AITKEN

4920 AIRLINE DRIVE
HOUSTON, TEXAS 77022
TEL: 281-441-5438 - FAX: 713-699-5186

sales@aitkenmfg.com
You can access our Catalogue on our website: www.aitkenmfg.com

AITKEN PRODUCT CODE INDEX

PRODUCT CODES	DESCRIPTION
201	FIGURE 8'S PADDLE SPACER & BLINDS
202	DRIP/BLEED RINGS, TEST INSERT & CALIBRATION RINGS
211	PRESSURE VESSELS
216	LAUNCHERS & RECEIVERS
301	TEMPORARY STRAINERS - CONE & BASKET
302	FABRICATED TYPE VERTICAL INLINE BASKET STRAINER
303	FABRICATED TYPE TEE STRAINERS
304	FABRICATED TYPE WYE STRAINERS
305	FABRICATED TYPE DUPLEX STRAINERS
317	FLOW NOZZLE METER TUBES
320	STRAIGHTENING VANES
321	ORIFICE FLANGE UNION METER TUBES
322	ORIFICE FLANGE UNIONS
323	FLOW NOZZLES
324	VENTURI TUBES
326	ORIFICE PLATES & ORIFICE PLATE HOLDERS
330	SAMPLE COOLERS

Aitken is an ASME Code Shop

We fabricate products to ASME Sec.VIII Div.1, B31.1, B31.3, B31.4 and B31.8

ASME "U" Stamp and National Board Registration are available
ASME "S" stamp is available.
ABS Certification is available.

Aitken Profile

1. PRODUCTS

1.1 Principle products including fabricated specialty and production items; size ranges; pressure ranges; wall thickness, etc.
ASME Pressure vessels, tanks, strainers, primary flow measurement devices, launchers, receivers, plate products
Vessel size ranges - 8 ft O.D. max; 30 ft long max Weight - 38,000 lbs.

1.2 Products commonly stocked, quantities carried:
Orifice flanges, orifice plates, spectacle blinds, paddles spacers, paddle blinds, drip rings,

1.3 Method of distribution:
Direct, Manufacturers representatives and supply houses

2. MATERIALS

2.1 Mill test reports obtained on: All material purchased
2.2 Identification and Traceability: As per Q.C. manual
2.3 Storage: Inside Yes Outside Yes
2.4 Storage areas are restricted: Yes
2.5 Types of materials commonly stocked: Fittings, pipe, flanges, bolts, gaskets

3. SCOPE OF FABRICATION

3.1 Approved for ASME Sec VIII, DIV 1 and all ASME materials.

3.1.1 Design and fabrication per ASME B31.1, B3.3, B31.4, B31.8
3.1.2 Other Specifications: DOT, AGA, ASME Fluid Meter, ASME MFC 3M

3.2 Material Limitations:

Material	Minimum T.	Maximum T.		
Carbon Steel	26 Ga.	8"	18"	96"
Chrome Molly	1/4"	4"	24"	96"
Stainless Steel	26 Ga.	4"		

3.3 Size and weight of vessels that can be completely shop fabricated:

	Max.	Min.
Plate thickness	6"	1/4"
Diameter (shipping consideration included)	96"	N/A
Length	30'-0	N/A
Weight	38,000 lbs.	N/A

4. MANUFACTURING FACILITIES

4.1 Code Certifications: ASME Section I and Section VIII DIV 1
Stamps: S and U

4.2 Material size handled:

Max. weight 38,000 lbs.
Max. O.D. 96"
Max. Length 30'-0"
Max. Thickness 6"
Min. Thickness 1/4"

4.3 Total manufacturing floor space: 43,000 S.F.
4.4 Number of Bays in use: 3

2 width 35 length 200 height 20'-0
1 width 30 length 100 height 24'-0

4.5 Crane capacities/type: 1 - 10 ton overhead; 2 - 5 ton overhead; 2 - 15 ton hydraulic yard crane

4.6 Welding:

4.6.1 Process used: MIG, SMAW, SAW, TIG, GMAW, FCAW
4.6.2 Procedures (PQR) available for review: Yes
4.6.3 Is the issue and use of consumables controlled? Yes

4.7 Heat treating facilities: Sub-contract

4.8 Testing:

RT (X-Ray) Sub-contract
UT Sub-contract
PT Sub-contract
Fluoroscopic Sub-contract
Magnetic Particle Sub-contract
Gamma Sub-contract
MT Sub-contract
PMI Sub-contract
Hydro In House
Die Penetrant Sub-contract & In-House

4.9 Cleaning Facilities
Sand Blast Sub-contract
Grit Blast Sub-contract
Acid Bath Sub-contract
Other Hand tool & power tool

4.10 Painting Facilities Sub-contract

4.11 Coating Facilities
A. Internal Sub-contract
B. External Sub-contract

5. MANUFACTURING/ FABRICATING EQUIPMENT

5.1 Cutting Equipment:	Number	Type	Max. Capacity
5.1.1 Plate Shears	1	Mech	1/4"
5.1.2 Automatic Flame Cutting	1	Elect. Eye	4"

5.1.3	Saws	1	Abrasive	20" W Heel
5.1.4	Circle Shear			O.D.
5.1.5	Plasma Cutting	1	N/A	3/4"
5.1.6	Arc Air	1	N/A	3"
5.1.7	Burning Machines	4	Str. Line	4"
5.1.8	Pipe Burner	1	N/A	36" O.D.

5.2 Forming Equipment:

5.2.1 Forming Equipment:

No.	Type	Max. "T"	Length	Minimum I.D.
1	Angle Roll	3/8"	20'-0	24"

5.3 Welding Equipment:

5.3.1 Automatic and Semi-automatic welding equipment:

No.	Type & Make
4	Lincoln Submerged Arc

5.3.2 Inert Gas Welding Equipment:

No.	Type & Make
10	Miller

5.3.3 Welding Positioners:

No.	Type (manual or power)	Capacity
3	Power	24"
6	Power	36"

5.3.4 Shell Turning Rolls:

No.	Type (manual or power)
3	Power
2	Fit-up Rolls (Manual)

5.4 Machine Tools:

5.4.1 Vertical Boring Mill:

No.	Max. Diameter	Working Height
1	54"	2'-0"

5.4.2 Radial Drill Press:

No.	Reach	Column	Max. Drill
2	4' - 0	6' - 0	3"

5.4.3 Lathes:

No.	Carriage Swing	Bed Length
4	12"	4' - 0
1	14"	6' - 0
1	26"	6' - 0

5.4.4 Punches:

No.	Max. Diameter	Max. "T"
5	1 3/8"	1"

6. MAINTENANCE

In house equipment maintanance schedule

7. SHIPPING FACILITIES

7.1 Truck: Yes
7.2 Rail: No
7.3 Bus: Yes
7.4 Air: Yes
7.5 Water: Yes Port of Houston

AITKEN
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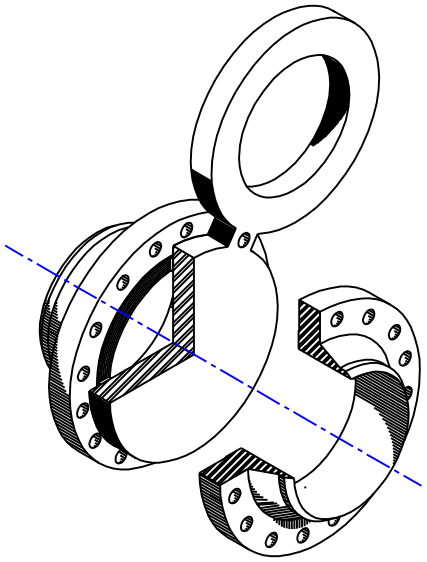
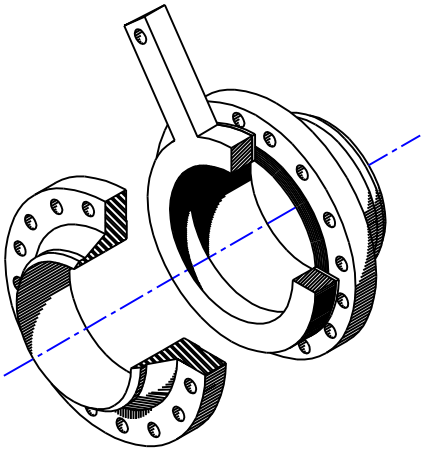
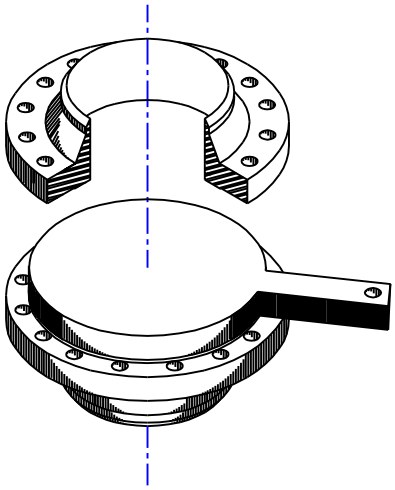
SPECTACLE BLINDS, PADDLE BLINDS & PADDLE SPACERS







REV.: 1 01/27/09

DWG. NO.: CATFIG8.DWG

AITKEN PLATE PRODUCTS

GENERAL INFORMATION

AITKEN PLATE PRODUCT THICKNESSES ARE BASED ON ASME B16.48 SPECIFICATIONS. IN JULY 1993 THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) B16 COMMITTEE GAVE TO ITS SUBCOMMITTEE C THE ASSIGNMENT TO CONVERT THE API 590 STEEL LINE BLANKS STANDARD INTO AN ASME STANDARD. THE AMERICAN PETROLEUM INSTITUTE NO LONGER PUBLISHES THE API 590 STANDARD. PRESSURE-TEMPERATURE RATINGS ARE THOSE LISTED IN ASME B16.5 FOR THE MATERIAL GROUPS CORRESPONDING TO THE LISTED MATERIALS IN TABLE 1 OF B16.48.

AITKEN STANDARD MANUFACTURING TOLERANCES ARE AS FOLLOWS:

OUTSIDE DIAMETER: (+0.00", -0.0625")
INSIDE DIAMETER: (+/- 0.0625")
THICKNESS: (PER B16.48 TOLERANCES)

RING JOINT DIMENSIONS AND TOLERANCES ARE IN STRICT ACCORDANCE WITH **A.N.S.I. B16.5 AND B16.20**. OCTAGONAL RING IS FURNISHED AS STANDARD ON MALE RING JOINT PLATE PRODUCTS UNLESS OVAL RING IS SPECIFIED AT TIME OF ORDER.

FOR PADDLE SPACERS, THE HOLE DIAMETER IN THE HANDLE IS 1/2" FOR 1" WIDE HANDLES, AND 3/4" FOR 1 1/2" WIDE HANDLES. ***ASME B16.48 PROHIBITS THE USE OF INDICATOR OR BOLT HOLES IN THE HANDLES OF PADDLE BLANKS***. HOWEVER, THIS OPTION IS AVAILABLE IF REQUIRED BY PURCHASER.

ONE COAT OF STANDARD SHOP PRIMER WILL BE APPLIED TO ALL CARBON STEEL PLATE PRODUCTS UNLESS OTHERWISE SPECIFIED.

STANDARD MATERIALS ARE:

A.S.T.M. A516 GR 70
304 STAINLESS STEEL
316 STAINLESS STEEL

OTHER ALLOYS CAN BE FURNISHED UPON REQUEST.

STANDARD FINISHES ARE:

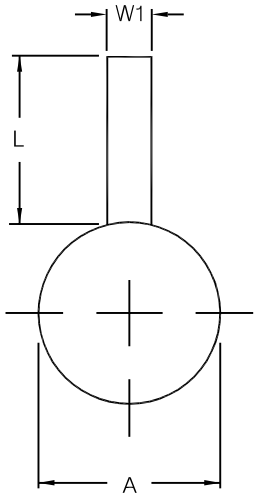
SMOOTH MILL: SOME SCALE MAY BE APPARENT
SERRATED: 125 - 250 AARH (3.2 - 6.3 Ra)

AITKEN PLATE PRODUCTS ARE PRODUCED IN STRICT ACCORDANCE WITH THE FOLLOWING CODES OF PRACTICE.

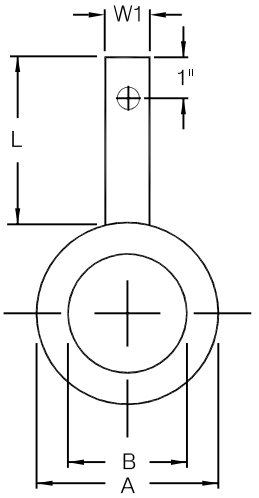
A.S.M.E. B16.48
A.N.S.I. B16.5
A.N.S.I. B16.20
A.S.M.E. B16.47 (FOR LARGER DIAMETER FLANGES)

WEIGHTS ARE FOR CARBON STEEL COMPONENTS

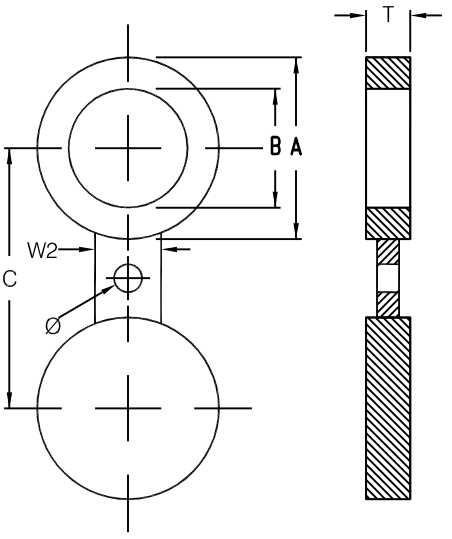
AITKEN ASME B16.48 ANSI 150# RAISED FACE/FLAT FACE



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

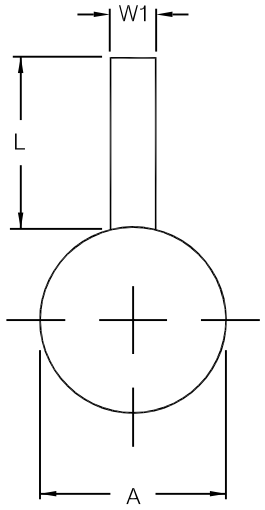
DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	L	W1	W2	Ø	1	1A	2
1/2	1.75	0.62	2.38	*0.25	4.00	1.00	1.50	N/A	1	1	1
3/4	2.12	0.82	2.75	*0.25	4.00	1.00	1.50	N/A	1	1	1
1	2.50	1.05	3.12	*0.25	4.00	1.00	1.50	N/A	1	1	1
1 1/4	2.88	1.66	3.50	0.25	4.00	1.00	1.50	N/A	1	1	1
1 1/2	3.25	1.90	3.88	0.25	4.00	1.00	1.50	N/A	1	1	2
2	4.00	2.38	4.75	0.25	4.00	1.00	2.00	N/A	2	1	2
2 1/2	4.75	2.88	5.50	0.25	4.00	1.00	2.00	N/A	2	2	3
3	5.25	3.50	6.00	0.25	4.00	1.00	2.50	N/A	2	2	3
3 1/2	6.25	4.00	7.00	0.38	4.00	1.00	2.50	0.75	4	3	6
4	6.75	4.50	7.50	0.38	4.00	1.00	2.50	0.75	5	3	7
5	7.62	5.56	8.50	0.38	4.00	1.00	3.00	0.875	6	3	8
6	8.62	6.62	9.50	0.50	4.00	1.00	3.00	0.875	9	4	13
8	10.88	8.62	11.75	0.50	4.00	1.00	3.00	0.875	14	6	19
10	13.25	10.75	14.25	0.62	5.00	1.00	4.00	1.00	26	10	34
12	16.00	12.75	17.00	0.75	5.00	1.50	4.00	1.00	45	18	60
14	17.62	14.00	18.75	0.75	5.00	1.50	4.25	1.125	54	21	73
16	20.12	16.00	21.25	0.88	5.00	1.50	4.25	1.125	81	31	110
18	21.50	18.00	22.75	1.00	5.00	1.50	4.50	1.25	106	33	136
20	23.75	20.00	25.00	1.12	5.00	1.50	4.75	1.25	144	44	185
24	28.12	24.00	29.50	1.25	5.00	1.50	5.50	1.375	223	63	283

**THICKNESS EXCEEDS A.S.M.E. B16.48 REQUIREMENTS.*

SIZE	RATING/FACING	TYPE	MATERIAL	GASKET SURFACE
1/2-24	150#	1=PADDLE BLANK 1A=PADDLE SPACER 2=FIGURE 8 BLANK	PER ASME B16.5, TABLE 1-A	M=SMOOTH MILL F=125-250 AARH X=OTHER

AITKEN ASME B16.48 ANSI 300# RAISED FACE/FLAT FACE



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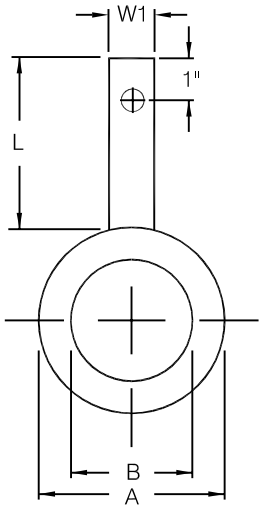
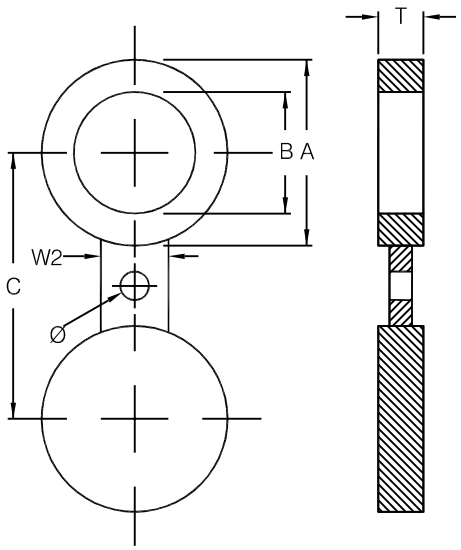
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

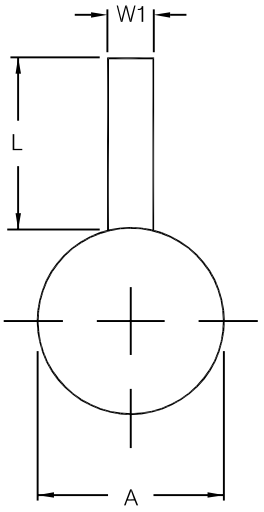
SIZE	A	B	C	T	L	W1	W2	Ø	1	1A	2
1/2	2.00	0.62	2.62	0.25	4.00	1.00	1.50	N/A	1	1	1
3/4	2.50	0.82	3.25	0.25	4.00	1.00	1.50	N/A	1	1	1
1	2.75	1.05	3.50	0.25	4.00	1.00	1.50	N/A	1	1	1
1 1/4	3.12	1.66	3.88	0.25	4.00	1.00	1.50	N/A	1	1	2
1 1/2	3.62	1.90	4.50	0.25	4.00	1.00	2.00	N/A	2	1	2
2	4.25	2.38	5.00	0.38	4.00	1.00	2.00	0.75	2	2	3
2 1/2	5.00	2.88	5.88	0.38	4.00	1.00	2.50	0.875	3	2	4
3	5.75	3.50	6.62	0.38	4.00	1.00	2.50	0.875	4	3	5
3 1/2	6.38	4.00	7.25	0.50	4.00	1.00	2.50	0.875	6	4	8
4	7.00	4.50	7.88	0.50	4.00	1.00	2.50	0.875	7	4	9
5	8.38	5.56	9.25	0.62	4.00	1.00	3.00	0.875	11	7	16
6	9.75	6.62	10.62	0.62	4.00	1.00	3.00	0.875	14	8	21
8	12.00	8.62	13.00	0.88	4.00	1.00	3.50	1.00	30	15	43
10	14.12	10.75	15.25	1.00	5.00	1.00	4.00	1.125	46	21	65
12	16.50	12.75	17.75	1.12	5.00	1.50	4.00	1.25	71	30	98
14	19.00	14.00	20.25	1.25	5.00	1.50	4.75	1.25	104	49	149
16	21.12	16.00	22.50	1.50	5.00	1.50	4.88	1.375	153	67	216
18	23.38	18.00	24.75	1.62	5.00	1.50	4.50	1.375	202	84	282
20	25.62	20.00	27.00	1.75	6.00	1.50	4.75	1.375	261	105	360
24	30.38	24.00	32.00	2.00	6.00	1.50	5.50	1.625	417	160	571

SIZE	RATING/FACING	TYPE	MATERIAL	GASKET SURFACE
1/2-24	300#	1=PADDLE BLANK 1A=PADDLE SPACER 2=FIGURE 8 BLANK	PER ASME B16.5, TABLE 1-A	M=SMOOTH MILL F=125-250 AARH X=OTHER

REV. NO.: 3 DATE: 12/02/09

DWG NO.: CAT30RF.DWG

AITKEN ASME B16.48 ANSI 600# RAISED FACE/FLAT FACE



TYPE 1
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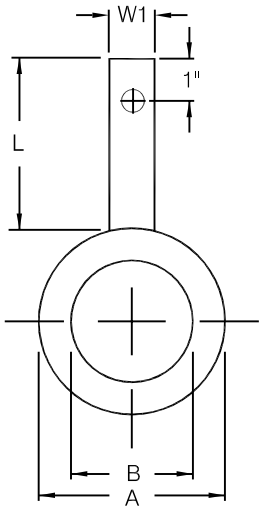
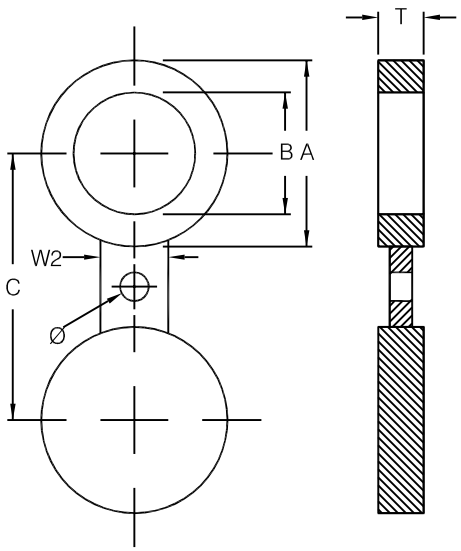


TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

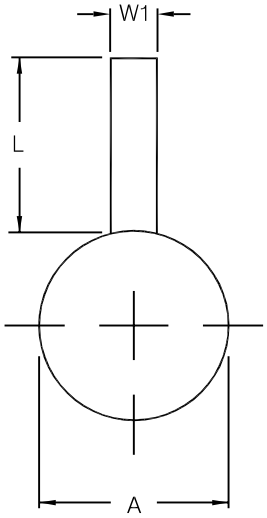
SIZE	A	B	C	T	L	W1	W2	Ø	1	1A	2
1/2	2.00	0.62	2.62	0.25	4.00	1.00	1.50	N/A	1	1	1
3/4	2.50	0.82	3.25	0.25	4.00	1.00	1.50	N/A	1	1	1
1	2.75	1.05	3.50	0.25	4.00	1.00	2.25	0.75	1	1	1
1 1/4	3.12	1.44	3.88	0.38	4.00	1.00	2.25	0.75	2	2	2
1 1/2	3.62	1.68	4.50	0.38	4.00	1.00	2.62	0.875"	2	2	3
2	4.25	2.16	5.00	0.38	4.00	1.00	2.25	0.75	2	2	3
2 1/2	5.00	2.64	5.88	0.50	4.00	1.00	2.62	0.875	4	3	6
3	5.75	3.26	6.62	0.50	4.00	1.00	2.62	0.875	5	4	7
3 1/2	6.25	3.76	7.25	0.62	4.00	1.00	3.00	1.00	7	5	10
4	7.50	4.26	8.50	0.62	4.00	1.00	3.00	1.00	9	6	14
5	9.38	5.30	10.50	0.75	4.00	1.00	3.38	1.125	16	11	26
6	10.38	6.36	11.50	0.88	5.00	1.00	3.38	1.125	23	15	36
8	12.50	8.33	13.75	1.12	5.00	1.00	3.75	1.25	41	24	63
10	15.62	10.42	17.00	1.38	5.00	1.50	4.12	1.375	78	45	119
12	17.88	12.39	19.25	1.62	5.00	1.50	4.12	1.375	119	64	178
14	19.25	13.62	20.75	1.75	5.00	1.50	4.50	1.50	149	76	220
16	22.12	15.62	23.75	2.00	6.00	1.50	4.88	1.625	224	115	332
18	24.00	17.62	25.75	2.12	6.00	1.50	5.25	1.75	278	131	403
20	26.75	19.56	28.50	2.50	6.00	1.50	5.25	1.75	405	192	591
24	31.00	23.50	33.00	2.88	6.00	1.50	6.00	2.00	623	270	887

SIZE	RATING/FACING	TYPE	MATERIAL	GASKET SURFACE
1/2-24	600#	1=PADDLE BLANK 1A=PADDLE SPACER 2=FIGURE 8 BLANK	PER ASME B16.5, TABLE 1-A	M=SMOOTH MILL F=125-250 AARH X=OTHER

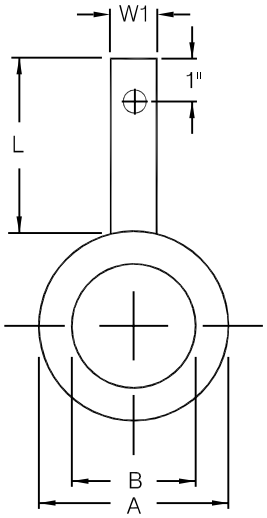
REV. NO.: 3 DATE: 12/02/09

DWG NO.: CAT60RF.DWG

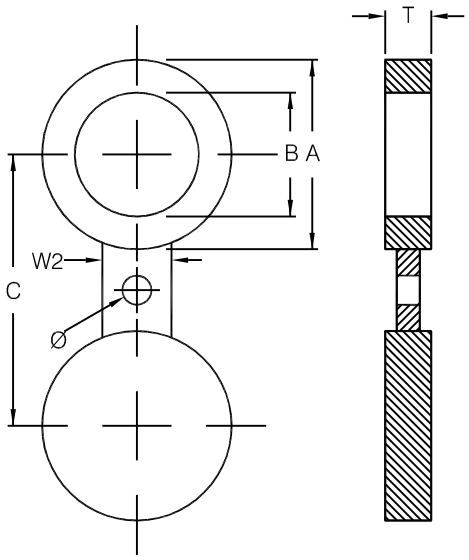
AITKEN ASME B16.48 ANSI 900# RAISED FACE/FLAT FACE



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

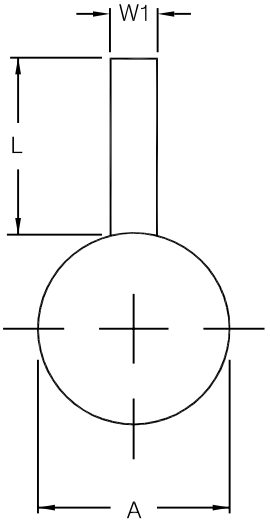
SIZE	A	B	C	T	L	W1	W2	Ø	1	1A	2
1/2	2.38	0.62	3.25	0.25	5.00	1.00	1.50	N/A	1	1	1
3/4	2.62	0.82	3.50	0.25	5.00	1.00	1.62	0.875	1	1	1
1	3.00	1.05	4.00	0.25	5.00	1.00	2.25	1.00	1	1	2
1 1/4	3.38	1.44	4.38	0.38	5.00	1.00	2.25	1.00	2	2	2
1 1/2	3.75	1.68	4.88	0.38	5.00	1.00	2.62	1.125	2	2	3
2	5.50	2.16	6.50	0.50	5.00	1.00	2.25	1.00	5	4	7
2 1/2	6.38	2.64	7.50	0.50	5.00	1.00	2.62	1.125	6	5	9
3	6.50	3.26	7.50	0.62	5.00	1.00	2.62	1.00	7	6	11
4	8.00	4.26	9.25	0.75	5.00	1.00	3.00	1.25	12	9	20
5	9.62	5.30	11.00	0.88	5.00	1.00	3.38	1.375	20	14	32
6	11.25	6.36	12.50	1.00	5.00	1.00	3.38	1.25	30	21	49
8	14.00	8.33	15.50	1.38	5.00	1.00	3.75	1.50	62	41	101
10	17.00	10.42	18.50	1.62	5.00	1.50	4.12	1.50	109	69	173
12	19.50	12.39	21.00	1.88	5.00	1.50	4.12	1.50	163	99	257
14	20.38	13.62	22.00	2.12	6.00	1.50	4.50	1.625	202	115	310
16	22.50	15.62	24.25	2.38	6.00	1.50	4.88	1.75	274	145	413
18	25.00	17.62	27.00	2.62	6.00	1.50	5.25	2.00	373	191	558
20	27.38	19.56	29.50	2.88	6.00	1.50	5.25	2.125	488	243	724
24	32.88	23.50	35.50	3.50	6.00	1.50	6.00	2.625	852	421	1271

SIZE	RATING/FACING	TYPE	MATERIAL	GASKET SURFACE
1/2-24	900#	1=PADDLE BLANK 1A=PADDLE SPACER 2=FIGURE 8 BLANK	PER ASME B16.5, TABLE 1-A	M=SMOOTH MILL F=125-250 AARH X=OTHER

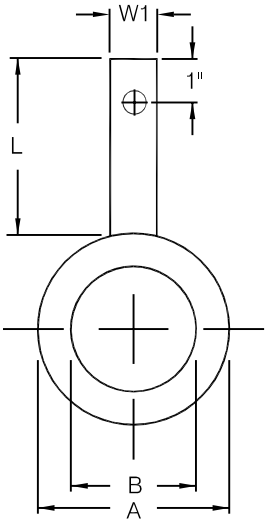
REV. NO.: 3 DATE: 12/02/09

DWG NO.: CAT90RF.DWG

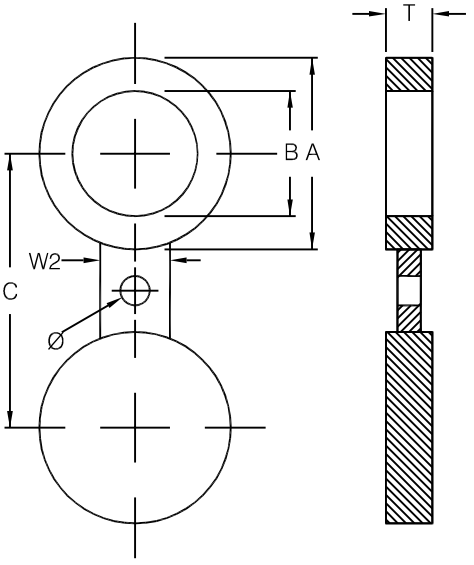
AITKEN ASME B16.48 ANSI 1500# RAISED FACE/FLAT FACE



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

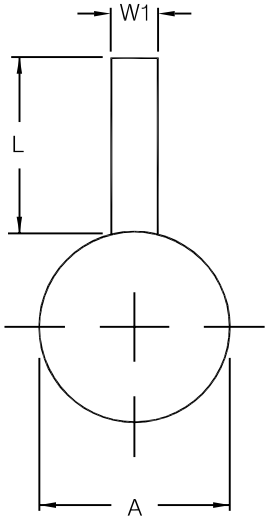
SIZE	A	B	C	T	L	W1	W2	Ø	1	1A	2
1/2	2.38	0.62	3.25	0.25	5.00	1.00	1.50	N/A	1	1	1
3/4	2.62	0.82	3.50	0.38	5.00	1.00	1.62	0.875	2	2	2
1	3.00	1.05	4.00	0.38	5.00	1.00	2.50	1.00	2	2	2
1 1/4	3.38	1.38	4.38	0.38	5.00	1.00	2.50	1.00	2	2	3
1 1/2	3.75	1.61	4.88	0.50	5.00	1.00	2.75	1.125	3	2	4
2	5.50	2.07	6.50	0.50	5.00	1.00	2.75	1.00	5	4	7
2 1/2	6.38	2.47	7.50	0.62	6.00	1.00	3.00	1.125	7	6	12
3	6.75	3.07	8.00	0.75	6.00	1.00	3.00	1.25	9	8	15
4	8.12	4.03	9.50	0.88	6.00	1.00	3.50	1.375	15	12	24
5	9.88	5.05	11.50	1.12	6.00	1.00	3.50	1.625	27	20	45
6	11.00	6.06	12.50	1.38	6.00	1.00	3.50	1.50	40	29	65
8	13.75	7.98	15.50	1.62	7.00	1.00	4.00	1.75	72	49	118
10	17.00	10.02	19.00	2.00	8.00	1.50	4.50	2.00	136	91	218
12	20.38	11.94	22.50	2.38	8.00	1.50	4.50	2.125	228	153	371
14	22.62	13.12	25.00	2.62	9.00	1.50	5.00	2.375	310	209	507
16	25.12	15.00	27.75	3.00	9.00	1.50	5.25	2.625	434	283	706
18	27.62	16.88	30.50	3.38	10.00	1.50	5.75	2.875	589	374	950
20	29.62	18.81	32.75	3.75	10.00	1.50	6.00	3.125	750	454	1191
24	35.38	22.62	39.00	4.38	10.00	1.50	7.00	3.625	1239	740	1972

SIZE	RATING/FACING	TYPE	MATERIAL	GASKET SURFACE
1/2-24	1500#	1=PADDLE BLANK 1A=PADDLE SPACER 2=FIGURE 8 BLANK	PER ASME B16.5, TABLE 1-A	M=SMOOTH MILL F=125-250 AARH X=OTHER

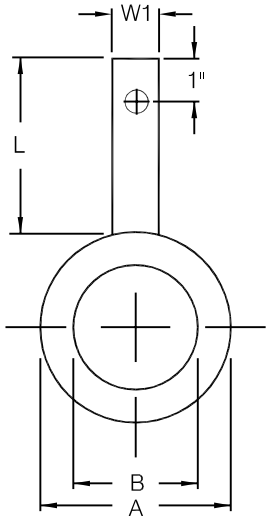
REV. NO.: 3 DATE: 12/02/09

DWG NO.: CAT15-RF.DWG

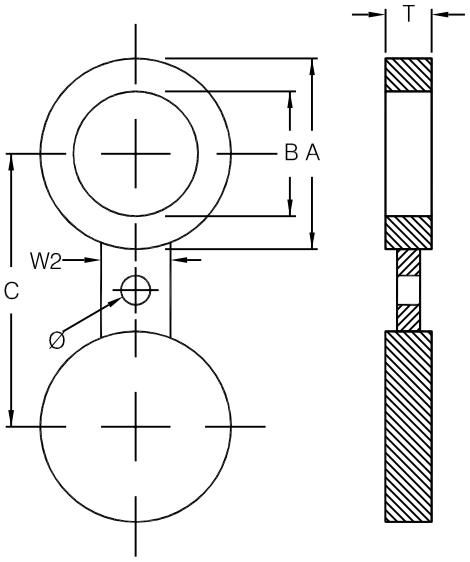
AITKEN ASME B16.48 ANSI 2500# RAISED FACE/FLAT FACE



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

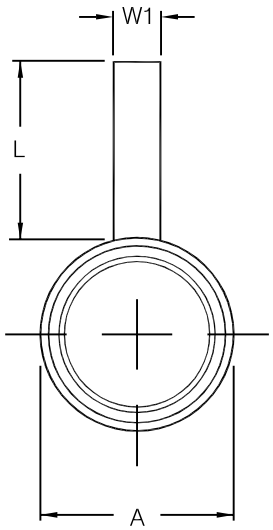
SIZE	A	B	C	T	L	W1	W2	Ø	1	1A	2
1/2	2.62	0.62	3.50	0.38	5.00	1.00	1.50	N/A	2	2	2
3/4	2.88	0.82	3.75	0.38	5.00	1.00	1.62	0.875	2	2	2
1	3.25	1.05	4.25	0.38	5.00	1.00	2.50	1.00	2	2	2
1 1/4	4.00	1.38	5.12	0.50	5.00	1.00	2.50	1.125	3	3	4
1 1/2	4.50	1.61	5.75	0.62	5.00	1.00	2.75	1.25	4	4	6
2	5.62	2.07	6.75	0.62	5.00	1.00	2.75	1.125	6	5	9
2 1/2	6.50	2.47	7.75	0.75	6.00	1.00	3.00	1.25	9	8	14
3	7.62	3.07	9.00	0.88	6.00	1.00	3.00	1.375	13	11	22
4	9.12	4.03	10.75	1.12	7.00	1.00	3.50	1.625	24	20	40
5	10.88	5.05	12.75	1.38	7.00	1.00	3.50	1.875	39	32	68
6	12.38	6.06	14.50	1.62	8.00	1.50	3.50	2.125	61	48	101
8	15.12	7.81	17.25	2.12	8.00	1.50	4.00	2.125	116	87	193
10	18.62	9.75	21.25	2.62	9.00	1.50	4.50	2.625	213	158	359
12	21.50	11.37	24.38	3.12	9.00	1.50	4.50	2.875	334	294	565

SIZE	RATING/FACING	TYPE	MATERIAL	GASKET SURFACE
1/2-12	2500#	1=PADDLE BLANK 1A=PADDLE SPACER 2=FIGURE 8 BLANK	PER ASME B16.5, TABLE 1-A	M=SMOOTH MILL F=125-250 AARH X=OTHER

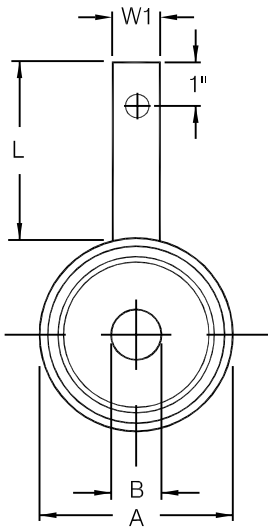
REV. NO.: 3 DATE: 12/02/09

DWG NO.: CAT25RF.DWG

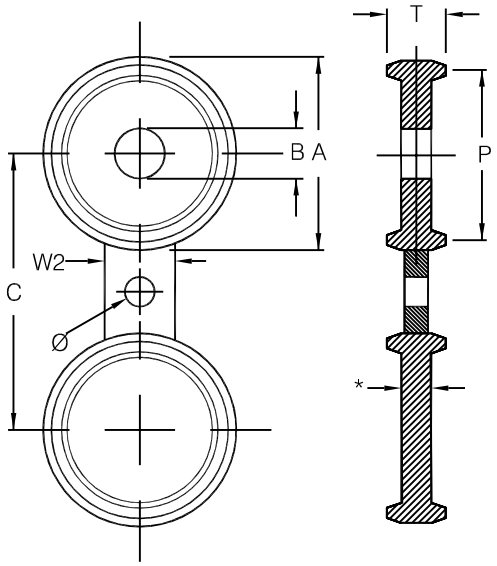
AITKEN ASME B16.48 ANSI 150# MALE OCTAGONAL RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	*	P	L	W1	W2	Ø	RING	1	1A	2
1	2.19	1.32	3.12	0.75	0.25	1.875	4.00	1.00	2.00	0.625	R 15	2	2	2
1 1/4	2.56	1.66	3.50	0.75	0.25	2.25	4.00	1.00	2.00	0.625	R 17	2	2	2
1 1/2	2.87	1.90	3.88	0.75	0.25	2.562	4.00	1.00	2.25	0.625	R 19	2	2	3
2	3.56	2.38	4.75	0.75	0.25	3.25	4.00	1.00	2.25	0.75	R 22	2	2	3
2 1/2	4.31	2.88	5.50	0.88	0.38	4.00	4.00	1.00	2.25	0.75	R 25	3	2	4
3	4.81	3.50	6.00	0.88	0.38	4.50	4.00	1.00	2.25	0.75	R 29	3	2	5
3 1/2	5.50	4.00	7.00	0.88	0.38	5.188	4.00	1.00	2.50	0.75	R 33	4	3	6
4	6.19	4.50	7.50	0.88	0.38	5.875	4.00	1.00	2.50	0.75	R 36	5	3	8
5	7.06	5.56	8.50	1.00	0.50	6.75	5.00	1.00	3.00	0.875	R 40	7	4	8
6	7.94	6.62	9.50	1.00	0.50	7.625	5.00	1.00	3.25	0.875	R 43	9	4	12
8	10.06	8.62	11.75	1.12	0.62	9.75	5.00	1.00	3.75	0.875	R 48	15	7	20
10	12.31	10.75	14.25	1.25	0.75	12.00	5.00	1.00	4.00	1.00	R 52	24	9	30
12	15.31	12.75	17.00	1.38	0.88	15.00	6.00	1.50	4.75	1.00	R 56	39	15	52
14	15.94	14.00	18.75	1.38	0.88	15.625	6.00	1.50	5.00	1.125	R 59	44	15	57
16	18.19	16.00	21.25	1.50	1.00	17.875	6.00	1.50	5.00	1.125	R 64	62	19	79
18	20.69	18.00	22.75	1.62	1.12	20.375	6.00	1.50	5.00	1.25	R 68	85	26	110
20	22.31	20.00	25.00	1.62	1.12	22.00	7.00	1.50	5.00	1.25	R 72	105	30	134
24	26.81	24.00	29.50	1.88	1.38	26.50	7.00	1.50	6.00	1.38	R 76	170	46	216

SIZE
1-24

RATING/FACING
150/MO

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

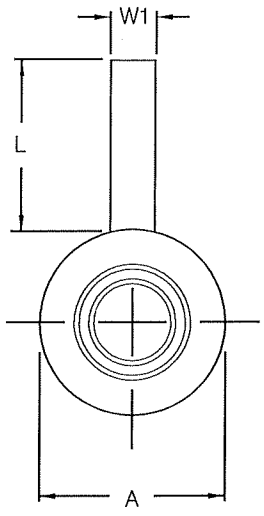
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

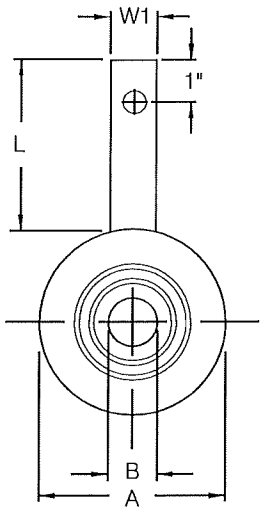
REV.: 2 12/02/09

DWG NO.: CAT15MO.DWG

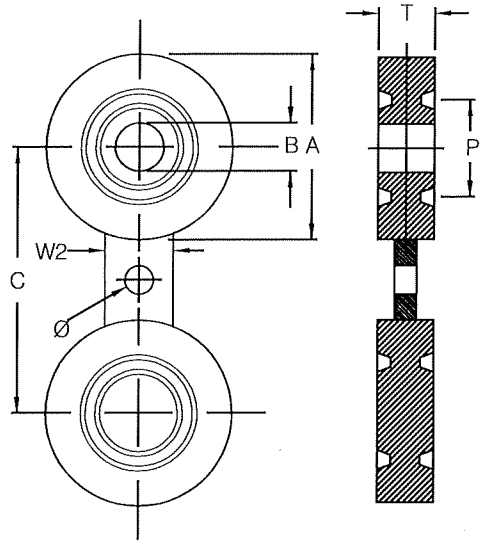
AITKEN ASME B16.48 ANSI 150# FEMALE RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	P	L	W1	W2	Ø	RING	1	1A	2
1	2.50	1.32	3.12	0.75	1.875	4.00	1.00	2.00	0.625	R 15	2	1	2
1 1/4	2.88	1.66	3.50	0.75	2.25	4.00	1.00	2.00	0.625	R 17	3	2	3
1 1/2	3.25	1.90	3.88	0.75	2.562	4.00	1.00	2.25	0.625	R 19	4	3	5
2	4.00	2.38	4.75	0.75	3.25	4.00	1.00	2.25	0.75	R 22	5	4	7
2 1/2	4.75	2.88	5.50	0.88	4.00	4.00	1.00	2.25	0.75	R 25	6	4	9
3	5.25	3.50	6.00	0.88	4.50	4.00	1.00	2.25	0.75	R 29	7	4	10
3 1/2	6.06	4.00	7.00	0.88	5.188	4.00	1.00	2.50	0.75	R 33	8	5	13
4	6.75	4.50	7.50	0.88	5.875	4.00	1.00	2.50	0.75	R 36	9	6	15
5	7.62	5.56	8.50	1.00	6.75	5.00	1.00	2.75	0.875	R 40	14	7	19
6	8.62	6.62	9.50	1.00	7.625	5.00	1.00	3.25	0.875	R 43	17	8	23
8	10.75	8.62	11.75	1.12	9.75	5.00	1.00	3.75	0.875	R 48	29	11	39
10	13.00	10.75	14.25	1.25	12.00	5.00	1.00	4.00	1.00	R 52	47	17	60
12	16.00	12.75	17.00	1.38	15.00	6.00	1.50	4.75	1.00	R 56	77	30	104
14	16.75	14.00	18.75	1.38	15.625	6.00	1.50	5.00	1.125	R 59	88	30	114
16	19.00	16.00	21.25	1.50	17.875	6.00	1.50	5.00	1.125	R 64	123	38	158
18	21.50	18.00	22.75	1.62	20.375	6.00	1.50	5.00	1.25	R 68	170	52	220
20	23.50	20.00	25.00	1.62	22.00	7.00	1.50	5.00	1.25	R 72	210	60	268
24	28.00	24.00	29.50	1.88	26.50	7.00	1.50	6.00	1.375	R 76	340	92	431

SIZE
1-24

RATING/FACING
150/FG

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

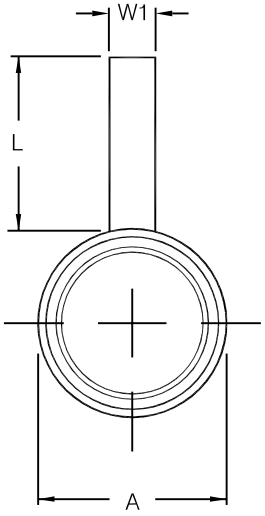
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

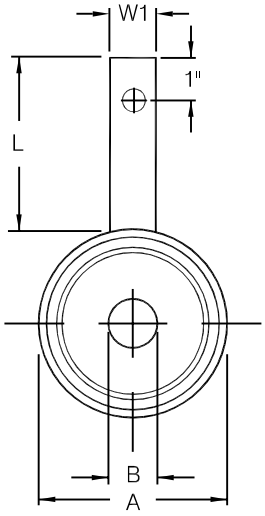
REV.: 1 12/02/09

DWG NO.: CAT15FG.DWG

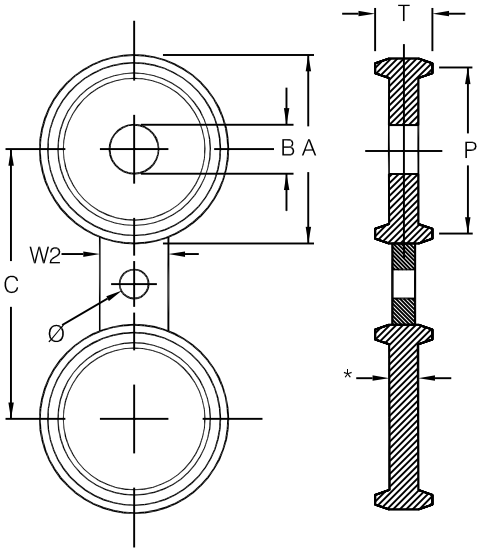
AITKEN ASME B16.48 ANSI 300# MALE OCTAGONAL RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	*	P	L	W1	W2	Ø	RING	1	1A	2
1/2	1.59	0.84	2.62	0.63	0.25	1.344	4.00	1.00	1.50	0.625	R 11	1	1	1
3/4	2.00	1.05	3.25	0.88	0.38	1.688	4.00	1.00	1.75	0.75	R 13	2	1	2
1	2.31	1.32	3.50	0.88	0.38	2.00	4.00	1.00	2.00	0.75	R 16	2	2	2
1 1/4	2.69	1.66	3.88	0.88	0.38	2.375	4.00	1.00	2.00	0.75	R 18	2	2	2
1 1/2	3.00	1.90	4.50	0.88	0.38	2.688	4.00	1.00	2.25	0.875	R 20	2	2	3
2	3.69	2.38	5.00	1.13	0.50	3.25	4.00	1.00	2.25	0.75	R 23	3	2	3
2 1/2	4.44	2.88	5.88	1.25	0.62	4.00	4.00	1.00	2.25	0.875	R 26	3	2	4
3	5.31	3.50	6.62	1.25	0.62	4.875	4.00	1.00	2.25	0.875	R 31	4	3	5
3 1/2	5.63	4.00	7.25	1.38	0.75	5.188	4.00	1.00	2.50	0.875	R 34	5	4	7
4	6.31	4.50	7.88	1.25	0.62	5.875	5.00	1.00	2.50	0.875	R 37	6	4	9
5	7.56	5.56	9.25	1.38	0.75	7.125	5.00	1.00	3.00	0.875	R 41	11	7	15
6	8.75	6.62	10.62	1.51	0.88	8.312	5.00	1.00	3.25	0.875	R 45	15	9	20
8	11.06	8.62	13.00	1.63	1.00	10.625	5.00	1.00	3.75	1.00	R 49	28	15	39
10	13.19	10.75	15.25	1.75	1.12	12.75	5.00	1.00	4.00	1.125	R 53	42	20	62
12	15.44	12.75	17.75	2.01	1.38	15.00	6.00	1.50	4.75	1.25	R 57	62	23	90
14	16.94	14.00	20.25	2.13	1.50	16.50	6.00	1.50	5.00	1.25	R 61	76	31	105
16	18.94	16.00	22.50	2.25	1.62	18.50	6.00	1.50	5.00	1.375	R 65	102	38	138
18	21.44	18.00	24.75	2.38	1.75	21.00	7.00	1.50	5.00	1.375	R 69	140	52	192
20	23.50	20.00	27.00	2.69	2.00	23.00	7.00	1.50	5.00	1.375	R 73	193	70	264
24	27.88	24.00	32.00	3.06	2.25	27.25	7.00	1.50	6.00	1.625	R 77	317	108	425

SIZE
1/2-24

RATING/FACING
300/MO

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

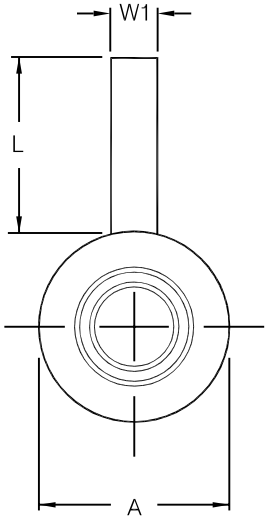
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

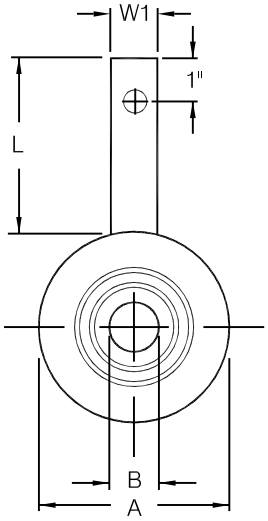
REV.: 2 12/02/09

DWG NO.: CAT30MO.DWG

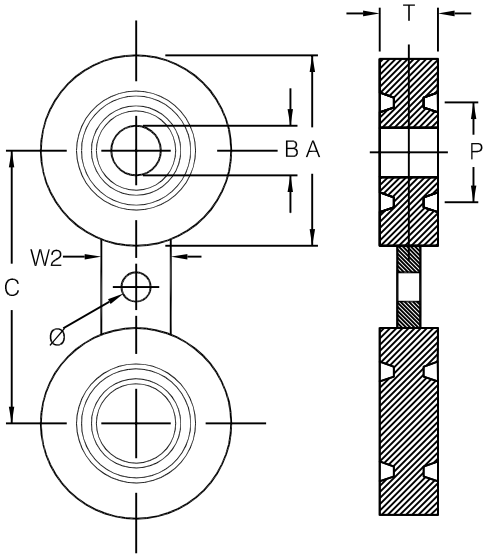
AITKEN ASME B16.48 ANSI 300# FEMALE RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	P	L	W1	W2	Ø	RING	1	1A	2
1/2	2.00	0.84	2.62	0.62	1.344	4.00	1.00	1.50	0.625	R 11	1	1	1
3/4	2.50	1.05	3.25	0.75	1.688	4.00	1.00	1.75	0.75	R 13	2	1	2
1	2.75	1.32	3.50	0.75	2.00	4.00	1.00	2.00	0.75	R 16	3	2	4
1 1/4	3.12	1.66	3.88	0.88	2.375	4.00	1.00	2.00	0.75	R 18	3	3	5
1 1/2	3.56	1.90	4.50	0.88	2.688	4.00	1.00	2.25	0.875	R 20	4	3	6
2	4.25	2.38	5.00	1.00	3.25	4.00	1.00	2.25	0.75	R 23	5	4	8
2 1/2	5.00	2.88	5.88	1.12	4.00	4.00	1.00	2.25	0.875	R 26	7	5	11
3	5.75	3.50	6.62	1.12	4.875	4.00	1.00	2.25	0.875	R 31	9	6	14
3 1/2	6.25	4.00	7.25	1.12	5.188	4.00	1.00	2.50	0.875	R 34	12	8	17
4	6.88	4.50	7.88	1.25	5.875	5.00	1.00	2.50	0.875	R 37	14	9	21
5	8.25	5.56	9.25	1.38	7.125	5.00	1.00	2.75	0.875	R 41	22	13	32
6	9.50	6.62	10.62	1.38	8.312	5.00	1.00	3.25	0.875	R 45	29	16	43
8	11.88	8.62	13.00	1.62	10.625	5.00	1.00	3.75	1.00	R 49	53	27	77
10	14.00	10.75	15.25	1.75	12.75	5.00	1.00	4.00	1.125	R 53	82	35	113
12	16.25	12.75	17.75	2.00	15.00	6.00	1.50	4.75	1.25	R 57	120	48	165
14	18.00	14.00	20.25	2.12	16.50	6.00	1.50	5.00	1.25	R 61	151	61	210
16	20.00	16.00	22.50	2.25	18.50	6.00	1.50	5.00	1.375	R 65	203	75	276
18	22.62	18.00	24.75	2.38	21.00	7.00	1.50	5.00	1.375	R 69	280	104	383
20	25.00	20.00	27.00	2.75	23.00	7.00	1.50	5.00	1.375	R 73	385	140	527
24	29.50	24.00	32.00	3.12	27.25	7.00	1.50	6.00	1.625	R 77	633	216	849

