



## **TKV COMBINATION AIR VALVE - DUAL BODY TYPE**

### **FUNCTION**

TKV Combination Air Valve is designed to automatically exhaust large volumes of air from the pipe system when it is being filled and to allow air to re-enter the pipe on line break or when the system is being drained. Plus, TKV Combination Air valves automatically expel small amounts of air which collect at system high point once the system is filled up to pressure and water is flowing.

### **DESIGN AND OPERATION**

TKV Combination Air Valve combines the function of the Air/Vacuum and Air Release Valves, its contains both a small air release orifice and a large Air/Vacuum port in one assembly. The orifice size of the Air/Vacuum valve is the same size as the valve inlet and outlet.

All Air/Vacuum valves should be designed to prevent the valve from being blown shut should the float ball become caught in the high velocity exhausting air stream. Should this happen, the purpose of the valve has been defeated since the orifice is then shut, but all the air has not yet been purged. TKV Combination Air Valve is designed NOT to be blown shut by the air stream, regardless of pressure, at exit velocities approaching sonic velocity.

TKV Air Valve uses hydro-dynamic principles, evolved from Bernoulli's Theory, to produce the air valve that is actually held the float in open position as air moving across it by means of "Aerokinetic" feature, an aerodynamic force created by the air stream moving over the float ball, and remains completely stable under all air outflow and inflow conditions without any possibility of premature closing of the valve. But is immediately closed when solid water rises in the valve and lifts the float ball, sealing the orifice.

To admit air, as necessary, to prevent potentially dangerous vacuum from forming when being emptied either intentionally or as a result of pipeline breakage.



# PIPEMATE SDN BHD

MALAYSIA  
 TEL : 603 - 61380977  
 FAX : 603 - 61388772

CLIENT : JTM

PROJECT : THE MARUA TO KARORI PIPELINE  
 GREATER WELLINGTON REGIONAL COUNCIL

TITLE : TKV COMBINATION AIR VALVE C/W WORM GEAR AND STEM CAP

DRAWN BY : YC SEE

CHECKED BY : KH LEE

APPROVED BY : KH LEE

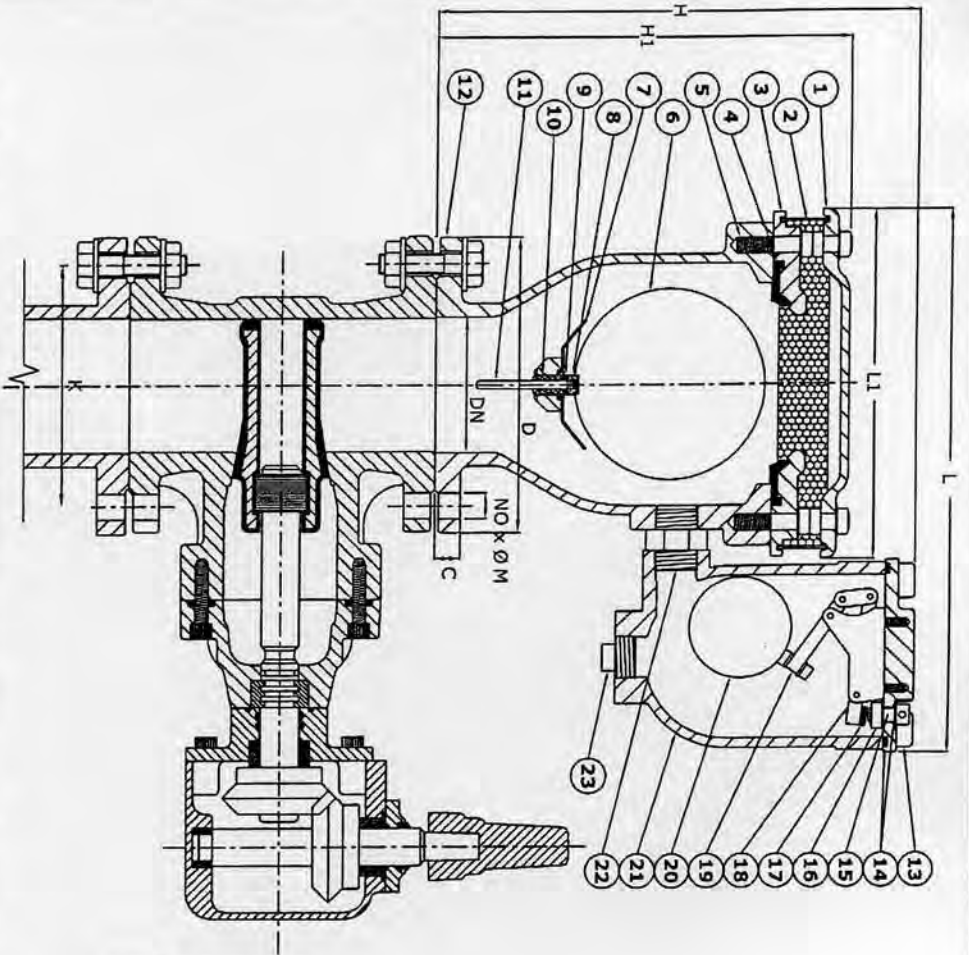
DRG NO : PM/5419/008

REV : 0

DATE : 06/03/08

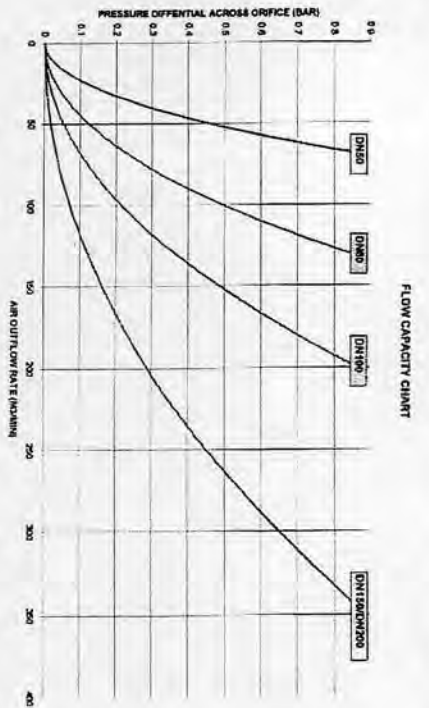
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MODEL	DN	H	H1	L	L1	D	K	NO x ØM	C	ORIFICE/ ORIFICE SIZE	REMARKS
50CAVF	50	345	275	355	210	185	125	4 x Ø19	19	50mm/1963mm <sup>2</sup>	FULL ORIFICE
80CAVF	80	360	310	410	260	200	180	8 x Ø19	19	80mm/5027mm <sup>2</sup>	FULL ORIFICE
100CAVF	100	380	340	410	280	220	180	8 x Ø19	19	100mm/7855mm <sup>2</sup>	FULL ORIFICE
150CAVF	150	540	540	540	385	285	240	8 x Ø23	19	150mm/17673mm <sup>2</sup>	FULL ORIFICE
200CAVF	200	540	540	540	385	340	295	12 x Ø23	20	150mm/17673mm <sup>2</sup>	REDUCE ORIFICE



FEATURE	SPECIFICATION
Flange Drillings	BS EN 1092-2/ISO 7005 PN 16
Maximum Service Temperature	70° C
Maximum Working Pressure	16 Bars

NO	Component	Material
1	Cowl	Ductile Iron, BS EN1563 Grade 420/12
2	Protection Ghd	Stainless Steel, BS 970:Part 1 304
3	Cover	Ductile Iron, BS EN1563 Grade 420/12
4	Seat	EPDM, BS EN 681-1 Type WA
5	Bolt	Stainless Steel, BS 970:Part 1 304
6	Float Ball	Stainless Steel, BS 970:Part 1 304
7	Buffer	Stainless Steel, BS 970:Part 1 304
8	Guide Screw	Stainless Steel, BS 970:Part 1 304
9	Guide Seal	EPDM, BS EN 681-1 Type WA
10	Guide Bush	Nylon
11	Float Guide	Stainless Steel, BS 970:Part 1 304
12	Body	Ductile Iron, BS EN1563 Grade 420/12
13	Cover	Ductile Iron, BS EN1563 Grade 420/12
14	O-Ring Seal	EPDM, BS EN 681-1 Type WA
15	Orifice	Stainless Steel, BS 970:Part 1 304
16	Hex Nut	Stainless Steel, BS 970:Part 1 304
17	Orifice Button	EPDM, BS EN 681-1 Type WA
18	Lever Arm	Stainless Steel, BS 970:Part 1 304
19	Float Pivot Arm	Stainless Steel, BS 970:Part 1 304
20	Float Ball	Stainless Steel, BS 970:Part 1 304
21	Air Release Body	Ductile Iron, BS EN1563 Grade 420/12
22	Nipple	Ductile Iron, BS EN1563 Grade 420/12
23	Plug	Ductile Iron, BS EN1563 Grade 420/12
24	Coating	Fusion Bonded Epoxy Powder Coated(250 Microns)





