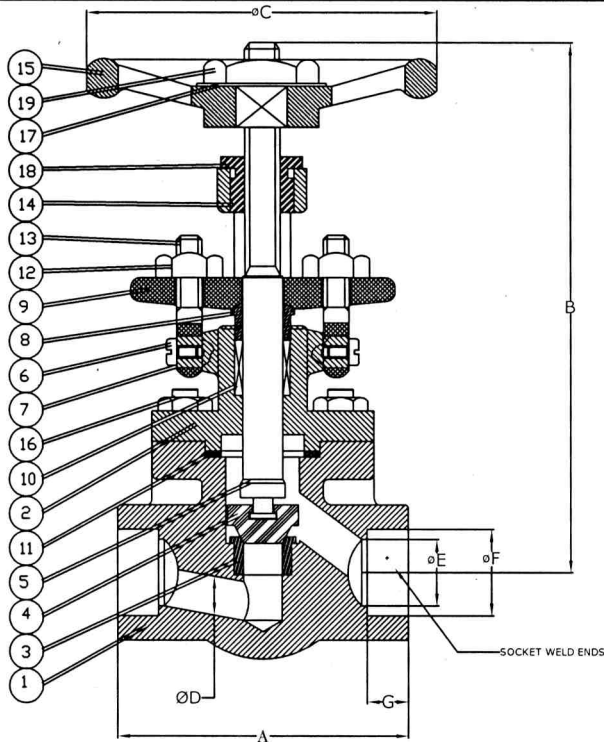
MINIMUM C/S AREA OF BODY BONNET BOLTING			
DN	Minimum body bonnet bolting c/s area requirement as per API-602	ACTUAL	Bolt Size x number of bolts
8	215.61	314.2	M10 x 4
10	215.61	314.2	M10 x 4
15	215.61	314.2	M10 x 4
20	350.50	380.0	M10 x 4
25	445.54	452.45	M10 x 4
32	445.54	452.45	M12 x 4
40	445.54	452.45	M12 x 4

NOTE: ALL DIMENSIONS ARE IN SQ MM

# FORGED-STEEL GLOBE VALVE REDUCED BORE

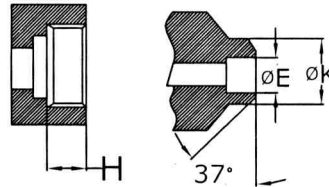
DATE= 10 APRIL 2008

DRG No FGL010-1500



DESIGN STD: API 602/BS EN ISO: 15761  
 TESTING STD: BS: 6755 PART-1/API: 598

PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A479 GR SS410
04	Disc	ASTM A217 GR CA 15
05	Stem	ASTM A479 GR SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A479 GR SS410
09	Gland flange	IS2062
10	Packing	Graphite
11	Gasket	SPW+304 FILLED WITH GRAFOIL
12	Eye bolt nut	Steel IS:1367
13	Eye bolt/Stud	Steel IS:1367
14	Yoke bush	SGI-400/12
15	Handwheel	Malleable Iron IS:2108
16	Stud/Nut	A 193 Gr.B7/ A194 Gr.2H
17	Name plate	Stainlees Steel
18	Lock nut	Steel Galvanised
19	Handwheel nut	Steel



SCREWED ENDS

BUTT WELD ENDS

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 40/80/160
- 3) SCREWED ENDS TO BSP } BS:21/IS:554  
 BSPT }  
 NPT:ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) \* FOR SIZE 40mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
- 7) ALL DIMENSIONS ARE IN mm.

CLASS	1500							
	SIZE	8	10	15	20	25	32	40
A		92	92	92	106	128	140	140
B	OPEN	185	185	185	194	283	292	292
	CLOSE	170	170	170	176	252	252	254
APPROX								
ØC		110	110	110	110	170	170	170
ØD		5.0	5.0	9.0	12.0	17.0	24.0	24.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0
ØF		14.2	17.6	21.8	27.2	33.9	42.7	48.8
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0
ØK		14.1	17.5	23.0	28.0	35.0	44.0	50.0
Wtqgs.APPROX		2.8	2.8	2.8	3.7	8.3	10.6	10.6

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN		F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
HYDRO	SHELL	398
	SEAT	285
STATIC	BACKSEAT	285
	SEAT	7
AIR	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

ASME CLASS 1500 FORGED STEEL BOLTED BONNET GLOBE VALVE

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	WELDED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 1500# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	15	15
32	22	22
40	27	27
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		

MINIMUM WALL THICKNESS FOR VALVE BODIES AND BONNETS				
DN	Minimum wall thickness in mm for 1500# As per B-16.34		ACTUAL	
			BODY	BONNET
8	3.7		4.20	5.50
10	3.7		4.20	5.50
15	4.2		5.00	5.50
20	4.8		5.80	8.00
25	5.3		6.80	7.00
32	6.6		10.60	8.00
40	7.5		10.60	8.00
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET DIAMETER AND DEPTH				
DN	Minimum diameter and depth for 1500# as per API-602		ACTUAL	
	Dia	Depth	Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
NOTE: ALL DIMENSIONS ARE IN MM				
SOCKET THREADED END MINIMUM WALL THICKNESS				
DN	Minimum wall thickness in mm for 1500# as per API-602		ACTUAL	
8	4.1		12.90	
10	4.3		11.20	
15	5.3		9.10	
20	6.1		10.40	
25	6.9		17.00	
32	8.1		18.60	
40	8.9		15.60	
NOTE: ALL DIMENSIONS ARE IN MM				



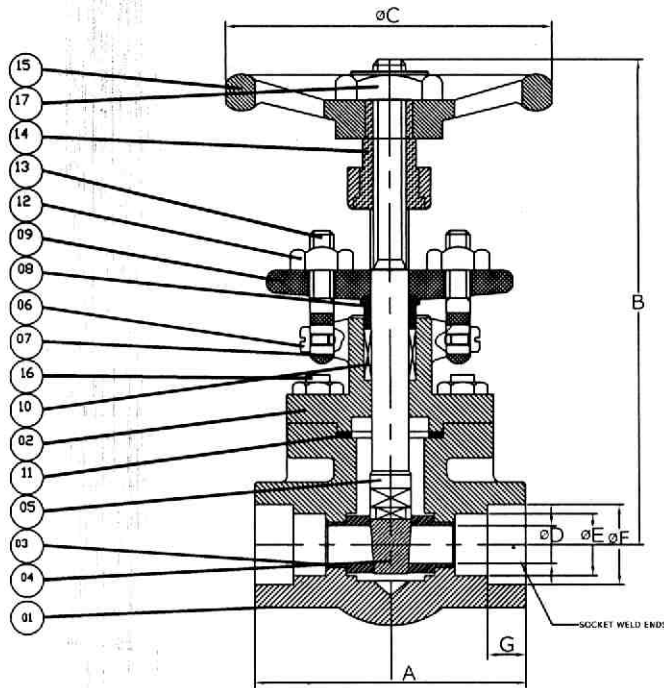
WEAR TRAVEL DISTANCE FOR GATE VALV E DISCS		
DN	Minimum wear travel distance as per API-602	ACTUAL
8≤DN≤20	1	3
25≤DN≤32	1.5	3
40≤DN≤60	2	3
NOTE: ALL DIMENSIONS ARE IN MM		
MINIMUM STEM DIAMETER		
DN	Minimum stem diameter in mm for 1500# as per API-602	ACTUAL
8	10.00	11
10	10.00	11
15	10.00	11
20	11.00	11
25	14.00	16
32	15.50	16
40	15.50	16
NOTE: ALL DIMENSIONS ARE IN MM		
MINIMUM UNCOMPRESSED PACKING HEIGHT		
DN	Minimum uncompressed packing height for 1500# as per API-602	ACTUAL
8	22	22.00
10	22	22.00
15	22	22.00
20	25	25.00
25	30	32.50
32	38	38.00
40	38	38.00
NOTE: ALL DIMENSIONS ARE IN MM		

MINIMUM C/S AREA OF BODY BONNET BOLTING			
DN	Minimum body bonnet bolting c/s area requirement as per API-602	ACTUAL	Bolt Size x number of bolts
8	215.61	314.2	M10 x 4
10	215.61	314.2	M10 x 4
15	215.61	314.2	M10 x 4
20	350.50	380.0	M10 x 4
25	445.54	452.45	M10 x 4
32	445.54	452.45	M12 x 4
40	445.54	452.45	M12 x 4
NOTE: ALL DIMENSIONS ARE IN SQ MM			