SIZE
1/2-24

RATING/FACING
300/FG

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

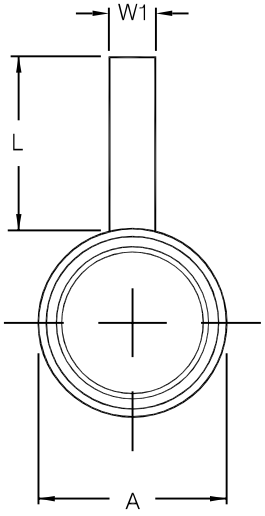
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

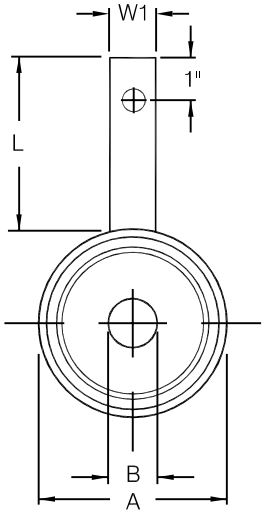
REV.: 2 12/02/09

DWG NO.: CAT30FG.DWG

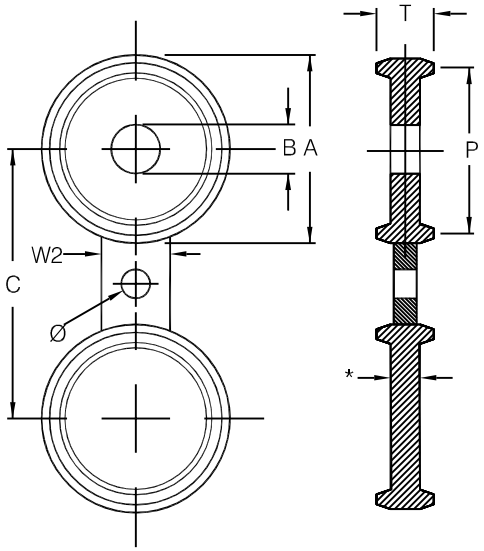
AITKEN ASME B16.48 ANSI 600# MALE OCTAGONAL RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	*	P	L	W1	W2	Ø	RING	1	1A	2
1/2	1.59	0.84	2.62	0.63	0.25	1.344	4.00	1.00	1.50	0.625	R 11	1	1	1
3/4	2.00	1.05	3.25	0.88	0.38	1.688	4.00	1.00	1.75	0.75	R 13	1	1	1
1	2.31	1.32	3.50	0.88	0.38	2.00	4.00	1.00	2.00	0.75	R 16	2	2	2
1 1/4	2.69	1.66	3.88	0.88	0.38	2.375	4.00	1.00	2.25	0.75	R 18	3	2	3
1 1/2	3.00	1.90	4.50	0.88	0.38	2.688	4.00	1.00	2.25	0.875	R 20	3	2	3
2	3.69	2.38	5.00	1.13	0.50	3.25	4.00	1.00	2.00	0.75	R 23	3	3	4
2 1/2	4.44	2.88	5.88	1.25	0.62	4.00	4.00	1.00	2.25	0.875	R 26	4	3	6
3	5.31	3.50	6.62	1.25	0.62	4.875	4.00	1.00	2.62	0.875	R 31	5	4	7
3 1/2	5.63	4.00	7.25	1.38	0.75	5.188	4.00	1.00	2.62	1.00	R 34	7	6	10
4	6.31	4.50	8.50	1.38	0.75	5.875	5.00	1.00	2.88	1.00	R 37	9	7	14
5	7.56	5.56	10.50	1.51	0.88	7.125	5.00	1.00	2.88	1.125	R 41	17	11	25
6	8.75	6.62	11.50	1.75	1.12	8.312	5.00	1.00	2.88	1.125	R 45	23	15	35
8	11.06	8.62	13.75	2.01	1.38	10.625	6.00	1.00	3.25	1.25	R 49	41	23	62
10	13.19	10.75	17.00	2.25	1.62	12.75	6.00	1.00	4.75	1.375	R 54	71	40	112
12	15.44	12.75	19.25	2.51	1.88	15.00	6.00	1.50	4.75	1.375	R 57	106	51	162
14	16.94	14.00	20.75	2.63	2.00	16.50	6.00	1.50	4.75	1.50	R 61	112	58	134
16	18.94	16.00	23.75	2.88	2.25	18.50	7.00	1.50	5.00	1.625	R 65	130	65	176
18	21.44	18.00	25.75	3.13	2.50	21.00	7.00	1.50	5.25	1.75	R 69	184	69	251
20	23.50	20.00	28.50	3.44	2.75	23.00	7.00	1.50	5.00	1.75	R 73	250	91	340
24	27.88	24.00	33.00	4.06	3.25	27.25	8.00	1.50	6.00	2.00	R 77	407	139	547

SIZE
1/2-24

RATING/FACING
600/MO

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

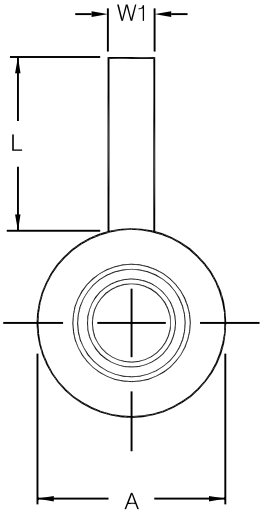
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

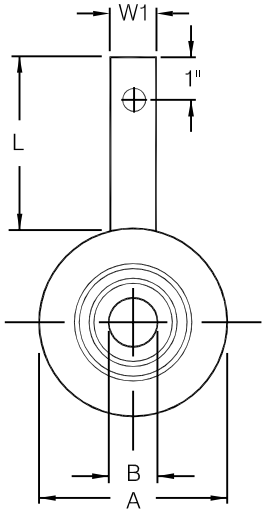
REV.: 2 12/02/09

DWG NO.: CAT60MO.DWG

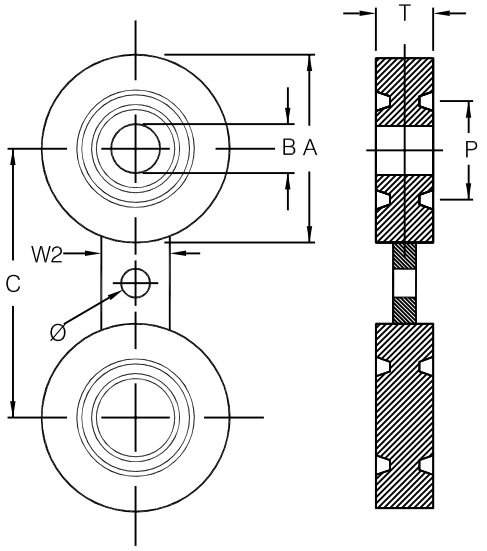
AITKEN ASME B16.48 ANSI 600# FEMALE RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	P	L	W1	W2	Ø	RING	1	1A	2
1/2	2.00	0.84	2.62	0.75	1.344	4.00	1.00	1.50	0.625	R 11	1	1	1
3/4	2.50	1.05	3.25	0.88	1.688	4.00	1.00	1.75	0.75	R 13	1	1	1
1	2.75	1.32	3.50	0.88	2.00	4.00	1.00	2.00	0.75	R 16	2	1	2
1 1/4	3.12	1.66	3.88	0.88	2.375	4.00	1.00	2.00	0.75	R 18	3	3	4
1 1/2	3.56	1.90	4.50	0.88	2.688	4.00	1.00	2.25	0.875	R 20	4	3	6
2	4.25	2.38	5.00	1.12	3.25	4.00	1.00	2.25	0.75	R 23	6	4	9
2 1/2	5.00	2.88	5.88	1.25	4.00	4.00	1.00	2.25	0.875	R 26	8	6	13
3	5.75	3.50	6.62	1.25	4.875	4.00	1.00	2.25	0.875	R 31	11	7	16
3 1/2	6.25	4.00	7.25	1.38	5.188	4.00	1.00	2.50	1.00	R 34	13	9	20
4	6.88	4.50	8.50	1.38	5.875	5.00	1.00	2.50	1.00	R 37	16	10	24
5	8.25	5.56	10.50	1.50	7.125	5.00	1.00	2.75	1.125	R 41	24	15	39
6	9.50	6.62	11.50	1.75	8.312	5.00	1.00	3.25	1.125	R 45	36	20	53
8	11.88	8.62	13.75	2.00	10.625	6.00	1.00	3.75	1.25	R 49	65	32	95
10	14.00	10.75	17.00	2.25	12.75	6.00	1.00	4.00	1.375	R 53	98	42	137
12	16.25	12.75	19.25	2.50	15.00	6.00	1.50	4.75	1.375	R 57	146	58	202
14	18.00	14.00	20.75	2.62	16.50	6.00	1.50	5.00	1.50	R 61	165	67	229
16	20.00	16.00	23.75	2.88	18.50	7.00	1.50	5.00	1.625	R 65	225	83	386
18	22.62	18.00	25.75	3.12	21.00	7.00	1.50	5.00	1.75	R 69	367	137	502
20	25.00	20.00	28.50	3.50	23.00	7.00	1.50	5.00	1.75	R 73	499	182	679
24	29.50	24.00	33.00	4.12	27.25	8.00	1.50	6.00	2.00	R 77	814	278	1094

SIZE
1/2-24

RATING/FACING
600/FG

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

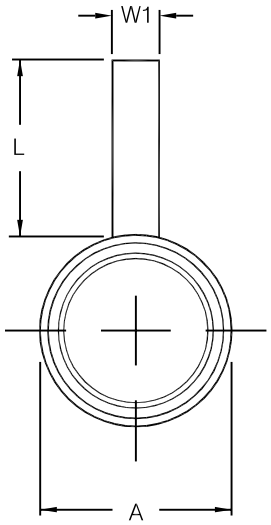
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

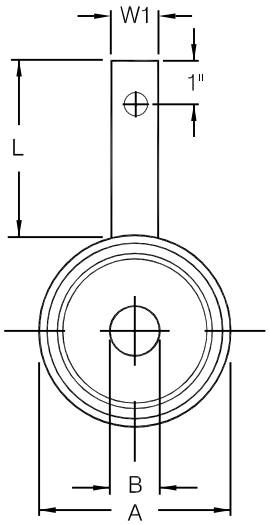
REV.: 2 12/02/09

DWG NO.: CAT60FG.DWG

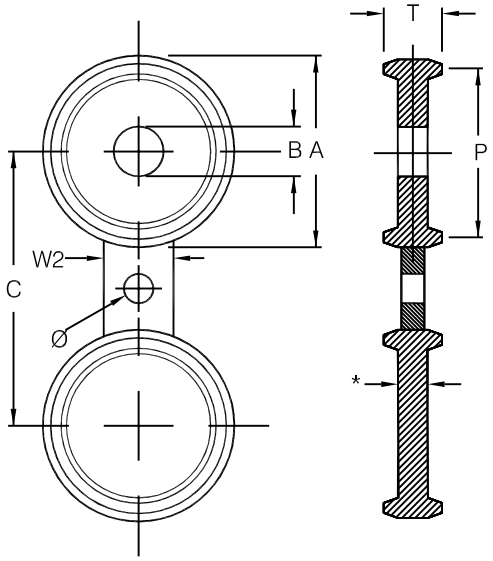
AITKEN ASME B16.48 ANSI 900# MALE OCTAGONAL RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	*	P	L	W1	W2	Ø	RING	1	1A	2
1/2	1.87	0.84	3.25	0.88	0.38	1.562	5.00	1.00	1.50	0.875	R 12	1	1	1
3/4	2.06	1.05	3.50	0.88	0.38	1.75	5.00	1.00	1.75	0.875	R 14	1	1	1
1	2.31	1.32	4.00	0.88	0.38	2.00	5.00	1.00	2.00	1.00	R 16	2	2	2
1 1/4	2.69	1.66	4.38	1.00	0.50	2.375	5.00	1.00	2.12	1.00	R 18	3	2	3
1 1/2	3.00	1.90	4.88	1.00	0.50	2.688	5.00	1.00	2.12	1.125	R 20	3	3	3
2	4.19	2.38	6.50	1.25	0.62	3.75	5.00	1.00	2.00	1.00	R 24	3	3	4
2 1/2	4.69	2.88	7.50	1.38	0.75	4.25	6.00	1.00	2.12	1.125	R 27	4	3	6
3	5.31	3.50	7.50	1.38	0.75	4.875	6.00	1.00	2.62	1.00	R 31	7	6	12
4	6.31	4.50	9.25	1.63	1.00	5.875	6.00	1.00	2.88	1.25	R 37	14	10	19
5	7.56	5.56	11.00	1.75	1.12	7.125	6.00	1.00	2.88	1.375	R 41	23	16	33
6	8.75	6.62	12.50	1.88	1.25	8.312	6.00	1.00	2.88	1.25	R 45	32	22	47
8	11.06	8.62	15.50	2.25	1.62	10.625	7.00	1.00	3.12	1.50	R 49	59	38	95
10	13.19	10.75	18.50	2.51	1.88	12.75	7.00	1.00	4.75	1.50	R 53	102	66	170
12	15.44	12.75	21.00	2.88	2.25	15.00	7.00	1.50	4.75	1.50	R 57	157	92	250
14	17.13	14.00	22.00	3.19	2.38	16.50	7.00	1.50	4.75	1.625	R 62	165	100	270
16	19.13	16.00	24.25	3.56	2.75	18.50	7.00	1.50	5.00	1.75	R 66	174	120	290
18	21.75	18.00	27.00	3.94	3.00	21.00	8.00	1.50	5.25	2.00	R 70	253	135	356
20	23.75	20.00	29.50	4.32	3.38	23.00	8.00	1.50	5.00	2.125	R 74	323	150	449
24	28.25	24.00	35.50	5.13	3.88	27.25	8.00	1.50	6.00	2.625	R 78	547	200	756

SIZE
1/2-24

RATING/FACING
900/MO

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

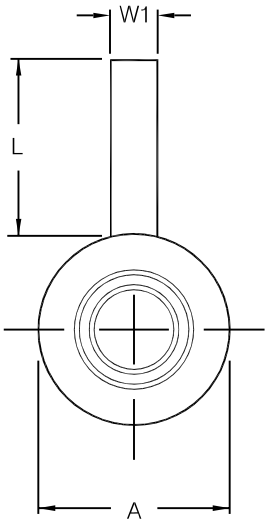
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

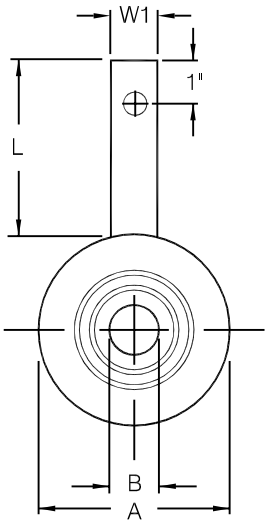
REV.: 2 12/02/09

DWG NO.: CAT90MO.DWG

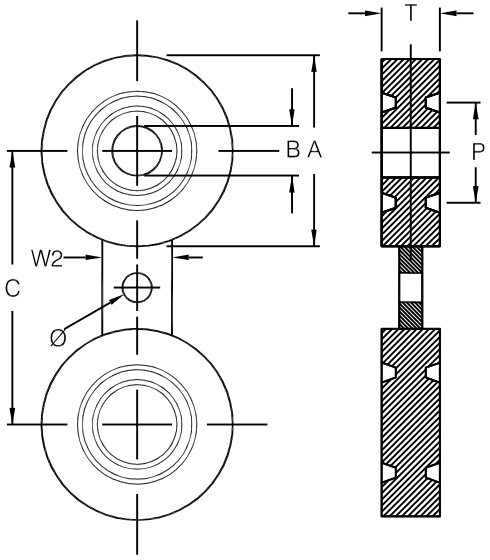
AITKEN ASME B16.48 ANSI 900# FEMALE RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	P	L	W1	W2	Ø	RING	1	1A	2
1/2	2.38	0.84	3.25	0.88	1.562	5.00	1.00	1.50	0.875	R 12	1	1	1
3/4	2.62	1.05	3.50	0.88	1.75	5.00	1.00	1.75	0.875	R 14	2	2	2
1	2.81	1.32	4.00	0.88	2.00	5.00	1.00	2.00	1.00	R 16	3	3	4
1 1/4	3.19	1.66	4.38	1.00	2.375	5.00	1.00	2.00	1.00	R 18	4	3	5
1 1/2	3.62	1.90	4.88	1.00	2.688	5.00	1.00	2.50	1.125	R 20	5	4	6
2	4.88	2.38	6.50	1.25	3.75	5.00	1.00	2.00	1.00	R 24	8	7	13
2 1/2	5.38	2.88	7.50	1.38	4.25	6.00	1.00	2.62	1.125	R 27	11	8	18
3	6.12	3.50	7.50	1.38	4.875	6.00	1.00	2.62	1.00	R 31	13	9	21
4	7.12	4.50	9.25	1.62	5.875	6.00	1.00	2.88	1.25	R 37	20	13	30
5	8.50	5.56	11.00	1.75	7.125	6.00	1.00	2.88	1.375	R 41	32	25	45
6	9.50	6.62	12.50	1.88	8.312	6.00	1.00	2.88	1.25	R 45	41	22	60
8	12.12	8.62	15.50	2.25	10.625	7.00	1.00	3.12	1.50	R 49	77	40	112
10	14.25	10.75	18.50	2.50	12.75	7.00	1.00	4.75	1.50	R 53	119	53	169
12	16.50	12.75	21.00	2.88	15.00	7.00	1.50	4.75	1.50	R 57	178	74	249
14	18.38	14.00	22.00	3.25	16.50	7.00	1.50	4.75	1.625	R 62	252	108	546
16	20.62	16.00	24.25	3.62	18.50	7.00	1.50	5.00	1.75	R 66	347	140	484
18	23.38	18.00	27.00	4.00	21.00	8.00	1.50	5.25	2.00	R 70	505	208	712
20	25.50	20.00	29.50	4.38	23.00	8.00	1.50	5.00	2.125	R 74	646	251	898
24	30.38	24.00	35.50	5.25	27.25	8.00	1.50	5.50	2.625	R 78	1094	413	1512

SIZE
1/2-24

RATING/FACING
900/FG

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

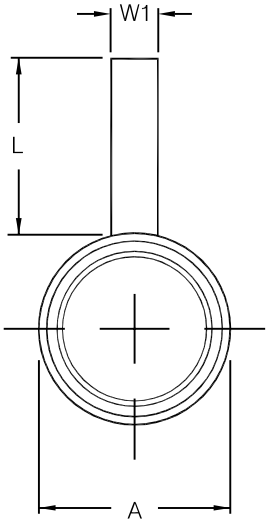
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

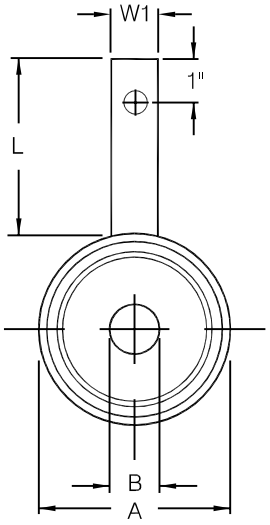
REV.: 2 12/02/09

DWG NO.: CAT90FG.DWG

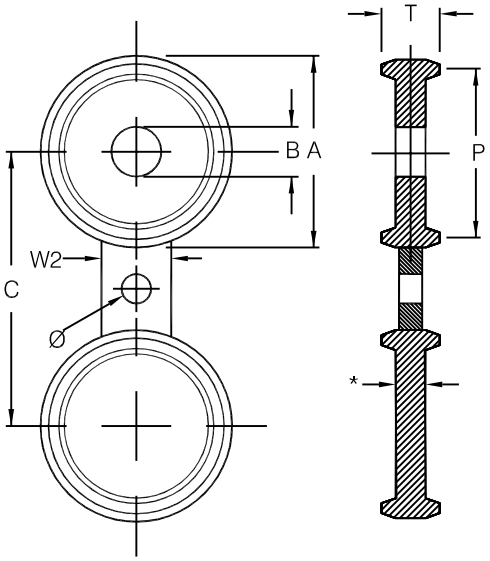
AITKEN ASME B16.48 ANSI 1500# MALE OCTAGONAL RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	*	P	L	W1	W2	Ø	RING	1	1A	2
1/2	1.87	0.84	3.25	0.88	0.38	1.562	5.00	1.00	1.50	0.875	R 12	1	1	1
3/4	2.06	1.05	3.50	0.88	0.38	1.75	5.00	1.00	1.75	0.875	R 14	1	1	2
1	2.31	1.32	4.00	1.00	0.50	2.00	5.00	1.00	2.12	1.00	R 16	2	2	3
1 1/4	2.69	1.66	4.38	1.00	0.50	2.375	5.00	1.00	2.12	1.00	R 18	2	2	3
1 1/2	3.00	1.90	4.88	1.12	0.62	2.688	5.00	1.00	2.25	1.125	R 20	3	3	4
2	4.19	2.38	6.50	1.38	0.75	3.75	5.00	1.00	2.12	1.00	R 24	5	4	8
2 1/2	4.69	2.88	7.50	1.51	0.88	4.25	6.00	1.00	2.25	1.125	R 27	7	5	11
3	5.81	3.50	8.00	1.75	1.12	5.375	6.00	1.00	2.88	1.25	R 35	9	7	16
4	6.81	4.50	9.50	1.88	1.25	6.375	6.00	1.00	3.00	1.375	R 39	17	14	27
5	8.06	5.56	11.50	2.13	1.50	7.625	6.00	1.00	3.00	1.625	R 44	24	18	44
6	8.81	6.62	12.50	2.3	1.62	8.312	6.00	1.00	3.12	1.50	R 46	36	22	61
8	11.25	8.62	15.50	2.81	2.00	10.62	7.00	1.00	3.38	1.75	R 50	68	41	110
10	13.38	10.75	19.00	3.31	2.50	12.75	8.00	1.00	5.25	2.00	R 54	128	75	205
12	15.88	12.75	22.50	3.94	2.88	15.00	8.00	1.50	5.25	2.125	R 58	210	127	340
14	17.50	14.00	25.00	4.43	3.12	16.50	9.00	1.50	5.50	2.375	R 63	220	140	360
16	19.63	16.00	27.75	4.88	3.50	18.50	9.00	1.50	5.75	2.625	R 67	256	155	372
18	22.13	18.00	30.50	5.26	3.88	21.00	10.00	1.50	6.00	2.875	R 71	350	165	508
20	24.25	20.00	32.75	5.75	4.25	23.00	10.00	1.50	6.50	3.125	R 75	456	197	657
24	28.63	24.00	39.00	6.63	5.00	27.25	10.00	1.50	7.00	3.625	R 79	742	306	1054

SIZE
1/2-24

RATING/FACING
900/MO

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

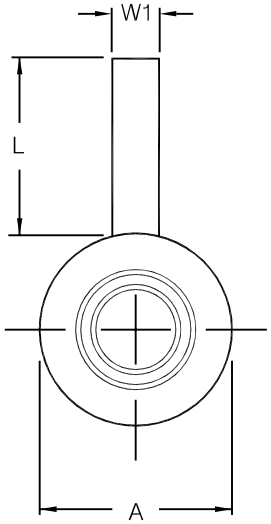
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

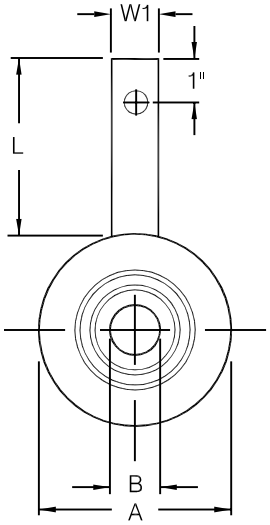
REV.: 2 12/02/09

DWG NO.: CAT15-MO.DWG

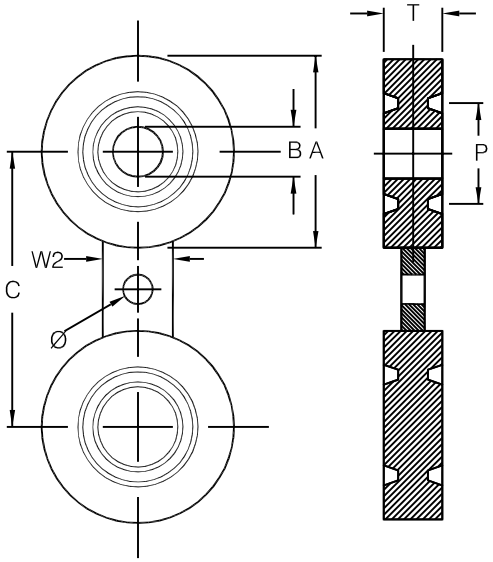
AITKEN ASME B16.48 ANSI 1500# FEMALE RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	P	L	W1	W2	Ø	RING	1	1A	2
1/2	2.38	0.84	3.25	0.88	1.562	5.00	1.00	1.50	0.875	R 12	1	1	1
3/4	2.62	1.05	3.50	1.00	1.75	5.00	1.00	1.75	0.875	R 14	2	2	2
1	2.81	1.32	4.00	1.00	2.00	5.00	1.00	2.00	1.00	R 16	3	3	4
1 1/4	3.19	1.66	4.38	1.00	2.375	5.00	1.00	2.00	1.00	R 18	4	3	5
1 1/2	3.62	1.90	4.88	1.12	2.688	5.00	1.00	2.50	1.125	R 20	5	4	6
2	4.88	2.38	6.50	1.38	3.75	5.00	1.00	2.12	1.00	R 24	8	7	13
2 1/2	5.38	2.88	7.50	1.50	4.25	6.00	1.00	2.62	1.125	R 27	11	8	18
3	6.62	3.50	8.00	1.75	5.375	6.00	1.00	2.88	1.25	R 35	19	14	31
4	7.62	4.50	9.50	1.88	6.375	6.00	1.00	3.00	1.375	R 39	28	19	43
5	9.00	5.56	11.50	2.12	7.625	6.00	1.00	3.00	1.625	R 44	41	25	61
6	9.75	6.62	12.50	2.38	8.312	6.00	1.00	3.12	1.50	R 46	53	30	79
8	12.50	8.62	15.50	2.88	10.625	7.00	1.00	3.38	1.75	R 50	106	57	159
10	14.62	10.75	19.00	3.25	12.75	8.00	1.50	5.25	2.00	R 54	161	76	236
12	17.25	12.75	22.50	4.00	15.00	8.00	1.50	5.25	2.125	R 58	268	124	390
14	19.25	14.00	25.00	4.38	16.50	9.00	1.50	5.50	2.375	R 63	365	174	539
16	21.50	16.00	27.75	4.88	18.50	9.00	1.50	5.75	2.625	R 67	511	230	744
18	24.12	18.00	30.50	5.25	21.00	10.00	1.50	6.00	2.875	R 71	700	312	1015
20	26.50	20.00	32.75	5.62	23.00	10.00	1.50	6.50	3.125	R 75	912	394	1313
24	31.25	24.00	39.00	6.62	27.25	10.00	1.50	7.00	3.625	R 79	1484	611	2108

SIZE
1/2-24

RATING/FACING
1500/FG

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

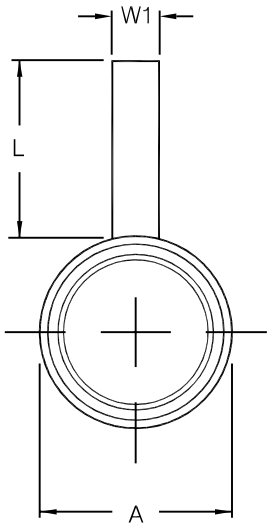
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

REV.: 2 12/02/09

DWG NO.: CAT15-FG.DWG

AITKEN ASME B16.48 ANSI 2500# MALE OCTAGONAL RING JOINT



TYPE 1
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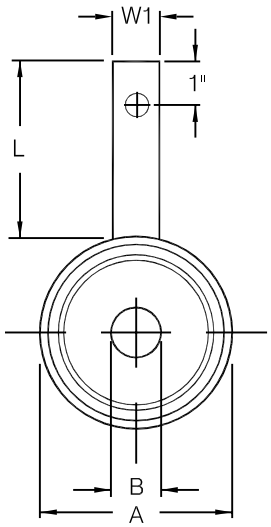
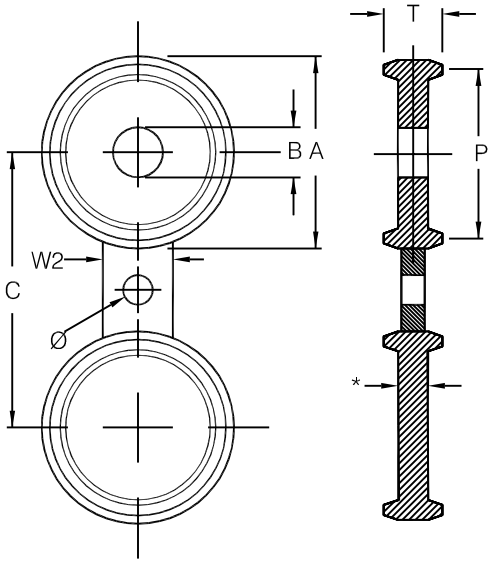


TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	*	P	L	W1	W2	Ø	RING	1	1A	2
1/2	2.00	0.84	3.50	1.00	0.50	1.688	5.00	1.00	1.62	0.875	R 13	1	1	1
3/4	2.31	1.05	3.75	1.12	0.62	2.00	5.00	1.00	1.88	0.875	R 16	2	2	2
1	2.69	1.32	4.25	1.12	0.62	2.375	5.00	1.00	2.12	1.00	R 18	3	3	4
1 1/4	3.28	1.66	5.12	1.38	0.75	2.844	5.00	1.00	2.12	1.125	R 21	3	3	4
1 1/2	3.69	1.90	5.75	1.51	0.88	3.25	5.00	1.00	2.38	1.25	R 23	4	4	6
2	4.44	2.38	6.75	1.63	1.00	4.00	5.00	1.00	2.25	1.125	R 26	8	6	12
2 1/2	4.88	2.88	7.75	1.81	1.12	4.375	6.00	1.00	2.38	1.25	R 28	10	7	17
3	5.50	3.50	9.00	1.94	1.25	5.00	6.00	1.00	3.00	1.375	R 32	15	11	24
4	6.81	4.50	10.75	2.31	1.50	6.188	7.00	1.00	3.25	1.625	R 38	25	16	41
5	8.25	5.56	12.75	2.82	1.88	7.50	7.00	1.00	3.50	1.875	R 42	41	26	66
6	9.75	6.62	14.50	3.19	2.25	9.00	8.00	1.00	3.75	2.125	R 47	57	35	91
8	11.88	8.62	17.25	3.81	2.75	11.00	8.00	1.00	3.75	2.125	R 51	102	63	165
10	14.63	10.75	21.25	4.63	3.25	13.50	9.00	1.50	3.75	2.625	R 55	190	115	306
12	17.25	12.75	24.38	5.38	3.88	16.00	9.00	1.50	6.00	2.875	R 60	312	187	507

SIZE
1/2-12

RATING/FACING
900/MO

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

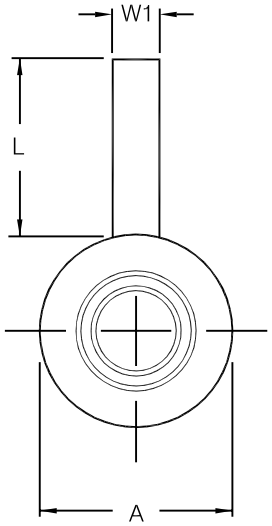
MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

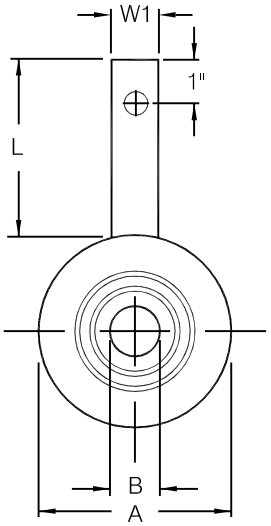
REV.: 2 12/02/09

DWG NO.: CAT25MO.DWG

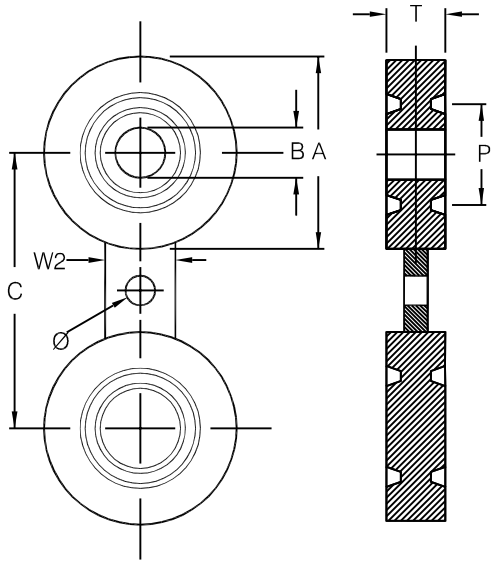
AITKEN ASME B16.48 ANSI 2500# FEMALE RING JOINT



TYPE 1
PADDLE BLIND



TYPE 1A
PADDLE SPACER



TYPE 2
FIGURE 8 BLANK

DIMENSIONAL DATA (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	A	B	C	T	P	L	W1	W2	Ø	RING	1	1A	2
1/2	2.56	0.84	3.50	1.00	1.688	5.00	1.00	1.50	0.875	R 13	2	2	4
3/4	2.88	1.05	3.75	1.12	2.00	5.00	1.00	1.75	0.875	R 16	3	3	5
1	3.25	1.32	4.25	1.12	2.375	5.00	1.00	2.12	1.00	R 18	4	4	6
1 1/4	4.00	1.66	5.12	1.38	2.844	5.00	1.00	2.12	1.125	R 21	7	5	10
1 1/2	4.50	1.90	5.75	1.50	3.25	5.00	1.00	2.38	1.25	R 23	8	7	14
2	5.25	2.38	6.75	1.62	4.00	5.00	1.00	2.25	1.125	R 26	13	11	20
2 1/2	5.88	2.88	7.75	1.88	4.375	6.00	1.00	2.38	1.25	R 28	17	13	27
3	6.62	3.50	9.00	2.00	5.00	6.00	1.00	3.00	1.375	R 32	22	17	35
4	8.00	4.50	10.75	2.50	6.188	7.00	1.00	3.25	1.625	R 38	37	26	60
5	9.50	5.56	12.75	2.88	7.50	7.00	1.00	3.50	1.875	R 42	64	43	104
6	11.00	6.62	14.50	3.25	9.00	8.00	1.00	3.75	2.125	R 47	91	59	147
8	13.38	8.62	17.25	3.88	11.00	8.00	1.00	3.75	2.125	R 51	158	94	249
10	16.75	10.75	21.25	4.62	13.50	9.00	1.50	3.58	2.625	R 55	300	178	476
12	19.50	12.75	24.38	5.25	16.00	9.00	1.50	6.00	2.875	R 60	453	261	714

SIZE
1/2-12

RATING/FACING
2500/FG

TYPE
1=PADDLE BLANK
1A=PADDLE SPACER
2=FIGURE 8 BLANK

MATERIAL
PER ASME B16.5, TABLE 1-A

NOTE:
GROOVE DIMENSIONS, GASKET SURFACE FINISH, & TOLERANCES PER ANSI B16.20

REV.: 2 12/02/09

DWG NO.: CAT25FG.DWG

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

BLEED RINGS
DRIP RINGS
TEST INSERTS
CALIBRATION RINGS

REV.: 2 01/27/09

DWG. NO.: NCATDRIP.DWG

AITKEN DRIP RINGS, BLEED RINGS, AND TEST INSERTS

GENERAL INFORMATION

AITKEN STANDARD MANUFACTURING TOLERANCES ARE AS FOLLOWS:
- OUTSIDE DIAMETER: (+0.00", -0.0625")
- INSIDE DIAMETER: (+/- 0.0625")
- THICKNESS: (+0.0625", -0.00")

RING JOINT DIMENSIONS AND TOLERANCES ARE IN STRICT ACCORDANCE WITH **A.N.S.I. B16.5 AND B16.20**. FEMALE OVAL RING GROOVE IS FURNISHED AS STANDARD.

AITKEN PROVIDES ONE 1/2" OR 3/4", THREADED OR SOCKET-WELD TAP. MULTIPLE TAPS CAN BE PROVIDED BUT MUST BE ORIENTATED BY CUSTOMER. THICKNESS OF RING MAY BE AFFECTED IF LARGER TAPS ARE REQUESTED.

ONE COAT OF STANDARD SHOP PRIMER WILL BE APPLIED TO ALL CARBON STEEL PLATE PRODUCTS UNLESS SPECIFIED DIFFERENTLY.

STANDARD MATERIALS ARE:
- A.S.T.M. A516 GR 70
- 304 STAINLESS STEEL
- 316 STAINLESS STEEL

OTHER ALLOYS CAN BE FURNISHED UPON REQUEST.

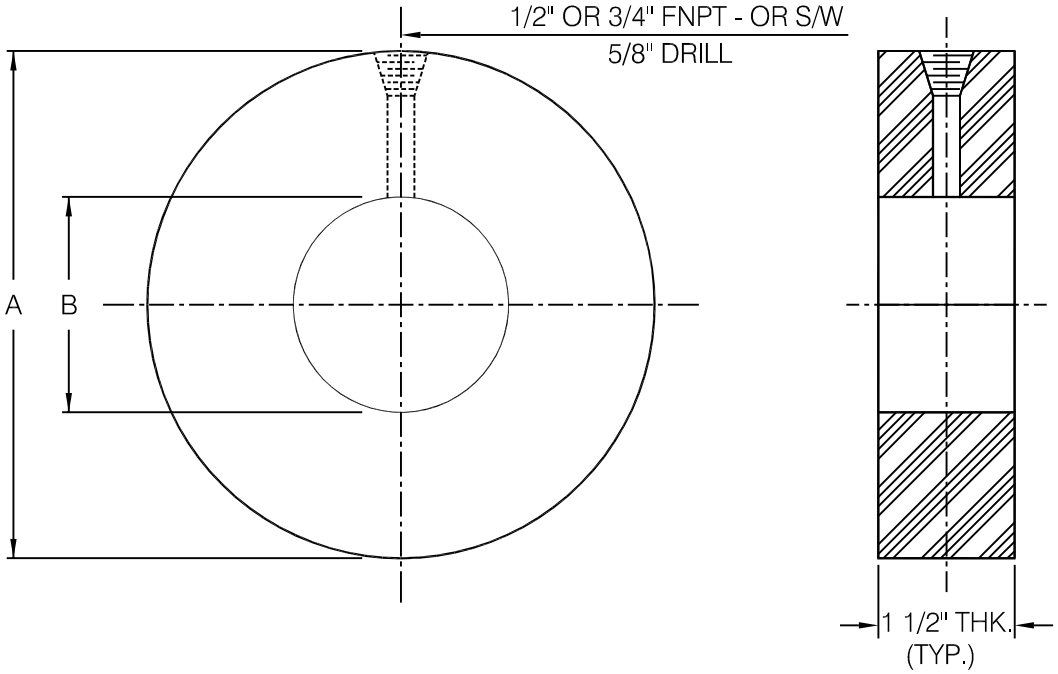
STANDARD FINISH IS: 125-250 AARH (3.2 – 6.3 Ra)

AITKEN DRIP RINGS, BLEED RINGS, AND TEST INSERTS ARE PRODUCED IN STRICT ACCORDANCE WITH THE FOLLOWING CODES OF PRACTICE.
- A.N.S.I. B16.5
- A.N.S.I. B16.20
- A.S.M.E. B16.47 (FOR LARGER DIAMETER FLANGES)

LISTED WEIGHTS ARE FOR CARBON STEEL COMPONENTS.

AITKEN STANDARD RAISED FACE/FLAT FACE BLEED RINGS

(DRIP RINGS – TEST INSERTS)



"A" DIMENSION (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	B	150#	300#	600#	900#	1500#	150#	300#	600#	900#	1500#
1	1.32	2.50	2.75	2.75	3.00	3.00	2	2	2	2	2
1 1/2	1.90	3.25	3.625	3.625	3.75	3.75	2	3	3	4	4
2	2.375	4.00	4.25	4.25	5.50	5.50	4	4	4	8	8
2 1/2	2.875	4.75	5.00	5.00	6.375	6.375	5	6	6	11	11
3	3.5	5.25	5.75	5.75	6.50	6.75	5	7	7	10	11
4	4.50	6.75	7.00	7.50	8.00	8.125	9	10	12	15	15
6	6.625	8.625	9.75	10.375	11.25	11.00	10	17	21	28	26
8	8.625	10.875	12.00	12.50	14.00	13.75	15	23	27	41	38
10	10.75	13.25	14.125	15.625	17.00	17.00	20	28	43	58	58
12	12.75	16.00	16.50	17.75	19.375	20.25	31	37	51	71	83
14	14	17.625	19	19.125	20.25	22.5	38	55	57	72	104
16	16	20.125	21.125	22	22.375	25	50	64	77	82	123
18	18	21.5	23.375	23.875	24.875	27.5	46	74	82	99	144
20	20	23.75	25.625	26.625	27.25	29.5	55	86	103	115	157
24	24	28.125	30.375	30.875	32.75	35.25	72	116	126	166	223

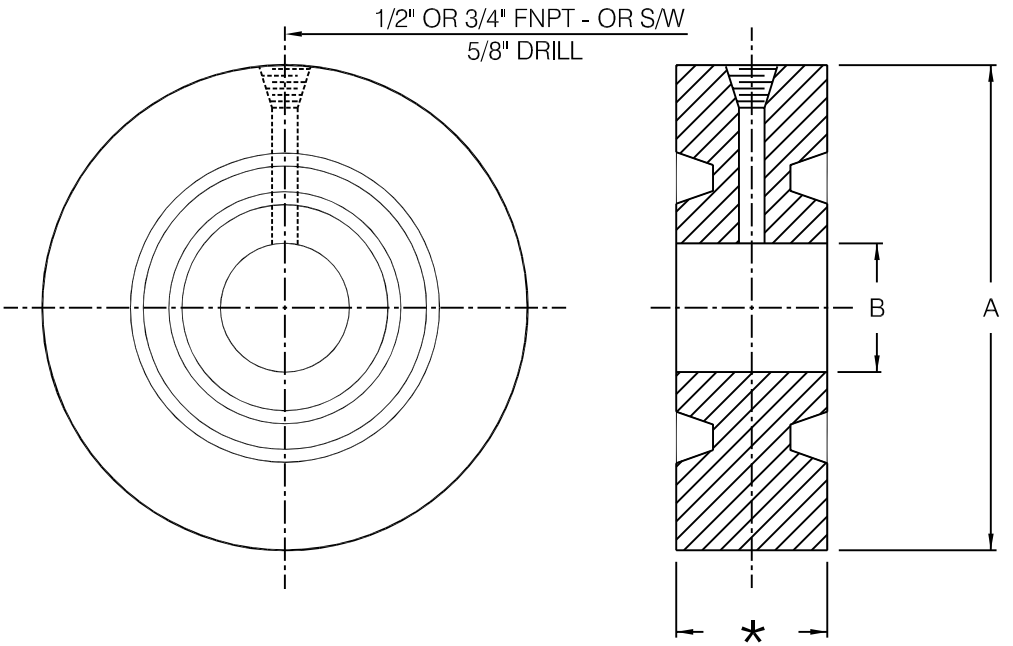
MATERIAL	GASKET SURFACE
A516-70	SMOOTH MILL
304 SS	125-250 AARH
316 SS	OTHER
OTHERS BY REQUEST	

REV. NO.: 3 DATE: 04/24/08

DWG. NO.: CATRFDRP.DWG

AITKEN STANDARD RING JOINT BLEED RINGS

(DRIP RINGS – TEST INSERTS)



* 2 1/8" THICK

** 2 1/2" THICK

(ADDITIONAL THICKNESSES LISTED BELOW FOR HIGHER RATINGS)

DIMENSIONAL DATA (INCHES)

*300 / *400 / *600#				*900#			*1500#			**2500#		
SIZE	A	B	RING#	A	B	RING#	A	B	RING#	A	B	RING#
1	2.75	1.32	R 16	2.812	1.32	R 16	2.812	1.32	R 16	3.25	1.32	R 18
1 1/2	3.562	1.90	R 20	3.625	1.90	R 20	3.625	1.90	R 20	4.50	1.90	R 23
2	4.25	2.375	R 23	4.875	2.375	R 24	4.875	2.375	R 24	5.25	2.375	R 26
2 1/2	5.00	2.875	R 26	5.375	2.875	R 27	5.375	2.875	R 27	5.875	2.875	R 28
3	5.75	3.50	R 31	6.125	3.50	R 31	6.625	3.50	R 35	6.625	3.50	R 32
4	6.875	4.50	R 37	7.125	4.50	R 37	7.625	4.50	R 39	8.00	4.50	R 38
6	9.50	6.625	R 45	9.50	6.625	R 45	9.75	6.625	R 46	11.00	6.625	R 47
8	11.875	8.625	R 49	12.125	8.625	R 49	12.50	8.625	R 50	13.375	8.625	R 51
10	14.00	10.75	R 53	14.25	10.75	R 53	14.625	10.75	R 54	16.75 (2)	10.75	R 55
12	16.25	12.75	R 57	16.50	12.75	R 57	17.25 (1)	12.75	R 58	19.50 (2)	12.75	R 60
14	18	14	R 61	18.375	14	R 62	19.25 (1)	14	R 63	–	–	–
16	20	16	R 65	20.62	16	R 66	21.5 (2)	16	R 67	–	–	–
18	22.62	18	R 69	23.38 (1)	18	R 70	24.12 (2)	18	R 71	–	–	–
20	25	20	R 73	25.5 (1)	20	R 74	26.5 (2)	20	R 75	–	–	–
24	29.5	24	R 77	30.38 (1)	24	R 78	31.25 (3)	24	R 79	–	–	–

API 6A DIMENSIONS - NEXT PAGE

ADDITIONAL THICKNESS

(1) USE 2 1/2" THK

(2) USE 2 3/4" THK

(3) USE 3" THK

AITKEN STANDARD RING JOINT BLEED RINGS

API 6A DIMENSIONS

*3,000# W.O.G.(6 B)					*5,000# W.O.G.(6 B)				**10,000# W.O.G.(6 BX)			
SIZE	A	B	RING#	WEIGHT	A	B	RING#	WEIGHT	A	B	RING#	WEIGHT
1 13/16									4.125	1.812	151	8
2 1/16	4.875	2.062	R 24	10	4.875	2.062	R 24	10	4.375	2.062	152	9
2 9/16	5.375	2.562	R 27	11	5.375	2.562	R 27	11	5.19	2.562	153	12
3 1/16									6	3.062	154	15
3 1/8	6.125	3.125	R 31	14	6.625	3.125	R 35	17				
4 1/16	7.125	4.062	R 37	17	7.625	4.062	R 39	20	7.28	4.062	155	21
7 1/16	9.50	7.125	R 45	19	9.75	7.125	R 46	26	11.88	7.062	156	51

APPROXIMATE WEIGHTS

*300/*400/*600#	
SIZE	WEIGHT
1	3
1 1/2	5
2	6
2 1/2	8
3	10
4	13
6	22
8	32
10	39
12	48
14	61
16	69
18	89
20	107
24	140

*900#	
SIZE	WEIGHT
1	3
1 1/2	5
2	9
2 1/2	10
3	12
4	15
6	22
8	35
10	42
12	52
14	67
16	81
18	124
20	140
24	194

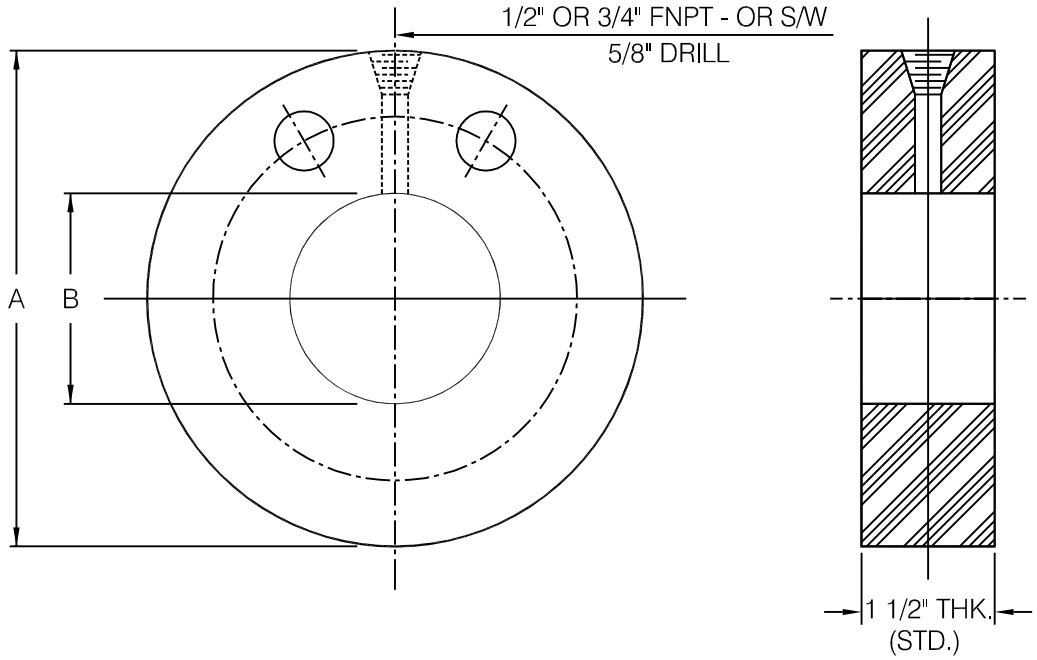
*1500#	
SIZE	WEIGHT
1	3
1 1/2	5
2	9
2 1/2	10
3	12
4	18
6	25
8	39
10	47
12	75
14	98
16	127
18	158
20	185
24	268

**2500#	
SIZE	WEIGHT
1	5
1 1/2	10
2	13
2 1/2	15
3	18
4	25
6	43
8	59
10	101
12	134

AITKEN STANDARD FULL FACE BLEED RINGS

(DRIP RINGS – TEST INSERTS)

SEE FOLLOWING PAGE FOR DRILLING INFORMATION



"A" DIMENSION (INCHES) *APPROXIMATE WEIGHTS (LBS)*

SIZE	B	150#	300#	600#	900#	1500#	150#	300#	600#	900#	1500#
1	1.32	4.25	4.88	4.88	5.88	5.88	6	7	7	11	11
1 1/2	1.90	5.00	6.13	6.13	7.00	7.00	7	11	11	15	15
2	2.375	6.00	6.50	6.50	8.50	8.50	10	12	12	22	22
2 1/2	2.875	7.00	7.50	7.50	9.63	9.63	14	16	16	28	28
3	3.5	7.50	8.25	8.25	9.50	10.50	15	19	19	26	32
4	4.50	9.00	10.00	10.75	11.50	12.25	20	26	32	37	43
6	6.625	11.00	12.50	14.00	15.00	15.50	26	38	51	60	66
8	8.625	13.50	15.00	16.50	18.50	19.00	36	50	66	89	96
10	10.75	16.00	17.50	20.00	21.50	23.00	47	64	85	104	122
12	12.75	19.00	20.50	22.00	24.00	26.50	63	78	95	123	156
14	14	21	23	23.75	25.25	29.5	77	101	108	130	195
16	16	23.5	25.5	27	27.75	32.5	93	119	141	152	231
18	18	25	28	29.25	31	36	93	139	162	186	281
20	20	27.5	30.5	32	33.75	38.75	109	162	184	217	316
24	24	32	36	37	41	46	137	220	233	324	445

1. LARGER SIZES AVAILABLE.

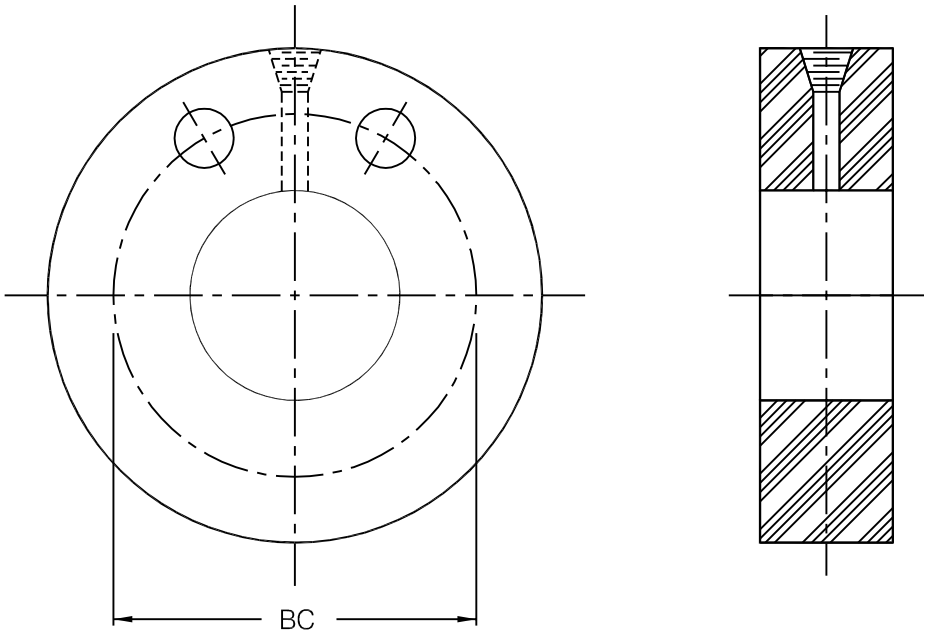
2. LARGER TAP SIZES AVAILABLE.