**PIPEMATE SDN BHD**  
 MALAYSIA  
 TEL : 603 - 61380977  
 FAX : 603 - 61388772

**CLIENT :** JTM  
**PROJECT :** Te Marua To Karori Pipeline  
 Greater Wellington

**DR BY :** Y. C. SEE  
**DWG NO :** PW/4386/06

**CK BY :** K. H. LEE  
**REV :** 2

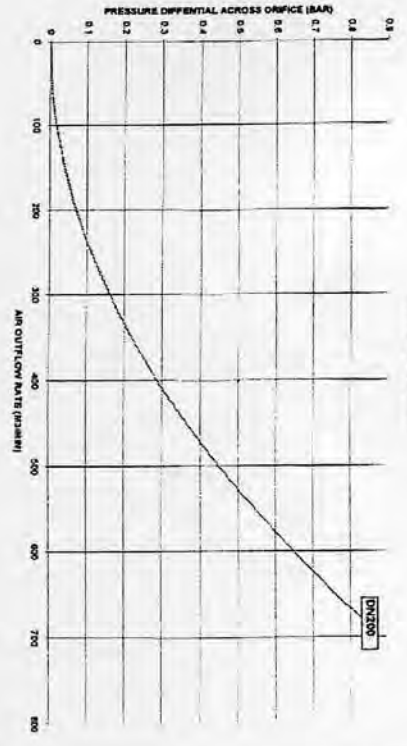
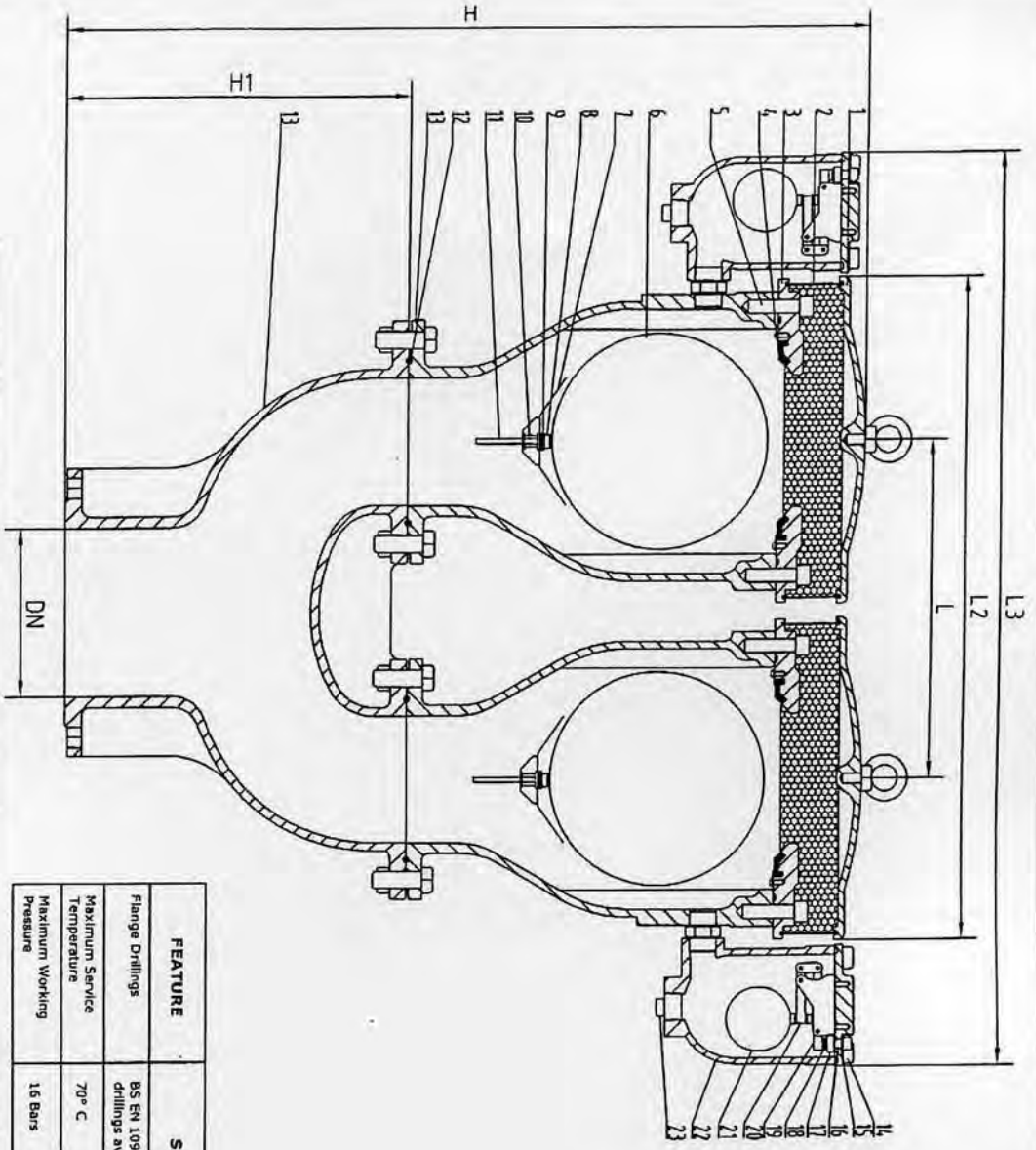
**SCALE :** M55  
**DATE :** 22/08/06