## FORGED-STEEL GATE VALVE REDUCED BORE

DATE = 10 APRIL 2008

DRG No FGT009-1500

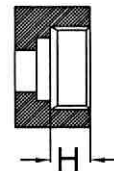


DESIGN STD: A P I: 602/BS EN ISO: 15761  
TESTING STD: API: 598/BS: 6755 PART-1

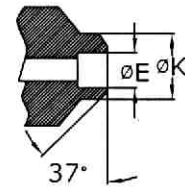
CLASS		1500						
SIZE		8	10	15	20	25	32	40
B	OPEN	177	177	177	194	268	280	280
	CLOSE	162	162	162	171	233	240	240
APPROX								
ØC		110	110	110	110	170	170	170
ØD		6.4	6.4	9.0	12.0	17.0	24.0	28.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0
ØF		14.2	17.6	21.8	27.2	33.9	42.7	48.8
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0
ØK		14.1	17.5	23.0	28.0	35.0	44.0	50.0
Wt kgs. APPROX		2.7	2.7	2.7	3.5	7.8	10.0	10.0

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A182	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F22

PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A479 GR SS410
04	Wedge	CA 15
05	Stem	ASTM A479 GR SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A479 GR SS410
09	Gland flange	IS2062
10	Packing	Graphite
11	Gasket	SPW+304 FILLED WITH GRAFOIL
12	Eye bolt nut	Steel IS:1367
13	Eye bolt/Stud	Steel IS 1367
14	Yoke sleeve	SG-400/12
15	Handwheel	Malleable iron IS:2108
16	Stud/Nut	A 193 Gr.B7/ A194 Gr.2H
17	Handwheel nut	Steel



SCREWED ENDS



BUTT WELD ENDS

### NOTES:

- DIMENSION A AS PER MANUFACTURERS STD.
- SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
- SCREWED ENDS TO BSP
  - BSPT } BS:21/IS:554
  - BSPT }
  - NPT:ANSI B 1.20.1
- BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- ALL DIMENSIONS ARE IN mm.

TEST PRESSURE BAR		
HYDRO	SHELL	395
	SEAT	285
STATIC	BACKSEAT	285
	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

ASME CLASS 1500 FORGED STEEL BONNET GATE VALVE

<b>SIZE RANGE:</b>	15MM TO 40MM
<b>TYPE:</b>	WELDED COVER TYPE
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34
<b>MANUFACTURING STANDARDS:</b>	
<b>SOCKET WELD END:</b>	ANSI B16.11
<b>BUTT WELD END:</b>	ANSI B16.25
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1
<b>CONSTRUCTIONAL DETAILS:</b>	

**MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY**

DN	Minimum diameter for 1500# as per API-602	ACTUAL
8	5	5
10	5	5
15	8	8
20	9	9
25	14	14
32	20	20
40	25	25

NOTE: ALL DIMENSIONS ARE IN MM

\* FLOW PASSAGE WAY FOR 40MM AND 50MM VALVES ARE SLIGHTLY LESSER THAN THE STANDARD

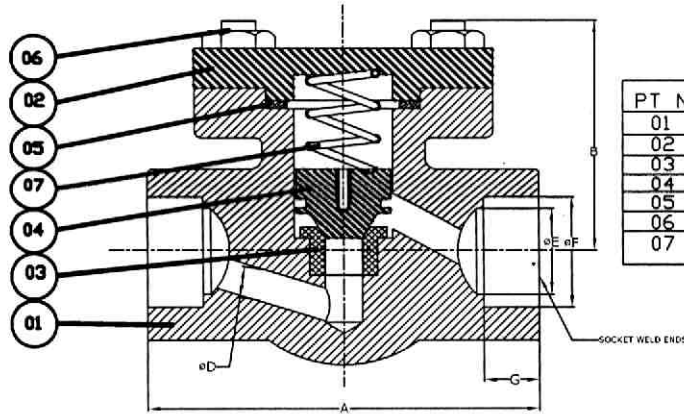
<b>MINIMUM WALL THICKNESS FOR VALVE BODIES AND COVERS</b>				
<b>DN</b>	<b>Minimum wall thickness in mm for 1500# as per B-16.34</b>		<b>ACTUAL</b>	
			<b>BODY</b>	<b>COVER</b>
8	3.5		8.80	10.00
10	3.5		8.80	10.00
15	4.1		7.80	10.00
20	4.2		10.70	10.00
25	5.3		11.50	12.00
32	6.3		13.80	12.00
40	7.2		17.00	13.00
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>				
<b>SOCKET DIAMETER AND DEPTH</b>				
<b>DN</b>	<b>Minimum diameter and depth for 1500# as per API-602</b>		<b>ACTUAL</b>	
			<b>Dia</b>	<b>Depth</b>
8	<b>Dia</b> 14.2	<b>Depth</b> 10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>				
<b>SOCKET &amp; THREADED END MINIMUM WALL THICKNESS</b>				
<b>DN</b>	<b>Minimum wall thickness in mm for 1500# as per API-602</b>		<b>ACTUAL</b>	
8	4.1		12.90	
10	4.3		11.20	
15	5.3		9.10	
20	6.1		10.40	
25	6.9		17.00	
32	8.1		18.60	
40	8.9		15.60	
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>				

MINIMUM C/S AREA OF BODY COVER BOLTING			
DN	Minimum body bonnet bolting c/s area requirement as per API-602	ACTUAL	Bolt Size x number of bolts
8	215.61	314.2	M10 x 4
10	215.61	314.2	M10 x 4
15	215.61	314.2	M10 x 4
20	350.50	380.0	M10 x 4
25	445.54	452.45	M10 x 4
32	445.54	452.45	M12 x 4
40	445.54	452.45	M12 x 4
NOTE: ALL DIMENSIONS ARE IN SQ MM			

**FORGED-STEEL CHECK VALVE REDUCED BORE**

DATE= 11 APRIL 2008

DRG No FLC011-1500



PT No	PART NAME	MATERIAL
01	BoDY	ASTM A105
02	Cover	ASTM A105
03	Seat ring	ASTM A479 SS 410
04	Disc	ASTM A217 GR CA15
05	Gasket	SPW+304 FILLED WITH GRAFOIL
06	Stud/Nut	ASTM A193 Gr B7/A 194Gr2H
07	Spring	SS 316

 DESIGN STD: API 602/BS EN ISO: 15761  
 TESTING STD: BS: 6755 PART-1/API: 598

CLASS	1500							
SIZE	8	10	15	20	25	32	40*	
A	92	92	92	106	128	128	140	
B (APPROX)	65	65	65	72	109	109	112	
ØD	6.4	6.4	9.0	12.0	17.0	24.0	24.0	
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0
ØF	14.2	17.6	21.8	27.2	33.9	42.7	48.8	
G	10.0	10.0	10.0	13.0	13.0	13.0	13.0	
H	10.2	10.4	13.5	14.5	17.3	20.0	21.0	
ØK	14.1	17.5	23.0	28.0	35.0	44.0	50.0	
Wt kgs. APPROX	2.03	2.03	2.03	2.67	6.0	6.2	8.9	

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP
  - BSPT } BS:21/IS:554
  - BSPT }
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) \* FOR SIZE 40mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
- 7) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN		F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURES BAR		
HYDRO	SHELL	398
STATIC	SEAT	285

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

<b>SIZE RANGE:</b>	15MM TO 40MM	
<b>TYPE:</b>	WELDED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 1500# as per API-602	ACTUAL
8	5	5.00
10	5	5.00
15	8	8.00
20	9	9.00
25	14	14.00
32	20	20.00
40	25	25.00
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		



<b>MINIMUM THICKNESS FOR VALVE BODIES AND BONNETS</b>			
<b>DN</b>	<b>Minimum wall thickness in mm for 1500# as per B16.34</b>	<b>ACTUAL</b>	
		<b>BODY</b>	<b>BONNET</b>
8	3.5	8.80	5.50
10	3.5	8.80	5.50
15	4.1	7.80	5.50
20	4.2	10.70	8.00
25	5.3	11.50	7.00
32	6.3	13.80	8.00
40	7.2	17.00	8.00

NOTE: ALL DIMENSIONS ARE IN MM

<b>SOCKET DIAMETER AND DEPTH</b>				
<b>DN</b>	<b>Minimum diameter and depth for 1500# as per API-602</b>		<b>ACTUAL</b>	
	<b>Dia</b>	<b>Depth</b>	<b>Dia</b>	<b>Depth</b>
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13