3. TAP SIZES WILL BE CONFIRMED FOR EACH SIZE AT QUOTATION STAGE.

MATERIAL	GASKET SURFACE
A516-70	125-250 AARH
304 SS	OTHER
316 SS	
OTHERS BY REQUEST	

AITKEN STANDARD FULL FACE BLEED RINGS

(DRIP RINGS – TEST INSERTS)
DRILLING INFORMATION



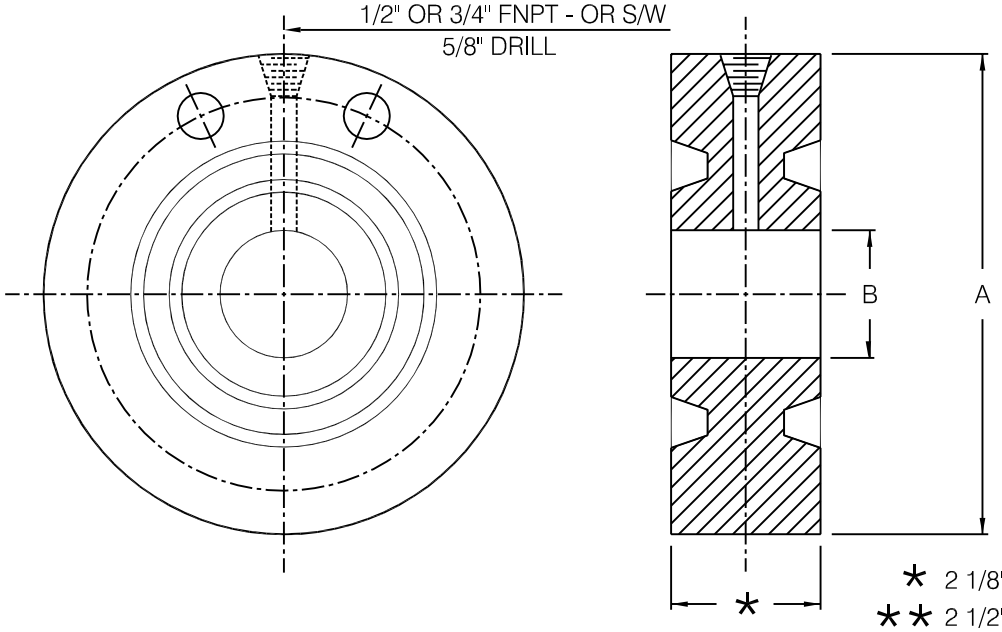
	150#			300#			600#			900#			1500#		
SIZE	Ø	BC	#Ø	Ø	BC	#Ø	Ø	BC	#Ø	Ø	BC	#Ø	Ø	BC	#Ø
1	0.63	3.13	4	0.75	3.50	4	0.75	3.50	4	1.00	4.00	4	1.00	4.00	4
1 1/2	0.63	3.88	4	0.88	4.50	4	0.88	4.50	4	1.13	4.88	4	1.13	4.88	4
2	0.75	4.75	4	0.75	5.00	8	0.75	5.00	8	1.00	6.50	8	1.00	6.50	8
2 1/2	0.75	5.50	4	0.88	5.88	8	0.88	5.88	8	1.13	7.50	8	1.13	7.50	8
3	0.75	6.00	4	0.88	6.63	8	0.88	6.63	8	1.00	7.50	8	1.25	8.00	8
4	0.75	7.50	8	0.88	7.88	8	1.00	8.50	8	1.25	9.25	8	1.38	9.50	8
6	0.88	9.50	8	0.88	10.63	12	1.13	11.50	12	1.25	12.50	12	1.50	12.50	12
8	0.88	11.75	8	1.00	13.00	12	1.25	13.75	12	1.50	15.50	12	1.75	15.5	12
10	1.00	14.25	12	1.13	15.25	16	1.38	17.00	16	1.50	18.50	16	2.00	19.00	12
12	1.00	17.00	12	1.25	17.75	16	1.38	19.25	20	1.50	21.00	20	2.13	22.50	16
14	1.12	18.75	12	1.25	20.25	20	1.5	20.75	20	1.62	22	20	2.38	25	16
16	1.12	21.25	16	1.38	22.5	20	1.62	23.75	20	1.75	24.25	20	2.62	27.75	16
18	1.25	22.75	16	1.38	24.75	24	1.75	25.75	20	2	27	20	2.88	30.5	16
20	1.25	25	20	1.38	27	24	1.75	28.5	24	2.12	29.5	20	3.12	32.75	16
24	1.38	29.5	20	1.62	32	24	2	33	24	2.62	35.5	20	3.62	39	16

1. TAP SIZES WILL BE CONFIRMED FOR EACH SIZE AT QUOTATION STAGE.

AITKEN STANDARD FULL FACE RING JOINT BLEED RINGS

(DRIP RINGS - TEST INSERTS)

SEE FOLLOWING PAGE FOR DRILLING INFORMATION



* 2 1/8" THICK (STD.)

** 2 1/2" THICK (STD.)

(ADDITIONAL THICKNESSES LISTED BELOW FOR HIGHER RATINGS)

DIMENSIONAL DATA (INCHES)

	*300#				*600#				*900#				*1500#				**2500#			
SIZE	A	B	R#	W	A	B	R#	W	A	B	R#	W	A	B	R#	W	A	B	R#	W
1	4.88	1.32	R 16	10	4.88	1.32	R 16	10	5.88	1.32	R 16	14	5.88	1.32	R 16	14	6.25	1.32	R 18	19
1 1/2	6.13	1.90	R 20	15	6.13	1.90	R 20	15	7.00	1.90	R 20	20	7.00	1.90	R 20	20	8.00	1.90	R 23	31
2	6.50	2.38	R 23	16	6.50	2.38	R 23	16	8.50	2.38	R 24	28	8.50	2.38	R 24	28	9.25	2.38	R 26	39
2 1/2	7.50	2.88	R 26	20	7.50	2.88	R 26	20	9.63	2.88	R 27	36	9.63	2.88	R 27	36	10.50	2.88	R 28	50
3	8.25	3.50	R 31	24	8.25	3.50	R 31	24	9.50	3.50	R 31	34	10.50	2.88	R 35	41	12.00	4.50	R 32	61
4	10.00	4.50	R 37	35	10.75	4.50	R 37	42	11.50	4.50	R 37	48	12.25	4.50	R 39	55	14.00	4.50	R 38	86
6	12.50	6.63	R 45	49	14.00	6.63	R 45	65	15.00	6.63	R 45	77	15.50	6.63	R 46	81	19.00	6.63	R 47	157
8	15.00	8.63	R 49	66	16.50	8.63	R 49	85	18.50	8.63	R 49	114	19.00	8.63	R 50	119	21.75	8.63	R 51	192
10	17.50	10.75	R 53	81	20.00	10.75	R 53	121	21.50	10.75	R 53	147	23.00	10.75	R 54	173	26.50 (2)	10.75	R 55	309
12	20.50	12.75	R 57	111	22.00	12.75	R 57	134	24.00	12.75	R 57	175	26.50 (1)	12.75	R 58	260	30.00 (2)	12.75	R 60	391
14	23	14	R 61	143	23.75	14	R 61	153	25.25	14	R 62	184	29.5 (1)	14	R 63	325	–	–	–	–
16	25.5	16	R 65	167	27	16	R 65	199	27.75	16	R 66	215	32.5 (2)	16	R 67	423	–	–	–	–
18	28	18	R 69	196	29.25	18	R 69	223	31.0 (1)	18	R 70	193	36.0 (2)	18	R 71	514	–	–	–	–
20	30.5	20	R 73	230	32	20	R 73	261	33.75 (1)	20	R 74	361	38.75 (2)	20	R 75	580	–	–	–	–
24	36	24	R 77	311	37	24	R 77	330	41.0 (1)	24	R 78	647	46.0 (3)	24	R 79	889	–	–	–	–

1. TAP SIZES WILL BE CONFIRMED FOR EACH SIZE AT QUOTATION STAGE.

W = APPROXIMATE WEIGHT (LBS.)

ADDITIONAL THICKNESS

(1) USE 2 1/2" THK

(2) USE 2 3/4" THK

(3) USE 3" THK

MATERIAL

A516-70

304 SS

316 SS

OTHERS BY REQUEST

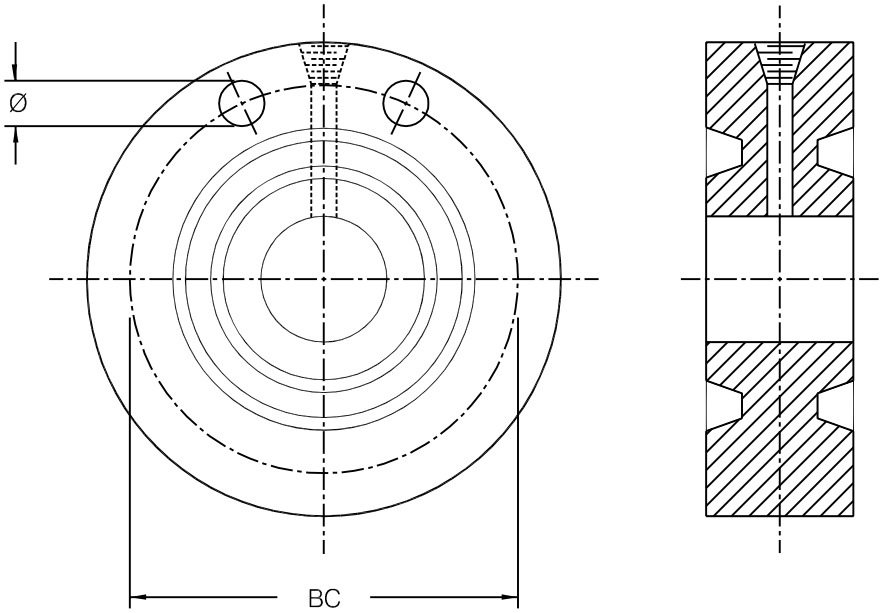
GASKET SURFACE

MACHINED

AITKEN STANDARD FULL FACE RING JOINT BLEED RINGS

(DRIP RINGS – TEST INSERTS)

DRILLING INFORMATION



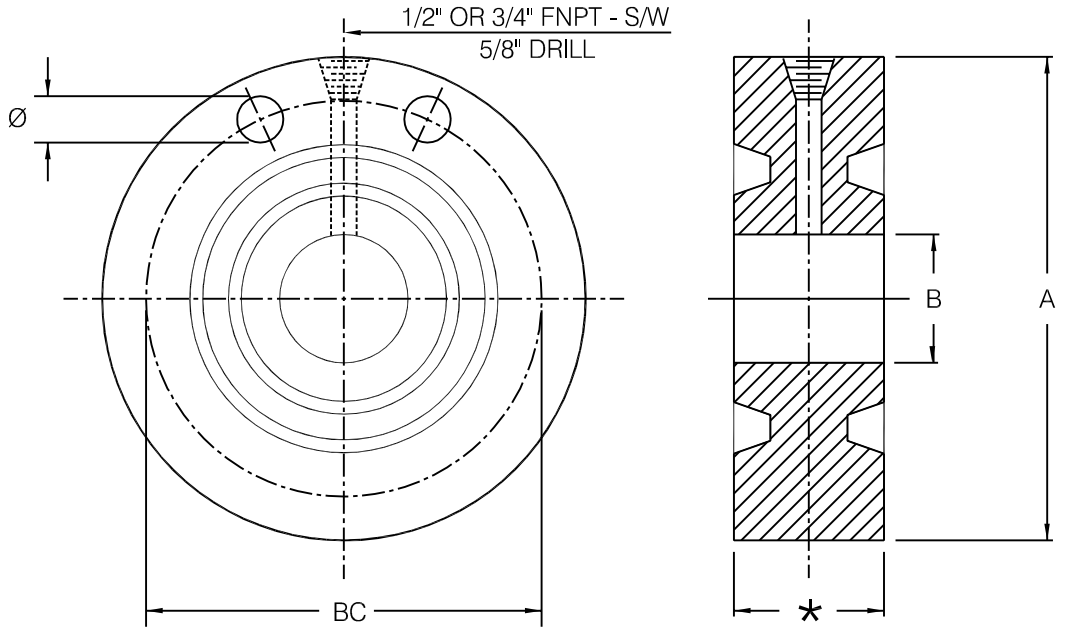
	300#			600#			900#			1500#			2500#		
SIZE	Ø	BC	#Ø	Ø	BC	#Ø	Ø	BC	#Ø	Ø	BC	#Ø	Ø	BC	#Ø
1	0.75	3.5	4	0.75	3.5	4	1.00	4.0	4	1.00	4.0	4	1.00	4.25	4
1 1/2	0.88	4.5	4	0.88	4.5	4	1.13	4.88	4	1.13	4.88	4	1.25	5.75	4
2	0.75	5.0	8	0.75	5.0	8	1.00	6.5	8	1.00	6.5	8	1.13	6.25	8
2 1/2	0.88	5.88	8	0.88	5.88	8	1.13	7.5	8	1.13	7.5	8	1.25	7.75	8
3	0.88	6.63	8	0.88	6.63	8	1.00	7.5	8	1.25	8.0	8	1.38	9.0	8
4	1.0	8.5	8	1.00	8.5	8	1.25	9.25	8	1.38	9.5	8	1.63	1.75	8
6	1.13	11.5	12	1.13	11.5	12	1.25	12.5	12	1.50	12.5	12	2.13	14.5	8
8	1.25	13.75	12	1.25	13.75	12	1.50	15.5	12	1.75	15.5	12	2.13	17.25	12
10	1.38	17.0	16	1.38	17.0	16	1.50	18.5	16	2.00	19.0	12	2.63	21.25	12
12	1.38	19.25	20	1.38	19.25	20	1.50	21.0	20	2.13	22.5	16	2.88	24.38	12
14	1.25	20.25	20	1.5	20.75	20	1.62	22	20	2.38	25	16	–	–	–
16	1.38	22.5	20	1.62	23.75	20	1.75	24.25	20	2.62	27.75	16	–	–	–
18	1.38	24.75	24	1.75	25.75	20	2	27	20	2.88	30.5	16	–	–	–
20	1.38	27	24	1.75	28.5	24	2.12	29.5	20	3.12	32.75	16	–	–	–
24	1.62	32	24	2	33	24	2.62	35.5	20	3.62	39	16	–	–	–

1. TAP SIZES WILL BE CONFIRMED FOR EACH SIZE AT QUOTATION STAGE.

AITKEN STANDARD FULL FACE RING JOINT BLEED RINGS

(DRIP RINGS – TEST INSERTS)

W.O.G.



* 2 1/8" THICK (STD.)

** 2 1/2" THICK (STD.)

DIMENSIONAL DATA (INCHES)

*3,000# (6B)					*5,000# (6B)				**10,000# (6BX)			
SIZE	A	B	R#	W	A	B	R#	W	A	B	R#	W
1 13/16									7.38	1.81	151	26
2 1/16	8.50	2.06	24	29	8.50	2.06	24	29	7.88	2.06	152	29
2 9/16	9.63	2.56	27	36	9.63	2.56	27	36	9.13	2.56	153	39
3 1/16									10.63	3.06	154	52
3 1/8	9.50	3.13	31	36	10.50	3.13	35	42				
4 1/16	11.50	4.06	37	49	12.25	4.06	39	56	12.44	4.06	155	70

W = APPROXIMATE WEIGHT (LBS.)

DRILLING INFORMATION

3,000# (6B)				5,000# (6B)			10,000# (6BX)		
SIZE	Ø	BC	#Ø	Ø	BC	#Ø	Ø	BC	#Ø
1 11/16							0.88	5.56	8
1 13/16							0.88	5.75	8
2 1/16	1.00	6.5	8	1.00	6.5	8	0.88	6.25	8
2 9/16	1.13	7.5	8	1.13	7.5	8	1.00	7.25	8
3 1/16							1.13	8.5	8
3 1/8	1.00	7.5	8	1.25	8.0	8			
4 1/16	1.25	9.25	8	1.38	9.5	8	1.25	10.19	8

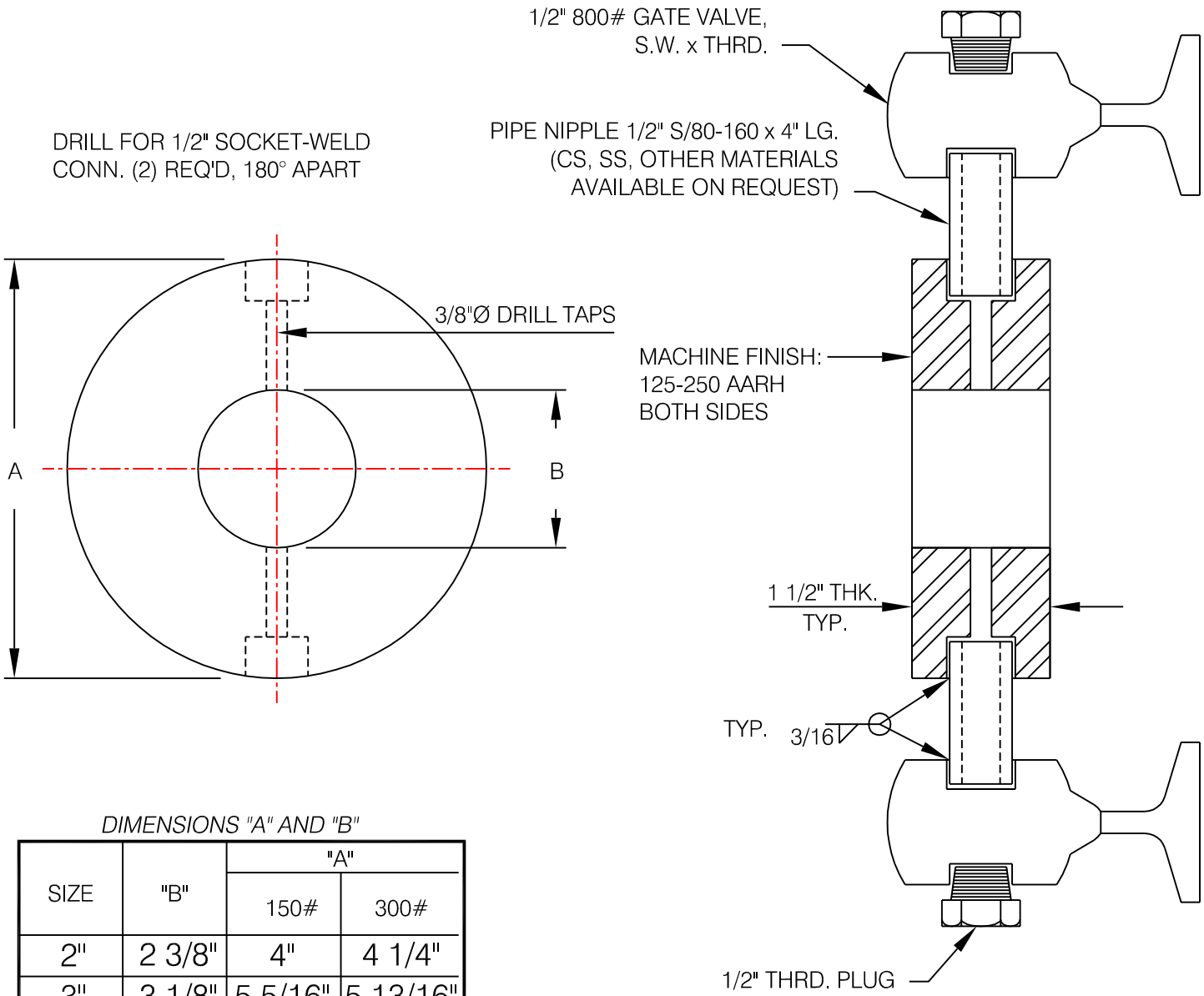
1. LARGER TAP SIZES AVAILABLE.

2. TAP SIZES WILL BE CONFIRMED FOR EACH SIZE AT QUOTATION STAGE.

REV. NO.: 5 DATE: 12/02/09

DWG. NO.: CATFFRJAPI6A.DWG

AITKEN STANDARD CALIBRATION RINGS



DIMENSIONS "A" AND "B"

SIZE	"B"	"A"	
		150#	300#
2"	2 3/8"	4"	4 1/4"
3"	3 1/8"	5 5/16"	5 13/16"
4"	4 1/2"	6 3/4"	7"

MATERIAL	GASKET SURFACE
A516-70	SMOOTH MILL
304 SS	125-250 AARH
316 SS	OTHER
OTHERS BY REQUEST	

NOTES:
1. DRILL 0.375" DIA. PRESSURE TAPS, 180° APART.
2. SOCKET I.D. TO BE 0.860" ±0.005".
3. SOCKET DEPTH TO BE 0.500".
4. OTHER SIZES AND RATINGS AVAILABLE UPON REQUEST.
5. SINGLE VALVE UNITS ALSO AVAILABLE ON REQUEST.

REV. NO.: 0 DATE: 10/02/09

DWG. NO.: CATCALIRING.DWG

Aitken is a manufacturer of
pressure vessels for various process industries in both the domestic and international markets. These industries include, but are not limited to, areas such as chemical and petrochemical plants, refineries, power plants, gas transmission facilities, paper and pulp plants, water treatment and offshore and on-shore oil and gas production facilities.

Aitken is authorized by the American Society of Mechanical Engineers (ASME) to use the ASME Section VIII, Division 1 “U”-stamp symbol. Other fabrication codes include ASME B31.1, ASME B31.3, ASME B31.4, ASME B31.8 and NACE MR-01-75.

Standard materials of construction include pressure vessel quality carbon steel, 304 and 316 stainless steel, low-temperature carbon steel and chrome-molly. High alloy materials such as monel and nickel are reviewed on an individual basis.

Aitkens’ engineering staff is experienced in estimating, engineering and mechanical design using the latest design software. A full range of on-site printing, plotting, scanning and copying abilities allows Aitken to meet the customer’s full documentation requirements.

Aitken operates under an established, documented and controlled quality control system. Aitkens’ experienced quality control personnel provide monitoring of all phases of the fabrication process to insure that all products meet the high quality standards established by Aitkens’ management team.

Aitken has built a reputation as a reliable pressure vessel supplier by providing high quality, on-time and responsive service, technical and engineering assistance, experienced staff, skilled craftsmen and timely delivery.

Aitken

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AITKEN

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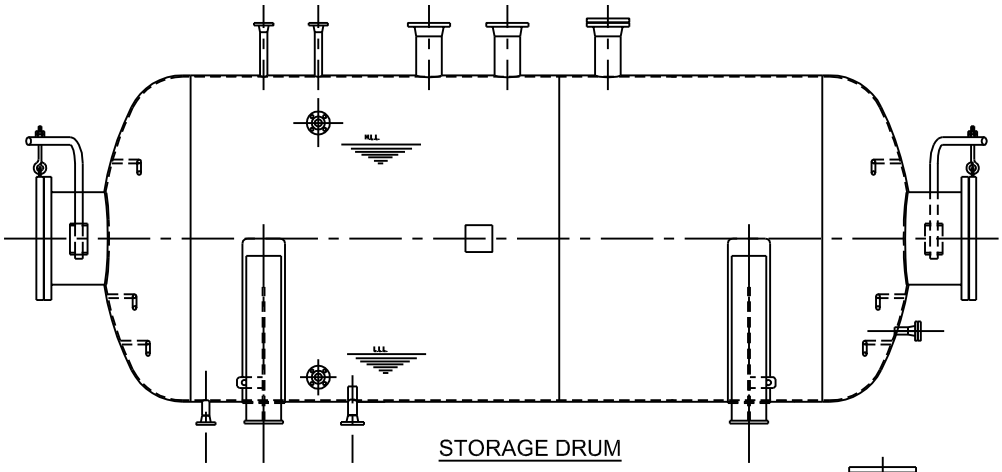
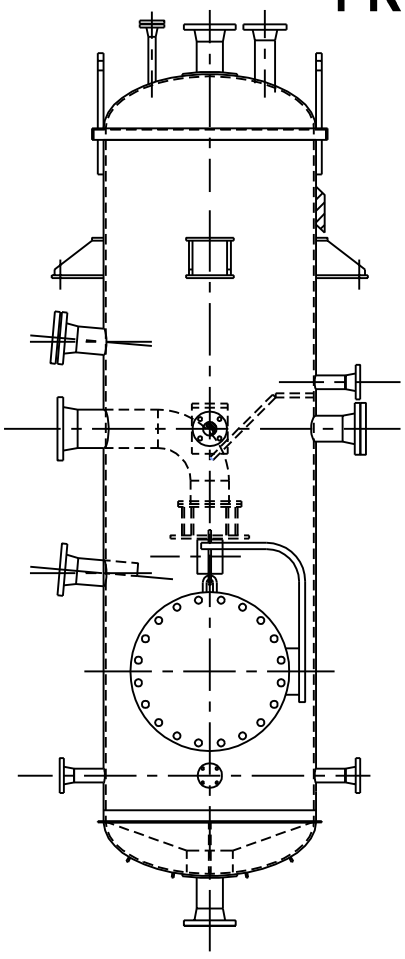
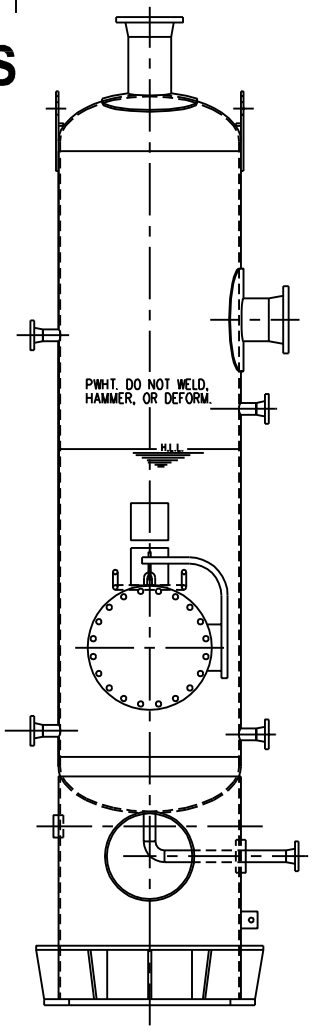


STORAGE DRUM

PRESSURE VESSELS



LIQUID ACCUMULATOR



FLARE K.O. DRUM

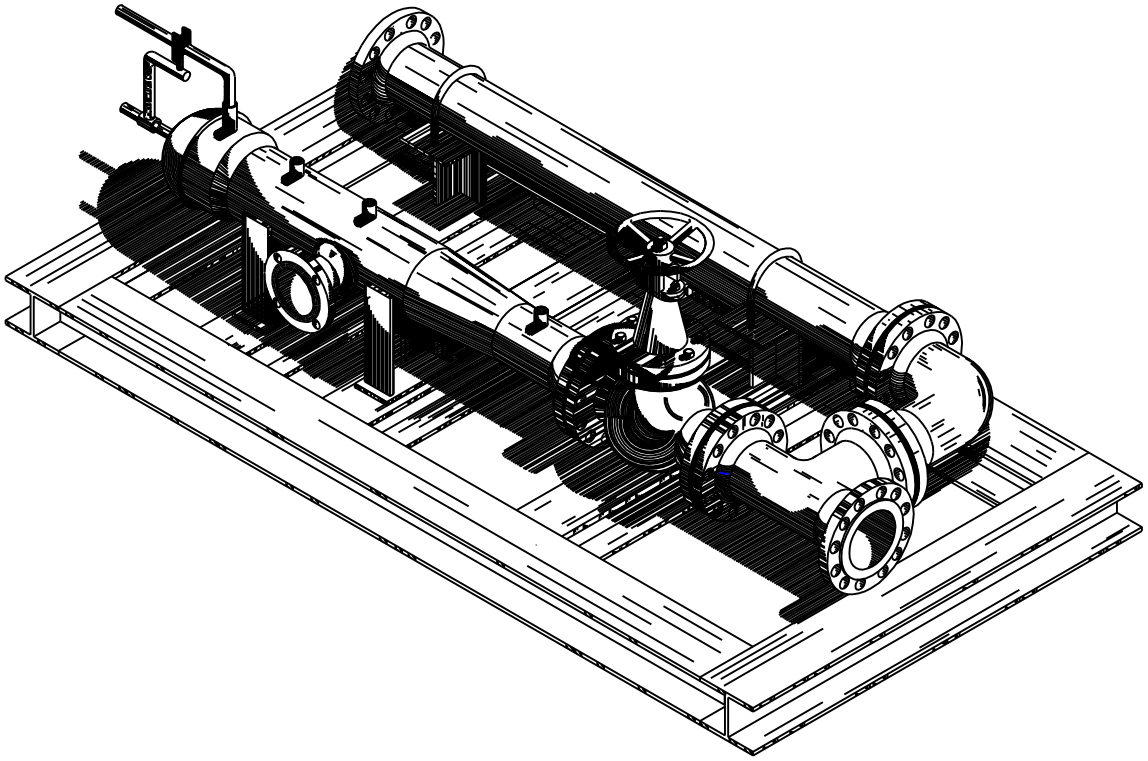
REV.: 1 01/27/09

DWG NO.: CatVesCvr.dwg

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

LAUNCHERS AND RECEIVERS



REV.: 3 01/27/09

DWG.: CATLRCVR.DWG

LAUNCHER / RECEIVER

STANDARD SPECIFICATIONS

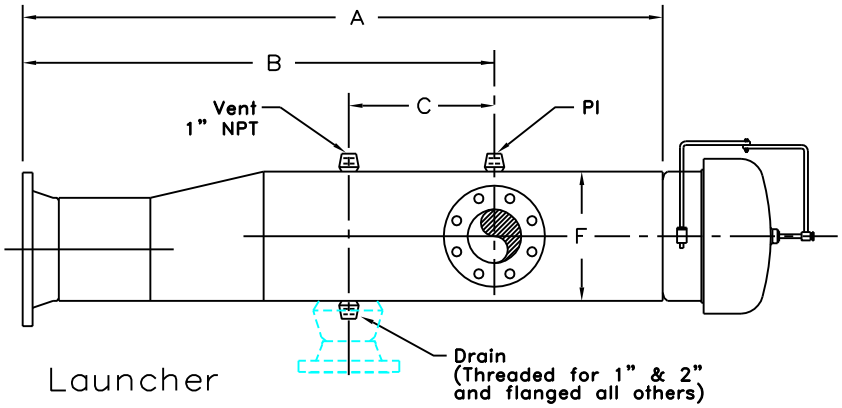
Design Criteria

Design Codes:	1. ASME B31.4 (Standard) 2. ASME Section VIII, Division 1 3. ASME B31.8 4. ASME B31.3
Design Pressure:	Specified by Customer
Design Temperature:	Specified by Customer
Non-Destructive Testing:	Specified by Customer
Welding Codes:	ASME Section XI or API 1104
Hydrostatic Testing:	Specified by Customer

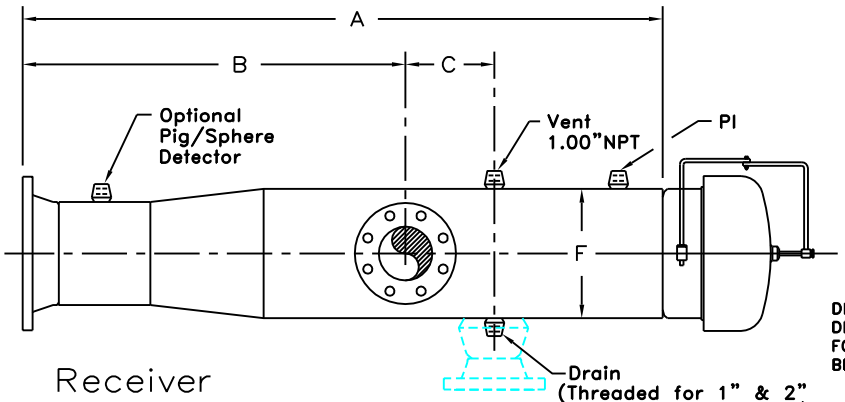
Construction Specifications

Closure:	1. Threaded Closure 2. Yoke Type Closure 3. Blind Flange
Body Materials:	1. Carbon Steel 2. Stainless Steel 3. High Yield (X42, X52, X60, etc.)
Standard Outlet:	1. Bypass / Kicker 2. Drain 3. Vent 4. Pressure Gages
Supports:	Specified by Customer
External Coating:	1. SP-3 cleaning and Shop Primer (Standard) 2. Customer Specifications

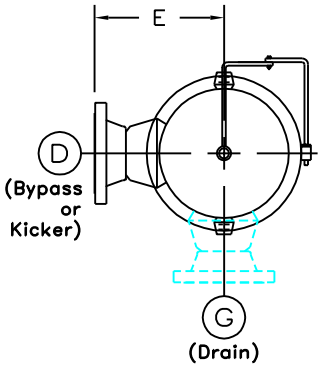
Launcher / Receiver



Launcher



Receiver



DIMENSIONS ARE INCHES.
DIMENSIONS ARE FOR REFERENCE ONLY, NOT FOR FABRICATION. ENGINEERING DRAWING WILL BE FURNISHED WITH PURCHASE ORDER.

Line Size	Laucher			Common				Receiver			Weight		
	A	B	C	D	E	F	G	A	B	C	150#	300#	600#
4	52	40	15	2	11	6.625	1	62	29	7	125	130	150
6	56	42	16	3	12	8.625	2	66	31	8	195	225	250
8	58	44	18	4	13	10.75	2	74	34	9	300	330	400
10	64	47	18	4	14	12.75	2	82	36	10	370	420	490
12	68	49	18	6	16	16	4	90	38	11	795	850	950
14	76	54	18	6	16	16	4	112	45	12	880	950	1060
16	90	64	20	8	17	18	4	114	50	14	1075	1160	1325
18	96	66	20	10	20	20	6	120	55	16	1270	1415	1600
20	98	66	22	10	21	24	6	124	58	18	1655	1860	2175
24	104	70	26	10	23	26	6	130	60	18	2225	2500	2825
26	108	72	26	10	24	28	6	138	64	18	2420	2765	3330
28	110	74	28	12	26	30	6	148	68	20	2825	3285	3925
30	114	76	28	12	28	36	8	160	74	22	3550	4035	4655
36	122	82	32	14	32	40	8	172	80	24	4215	4765	5515

- STANDARD DIMENSIONS
- CUSTOM DESIGN AVAILABLE
- BARREL LENGTH CAN BE MADE TO ACCOMMODATE "SMART" PIG

Design Code

- ASME B31.4 (STANDARD)
- ASME SECTION VIII, DIVISION 1
- ASME B31.8
- ASME B31.3

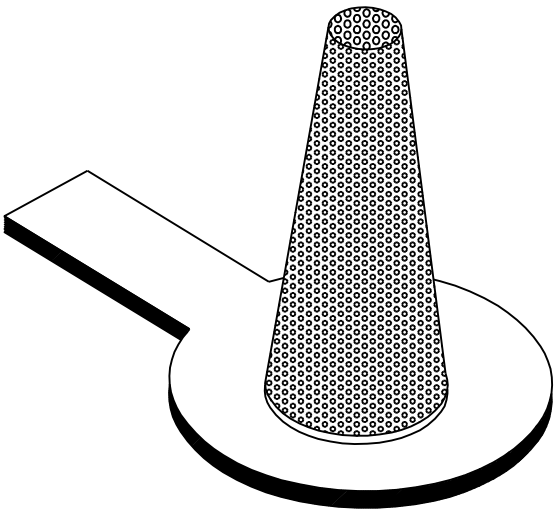
External Coating

- SHOP PRIMER – STANDARD
- CUSTOMER SPECIFICATIONS

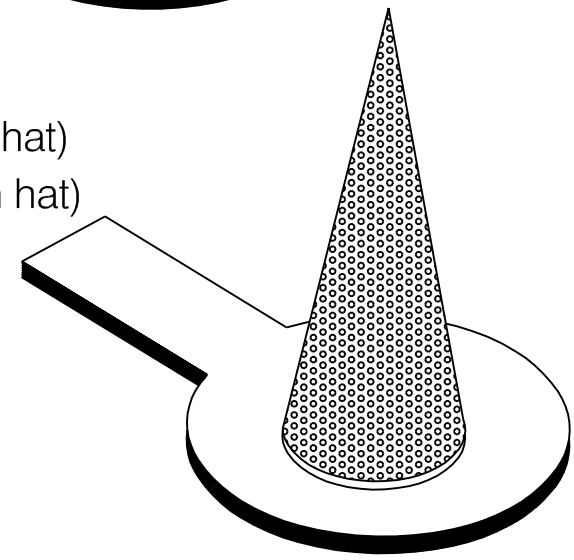
AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

TEMPORARY STRAINERS



CONE STRAINER - (witches hat)
BASKET STRAINER- (pilgrim hat)
FLAT TYPE
COMPRESSOR SUCTION
TYPE IR-11
TYPE "R"



REV.: 3 01/27/09

DWG. NO.: CATTMPCV.DWG

STRAINERS

THE PROBLEM WITH UNWANTED MATERIAL IN PIPELINES IS A NEVER ENDING ONE. WHETHER THE FLOWING MATERIAL IS WATER, OIL, GAS, PAINT OR A VARIETY OF FOOD OR CHEMICAL PRODUCTS, THERE IS OFTEN PRESENT UNWANTED MATTER THAT CAN CAUSE SERIOUS PROBLEMS. DIRT, FOREIGN MATTER OR EVEN CLUMPS OF THE PRODUCT ITSELF, CAN CLOG OR DAMAGE SPRAY NOZZLES, PUMPS, TURBINE METERS, OR SIMILAR EQUIPMENT.

STRAINERS ARE A SOLUTION TO THESE PROBLEMS. THEY PREVENT THE PASSAGE OF UNWANTED MATTER IN THE LINE THAT COULD CAUSE DAMAGE OR EVEN RUIN THE PRODUCT ITSELF.

WHEN COMPARED TO THE COST OF REPLACING DAMAGED PUMPS, METERS, ETC., STRAINERS ARE AN INEXPENSIVE INSURANCE POLICY.

STRAINERS ARE WIDELY USED IN THE FOLLOWING INDUSTRIES:

TANK CARS AND TRUCK	PAINT,INK, LATEX
CERAMICS	PULP & PAPER
CHEMICALS	PETROLEUM REFINING
ELECTRIC POWER	PHARMACEUTICAL
FOOD PROCESSING	PROCESS EQUIPMENT
MARINE	WASTE & WATER TREATMENT
TURBINE METER SERVICE	COMPRESSOR STATIONS
PIPE LINE	CO-GENERATION

SPECIFICATION SHEET

TEMPORARY STRAINER

SPECIFICATION DATA

STRAINER TYPE: _____BASKET _____CONE

QUANTITY_____ LINE SIZE_____

RATING_____

FS_____

RTS_____

PERCENTAGE OF OPEN AREA: _____100 _____150 _____200

_____300 _____OTHER

MATERIAL SPECIFICATION

RING:_____ CARBON STEEL _____304 S.S. _____316 S.S. _____OTHER

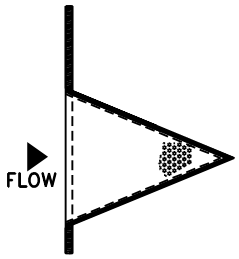
PERFORATED METAL: _____CARBON STEEL _____304 S.S. _____316 S.S. _____OTHER

MESH: _____X_____ WIRE DIAMETER_____

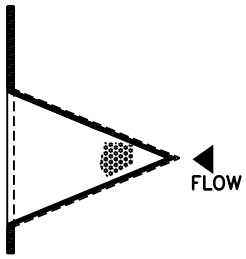
WIDTH OF OPENING _____ _____CARBON STEEL _____304 S.S

_____316 S.S. _____ INSIDE _____OUTSIDE

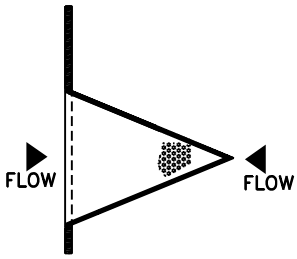
TEMPORARY "START-UP" STRAINERS



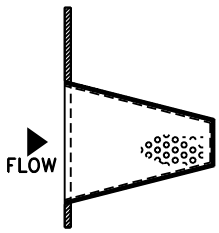
CONE TYPE WITH MESH INSIDE



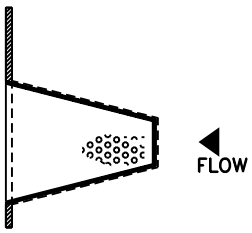
CONE TYPE WITH MESH OUTSIDE



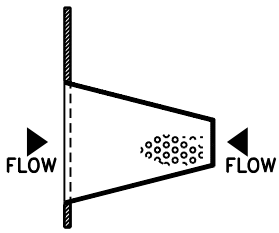
CONE TYPE PERFORATED



BASKET TYPE WITH MESH INSIDE

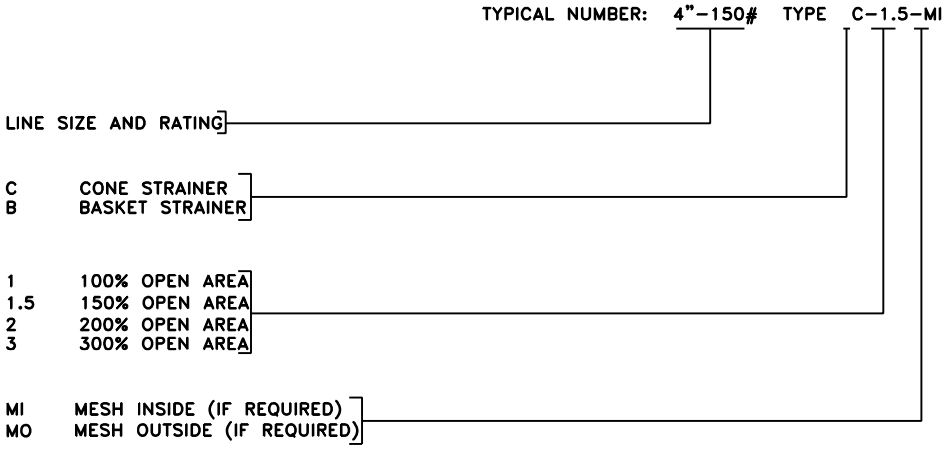


BASKET TYPE WITH MESH OUTSIDE



BASKET TYPE PERFORATED

MODEL NUMBERS FOR AITKEN TEMPORARY STRAINERS



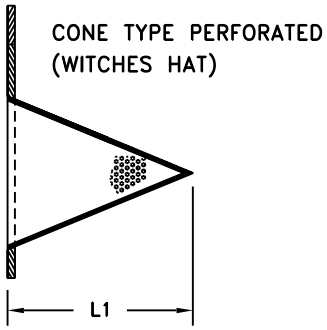
SPECIFICATIONS

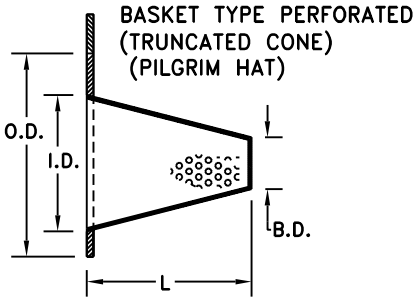
1. OPEN AREA: RANGE IN OPEN AREA OF STRAINER TO CROSS SECTIONAL AREA OF THE PIPE 100% AND UP.
2. STANDARD PERFORATED MATERIAL THICKNESS: 16 GA. (UP TO 18"), 14 GA. (20" AND ABOVE. FLANGE RINGS 14 GA. (UP TO 8"), 11 GA. (10" AND UP). HEAVIER GAUGE AVAILABLE FOR PERFORATED AND/OR RINGS.
3. PERFORATION: HOLE SIZES 1/16" AND UP. (SEE FOLLOWING PAGES)
4. MATERIAL: CARBON STEEL, STAINLESS STEEL, MONEL.
5. FLANGE FACINGS: RAISED FACE AND RTJ AVAILABLE.
6. LINERS/COVERS: 10 MESH AND UP. (SEE FOLLOWING PAGES) - STD MESH IS 304SS.
7. DIMENSIONAL DATA: SEE FOLLOWING PAGES.

SPECIAL 3-PLY COMPRESSOR SUCTION STRAINERS ARE ALSO AVAILABLE.

AITKEN STRAINER DIMENSIONS

FLANGE DIMENSIONS						
NOMINAL PIPE SIZE	I.D.	O.D.				
		150#	300#	600#	900#	1500#
1 1/2"	1.250"	3.250"	3.625"	3.625"	3.750"	3.750"
2"	1.750"	4.000"	4.250"	4.250"	5.500"	5.500"
2 1/2"	2.250"	4.750"	5.000"	5.000"	6.375"	6.375"
3"	2.750"	5.250"	5.750"	5.750"	6.500"	6.750"
4"	3.750"	6.750"	7.000"	7.500"	8.000"	8.125"
5"	4.625"	7.625"	8.375"	9.375"	9.625"	9.875"
6"	5.375"	8.625"	9.750"	10.375"	11.250"	11.000"
8"	7.375"	10.875"	12.000"	12.500"	14.000"	13.750"
10"	9.375"	13.250"	14.125"	15.625"	17.000"	17.000"
12"	11.000"	16.000"	16.500"	17.875"	19.500"	20.375"
14"	12.250"	17.375"	19.000"	19.000"	20.375"	22.625"
16"	14.000"	20.125"	21.125"	21.875"	22.500"	
18"	15.750"	21.250"	23.375"	23.750"	25.000"	
20"	17.500"	23.500"	25.625"	26.625"		
24"	21.250"	27.875"	30.375"	30.875"		
30"	28.125"	34.375"	37.125"	37.875"		





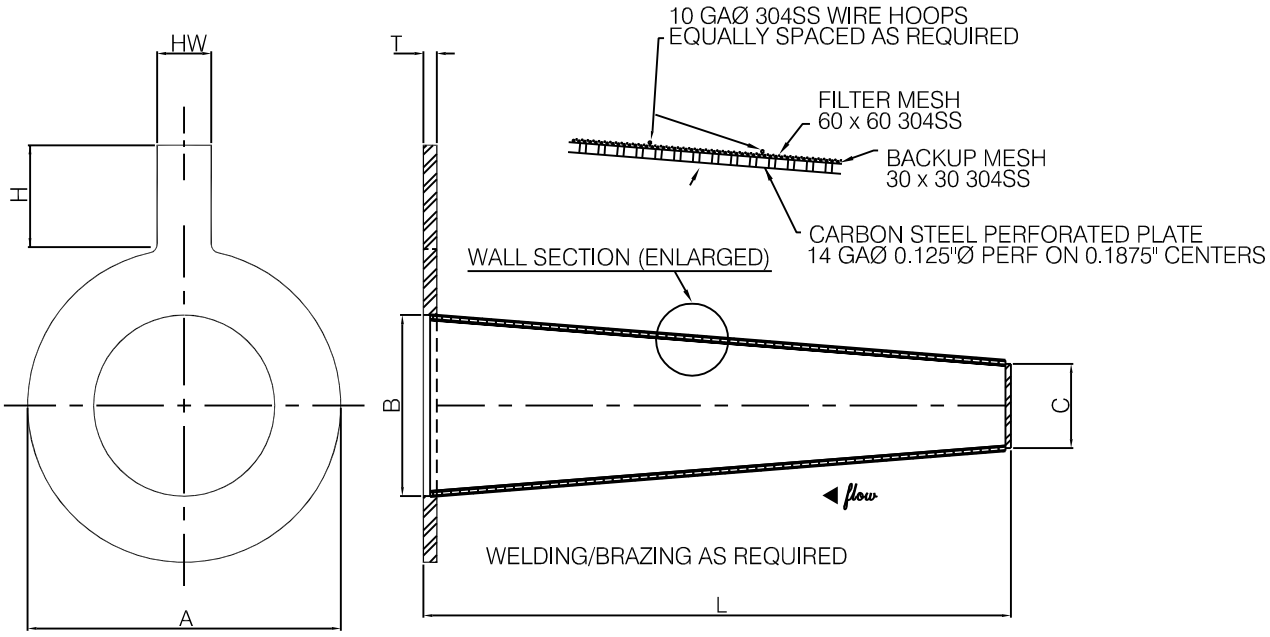
CONE LENGTH "L1"					BASKET LENGTH "L"				
NOMINAL PIPE SIZE	100% C-1	150% C-1.5	200% C-2	300% C-3	NOMINAL PIPE SIZE	100% B-1	150% B-1.5	200% B-2	300% B-3
1 1/2"	3.500"	4.500"	6.000"	9.000"	1 1/2"	2.000"	2.500"	3.500"	5.000"
2"	4.000"	6.000"	8.000"	11.000"	2"	2.500"	3.000"	4.000"	6.000"
2 1/2"	4.000"	6.000"	8.000"	11.000"	2 1/2"	2.500"	3.000"	4.500"	6.000"
3"	5.000"	7.000"	9.000"	13.000"	3"	3.000"	4.500"	6.000"	8.000"
4"	8.000"	10.000"	12.000"	18.000"	4"	4.000"	5.000"	7.000"	11.000"
5"	8.000"	11.000"	14.000"	22.000"	5"	4.500"	7.000"	9.000"	14.000"
6"	9.000"	13.000"	18.000"	25.000"	6"	5.500"	8.000"	11.000"	17.000"
8"	12.000"	17.000"	23.000"	33.000"	8"	7.000"	11.000"	14.000"	21.000"
10"	14.000"	21.000"	28.000"	41.000"	10"	8.000"	13.000"	17.000"	26.000"
12"	16.000"	25.000"	34.000"	49.000"	12"	10.000"	15.000"	20.000"	31.000"
14"	18.000"	27.000"	36.000"	53.000"	14"	10.000"	16.000"	22.000"	33.000"
16"	21.000"	31.000"	40.000"	61.000"	16"	12.000"	19.000"	24.000"	37.000"
18"	24.000"	35.000"	46.000"	68.000"	18"	14.000"	21.000"	27.000"	41.000"
20"	26.000"	38.000"	51.000"	76.000"	20"	16.000"	24.000"	31.000"	48.000"
24"	31.000"	45.000"	61.000"	90.000"	24"	18.000"	28.000"	37.000"	57.000"
30"	38.000"	57.000"	76.000"	114.000"	30"	22.000"	34.000"	46.000"	71.000"
36"	46.000"	68.000"	91.000"	130.000"	36"	27.000"	42.000"	58.000"	85.000"

NOTES:

1. STANDARD PERFORATED MATERIAL THICKNESS: 16 GA. (UP TO 18"), 14 GA. (20" AND ABOVE). FLANGE RINGS 14 GA. (UP TO 8"), 11 GA. (10" AND UP). HEAVIER GAUGE AVAILABLE FOR PERFORATED AND/OR RINGS.
2. SPECIAL LENGTHS ARE AVAILABLE.
3. B.D. EQUALS 1/2 THE NOMINAL PIPE SIZE.

AITKEN IR11 COMPRESSOR SUCTION STRAINER

FOR RAISED FACE FLANGES. RING JOINT FLANGE COMPATIBLE STRAINERS ARE AVAILABLE.



NOMINAL PIPE SIZE	CLASS 150 A	CLASS 300 A	CLASS 600 A	B	C	HW	H	L	# HOOPS	T
2"	4"	4.25"	4.25"	1.4375"	0.875"	1"	4"	5"	0	0.125"
2.5"	4.75"	5"	5"	1.625"	0.875"	1"	4"	6.25"	0	0.125"
3"	5.25"	5.75"	5.75"	2.125"	1.125"	1"	4"	7.5"	1	0.125"
3.5"	6.25"	6.37"	6.25"			1"	4"			0.125"
4"	6.75"	7"	7.5"	3"	1.5"	1"	4"	9"	1	0.125"
6"	8.62"	9.75"	10.38"	4.75"	2.375"	1.5"	6"	13"	2	0.1875"
8"	10.88"	12"	12.5"	6.625"	3.3125"	1.5"	6"	16.25"	3	0.25"
10"	13.25"	14.12"	15.62"	8.25"	4.125"	1.5"	6"	20.25"	4	0.25"
12"	16"	16.5"	17.88"	9.875"	4.9375"	1.5"	6"	24"	4	0.25"
14"	17.62"	19"	19.25"	10.875"	5.4375"	1.5"	6"	27"	5	0.25"
16"	20.12"	21.12"	22.12"	12.5"	6.25"	1.5"	6"	32"	5"	0.25"
18"	21.5"	23.38"	24"	14.125"	7.0625"	1.5"	6"	36"	6	0.375"
20"	23.75"	25.62"	26.75"	15.75"	7.875"	1.5"	6"	40"	6	0.375"
24"	28.12"	30.38"	31"	19"	9.5"	1.5"	6"	48"	7	0.375"

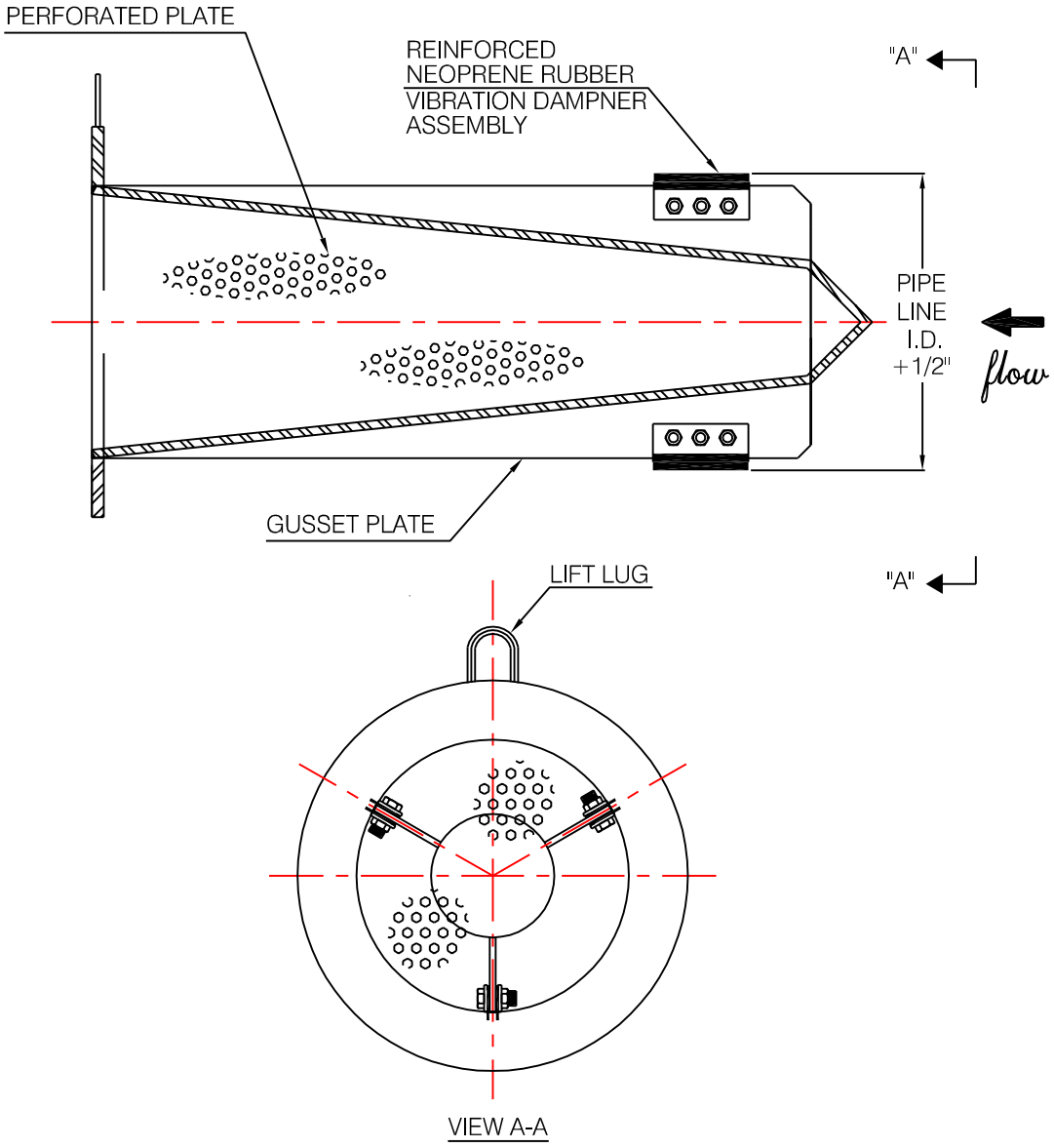
AITKEN IR11 TEMPORARY STRAINER DIMENSIONAL DATA

REV.: 01/25/00

CATIR11.DWG

AITKEN TYPE "R" COMPRESSOR SUCTION STRAINER

FOR RAISED FACE/FLAT FACE FLANGES.