**TITLE : TKV COMBINATION AIR VALVE DUAL BODY TYPE**

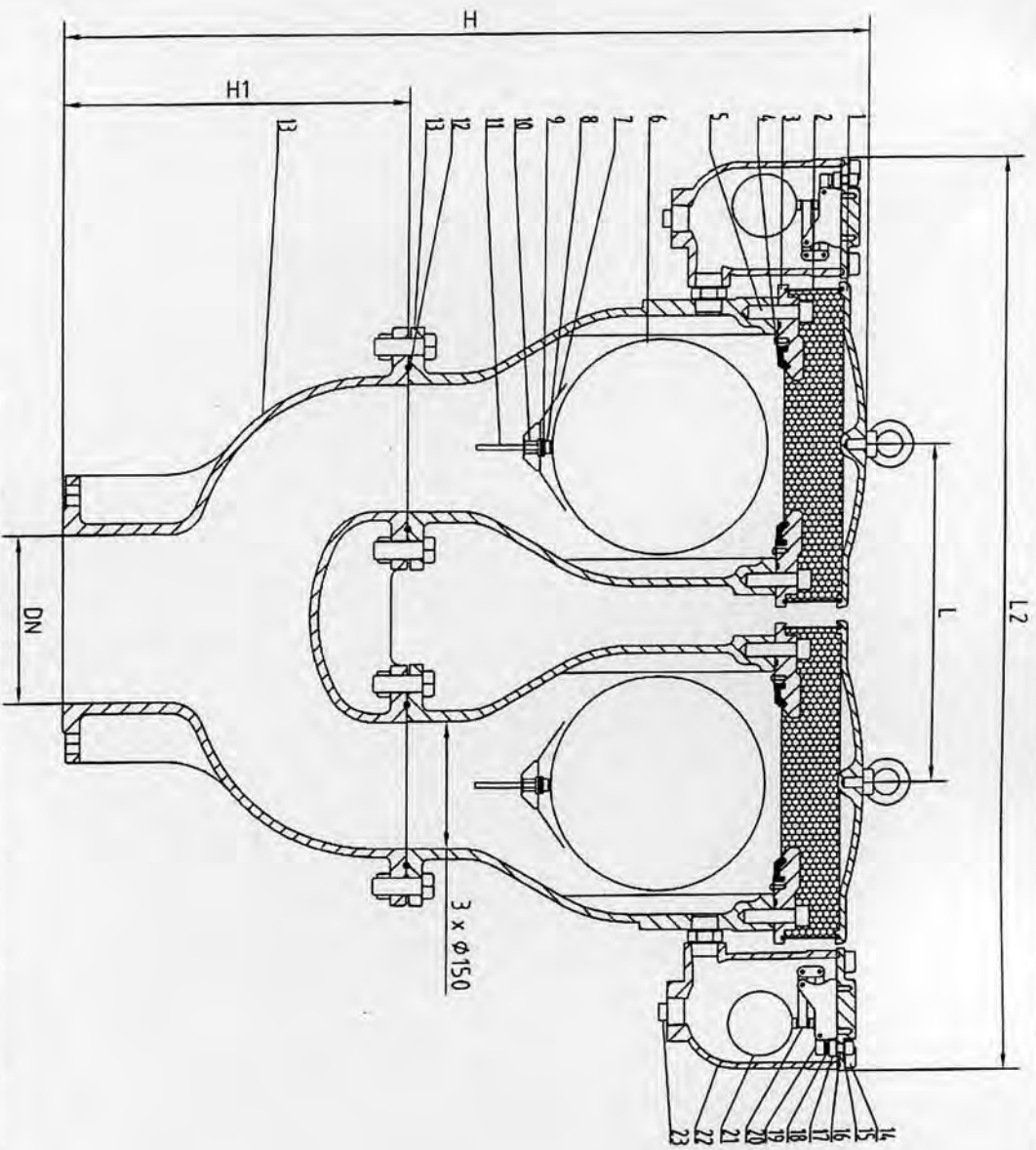
MODEL	DN	H	H1	L	L2	L3	OUTLET/ ORIFICE SIZE
200CAVY	200	945	405	400	784	1082	2 x 150mm/353x46mm <sup>2</sup>

FEATURE	SPECIFICATION
Flange Drillings	BS EN 1092-2/ISO 7005 PN 16 other drillings available
Maximum Service Temperature	70° C
Maximum Working Pressure	16 Bars

NO	Component	Material
1	Cowl	Ductile Iron, BS EN1563 Grade 500/7
2	Protection Grid	Stainless Steel, BS 970:Part 1 304
3	Cover	Ductile Iron, BS EN1563 Grade 500/7
4	Seat	EPDM BS EN 681-1 Type WA
5	Body	Stainless Steel, BS 970:Part 1 304
6	Front Ball	Stainless Steel, BS 970:Part 1 304
7	Buflife	Stainless Steel, BS 970:Part 1 304
8	Guide Screw	Stainless Steel, BS 970:Part 1 304
9	Guide Seal	EPDM BS EN 681-1 Type WA
10	Guide Rush	Nylon
11	Guide Guide	Stainless Steel, BS 970:Part 1 304
12	O-Ring Seal	EPDM BS EN 681-1 Type WA
13	Body	Ductile Iron, BS EN1563 Grade 500/7
14	Cover	Ductile Iron, BS EN1563 Grade 500/7
15	O-Ring Seal	EPDM BS EN 681-1 Type WA
16	Orifice	Stainless Steel, BS 970:Part 1 304
17	Hex Nut	Stainless Steel, BS 970:Part 1 304
18	Orifice Button	EPDM BS EN 681-1 Type WA
19	Lever Arm	Stainless Steel, BS 970:Part 1 304
20	Float Pivot Arm	Stainless Steel, BS 970:Part 1 304
21	Float Ball	Stainless Steel, BS 970:Part 1 304
22	Air Release Body	Ductile Iron, BS EN1563 Grade 500/7
23	Plug	Ductile Iron, BS EN1563 Grade 500/7
24	Coating	Fusion Bonded Epoxy Powder Coated (350 Microns)



FLOW CAPACITY CHART



MODEL	DN	H	HI	L	L2	OUTLET/ ORIFICE SIZE
300CAVYR	300	1000	460	400	1085	3 x 150mm/53013mm <sup>2</sup>

NO	Component	Material
1	Cowl	Ductile Iron, BS EN1563 Grade 500/7
2	Protection Grid	Stainless Steel, BS 970:Part 1 304
3	Cover	Ductile Iron, BS EN1563 Grade 500/7
4	Seal	EPDM BS EN 681-1 Type WA
5	Bolt	Stainless Steel, BS 970:Part 1 304
6	Float Ball	Stainless Steel, BS 970:Part 1 304
7	Buffer	Stainless Steel, BS 970:Part 1 304
8	Guide Screw	Stainless Steel, BS 970:Part 1 304
9	Guide Seal	EPDM BS EN 681-1 Type WA
10	Guide Bush	Nylon
11	Float Guide	Stainless Steel, BS 970:Part 1 304
12	O-Ring Seal	EPDM BS EN 681-1 Type WA
13	Body	Ductile Iron, BS EN1563 Grade 500/7
14	Cover	Ductile Iron, BS EN1563 Grade 500/7
15	O-Ring Seal	EPDM BS EN 681-1 Type WA
16	Orifice	Stainless Steel, BS 970:Part 1 304
17	Hex Nut	Stainless Steel, BS 970:Part 1 304
18	Orifice Button	EPDM BS EN 681-1 Type WA
19	Lever Arm	Stainless Steel, BS 970:Part 1 304
20	Float Pivot Arm	Stainless Steel, BS 970:Part 1 304
21	Float Ball	Stainless Steel, BS 970:Part 1 304
22	Air Release Body	Ductile Iron, BS EN1563 Grade 500/7
23	Plug	Ductile Iron, BS EN1563 Grade 500/7
24	Coating	Fusion Bonded Epoxy Powder Coated

FEATURE	SPECIFICATION
Flange Drillings	BS EN 1092-2/ISO 7005 PN 16 other drillings available
Maximum Service Temperature	70° C
Maximum Working Pressure	16 Bars



**PIPEMATE SDN BHD**

MALAYSIA  
TEL : 603 - 61380977  
FAX : 603 - 61388772

CLIENT : JTM

PROJECT : TE MARUA TO KAPORI PIPELINE  
GREATER WELLINGTON REGIONAL COUNCIL.