NOTE: ALL DIMENSIONS ARE IN MM

<b>SOCKET AND THREADED END MINIMUM WALL THICKNESS</b>		
<b>DN</b>	<b>Minimum wall thickness in mm for 1500# as per API-602</b>	<b>ACTUAL</b>
8	4.1	12.90
10	4.3	11.20
15	5.3	9.10
20	6.1	10.40
25	6.9	17.00
32	8.1	18.60
40	8.9	15.60

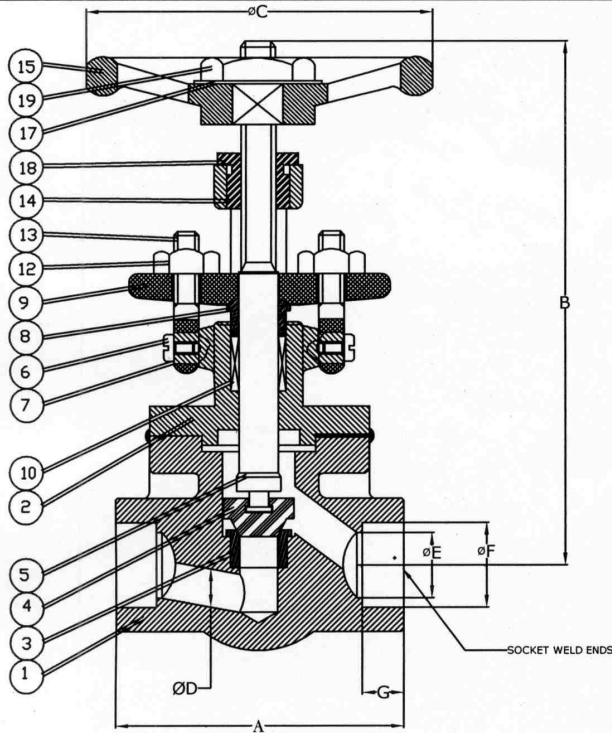
NOTE: ALL DIMENSIONS ARE IN MM

MINIMUM STEM DIAMETER		
DN	Minimum stem diameter in mm for 1500# as per API-602	ACTUAL
8	10	11.00
10	10	11.00
15	10	11.00
20	11	12.50
25	11	11.00
25	14	16.00
32	15.5	16.00
40	15.5	16.00
NOTE: ALL DIMENSIONS ARE IN MM		
MINIMUM UN COMPRESSED PACKING HEIGHT		
DN	Minimum uncompressed packing height for 1500# as per API-602	ACTUAL
8	22	22.00
10	22	22.00
15	22	22.00
20	25	25.00
25	30	32.50
32	38	38.00
40	38	38.00
NOTE: ALL DIMENSIONS ARE IN MM		

## FORGED-STEEL GLOBE VALVE REDUCED BORE WELDED BONNET

DATE= 10 APRIL 2008

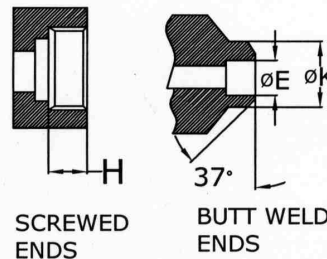
DRG No:FGL010-1500WB



PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A 479 SS410
04	Disc	ASTM A 217 GR CA 15
05	Stem	ASTM A 479 SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A 479 SS410
09	Gland flange	IS2062
10	Packing	Graphite
12	Eye bolt nut	Steel IS:1367
13	Eye bolt	Steel IS 1367
14	Yoke bush	SGI-400/12
15	Handwheel	Malleable Iron IS:2108
17	Name plate	Stainless Steel
18	Lock nut	Steel Galvanised
19	Handwheel nut	Steel

DESIGN STD: API 602/BS EN ISO: 15761  
TESTING STD: BS: 6755 PART-1/API: 598

CLASS	1500							
	SIZE	8	10	15	20	25	32	40
A		92	92	92	106	128	140	140
B	OPEN	185	185	185	194	283	292	292
	CLOSE	170	170	170	176	252	254	254
APPROX		110	110	110	110	170	170	170
ØC		110	110	110	110	170	170	170
ØD		6.4	6.4	9.0	12.0	17.0	24.0	24.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1	40.9
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5	38.1
	SCH-160	-	-	11.8	15.6	20.7	29.5	34.0
ØF		14.2	17.6	21.8	27.2	33.9	42.7	48.8
G		10.0	10.0	10.0	13.0	13.0	13.0	13.0
H		10.2	10.4	13.5	14.5	17.3	20.0	21.0
ØK		14.1	17.5	23.0	28.0	35.0	44.0	50.0
Wt kgs APPROX		2.8	2.8	2.8	2.8	3.7	10.6	10.6



### NOTES:

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP } BS:21/IS:554  
BSPT }  
NPT:ANSI B 1.20.1 }
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) \* FOR SIZE 40mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
- 7) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
HYDRD	SHELL	398
	SEAT	285
STATIC	BACKSEAT	285
	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

ASME CLASS 1500 FORGED STEEL WELDED BONNET GLOBE VALVE

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	WELDED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>SOCKET WELD END:</b>	ANSI B16.11	
<b>BUTT WELD END:</b>	ANSI B16.25	
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554	
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 1500# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	15	15
32	22	22
40	27	27
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		

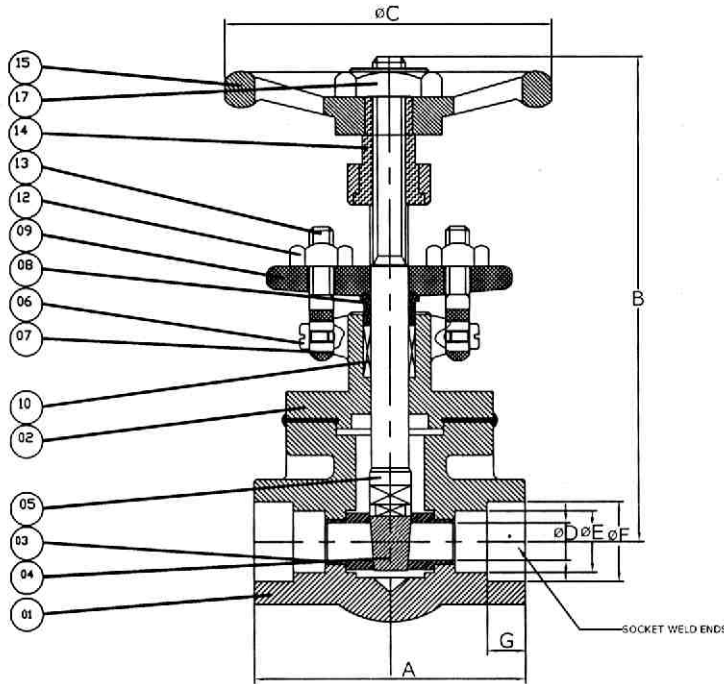
<b>MINIMUM WALL THICKNESS FOR VALVE BODIES AND BONNETS</b>				
<b>DN</b>	<b>Minimum wall thickness in mm for 1500# As per B-16.34</b>		<b>ACTUAL</b>	
			<b>BODY</b>	<b>BONNET</b>
8	3.7		4.20	5.50
10	3.7		4.20	5.50
15	4.2		5.00	5.50
20	4.8		5.80	8.00
25	5.3		6.80	7.00
32	6.6		10.60	8.00
40	7.5		10.60	8.00
NOTE: ALL DIMENSIONS ARE IN MM				
<b>SOCKET DIAMETER AND DEPTH</b>				
<b>DN</b>	<b>Minimum diameter and depth for 1500# as per API-602</b>		<b>ACTUAL</b>	
			<b>Dia</b>	<b>Depth</b>
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13
NOTE: ALL DIMENSIONS ARE IN MM				
<b>SOCKET THREADED END MINIMUM WALL THICKNESS</b>				
<b>DN</b>	<b>Minimum wall thickness in mm for 1500# as per API-602</b>		<b>ACTUAL</b>	
8	4.1		12.90	
10	4.3		11.20	
15	5.3		9.10	
20	6.1		10.40	
25	6.9		17.00	
32	8.1		18.60	
40	8.9		15.60	
NOTE: ALL DIMENSIONS ARE IN MM				