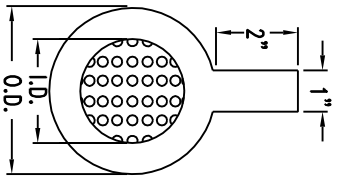


NOTES:

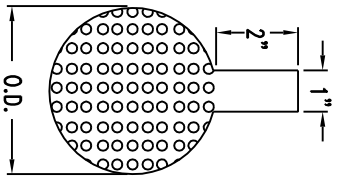
1. AVAILABLE IN CARBON STEEL AND STAINLESS STEEL.
2. VARIOUS PERFORATIONS AND MESH AVAILABLE TO SUIT PROCESS REQUIREMENTS.
3. DESIGN ABILITY FOR CUSTOMER SPECIFIED COLLAPSE AND DIFFERENTIAL PRESSURE. CUSTOMER TO ADVISE COLLAPSE REQUIREMENT AND OPEN AREA REQUIREMENT.
4. CUSTOMER TO ADVISE PIPELINE I.D. AND WALL THICKNESS.

FLAT STRAINERS AND RING JOINT FACINGS

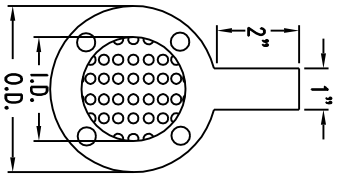
TEMPORARY FLAT STRAINERS



FLAT WITH RING
(MODEL FWR)



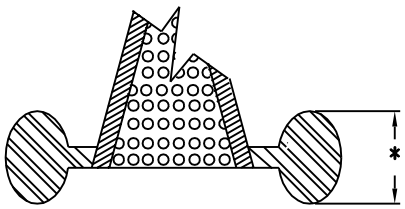
FLAT ALL PERFORATED
(MODEL FAP)



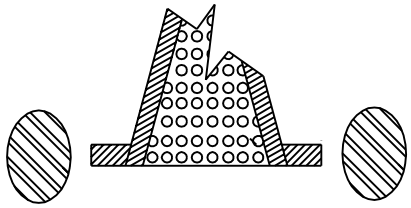
FLAT FACE WITH RING
(MODEL FFWR)

SEE CONE / BASKET DIMENSIONS FOR O.D. / I.D. DIMENSIONS

STRAINER FOR RING JOINT FACINGS



INTEGRAL 560 RING



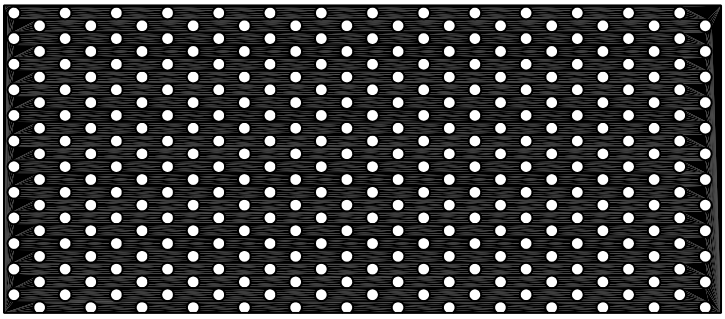
INSIDE FIT
(MODEL RTJ IF)

*THICKNESS EXCEEDS STANDARD RING DIMENSIONS.

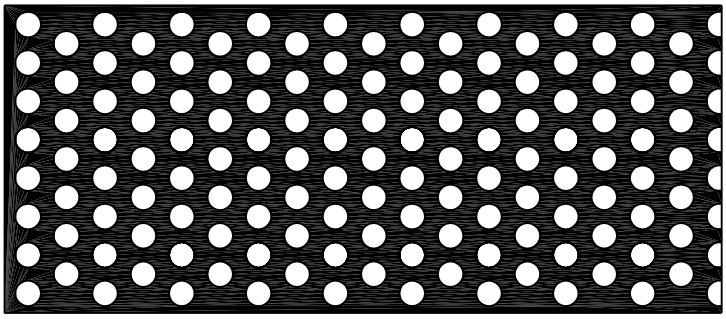
BOLT-IN INDICATOR TABS COME WITH RABBETTED TYPE STRAINERS

FOR RTJ COMPRESSOR STRAINERS WITH 3/16" OR 1/4" THICK RINGS, THE AITKEN RTJ-I RING AND GASKET IS MADE OF ONE PIECE.

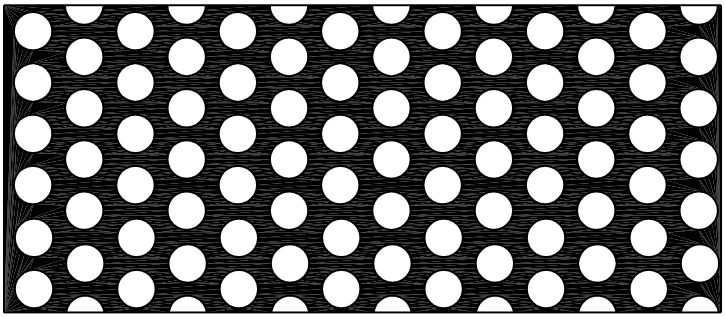
BASE MATERIALS FOR STRAINERS



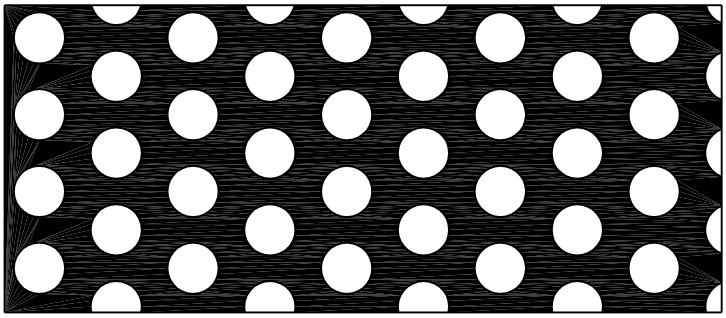
1/16"ø on 1/8" ctrs.



1/8"ø on 3/16" ctrs.



3/16"ø on 1/4" ctrs.



1/4"ø on 3/8" ctrs.

PERFORATED MATERIALS

Gage	Perforation	Holes/sq. in.	% of Open Area	Material Range
20	1/16"ø on 1/8" ctrs.	74.0	22.7%	Carbon Steel, 304SS, 316SS
16	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel, 304SS, 316SS 304L, 316L, Monel
16	3/16"ø on 1/4" ctrs.	18.5	51.0%	Carbon Steel, 304SS, 316SS
16	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS
14	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel, 304SS, 316SS
14	3/16"ø on 1/4" ctrs.	18.5	51.0%	Carbon Steel, 304SS, 316SS
14	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS
12	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel
11	1/8"ø on 3/16" ctrs.	33.0	40.3%	304SS, 316SS
11	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS

OTHER PERFORATIONS AVAILABLE UPON REQUEST.

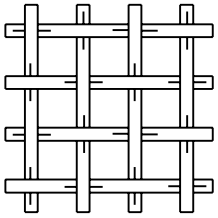
Rev. 0, 6/4/98

Dwg. No.: NCatperfs

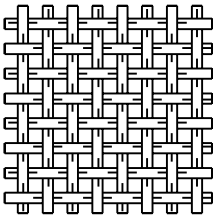
WIRE MESH TYPE BASE MATERIAL
(Available From Stock)

Mesh	Wire Diameters		Width of Opening		% of Opening	Material Range
	in.	mm.	in.	mm.		
2	.063	1.6	.437	11.10	76.4%	Carbon Steel, 304SS, 316SS
3	.063	1.6	.270	6.86	65.5%	Carbon Steel, 304SS, 316SS
4	.063	1.6	.187	4.75	56.0%	Carbon Steel, 304SS, 316SS
5	.063"	1.6	.137	3.48	46.9%	Carbon Steel, 304SS, 316SS
6	.047	1.19	.120	3.50	51.8%	Carbon Steel, 304SS, 316SS
8	.047	1.19	.078	1.98	38.9%	Carbon Steel, 304SS, 316SS

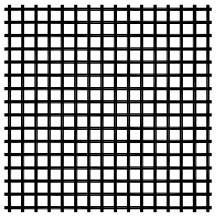
OTHER SIZES AND MATERIALS AVAILABLE UPON APPLICATION.



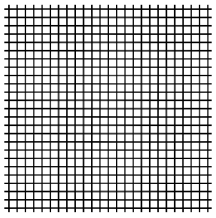
4 Mesh
.072



8 Mesh
.047



10 Mesh
.025



20 Mesh
.016

WIRE MESH LINER MATERIAL
(Available From Stock)

Mesh	Wire Diameters		Width of Opening		% of Opening	Material Range
	in.	mm.	in.	mm.		
10	.025	.640	.075	1.91	56.3%	304SS, 316SS
20	.016	.406	.034	.86	46.2%	304SS, 316SS
30	.013	.330	.020	.52	37.1%	304SS, 316SS
40	.010	.254	.015	.38	36.0%	304SS, 316SS
50	.009	.229	.011	.28	30.3%	304SS, 316SS
60	.0075	.191	.009	.23	30.5%	304SS, 316SS
80	.0055	.140	.007	.19	31.4%	304SS, 316SS
100	.0045	.114	.006	.14	30.3%	304SS, 316SS

OTHER SIZES AND MATERIALS AVAILABLE UPON APPLICATION.

TYPE "C" CONE STRAINER

PRESSURE DROP OF CLEAN VS. WATER FLOW RATE

COLUMN 1 UNDER EACH PIPE SIZE=100% OPEN AREA/COLUMN 2=200% OPEN AREA

FLOW RATE GPM	2"		3"		4"		6"		8"		10"		12"		14"		16"		18"		20"	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
100	3.7	3																				
200	17	11	2.4	2.1	1.2	1.1																
300	40	24	6	4.5	2.9	2.5																
400	72	40	12	8	5.4	4.2																
500		60	18	12	9	6.2																
600		83	27	17	14	8.8	1.2	1.1														
700			37	23	18	13	1.7	1.6														
800			50	28	25	16	2.3	2														
900			65	35	32	18	2.9	2.5	1.1	1.1												
1000			80	43	40	24	3.6	3	1.5	1.4												
2000						82	17	11	6.1	3.7	2	1.8										
3000							39	24	16	10	4.9	3.9	2.1	2	1.6	1.5						
4000							72	40	29	18	9	6.6	4	3.5	2.8	2.4	1.7	1.5				
5000								60	45	26	16	10	6.5	5.1	4.6	3.7	2.5	2.3	1.5	1.4		
6000								73	68	37	22	14	9.5	7.1	7	5	3.8	3.1	2.2	1.9	1.5	1.3
7000									95	49	31	19	15	9.5	9.5	6.9	5.2	4.1	3	2.6	1.9	1.9
8000										75	41	24	19	12	14	9	7	5.2	4	3.2	2.7	2.3
9000											52	29	24	16	17	12	9	6.7	5.2	4	3.3	2.8
10000											68	35	30	19	21	14	12	8	6.6	5	4.2	3.4

CORRECTION FACTOR:
FOR LIQUIDS MORE VISCOUS THAN WATER OR WHERE WIRE CLOTH LINER IS ADDED MULTIPLY PRESSURE DROP IN CHARTS BY:

VISCOSITY (SSU)	PERFORATED (1/8" HOLES)	PERFORATED W/WIRE CLOTH		
		40 MESH	60 MESH	80 MESH
30	1.00	1.32	1.53	1.62
270	1.30	1.61	1.83	2.00
385	1.44	1.76	2.00	2.20
500	1.58	1.92	2.13	2.41
1000	1.66	2.22	2.41	2.63
2000	1.86	2.41	2.72	2.91

TYPE "B" BASKET STRAINER

PRESSURE DROP OF CLEAN VS. WATER FLOW RATE

COLUMN 1 UNDER EACH PIPE SIZE=100% OPEN AREA/COLUMN 2=200% OPEN AREA

FLOW RATE GPM	2"		3"		4"		6"		8"		10"		12"		14"		16"		18"		20"	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
100	3.2	2.7	2.1	1.7																		
200	15	12	4.8	3.8	1.1																	
300	32	27	9	7	2.5	1.9																
400	58	46	15	12	4.5	3.5																
500	91	72	21	17	7.1	5.6																
600			29	23	11	8	1.2															
700			38	30	15	12	1.6	1.2														
800			47	37	19	16	2	1.7														
900			60	46	25	19	2.6	2	1													
1000					31	25	3.2	2.5	1.2													
2000							14	11	5	3.7	1.8	1.5										
3000							31	25	12	9	4.2	3.3	1.9	1.6	1.4	1						
4000							56	45	21	17	7.7	6	3.5	2.8	2.5	2	1.5	1.1				
5000							91	70	33	26	13	9.3	5.6	4.5	3.9	3	2.2	1.8	1.3	1		
6000									48	38	18	15	8.1	6.3	5.6	4.2	3.3	2.5	1.9	1.5	1.2	1
7000									68	50	25	19	11	8.8	8	6	4.5	3.4	2.6	2	1.8	1.4
8000									88	68	32	25	16	12	11	8	6	4.5	3.4	2.7	2.2	1.8
9000										85	41	32	19	16	13	10	7.3	5.8	4.4	3.3	2.8	2.2
10000											50	39	23	19	17	13	9.3	7	5.5	4.1	3.5	2.7

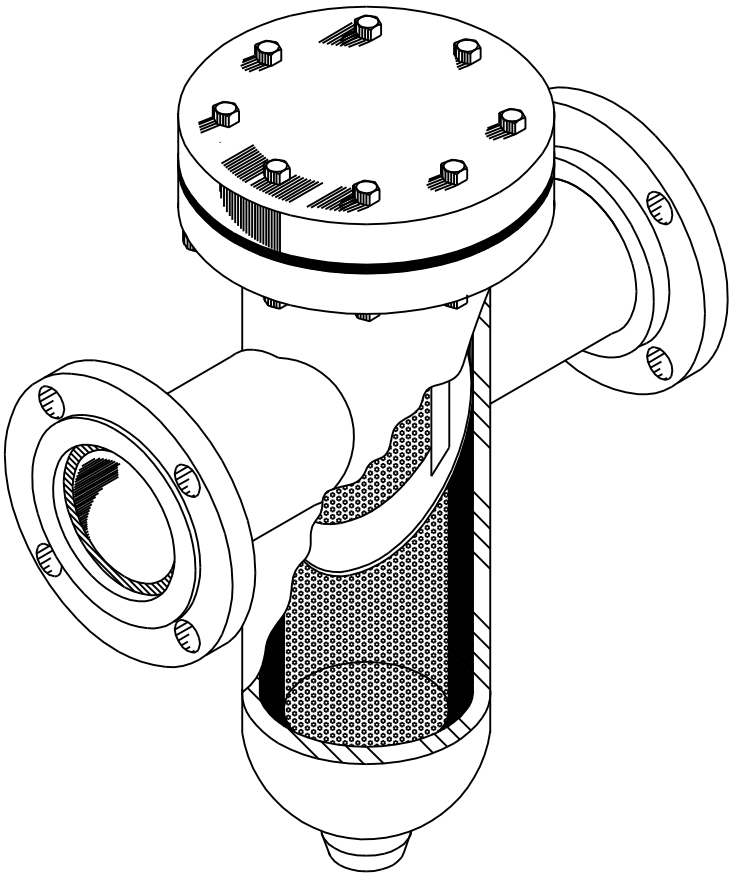
CORRECTION FACTOR:
FOR LIQUIDS MORE VISCOUS THAN WATER OR WHERE WIRE CLOTH LINER IS ADDED MULTIPLY PRESSURE DROP IN CHARTS BY:

VISCOSITY (SSU)	PERFORATED (1/8" HOLES)	PERFORATED W/WIRE CLOTH		
		40 MESH	60 MESH	80 MESH
30	1.00	1.32	1.53	1.62
270	1.30	1.61	1.83	2.00
385	1.44	1.76	2.00	2.20
500	1.58	1.92	2.13	2.41
1000	1.66	2.22	2.41	2.63
2000	1.86	2.41	2.72	2.91

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

FABRICATED VERTICAL BASKET STRAINERS



Standard and Super Design
Slant Top Basket
Flat Top Basket
Turbine Meter Design

REV.: 5 01/27/09

DWG NO.: CATVBS

STRAINERS

THE PROBLEM WITH UNWANTED MATERIAL IN PIPELINES IS A NEVER ENDING ONE. WHETHER THE FLOWING MATERIAL IS WATER, OIL, GAS, PAINT OR A VARIETY OF FOOD OR CHEMICAL PRODUCTS, THERE IS OFTEN PRESENT UNWANTED MATTER THAT CAN CAUSE SERIOUS PROBLEMS. DIRT, FOREIGN MATTER OR EVEN CLUMPS OF THE PRODUCT ITSELF, CAN CLOG OR DAMAGE SPRAY NOZZLES, PUMPS, TURBINE METERS, OR SIMILAR EQUIPMENT.

STRAINERS ARE A SOLUTION TO THESE PROBLEMS. THEY PREVENT THE PASSAGE OF UNWANTED MATTER IN THE LINE THAT COULD CAUSE DAMAGE OR EVEN RUIN THE PRODUCT ITSELF.

WHEN COMPARED TO THE COST OF REPLACING DAMAGED PUMPS, METERS, ETC., STRAINERS ARE AN INEXPENSIVE INSURANCE POLICY.

STRAINERS ARE WIDELY USED IN THE FOLLOWING INDUSTRIES:

TANK CARS AND TRUCKS	**PAINT, INK, & LATEX**
CERAMICS	**PULP & PAPER**
CHEMICALS	**PETROLEUM REFINING**
ELECTRIC POWER	**PHARMACEUTICAL**
FOOD PROCESSING	**PROCESS EQUIPMENT**
MARINE	**WASTE & WATER TREATMENT**
TURBINE METER SERVICE	**COMPRESSOR STATIONS**
PIPE LINE	**CO-GENERATION**

AITKEN VERTICAL BASKET STRAINER

MODEL VBS

STANDARD STRAINER: THE STRAINER MOST WIDELY ACCEPTED BY ALL TYPE OF INDUSTRY. THE STANDARD STRAINER DESIGN MAKES IT THE MOST ECONOMICAL STYLE STRAINER. MINIMUM OPEN AREA RATIO IS 3:1.

SUPER STRAINER: THE SUPER STRAINER'S LARGER BODY AND BASKET DESIGN ALLOWS FOR MORE REMOVABLE CAPACITY AND LESS FREQUENT CLEAN OUT INTERVALS. MINIMUM OPEN AREA RATIO IS 4:1.

MATERIAL SPECIFICATIONS: STANDARD MATERIAL OF CONSTRUCTION IS CARBON STEEL. BASKET MATERIAL IS SPECIFIED BY THE CUSTOMER.

OTHER MATERIALS AVAILABLE IN:

1 1/4 CR - 1/2 MO
5 CR - 1/2 MO
9 CR - 1 MO
304/304L SS
316/316L SS
MONEL

OTHER ALLOYS-REVIEWED ON AN INDIVIDUAL BASIS.

DIMENSIONAL DATA: SEE FOLLOWING PAGES.

PRESSURE DROP INFORMATION SEE PRESSURE DROP CHARTS.

RECOMMENDED SPARE PARTS:

1.) BASKET
2.) GASKETS FOR ACCESS OPENING
3.) O-RINGS FOR QUICK OPENING ACCESS CLOSURES

OPTIONS:

1.) QUICK OPENING CLOSURES.
2.) PRESSURE TAP CONNECTIONS
3.) VENTS
4.) CONTINUOUS SLOT-OPENING WEDGE WIRE BASKET
5.) DAVIT FOR ACCESS BLIND FLANGE
6.) FLAT TOP BASKET FOR OFFSET NOZZLES
7.) SELF FLUSHING BLOWDOWN BASKET
8.) TURBINE METER STRAINER
9.) LEGS / SKIRT

DESIGN CODE(s) / STANDARDS:

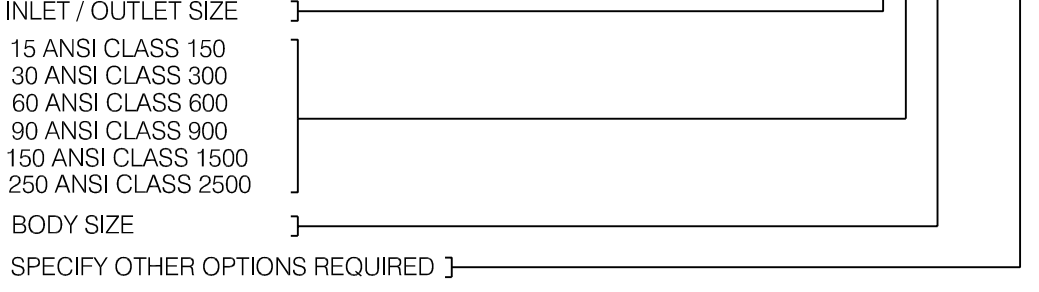
STANDARD DESIGN AND FABRICATION PER ASME B31.3
OTHER CODES AVAILABLE ARE:
A.S.M.E. 31.1
A.S.M.E. B31.4
A.S.M.E. B31.8
A.S.M.E. PRESSURE VESSEL AND BOILER CODE, SECTION VIII, DIV. 1.
D.O.T.
N.A.C.E.
M.D.M.T. REQUIRED FOR A.S.M.E. B31.3 AND SECTION VIII DESIGN.

PAINT/COATINGS: PROVIDED WITH EXTERNAL SP-3 MECHANICAL TOOL CLEANING AND ONE COAT OF SHOP PRIMER OR AS SPECIFIED BY CUSTOMER.

NDE PER APPLICABLE CODE AND / OR CUSTOMER SPECIFICATIONS.

MODEL NUMBER FOR AITKEN VERTICAL BASKET STRAINERS

TYPICAL MODEL NUMBER: 615-10-VBS-X



SPECIFICATION SHEET

VERTICAL BASKET STRAINER

MANUFACTURING AND DESIGN CODE

_____B31.1 _____B31.3 _____B31.4 _____B31.8 _____ASME SECTION VII, DIV.1

"U" STAMP __YES __NO DESIGN TEMP._____^{O}F DESIGN PRESSURE_____PSIG

CORROSION ALLOWANCE_____ STRESS RELIEF __YES __NO MDMT_____^{O}F

RADIOGRAPHY_____ OTHER NDE_____

COVER ASSEMBLY _____BLIND FLANGE _____BLIND FLANGE W/DAVIT

_____ QUICK OPENING _____OTHER

INLET CONN. SIZE & RATING_____ OUTLET CONN. SIZE & RATING_____

PAINT:_____SHOP PRIMER OTHER_____

BI-DIRECTIONAL FLOW __YES __NO DUPLEX ASSEMBLY __YES __NO

SPECIFICATION DATA

QUANITITY_____ LINE SIZE_____ FLOW RATE_____ OPERATING TEMP_____^{O}F

OPERATING PRESSURE_____PSIG FLUID_____VISCOSITY_____cP OPERATING

SPECIFIC GRAVITY_____@ OPERATING MAXIMUM ΔP CLEAN_____PSIG

MATERIAL SPECIFICATION

STRAINER BODY:_____CARBON STEEL _____304 S.S. _____316 S.S. _____OTHER

STRAINER BASKET: PERFORATED METAL_____GA. OR_____" THICK

HOLE DIAMETER_____" ON _____CENTERS

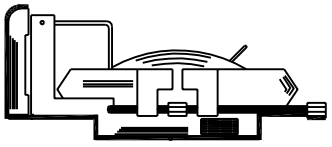
OTHER_____

__CARBON __304 S.S. __316 S.S. _____OTHER

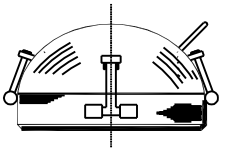
MESH: _____X_____ WIRE DIAMETER_____ WIDTH OF OPENING_____

_____CARBON STEEL _____304 S.S. _____316 S.S.

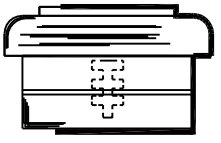
STRAINER OPTIONS



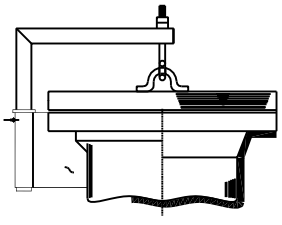
DOUBLE - BOLT CLOSURE



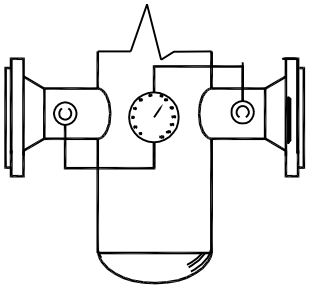
T - BOLT CLOSURE



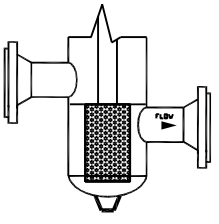
THREADED CLOSURE



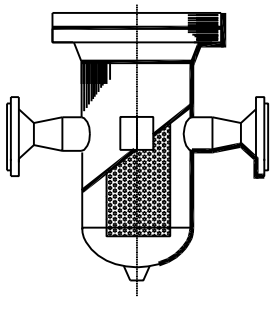
DAVIT FOR BLIND FLANGE



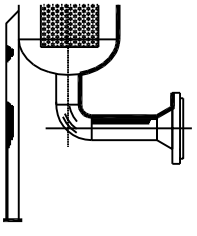
DIFFERENTIAL PRESSURE CONNECTIONS



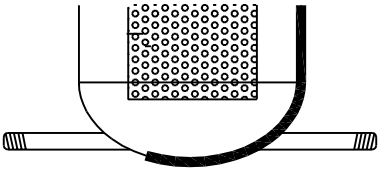
OFFSET NOZZLES



TURBINE METER STRAINER



LEG OR SKIRT W/ BOTTOM DRAIN



SIDE DRAIN

NOTE:

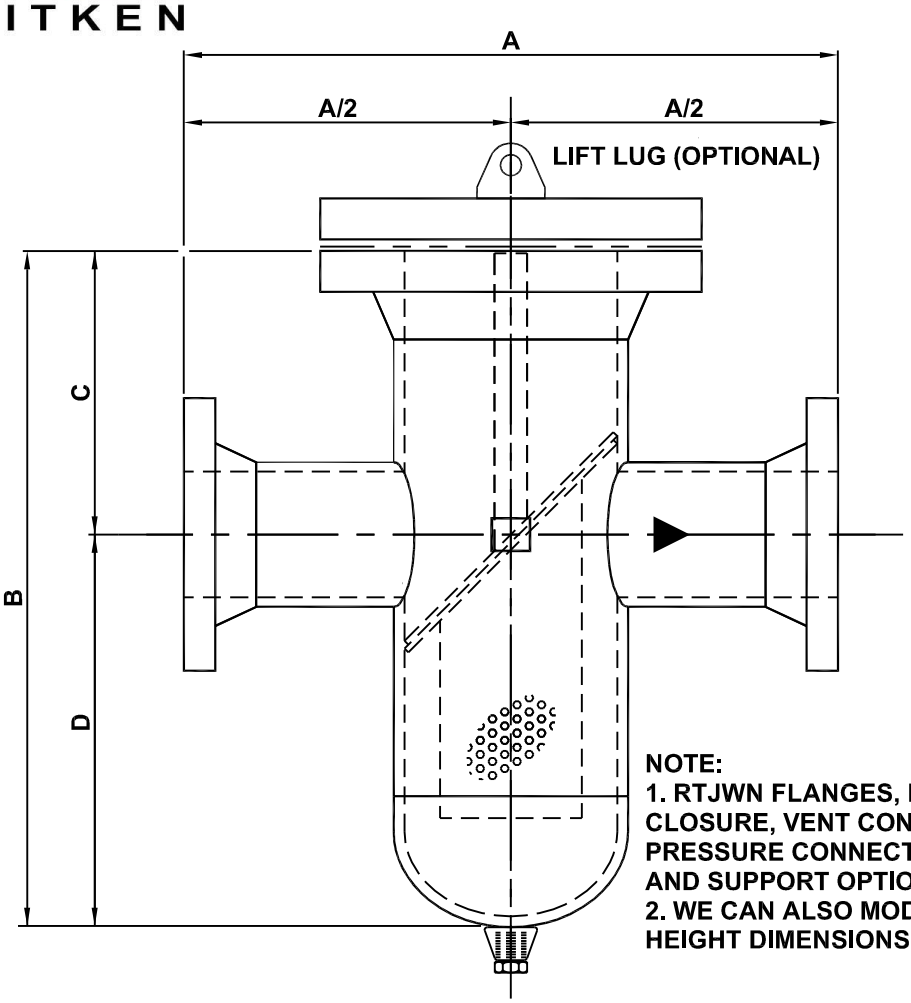
1. MODIFICATION OF BASKETS FOR BI-DIRECTIONAL FLOW AVAILABLE.
2. CUSTOM OPTIONS AVAILABLE UPON REQUEST.

REV. NO.: 2 01/06/03

DRW NO.: STR-OPT.

AITKEN VERTICAL BASKET STRAINER

MODEL VBS STANDARD



NOTE:
1. RTJWN FLANGES, DAVIT ARM, QUICK OPENING CLOSURE, VENT CONNECTIONS, DIFFERENTIAL PRESSURE CONNECTIONS, FLANGED DRAIN, AND SUPPORT OPTIONS ARE ALSO AVAILABLE.
2. WE CAN ALSO MODIFY THE FACE TO FACE AND HEIGHT DIMENSIONS OF THE STRAINER.

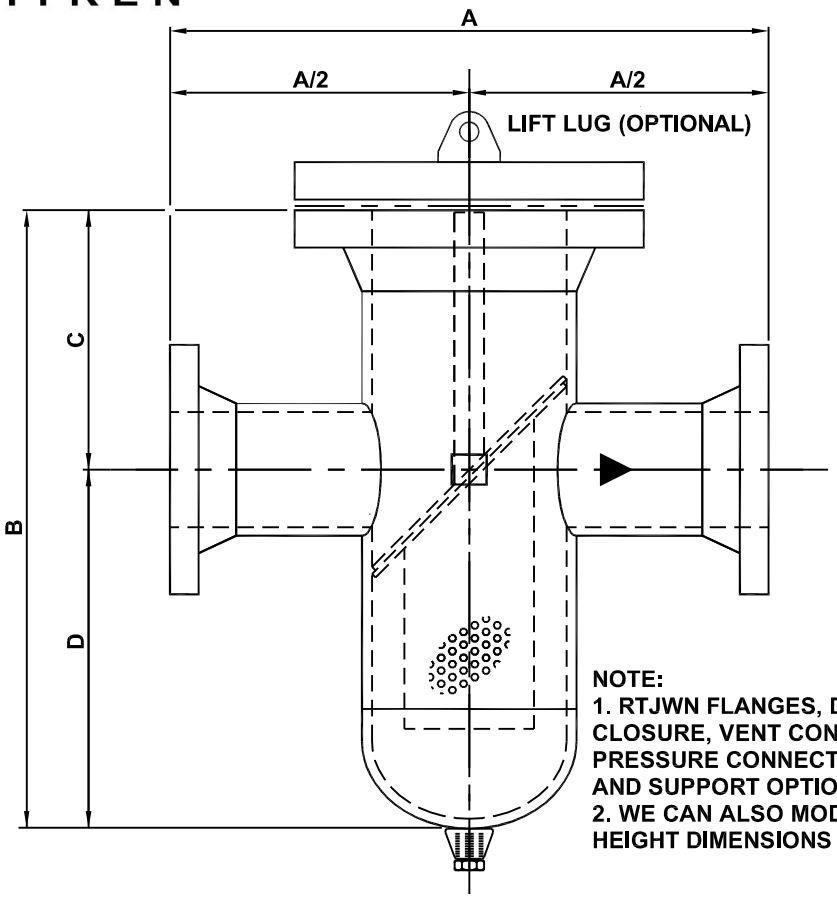
DIMENSIONAL DATA

NOZZLE SIZE (NPS)	VESSEL SIZE (NPS)	A	* B	C	D	** OPEN AREA	DRAIN SIZE	WEIGHTS (LBS)		
								CLASS 150	CLASS 300	CLASS 600
2"	4"	19"	17"	9"	8"	589%	0.75"	70	100	135
2"	6"	22"	21"	9"	12"	1288%	0.75"	120	180	245
3"	6"	22"	21"	9"	12"	584%	0.75"	130	205	270
4"	8"	26"	25"	11"	14"	537%	0.75"	190	310	520
6"	10"	30"	31"	13"	18"	427%	0.75"	290	450	830
8"	12"	36"	36"	15"	21"	393%	1"	480	700	1105
10"	16"	40"	42"	18"	24"	364%	1"	750	1095	2085
12"	18"	43"	49"	20"	29"	350%	1"	940	1380	2825
14"	20"	48"	51"	22"	29"	339%	2"	1140	2155	3550
16"	20"	50"	51"	22"	29"	320%	2"	1235	2275	3985
18"	24"	58"	67"	24"	43"	420%	2"	1534	3345	5450
20"	24"	60"	67"	24"	43"	337%	2"	1860	3615	6645
24"	30"	70"	83"	32"	51"	334%	2"	3465	6093	10115

DIMENSIONS FOR REFERENCE ONLY. CERTIFIED DRAWINGS ARE AVAILABLE WITH ORDER.
*ALSO THE RECOMMENDED CLEARANCE FOR BASKET REMOVAL.
**RATIO OF THE INLET I.D. AREA TO BASKET OPEN AREA.
(OPEN AREA BASED ON CLASS 150 WITH STD PIPE SCHEDULES)
STANDARD DESIGN AND FABRICATION: ASME B31.3. (OTHER CODES AVAILABLE)
LARGER SIZES AND HIGHER ANSI RATINGS ARE ALSO AVAILABLE.

AITKEN VERTICAL BASKET STRAINER

MODEL VBS SUPER



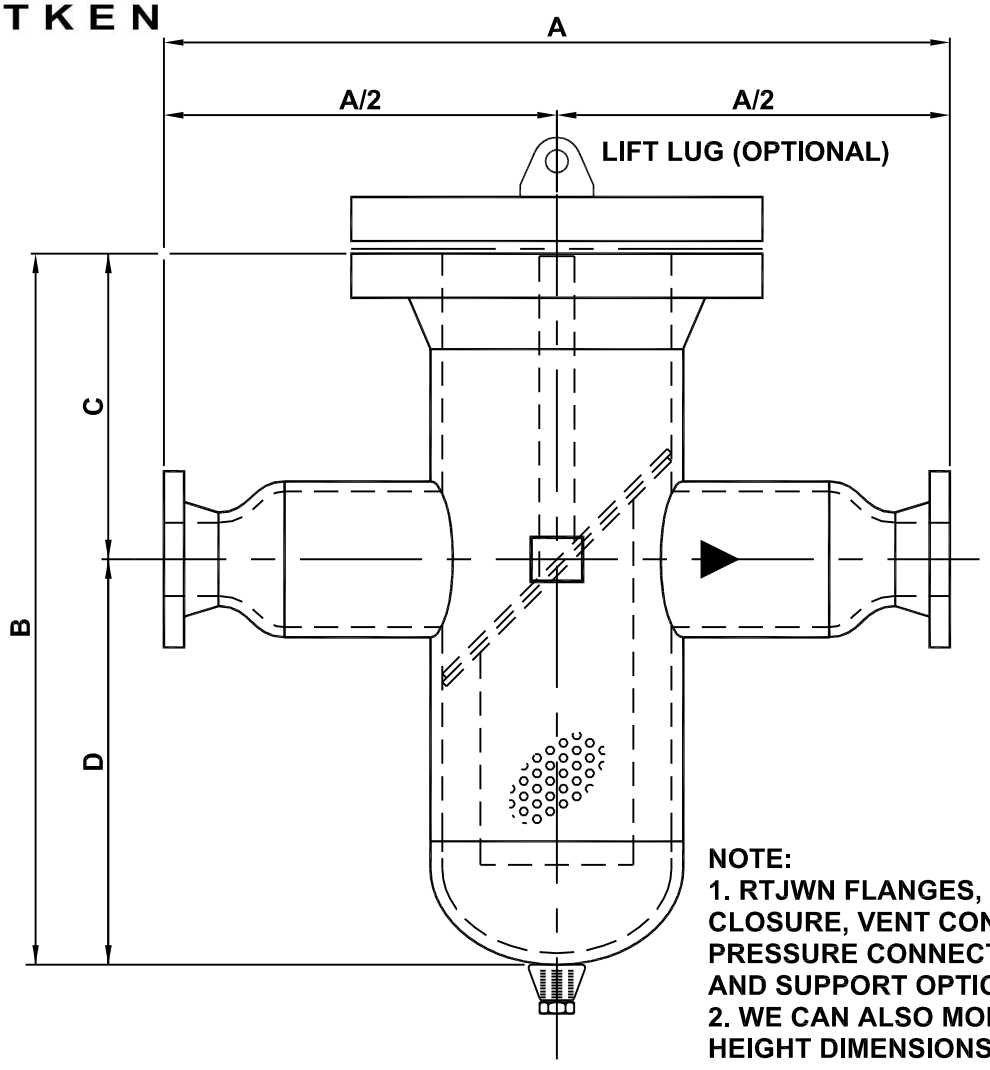
NOTE:
1. RTJWN FLANGES, DAVIT ARM, QUICK OPENING CLOSURE, VENT CONNECTIONS, DIFFERENTIAL PRESSURE CONNECTIONS, FLANGED DRAIN, AND SUPPORT OPTIONS ARE ALSO AVAILABLE.
2. WE CAN ALSO MODIFY THE FACE TO FACE AND HEIGHT DIMENSIONS OF THE STRAINER.

DIMENSIONAL DATA

NOZZLE SIZE (NPS)	VESSEL SIZE (NPS)	A	* B	C	D	** OPEN AREA	DRAIN SIZE	WEIGHTS (LBS)		
								CLASS 150	CLASS 300	CLASS 600
2"	8"	22"	23"	9"	14"	2038%	0.75"	152	215	415
3"	8"	22"	23"	9"	14"	925%	0.75"	168	235	438
4"	10"	26"	29"	11"	18"	970%	0.75"	254	420	705
6"	12"	30"	34"	13"	21"	681%	0.75"	376	650	1045
8"	14"	36"	38"	15"	23"	515%	1"	518	885	1425
8"	16"	36"	39"	15"	24"	574%	1"	604	1025	1910
10"	18"	40"	47"	18"	29"	592%	1"	787	1265	2600
12"	20"	43"	49"	20"	29"	413%	2"	1030	2030	3350
14"	24"	48"	65"	22"	43"	711%	2"	1492	3120	5025
16"	24"	50"	65"	22"	43"	537%	2"	1534	3345	5450
18"	30"	58"	75"	24"	51"	607%	2"	2990	4950	8250
20"	30"	60"	75"	24"	51"	488%	2"	3125	5326	8780
24"	36"	70"	88"	32"	56"	432%	2"	4760	8550	12700

DIMENSIONS FOR REFERENCE ONLY. CERTIFIED DRAWINGS ARE AVAILABLE WITH ORDER.
***ALSO THE RECOMMENDED CLEARANCE FOR BASKET REMOVAL.**
****RATIO OF THE INLET I.D. AREA TO BASKET OPEN AREA.**
(OPEN AREA BASED ON CLASS 150 WITH STD PIPE SCHEDULE)
STANDARD DESIGN AND FABRICATION: ASME B31.3. (OTHER CODES AVAILABLE)
LARGER SIZES AND HIGHER ANSI RATINGS ARE ALSO AVAILABLE.

AITKEN TURBINE METER
VERTICAL BASKET STRAINER



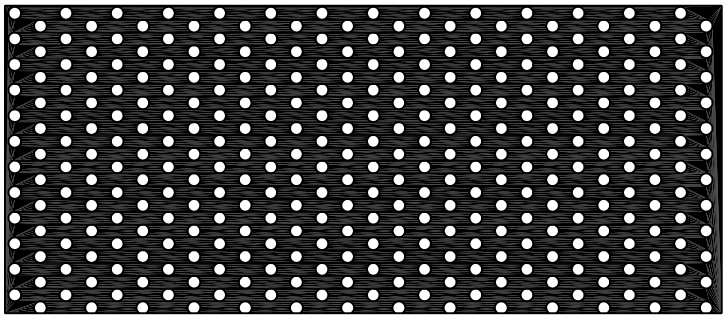
NOTE:
1. RTJWN FLANGES, DAVIT ARM, QUICK OPENING CLOSURE, VENT CONNECTIONS, DIFFERENTIAL PRESSURE CONNECTIONS, FLANGED DRAIN, AND SUPPORT OPTIONS ARE ALSO AVAILABLE.
2. WE CAN ALSO MODIFY THE FACE TO FACE AND HEIGHT DIMENSIONS OF THE STRAINER.

DIMENSIONAL DATA

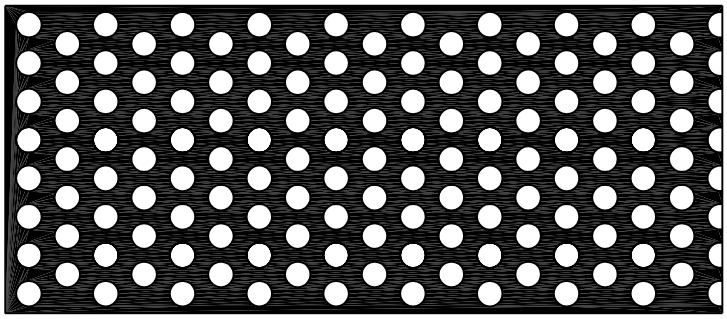
NOZZLE SIZE (NPS)	VESSEL SIZE (NPS)	A	* B	C	D	* * OPEN AREA	DRAIN SIZE	WEIGHTS (LBS)		
								CLASS 150	CLASS 300	CLASS 600
3"/6"	10"	36"	31"	13"	18"	1670%	0.75"	264	320	452
4"/8"	12"	40"	36"	15"	21"	1547%	1"	353	431	515
6"/10"	16"	46"	42"	18"	24"	994%	1"	664	978	1555
8"/12"	18"	51"	49"	20"	29"	935%	1"	1057	1454	2185
10"/14"	20"	65"	51"	22"	29"	592%	2"	1382	1816	2183
12"/18"	24"	71"	67"	24"	43"	867%	2"	2193	2430	4383

DIMENSIONS FOR REFERENCE ONLY. CERTIFIED DRAWINGS ARE AVAILABLE WITH ORDER.
*ALSO THE RECOMMENDED CLEARANCE FOR BASKET REMOVAL.
**RATIO OF THE INLET I.D. AREA TO BASKET OPEN AREA.
(OPEN AREA BASED ON CLASS 150 WITH STD PIPE SCHEDULES)
STANDARD DESIGN AND FABRICATION: ASME B31.3. (OTHER CODES AVAILABLE)
LARGER SIZES AND HIGHER ANSI RATINGS ARE ALSO AVAILABLE.

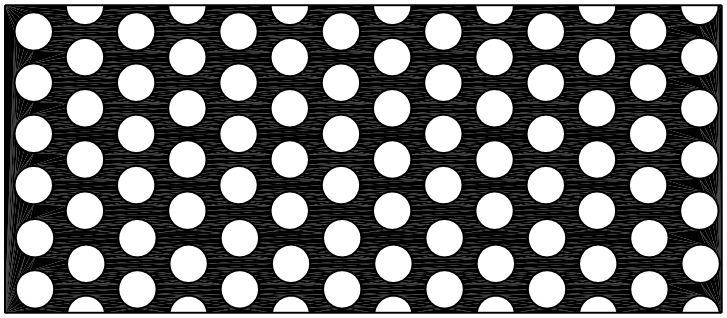
BASE MATERIALS FOR STRAINERS



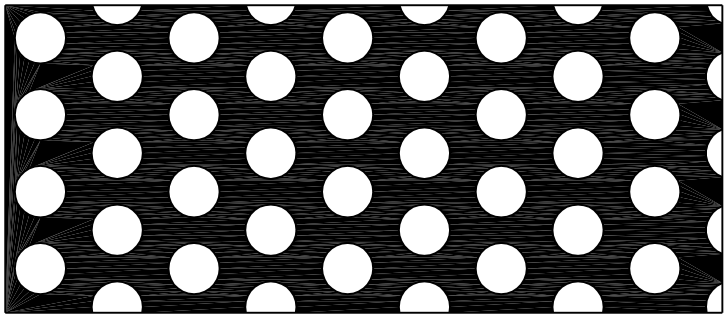
1/16"ø on 1/8" ctrs.



1/8"ø on 3/16" ctrs.



3/16"ø on 1/4" ctrs.



1/4"ø on 3/8" ctrs.

PERFORATED MATERIALS

Gage	Perforation	Holes/sq. in.	% of Open Area	Material Range
20	1/16"ø on 1/8" ctrs.	74.0	22.7%	Carbon Steel, 304SS, 316SS
16	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel, 304SS, 316SS 304L, 316L, Monel
16	3/16"ø on 1/4" ctrs.	18.5	51.0%	Carbon Steel, 304SS, 316SS
16	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS
14	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel, 304SS, 316SS
14	3/16"ø on 1/4" ctrs.	18.5	51.0%	Carbon Steel, 304SS, 316SS
14	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS
12	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel
11	1/8"ø on 3/16" ctrs.	33.0	40.3%	304SS, 316SS
11	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS

OTHER PERFORATIONS AVAILABLE UPON REQUEST.

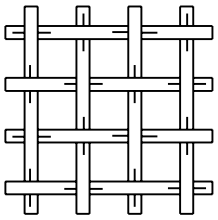
Rev. 0, 6/4/98

Dwg. No.: NCatperfs

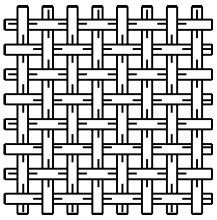
WIRE MESH TYPE BASE MATERIAL
(Available From Stock)

Mesh	Wire Diameters		Width of Opening		% of Opening	Material Range
	in.	mm.	in.	mm.		
2	.063	1.6	.437	11.10	76.4%	Carbon Steel, 304SS, 316SS
3	.063	1.6	.270	6.86	65.5%	Carbon Steel, 304SS, 316SS
4	.063	1.6	.187	4.75	56.0%	Carbon Steel, 304SS, 316SS
5	.063"	1.6	.137	3.48	46.9%	Carbon Steel, 304SS, 316SS
6	.047	1.19	.120	3.50	51.8%	Carbon Steel, 304SS, 316SS
8	.047	1.19	.078	1.98	38.9%	Carbon Steel, 304SS, 316SS

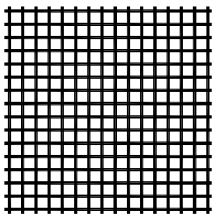
OTHER SIZES AND MATERIALS AVAILABLE UPON APPLICATION.



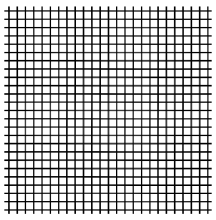
4 Mesh
.072



8 Mesh
.047



10 Mesh
.025



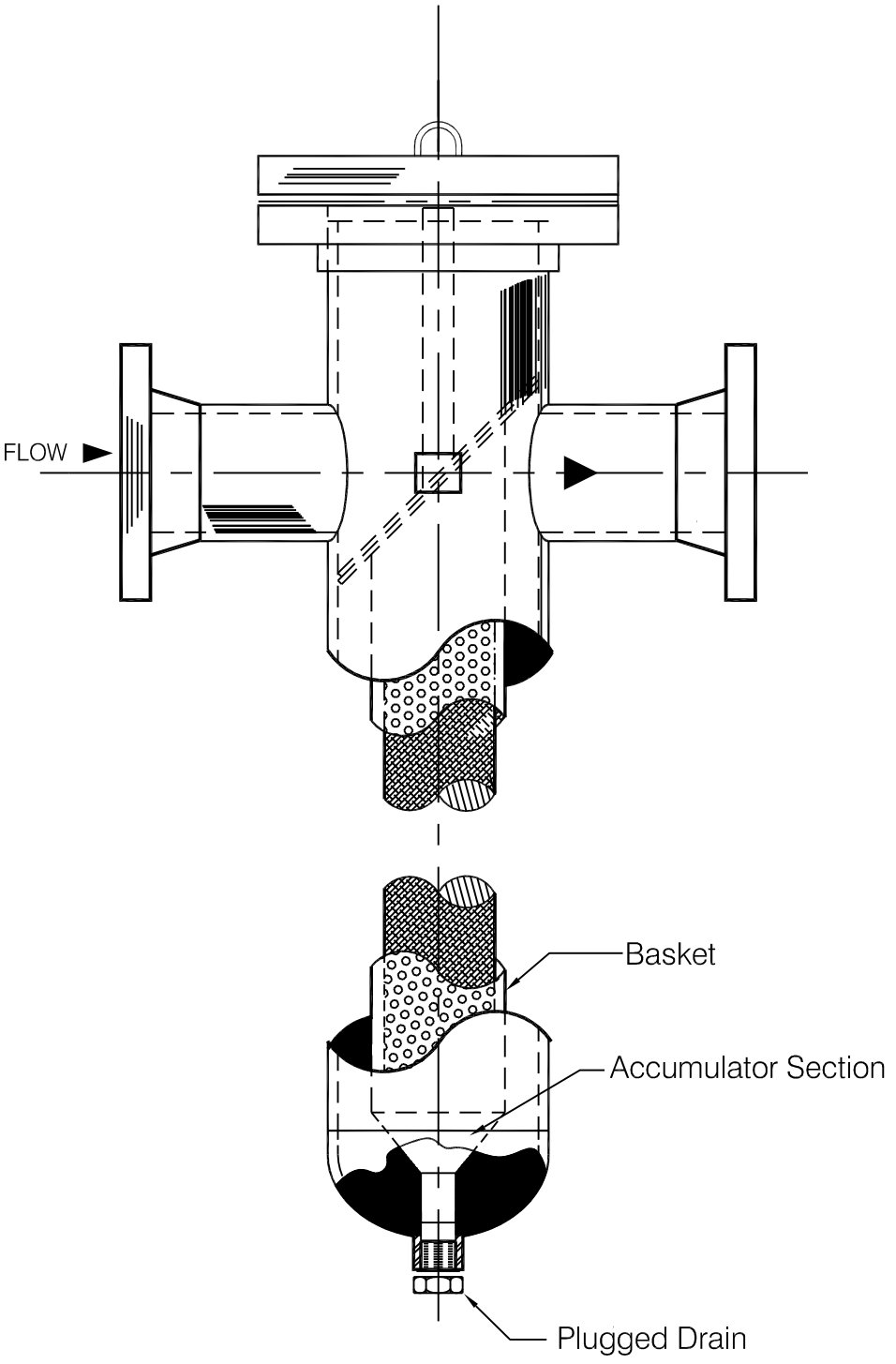
20 Mesh
.016

WIRE MESH LINER MATERIAL
(Available From Stock)

Mesh	Wire Diameters		Width of Opening		% of Opening	Material Range
	in.	mm.	in.	mm.		
10	.025	.640	.075	1.91	56.3%	304SS, 316SS
20	.016	.406	.034	.86	46.2%	304SS, 316SS
30	.013	.330	.020	.52	37.1%	304SS, 316SS
40	.010	.254	.015	.38	36.0%	304SS, 316SS
50	.009	.229	.011	.28	30.3%	304SS, 316SS
60	.0075	.191	.009	.23	30.5%	304SS, 316SS
80	.0055	.140	.007	.19	31.4%	304SS, 316SS
100	.0045	.114	.006	.14	30.3%	304SS, 316SS

OTHER SIZES AND MATERIALS AVAILABLE UPON APPLICATION.

VERTICAL BASKET STRAINER



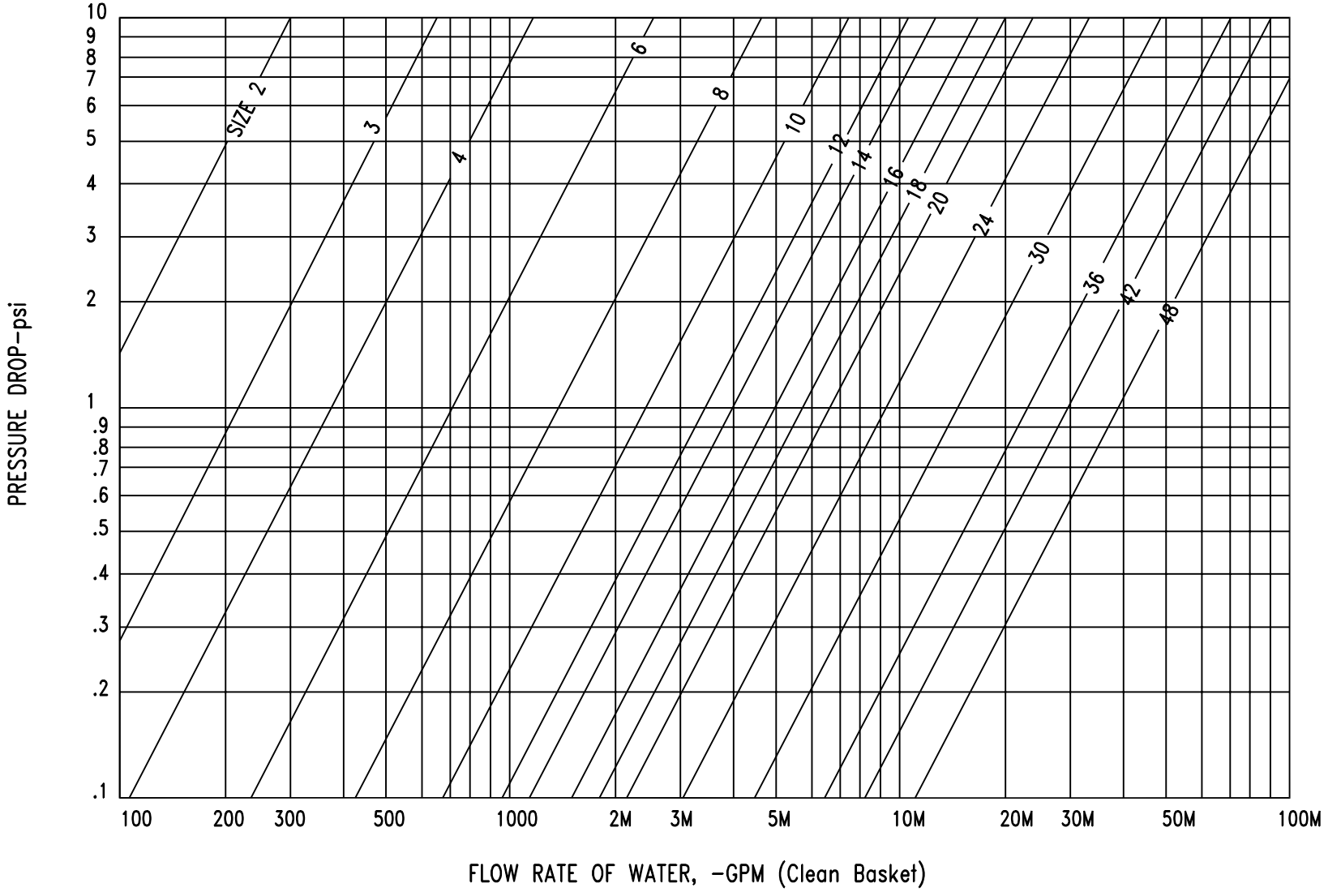
Speed and ease of cleaning without frequent removal of basket.