TITLE : TKV COMBINATION AIR VALVE

DRAWN BY : YC SEE

CHECKED BY : KH LEE

APPROVED BY : KH LEE

DRG NO : PM/5438/08

REV : 0

DATE : 18/03/08

SCALE : NTS



**PIPEMATE SDN BHD**

MALAYSIA

TEL : 603 - 61380977

FAX : 603 - 61388772

CLIENT : JTM

PROJECT : THE MARUA TO KAPORI PIPELINE  
GREATER WELLINGTON REGIONAL COUNCIL

TITLE : TKV DN25 AIR RELEASE VALVE PN 25

DRAWN BY : YC SEE

CHECKED BY : KH LEE

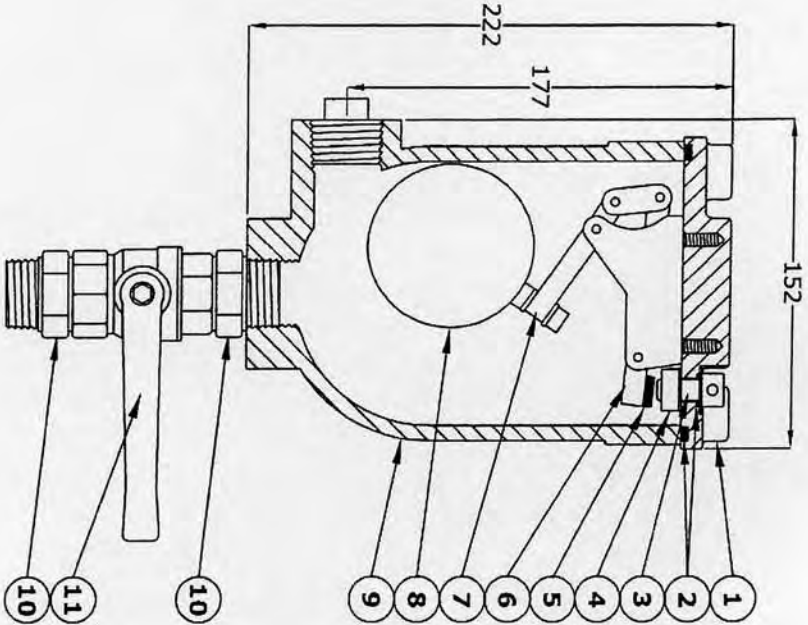
APPROVED BY : KH LEE

DRG NO : PM/5437/08

REV : 0

DATE : 18/03/08

SCALE : NTS



NO	Component	Material
1	Cover	Ductile Iron, BS EN1563 Grade 500/7
2	O-Ring Seal	EPDM BS EN 681-1 Type WA
3	Orifice	Stainless Steel, BS 970:Part 1 304
4	Hex Nut	Stainless Steel, BS 970:Part 1 304
5	Orifice Button	EPDM BS EN 681-1 Type WA
6	Lever Arm	Stainless Steel, BS 970:Part 1 304
7	Float Pivot Arm	Stainless Steel, BS 970:Part 1 304
8	Float Ball	Stainless Steel, BS 970:Part 1 304
9	Air Release Body	Ductile Iron, BS EN1563 Grade 500/7
10	Nipple	1" BSPT x 11G
11	Ball Valve	Stainless Steel
12	Coating	Fusion Bonded Epoxy Powder Coated

FEATURE	SPECIFICATION
Maximum Service Temperature	70° C
Maximum Working Pressure	25 Bar

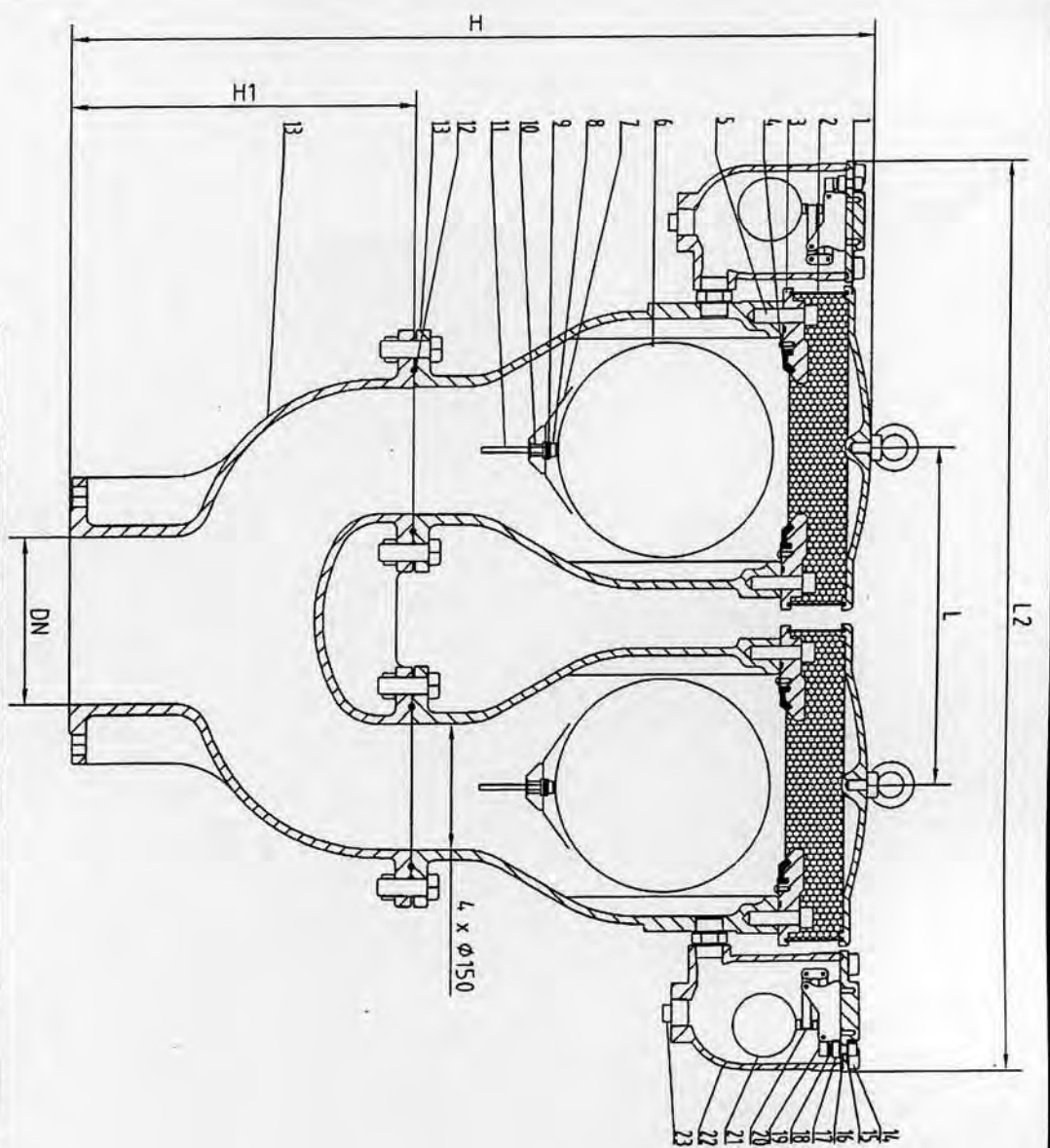


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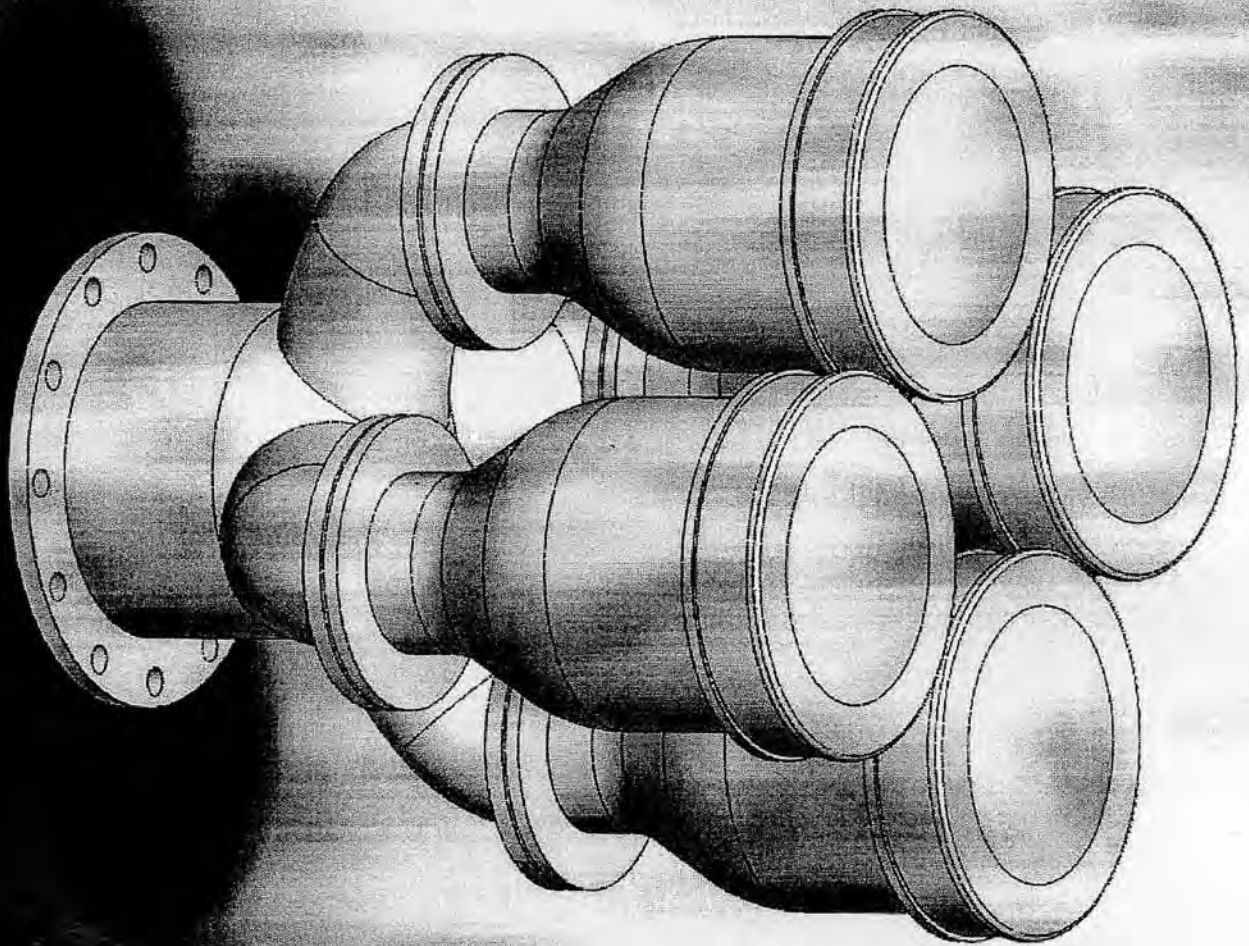
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 DRAWN BY : YC SEE  
 CHECKED BY : KH LEE  
 REV : 0  
 APPROVED BY : KH LEE  
 DATE : 18/03/08  
 SCALE : NTS