<b>WEAR TRAVEL DISTANCE FOR GATE VALV E DISCS</b>		
<b>DN</b>	<b>Minimum wear travel distance as per API-602</b>	<b>ACTUAL</b>
8≤DN≤20	1	3
25≤DN≤32	1.5	3
40≤DN≤60	2	3
NOTE: ALL DIMENSIONS ARE IN MM		
<b>MINIMUM STEM DIAMETER</b>		
<b>DN</b>	<b>Minimum stem diameter in mm for 1500# as per API-602</b>	<b>ACTUAL</b>
8	10.00	11
10	10.00	11
15	10.00	11
20	11.00	11
25	14.00	16
32	15.50	16
40	15.50	16
NOTE: ALL DIMENSIONS ARE IN MM		
<b>MINIMUM UNCOMPRESSED PACKING HEIGHT</b>		
<b>DN</b>	<b>Minimum uncompressed packing height for 1500# as per API-602</b>	<b>ACTUAL</b>
8	22	22.00
10	22	22.00
15	22	22.00
20	25	25.00
25	30	32.50
32	38	38.00
40	38	38.00
NOTE: ALL DIMENSIONS ARE IN MM		

### FORGED-STEEL GATE VALVE REDUCED BORE WELDED BONNET

DATE = 10 APRIL 2008

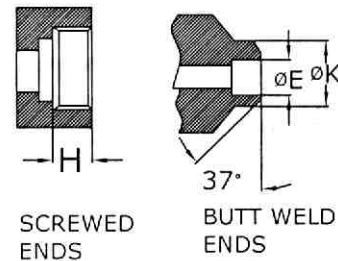
DRG No FGT009-1500WB



PT.No	PART NAME	MATERIAL
01	Body	ASTM A-105
02	Bonnet	ASTM A-105
03	Seat ring	ASTM A479 SS410
04	Wedge	ASTM A217 GR CA 15
05	Stem	ASTM A479 SS410
06	Screw	Steel Galvanised
07	Washer	Steel Galvanised
08	Gland	ASTM A479 SS410
09	Gland flange	IS 2062
10	Packing	Graphite
12	Eye bolt nut	Steel IS:1367
13	Eye bolt	Steel IS:1367
14	Yoke sleeve	SG-400/12
15	Handwheel	Malleable Iron IS:2108
17	Handwheel nut	Steel

DESIGN STD: A P I: 602/BS EN ISO: 15761  
 TESTING STD: API: 598/BS: 6755 PART-1

CLASS	1500						
	8	10	15	20	25	32	40
SIZE	8	10	15	20	25	32	40
ØA	92	92	92	106	128	140	140
B	OPEN	177	177	177	194	268	280
	CLOSE	162	162	162	171	233	240
APPROX ØC	110	110	110	110	170	170	170
ØD	6.4	6.4	9.0	12.0	17.0	24.0	28.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5
	SCH-160	-	-	11.8	15.6	20.7	29.5
ØF	14.2	17.6	21.8	27.2	33.9	42.7	48.8
G	10.0	10.0	10.0	13.0	13.0	13.0	13.0
H	10.2	10.4	13.5	14.5	17.3	20.0	21.0
ØK	14.1	17.5	23.0	28.0	35.0	44.0	50.0
Wt kgs APPROX	2.7	2.7	2.7	3.5	7.8	10.0	10.0



**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP
  - BSPT } BS:21/IS:554
  - NPT/ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN		F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURE BAR		
HYDRD	SHELL	398
	SEAT	285
STATIC	BACKSEAT	285
	SEAT	7
AIR	SEAT	7

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

<b>SIZE RANGE:</b>	15MM TO 40MM
<b>TYPE:</b>	WELDED COVER TYPE
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34
<b>MANUFACTURING STANDARDS:</b>	
<b>SOCKET WELD END:</b>	ANSI B16.11
<b>BUTT WELD END:</b>	ANSI B16.25
<b>SCREWED END TO BSP &amp; BSPT:</b>	BS:21/IS 554
<b>SCREWED END TO NPT:</b>	ANSI B 1.20.1
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1
<b>CONSTRUCTIONAL DETAILS:</b>	

**MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY**

DN	Minimum diameter for 1500# as per API-602	ACTUAL
8	5	5
10	5	5
15	8	8
20	9	9
25	14	14
32	20	20
40	25	25

NOTE: ALL DIMENSIONS ARE IN MM

\* FLOW PASSAGE WAY FOR 40MM AND 50MM VALVES ARE SLIGHTLY LESSER THAN THE STANDARD



**MINIMUM WALL THICKNESS FOR VALVE BODIES AND COVERS**

DN	Minimum wall thickness in mm for 1500# as per B-16.34	ACTUAL	
		BODY	COVER
8	3.5	8.80	10.00
10	3.5	8.80	10.00
15	4.1	7.80	10.00
20	4.2	10.70	10.00
25	5.3	11.50	12.00
32	6.3	13.80	12.00
40	7.2	17.00	13.00

NOTE: ALL DIMENSIONS ARE IN MM

**SOCKET DIAMETER AND DEPTH**

DN	Minimum diameter and depth for 1500# as per API-602		ACTUAL	
	Dia	Depth	Dia	Depth
8	14.2	10	14.2	10
10	17.6	10	17.6	10
15	21.8	10	21.8	10
20	27.2	13	27.2	13
25	33.9	13	33.9	13
32	42.7	13	42.7	13
40	48.8	13	48.8	13

NOTE: ALL DIMENSIONS ARE IN MM

**SOCKET & THREADED END MINIMUM WALL THICKNESS**

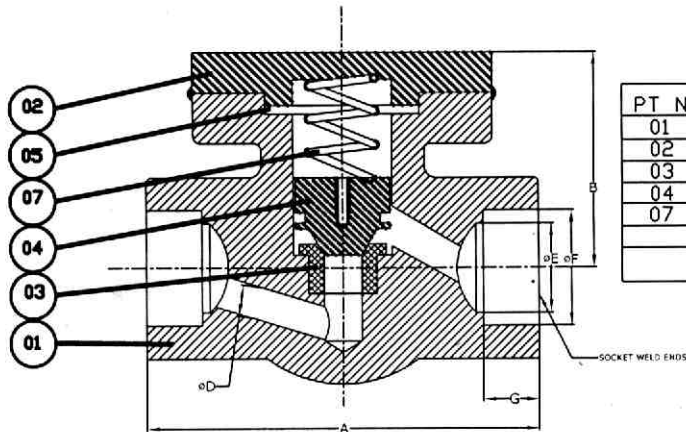
DN	Minimum wall thickness in mm for 1500# as per API-602	ACTUAL
8	4.1	12.90
10	4.3	11.20
15	5.3	9.10
20	6.1	10.40
25	6.9	17.00
32	8.1	18.60
40	8.9	15.60

NOTE: ALL DIMENSIONS ARE IN MM

**FORGED-STEEL CHECK VALVE REDUCED BORE WELDED BONNET**

DATE= 11 APRIL 2008

DRG No FLC011-1500WB



PT No	PART NAME	MATERIAL
01	Body	ASTM A105
02	Cover	ASTM A105
03	Seat ring	ASTM A479 SS410
04	Disc	ASTM A217 GR CA15
07	Spring	SS 316

DESIGN STD: API 602/BS EN ISO: 15761  
 TESTING STD: BS: 6755 PART-1/API: 598

CLASS	1500						
SIZE	8	10	15	20	25	32	40*
A	92	92	92	106	128	140	140
B (APPROX)	65	65	65	72	109	112	112
ØD	6.4	6.4	9.0	12.0	17.0	24.0	24.0
ØE	SCH-40	9.3	12.5	15.8	20.9	26.7	35.1
	SCH-80	7.7	10.8	13.9	18.9	24.3	32.5
	SCH-160	-	-	11.8	15.6	20.7	29.5
ØF	14.2	17.6	21.8	27.2	33.9	42.7	48.8
G	10.0	10.0	10.0	13.0	13.0	13.0	13.0
H	10.2	10.4	13.5	14.5	17.3	20.0	21.0
ØK	14.1	17.5	23.0	28.0	35.0	44.0	50.0
Wt kgs. APPROX	2.0	2.0	2.0	2.67	6.0	8.9	8.9

**NOTES:**

- 1) DIMENSION A AS PER MANUFACTURERS STD.
- 2) SOCKET WELD ENDS TO ANSI.B16.11 SCH 40/80/160
- 3) SCREWED ENDS TO BSP } BS:21/IS:554  
 BSPT }  
 NPT-ANSI B 1.20.1
- 4) BUTT WELD ENDS TO ANSI B16.25, SCH.40/80/160
- 5) TEST PRESSURE FOR IBR VALVES SHALL BE AS PER IBR REQUIREMENTS.
- 6) \* FOR SIZE 40mm FLOW BORE IS SLIGHTLY LESS THAN STANDARD.
- 7) ALL DIMENSIONS ARE IN mm.