CORRECTION FACTOR:
FOR LIQUIDS MORE VISCOUS THAN WATER
OR WHERE WIRE CLOTH LINER IS ADDED
MULTIPLY PRESSURE IN CHARTS BY:

VISCOSITY (SSU)	PERFORATED (1/8" HOLES)	PERFORATED W/ WIRE CLOTH		
		40 MESH	60 MESH	80 MESH
30	1.00	1.32	1.53	1.62
270	1.30	1.61	1.83	2.00
385	1.44	1.76	2.00	2.20
500	1.58	1.92	2.13	2.41
1000	1.66	2.22	2.41	2.63
2000	1.86	2.41	2.72	2.91

VERTICAL BASKET STRAINERS
PRESSURE DROP FOR LIQUIDS

(Perforated basket 1/8" dia. holes on 3/16" centers)



Rev.0 01/07/03

Dwg. No.: CATPD

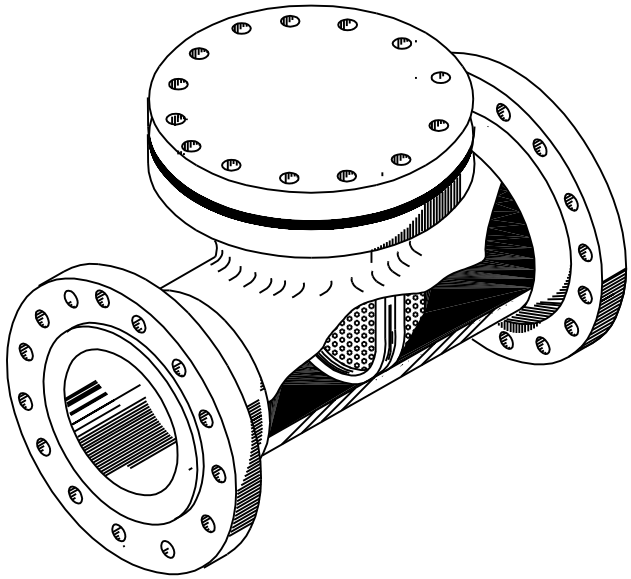
VERTICAL BASKET STRAINER WEIGHTS

STRAINER SIZE	FLANGE RATING		
	150# ANSI	300# ANSI	600# ANSI
2 ON 4	70 LBS.	100 LBS.	135 LBS.
2 ON 8	152 LBS.	215 LBS.	415 LBS.
3 ON 6	130 LBS.	205 LBS.	270 LBS.
3 ON 8	168 LBS.	235 LBS.	438 LBS.
4 ON 8	190 LBS.	310 LBS.	520 LBS.
4 ON 10	254 LBS.	420 LBS.	705 LBS.
6 ON 10	290 LBS.	450 LBS.	830 LBS.
6 ON 12	376 LBS.	650 LBS.	1045 LBS.
8 ON 12	480 LBS.	700 LBS.	1105 LBS.
8 ON 14	518 LBS.	885 LBS.	1425 LBS.
8 ON 16	604 LBS.	1025 LBS.	1910 LBS.
10 ON 14	617 LBS.	885 LBS.	1675 LBS.
10 ON 16	750 LBS.	1095 LBS.	2085 LBS.
10 ON 18	787 LBS.	1265 LBS.	2600 LBS.
12 ON 18	940 LBS.	1380 LBS.	2825 LBS.
12 ON 20	1030 LBS.	2030 LBS.	3350 LBS.
14 ON 18	1000 LBS.	1500 LBS.	2995 LBS.
14 ON 20	1140 LBS.	2155 LBS.	3550 LBS.
14 ON 24	1492 LBS.	3120 LBS.	5025 LBS.
16 ON 20	1235 LBS.	2275 LBS.	3985 LBS.
16 ON 24	1534 LBS.	3345 LBS.	5450 LBS.
18 ON 24	1715 LBS.	3475 LBS.	6065 LBS.
18 ON 30	2990 LBS.	4950 LBS.	8250 LBS.
20 ON 24	1860 LBS.	3615 LBS.	6645 LBS.
20 ON 30	3125 LBS.	5326 LBS.	8780 LBS.
24 ON 30	3465 LBS.	6093 LBS.	10,115 LBS.
24 ON 36	4760 LBS.	8550 LBS.	12,700 LBS.

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

TEE STRAINERS



TEE TYPE STRAINER

Tee Straight Flow

Tee Angle Flow

Tee Angle Flow Modified

REV.: 4 01/27/09

DWG NO.: CATSTR01

STRAINERS

THE PROBLEM WITH UNWANTED MATERIAL IN PIPELINES IS A NEVER ENDING ONE. WHETHER THE FLOWING MATERIAL IS WATER, OIL, GAS, PAINT OR A VARIETY OF FOOD OR CHEMICAL PRODUCTS, THERE IS OFTEN PRESENT UNWANTED MATTER THAT CAN CAUSE SERIOUS PROBLEMS. DIRT, FOREIGN MATTER OR EVEN CLUMPS OF THE PRODUCT ITSELF, CAN CLOG OR DAMAGE SPRAY NOZZLES, PUMPS, TURBINE METERS, OR SIMILAR EQUIPMENT.

STRAINERS ARE A SOLUTION TO THESE PROBLEMS. THEY PREVENT THE PASSAGE OF UNWANTED MATTER IN THE LINE THAT COULD CAUSE DAMAGE OR EVEN RUIN THE PRODUCT ITSELF.

WHEN COMPARED TO THE COST OF REPLACING DAMAGED PUMPS, METERS, ETC., STRAINERS ARE AN INEXPENSIVE INSURANCE POLICY.

STRAINERS ARE WIDELY USED IN THE FOLLOWING INDUSTRIES:

TANK CARS AND TRUCKS	**PAINT, INK, & LATEX**
CERAMICS	**PULP & PAPER**
CHEMICALS	**PETROLEUM REFINING**
ELECTRIC POWER	**PHARMACEUTICAL**
FOOD PROCESSING	**PROCESS EQUIPMENT**
MARINE	**WASTE & WATER TREATMENT**
TURBINE METER SERVICE	**COMPRESSOR STATIONS**
PIPE LINE	**CO-GENERATION**

SPECIFICATION SHEET

TEE STRAINER

MANUFACTURING AND DESIGN CODE

_____B31.1 _____B31.3 _____B31.4 _____B31.8 _____ASME SECTION VII, DIV.1

"U" STAMP __YES __NO DESIGN TEMP._____^{O}F DESIGN PRESSURE_____PSIG

CORROSION ALLOWANCE_____ STRESS RELIEF __YES __NO MDMT_____^{O}F

RADIOGRAPHY_____ OTHER NDE_____

COVER ASSEMBLY _____BLIND FLANGE _____BLIND FLANGE W/DAVIT

_____ QUICK OPENING _____OTHER

INLET CONN. SIZE & RATING_____ OUTLET CONN. SIZE & RATING_____

PAINT:_____SHOP PRIMER OTHER_____

STRAIGHT FLOW __YES __NO ANGLE FLOW __YES __NO

MODIFIED ANGLE FLOW __YES __NO

SPECIFICATION DATA

QUANITITY_____ LINE SIZE_____ FLOW RATE_____ OPERATING TEMP_____^{O}F

OPERATING PRESSURE_____PSIG FLUID_____VISCOSITY_____cP OPERATING

SPECIFIC GRAVITY_____@ OPERATING MAXIMUM ΔP CLEAN_____PSIG

MATERIAL SPECIFICATION

STRAINER BODY:_____CARBON STEEL _____304 S.S. _____316 S.S. _____OTHER

STRAINER BASKET: PERFORATED METAL_____GA. OR_____" THICK

HOLE DIAMETER_____" ON _____CENTERS

OTHER_____

__CARBON __304 S.S. __316 S.S. _____OTHER

MESH: _____X_____ WIRE DIAMETER_____ WIDTH OF OPENING_____

_____CARBON STEEL _____304 S.S. _____316 S.S. _____BRASS

AITKEN TEE STRAINER

STANDARD STRAINER:

OUR STANDARD "BATHTUB" STRAINER USES DOUBLE RUNNER RODS SO THAT FLOW CAN BE REVERSED. OUR SPECIAL ANGLE FLOW "TAM" STRAINER ALLOWS FOR BI-DIRECTIONAL FLOW.

STANDARD MATERIAL SPECIFICATIONS:

STANDARD MATERIAL OF CONSTRUCTION IS CARBON STEEL. BASKET MATERIAL IS SPECIFIED BY THE CUSTOMER.

OTHER MATERIALS AVAILABLE IN:
1 1/4 CR - 1/2 MO
5 CR - 1/2 MO
9 CR - 1 MO
304/304L SS
316/316L SS
MONEL
OTHER ALLOYS - REVIEWED ON AN INDIVIDUAL BASIS.

DIMENSIONAL DATA:

SEE FOLLOWING PAGES.

PRESSURE DROP INFORMATION:

SEE PRESSURE DROP CHARTS.

RECOMMENDED SPARE PARTS:

1.) BASKET
2.) GASKETS FOR ACCESS OPENING
3.) O-RINGS FOR QUICK OPENING ACCESS CLOSURES

OPTIONS:

1.) QUICK OPENING CLOSURES.
2.) PRESSURE TAP CONNECTIONS
3.) VENTS
4.) DAVIT FOR ACCESS BLIND FLANGE
5.) BLOWDOWN BASKET

DESIGN CODE(s) / STANDARDS:

STANDARD DESIGN AND FABRICATION PER ASME B31.3
OTHER CODES AVAILABLE ARE:
A.S.M.E. 31.1
A.S.M.E. B31.4
A.S.M.E. B31.8
A.S.M.E. PRESSURE VESSEL AND BOILER CODE, SECTION VIII, DIV. 1.
D.O.T.
N.A.C.E.
M.D.M.T. REQUIRED FOR A.S.M.E. B31.3 AND SECTION VIII DESIGN.

PAINT/COATINGS:

PROVIDED WITH EXTERNAL SP-3 MECHANICAL TOOL CLEANING AND ONE COAT OF SHOP PRIMER OR AS SPECIFIED BY CUSTOMER.

NDE:

PER APPLICABLE CODE AND/OR AS SPECIFIED BY CUSTOMER.

MODEL NUMBER FOR AITKEN TEE STRAINERS

TYPICAL MODEL NUMBER: 6 15 - TS - X

SIZE

15 ANSI CLASS 150
30 ANSI CLASS 300
60 ANSI CLASS 600
90 ANSI CLASS 900
150 ANSI CLASS 1500
250 ANSI CLASS 2500

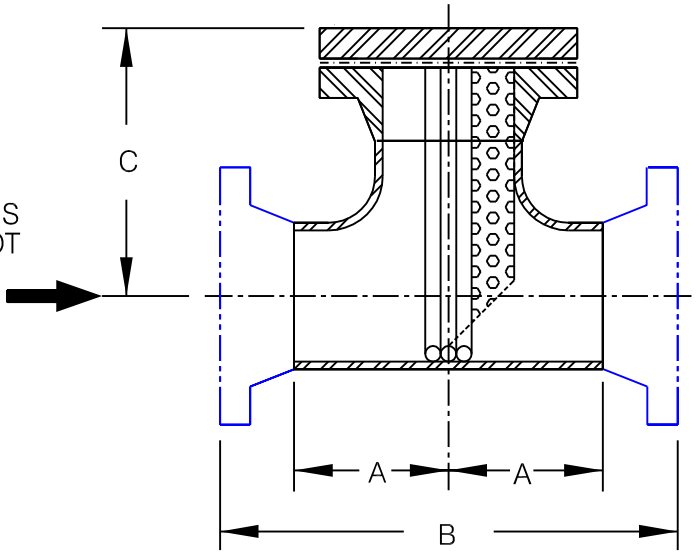
BODY STYLE

TS - STRAIGHT FLOW, BUTTWELD INLET / OUTLET
TSF - STRAIGHT FLOW, FLANGED INLET / OUTLET
TA - ANGLE FLOW, BUTTWELD INLET / OUTLET
TAF - ANGLE FLOW, FLANGED INLET / OUTLET
TAM - MODIFIED (BI DIRECTIONAL), BUTTWELD INLET / OUTLET
TAMF - MODIFIED (BI-DIRECTIONAL), FLANGED INLET / OUTLET

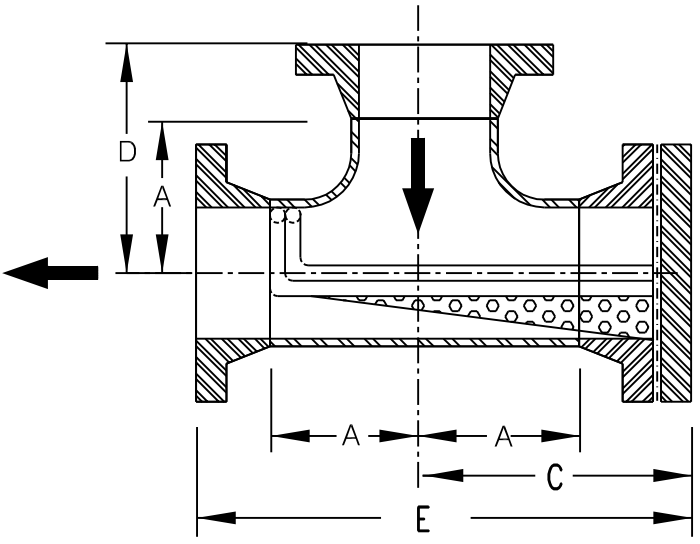
SPECIFY OTHER OPTIONS REQUIRED

AITKEN TEE TYPE STRAINERS

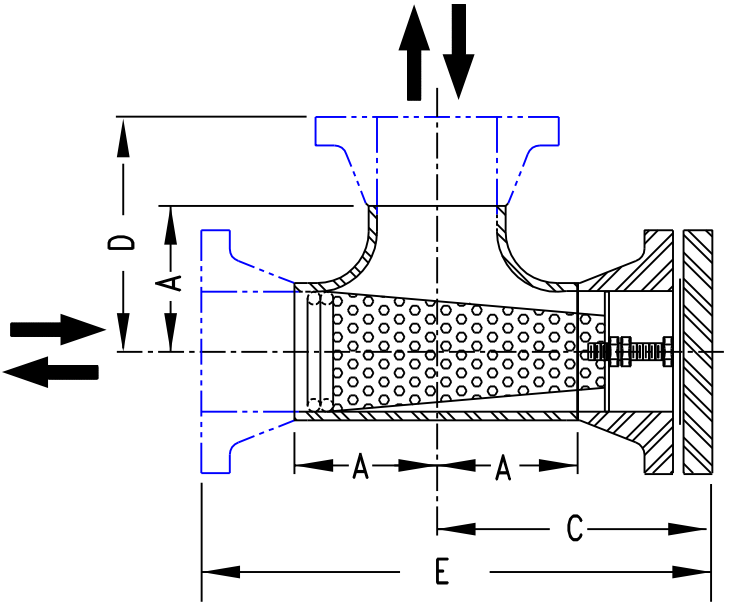
TEE STRAIGHT FLOW
"MODEL TS"
(DOUBLE RUNNER RODS ARE USED ON THIS MODEL SO THAT FLOW REVERSAL WILL NOT CREATE ANY PROBLEMS.)



TEE ANGLE FLOW
"MODEL TA"



TEE ANGLE MODIFIED
(BI-DIRECTIONAL FLOW)
"MODEL TAM"



TEE TYPE STRAINERS

AITKEN

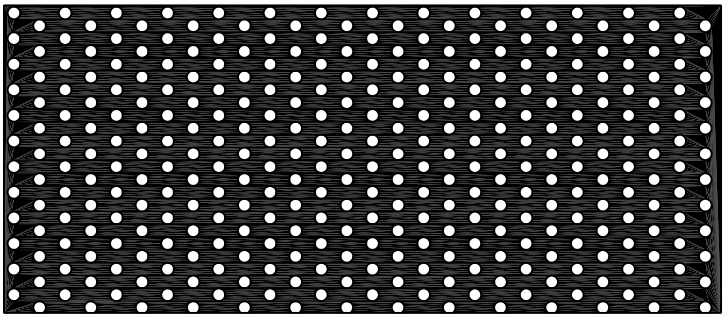
DIMENSIONAL DATA

PIPE SIZE	A	B					C				
		150#	300#	600#	900#	1500#	150#	300#	600#	900#	1500#
2"	2 1/2"	10 1/4"	10 3/4"	11 1/2"	13 3/4"	13 3/4"	6"	6 3/8"	7 1/8"	8 3/4"	8 3/4"
2.5"	3"	11 3/4"	12 1/4"	13"	15"	15"	6 7/8"	7 1/4"	8"	9 1/2"	9 1/2"
3"	3 3/8"	12 1/2"	13 1/4"	14"	15 1/2"	16 3/4"	7 5/16"	7 7/8"	8 5/8"	9 5/8"	10 5/8"
4"	4 1/8"	14 1/2"	15 1/4"	17"	18"	18 3/4	8 5/16"	9"	10 1/2"	11 1/8"	11 7/8"
5"	4 7/8"	17"	17 3/4"	19 1/2"	20 1/2"	22 3/4"	9 9/16"	10 3/8"	11 7/8"	12 5/8"	14 5/8"
6"	5 5/8"	18 1/2"	19 1/4"	21 1/4"	23"	25 1/2"	10 3/8"	11 3/16"	12 7/8"	14 1/16"	16 3/8"
8"	7"	22 1/4"	23"	25 1/4"	27 1/2"	31 1/2"	12 3/8"	13 1/4"	15 3/16"	16 5/8"	19 3/4"
10"	8 1/2"	25 1/4"	26 1/2"	29 3/4"	32 1/4"		13 15/16"	15 1/4"	17 3/4"	19 1/4"	
12"	10"	29 1/4"	30 1/2"	33"	36 1/2"		16"	17 3/8"	19 1/2"	21 3/4"	
14"	11"	32 1/4"	33 1/2"	35 3/4"			17 5/8"	19"	21"		
16"	12"	34 1/4"	35 3/4"	38 3/4"			18 11/16"	20 1/4"	22 3/4"		
18"	13 1/2"	38 1/4"	39 3/4"	42 1/4"			20 13/16"	22 3/8"	24 3/4"		
20"	15"	41 5/8"	43"	45 3/4"			22 5/8"	24 1/8"	26 3/4"		
24"	17"	46 1/4"	47 1/2"	50 3/4"			25 1/8"	26 5/8"	29 3/4"		

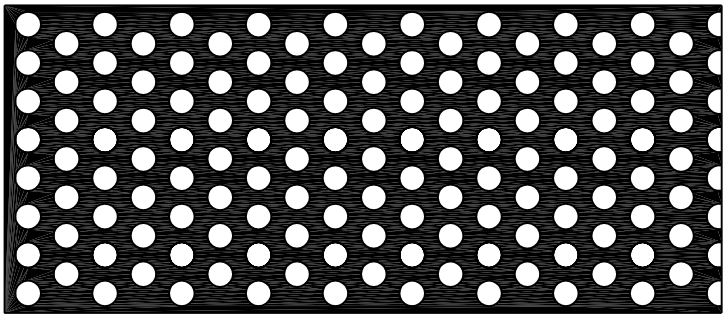
PIPE SIZE		D					E				
		150#	300#	600#	900#	1500#	150#	300#	600#	900#	1500#
2"	2 1/2"	5 1/8"	5 3/8"	5 3/4"	6 7/8"	6 7/8"	11 1/8"	11 3/4"	12 5/8''	15 3/8"	15 3/8"
2.5"	3"	5 7/8"	6 1/8"	6 1/2"	7 1/2"	7 1/2"	12 3/4"	13 3/8"	14 1/4"	16 5/8"	16 5/8"
3"	3 3/8"	6 1/4"	6 5/8"	7"	7 3/4"	8 3/8"	13 9/16"	14 1/2"	15 3/8"	17 1/8"	18 3/4"
4"	4 1/8"	7 1/4"	7 5/8"	8 1/2"	9"	9 3/8"	15 9/16"	16 5/8"	18 5/8"	19 7/8"	20 3/4"
5"	4 7/8"	8 1/2"	8 7/8"	9 3/4"	10 1/4"	11 3/8"	18 1/16"	19 1/4"	21 3/8"	22 5/8"	25 3/4"
6"	5 5/8"	9 1/4"	9 5/8"	10 5/8"	11 1/2"	12 3/4"	19 5/8"	20 13/16"	23 1/4"	25 5/16"	28 7/8"
8"	7"	11 1/8"	11 1/2"	12 5/8"	13 3/4"	15 3/4"	23 1/2"	24 3/4"	27 9/16"	30 1/8"	35 1/4"
10"	8 1/2"	12 5/8"	13 1/4"	14 7/8"	16 1/8"		26 9/16"	28 1/2"	32 3/8"	35 1/8"	
12"	10"	14 5/8"	15 1/4"	16 1/2"	18 1/4"		30 5/8"	32 5/8"	35 3/4"	39 3/4"	
14"	11"	16 1/8"	16 3/4"	17 7/8"			33 3/4"	35 3/4"	38 5/8"		
16"	12"	17 1/8"	17 7/8"	19 3/8"			35 13/16"	38 1/8"	41 7/8"		
18"	13 1/2"	19 1/8"	19 7/8"	21 7/8"			39 15/16"	42 1/4"	45 5/8"		
20"	15"	20 13/16"	21 1/2"	22 7/8"			43 7/16"	45 5/8"	49 3/8"		
24"	17"	23 1/8"	23 3/4"	25 3/8"			48 1/4"	50 3/8"	54 7/8"		

DIMENSIONS SHOWN ARE (REFERENCE DIMENSIONS) FOR ESTIMATING PURPOSES ONLY.
ACTUAL DIMENSIONS WILL BE PROVIDED ON "AS-BUILT" DRAWINGS, AVAILABLE WITH ORDER.
THE DIMENSIONS ABOVE ARE ONLY APPLICABLE WITH RAISED FACE WELD NECK (RFWN) FLANGES.
DIMENSIONS 'C' AND 'E' INCLUDES 1/8" THK GASKET THICKNESS AND 1/8" WELD GAP.

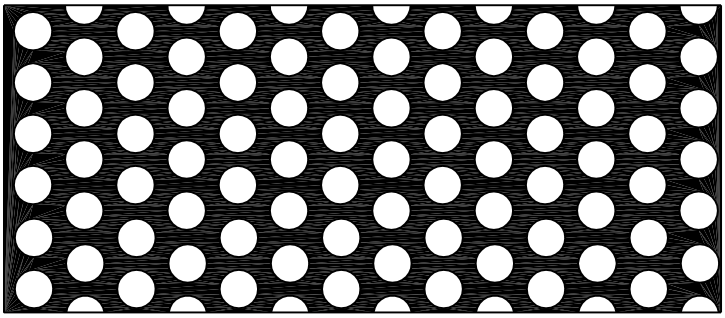
BASE MATERIALS FOR STRAINERS



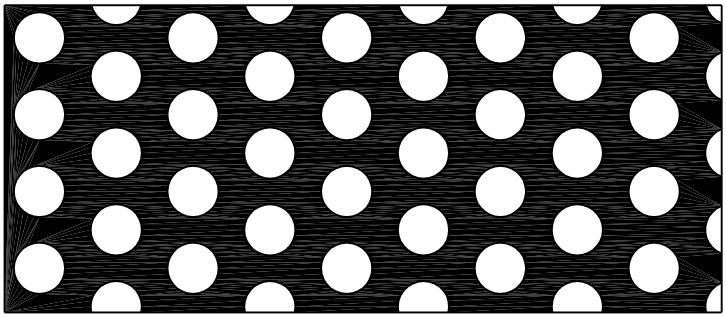
1/16"ø on 1/8" ctrs.



1/8"ø on 3/16" ctrs.



3/16"ø on 1/4" ctrs.



1/4"ø on 3/8" ctrs.

PERFORATED MATERIALS

Gage	Perforation	Holes/sq. in.	% of Open Area	Material Range
20	1/16"ø on 1/8" ctrs.	74.0	22.7%	Carbon Steel, 304SS, 316SS
16	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel, 304SS, 316SS 304L, 316L, Monel
16	3/16"ø on 1/4" ctrs.	18.5	51.0%	Carbon Steel, 304SS, 316SS
16	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS
14	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel, 304SS, 316SS
14	3/16"ø on 1/4" ctrs.	18.5	51.0%	Carbon Steel, 304SS, 316SS
14	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS
12	1/8"ø on 3/16" ctrs.	33.0	40.3%	Carbon Steel
11	1/8"ø on 3/16" ctrs.	33.0	40.3%	304SS, 316SS
11	1/4"ø on 3/8" ctrs.	8.0	40.3%	Carbon Steel, 304SS, 316SS

OTHER PERFORATIONS AVAILABLE UPON REQUEST.

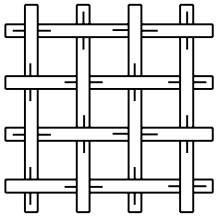
Rev. 0, 6/4/98

Dwg. No.: NCatperfs

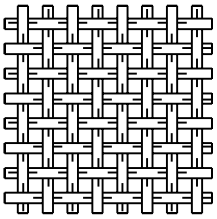
WIRE MESH TYPE BASE MATERIAL
(Available From Stock)

Mesh	Wire Diameters		Width of Opening		% of Opening	Material Range
	in.	mm.	in.	mm.		
2	.063	1.6	.437	11.10	76.4%	Carbon Steel, 304SS, 316SS
3	.063	1.6	.270	6.86	65.5%	Carbon Steel, 304SS, 316SS
4	.063	1.6	.187	4.75	56.0%	Carbon Steel, 304SS, 316SS
5	.063"	1.6	.137	3.48	46.9%	Carbon Steel, 304SS, 316SS
6	.047	1.19	.120	3.50	51.8%	Carbon Steel, 304SS, 316SS
8	.047	1.19	.078	1.98	38.9%	Carbon Steel, 304SS, 316SS

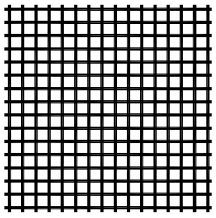
OTHER SIZES AND MATERIALS AVAILABLE UPON APPLICATION.



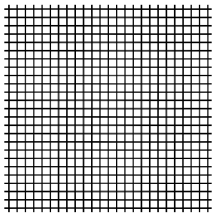
4 Mesh
.072



8 Mesh
.047



10 Mesh
.025



20 Mesh
.016

WIRE MESH LINER MATERIAL
(Available From Stock)

Mesh	Wire Diameters		Width of Opening		% of Opening	Material Range
	in.	mm.	in.	mm.		
10	.025	.640	.075	1.91	56.3%	304SS, 316SS
20	.016	.406	.034	.86	46.2%	304SS, 316SS
30	.013	.330	.020	.52	37.1%	304SS, 316SS
40	.010	.254	.015	.38	36.0%	304SS, 316SS
50	.009	.229	.011	.28	30.3%	304SS, 316SS
60	.0075	.191	.009	.23	30.5%	304SS, 316SS
80	.0055	.140	.007	.19	31.4%	304SS, 316SS
100	.0045	.114	.006	.14	30.3%	304SS, 316SS

OTHER SIZES AND MATERIALS AVAILABLE UPON APPLICATION.

TEE STRAINER WEIGHTS

WEIGHTS FOR STRAIGHT FLOW TEE STRAINER W / B.W. INLET & OUTLET											
PIPE SIZE	150#	300#	600#	900#	1500#	PIPE SIZE	150#	300#	600#	900#	1500#
2"	20	27	35	63	67	10"	241	351	609	738	1230
2 1/2"	31	37	51	97	97	12"	346	508	772	1069	1931
3"	38	45	62	83	130	14"	465	685	1023	1445	2570
4"	54	72	113	146	192	16"	570	861	1389	1783	3400
5"	74	100	181	232	360	18'	750	1213	1709	2435	4477
6"	94	137	236	303	439	20"	912	1491	2255	3112	5765
8"	156	231	309	528	771	24"	1357	2192	3228	5432	9120

WEIGHTS FOR STRAIGHT FLOW TEE STRAINER W / FLANGED INLET & OUTLET											
PIPE SIZE	150#	300#	600#	900#	1500#	PIPE SIZE	150#	300#	600#	900#	1500#
2"	33	43	55	111	115	10"	351	549	979	1274	2138
2 1/2"	51	61	87	145	169	12"	516	692	1220	1813	3311
3"	62	77	102	155	226	14"	693	1057	1691	2569	4450
4"	86	122	193	248	330	16"	854	1353	2313	3153	5900
5"	114	168	313	404	624	18'	1060	1823	2771	4283	7727
6"	142	227	390	523	767	20"	1252	2237	3611	5440	9865
8"	240	371	535	902	1317	24"	1877	3050	5146	5566	15770

WEIGHTS FOR ANGLE FLOW TEE STRAINER											
PIPE SIZE	150#	300#	600#	900#	1500#	PIPE SIZE	150#	300#	600#	900#	1500#
2"	13	43	55	111	115	10"	351	549	979	1274	2138
2 1/2"	51	61	87	145	169	12"	516	692	1220	1813	3311
3"	62	77	102	155	226	14"	693	1057	1691	2569	4450
4"	86	122	193	248	330	16"	854	1353	2313	3153	5900
5"	114	168	313	404	624	18'	1060	1823	2771	4283	7727
6"	142	227	390	523	767	20"	1252	2237	3611	5440	9865
8"	240	371	535	902	1317	24"	1877	3050	5146	5566	15770

WEIGHTS FOR ANGLE MODIFIED FLOW TEE STRAINER W / B.W. INLET & OUTLET											
PIPE SIZE	150#	300#	600#	900#	1500#	PIPE SIZE	150#	300#	600#	900#	1500#
2"	22	29	37	65	69	10"	243	353	612	740	1232
2 1/2"	33	39	53	99	99	12"	348	510	774	1071	1933
3"	41	47	64	85	132	14"	467	687	1025	1447	2572
4"	57	75	116	149	195	16"	573	864	1392	1785	3503
5"	77	103	184	235	363	18'	753	1216	1712	2438	4480
6"	97	140	239	306	442	20"	915	1494	2258	3115	5768
8"	160	235	314	532	775	24"	1361	2196	3232	5436	9126

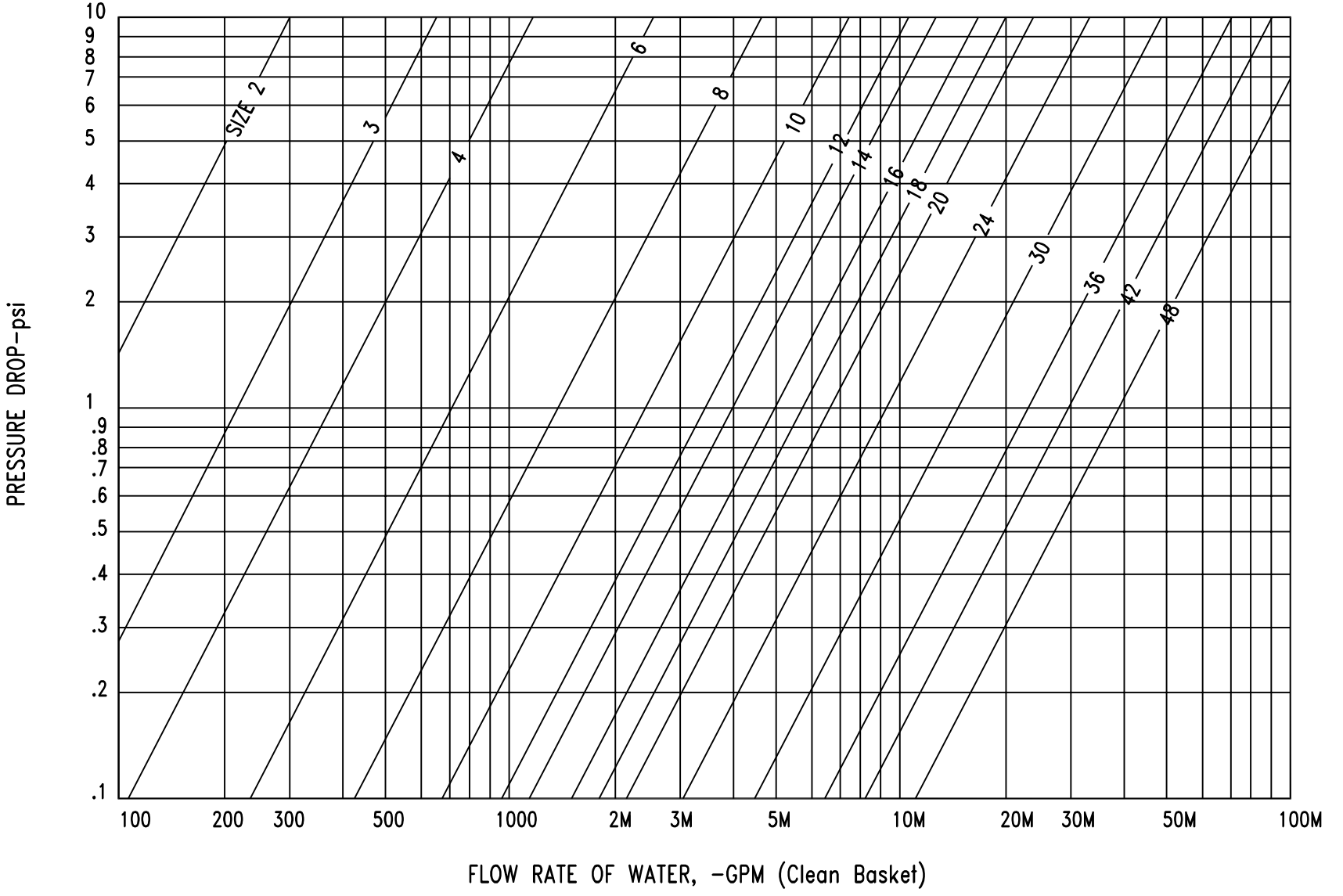
WEIGHT FOR ANGLE MODIFIED FLOW TEE STRAINER W / FLANGED INLET & OUTLET											
PIPE SIZE	150#	300#	600#	900#	1500#	PIPE SIZE	150#	300#	600#	900#	1500#
2"	34	44	56	112	116	10"	352	550	980	1275	2139
2 1/2"	52	62	88	146	170	12"	517	693	1221	1814	3312
3"	63	78	103	156	228	14"	695	1059	1693	2571	4452
4"	88	123	195	249	332	16"	856	1355	2315	3155	5920
5"	116	169	315	406	626	18'	1260	1825	2773	4285	7729
6"	144	229	392	525	769	20"	1253	2239	3613	5442	9867
8"	242	373	537	903	1319	24"	1879	3250	5148	5568	15772

CORRECTION FACTOR:
FOR LIQUIDS MORE VISCOUS THAN WATER
OR WHERE WIRE CLOTH LINER IS ADDED
MULTIPLY PRESSURE IN CHARTS BY:

VISCOSITY (SSU)	PERFORATED (1/8" HOLES)	PERFORATED W/ WIRE CLOTH		
		40 MESH	60 MESH	80 MESH
30	1.00	1.32	1.53	1.62
270	1.30	1.61	1.83	2.00
385	1.44	1.76	2.00	2.20
500	1.58	1.92	2.13	2.41
1000	1.66	2.22	2.41	2.63
2000	1.86	2.41	2.72	2.91

TEE TYPE STRAINERS
PRESSURE DROP FOR LIQUIDS

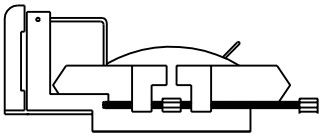
(Perforated basket 1/8" dia. holes on 3/16" centers)



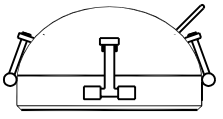
Rev.0 01/07/03

Dwg. No.: CATTPD

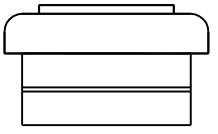
TEE STRAINER OPTIONS



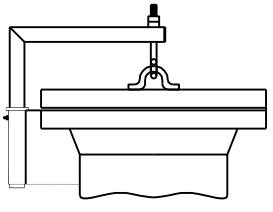
DOUBLE - BOLT CLOSURE



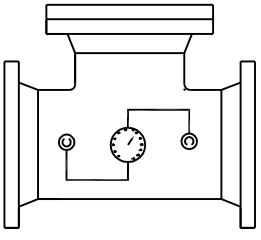
T - BOLT CLOSURE



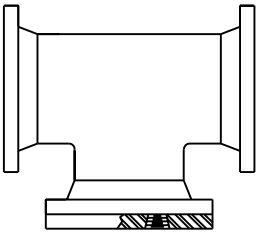
THREADED CLOSURE



DAVIT FOR BLIND FLANGE



DIFFERENTIAL PRESSURE CONNECTIONS



BLOW DOWN CONNECTION

NOTE:

1. CUSTOM OPTIONS AVAILABLE UPON REQUEST.

REV. 0, 11/19/96

DWG NO.: CATEEOPT.DWG

AITKEN

TEE STRAINER OPEN AREAS

		T.S.			T.A.			T.A.M.		
LINE SIZE	SQ. IN. OF PIPE	GROSS SQ. IN.	% OF OPEN AREA	% INCREASE PER 1" ADDED TO LENGTH	GROSS SQ. IN.	% OF OPEN AREA	% INCREASE PER 1" ADDED TO LENGTH	GROSS SQ. IN.	% OF OPEN AREA	LENGTH
2	3.36	15	179	29.4	14	171	47	22	262	5 3/4"
2.5	4.79	21	177		20	195	43			
3	7.39	30	162	11.5	30	193	34	48	260	7 3/4"
4	12.73	48	151	16.6	51	189	27	83	261	9 3/4"
6	28.9	96	133	11.3	105	177	18	167	231	13"
8	50	158	126	8.4	178	185	14	278	222	16"
10	78.6	237	120	6.9	275	190	11	433	220	19 1/2"
12	113.1	336	119	5.8	397	189	9	619	219	23"
14	138	408	118	5.2	476	198	8	766	222	25 1/2"
16	183	521	114	2.6	606	196	7	183	209	27 1/2"
18	234	664	114	4	791	193	7	1223	209	31"
20	291	805	111	3.6	970	190	6	1513	208	34 1/4"
24	425	1130	106	3	1185	179	5	2064	194	38 1/2"

NOTES:

1.) BASED ON PERFORATED PLATE WITH OPEN AREA RATIO OF 40.3% (e.g. 1/8" DIA. HOLES ON 3/16" CENTERS).

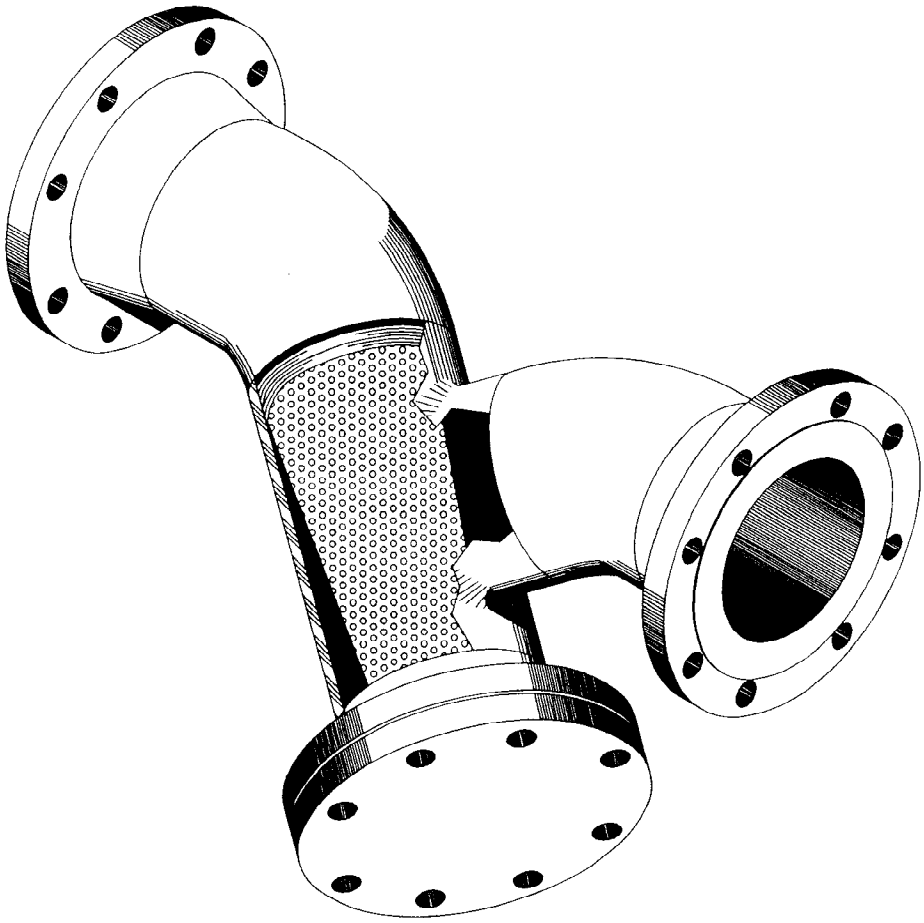
2.) ALL BASED ON 150# RATING.

3.) REDUCE BY 15% IF MESH IS ADDED.

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

FABRICATED WYE STRAINERS



REV.4 01/27/09

DWG NO.: CATWYECS

AITKEN FABRICATED WYE STRAINER

MODEL YBS

STANDARD STRAINER: OUR FABRICATED STRAINER CAN BE SUPPLIED FLANGED, BUTTWELD, OR ANY COMBINATION. QUICK OPEN CLOSURES ARE AVAILABLE.

STANDARD MATERIAL SPECIFICATIONS: STANDARD MATERIAL OF CONSTRUCTION IS CARBON STEEL. BASKET MATERIAL IS SPECIFIED BY THE CUSTOMER.

OTHER MATERIALS AVAILABLE IN:
1 1/4 CR - 1/2 MO
5 CR - 1/2 MO
9 CR - 1 MO
304/304L SS
316/316L SS
MONEL
OTHER ALLOYS - REVIEWED ON AN INDIVIDUAL BASIS.

DIMENSIONAL DATA: SEE FOLLOWING PAGES.

PRESSURE DROP INFORMATION: AVAILABLE ON REQUEST.

RECOMMENDED SPARE PARTS:

1.) BASKET
2.) GASKETS FOR ACCESS OPENING
3.) O-RINGS FOR QUICK OPENING ACCESS CLOSURES

OPTIONS:

1.) QUICK OPENING CLOSURES.
2.) PRESSURE TAP CONNECTIONS
3.) VENTS
4.) CONTINUOUS SLOT-OPENING WEDGE WIRE BASKET
5.) HINGE FOR ACCESS BLIND FLANGE
6.) FLAT TOP BASKET FOR OFFSET NOZZLES
7.) BLOWDOWN BASKET

DESIGN CODE(s) / STANDARDS:

STANDARD DESIGN AND FABRICATION PER ASME B31.3
OTHER CODES AVAILABLE ARE:
A.S.M.E. 31.1
A.S.M.E. B31.4
A.S.M.E. B31.8
A.S.M.E. PRESSURE VESSEL AND BOILER CODE, SECTION VIII, DIV. 1.
D.O.T.
N.A.C.E.
M.D.M.T. REQUIRED FOR A.S.M.E. B31.3 AND SECTION VIII DESIGN.

PAINT/COATINGS: PROVIDED WITH EXTERNAL SP-3 MECHANICAL TOOL CLEANING AND ONE COAT OF SHOP PRIMER OR AS SPECIFIED BY CUSTOMER.

NDE: PER APPLICABLE CODE AND/OR AS SPECIFIED BY CUSTOMER.

MODEL NUMBER FOR AITKEN FABRICATED WYE STRAINERS

TYPICAL MODEL NUMBER: 6 15 - YBS - X

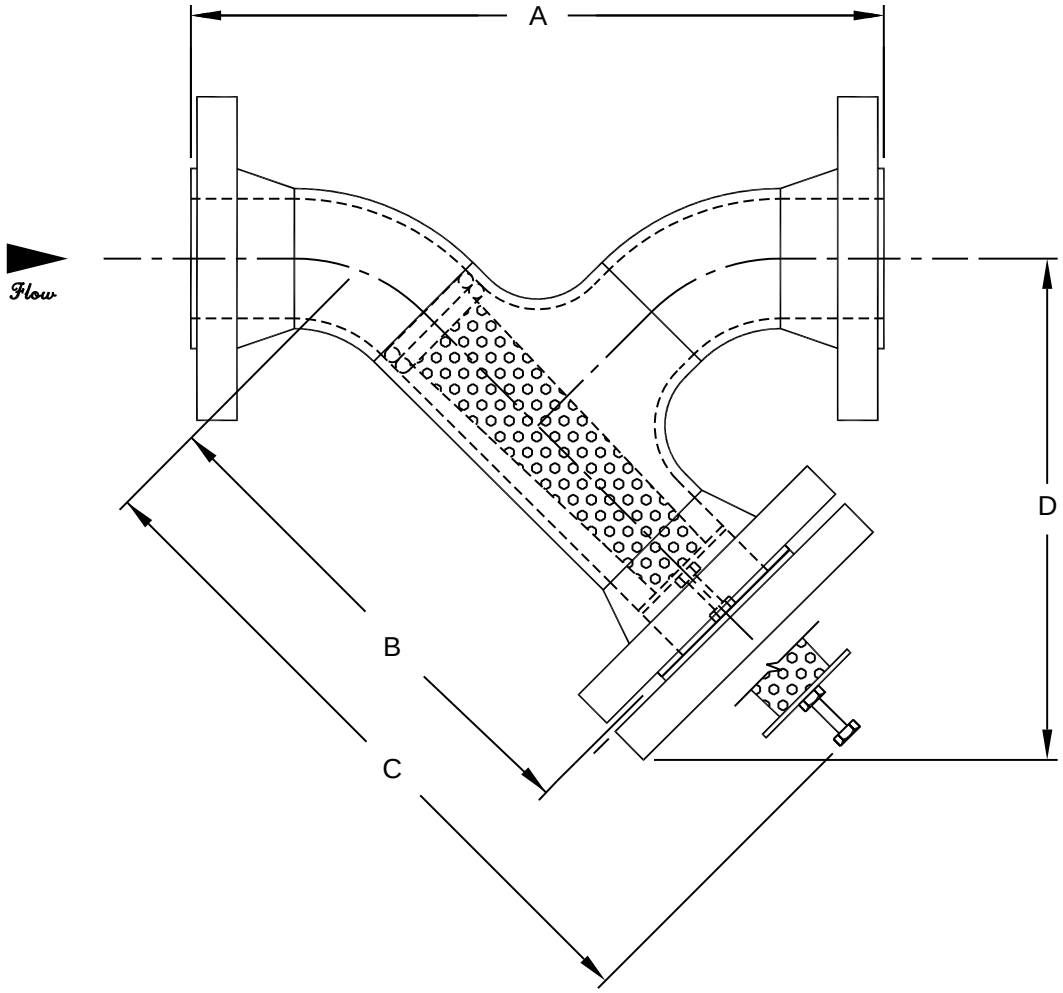
INLET / OUTLET SIZE

15 ANSI CLASS 150
30 ANSI CLASS 300
60 ANSI CLASS 600
90 ANSI CLASS 900
150 ANSI CLASS 1500
250 ANSI CLASS 2500

SPECIFY OTHER OPTIONS REQUIRED

FABRICATED FLANGED WYE STRAINER

MODEL YBS STANDARD



CLASS 150, DIMENSIONAL DATA

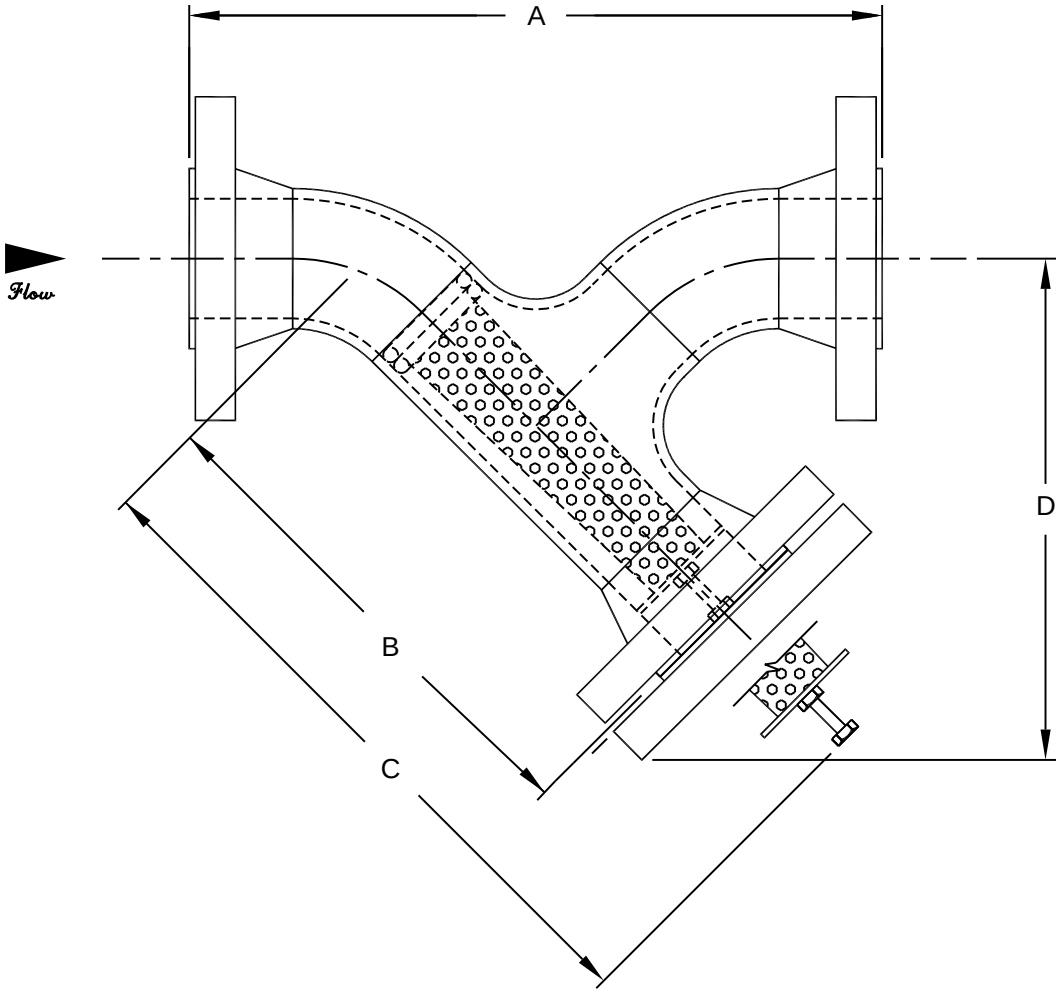
SIZE	DIM. A	DIM. B	DIM. C	DIM. D	WEIGHT
2"	13 1/4"	9"	15 7/8"	8 1/2"	34 LBS
3"	17 1/8"	11 1/2"	21"	10 3/4"	67 LBS
4"	20 3/4"	13 3/4"	25"	19 1/2"	93 LBS
6"	28 1/8"	18 1/2"	33 1/4"	17"	166 LBS
8"	35 5/16"	23"	41"	21"	282 LBS
10"	41 11/16"	27 1/4"	48 1/4"	24 15/16"	463 LBS
12"	49 1/16"	32"	56 1/2"	29 3/8"	625 LBS
14"	55 3/4"	35 3/4"	62 3/4"	32 3/4"	829 LBS
16"	61 3/8"	39"	68"	35 15/16"	1054 LBS
18"	68 3/4"	43 3/4"	76 1/4"	39 13/16"	1305 LBS
20"	75 1/2"	48 3/16"	83 7/8"	43 13/16"	1612 LBS
24"	87 7/16"	54"	93"	49 1/2"	2195 LBS

NOTE: DIMENSIONS SHOWN ARE (REFERENCE DIMENSIONS) FOR ESTIMATING PURPOSES ONLY.
ACTUAL DIMENSIONS WILL BE PROVIDED ON "AS-BUILT" DRAWINGS, AVAILABLE WITH ORDER.
THE DIMENSIONS ABOVE ARE ONLY APPLICABLE WITH RAISED FACE WELD NECK (RFWN) FLANGES.
ALL DIMENSIONS ARE BASED ON STANDARD SIZES LISTED IN SPECIFICATIONS ASME/ANSI B16.5
AND ASME B16.9 FOR FLANGED FITTINGS AND BUTTWELDING FITTINGS, RESPECTIVELY.
LARGER SIZES AVAILABLE PER ASME B16.47, SERIES "A" & "B".