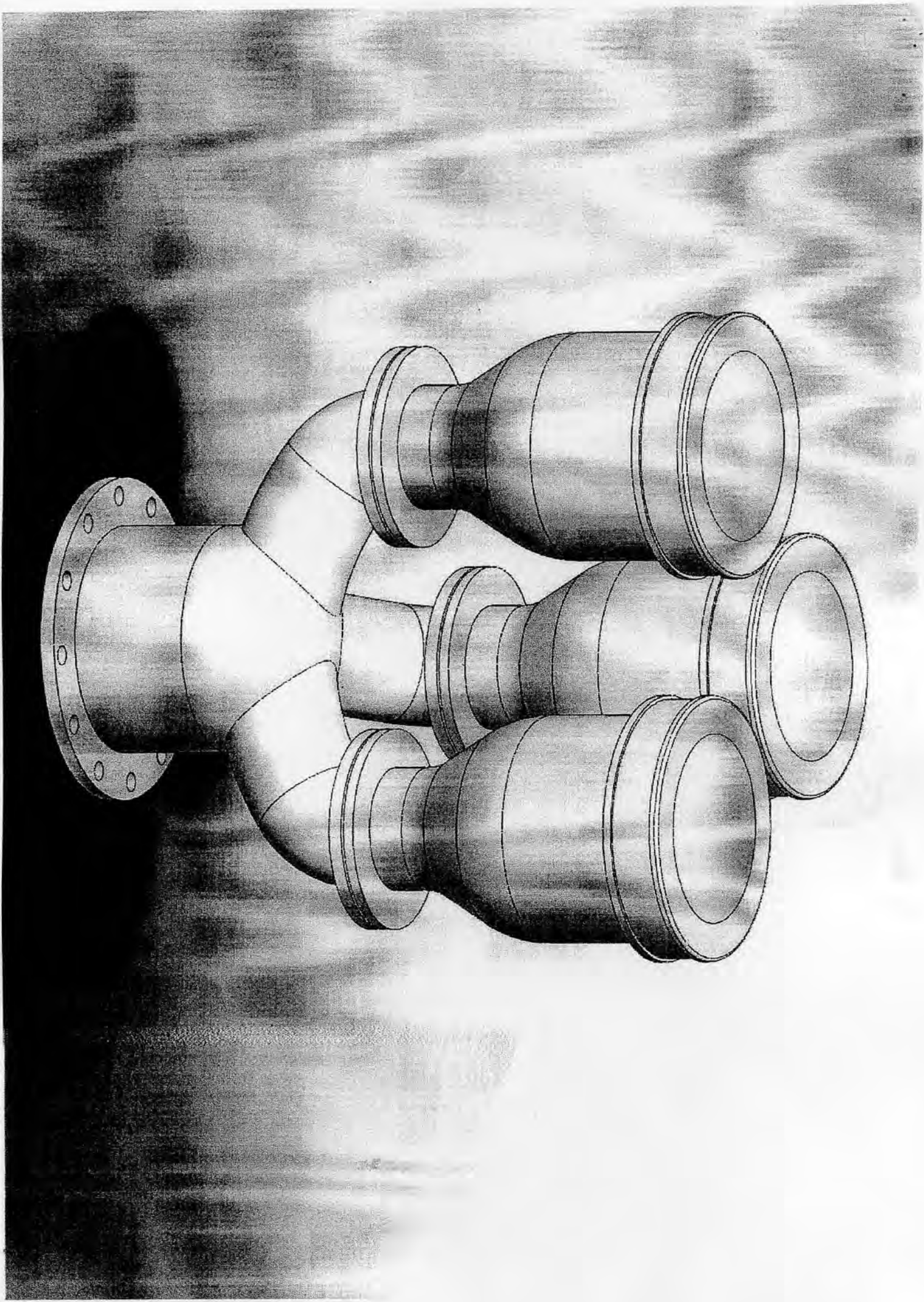
MODEL	DN	H	H1	L	L2	OUTLET/ ORIFICE SIZE
300CAVVF	300	1000	460	400	1085	4 x 150mm/70684mm <sup>2</sup>