CODE	A105	F304	F316	CA15	CF8	CF8M	410	304	316	F 22
MATRL	A105	A182	A182	A217	A351	A351	A276	A276	A276	A182
SPECN		F304	F316	CA15	CF8	CF8M	410	304	316	F22

TEST PRESSURES BAR		
HYDRO	SHELL	398
STATIC	SEAT	285

**MANUFACTURED BY: MANOHAR VALVES HUBLI-580 030**

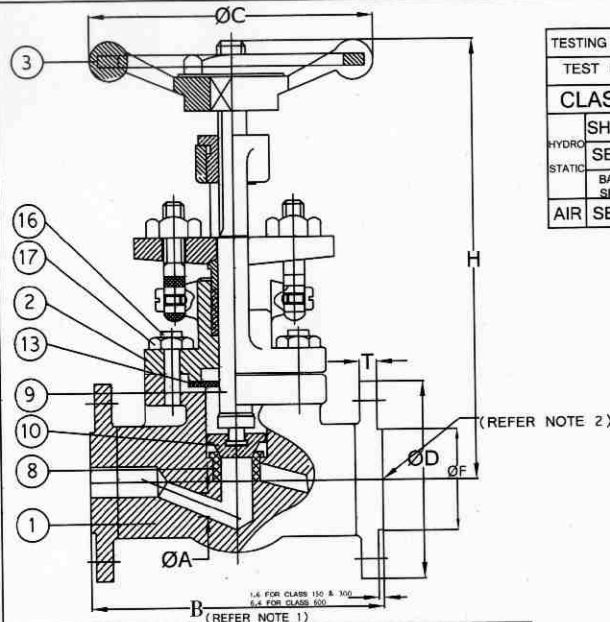
<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	BOLTED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	FLANGED END (WELD ON TYPE)	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>FLANGED END:</b>	ANSI B16.5	
<b>FACE TO FACE:</b>	ANSI B16.10, BS 2080	
	For Class 150 valves, the flange drilling dimensions will be as per Class 150 and all other dimensions as per Class 300.	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 150,300&600# as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	24
40	28	24*
50	36	30*
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		
* FLOW PASSAGE DIAMETER OF 40MM AND 50MM VALVES IS SLIGHTY LESSER THAN THE STANDARD		

MINIMUM THICKNESS FOR VALVE BODIES AND BONNETS			
DN	Minimum wall thickness in mm for 150,300&600# as per API-602	ACTUAL	
		BODY	BONNET
8	3.1	4.3	6.00
10	3.3	4.3	6.00
15	4.1	4.3	6.00
20	4.8	5.2	5.50
25	5.6	5.9	7.00
32	5.8	6.3	7.00
40	6.1	6.3	7.00
50	7.1	9.5	8.00
NOTE: ALL DIMENSIONS ARE IN MM			
MINIMUM STEM DIAMETER			
DN	Minimum stem diameter in mm for 150,300 & 600 # as per API-602	ACTUAL	
8	7	10	
10	7	10	
15	8.5	10	
20	9.5	11	
25	11	11	
32	12.5	16	
40	14	16	
50	15.5	16	
NOTE: ALL DIMENSIONS ARE IN MM			

<b>MINIMUM UN COMPRESSED PACKING HEIGHT</b>			
<b>DN</b>	<b>Minimum uncompressed packing height for 150# as per API-602</b>	<b>ACTUAL</b>	
8	12	20	
10	12	20	
15	15	20	
20	15	21	
25	25	25	
32	25	32.5	
40	28	32.5	
50	28	32.5	
NOTE: ALL DIMENSIONS ARE IN MM			
<b>MINIMUM C/S AREA OF BODY BONNET BOLTING</b>			
<b>DN</b>	<b>Minimum body bonnet bolting c/s area requirement as per API-602</b>	<b>ACTUAL</b>	<b>Bolt Size x number of bolts</b>
8	100.82	314.2	M10 x 4
10	100.82	314.2	M10 x 4
15	100.82	314.2	M10 x 4
20	111.72	314.2	M10 x 4
25	181.61	314.2	M10 x 4
32	351.97	452.45	M12 x 4
40	351.97	452.45	M12 x 4
50	424.8	452.45	M12 x 4
NOTE: ALL DIMENSIONS ARE IN SQ MM			

**FORGED STEEL GLOBE VALVE FLANGED END  
REDUCED BORE, CLASS-150,300 & 600**

**MFG.STD.  
API-602**



TESTING STD:API-598/BS:EN:12266  
TEST PRESSURE KG/SQ.CM

CLASS	150	300	600
SHELL	30.5	77.4	154.9
HYDRO SEAT	22.4	57.1	116.2
STATIC BACK SEAT	22.4	57.1	116.2
AIR SEAT	6.1	6.1	6.1

PART NO	PART NAME	MATERIAL
1	BODY	ASTM A-105
2	BONNET	ASTM A-105
3	HAND WHEEL	MALLEABLE IRON IS:2108 Gr.B
8	SEAT RING	AISI-410
9	STEM	AISI-410
10	PLUGE	ASTM A 217 Gr CA-15
13	GASKET	S.P.W-SS:304 GRAPHITE FILLED
16	BODY STUD	ASTMA-193 GR,B7
17	BODY NUT	ASTM A-194 GRADE 2H

### CLASS-150

ALL DIMENSIONS ARE IN MM

SIZE	ØA	B	ØC	ØD	P.C.D	HOLESØ	NO.OF HOLES	T	H APPROX		APPROX WT,KGS	ØF
									OPEN	CLOSE		
15	9.0	152	110	89	60.5	15.8	4	11.5	170	160	3.2	35
20	12.0	178	110	99	70.0	15.8	4	13	185	170	4.0	43
25	17.0	203	110	108	79.5	15.8	4	14.5	194	176	6.0	51
32	22*	216	170	117	89	15.8	4	16	283	252	12.0	63.5
40	24*	229	170	127	98.5	15.8	4	17.5	283	252	12.0	73
50	29*	267	170	153	120.5	19.1	4	19.5	292	254	18.5	92

### CLASS-300

15	9.0	152	110	95	66.6	15.75	4	14.5	170	160	4.0	35
20	12.0	178	110	117	82.6	19.00	4	16	185	170	5.0	43
25	17.5	203	110	124	88.9	19.00	4	17.5	194	176	7.5	51
32	24	216	170	133	98.6	19.00	4	19.5	283	252	15.5	63.5
40	24*	229	170	156	114.3	22.50	4	21	283	252	15.5	73
50	29*	267	170	165	127	19.00	8	22.5	292	254	21.0	92

### CLASS-600

15	9.0	165	110	95	66.6	15.75	4	20.9	170	160	5.3	35
20	12.0	190	110	117	82.6	19.00	4	22.4	185	170	6.5	43
25	17.5	216	110	124	88.9	19.00	4	23.9	194	176	8.2	51
32	22*	229	170	133	98.6	19.00	4	27.4	283	252	17.2	63.5
40	24*	241	170	156	114.3	22.50	4	28.9	283	252	17.2	73
50	29*	292	170	165	127	19.00	8	31.9	292	254	23.8	92

#### NOTES

- DIMN'B' CONFORMS TO ANSI-B 16.10/BS:2080 EXCEPT FOR CLASSES 150 WHICH IS MAINTAINED SAME AS CLASS-300
- FLANGED ENDS TO ANSI-B 16.5
- \* NOT AS PER STANDARD
- DIMENSION GIVEN ARE FOR STANDARD OPERATION OF HANDWHEEL AND MAY VARY FOR REQUIREMENTS OTHER THAN STANDARD.
- FOR HIGHER TEMP, VALVE WITH APPROPRIATE MOC IS AVAILABLE.
- WELDED BONNET VALVES ARE ALSO AVAILABLE.