DESIGN CRITERIA:
STANDARD DESIGN & FABRICATION ARE IN ACCORDANCE WITH ASME B31.3. OTHER CODES ARE AVAILABLE

FABRICATED FLANGED WYE STRAINER

MODEL YBS STANDARD



CLASS 300, DIMENSIONAL DATA

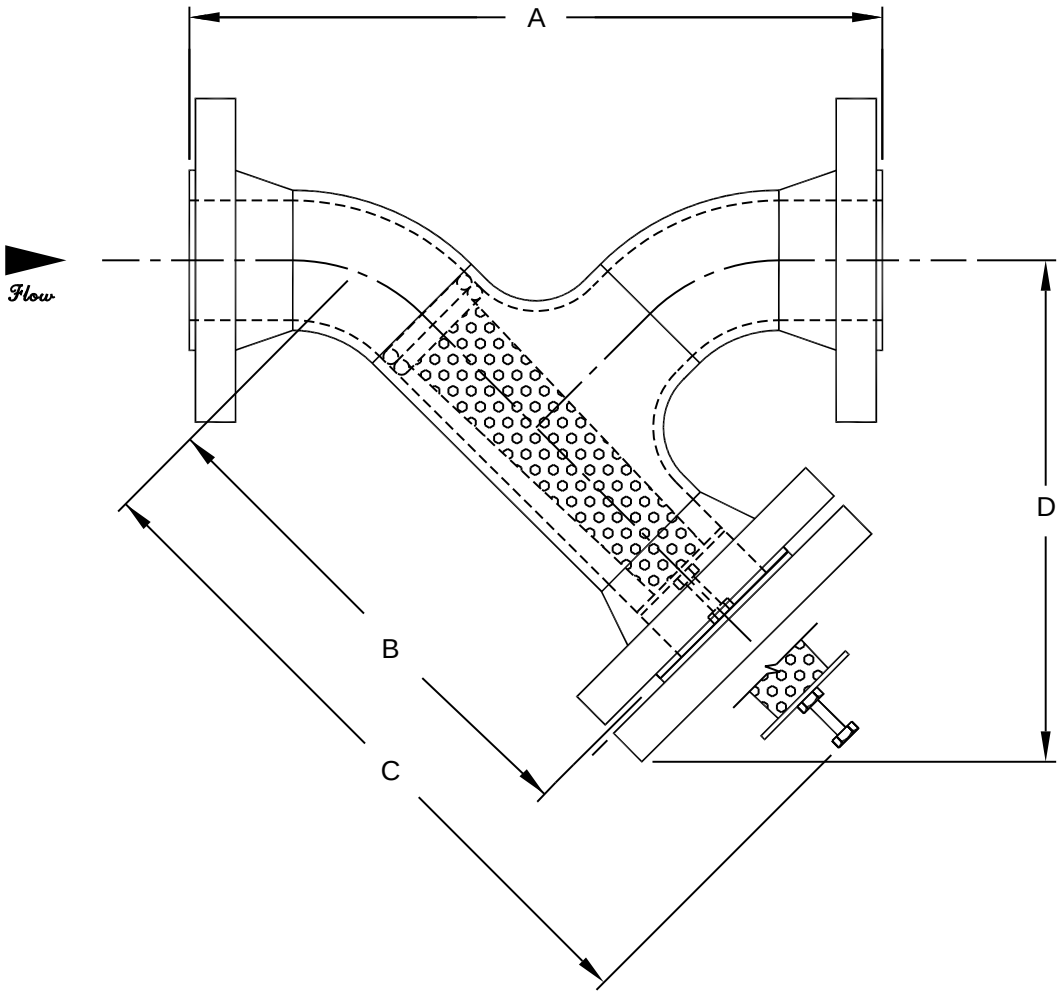
SIZE	DIM. A	DIM. B	DIM. C	DIM. D	WEIGHT
2"	13 3/4"	9 1/4"	17 1/4"	9 1/2"	42 LBS
3"	17 7/8"	12 1/8"	22 1/4"	12 1/2"	66 LBS
4"	21 1/2"	14 7/8"	27 1/4"	15 1/16"	118 LBS
6"	28 15/16"	18 7/8"	34"	18 15/16"	236 LBS
8"	36 1/16"	23 3/8"	41 3/4"	23 1/4"	406 LBS
10"	42 15/16"	27 7/8"	49 1/2"	27 5/8"	628 LBS
12"	50 5/16"	32 5/8"	57 3/4"	32 1/8"	863 LBS
14"	56 15/16"	36 5/16"	63 7/8"	35 3/4"	1171 LBS
16"	62 7/8"	39 3/4"	69 1/2"	39"	1516 LBS
18"	70 1/4"	44 1/2"	77 3/4"	43 1/2"	1939 LBS
20"	76 7/8"	48 7/8"	85 1/4"	47 5/8"	2406 LBS
24"	88 11/16"	54 5/8"	94 1/4"	53 7/8"	3342 LBS

NOTE: DIMENSIONS SHOWN ARE (REFERENCE DIMENSIONS) FOR ESTIMATING PURPOSES ONLY.
ACTUAL DIMENSIONS WILL BE PROVIDED ON "AS-BUILT" DRAWINGS, AVAILABLE WITH ORDER.
THE DIMENSIONS ABOVE ARE ONLY APPLICABLE WITH RAISED FACE WELD NECK (RFWN) FLANGES.
ALL DIMENSIONS ARE BASED ON STANDARD SIZES LISTED IN SPECIFICATIONS ASME/ANSI B16.5 AND ASME B16.9 FOR FLANGED FITTINGS AND BUTTWELDING FITTINGS, RESPECTIVELY.
LARGER SIZES AVAILABLE PER ASME B16.47, SERIES "A" & "B".

DESIGN CRITERIA:
STANDARD DESIGN & FABRICATION ARE IN ACCORDANCE WITH ASME B31.3. OTHER CODES ARE AVAILABLE

FABRICATED FLANGED WYE STRAINER

MODEL YBS STANDARD



CLASS 600, DIMENSIONAL DATA

SIZE	DIM. A	DIM. B	DIM. C	DIM. D	WEIGHT
*2"	14 1/2"	9 5/8"	17 3/4"	9 7/8"	55 LBS
3"	19 1/8"	12 1/2"	22 3/4"	12 3/4"	99 LBS
4"	23 1/4"	15 3/4"	28 1/4"	16 3/16"	189 LBS
6"	30 1/8"	19 7/8"	36"	20 5/8"	378 LBS
8"	38 5/16"	24 1/2"	44"	25 1/8"	590 LBS
10"	46 3/16"	29 1/2"	52 3/4"	30 1/8"	1003 LBS
12"	52 13/16"	33 7/8"	60 1/4"	34 1/8"	1219 LBS
14"	59 3/16"	37 1/2"	66 1/4"	37 3/8"	1348 LBS
16"	65 7/8"	41 1/4"	72 1/2"	41 1/4"	2330 LBS
18"	72 3/4"	45 3/4"	80 1/4"	45 11/16"	2846 LBS
20"	79 9/16"	50 1/4"	88"	50"	3618 LBS
24"	91 7/8"	56 1/4"	97 1/2"	56 5/8"	5029 LBS

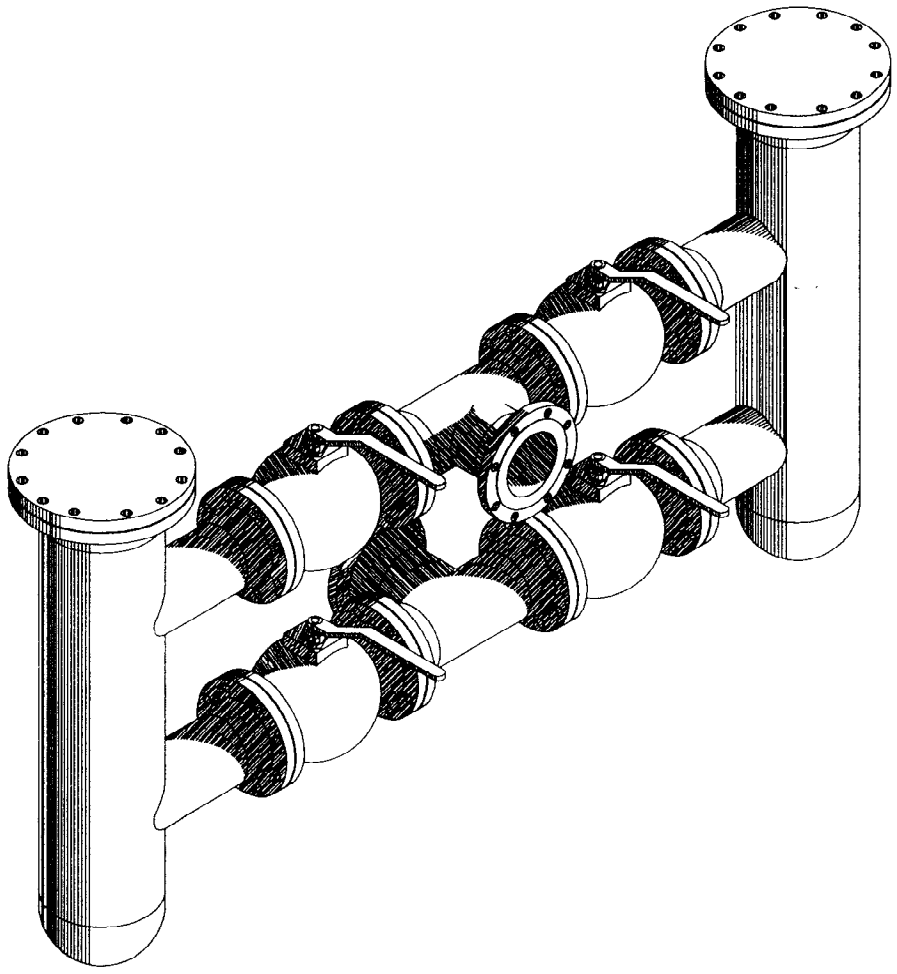
NOTE: * PIPE PUB REQUIRED ON CLOSED END FOR FULL FLANGE BOLT ACCESS (2 " MIN. LENGTH).
DIMENSIONS SHOWN ARE (REFERENCE DIMENSIONS) FOR ESTIMATING PURPOSES ONLY.
ACTUAL DIMENSIONS WILL BE PROVIDED ON "AS-BUILT" DRAWINGS, AVAILABLE WITH ORDER.
THE DIMENSIONS ABOVE ARE ONLY APPLICABLE WITH RAISED FACE WELD NECK (RFWN) FLANGES.
ALL DIMENSIONS ARE BASED ON STANDARD SIZES LISTED IN SPECIFICATIONS ASME/ANSI B16.5
AND ASME B16.9 FOR FLANGED FITTINGS AND BUTTWELDING FITTINGS, RESPECTIVELY.
LARGER SIZES AVAILABLE PER ASME B16.47, SERIES "A" & "B".

DESIGN CRITERIA:
STANDARD DESIGN & FABRICATION ARE IN ACCORDANCE WITH ASME B31.3. OTHER CODES ARE AVAILABLE

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

FABRICATED DUPLEX STRAINERS



REV. 4 01/27/09

DWG NO. CATDPXCS.DWG

AITKEN VERTICAL BASKET DUPLEX STRAINER

STANDARD STRAINER: THE STRAINER MOST WIDELY ACCEPTED BY ALL TYPE OF INDUSTRY. THE STANDARD STRAINER DESIGN MAKES IT THE MOST ECONOMICAL STYLE STRAINER. MINIMUM OPEN AREA RATIO IS 3:1.

SUPER STRAINER: THE SUPER STRAINER'S LARGER BODY AND BASKET DESIGN ALLOWS FOR MORE REMOVABLE CAPACITY AND LESS FREQUENT CLEAN OUT INTERVALS. MINIMUM OPEN AREA RATIO IS 4:1.

MATERIAL SPECIFICATIONS: STANDARD MATERIAL OF CONSTRUCTION IS CARBON STEEL. BASKET MATERIAL IS SPECIFIED BY THE CUSTOMER.

OTHER MATERIALS AVAILABLE IN:

1 1/4 CR - 1/2 MO
5 CR - 1/2 MO
9 CR - 1 MO
304/304L SS
316/316L SS
MONEL

OTHER ALLOYS

DIMENSIONAL DATA: SEE FOLLOWING PAGES.

PRESSURE DROP INFORMATION SEE PRESSURE DROP CHARTS.

RECOMMENDED SPARE PARTS:

1.) BASKET
2.) GASKETS FOR ACCESS OPENING
3.) O-RINGS FOR QUICK OPENING ACCESS CLOSURES

OPTIONS:

1.) QUICK OPENING CLOSURES.
2.) PRESSURE TAP CONNECTIONS
3.) VENTS
4.) CONTINUOUS SLOT-OPENING WEDGE WIRE BASKET
5.) DAVIT FOR ACCESS BLIND FLANGE
6.) FLAT TOP BASKET FOR OFFSET NOZZLES
7.) SELF FLUSHING BLOWDOWN BASKET
8.) TURBINE METER STRAINER
9.) LEGS / BASE SKIRT

DESIGN CODE(s) / STANDARDS:

STANDARD DESIGN AND FABRICATION PER ASME B31.3
OTHER CODES AVAILABLE ARE:
A.S.M.E. 31.1
A.S.M.E. B31.4
A.S.M.E. B31.8
A.S.M.E. PRESSURE VESSEL AND BOILER CODE, SECTION VIII, DIV. 1.
D.O.T.
N.A.C.E.

PAINT/COATINGS: PROVIDED WITH EXTERNAL SP-3 MECHANICAL TOOL CLEANING AND ONE COAT OF SHOP PRIMER OR AS SPECIFIED BY CUSTOMER.

NDE PER APPLICABLE CODE AND / OR CUSTOMER SPECIFICATIONS.

MODEL NUMBER FOR AITKEN VERTICAL BASKET DUPLEX STRAINERS

TYPICAL MODEL NUMBER: 615-10-VBS-X

INLET / OUTLET SIZE

15 ANSI CLASS 150
30 ANSI CLASS 300
60 ANSI CLASS 600
90 ANSI CLASS 900
150 ANSI CLASS 1500
250 ANSI CLASS 2500

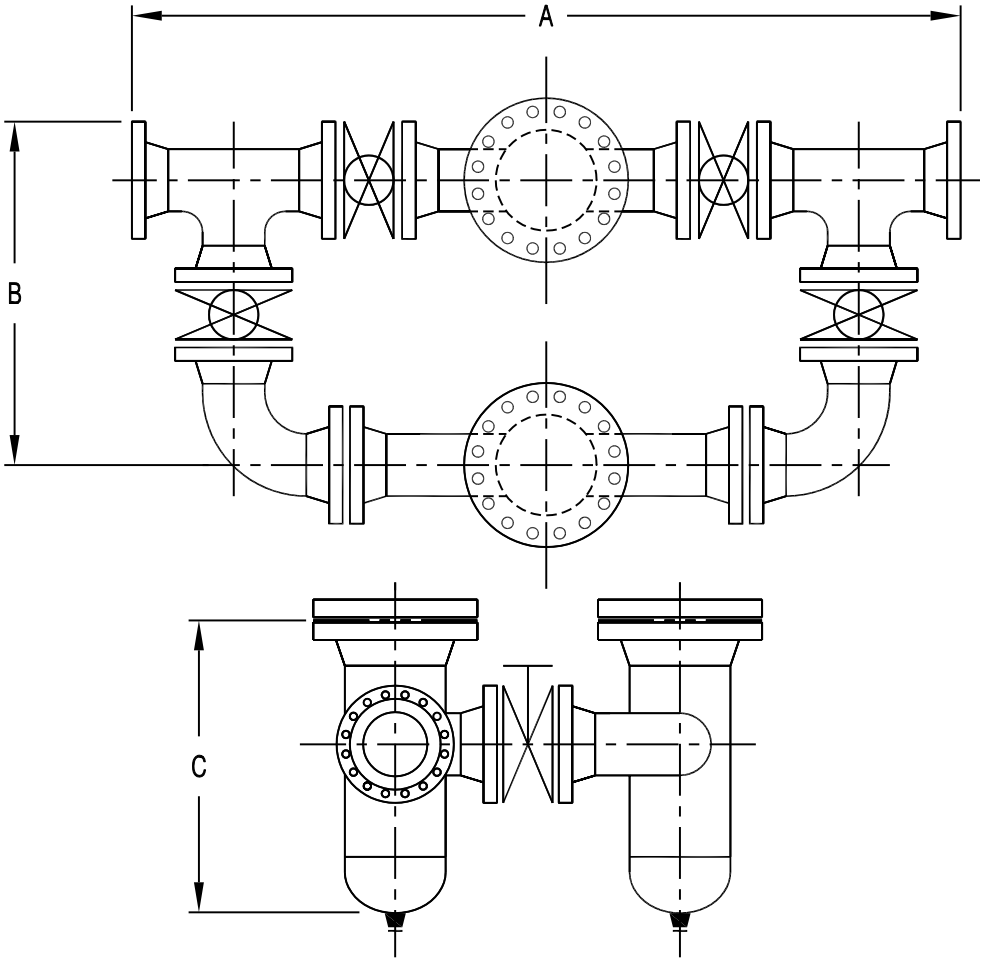
BODY SIZE

SPECIFY OTHER OPTIONS REQUIRED

REV.: 1 1-7-00

DWG NO.: CATDUPVBS

`D` TYPE DUPLEX STRAINER ASSEMBLY



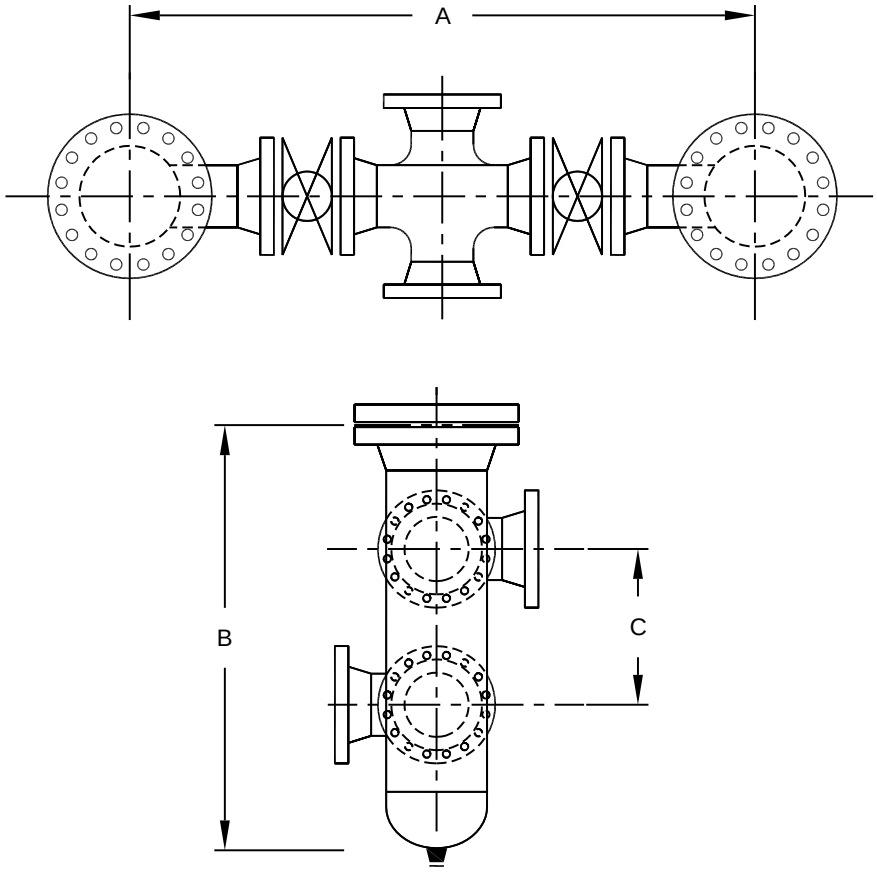
NOTE:

DIMENSIONS FOR REFERENCE ONLY. CERTIFIED DRAWINGS ARE AVAILABLE WITH ORDER.

DIMENSIONAL DATA

NOZZLE/ BODY SIZE	150 LB				300 LB				600 LB			
	A	B	C	WEIGHT	A	B	C	WEIGHT	A	B	C	WEIGHT
8/12	117 1/4	45 1/2	36	4808	121 3/4	47 7/8	36	5822	137 3/4	56 1/8	36	7770
10/14	132 3/4	52 7/8	41	6898	138	55 1/2	41	8270	160 3/4	72 1/8	41	12,782
10/16	132 3/4	52 7/8	42	6998	138	55 1/2	42	8560	160 3/4	72 1/8	42	12,982
12/18	149 3/4	61 3/8	49	9702	155 1/4	64 1/8	49	11,662	174 1/4	73 7/8	49	17,414
14/18	166 3/4	69 3/8	51	11,762	175 1/4	75 3/8	51	14,078	188 3/4	80 5/8	51	21,970
14/20	166 3/4	69 3/8	51	12,042	175 1/4	73 5/8	51	15,388	188 3/4	80 5/8	51	23,080
16/20	181 3/4	76 3/8	51	14,158	187 3/4	80 7/8	51	20,052	204 3/4	89 5/8	51	28,572
18/24	206 3/4	87 7/8	67	20,608	209 3/4	89 3/8	67	27,316	227 3/4	98 5/8	67	36,382
20/24	218 1/2	92 3/4	67	24,444	227 1/4	97 1/8	67	32,156	244 3/4	107 5/8	67	47,312
24/30	249 3/4	107 3/8	83	37,344	255 1/4	111 5/8	83	48,486	280 3/4	124 5/8	83	58,830

`H` TYPE DUPLEX STRAINER ASSEMBLY



NOTE:
DIMENSIONS FOR REFERENCE ONLY. CERTIFIED DRAWINGS ARE AVAILABLE WITH ORDER.

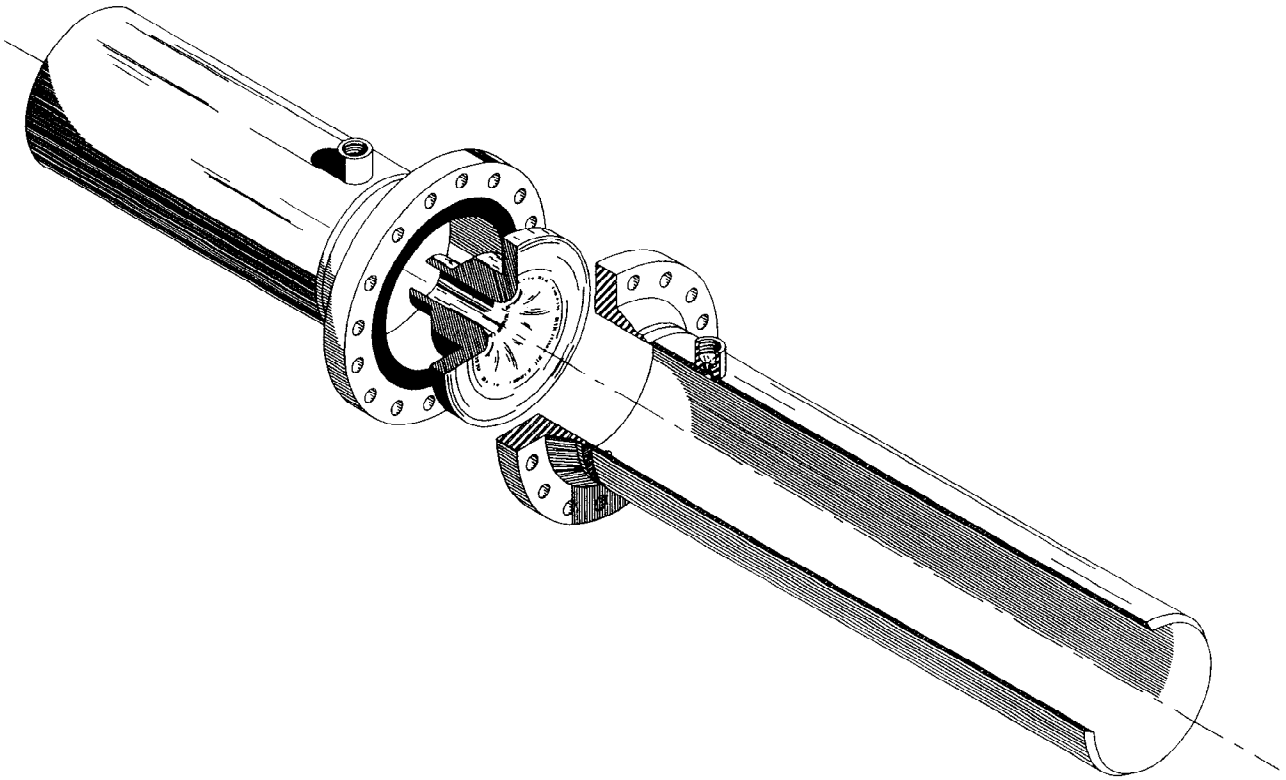
DIMENSIONAL DATA

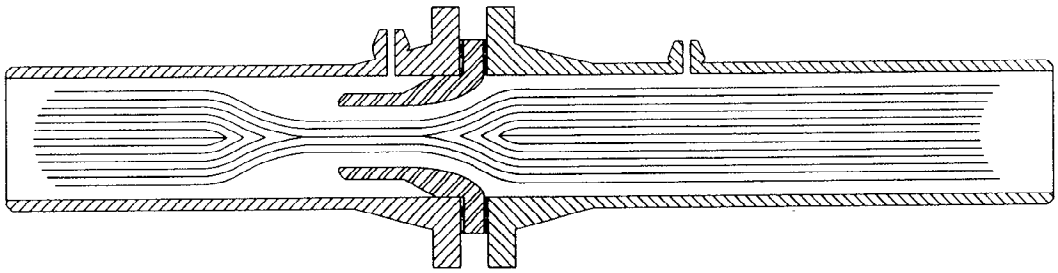
NOZZLE/ BODY SIZE	150 LB				300 LB				600 LB			
	A	B	C	WEIGHT	A	B	C	WEIGHT	A	B	C	WEIGH
8/12	94 1/2	47 7/8	18	4864	98 3/4	48 1/2	18	5962	108	49 3/4	18	7994
10/14	110 1/4	56 7/8	22	6972	111 1/2	57 1/2	22	8468	122 1/2	58 5/8	22	13,160
10/16	110 1/4	57 3/8	22	7072	111 1/2	58 1/8	22	8758	122 1/2	59 5/8	22	13,360
12/18	120 1/2	66 3/8	26	9822	124 3/4	67 1/8	26	11,946	135 3/4	68 3/8	26	17,866
14/18	134 1/2	74 3/8	30	11,916	141 3/4	75 1/8	30	14,450	148 1/2	76 3/8	30	22,664
14/20	134 1/2	75 1/16	30	12,196	141 3/4	75 3/4	30	15,760	148 1/2	77 1/8	30	23,774
16/20	145 1/2	83 1/16	34	14,344	152	83 3/4	34	20,544	159 1/2	85 1/8	34	29,534
18/24	164 1/2	92 3/8	38	20,848	170	93	38	27,926	186	94 5/8	38	37,492
20/24	173 7/8	100 3/8	42	24,754	181 1/4	101	42	32,912	188 1/2	102 5/8	42	48,692
24/30	200 1/2	117 7/8	50	37,764	207 3/4	120 1/8	50	49,576	217 1/2	121 7/8	50	60,784

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

FLOW NOZZLE METER TUBES





REV.: 2 01/27/09

DWG.: CATFNMCV.DWG

FLOW NOZZLES &
FLOW NOZZLE SECTIONS

Service: Recommended for steam and water service. Also suitable for other gases and liquids.

***Accuracy:** Uncalibrated accuracy of 2%.
Calibrated accuracy of ¼%.

Design: Each flow nozzle and flow nozzle section is manufactured in strict accordance with recommendations set forth in the A.S.M.E. Fluid Meters Handbook, A.S.M.E. MFC-3M-1989 and A.S.M.E. piping design codes. Each flow nozzle and nozzle section is computer designed for optimum accuracy and performance.

Fabrication: Welding is accomplished by code certified welders in conformance with A.S.M.E. Boiler and Pressure Vessel Codes.

Materials: In order to assure a highly polished transition and throat section, it is recommended that stainless steel be used.

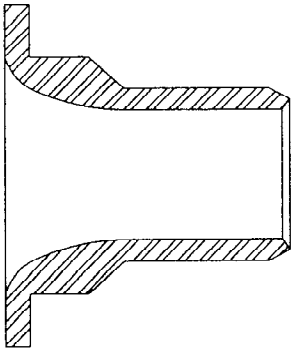
Upon special request, nozzles can be made out of virtually any material.

Advantages:

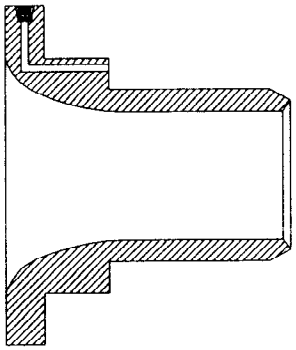
1. Flow capacity is 60% greater for flow nozzles, compared to an orifice plate with same beta ratio.
2. Flow nozzles have less damming effect of solids or foreign matter in the flow stream than the orifice plate.
3. Nozzles sustain accuracy and wear qualities over a longer period of time than the orifice plate.

***It is recommended that the buyer purchase the complete flow section from the same manufacturer to assure stated accuracy.**

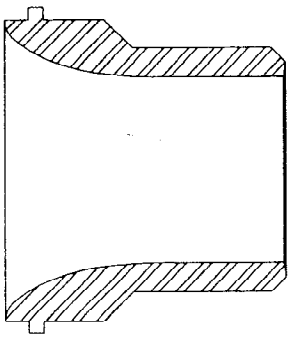
TYPES OF FLOW NOZZLES



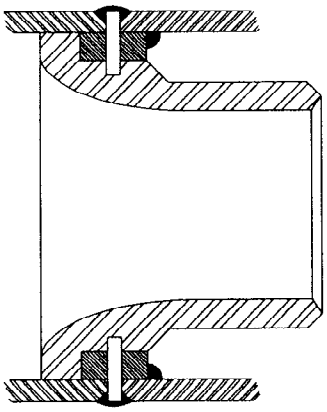
The standard "Flanged Flow Nozzle" style is the most commonly used flow nozzle. It is designed to be inserted between pipe flanges. A specially machined shoulder on the back side of the nozzle assures the proper alignment of the nozzle with the pipe inside diameter. This style flow nozzle utilizes pipe wall taps.



The "Tapped Type Flanged Flow Nozzle: is basically the same as the "Flange" style. A downstream tap, usually a 1/2" connection, is provided in the flange of the nozzle. This style nozzle is recommended in smaller line sizes where the downstream tap usually interferes with the pipe weld or downstream holding flange.



The "Weld-In Flow Nozzle" style is designed to be installed permanently in a pipe section. This nozzle has a specially machined step on the outside diameter, that is used to align a beveled inlet and outlet bored pipe section. This type nozzle is widely used where high temperature and pressure applications prohibit the use of pipe flanges such as in power plant and fee water installations. Pipe wall taps are utilized with this style nozzle.



The Holding Ring Flow Nozzle style is designed so that the welding of dissimilar materials is eliminated. The holding ring and locating pins are made of the same material as the pipe in which the nozzle is to be installed. This allows the nozzle to be offered in a wide range of materials. This style is not recommended for line sizes below 4 inches.

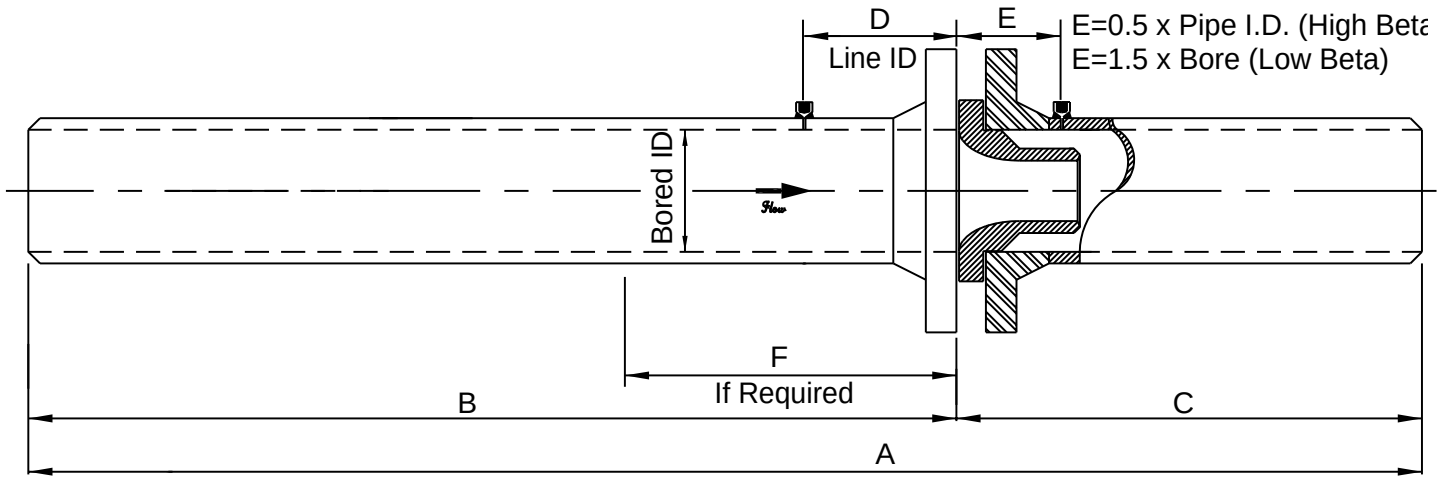
DIMENSIONAL DATA

Size	Pipe	Schedule	Bored ID	A	B	C	F	Weight
	40	4.026”	4.065”					87
4”	80	3.826”	4.026”	6’-8”	5’-0”	1’-8”	1’-4”	112
	120	3.624”	3.697”					127
	160	3.438”	3.514”					148
	40	5.047”	5.089”					162
5”	80	4.813”	4.874”	8’-4”	6’-3”	2’-1”	1’-8”	188
	120	4.563”	4.626”					238
	160	4.313”	4.408”					285
	40	6.065”	6.111”					244
6”	80	5.761”	5.805”	10’-0”	7’-6”	2’-6”	2’-0”	330
	120	5.501”	5.577”					410
	160	5.187”	5.304”					500
	40	7.981”	8.033”					450
8”	80	7.625”	7.681”	13’-4”	10’-0”	3’-4”	2’-8”	618
	120	7.187”	7.299”					846
	160	6.813”	6.97”					1,025
	40	10.02”	10.081”					750
10”	80	9.562”	9.638”	16’-8”	12’-6”	4’-2”	3’-4”	1,108
	120	9.062”	9.201”					1,500
	160	8.5”	8.707”					1,929
	40	11.938”	12.004”					1,100
12”	80	11.374”	11.467”	20’-0”	15’-0”	5’-0”	4’-0”	1,879
	120	10.75”	10.919”					2,609
	160	10.126”	10.373”					3,308
	40	13.124”	13.197”					1,618
14”	80	12.5”	12.603”	23’-4”	17’-6”	5’-10”	4’-8”	2,580
	120	11.812”	12.003”					3,575
	160	11.188”	11.455”					4,450
	40	15”	15.25”					2,392
16”	80	14.312”	14.435”	26’-8”	20’-0”	6’-8”	5’-4”	3,789
	120	13.562”	13.778”					5,240
	160	12.812”	13.122”					6,610
	40	16.876”	17”					3,419
18”	80	16.124”	16.265”	30’-0”	22’-6”	7’-6”	6’-0”	5,399
	120	15.25”	15.499”					7,563
	160	14.438”	14.788”					9,495
	40	18.812”	19”					4,365
20”	80	17.938”	18.095”	33’-4”	25’-0”	8’-4”	6’-8”	7,203
	120	17”	17.274”					10,043
	160	16.062”	16.455”					12,782
	40	22.624”	22.876”					7,248
24”	80	21.562”	21.762”	40’-0”	30’-0”	10’-0”	8’-0”	12,206
	120	20.376”	20.723”					17,526
	160	19.312”	19.794”					21,950

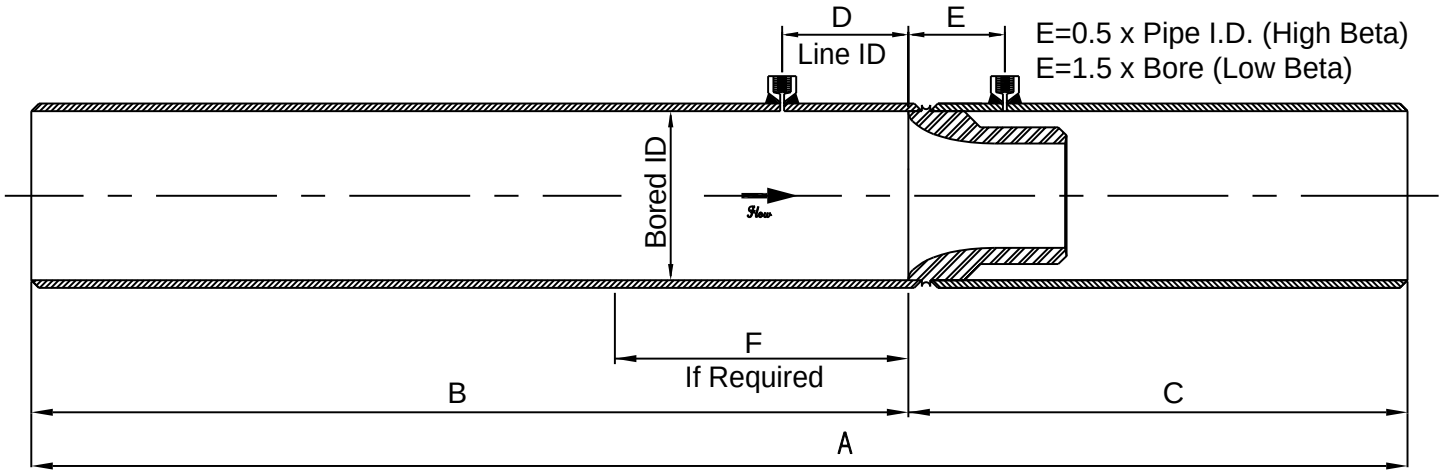
General Notes

1. **Dimensions shown are based on Figure (A) & 0.7 Beta Ratio from A.S.M.E. Fluid Meters, 6th Edition.**
2. **Boring of dimension “F” is required on holding ring type nozzle section.**
3. **Pipe boring (Dimension F) is required if pipe is out of round by more than 0.33% of average pipe ID or if pipe surface does not maintain a 300 Micro-Inch Finish.**
4. **Nozzle sections are manufactured in strict accordance with A.S.M.E. Fluid Meters Handbook and A.S.M.E. Piping Design Codes.**
5. **Dimensions are approximate and subject to change.**
6. **Weights are based on weld-in style flow nozzles and beveled ends.**

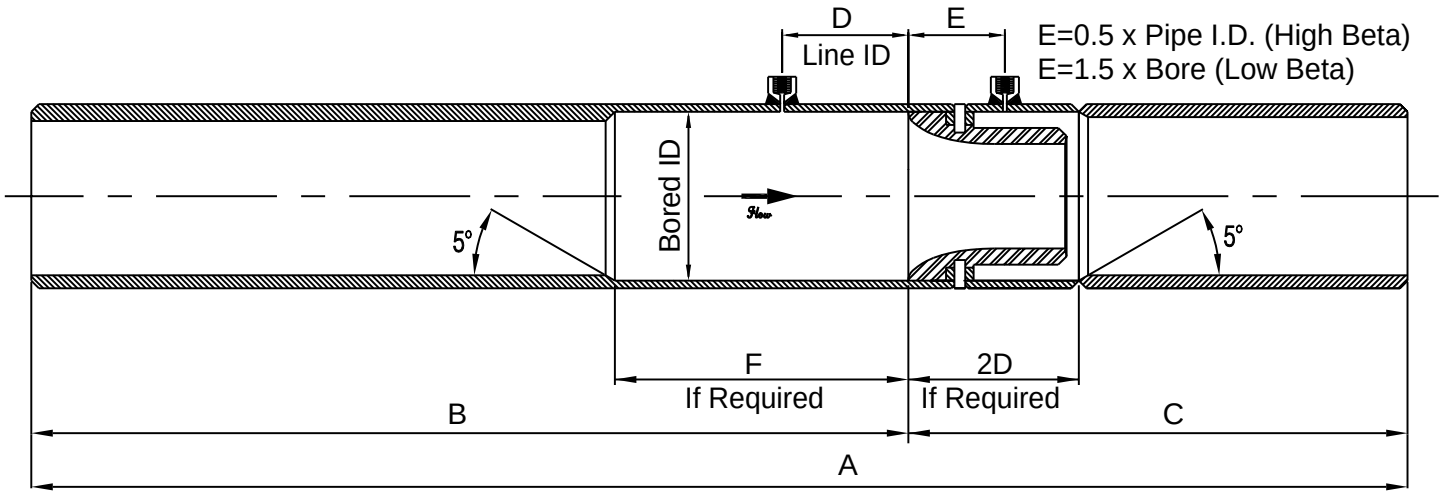
FLOW NOZZLE SECTIONS



FLANGED FLOW NOZZLE



WELD-IN FLOW NOZZLE



HOLDING PIN FLOW NOZZLE

ORDER ENTRY INFORMATION

NOZZLE TYPE

Flanged (Std) **Flanged (Tap)** **Throat-Tap**

Weld-In **Holding-Ring**

FLOW NOZZLE PIPE SECTION

Manufacturing & Design Code:

B31.3 **B31.8**

A.S.M.E. Section VIII, Div. I, "U" Stamp

Other:_____

Design Temp. _____ °F **Design Pressure_____PSIG**

Corrosion Allowance_____

FLOW NOZZLE PIPE SECTION

Pressure Tap Connection _____

Outer End Prep.: **Beveled** **Other _____**

Surface Prep.: **Sand Blast** **Shop Primer** **Other_____**

MATERIAL SPECIFICATION

Nozzle _____ **Pipe _____**

Attach appropriate completed Bore Calculation Data Sheet.

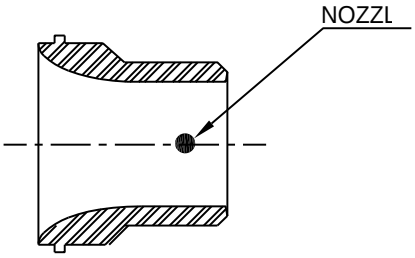
AITKEN
4920 Airline Dr.
HOUSTON, TEXAS 77022

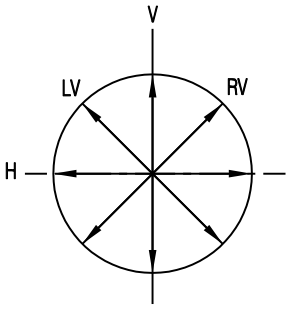
FLOW NOZZLE MICROMETER READINGS

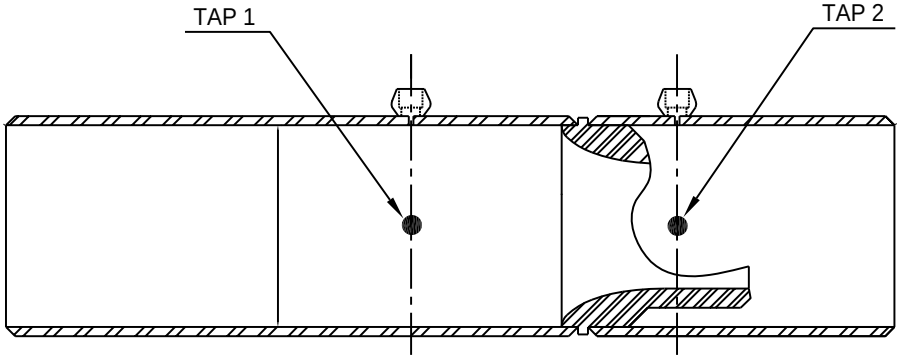
CUSTOMER _____ TAG NO.: _____
ADDRESS: _____ P.O. NO.: _____
DESTINATION: _____ INV. NO.: _____

THROAT BORE: _____
SIZE: _____ RATING: _____ PIPE SCH.: _____ PUB. I.D.: _____

DATE PERFORMED: _____
NOZZLE SERIAL NO.: _____







TYPE	UPSTREAM TAP	DOWNSTREAM TAP	NOZZLE
	TAP 1	TAP2	
V			
LV			
RV			
H			
AVG.			

THIS IS TO CERTIFY THAT THE ABOVE MICROMETER READINGS ARE CORRECT AND ACCURATE.

SIGNED: _____ DATE: _____

AITKEN

TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: LIQUID

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____

STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Vapor Pressure (psia)				
OPTION 2:				
***Specific Gravity @ Base				
Specific Gravity @ Flow				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Vapor Pressure (psia)				
****OPTION 3: (Database)**				
Water				

⇔*Customer must provide information for either Option1, Option 2, **OR** Option3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are needed for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN
TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET
FLUID TYPE : GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
***Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Air				

⇔*Customer must provide information for either Option 1, Option 2, **OR** Option 3.
**Available for some fluids. Inquire if desired fluid is available on Database.
***These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

AITKEN
TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: VAPOR

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
***Liquid Compressibility @ Base (z)				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Steam				

⇔*Customer to provide information; EITHER OPTION 1, OPTION 2, **OR** OPTION3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are required for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN
TEL.: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE : NATURAL GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

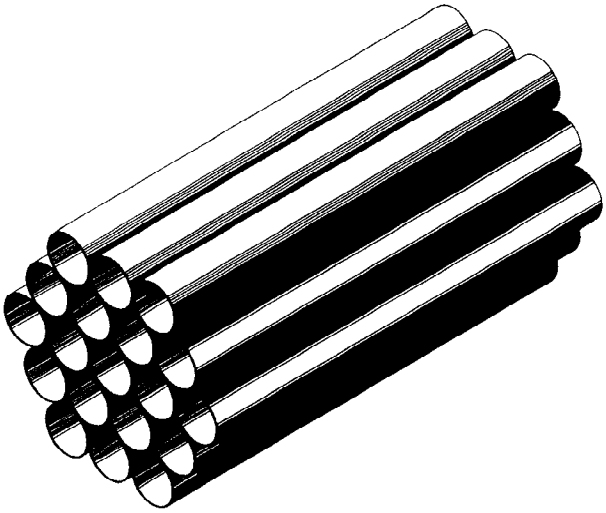
Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
**Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
**Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 3:				
%Nitrogen				
%Carbon Dioxide				
Specific Gravity @ Base				

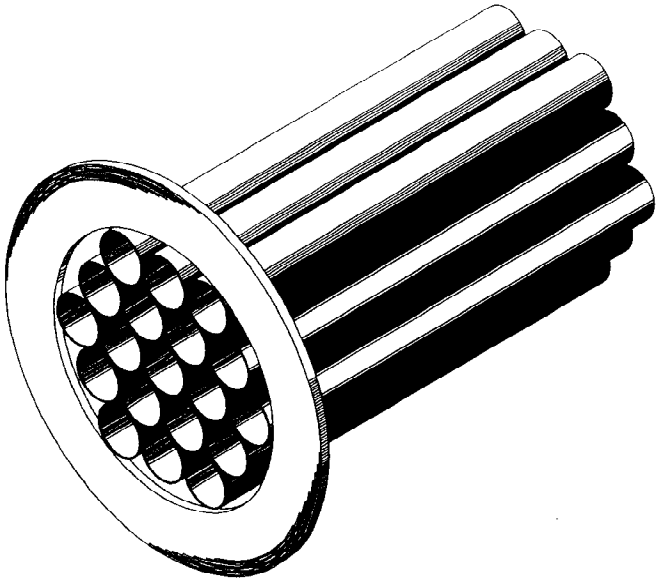
⇔*Customer to provide information for either Option 1, Option 2, **OR** Option 3.
**These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

STRAIGHTENING VANES





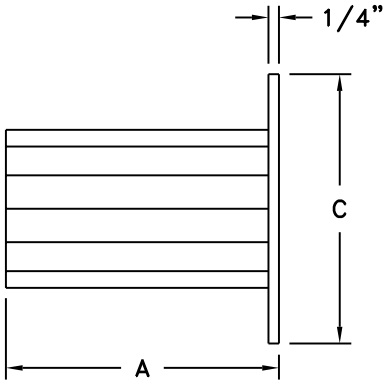
REV. 2 01/27/09

DWG NO. CATSVNCS.DWG

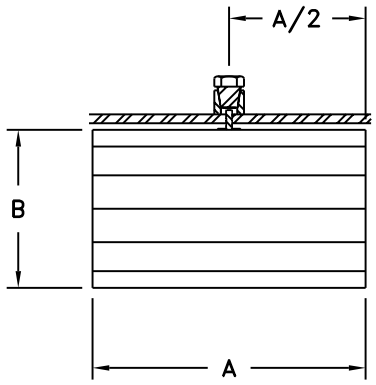
STRAIGHTENING VANES

SIZE AND TYPE OF VANE INSTALLATION

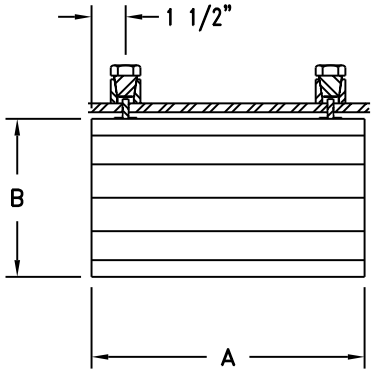
FLANGE MODEL
ALL SIZES

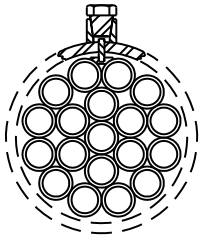


LINE MODEL
2" – 10"

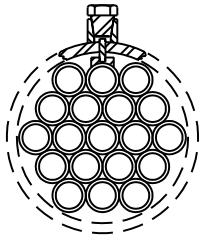


LINE MODEL
12" & UP

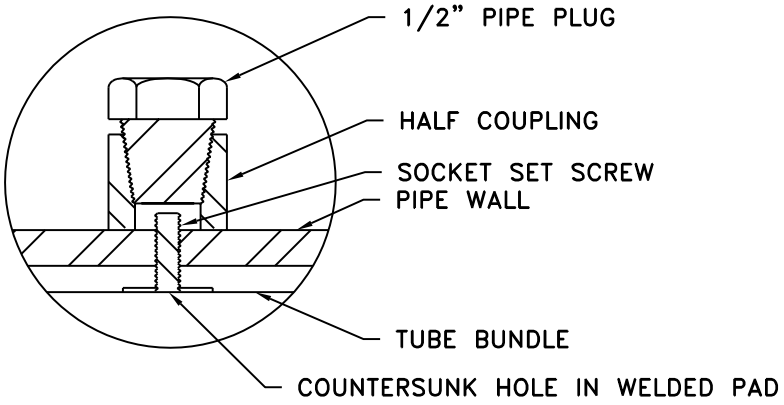




TYPE II
CONCENTRIC BUNDLE



TYPE III
SCALLOP BUNDLE



NOTE:
TUBE DIMENSIONS SHOWN ARE SUBJECT
TO CHANGE WITHOUT NOTICE

STRAIGHTENING VANES

CARBON STEEL

DIMENSIONAL DATA

								LINE MODEL	APPROX. WEIGHTS		
LINE SIZE	TYPE OF VANE	LINE I.D.	LENGTH OF VANE	O.D. OF VANE	O.D. OF TUBES*	TUBE W.T.	NO. OF TUBES	NO. & SIZE OF SCREWS	FLANGE MODEL	LINE MODEL	FLANGE O.D.
			A	B	D	E			LBS.	LBS.	C
2"	II	2.067"	6"	1 27/32"	3/8"	0.049	19	1-3/8" X 3/4"	3	2	3 5/8"
2"	II	1.939"	6"	1 27/32"	3/8"	0.049	19	1-3/8" X 3/4"	3	2	3 5/8"
3"	III	3.068"	8"	2 13/16"	9/16"	0.049	19	1-3/8" X 3/4"	4	3	5"
3"	II	2.900"	8"	2 3/4"	9/16"	0.049	19	1-3/8" X 3/4"	4	3	5"
4"	III	4.026"	10"	3 3/4"	3/4"	0.049	19	1-3/8" X 3/4"	8	7	6 3/16"
4"	II	3.826"	10"	3 21/32"	3/4"	0.049	19	1-3/8" X 1"	8	7	6 3/16"
5"	II	5.047"	12"	4 27/32"	1"	0.049	19	1-1/2" X 1"	11	9	7 5/16"
6"	III	6.065"	12"	5 5/8"	1 1/8"	0.049	19	1-1/2" X 1"	21	19	8 1/2"
6"	II	5.761"	12"	5 1/2"	1 1/8"	0.049	19	1-1/2" X 1"	21	19	8 1/2"
8"	II	7.625"	16"	7 5/16"	1 1/2"	0.065	19	1-1/2" X 1"	37	35	10 5/8"
8"	II	7.981"	16"	7 29/32"	1 5/8"	0.065	19	1-1/2" X 1"	37	35	10 5/8"
10"	II	10.136"	20"	9 3/4"	2"	0.065	19	1-1/2" X 1"	57	54	12 3/4"
10"	II	10.020"	20"	9 3/4"	2"	0.065	19	1-1/2" X 1"	57	54	12 3/4"
12"	III	12.090"	24"	11 7/8"	2 3/8"	0.083	19	2-1/2" X 1 1/4"	81	77	15"
12"	III	11.374"	24"	10"	2"	0.083	19	2-1/2" X 1 1/4"	81	77	15"
12"	II	11.938"	24"	11 9/16"	2 3/8"	0.083	19	2-1/2" X 1 1/4"	81	77	15"
14"	III	13.250"	28"	12 1/2"	2 1/2"	0.120	19	2-1/2" X 1 1/4"	105	100	16 1/4"
14"	III	13.000"	28"	12 1/2"	2 1/2"	0.120	19	2-1/2" X 1 1/4"	105	100	16 1/4"
16"	III	15.250"	32"	15"	3"	0.188	19	2-1/2" X 1 1/4"	274	268	18 1/2"
16"	II	15.000"	32"	14 19/32"	3"	0.188	19	2-1/2" X 1 1/4"	274	268	18 1/2"
18"	II	17.25	36"	17 1/16"	3 1/2"	0.188	19	2-1/2" X 1 1/4"	386	378	21"
20"	III	19.250"	40"	18 1/8"	3 5/8"	0.250	19	2-1/2" X 1 1/4"	477	468	23"
24"	III	23.250"	48"	22 1/2"	4 1/2"	0.250	19	2-1/2" X 1 1/2"	704	693	27 1/4"
26"	III	25.250"	52"	25"	5"	0.188	19	2-1/2" X 1 1/2"	814	796	29 1/2"
30"	III	29.250"	60"	27 1/2"	5 1/2"	0.188	19	2-1/2" X 1 1/2"	1295	1273	33 3/4"
34"	II	33.250"	68"	32 13/16"	6 3/4"	0.250	19	2-1/2" X 1 1/2"	1880	1860	38"
36"	III	35.250"	72"	33 3/4"	6 3/4"	0.250	19	2-1/2" X 1 1/2"	1582	1559	40 1/4"