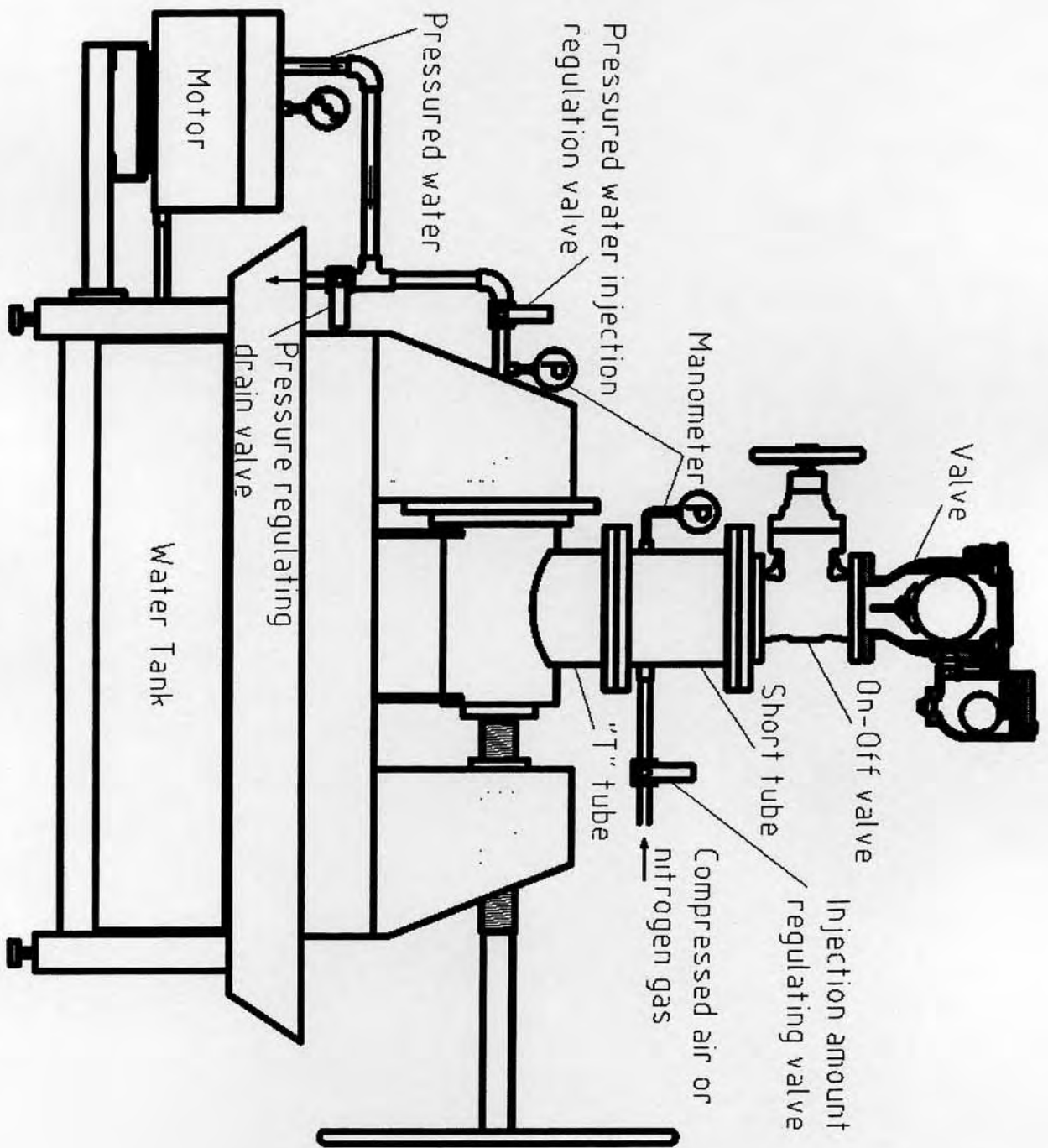


NO	Component	Material
1	Cowl	Ductile Iron, BS EN1563 Grade 500/7
2	Protection Grid	Stainless Steel/BS 970:Part 1 304
3	Cover	Ductile Iron, BS EN1563 Grade 500/7
4	Seat	EPDM BS EN 681-1 Type WA
5	Bolt	Stainless Steel/BS 970:Part 1 304
6	Float Ball	Stainless Steel/BS 970:Part 1 304
7	Baffle	Stainless Steel/BS 970:Part 1 304
8	Guide Screw	Stainless Steel/BS 970:Part 1 304
9	Guide Seal	EPDM BS EN 681-1 Type WA
10	Guide Bush	Nylon
11	Float Guide	Stainless Steel/BS 970:Part 1 304
12	O-Ring Seal	EPDM BS EN 681-1 Type WA
13	Body	Ductile Iron, BS EN1563 Grade 500/7
14	Cover	Ductile Iron, BS EN1563 Grade 500/7
15	O-Ring Seal	EPDM BS EN 681-1 Type WA
16	Orifice	Stainless Steel/BS 970:Part 1 304
17	Hex Nut	Stainless Steel/BS 970:Part 1 304
18	Orifice Button	EPDM BS EN 681-1 Type WA
19	Lever Arm	Stainless Steel/BS 970:Part 1 304
20	Float Pivot Arm	Stainless Steel/BS 970:Part 1 304
21	Float Ball	Stainless Steel/BS 970:Part 1 304
22	Air Release Body	Ductile Iron, BS EN1563 Grade 500/7
23	Plug	Ductile Iron, BS EN1563 Grade 500/7
24	Coating	Fusion Bonded Epoxy Powder Coated

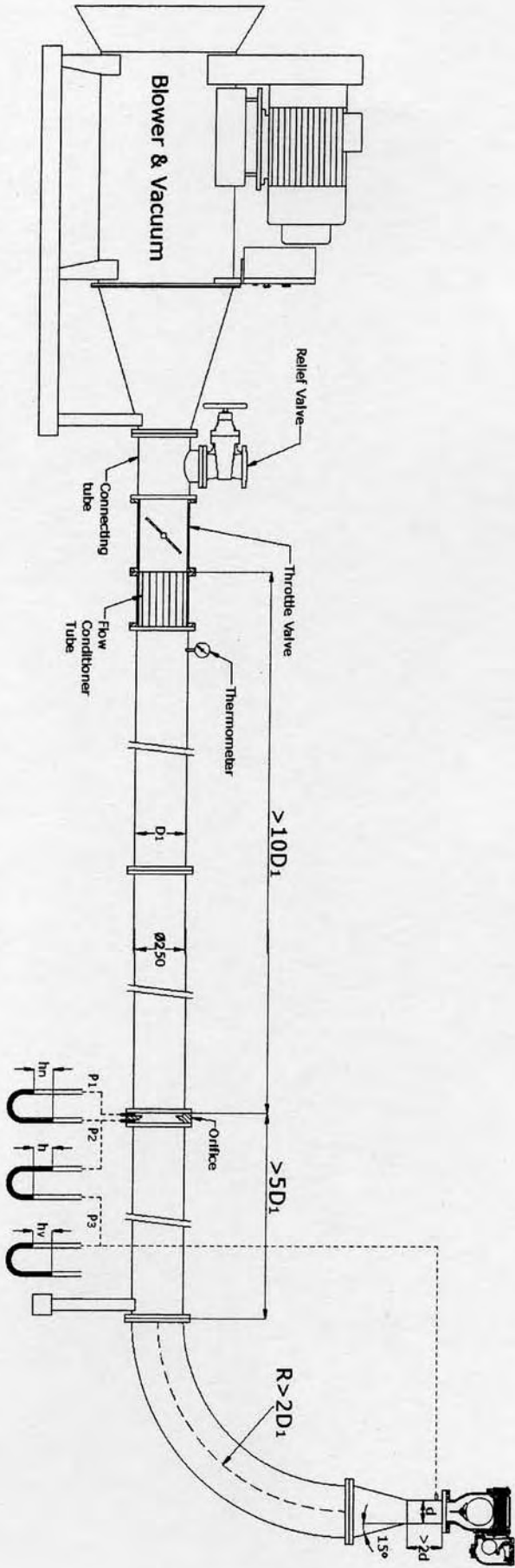
FEATURE	SPECIFICATION
Flange Drillings	BS EN 1092-2/ISO 7005 PN 16 other drillings available
Maximum Service Temperature	70° C
Maximum Working Pressure	16 Bars