Drg.NO:FE-FGLV-015050-RB OUR REF

REV NO 0

MANOHAR VALVES HUBLI

<b>SIZE RANGE:</b>	15MM TO 50MM	
<b>TYPE:</b>	BOLTED BONNET OS & Y TYPE	
<b>END CONNECTION:</b>	FLANGED END	
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34	
<b>MANUFACTURING STANDARDS:</b>		
<b>FLANGED END:</b>	ANSI B16.5	
<b>FACE TO FACE:</b>	ANSI B16.10, BS 2080	
	For Class 150 valves, the flange drilling dimensions will be as per Class 150 and all other dimensions as per Class 300.	
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1	
<b>CONSTRUCTIONAL DETAILS:</b>		
<b>MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY</b>		
DN	Minimum diameter for 150,300 & 600 # as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	23
40	28	28
50	36	36
<b>NOTE: ALL DIMENSIONS ARE IN MM</b>		

MINIMUM WALL THICKNESS FOR VALVE BODIES AND BONNETS			
DN	Minimum wall thickness for 150,300 & 600 # as per API-602	ACTUAL	
		BODY	BONNET
8	3.1	4.2	6.00
10	3.3	4.2	6.00
15	4.1	4.2	6.00
20	4.8	5	5.50
25	5.6	5.8	8.00
32	5.8	6.8	7.00
40	6.1	6.8	7.00
50	7.1	10.6	8.00
NOTE: ALL DIMENSIONS ARE IN MM			
WEAR TRAVEL DISTANCE FOR GATE VALVE DISCS			
DN	Minimum wear travel distance as per API-602	ACTUAL	
8≤DN≤20	1	3	
25≤DN≤32	1.5	3	
40≤DN≤60	2	3	
NOTE: ALL DIMENSIONS ARE IN MM			
MINIMUM STEM DIAMETER			
DN	Minimum stem diameter for 150,300 & 600 # as per API-602	ACTUAL	
8	7	10	
10	7	10	
15	8.5	10	
20	9.5	11	
25	11	11	
32	12.5	16	
40	14	16	
50	15.5	16	
NOTE: ALL DIMENSIONS ARE IN MM			

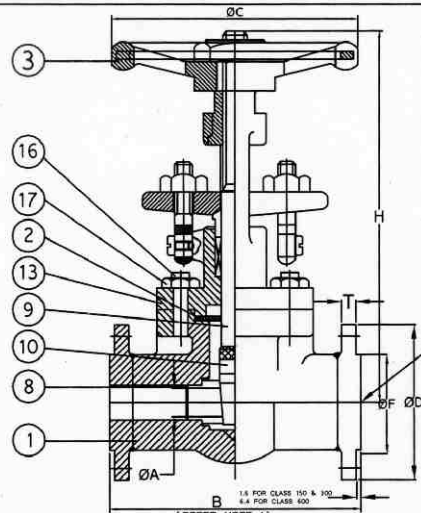


MINIMUM UNCOMPRESSED PACKING HEIGHT		
DN	Minimum uncompressed packing height for 150,300 & 600 # as per API-602	ACTUAL
8	12	20
10	12	20
15	15	20
20	15	21
25	25	25
32	25	32.5
40	28	32.5
50	28	32.5
NOTE: ALL DIMENSIONS ARE IN MM		

MINIMUM C/S AREA OF BODY BONNET BOLTING			
DN	Minimum body bonnet bolting c/s area requirement as per API-602	ACTUAL	Bolt Size x number of bolts
8	100.82	314.2	M10 x 4
10	100.82	314.2	M10 x 4
15	100.82	314.2	M10 x 4
20	111.72	314.2	M10 x 4
25	181.61	314.2	M10 x 4
32	351.97	452.45	M12 x 4
40	351.97	452.45	M12 x 4
50	424.8	452.45	M12 x 4
NOTE: ALL DIMENSIONS ARE IN SQ MM			

FORGED STEEL GATE VALVE FLANGED END  
REDUCED BORE, CLASS-150,300 & 600

MFG.STD.  
API-602



TESTING STD:API:598/BS:EN:12266			
TEST PRESSURE KG/SQ.CM			
CLASS	150	300	600
HYDRO SHELL	30.5	77.4	154.9
SEAT	22.4	57.1	116.2
STATIC BACK SEAT	22.4	57.1	116.2
AIR SEAT	6.1	6.1	6.1

PART NO	PART NAME	MATERIAL
1	BODY	ASTM A-105
2	BONNET	ASTM A-105
3	HAND WHEEL	MALLEABLE IRON IS:2108 Gr.B
8	SEAT RING	AISI-410
9	STEM	AISI-410
10	WEDGE	ASTM A217 Gr CA-15
13	GASKET	S.P.W-SS:304 GRAPHITE FILLED
16	BODY STUD	ASTM A-193 GR,B7
17	BODY NUT	ASTM A-194 GRADE 2H

NOTES

- DIMENSION GIVEN ARE FOR STANDARD OPERATION OF HANDWHEEL AND MAY VARY FOR REQUIREMENTS OTHER THAN STANDARD, WHEN SPECIFIED.
- FOR HIGHER TEMP. VALVE WITH APPROPRIATE MOC IS AVAILABLE, WHEN SPECIFIED.

CLASS-150

SIZE	ØA	B	ØC	ØD	P.C.D	HOLESØ	NO.OF HOLES	T	H APPROX		APPROX WT,KGS	ØF
									OPEN	CLOSE		
15	9.0	140	110	89	60.5	15.8	4	11.5	162	152	3.0	35
20	12.0	152	110	99	70.0	15.8	4	13	176	162	3.8	43
25	17.0	165	110	108	79.5	15.8	4	14.5	195	169	5.8	51
32	23.0	178	170	120	89.0	15.8	4	16	271	235	11.5	63.5
40	28.0	190	170	127	98.5	15.8	4	17.5	271	235	11.5	73
50	36.0	216	170	153	120.5	19.1	4	19.5	278	237	16.5	92

CLASS-300

SIZE	ØA	B	ØC	ØD	P.C.D	HOLESØ	NO.OF HOLES	T	H APPROX		APPROX WT,KGS	ØF
									OPEN	CLOSE		
15	9.0	140	110	95	66.6	15.75	4	14.5	162	152	3.8	35
20	12.0	152	110	117	82.6	19.00	4	16	176	162	4.8	43
25	17.0	165	110	124	88.9	19.00	4	17.5	195	169	7.2	51
32	23.0	178	170	133	98.6	19.00	4	19.5	271	235	15.1	63.5
40	28.0	190	170	156	114.3	22.50	4	21	271	235	15.1	73.0
50	36.0	216	170	165	127	19.00	8	22.5	278	237	19.8	92.0

CLASS-600

SIZE	ØA	B	ØC	ØD	P.C.D	HOLESØ	NO.OF HOLES	T	H APPROX		APPROX WT,KGS	ØF
									OPEN	CLOSE		
15	9.0	165	110	95	66.6	15.75	4	20.9	162	152	4.8	35
20	12.0	190	110	117	82.6	19.00	4	22.4	176	162	6.2	43
25	18.0	216	110	124	88.9	19.00	4	23.9	195	169	8.0	51
32	23.0	229	170	133	98.6	19.00	4	27.4	271	235	16.0	63.5
40	30.0	241	170	156	114.3	22.50	4	28.9	271	235	16.0	73.0
50	36.0	292	170	165	127	19.00	8	31.9	278	237	22.5	92.0

NOTES

- DIMN'B' CONFORMS TO ANSI-B 16.10/BS:2080 EXCEPT FOR CLASS 150 WHICH IS MAINTAINED SAME AS CLASS-300
- FLANGED ENDS TO ANSI-B 16.5
- VALVES ARE AVAILABLE IN WELDED BONNET ALSO

Org.NO:FE-FGTV-015050-RB  
REV NO 0

OUR REF  
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MANOHAR VALVES HUBLI

<b>SIZE RANGE:</b>	15MM TO 50MM
<b>TYPE:</b>	BOLTED COVER OS & Y TYPE
<b>END CONNECTION:</b>	SOCKET WELD END, BUTT WELD END & SCREWED END TO BSP, BSPT AND NPT
<b>DESIGN STANDARDS:</b>	API 602, BS EN ISO 15761, ANSI B16.34
<b>MANUFACTURING STANDARDS:</b>	
<b>FLANGED END:</b>	ANSI B16.5
<b>FACE TO FACE:</b>	ANSI B16.10, BS 2080
	For Class 150 valves, the flange drilling dimensions will be as per Class 150 and all other dimensions as per Class 300.
<b>TESTING STANDARD:</b>	API-598, BS 6755 PART-1
<b>CONSTRUCTIONAL DETAILS:</b>	