***O.D. of tubes is subject to change based on material availability at time of order.**

NOTE:
TUBE DIMENSIONS SHOWN ARE SUBJECT
TO CHANGE WITHOUT NOTICE

STRAIGHTENING VANES

304 STAINLESS STEEL

DIMENSIONAL DATA

								LINE MODEL	APPROX. WEIGHTS		
LINE SIZE	TYPE OF VANE	LINE I.D.	LENGTH OF VANE	O.D. OF VANE	O.D. OF TUBES*	TUBE W.T.	NO. OF TUBES	NO. & SIZE OF SCREWS	FLANGE MODEL	LINE MODEL	FLANGE O.D.
			A	B	D	E			LBS.	LBS.	C
2"	II	2.067"	6"	1 27/32"	3/8"	0.049	19	1-3/8" X 3/4"	3	2	3 5/8"
2"	II	1.939"	6"	1 27/32"	3/8"	0.049	19	1-3/8" X 3/4"	3	2	3 5/8"
3"	III	3.068"	8"	2 13/16"	9/16"	0.049	19	1-3/8" X 3/4"	4	3	5"
3"	II	2.900"	8"	2 3/4"	9/16"	0.049	19	1-3/8" X 3/4"	4	3	5"
4"	III	4.026"	10"	3 3/4"	3/4"	0.049	19	1-3/8" X 3/4"	8	7	6 3/16"
4"	II	3.826"	10"	3 21/32"	3/4"	0.049	19	1-3/8" X 1"	8	7	6 3/16"
6"	III	6.065"	12"	5 5/8"	1 1/8"	0.049	19	1-1/2" X 1"	21	19	8 1/2"
6"	II	5.761"	12"	5 1/2"	1 1/8"	0.049	19	1-1/2" X 1"	21	19	8 1/2"
8"	II	7.625"	16"	7 5/16"	1 1/2"	0.065	19	1-1/2" X 1"	37	35	10 5/8"
8"	II	7.981"	16"	7 29/32"	1 5/8"	0.065	19	1-1/2" X 1"	37	35	10 5/8"
10"	II	10.136"	20"	9 3/4"	2"	0.065	19	1-1/2" X 1"	57	54	12 3/4"
10"	II	10.020"	20"	9 3/4"	2"	0.065	19	1-1/2" X 1"	57	54	12 3/4"
12"	III	12.090"	24"	11 1/4"	2 1/4"	0.083	19	2-1/2" X 1 1/4"	81	77	15"
12"	II	11.374"	24"	10 31/32"	2 1/4"	0.083	19	2-1/2" X 1 1/4"	81	77	15"
12"	III	11.938"	24"	11 1/4"	2 1/4"	0.083	19	2-1/2" X 1 1/4"	81	77	15"

***O.D. of tubes is subject to change based on material availability at time of order.**

NOTE:
TUBE DIMENSIONS SHOWN ARE SUBJECT
TO CHANGE WITHOUT NOTICE

STRAIGHTENING VANES

316 STAINLESS STEEL

DIMENSIONAL DATA

								LINE MODEL	APPROX. WEIGHTS		
LINE SIZE	TYPE OF VANE	LINE I.D.	LENGTH OF VANE	O.D. OF VANE	O.D. OF TUBES*	TUBE W.T.	NO. OF TUBES	NO. & SIZE OF SCREWS	FLANGE MODEL	LINE MODEL	FLANGE O.D.
			A	B	D	E			LBS.	LBS.	C
2"	II	2.067"	6"	1 27/32"	3/8"	0.049	19	1-3/8" X 3/4"	3	2	3 5/8"
2"	II	1.939"	6"	1 27/32"	3/8"	0.049	19	1-3/8" X 3/4"	3	2	3 5/8"
3"	III	3.068"	8"	2 13/16"	9/16"	0.065	19	1-3/8" X 3/4"	4	3	5"
3"	II	2.900"	8"	2 3/4"	9/16"	0.065	19	1-3/8" X 3/4"	4	3	5"
4"	III	4.026"	10"	3 3/4"	3/4"	0.049	19	1-3/8" X 3/4"	8	7	6 3/16"
4"	II	3.826"	10"	3 21/32"	3/4"	0.049	19	1-3/8" X 1"	8	7	6 3/16"
6"	III	6.065"	12"	5"	1"	0.049	19	1-1/2" X 1"	21	19	8 1/2"
6"	III	5.761"	12"	5"	1"	0.049	19	1-1/2" X 1"	21	19	8 1/2"
8"	II	7.625"	16"	7 5/16"	1 1/2"	0.065	19	1-1/2" X 1"	37	35	10 5/8"
8"	II	7.981"	16"	7 29/32"	1 5/8"	0.065	19	1-1/2" X 1"	37	35	10 5/8"
10"	II	10.136"	20"	9 3/4"	2"	0.065	19	1-1/2" X 1"	57	54	12 3/4"
10"	II	10.020"	20"	9 3/4"	2"	0.065	19	1-1/2" X 1"	57	54	12 3/4"
12"	III	12.090"	24"	10"	2"	0.083	19	2-1/2" X 1 1/4"	81	77	15"
12"	III	11.374"	24"	10"	2"	0.083	19	2-1/2" X 1 1/4"	81	77	15"
12"	III	11.938"	24"	10"	2"	0.083	19	2-1/2" X 1 1/4"	81	77	15"

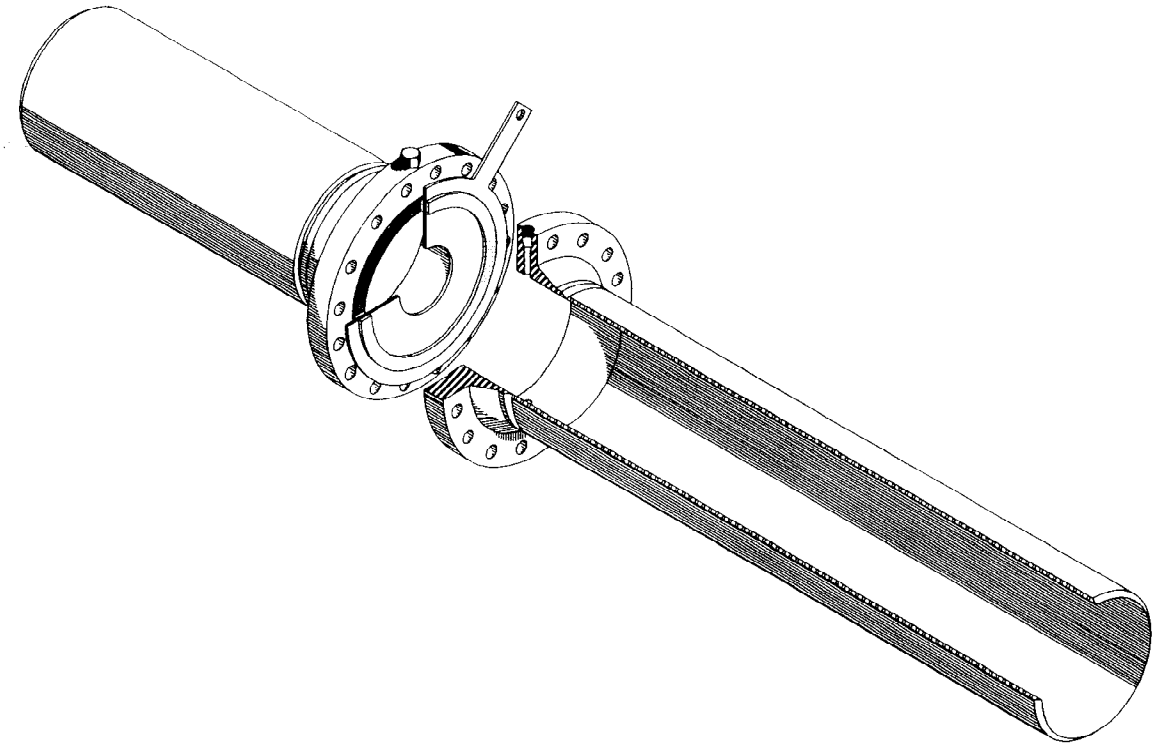
***O.D. of tubes is subject to change based on material availability at time of order.**

NOTE:
TUBE DIMENSIONS SHOWN ARE SUBJECT
TO CHANGE WITHOUT NOTICE

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

ORIFICE FLANGE UNION METER TUBES



REV. 3, 01/27/09

DWG. NO. CATMETCS.DWG

Special care is taken to assure that each Meter Tube is manufactured to meet or exceed the recommendations of The American Gas Association (AGA), American Society of Mechanical Engineers (ASME),API/ANSI MPMS Chapter 14.3, and GPA (Gas Processors Association) 8185-90. Each Meter Tube is individually inspected at various production points to assure adherence to quality standards. Each weld is made by code certified welders and then ground and polished smooth. Pipe and tubing is carefully inspected before purchase to guarantee quality.

Typical Meter Tube Configuration:

Pipe: Commercially A-106 GRADE B SMLS

Flanges: 300# Raised Face Weldneck Orifice

Outer Ends: Beveled for welding

Inspection: Micrometer charts

Hardware: 1/16" non-asbestos gaskets, B-7 studs, jackscrews, plugs

Couplings: None (Specified by customer)

Orifice Plate: Sold Separately

Options:

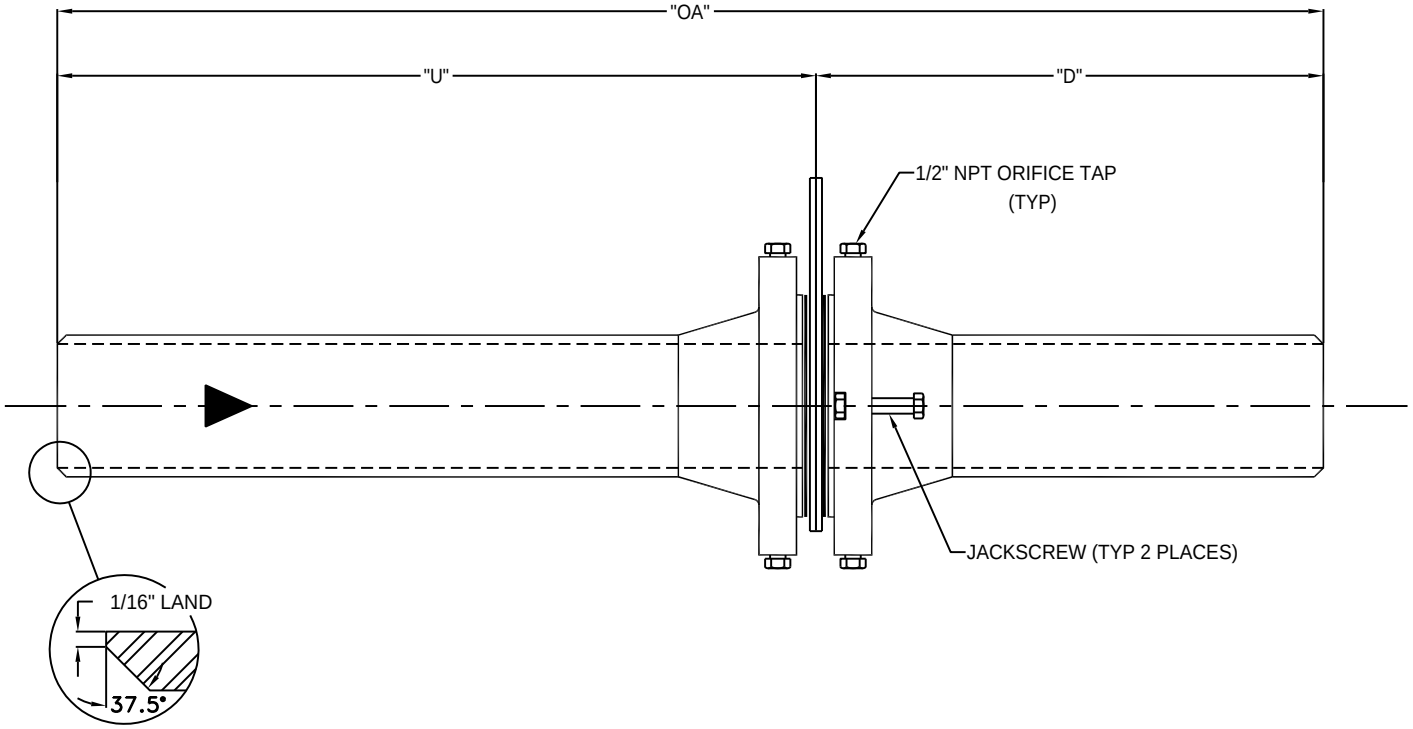
Pipe: Stainless steel, monel, hastelloy, nickel & others

Outer ends: Flanged, threaded, or socketweld

Straightening vanes: Line and flanged type

Inspection: Hydrostatic and all other NDE testing

ORIFICE FLANGE METER TUBE ASSEMBLY



BEVEL DETAIL

TYPICAL APPLICATION

PIPE SIZE	"U"	"D"	"OA"	PIPE I.D. SCH. 40	PIPE I.D. SCH. 80
2"	5'–0"	3'–0"	8'–0"	2.067"	1.939"
3"	6'–0"	4'–0"	10'–0"	3.068"	2.900"
4"	8'–0"	4'–0"	12'–0"	4.026"	3.826"
6"	12'–0"	5'–0"	17'–0"	6.065"	5.761"
8"	15'–0"	5'–0"	20'–0"	7.981"	7.625"
10"	19'–0"	6'–0"	25'–0"	10.020"	9.564"
12"	21'–0"	7'–0"	28'–0"	11.938"	11.376"

Lengths above are Aitken standard lengths. Customer to advise length required to meet applicable code.

WHEN ORDERING, PLEASE SPECIFY:

1. LINE SIZE
2. FLANGE RATING AND TYPE
3. PIPE I.D.
4. ENDS (BEVELED, FLANGED, THREADED, OTHER)
5. INSPECTION AND TESTING REQUIREMENTS
6. PIPE LENGTH

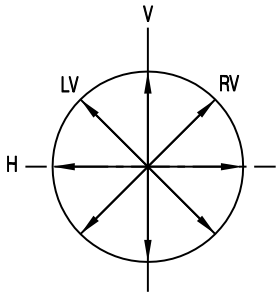
AITKEN
4920 Airline Dr.
HOUSTON, TEXAS 77022

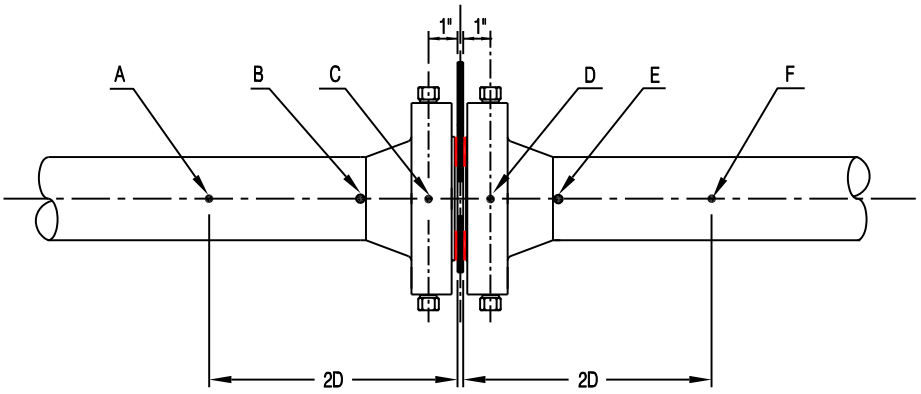
METER TUBE MICROMETER READINGS

CUSTOMER _____ TAG NO.: _____
ADDRESS: _____ P.O. NO.: _____
DESTINATION: _____ INV. NO.: _____

FITTING TYPE: _____ BORE: _____
SIZE: _____ RATING: _____ PIPE SCH.: _____ PUB. I.D.: _____

METER TUBE SURFACE TEMPERATURE(°F): _____
DATE PERFORMED: _____
METER TUBE SERIAL NO.: _____





TYPE	UPSTREAM TUBE			DOWNSTREAM TUBE				
	LOCATION			LOCATION				
	A	B	C	D	E	F	G	H
V								
LV								
RV								
H								
AVG.								
MEAN AVG. STAMPED/TUBE	$\frac{A+B+C}{3}$			$\frac{D+E+F}{3}$			$\frac{G+H}{2}$	

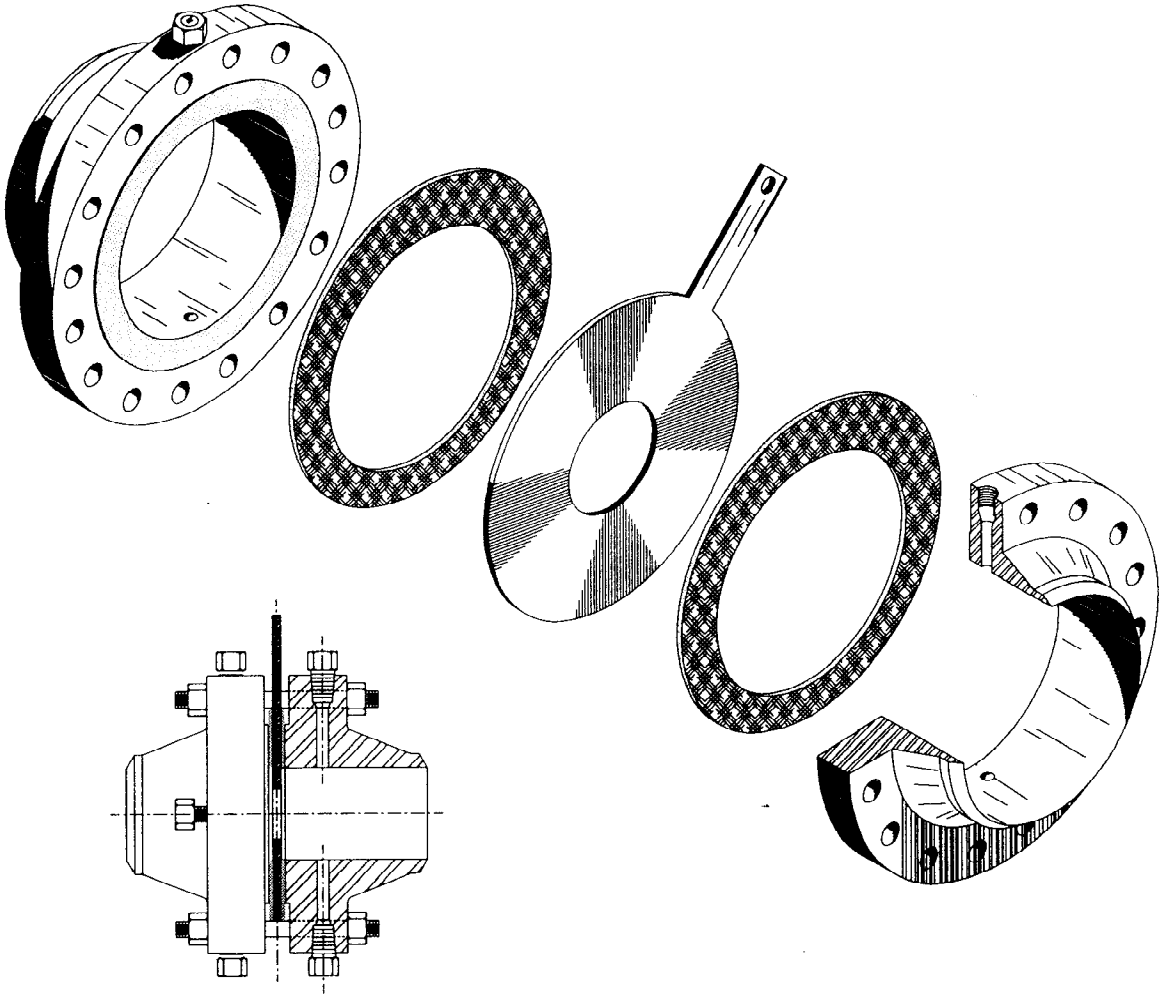
THIS IS TO CERTIFY THAT THE ABOVE MICROMETER READINGS ARE CORRECT AND ACCURATE.

SIGNED: _____ DATE: _____

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

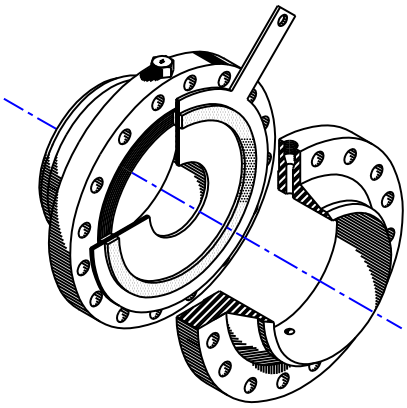
ORIFICE FLANGE UNIONS

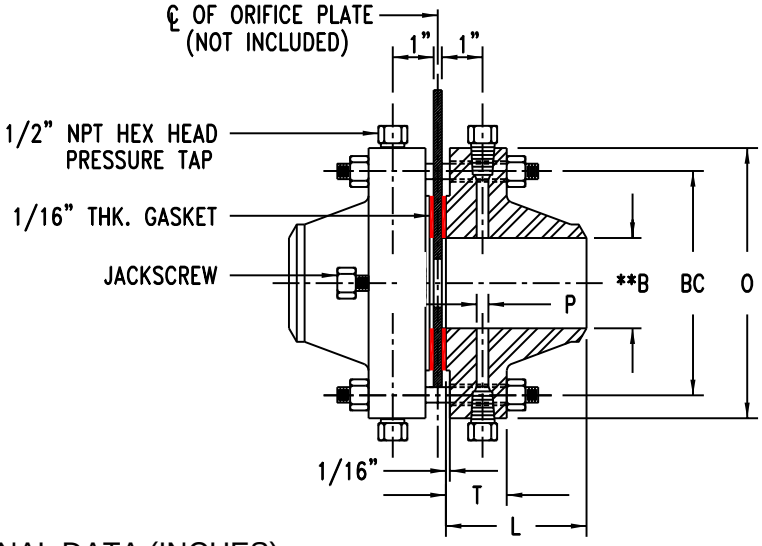


REV.: 4 03/12/13

DWG.: CATOFUCV.DWG

RAISED FACE WELD NECK ORIFICE FLANGES





CLASS 300, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	DIAMETER OF FLANGE	MINIMUM FLANGE THICKNESS	DIAMETER OF RAISED FACE	LENGTH THROUGH HUB	PRESSURE TAP HOLE SIZE	DIAMETER OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	O	T	R	L	P	BC	# Ø	Ø	S	J	W
*0.5"	SEE CLASS 600 FOR 3" NPS AND SMALLER.										
*0.75"											
1"											
*1.25"											
1.5"											
2"											
2.5"											
3"	8.25"	1.5"	5"	3.5"	0.375"	6.62"	8	0.81"	0.75"x5.25"	0.75"x3"	48
4"	10"	1.5"	6.19"	3.62"	0.5"	7.88"	8	0.81"	0.75"x5.25"	0.75"x3"	68
6"	12.5"	1.5"	8.5"	3.94"	0.5"	10.62"	12	0.88"	0.75"x5.25"	0.75"x3"	100
8"	15"	1.62"	10.62"	4.38"	0.5"	13"	12	1"	0.875"x5.75"	0.75"x3"	155
10"	17.5"	1.88"	12.75"	4.62"	0.5"	15.25"	16	1.12"	1"x6.5"	1"x4.5"	220
12"	20.5"	2"	15"	5.12"	0.5"	17.75"	16	1.25"	1.125"x7"	1"x4.5"	330
14"	23"	2.12"	16.25"	5.62"	0.5"	20.25"	20	1.25"	1.125"x7.25"	1"x4.5"	425
16"	25.5"	2.25"	18.5"	5.75"	0.5"	22.25"	20	1.38"	1.25"x7.75"	1"x4.5"	590
18"	28"	2.38"	21"	6.25"	0.5"	24.75"	24	1.38"	1.25"x8"	1"x4.5"	750
20"	30.5"	2.5"	23"	6.38"	0.5"	27"	24	1.38"	1.25"x8.5"	1"x4.5"	910
22"	33"	2.69"	25.25"	6.5"	0.5"	29.25"	24	1.62"	1.5"x9.25"	1"x5.5"	1125
24"	36"	2.75"	27.25"	6.62"	0.5"	32"	24	1.62"	1.5"x9.5"	1"x5.5"	1350
36"	50"	4.18"	40.25"	9.5"	0.5"	46"	32	2.12"	2"x13.25"	1"x6.5"	3200

*SIZES NOT LISTED IN ASME/ANSI B16.36, ORIFICE FLANGES.

**DIMENSION "B" TO BE SPECIFIED BY CUSTOMER.

REFERENCE ASME B16.5 & B16.36 FOR MATERIAL OF CONSTRUCTION, DIMENSIONS, PRESSURE/TEMPERATURE RATINGS AND IDENTIFICATION MARKINGS.

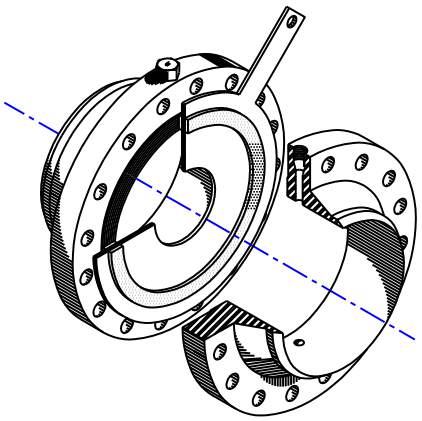
EACH ORIFICE UNION COMES COMPLETE WITH:

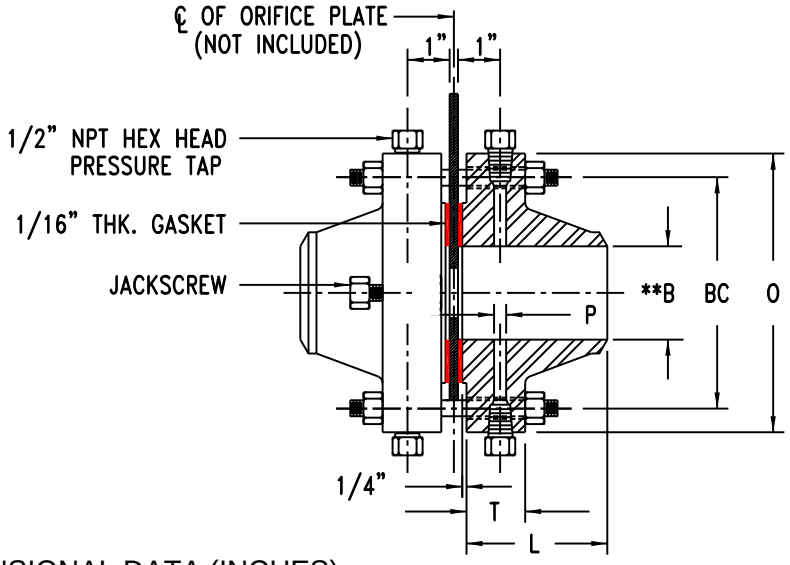
(2) JACKSCREWS
(2) 1/2" PLUGS
(2) GASKETS 1/16" THICK COMPRESSED NON-ASBESTOS

REV.: 3 03/12/13

DWG NO.: CATOFU3W.DWG

RAISED FACE WELD NECK ORIFICE FLANGES





CLASS 400, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	DIAMETER OF FLANGE	MINIMUM FLANGE THICKNESS	DIAMETER OF RAISED FACE	LENGTH THROUGH HUB	PRESSURE TAP HOLE SIZE	DIAMETER OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	O	T	R	*L	P	BC	# Ø	Ø	S	J	W
1"	SEE CLASS 600 FOR 3" NPS AND SMALLER.										
1.5"											
2"											
2.5"											
3"											
4"	10"	1.5"	6.19"	3.5"	0.5"	7.88"	8	1"	0.875"x5.5"	0.75"x4"	83
6"	12.5"	1.62"	8.5"	4.06"	0.5"	10.62"	12	1"	0.875"x6.25"	0.75"x4"	135
8"	15"	1.88"	10.62"	4.62"	0.5"	13"	12	1.12"	1"x6.75"	0.75"x4"	205
10"	17.5"	2.12"	12.75"	4.88"	0.5"	15.25"	16	1.25"	1.125"x7.5"	1"x4.5"	300
12"	20.5"	2.25"	15"	5.38"	0.5"	17.75"	16	1.38"	1.25"x8"	1"x4.5"	420
14"	23"	2.39"	16.25"	5.88"	0.5"	20.25"	20	1.375"	1.25"x8.25"	1"x4.5"	555
16"	25.5"	2.5"	18.5"	6"	0.5"	22.5"	20	1.5"	1.375"x8.75"	1"x5.5"	710
18"	28"	2.62"	21"	6.5"	0.5"	24.75"	24	1.5"	1.375"x9.25"	1"x5.5"	865
20"	30.5"	2.75"	23"	6.62"	0.5"	27"	24	1.625"	1.5"x9.75"	1"x5.5"	1070
24"	38"	3"	27.25"	6.88"	0.5"	32"	24	1.875"	1.75"x11"	1"x6.5"	1560

*DIMENSION DOES NOT INCLUDE 1/4" RAISED FACE THICKNESS. ADD 1/4" TO DIMENSION "L" FOR OVERALL LENGTH THROUGH HUB, SEE DETAIL ABOVE.

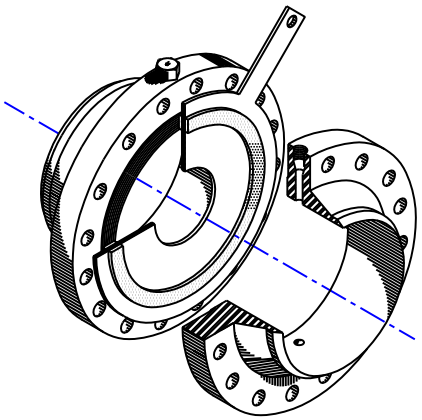
**DIMENSION "B" TO BE SPECIFIED BY CUSTOMER.

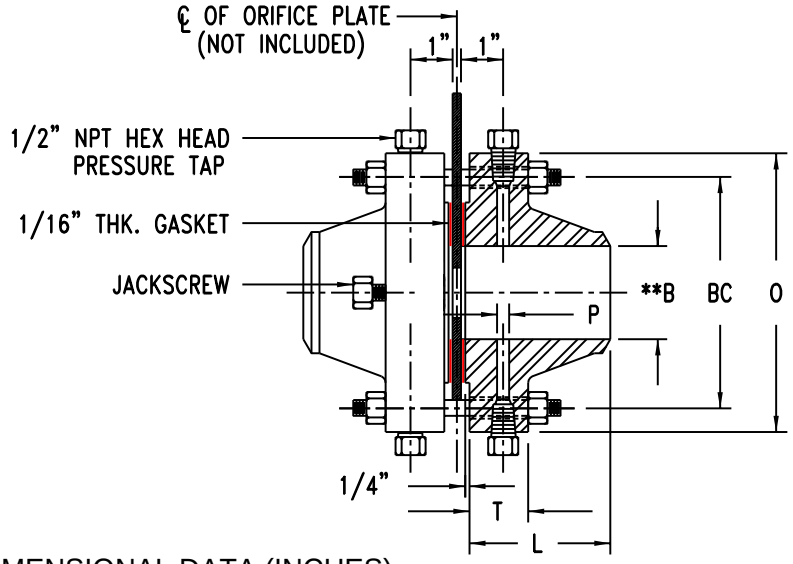
REFERENCE ASME B16.5 & B16.36 FOR MATERIAL OF CONSTRUCTION, DIMENSIONS, PRESSURE/TEMPERATURE RATINGS AND IDENTIFICATION MARKINGS.

EACH ORIFICE UNION COMES COMPLETE WITH:

(2) JACKSCREWS
(2) 1/2" PLUGS
(2) GASKETS 1/16" THICK COMPRESSED NON-ASBESTOS

RAISED FACE WELD NECK ORIFICE FLANGES





CLASS 600, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	DIAMETER OF FLANGE	MINIMUM FLANGE THICKNESS	DIAMETER OF RAISED FACE	LENGTH THROUGH HUB	PRESSURE TAP HOLE SIZE	DIAMETER OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	O	T	R	*L	P	BC	# Ø	Ø	S	J	W
1"	4.88"	1.5"	2"	3.25"	0.25"	3.5"	4	0.75"	0.625"x5"	0.625"x3"	19
1.5"	6.12"	1.5"	2.88"	3.375"	0.25"	4.5"	4	0.875"	0.75"x5.25"	0.625"x3"	23
2"	6.5"	1.5"	3.625"	3.375"	0.25"	5"	8	0.75"	0.625"x5"	0.625"x3"	25
2.5"	7.5"	1.5"	4.125"	3.5"	0.25"	5.875"	8	0.875"	0.75"x5.25"	0.625"x3"	33
3"	8.25"	1.5"	5"	3.5"	0.375"	6.625"	8	0.875"	0.75"x5.25"	0.75"x3"	45
4"	10.75"	1.5"	6.19"	4"	0.5"	8.5"	8	1"	0.875"x6"	0.75"x4"	97
6"	14"	1.88"	8.5"	4.62"	0.5"	11.5"	12	1.12"	1"x7"	0.75"x4"	195
8"	16.5"	2.19"	10.62"	5.25"	0.5"	13.75"	12	1.25"	1.125"x7.75"	0.75"x4.5"	285
10"	20"	2.5"	12.75"	6"	0.5"	17"	16	1.38"	1.25"x8.75"	1"x5.5"	450
12"	22"	2.62"	15"	6.12"	0.5"	19.25"	20	1.38"	1.25"x9"	1"x5.5"	540
14"	23.75"	2.75"	16.25"	6.5"	0.5"	20.75"	20	1.5"	1.375"x9.5"	1"x4.5"	820
16"	27"	3"	18.5"	7"	0.5"	23.75"	20	1.625"	1.5"x10.25"	1"x5.5"	1110
18"	29.25"	3.25"	21"	7.25"	0.5"	25.75"	20	1.75"	1.625"x11"	1"x5.5"	1305
20"	32"	3.5"	23"	7.5"	0.5"	28.5"	24	1.75"	1.625"x11.75"	1"x5.5"	1624
24"	37	4"	27.25"	8"	0.5"	33"	24	2	1.875"x13.25"	1"x6.5"	2322

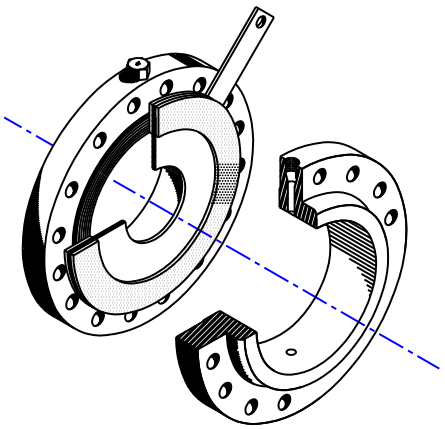
*DIMENSION DOES NOT INCLUDE 1/4" RAISED FACE THICKNESS. ADD 1/4" TO DIMENSION "L" FOR OVERALL LENGTH THROUGH HUB, SEE DETAIL ABOVE.
**DIMENSION "B" TO BE SPECIFIED BY CUSTOMER.
REFERENCE ASME B16.5 & B16.36 FOR MATERIAL OF CONSTRUCTION, DIMENSIONS, PRESSURE/TEMPERATURE RATINGS AND IDENTIFICATION MARKINGS.

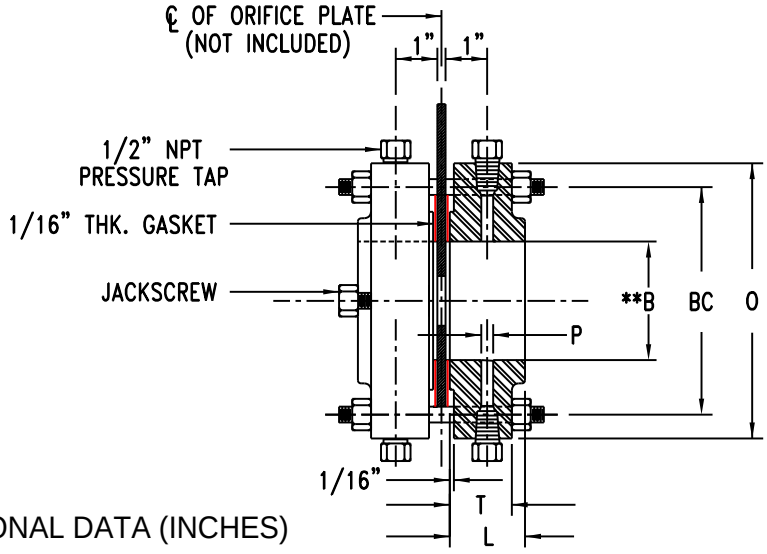
EACH ORIFICE UNION COMES COMPLETE WITH:
(2) JACKSCREWS
(2) 1/2" PLUGS
(2) GASKETS 1/16" THICK COMPRESSED NON-ASBESTOS

DWG NO.: CATOFU6W.DWG

REV.: 4 04/09/2013

RAISED FACE SLIP-ON ORIFICE FLANGES





CLASS 300, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	DIAMETER OF FLANGE	MINIMUM FLANGE THICKNESS	DIAMETER OF RAISED FACE	LENGTH THROUGH HUB	PRESSURE TAP HOLE SIZE	DIAMETER OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	O	T	R	L	P	BC	#Ø	Ø	S	J	W
*0.5"	3.75"	1.5"	1.38"	1.81"	0.12"	2.62"	4	0.56"	0.5"x4.75"	0.5"x3"	9
*0.75"	4.62"	1.5"	1.69"	1.88"	0.12"	3.25"	4	0.69"	0.625"x5"	0.5"x3"	9
1"	4.88"	1.5"	2"	1.88"	0.25"	3.5"	4	0.69"	0.625"x5"	0.625"x3"	15
*1.25"	5.25"	1.5"	2.5"	1.81"	0.25"	3.88"	4	0.69"	0.625"x5"	0.625"x3"	17
1.5"	6.12"	1.5"	2.88"	1.88"	0.25"	4.5"	4	0.81"	0.75"x5.25"	0.625"x3"	19
2"	6.5"	1.5"	3.62"	1.94"	0.25"	5"	8	0.69"	0.625"x5"	0.625"x3"	23
2.5"	7.5"	1.5"	4.12"	2"	0.25"	5.88"	8	0.81"	0.75"x5.25"	0.625"x3"	31
3"	8.25"	1.5"	5"	2.06"	0.375"	6.62"	8	0.81"	0.75"x5.25"	0.75"x3"	39
4"	10"	1.5"	6.19"	2.12"	0.5"	7.88"	8	0.81"	0.75"x5.25"	0.75"x3"	60
6"	12.5"	1.5"	8.5"	2.12"	0.5"	10.62"	12	0.88"	0.75"x5.25"	0.75"x3"	100
8"	15"	1.62"	10.62"	2.44"	0.5"	13"	12	1"	0.875"x5.75"	0.75"x3"	135
10"	17.5"	1.88"	12.75"	2.62"	0.5"	15.25"	16	1.12"	1"x6.5"	1"x4.5"	196
12"	20.5"	2"	15"	2.88"	0.5"	17.75"	16	1.25"	1.125"x7"	1"x4.5"	281
14"	23"	2.12"	16.25"	3"	0.5"	20.25"	20	1.25"	1.125"x7.25"	1"x4.5"	380
16"	25.5"	2.25"	18.5"	3.25"	0.5"	22.25"	20	1.38"	1.25"x7.75"	1"x4.5"	530
18"	28"	2.38"	21"	3.5"	0.5"	24.75"	24	1.38"	1.25"x8"	1"x4.5"	691
20"	30.5"	2.5"	23"	3.75"	0.5"	27"	24	1.38"	1.25"x8.5"	1"x4.5"	781
24"	36"	2.75"	27.25"	4.19"	0.5"	32"	24	1.62"	1.5"x9.5"	1"x5.5"	1201

*SIZES NOT LISTED IN ASME/ANSI B16.36, ORIFICE FLANGES.

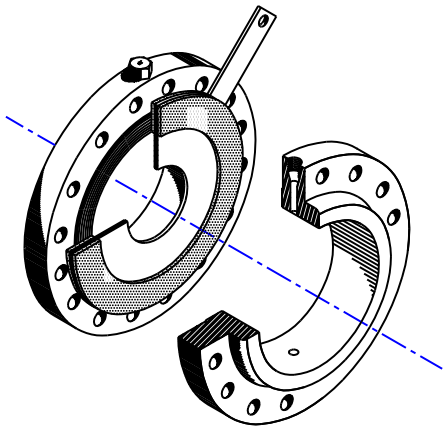
**DIMENSION "B" TO ACCOMADATE NOMINAL PIPE SIZE.
REFERENCE ASME B16.5 & B16.36 FOR MATERIAL OF CONSTRUCTION, DIMENSIONS, PRESSURE/TEMPERATURE RATINGS AND IDENTIFICATION MARKINGS.

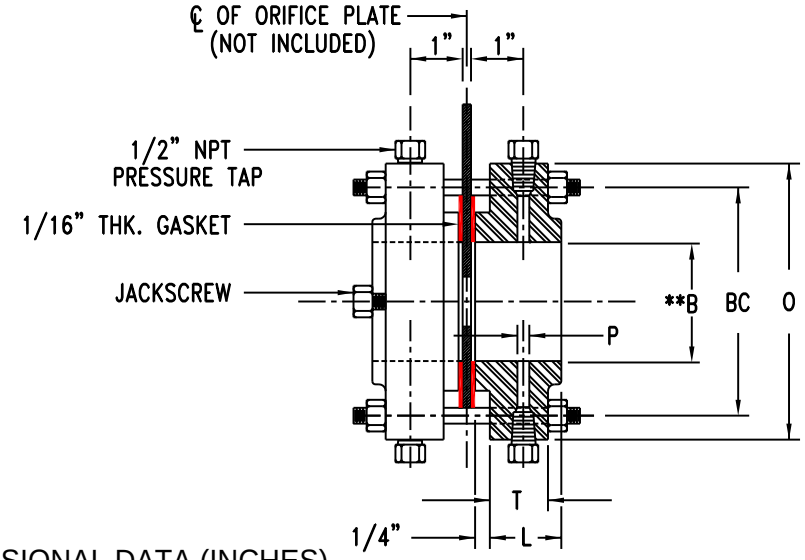
EACH ORIFICE UNION COMES COMPLETE WITH:
(2) JACKSCREWS
(2) 1/2" PLUGS
(2) GASKETS 1/16" THICK COMPRESSED NON-ASBESTOS

REV.: 3 04/09/2013

DWG NO.: CATOFU3S.DWG

RAISED FACE SLIP-ON ORIFICE FLANGES





CLASS 400, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	DIAMETER OF FLANGE	MINIMUM FLANGE THICKNESS	DIAMETER OF RAISED FACE	LENGTH THROUGH HUB	PRESSURE TAP HOLE SIZE	DIAMETER OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	O	T	R	*L	P	BC	# Ø	Ø	S	J	W
				SEE CLASS 300 FOR 3" NPS AND SMALLER.							
4"	10"	1.5"	6.19"	2"	0.5"	7.88"	8	1"	0.875"x6"	0.75"x4"	65
6"	12.5"	1.62"	8.5"	2.25"	0.5"	10.62"	12	1"	0.875"x6.25"	0.75"x4"	110
8"	15"	1.88"	10.62"	2.68"	0.5"	13"	12	1.12"	1"x7"	0.75"x4"	170
10"	17.5"	2.12"	12.75"	2.88"	0.5"	15.25"	16	1.25"	1.125"x7.75"	1"x4.5"	239
12"	20.5"	2.25"	15"	3.12"	0.5"	17.75"	16	1.38"	1.25"x8.25"	1"x4.5"	333

CLASS 600, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	DIAMETER OF FLANGE	MINIMUM FLANGE THICKNESS	DIAMETER OF RAISED FACE	LENGTH THROUGH HUB	PRESSURE TAP HOLE SIZE	DIAMETER OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	O	T	R	*L	P	BC	# Ø	Ø	S	J	W
				SEE CLASS 300 FOR 3" NPS AND SMALLER.							
4"	10.75"	1.5"	6.19"	2.12"	0.5"	8.5"	8	1"	0.875"x6"	0.75"x4"	75
6"	14"	1.88"	8.5"	2.62"	0.5"	11.5"	12	1.12"	1"x7"	0.75"x4"	160
8"	16.5"	2.19"	10.62"	3"	0.5"	13.75"	12	1.25"	1.125"x8"	0.75"x4.5"	230
10"	20"	2.5"	12.75"	3.38"	0.5"	17"	16	1.38"	1.25"x8.75"	1"x5.5"	355
12"	22"	2.62"	15"	3.62"	0.5"	19.25"	20	1.38"	1.25"x9"	1"x5.5"	430

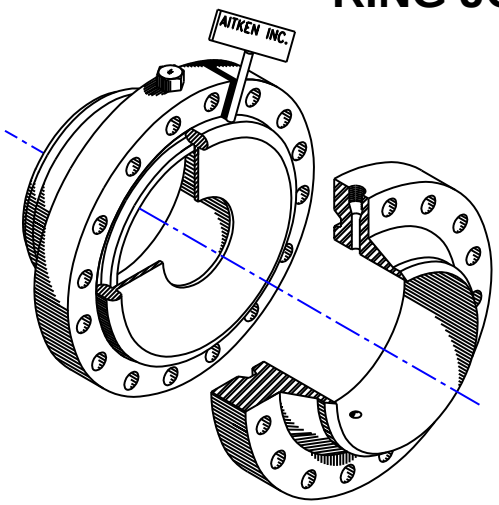
*DIMENSION DOES NOT INCLUDE 1/4" RAISED FACE. ADD 1/4" TO DIMENSION L FOR OVERALL HUB LENGTH, SEE DETAIL.
**DIMENSION "B" TO ACCOMADATE NOMINAL PIPE SIZE.
REFERENCE ASME B16.5 & B16.36 FOR MATERIAL OF CONSTRUCTION, DIMENSIONS, PRESSURE/TEMPERATURE RATINGS AMD IDENTIFICATION MARKINGS.

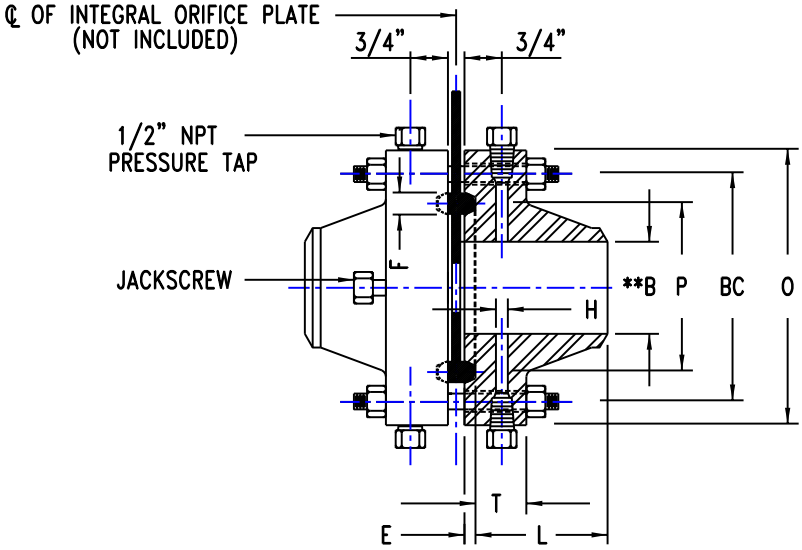
EACH ORIFICE UNION COMES COMPLETE WITH:
(2) JACKSCREWS
(2) 1/2" PLUGS
(2) GASKETS 1/16" THICK COMPRESSED NON-ASBESTOS
LARGER SIZES ARE AVAILABLE UPON REQUEST.

DWG NO.: CATOFU6S.DWG

REV.: 2 01/26/00

RING JOINT ORIFICE FLANGES





CLASS 300, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	A.P.I. RING NUMBER	DIAMETER OF FLANGE	MIN. FLANGE THICKNESS	LENGTH THROUGH HUB	PRESS. TAP HOLE SIZE	PITCH DIA. OF RING AND GROOVE	GROOVE DEPTH	GROOVE WIDTH	DIA. OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	R-NO.	O	T	*L	H	P	E	F	BC	# Ø	Ø	S	J	W
0.5"	R-11	3.75"	1.25"	2.75"	0.12"	1.3438"	0.2188"	0.2813"	2.625"	4	0.56"	0.5"x5.25"	0.5"x3"	10
0.75"	R-13	4.62"	1.25"	2.88"	0.12"	1.6875"	0.25"	0.3438"	3.25"	4	0.69"	0.625"x5.5"	0.5"x3.5"	10
1"	R-16	4.88"	1.25"	3"	0.12"	2"	0.25"	0.3438"	3.5"	4	0.69"	0.625"x5.5"	0.625"x4"	15
1.25"	R-18	5.25"	1.25	3.06"	0.12"	2.375"	0.25"	0.3438"	3.88"	4	0.69"	0.625"x5.75"	0.625"x4"	23
1.5"	R-20	6.12"	1.25"	3.12"	0.18"	2.6875"	0.25"	0.3438"	4.5"	4	0.81"	0.75"x5.75"	0.625"x4"	25
2"	R-23	6.5"	1.25"	3.12"	0.38"	3.25"	0.3125"	0.4688"	5"	8	0.69"	0.625"x5.5"	0.625"x4"	30
2.5"	R-26	7.5"	1.25"	3.25"	0.38"	4"	0.3125"	0.4688"	5.875"	8	0.81"	0.75"x5.75"	0.625"x4"	46
3"	R-31	8.25"	1.25"	3.25"	0.38"	4.875"	0.3125"	0.4688"	6.625"	8	0.81"	0.75"x5.75"	0.75"x4"	56
4"	R-37	10"	1.25"	3.38"	0.5"	5.875"	0.3125"	0.4688"	7.875"	8	0.81"	0.75"x5.75"	0.75"x4"	65
6"	R-45	12.5"	1.43"	3.88"	0.5"	8.3125"	0.3125"	0.4688"	10.625"	12	0.88"	0.75"x6.25"	0.75"x4"	107
8"	R-49	15"	1.62"	4.38"	0.5"	10.625"	0.3125"	0.4688"	13"	12	1"	0.875"x6.75"	0.75"x4"	169
10"	R-53	17.5"	1.88"	4.62"	0.5"	12.75"	0.3125"	0.4688"	15.25"	16	1.12"	1"x7.5"	1"x4.5"	250
12"	R-57	20.5"	2"	5.12"	0.5"	15"	0.3125"	0.4688"	17.75"	16	1.25"	1.125"x8"	1"x5.5"	365
14"	R-61	23"	2.12"	5.62"	0.5"	16.5"	0.3125"	0.4688"	20.25"	20	1.25"	1.12"x8.5"	1"x5.5"	491
16"	R-65	25.5"	2.25"	5.75"	0.5"	18.5"	0.3125"	0.4688"	22.5"	20	1.38"	1.25"x9"	1"x5.5"	640
18"	R-69	28"	2.38"	6.25"	0.5"	21"	0.3125"	0.4688"	24.75"	24	1.38"	1.25"x9.25"	1"x5.5"	785
20"	R-73	30.5"	2.5"	6.38"	0.5"	23"	0.375"	0.5313"	27"	24	1.38"	1.25"x9.5"	1"x5.5"	960
24"	R-77	36"	2.75"	6.62"	0.5"	27.25"	0.4375"	0.6563"	32"	24	1.62"	1.5"x10.5"	1"x6.5"	1410

*DIMENSION DOES NOT INCLUDE GROOVE DEPTH (E). ADD DIMENSION (E) TO DIMENSION (L) FOR OVERALL HUB LENGTH, SEE DETAIL.
**DIMENSION "B" TO BE SPECIFIED BY CUSTOMER.
REFERENCE ASME B16.5 & B16.36 FOR MATERIAL OF CONSTRUCTION, DIMENSIONS, PRESSURE/TEMPERATURE RATINGS AND IDENTIFICATION MARKINGS.

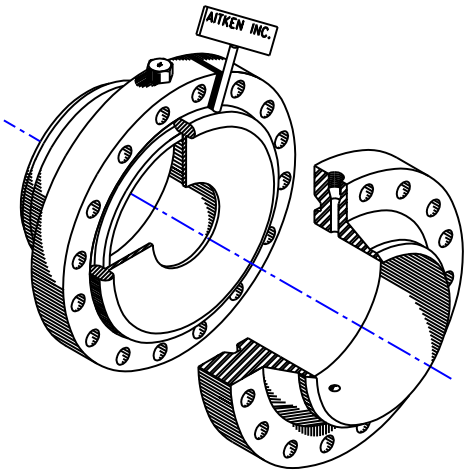
EACH ORIFICE UNION COMES COMPLETE WITH:

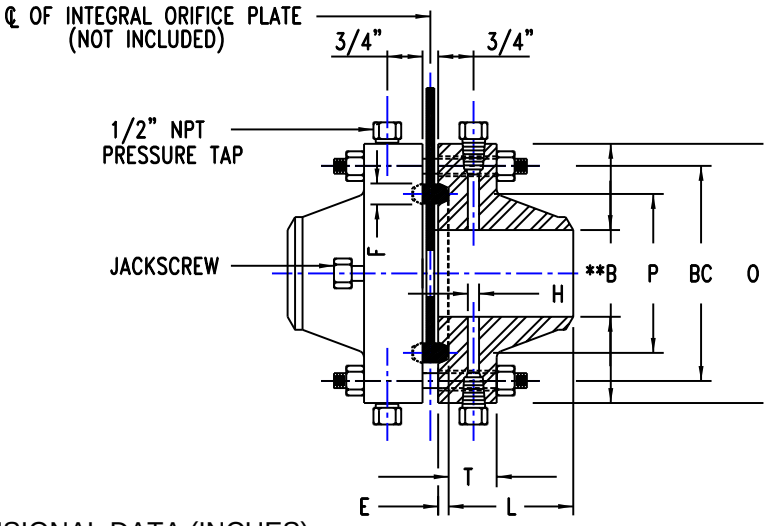
(2) JACKSCREWS
(2) 1/2" PLUGS
CUSTOMER TO SPECIFY BORE SIZE (I.E. S/40).