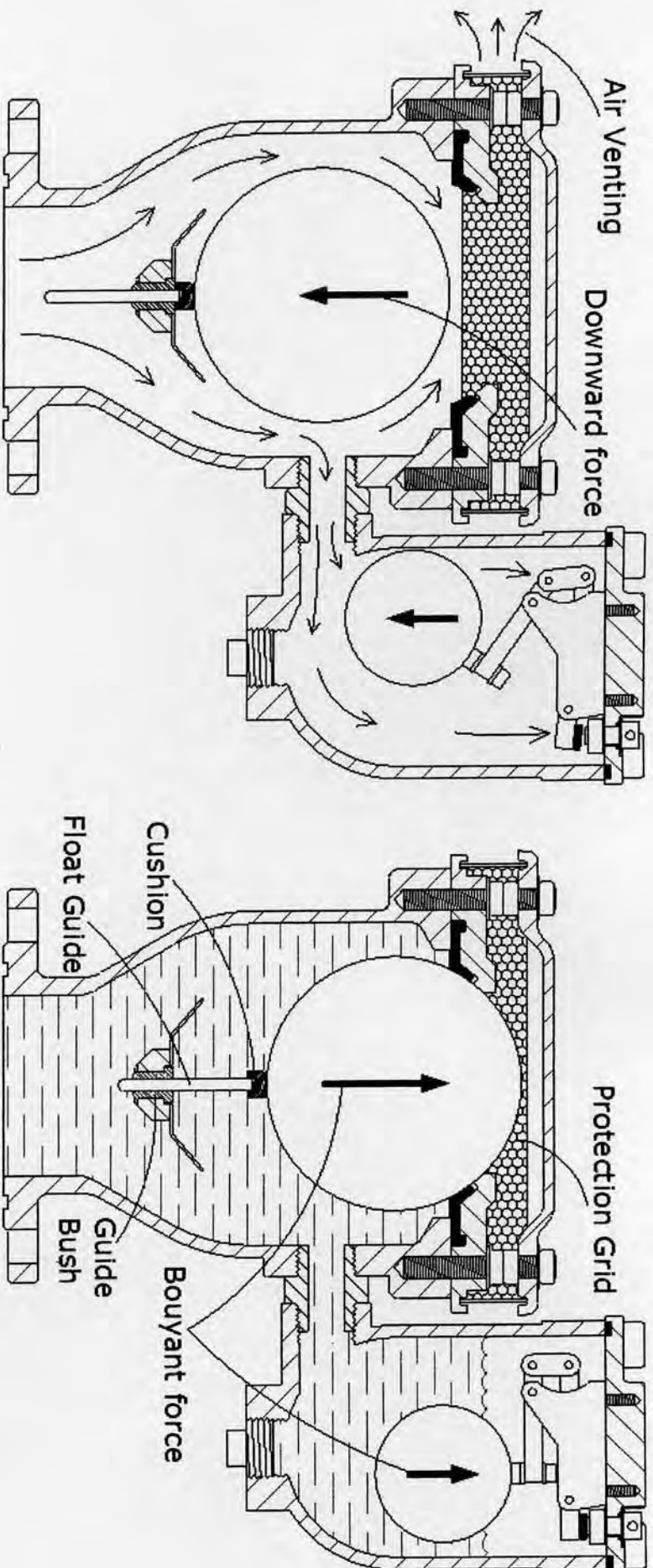




# Function test methods

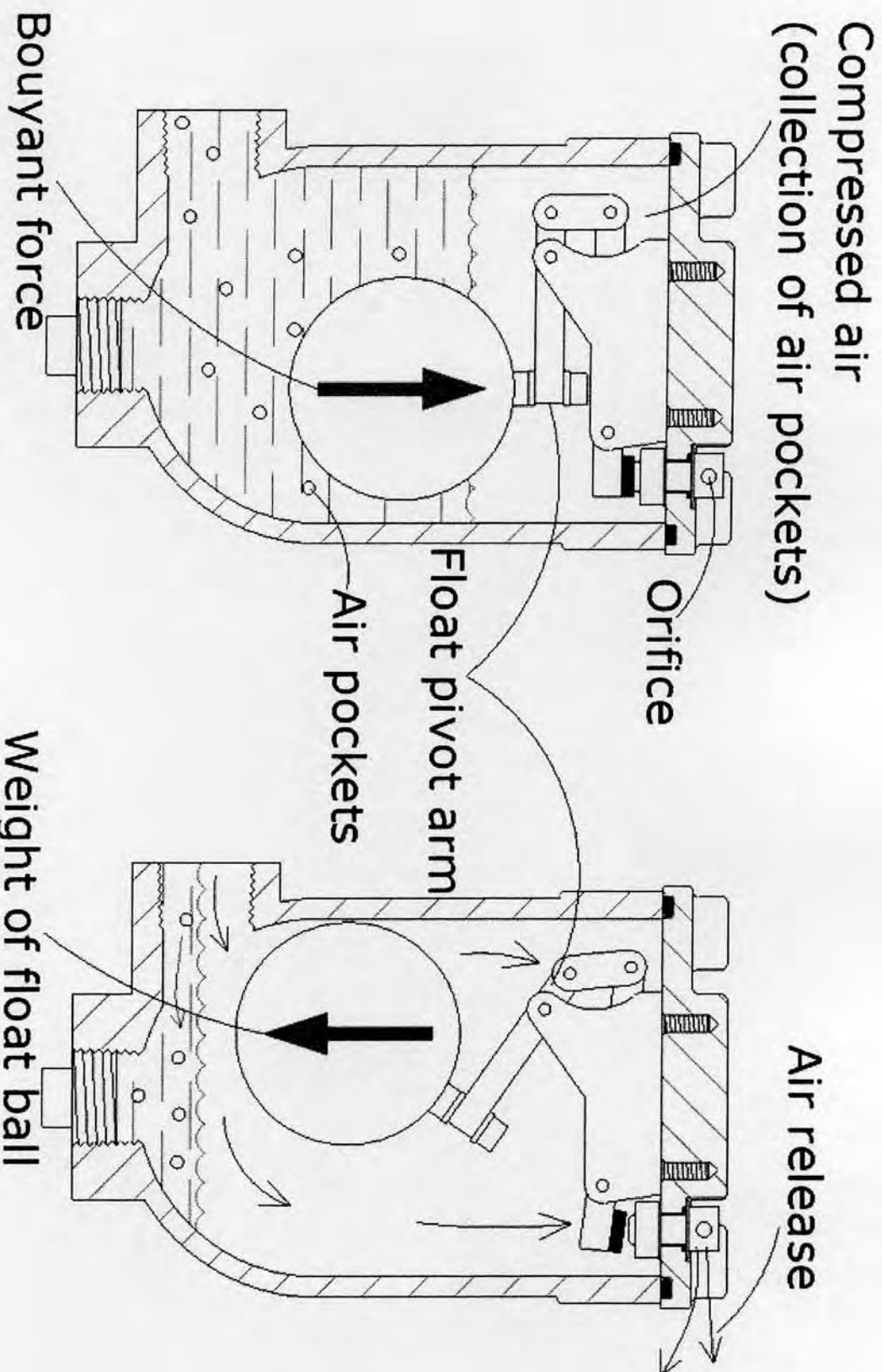


Large amount exhaust test methods



**The outlet surface area will be at equal or bigger than the inlet surface area. Ensure that air will escape smoothly.**