**MINIMUM DIAMETER OF EQUIVALENT FLOW PASSAGE WAY**

DN	Minimum diameter for 150,300 & 600 # as per API-602	ACTUAL
8	6	6.4
10	6	6.4
15	9	9
20	12	12
25	17	17
32	23	24
40	28	24*
50	36	30*

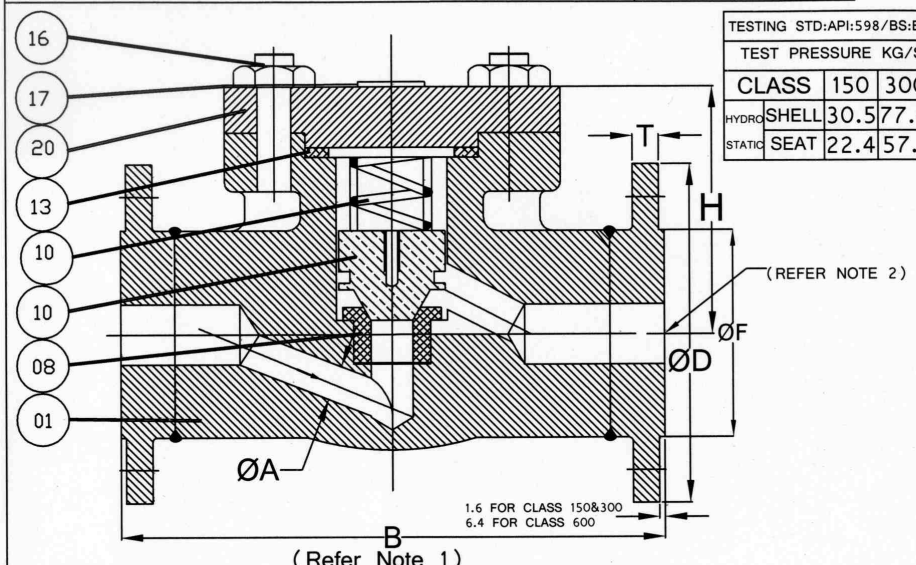
NOTE: ALL DIMENSIONS ARE IN MM

\* FLOW PASSAGE WAY FOR 40MM AND 50MM VALVES ARE SLIGHTLY LESSER THAN THE STANDARD

MINIMUM WALL THICKNESS FOR VALVE BODIES AND COVERS			
DN	Minimum wall thickness for 150,300 & 600 # as per API-602	ACTUAL	
		BODY	COVER
8	3.1	4.3	8
10	3.3	4.3	8
15	4.1	4.3	8
20	4.8	5.2	10
25	5.6	5.9	10
32	5.8	6.3	12
40	6.1	6.3	12
50	7.1	9.5	13
NOTE: ALL DIMENSIONS ARE IN MM			
MINIMUM C/S AREA OF BODY COVER BOLTING			
DN	Minimum body bonnet bolting c/s area requirement as per API-602	ACTUAL	Bolt Size x number of bolts
8	100.82	314.2	M10 x 4
10	100.82	314.2	M10 x 4
15	100.82	314.2	M10 x 4
20	111.72	314.2	M10 x 4
25	181.61	314.2	M10 x 4
32	351.97	452.45	M12 x 4
40	351.97	452.45	M12 x 4
50	424.8	452.45	M12 x 4
NOTE: ALL DIMENSIONS ARE IN SQ MM			

**FORGED STEEL LIFT CHECK FLANGED END VALVE REDUCED BORE, CLASS-150,300 & 600**

**MFG.STD. API-602**



TESTING STD:API:598/BS:EN:12266			
TEST PRESSURE KG/SQ.CM			
CLASS	150	300	600
HYDRG SHELL	30.5	77.4	154.9
STATIC SEAT	22.4	57.1	116.2

PART NO	PART NAME	MATERIAL
1	BODY	ASTM A-105
3	SEAT RING	AISI-410
9	DISC	AISI-410
13	GASKET	S.P.W-SS:304GRAPHITE FILLED
16	BODY STUD	ASTM A-193 GR,B7
17	BODY NUT	ASTMA-194 GRADE 2H
20	COVER	ASTM A-105
10	SPIRING	SS 316

- NOTES**
- DIMN'B' CONFORMS TO ANSI-B 16.10/BS:2080 EXCEPT FOR CLASS 150 WHICH IS MAINTAINED SAME AS CLASS-300
  - FLANGED ENDS TO ANSI-B 16.5
  - \* NOT AS PER STANDARD
  - FOR HIGHER TEMP, VALVE WITH APPROPRIATE MOC IS AVAILABLE,WHEN SPECIFIED.
  - VALVES WITH WELDED COVERS ARE ALSO AVAILABLE.

**CLASS-150**

ALL DIMENSIONS ARE IN MM								H APPROX	APPROX Wt,KGS	ØF
SIZE	ØA	B	ØD	P.C.D	HOLESØ	NO.OF HOLES	T			
15	9.0	152	89	60.5	15.8	4	11.5	54	2.3	35
20	12.0	178	99	70.0	15.8	4	13	66	3.0	43
25	17.0	203	108	79.5	15.8	4	14.5	72	4.5	51
32	24.0	216	117	89.0	15.8	4	16	102	9.2	63.5
40	24*	229	127	98.5	15.8	4	17.5	102	9.2	73
50	30*	267	153	120.5	19.1	4	19.5	108	13.5	92

**CLASS-300**

ALL DIMENSIONS ARE IN MM								H APPROX	APPROX Wt,kgs	ØF
SIZE	ØA	B	ØD	P.C.D	HOLESØ	NO.OF HOLES	T			
15	9.0	152	95	66.6	15.75	4	14.5	54	2.8	35
20	12.0	178	117	82.6	19.00	4	16	66	4.0	43
25	17.0	203	124	88.9	19.00	4	17.5	72	6.0	51
32	24.0	216	133	98.6	19.00	4	19.5	102	12.5	63.5
40	24*	229	156	114.3	22.50	4	21	102	12.5	73
50	30*	267	165	127	19.00	8	22.5	108	15.0	92

**CLASS-600**

ALL DIMENSIONS ARE IN MM								H APPROX	APPROX Wt,kgs	ØF
SIZE	ØA	B	ØD	P.C.D	HOLESØ	NO.OF HOLES	T			
15	9.0	165	95	66.6	15.75	4	20.9	54	3.5	35
20	12.0	190	117	82.6	19.00	4	22.4	66	5.2	43
25	17.5	216	124	88.9	19.00	4	23.9	72	7.2	51
32	22*	229	133	98.6	19.00	4	27.4	102	14.0	63.5
40	24*	241	156	114.3	22.50	4	28.6	102	14.0	73
50	29*	292	165	127	19.00	8	31.9	108	19.5	92