**Float ball are guided for air valve to ensure proper closure of outlet during water surge.**

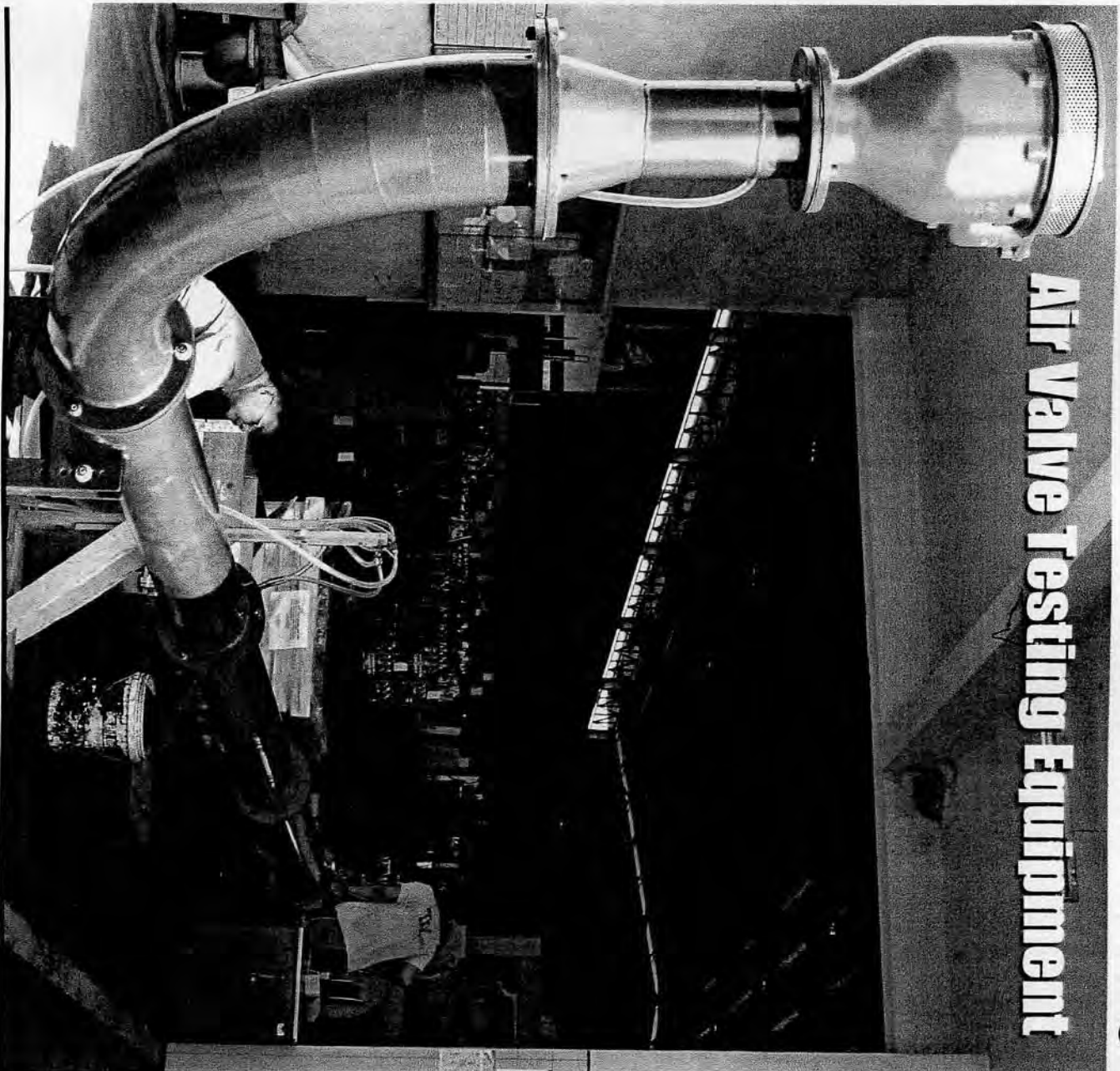


Close position

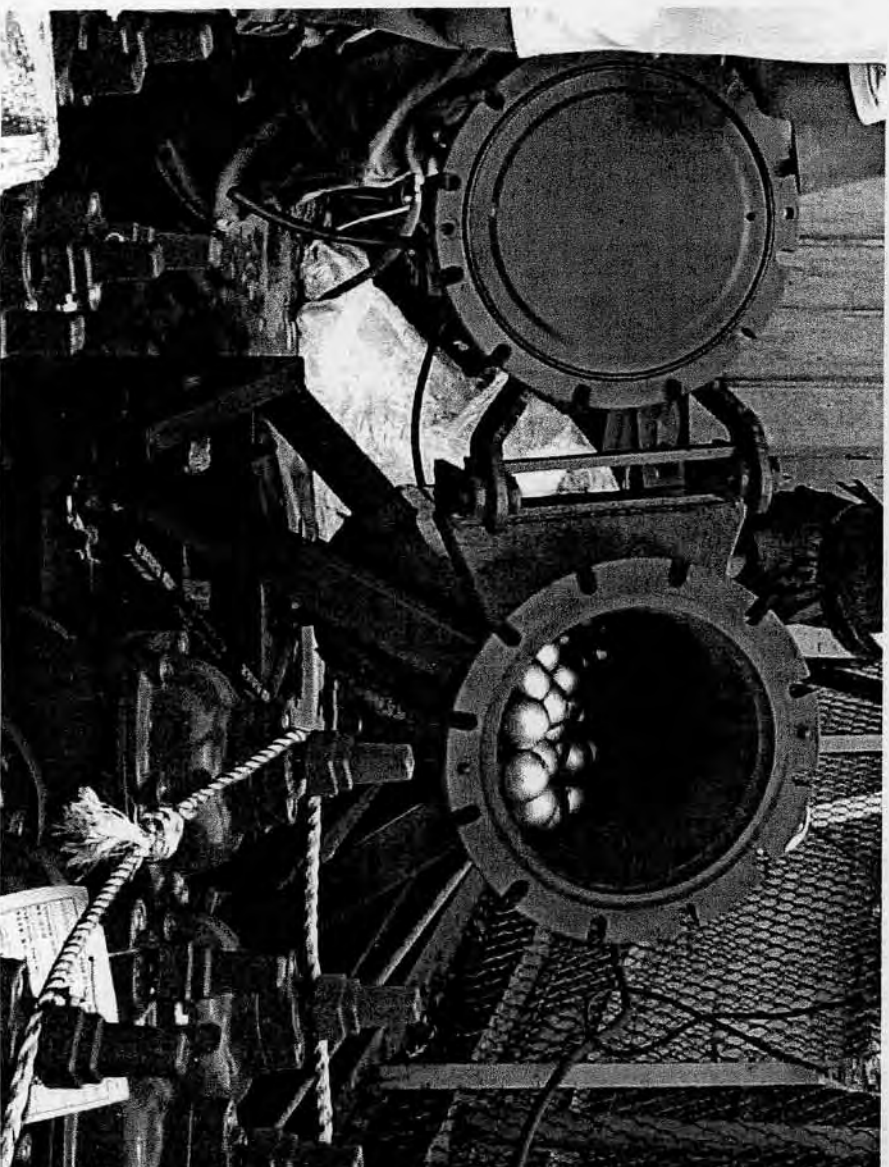
Open position

**Air release valve has a pivot to guide its float ball.**

JIS B 2063 – Air Valve Exhaust Air Flow Rate Testing Equipment



Every floats shall conduct the collapsible pressure test for valve inlet size less than 100mm at 69 bars and valve inlet size equal and larger than 100mm at 51 bars.

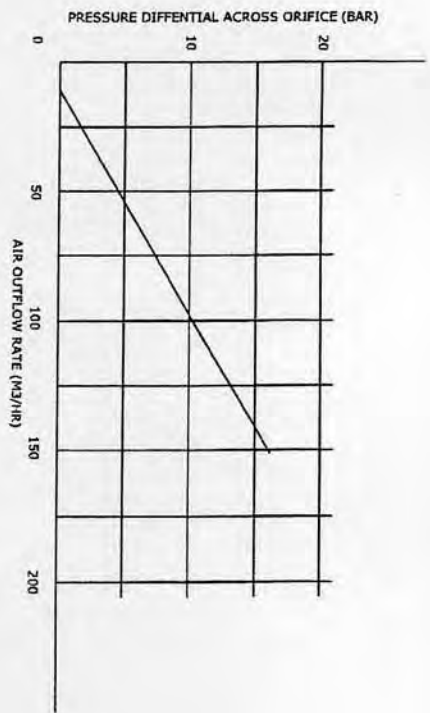
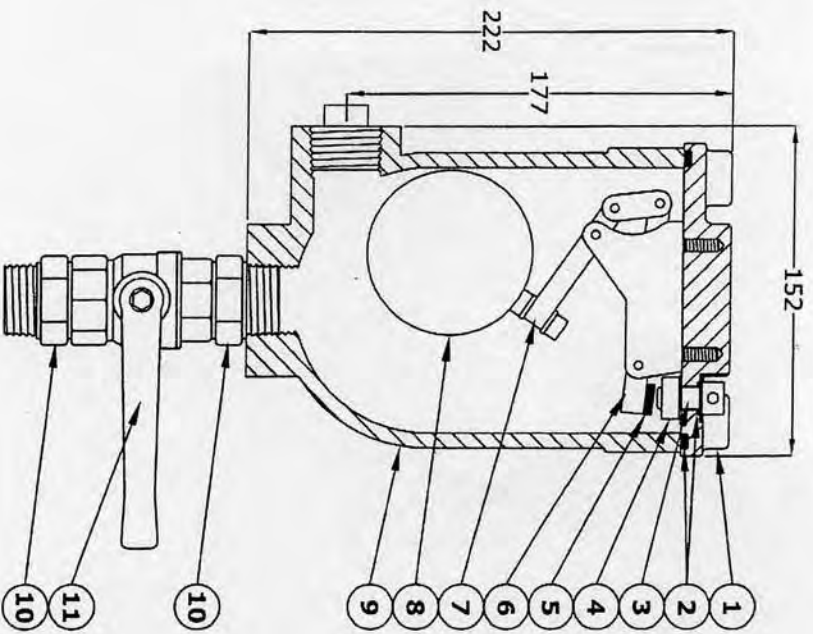




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 TEL : 603 - 61380977  
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CLIENT : JTM  
 PROJECT : TE MARUA TO KARORI PIPELINE  
 GREATER WELLINGTON REGIONAL COUNCIL

TITLE : TKV DN25 AIR RELEASE VALVE PN 25  
 DRAWN BY : YC SEE  
 CHECKED BY : KH LEE  
 APPROVED BY : KH LEE  
 DATE : 14/04/08  
 SCALE : NTS  
 DRG NO : PM/5437/08  
 REV : 1



NO	Component	Material
1	Cover	Ductile Iron, BS EN1563 Grade 500/7
2	O-Ring Seal	EPDM BS EN 681-1 Type WA
3	Orifice	Stainless Steel, BS 970:Part 1 304
4	Hex Nut	Stainless Steel, BS 970:Part 1 304
5	Orifice Button	EPDM BS EN 681-1 Type WA
6	Lever Arm	Stainless Steel, BS 970:Part 1 304
7	Float Pivot Arm	Stainless Steel, BS 970:Part 1 304
8	Float Ball	Stainless Steel, BS 970:Part 1 304
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10	Nipple	1" BSPT x 11G
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FEATURE	SPECIFICATION
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Maximum Working Pressure	25 Bar