Drg.NO:FE-FLCV-015050-RB OUR REF --

REV NO 0

**MANOHAR VALVES HUBLI**

MATERIAL ASTM A105 AND LF2 (SPECIAL CLASS)							
TEMPERATURE IN °C	Working Pressure by Class,bar						
	150	300	600	800	900	1500	2500
- 29 to 38	19.8	51.7	103.4	137.9	155.1	258.6	430.9
50	19.8	51.7	103.4	137.9	155.1	258.6	430.9
100	19.8	51.6	103.3	137.7	154.9	258.2	430.3
150	19.6	51	102.1	136.1	153.1	255.2	425.3
200	19.4	50.6	101.1	134.8	151.7	252.9	421.4
250	19.4	50.5	101.1	134.8	151.6	252.6	421.1
300	19.4	50.5	101.1	134.8	151.6	252.6	421.1
325	19.2	50.1	100.2	133.6	150.3	250.6	417.6
350	18.7	48.9	97.8	130.4	146.7	244.6	407.6
375	18.1	47.1	94.2	125.6	141.3	235.5	392.5
400	16.6	43.4	86.8	115.7	130.2	217	361.7
425	13.8	36	71.9	95.9	107.9	179.8	299.6
450	11	28.8	57.5	76.7	86.3	143.8	239.6
475	8.4	21.8	43.6	58.1	65.4	109	181.6
500	5.6	14.7	29.4	39.2	44.1	73.5	122.4
538	2.8	7.4	14.8	19.7	22.2	36.9	61.6
MATERIAL ASTM A182 Gr F11 CL.2 (SPECIAL CLASS)							
TEMPERATURE IN °C	Working Pressure by Class,bar						
	150	300	600	800	900	1500	2500
- 29 to 38	19.8	51.7	103.4	137.9	155.1	258.6	430.9
50	19.8	51.7	103.4	137.9	155.1	258.6	430.9
100	19.8	51.7	103.4	137.9	155.1	258.6	430.9
150	19.8	51.7	103.4	137.9	155.1	258.6	430.9
200	19.8	51.7	103.4	137.9	155.1	258.6	430.9
250	19.8	51.7	103.4	137.9	155.1	258.6	430.9
300	19.8	51.7	103.4	137.9	155.1	258.6	430.9
325	19.8	51.7	103.4	137.9	155.1	258.6	430.9
350	19.8	51.5	102.8	137.1	154.3	257.1	428.6
375	19.3	50.6	101	134.7	151.5	252.5	420.9
400	19.3	50.3	100.6	133.9	150.6	251.2	418.3
425	19	49.6	99.3	127.0	140.9	248.2	413.7
450	18.1	47.3	94.4	125.7	141.4	235.8	393.1
475	16.4	42.8	85.5	114.0	128.2	213.7	356.3
500	12.3	32.2	64.3	85.8	96.5	160.8	268
538	7.1	18.6	37.2	49.6	55.8	93.1	155.1
550	6.1	15.9	31.8	42.4	47.7	79.4	132.4
575	4.2	11	22	29.3	33	55	91.7
600	2.9	7.6	15.3	20.4	22.9	38.2	63.6

MATERIAL ASTM A182 F22 CL3 (SPECIAL CLASS)							
TEMPERATURE IN °C	Working Pressure by Class,bar						
	150	300	600	800	900	1500	2500
- 29 to 38	19.8	51.7	103.4	137.9	155.1	258.6	430.9
50	19.8	51.7	103.4	137.9	155.1	258.6	430.9
100	19.8	51.6	103.2	137.7	154.9	258.1	430.2
150	19.5	51	101.9	135.9	152.9	254.8	424.6
200	19.3	50.2	100.4	133.9	150.7	251.1	418.5
250	19.2	50	100	133.3	149.9	249.9	416.5
300	19.1	49.8	99.6	132.7	149.3	248.9	414.8
325	19	49.6	99.2	132.3	148.8	248	413.3
350	18.9	49.2	98.4	131.2	147.6	246	410
375	18.7	48.8	97.5	130.0	146.3	243.8	406.3
400	18.7	48.8	97.5	130.0	146.3	243.8	406.3
425	18.7	48.8	97.5	130.0	146.3	243.8	406.3
450	18.1	47.3	94.4	125.7	141.4	235.8	393.1
475	16.4	42.8	85.5	114.0	128.2	213.7	356.3
500	13.7	35.6	71.5	95.2	107.1	178.6	297.5
538	8.8	23	46.1	61.4	69.1	115.2	192.1
550	7.5	19.5	39.1	52.1	58.6	97.7	162.8
575	5	13.2	26.3	35.1	39.5	65.8	109.7
600	3.3	8.6	17.2	22.9	25.8	43	71.7

MATERIAL ASTM A182 Gr F304 (1) (SPECIAL CLASS)							
TEMPERATURE IN °C	Working Pressure by Class,bar						
	150	300	600	800	900	1500	2500
- 29 to 38	19.8	51.7	103.4	137.9	155.1	258.6	430.9
50	19.4	50.5	101	134.7	151.5	252.5	420.8
100	17.5	45.6	91.2	121.6	136.8	228	380
150	15.8	41.3	82.6	110.1	123.9	206.5	344.2
200	14.8	38.5	77	102.6	115.4	192.4	320.7
250	13.9	36.3	72.5	96.7	108.8	181.3	302.2
300	13.2	34.5	69	92.0	103.5	172.5	287.5
325	12.9	33.7	67.5	90.0	101.2	168.7	281.1
350	12.7	33.1	66.1	88.2	99.2	165.3	275.5
375	12.4	32.4	64.8	86.4	97.2	162	270
400	12.2	31.7	63.5	84.6	95.2	158.7	264.5
425	12	31.2	62.5	83.3	93.7	156.2	260.4
450	11.7	30.6	61.2	81.6	91.8	153	254.9
475	11.5	30.1	60.1	80.2	90.2	150.3	250.5
500	11.3	29.6	59.1	78.8	88.7	147.8	246.4
538	11	28.6	57.3	76.4	85.9	143	238.5
550	10.9	28.4	56.8	75.7	85.1	141.9	236.5
575	10	26.1	52.1	69.5	78.2	130.3	217.2
600	8.1	21.1	42.2	56.3	63.3	105.5	175.8

MATERIAL ASTM A182 F316 (1) (SPECIAL CLASS)							
TEMPERATURE IN °C	Working Pressure by Class,bar						
	150	300	600	800	900	1500	2500
- 29 to 38	19.8	51.7	103.4	137.9	155.1	258.6	430.9
50	19.5	50.8	101.6	135.5	152.5	254.1	423.5
100	18.1	47.1	94.2	125.6	141.3	235.5	392.4
150	16.5	43	85.9	114.6	128.9	214.8	358
200	15.3	39.8	79.6	106.1	119.4	199	331.7
250	14.3	37.3	74.5	99.4	111.8	186.3	310.4
300	13.5	35.3	70.6	94.1	105.9	176.4	294.1
325	13.2	34.5	68.9	91.9	103.4	172.3	287.2
350	13	33.8	67.7	90.2	101.5	169.2	282.1
375	12.8	33.3	66.7	88.9	100	166.7	277.9
400	12.6	32.9	65.7	87.6	98.6	164.3	273.8
425	12.5	32.5	65.1	86.8	97.6	162.6	271.1
450	12.3	32.2	64.4	85.9	96.6	161	268.3
475	12.3	32	64	85.3	96	160	266.6
500	12.2	31.7	63.4	84.5	95.1	158.6	264.3
538	11	29	57.9	77.2	86.9	145.1	241.7
550	11	29	57.9	77.2	86.9	145.1	241.7
575	10.9	28.6	57.1	75.9	85.37	143	238.3
600	9.5	24.9	49.8	66.3	74.6	124.4	207.3
MATERIAL ASTM A182 Gr F304L (1) & F316L (SPECIAL CLASS)							
TEMPERATURE IN °C	Working Pressure by Class,bar						
	150	300	600	800	900	1500	2500
- 29 to 38	17.7	46.2	92.3	123.1	138.5	230.9	384.8
50	17.1	44.7	89.3	119.1	134	223.3	372.2
100	14.9	38.8	77.7	103.6	116.5	194.1	373.6
150	13.4	35	70.1	93.4	105.1	175.2	291.9
200	12.5	32.5	65.1	86.8	97.6	162.7	271.2
250	11.8	30.7	61.3	81.8	92	153.3	255.4
300	11.2	29.1	58.2	77.6	87.3	145.5	242.4
325	10.9	28.4	56.9	75.8	85.3	142.2	237
350	10.7	28	56	74.6	83.9	139.9	233.2
375	10.6	27.6	55.2	73.7	82.9	138.1	230.2
400	10.4	27.1	54.3	72.4	81.4	135.6	226
425	10.2	26.6	53.3	71.0	79.9	133.1	221.9
450	10	26.1	52.3	69.7	78.4	130.6	217.7



ASTM STD	ASTM A350		ASTM A182					
	A105	LF2	F11	F22	F304	F316	F304L	F316L
ELEMENTS % MAX								
CARBON	0.5	0.3	0.1-0.2	0.05-0.15	0.08	0.08	0.035	0.035
MANGANESE	0.6 - 1.05	.6-1.35	0.3-0.8	0.3-0.6	2	2	2	2
SILICON	0.1-0.35	.15-.3	0.5-0.1	0.5	1	1	1	1
SULPHUR	0.04	0.04	0.04	0.04	0.03	0.03	0.03	0.03
PHOSPOROUS	0.035	0.035	0.04	0.04	0.045	0.045	0.045	0.045
CHROMIUM	0.3 (1)	0.3	1-1.5	2-2.5	18-20	16-18	18-20	16-18
NICKEL	0.4(1)	0.4	***	***	8.0-11	10.0-14	8.0-13	8.0-13
MOLYBDENUM	0.12(1)	0.12	0.44-0.65	0.87-1.13	***	2.0-3	***	2.0-3