DWG NO.: CATOFU3R.DWG

REV.: 3 01/26/00

RING JOINT ORIFICE FLANGES





CLASS 400, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	A.P.I. RING NUMBER	DIAMETER OF FLANGE	MIN. FLANGE THICKNESS	LENGTH THROUGH HUB	PRESS. TAP HOLE SIZE	PITCH DIA. OF RING AND GROOVE	GROOVE DEPTH	GROOVE WIDTH	DIA. OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	R-NO.	O	T	L	H	P	E	F	BC	#Ø	Ø	S	J	W
					SEE CLASS 300 FOR 3"NPS AND SMALLER.									
4"	R-37	10"	1.5"	3.5"	0.5"	5.875"	0.312"	0.469"	7.88"	8	1"	0.875"x6"	0.75"x4"	92
6"	R-45	12.5"	1.62"	4.06"	0.5"	8.312"	0.312"	0.469"	10.62"	12	1"	0.875"x6.5"	0.75"x4"	145
8"	R-49	15"	1.88"	4.62"	0.5"	10.625"	0.312"	0.469"	13"	12	1.12"	1"x7.25"	0.75"x4.5"	225
10"	R-53	17.5"	2.12"	4.88"	0.5"	12.75"	0.312"	0.469"	15.25"	16	1.25"	1.125"x8"	1"x5.5"	325
12"	R-57	20.5"	2.25"	5.38"	0.5"	15"	0.312"	0.469"	17.75"	16	1.38"	1.25"x8.5"	1"x5.5"	445
14"	R-61	23"	2.38"	5.88"	0.5"	16.5"	0.312"	0.469"	20.25"	20	1.38"	1.25"x9"	1"x5.5"	595
16"	R-65	25.5"	2.5"	6"	0.5"	18.5"	0.312"	0.469"	22.5"	20	1.5"	1.375"x9.25"	1"x5.5"	750
18"	R-69	28"	2.62"	6.5"	0.5"	21"	0.312"	0.469"	24.75"	24	1.5"	1.375"x9.5"	1"x6.5"	915
20"	R-73	30.5"	2.75"	6.62"	0.5"	23"	0.375"	0.531"	27"	24	1.62"	1.5"x10.25"	1"x6.5"	1155

CLASS 600, DIMENSIONAL DATA (INCHES)

				SEE CLASS 300 FOR 3"NPS AND SMALLER.										
4"	R-37	10.75"	1.5"	4"	0.5"	5.875"	0.312"	0.469"	8.5"	8	1"	0.875"x6.5"	0.75"x4"	110
6"	R-45	14"	1.88"	4.62"	0.5"	8.312"	0.312"	0.469"	11.5"	12	1.12"	1"x7.5"	0.75"x4.5"	210
8"	R-49	16.5"	2.19"	5.25"	0.5"	10.625"	0.312"	0.469"	13.75"	12	1.25"	1.125"x8.25"	0.75"x5.5"	305
10"	R-53	20"	2.5"	6"	0.5"	12.75"	0.312"	0.469"	17"	16	1.38"	1.25"x9.25"	1"x5.5"	485"
12"	R-57	22"	2.62"	6.12"	0.5"	15"	0.312"	0.469"	19.25"	20	1.38"	1.25"x9.5"	1"x5.5"	580
14"	R-61	23.75"	2.75"	6.5"	0.5"	16.5"	0.312"	0.469"	20.75"	20	1.5"	1.375"x10"	1"x6.5"	825
16"	R-65	25.5"	2.5"	6"	0.5"	18.5"	0.312"	0.469"	22.5"	20	1.5"	1.375"x9.25"	1"x5.5"	750
18"	R-69	28"	2.62"	6.5"	0.5"	21"	0.312"	0.469"	24.75"	24	1.5"	1.375"x9.5"	1"x6.5"	915
20"	R-73	30.5"	2.75"	6.62"	0.5"	23"	0.375"	0.531"	27"	24	1.62"	1.5"x10.25"	1"x6.5"	1155

*DIMENSION DOES NOT INCLUDE GROOVE DEPTH (E). ADD DIMENSION (E) TO DIMENSION (L) FOR OVERALL HUB LENGTH, SEE DETAIL.
**DIMENSION "B" TO BE SPECIFIED BY CUSTOMER.
REFERENCE ASME B16.5 & B16.36 FOR MATERIAL OF CONSTRUCTION, DIMENSIONS, PRESSURE/TEMPERATURE RATINGS AND IDENTIFICATION MARKINGS.

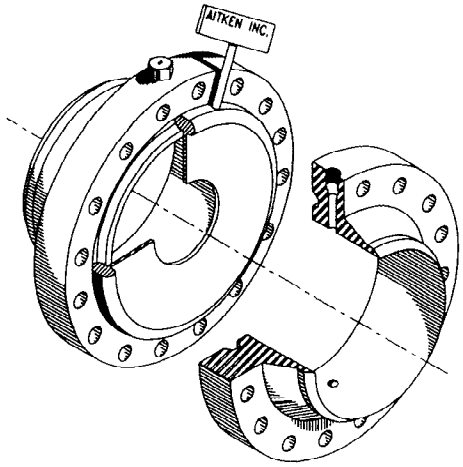
EACH ORIFICE UNION COMES COMPLETE WITH:

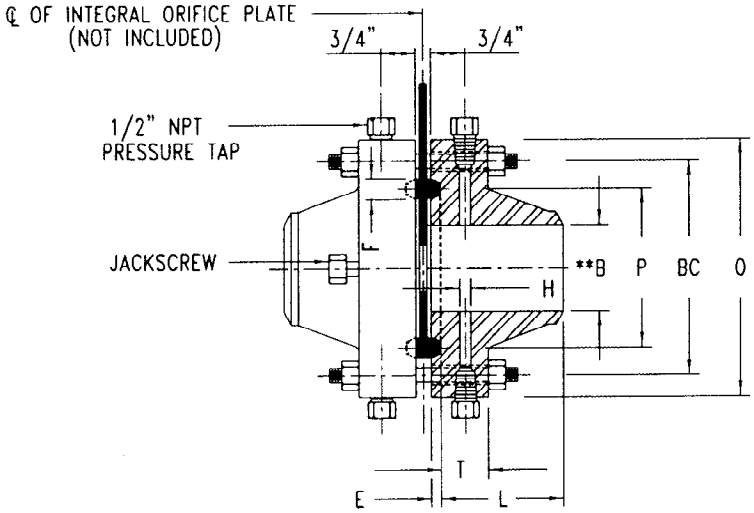
(2) JACKSCREWS
(2) 1/2" PLUGS
CUSTOMER TO SPECIFY BORE SIZE (I.E. S/40).

REV.: 3 01/26/00

DWG NO.: CATOFU6R.DWG

RING JOINT ORIFICE FLANGES





CLASS 900, DIMENSIONAL DATA (INCHES)

NOMINAL PIPE SIZE	A.P.I. RING NUMBER	DIAMETER OF FLANGE	MIN. FLANGE THICKNESS	LENGTH THROUGH HUB	PRESS. TAP HOLE SIZE	PITCH DIA. OF RING AND GROOVE	GROOVE DEPTH	GROOVE WIDTH	DIA. OF BOLT CIRCLE	NUMBER OF HOLES	SIZE OF HOLES	SIZE & LENGTH OF STUDS	SIZE & LENGTH OF JACKSCREW	APPROX. WT. PER UNION (LBS)
SIZE	R-NO.	O	T	L	H	P	E	F	BC	#Ø	Ø	S	J	W
					SEE CLASS 1500 FOR 2.5" NPS AND SMALLER.									
3"	R-31	9.5"	1.5"	4"	0.38"	4.875"	0.312"	0.469"	7.5"	8	1"	0.875"x6.5"	0.75"x4"	79
4"	R-37	11.5"	1.75"	4.5"	0.5"	5.875"	0.312"	0.469"	9.25"	8	1.25"	1.125"x7.5"	0.75"x4"	129
6"	R-45	15"	2.19"	5.5"	0.5"	8.312"	0.312"	0.469"	12.5"	12	1.25"	1.125"x8.25"	0.75"x4.5"	263
8"	R-49	18.5"	2.5"	6.38"	0.5"	10.625"	0.312"	0.469"	15.5"	12	1.5"	1.38"x9.5"	1"x5.5"	445
10"	R-53	21.5"	2.75"	7.25"	0.5"	12.75"	0.312"	0.469"	18.5"	16	1.5"	1.38"x10"	1"x5.5"	634
12"	R-57	24"	3.12"	7.88"	0.5"	15"	0.312"	0.469"	21"	20	1.5"	1.38"x10.75"	1"x5.5"	872

CLASS 1500, DIMENSIONAL DATA (INCHES)

1"	R-16	5.88"	1.5"	3.25"	0.25"	2"	0.25"	0.344"	4"	4	1"	0.875"x6.25"	0.625"x4"	26
1.5"	R-20	7"	1.5"	3.5"	0.25"	2.688"	0.25"	0.344"	4.88"	4	1.12"	1"x6.5"	0.625"x4"	45
2"	R-24	8.5"	1.5"	4"	0.25"	3.75"	0.312"	0.469"	6.5"	8	1"	0.875"x6.5"	0.625"x4"	65
2.5"	R-27	9.62"	1.62"	4.12"	0.25"	4.25"	0.312"	0.469"	7.5"	8	1.12"	1"x7"	0.625"x4"	98
3"	R-35	10.5"	1.88"	4.62"	0.38"	5.375"	0.312"	0.469"	8"	8	1.25"	1.125"x7.25"	0.75"x4"	123
4"	R-39	12.25"	2.12"	4.88"	0.5"	6.375"	0.312"	0.469"	9.5"	8	1.38"	1.25"x8.5"	0.75"x4.5"	182
6"	R-46	15.5"	3.25"	6.75"	0.5"	8.312"	0.375"	0.531"	12.5"	12	1.5"	1.375"x11"	0.75"x5.5"	407

CLASS 2500, DIMENSIONAL DATA (INCHES)

1"	R-18	6.25"	1.5"	3.62"	0.25"	2.375"	0.25"	0.344"	4.25"	4	1"	0.875"x6.25"	0.625"x4"	26
1.5"	R-23	8"	1.75"	4.38"	0.25"	3.25"	0.312"	0.469"	5.75"	4	1.25"	1.125"x7.5"	0.75"x4"	56
2"	R-26	9.25"	2"	5"	0.25"	4"	0.312"	0.469"	6.75"	4	1.12"	1"x7.75"	0.75"x4"	84
2.5"	R-28	10.5"	2.25"	5.62"	0.25"	4.375"	0.375"	0.531"	7.75"	8	1.25"	1.125"x8.5"	0.75"x4.5"	104
3"	R-32	12"	2.62"	6.62"	0.38"	5"	0.375"	0.531"	9"	8	1.38"	1.25"x9.5"	0.75"x5.5"	188

*DIMENSION DOES NOT INCLUDE GROOVE DEPTH (E). ADD DIMENSION (E) TO DIMENSION (L) FOR OVERALL HUB LENGTH, SEE DETAIL.
**DIMENSION "B" TO BE SPECIFIED BY CUSTOMER.

EACH ORIFICE UNION COMES COMPLETE WITH:

(2) JACKSCREWS
(2) 1/2" PLUGS
CUSTOMER TO SPECIFY BORE SIZE (I.E. S/40).

REV.: 2 01/26/00

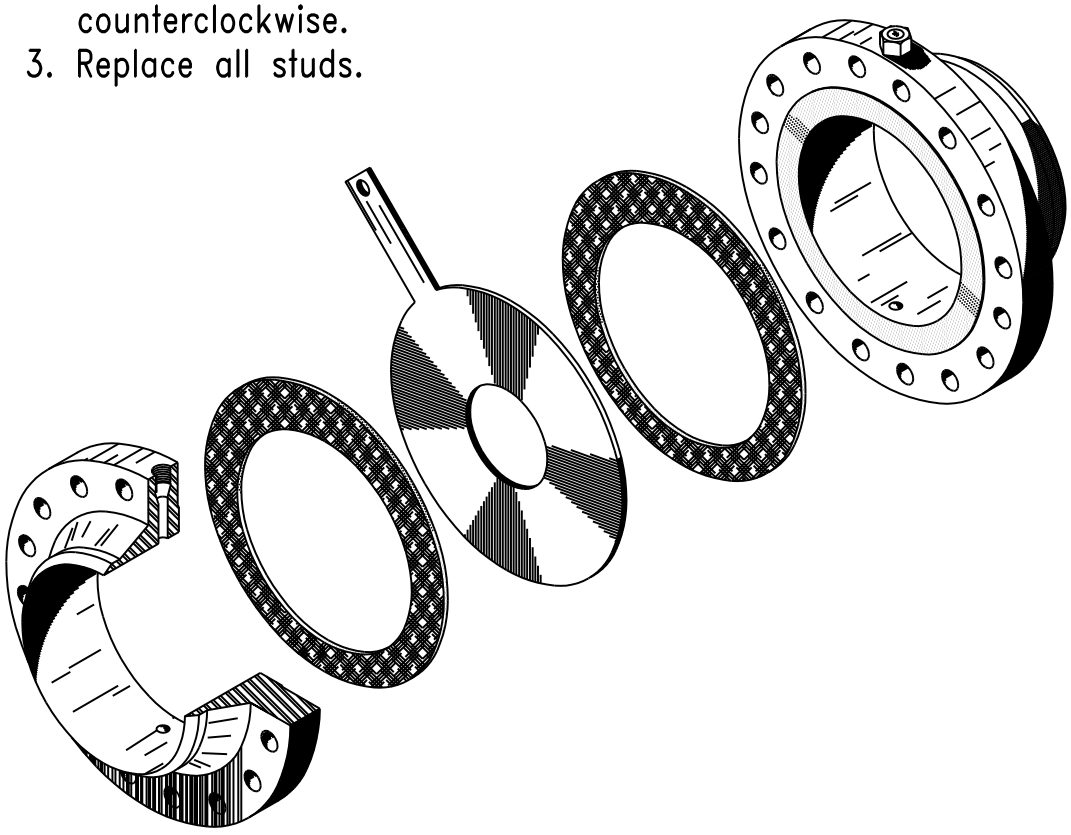
DWG NO.: CATOF25R.DWG

To Remove Orifice Plate:

1. Loosen all studs and remove the top half of the studs.
2. Spread flanges apart by turning the jackbolts clockwise.
3. Remove orifice plate for inspection or replacement.

To Install Orifice Plate:

1. Replace orifice plate and gaskets between flanges
2. Release the flanges by turning the two jackbolts counterclockwise.
3. Replace all studs.



When Installing Orifice Plate:

1. Orifice Bore must be centered within 3% of inside pipe dia..
2. If bore is beveled, bevel must face downstream.
3. Pipe ends should be flush (within 1/4") with orifice plate
4. * Inside diameter of gaskets must not protrude beyond inside surface of pipe.
5. Orifice plate must be installed flat without distortion.
6. Tighten flange bolts evenly to prevent plate buckling.
7. On orifice flanges other than weld neck or corner tap, pressure tap holes must be drilled through the pipe. Holes must be free of burrs or other irregularities. Holes may be left square or rounded slightly.

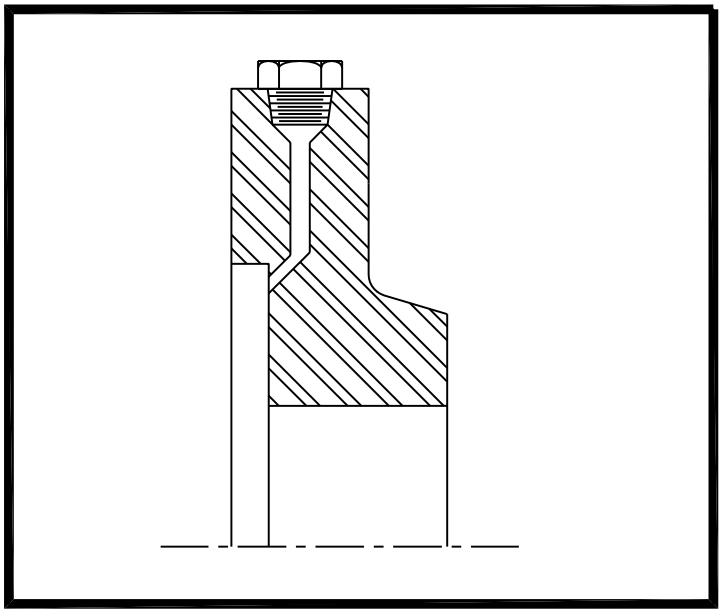
*Gaskets should be replaced at each orifice plate inspection.

CORNER TAP UNIONS

Recognized By A.S.M.E. / A.G.A. / I.S.A.
Dependable repeatability and accuracy
Ideal for use in HVAC installations
Recommended for smaller line sizes
Available in 150# ANSI Rating
No field drilling or tapping

"Principals & Practices of Flow Meter Engineering" by L.K. Spink indicates that the corner-tap style orifice flange is especially desirable in installation of 2" pipe size and smaller. This is because the corner-tap design places the pressure signal point directly at the upstream and downstream face of the orifice plate. Other tap location (such as flange taps with fairly high Beta Ratios) place the down-stream pressure signal point somewhere beyond the plane of the vena-contracta, and in a highly turbulent region, therefore creating inaccuracy in flow measurement. The corner-tap eliminates these problems in smaller sizes. Because corner-taps are available in 150# ANSI Rating, they are very economical in installations where 300# flange-taps may not be necessary. This is desirable in HVAC installations where lighter weight piping is required.

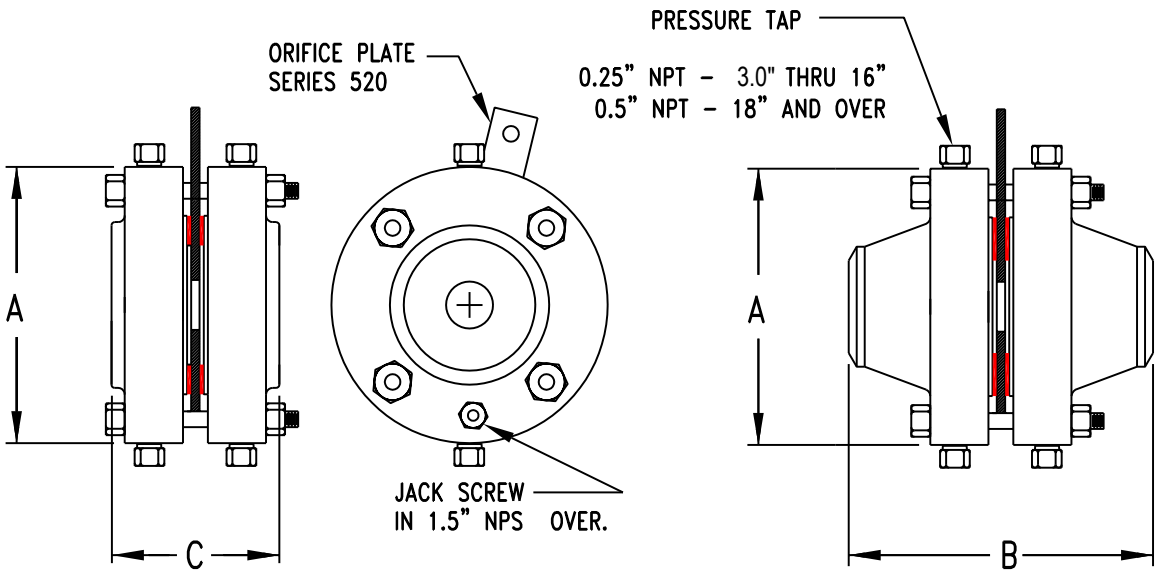
The 45° exit pattern design makes the pressure tap hole less subject to clogging by impurities in the flow.



REV.: 1 03-19-97

DWG.: CATCTU.DWG

CORNER TAP UNIONS



SLIP-ON AND THREADED

WELD NECK

150 LB

PIPE SIZE	A	B	C	MACHINE BOLTS		
				NO.	SIZE	LENGTH
3"	7.5"	5.625"	2.5"	4	0.625"	3"
3.5"	8.5"	5.75"	2.625"	8	0.625"	3"
4"	9"	6.125"	2.75"	8	0.625"	3"
5"	10"	7.125"	3"	8	0.75"	3"
6"	11"	7.125"	3.25"	8	0.75"	3.25"
8"	13.5"	8.125"	3.5"	8	0.75"	3.5"
10"	16"	8.125"	4"	12	0.875"	3.75"
12"	19"	9.125"	4.5"	12	0.875"	4.5"
14"	21"	10.125"	4.625"	12	1"	4.25"
16"	23.5"	10.125"	5.125"	16	1"	4.25"
18"	25"	11.25"	5.75"	16	1.125"	5"
20"	27.5"	11.625"	6.125"	20	1.125"	5.25"
24"	32"	12.25"	6.875"	20	1.25"	5.75"

300 LB

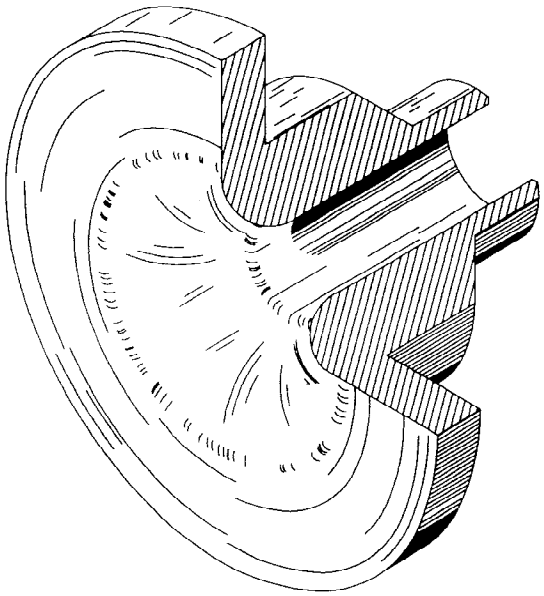
PIPE SIZE	A	B	C	MACHINE BOLTS		
				NO.	SIZE	LENGTH
3"	8.25"	6.375"	3.5"	8	0.75"	3.5"
3.5"	9"	6.5"	3.625"	8	0.75"	3.5"
4"	10"	6.875"	3.875"	8	0.75"	3.75"
5"	11"	7.875"	4.125"	8	0.75"	4"
6"	12.5"	7.875"	4.25"	12	0.75"	4"
8"	15"	8.875"	4"	12	0.875"	4.75"
10"	17.5"	9.375"	5.375"	16	1"	5.25"
12"	20.5"	10.375"	5.875"	16	1.125"	5.5"
14"	23"	11.375"	6.125"	20	1.125"	6"
16"	25.5"	11.625"	6.625"	20	1.25"	6.25"
18"	28"	12.75"	7.25"	24	1.25"	6.5"
20"	30.5"	13"	7.75"	24	1.25"	7"
24"	36"	13.5"	8.625"	24	1.5"	7.75"

NOTE: B & C DIMENSIONS DO NOT INCLUDE ORIFICE PLATE THICKNESS.

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

FLOW NOZZLES



REV.: 3 01/27/09

DWG.: CATFNCVR.DWG

FLOW NOZZLES

Service: Recommended for steam and water service. Also suitable for other gases and liquids.

***Accuracy:** Uncalibrated accuracy of two percent .
Calibrated accuracy of one quarter percent.

Design: Each flow nozzle is manufactured in strict accordance with recommendations set forth in the A.S.M.E. Fluid Meters Handbook and A.S.M.E. piping design codes. Each flow nozzle is computer designed for optimum accuracy and performance.

Fabrication: Welding is accomplished by code certified welders in conformance with A.S.M.E. Boiler and Pressure Vessel Codes.

Materials: In order to assure a highly polished transition and throat section, it is recommended that stainless steel be used.

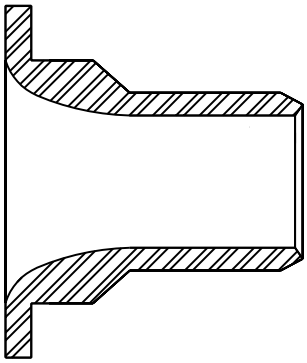
Upon special request, nozzles can be made out of virtually any material.

Advantages:

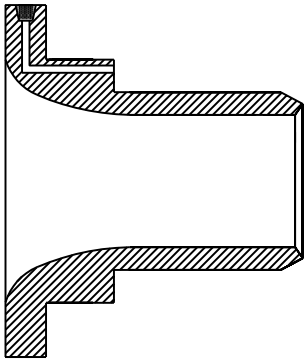
1. Flow capacity is 60% greater for flow nozzles than that of an orifice plate with same beta ratio.
2. Flow nozzles have a less damming effect on solids or foreign matter in the flow stream than an orifice plate.
3. Nozzles sustain accuracy and wear qualities over a longer period of time than the orifice plate.

*It is recommended that the buyer purchase the complete flow section from the same manufacturer to assure stated accuracy.

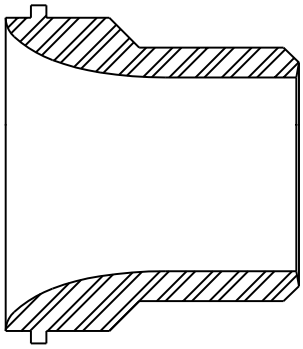
TYPES OF FLOW NOZZLES



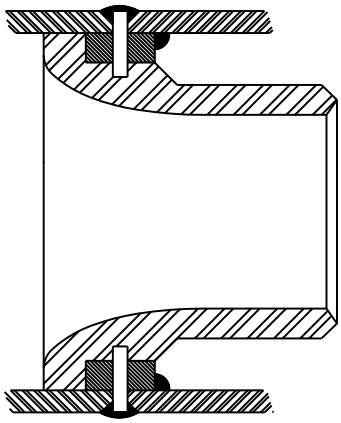
The standard "Flanged Flow Nozzle" style is the most commonly used flow nozzle. It is designed to be inserted between pipe flanges. A specially machined shoulder on the back side of the nozzle assures the proper alignment of the nozzle with the pipe inside diameter. This style flow nozzle utilizes pipe wall taps .



The "Tapped Type Flanged Flow Nozzle", is basically the same as the "Flange" style. A downstream tap, usually a 1/2" connection, is provided in the flange of the nozzle. This style nozzle is recommended in smaller line sizes where the downstream tap usually interferes with the pipe weld or downstream holding flange.



The "Weld-In Flow Nozzle" style is designed to be installed permanently in a pipe section. This nozzle has a specially machined step on the outside diameter, that is used to align a beveled inlet and outlet bored pipe section. This type nozzle is widely used where high temperature and pressure applications prohibit the use of pipe flanges such as in power plant and feed water installations. Pipe wall taps are utilized with this style nozzle.



The Holding Ring Flow Nozzle style is designed so that the welding of dissimilar materials is eliminated. The holding ring and locating pins are made of the same material as the pipe in which the nozzle is to be installed. This allows the nozzle to be offered in a wide range of materials. This style is not recommended for line sizes below 4 inches.

ORDER ENTRY INFORMATION

NOZZLE TYPE

Flanged (Std) **Flanged (Tap)** **Throat-Tap**

Weld-In **Holding-Ring**

FLOW NOZZLE PIPE SECTION

Manufacturing & Design Code:

B31.3 **B31.8**

A.S.M.E. Section VIII, Div. I, "U" Stamp

Other:_____

Design Temp. _____ °F **Design Pressure_____PSIG**

Corrosion Allowance_____

FLOW NOZZLE PIPE SECTION

Pressure Tap Connection _____

Outer End Prep.: **Beveled** **Other _____**

Surface Prep.: **Sand Blast** **Shop Primer** **Other_____**

MATERIAL SPECIFICATION

Nozzle _____ **Pipe _____**

Attach appropriate completed Bore Calculation Data Sheet.

AITKEN

TEL.: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: LIQUID

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____

STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Vapor Pressure (psia)				
OPTION 2:				
***Specific Gravity @ Base				
Specific Gravity @ Flow				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Vapor Pressure (psia)				
****OPTION 3: (Database)**				
Water				

⇔*Customer must provide information for either Option1, Option 2, **OR** Option3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are needed for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN

PHONE NO.: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE : GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
***Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Air				

⇔*Customer must provide information for either Option 1, Option 2, **OR** Option 3.
**Available for some fluids. Inquire if desired fluid is available on Database.
***These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

AITKEN

PHONE NO.: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: VAPOR

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
***Liquid Compressibility @ Base (z)				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Steam				

⇔*Customer to provide information; EITHER OPTION 1, OPTION 2, **OR** OPTION3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are required for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN

PHONE NO.: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE : NATURAL GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
**Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
**Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 3:				
%Nitrogen				
%Carbon Dioxide				
Specific Gravity @ Base				

⇔*Customer to provide information for either Option 1, Option 2, **OR** Option 3.
**These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

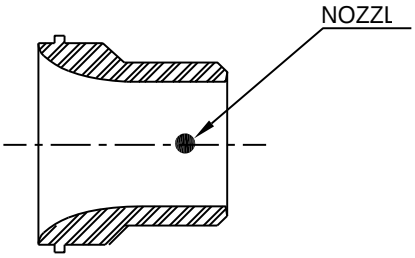
AITKEN
4920 Airline Dr.
HOUSTON, TEXAS 77022

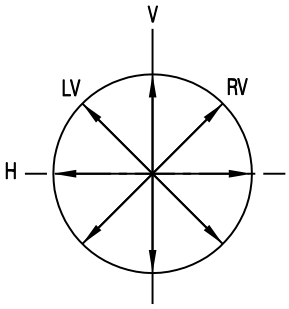
FLOW NOZZLE MICROMETER READINGS

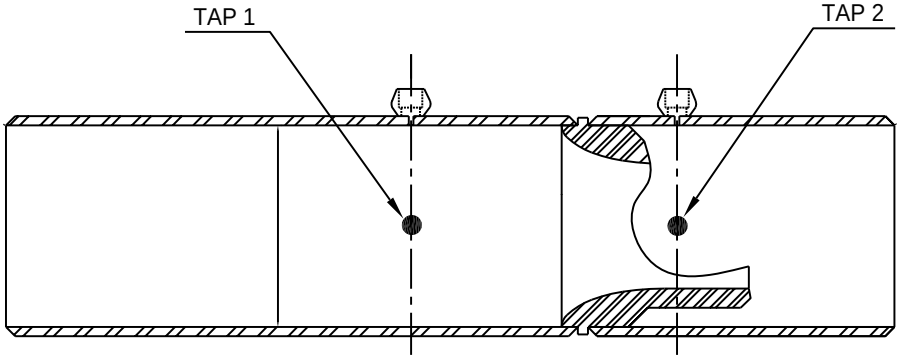
CUSTOMER _____ TAG NO.: _____
ADDRESS: _____ P.O. NO.: _____
DESTINATION: _____ INV. NO.: _____

THROAT BORE: _____
SIZE: _____ RATING: _____ PIPE SCH.: _____ PUB. I.D.: _____

DATE PERFORMED: _____
NOZZLE SERIAL NO.: _____







TYPE	UPSTREAM TAP	DOWNSTREAM TAP	NOZZLE
	TAP 1	TAP2	
V			
LV			
RV			
H			
AVG.			

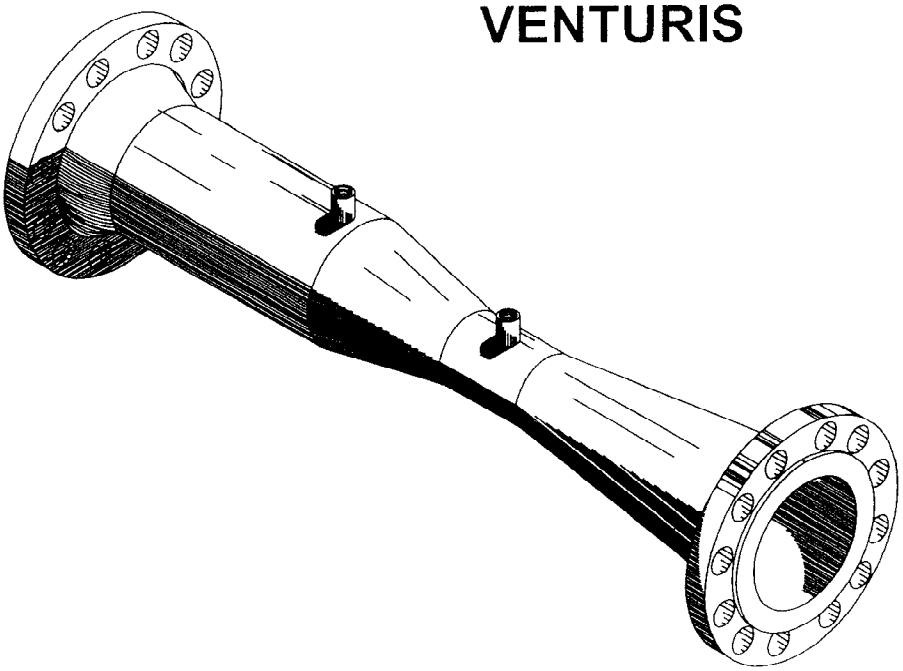
THIS IS TO CERTIFY THAT THE ABOVE MICROMETER READINGS ARE CORRECT AND ACCURATE.

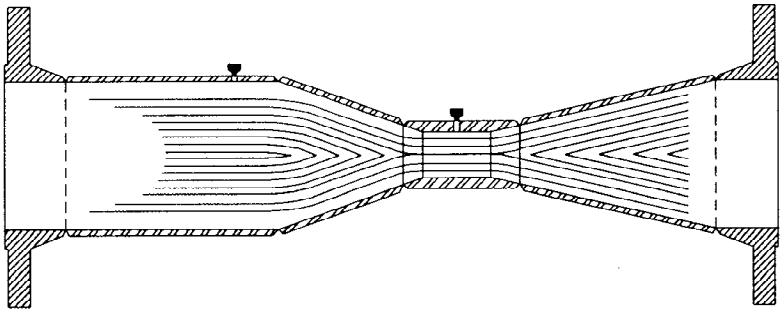
SIGNED: _____ DATE: _____

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

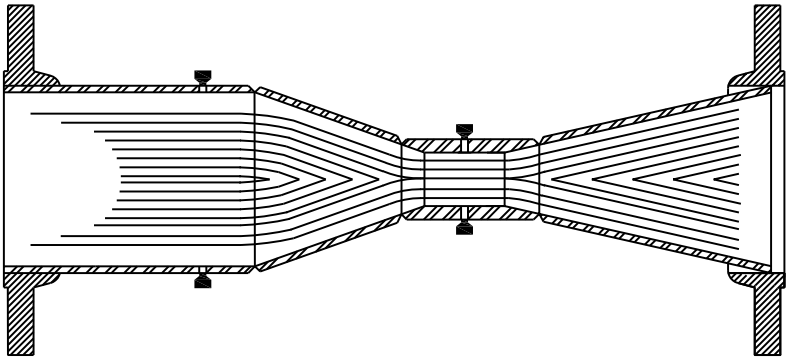
CLASSICAL VENTURIS





REV.: 4 01/27/09

DWG.: CATVENCR.DWG



BACKGROUND:

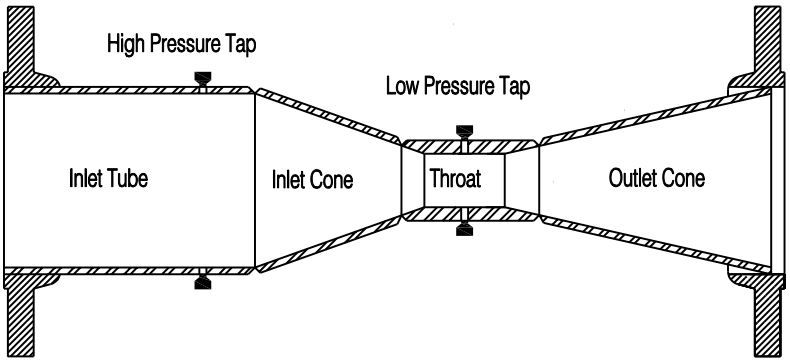
The Classical Style Venturi Tube was first developed as a practical differential pressure producing device for flow measurement by Clemens Herschel in 1887. Since that time it has been universally accepted as the most efficient primary device available. No other type of venturi or flow tube design has been more thoroughly researched, tested, and proven, than the Classical style.

DESIGN:

The Classical Style Venturi Tube consists of (1) a straight inlet section of the same diameter as the pipe and in which the high pressure tap is located; (2) a converging conical inlet section in which the cross section of the stream decreases and the velocity increases with a consequent increase of velocity head and decrease of pressure head; (3) a cylindrical throat which provides for the low pressure tap location of this decreased pressure in an area where flow velocity is neither increasing nor decreasing; and (4) a divergent recovery cone in which velocity decreases and the decreased velocity head is recovered as a pressure head.

ACCURACY:

The Classical Venturi is designed to have an uncalibrated inaccuracy of ± 1 - 2% of actual flow. Accuracy of ± 0.25% can be obtained when the venturi is calibrated at a recognized hydraulics laboratory.



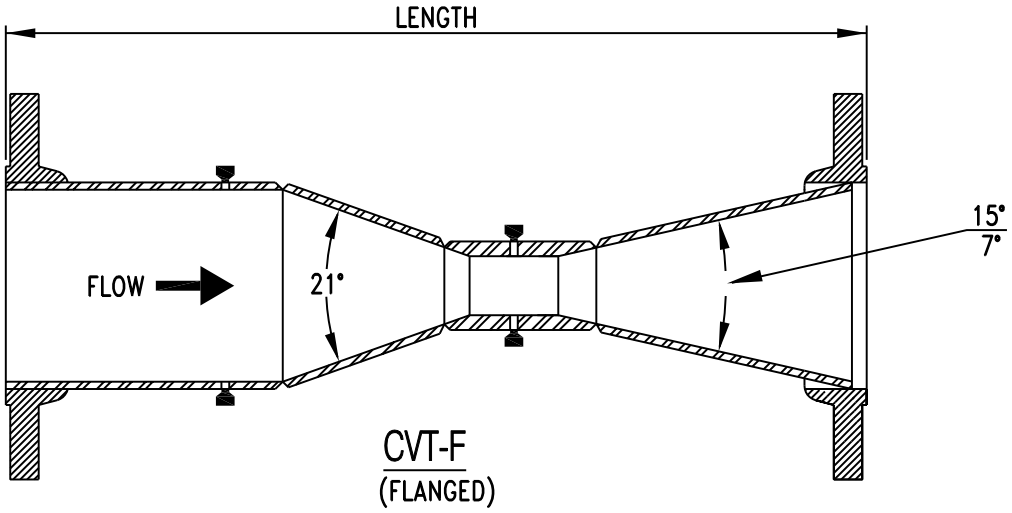
MODEL NUMBERS FOR AITKEN CLASSICAL & MODIFIED VENTURI TUBES

TYPICAL NO.: 10 - CVT - RF 30 - F 1

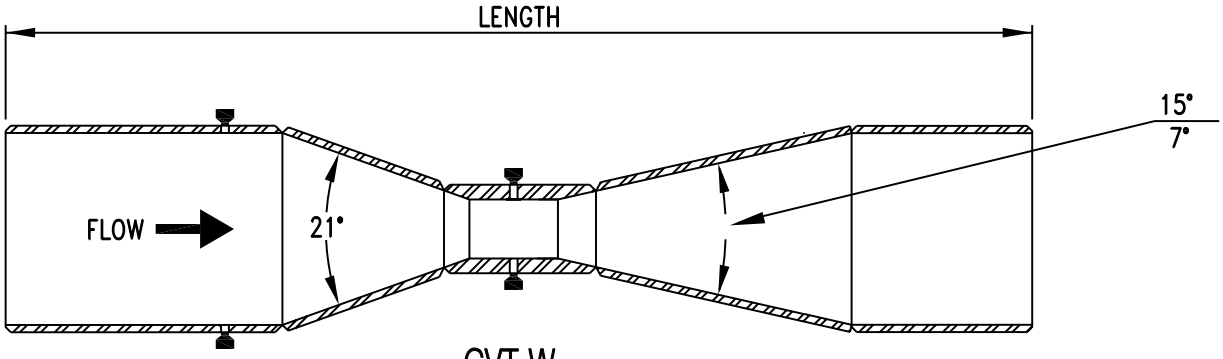
LINE SIZE:	**01” to 96"**
	CVT-(Classical Venturi Tube)
RF	**Raised Face Flange Both Ends**
RJ	**Ring Type Joint Flange Both Ends**
W	**Beveled For Welding Both Ends**
***PSRF**	**Pipe, Shell, RF Flanged Both Ends**
***PSRJ**	**Pipe, Shell, RJ Flanged Both Ends**
***PSW**	**Pipe, Shell, Beveled Both Ends for Welding**
O	**Other (Special)**
OO	**Unrated**
15	**150 ANSI Rated**
30	**300 ANSI Rated**
60	**600 ANSI Rated**
90	**900 ANSI Rated**
150	**1500 ANSI Rated**
250	**2500 ANSI Rated**
****M**	**Machined Convergent**
F	**Fabricated Convergent**
*****Z**	**Machined Venturi**
1	**Carbon Steel Body / 304SS Throat**
2	**Carbon Steel Body / 316SS Throat**
3	**304SS Body / 304SS Throat**
4	**316SS Body / 316SS Throat**
5	**Fiberglass Reinforced Plastic (Standard)**
6	**Fiberglass Reinforced Plastic (High Temperature)**
7	**Fiberglass Reinforced Plastic / 304SS Throat**
8	**Others (Special)**

***Available in line sizes 8” and larger**
(for high pressure, high temperature service).
****Available in line sizes 21/2” through 6”.**
*****Standard for 2” and below.**

TYPES OF VENTURIS



CVT-F
(FLANGED)



CVT-W
(WELD–IN)

NOTES:

1. Lengths are based on slip-on flanges. Weld neck flanges are available.
2. Lengths and weights are based on Std. Wt. pipe.
3. This data is for estimating only and subject to change without notice.

TYPICAL SPECIFICATIONS FOR A.S.M.E. CLASSICAL STYLE SHORT FORM VENTURI

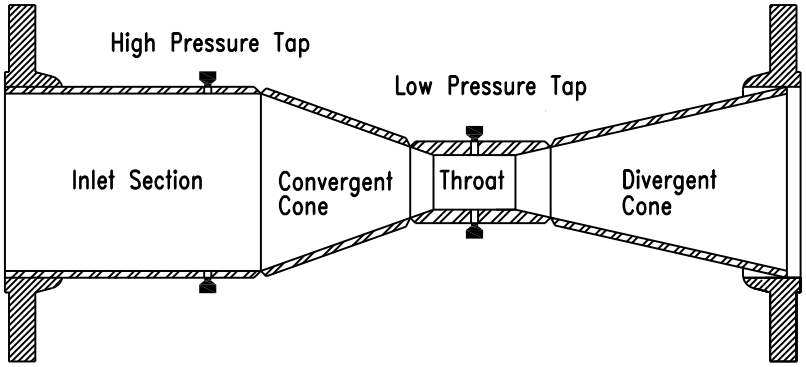
The Primary Element shall produce a differential, which is proportional to the square of the flow rate through the device, utilizing static pressure sensed at the inlet tap and the throat tap.

The Primary Element shall be fabricated in accordance with the appropriate A.S.M.E. Piping Code, A.S.M.E. MFC-3M-1989 and A.S.M.E. Fluid Meters, 6th Edition. The inlet section shall consist of a straight pipe of like diameter to the preceding line pipe, and an entrance cone with an A.S.M.E. specified 21 degree angle of convergence. The throat shall be a straight cylindrical section of at least 0.5 times the throat diameter. The outlet section shall be an exit cone with A.S.M.E. specified 15 degree angle of divergence for Short Form applications and 7 degree angle for Long Form applications.

The Primary Element shall be furnished with four pressure sensing taps; two in the straight inlet pipe section (upstream tap) and two in the throat section (downstream tap). There shall be no annular chambers or slots within the primary element.

The Primary Element shall have a discharge coefficient that is constant over the normal range of flow; independent of Beta Ratio or line size.

The Primary Element shall have an uncalibrated accuracy of ±1 1/2% of acutal flow for the range specified for fabricated venturis and 1% for machined venturis.



SHORT FORM CLASSICAL VENTURI TUBES

DIMENSIONAL DATA

		LENGTH / INCHES		WEIGHT IN POUNDS		
LINE SIZE	BETA RATIO	CVT-F	CVT-W	CVT-W	CVT-F15	CVT-F30
	0.35	24	24	22	48	65
4"	0.55	20	20	20	45	62
	0.7	16	16	16	30	35
	0.35	34	37	55	113	133
6"	0.55	27	30	52	110	130
	0.7	22	25	50	108	128
	0.35	45	48	100	160	216
8"	0.55	36	40	85	145	201
	0.7	29	33	78	138	194
	0.35	56	60	160	246	322
10"	0.55	45	50	135	221	297
	0.7	37	42	115	201	277
	0.35	67	73	278	406	508
12"	0.55	54	60	226	354	456
	0.7	44	50	185	313	415
	0.35	74	80	346	516	674
14"	0.55	60	66	295	465	623
	0.7	49	55	250	420	528
	0.35	86	92	438	624	878
16"	0.55	70	76	394	580	834
	0.7	57	63	358	544	798
	0.35	98	106	565	805	1125
18"	0.55	78	86	445	685	1005
	0.7	64	72	390	630	905
	0.35	108	118	734	1,044	1,384
20"	0.55	86	96	630	940	1,280
	0.7	72	82	536	846	1,186
	0.35	130	142	958	1,378	1,938
24"	0.55	104	116	820	1,240	1,800
	0.7	86	98	706	1,126	1,686
	0.35	164	180	1,660	0.A.	0.A.
30"	0.55	132	147	1,415	0.A.	0.A.
	0.7	107	122	1,245	0.A.	0.A.
	0.35	197	215	2,418	0.A.	0.A.
36"	0.55	158	176	2,080	0.A.	0.A.
	0.7	130	148	1,810	0.A.	0.A.
	0.35	222	240	3,318	0.A.	0.A.
42"	0.55	186	204	2,820	0.A.	0.A.
	0.7	150	168	2,341	0.A.	0.A.
	0.35	264	288	4,510	0.A.	0.A.
48"	0.55	212	236	3,744	0.A.	0.A.
	0.7	174	198	3,108	0.A.	0.A.

AITKEN
TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: LIQUID

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____

STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Vapor Pressure (psia)				
OPTION 2:				
***Specific Gravity @ Base				
Specific Gravity @ Flow				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Vapor Pressure (psia)				
****OPTION 3: (Database)**				
Water				

⇔*Customer must provide information for either Option1, Option 2, **OR** Option3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are needed for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN

TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE : GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____ QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
***Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Air				

⇔*Customer must provide information for either Option 1, Option 2, **OR** Option 3.
**Available for some fluids. Inquire if desired fluid is available on Database.
***These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

AITKEN
TEL: (281)441.5438
FAX: (713)699.51486
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: VAPOR

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
***Liquid Compressibility @ Base (z)				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Steam				

⇔*Customer to provide information; EITHER OPTION 1, OPTION 2, **OR** OPTION3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are required for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN
TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE : NATURAL GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
**Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
**Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 3:				
%Nitrogen				
%Carbon Dioxide				
Specific Gravity @ Base				

⇔*Customer to provide information for either Option 1, Option 2, **OR** Option 3.
**These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

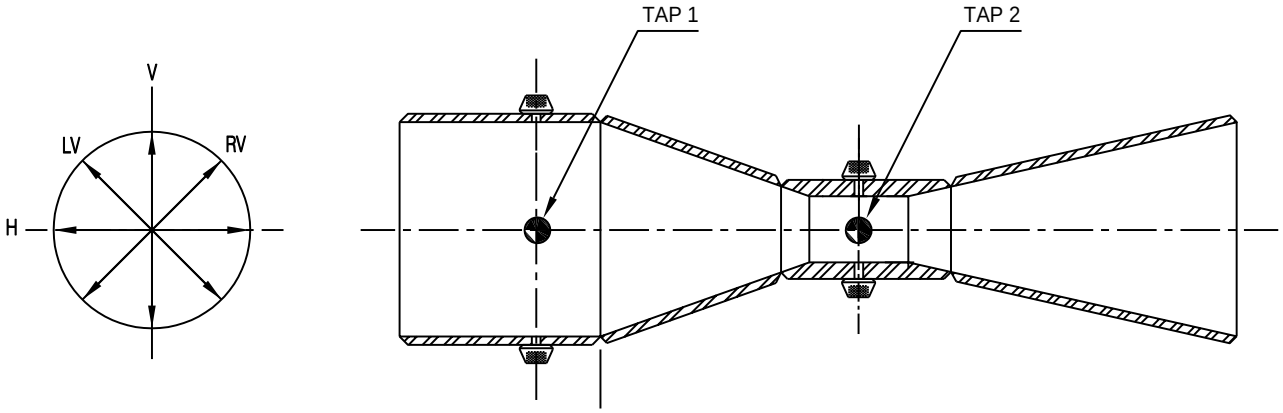
AITKEN
4920 Airline Dr.
HOUSTON, TEXAS 77022

VENTURI MICROMETER READINGS

CUSTOMER _____ TAG NO.: _____
ADDRESS: _____ P.O. NO.: _____
DESTINATION: _____ INV. NO.: _____

SERIAL NO.: _____ THROAT BORE: _____
SIZE: _____ RATING: _____ PIPE SCH.: _____ PUB. I.D.: _____

DATE PERFORMED: _____
VENTURI SERIAL NO.: _____



TYPE	UPSTREAM TAP	DOWNSTREAM TAP
	TAP 1	TAP2
V		
LV		
RV		
H		
AVG.		

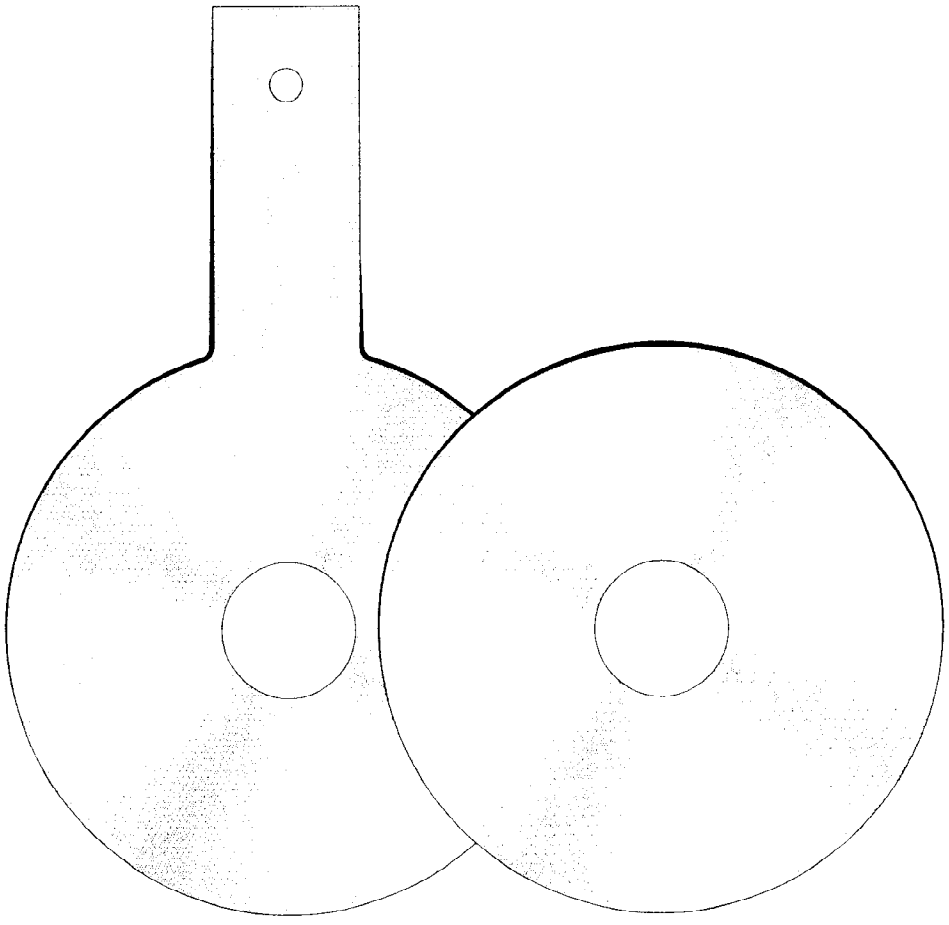
THIS IS TO CERTIFY THAT THE ABOVE MICROMETER READINGS ARE CORRECT AND ACCURATE.

SIGNED: _____ DATE: _____

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

AITKEN STANDARD ORIFICE PLATES



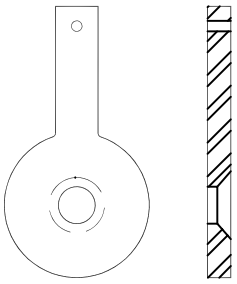
AITKEN CATALOG 520 AITKEN CATALOG 500

REV. 2. 01/27/09

DWG NO. CATOP.DWG

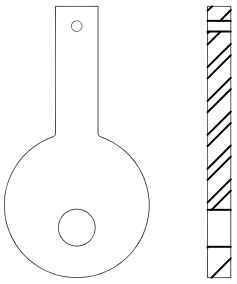
CONCENTRIC BORE AND BEVEL

Used primarily for clean homogeneous flow of liquids, gases, or vapors that are relatively non–viscous. The bevel is machined to a 45 degree angle to the desired edge thickness. Accuracy range at ±.6% for beta ratio between 0.2 to 0.75. For Pipe taps, accuracy range at ±0.8% to ±1.6% for beta ratio between 0.2 to 0.5.



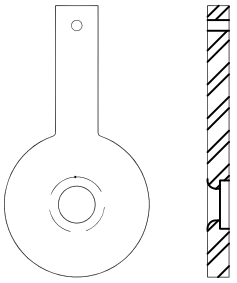
ECCENTRIC BORE

Used primarily for measurement of entrained solids or slurries. The eccentric bore can also be used to measure vapors & gases where condensation is present. The eccentric bore is offset to where the bore edge is inscribed in a circle that is 98% of line I.D. Accuracy range between ±1.5% to ±2% for beta ratio between 0.3 to 0.75.



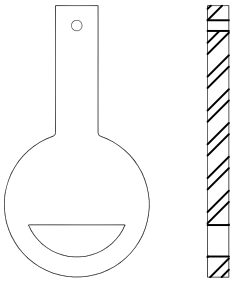
QUADRANT BORE

This type of orifice bore is used primarily in the measurement of high viscosity flow, such as heavy crude, syrups, and slurries. The radius on the inlet side is equal to the plate thickness. The quadrant is always recommended where the Reynolds Number factor is less than 100,000. Accuracy is ±2% for beta ratio between 0.24 to 0.6.



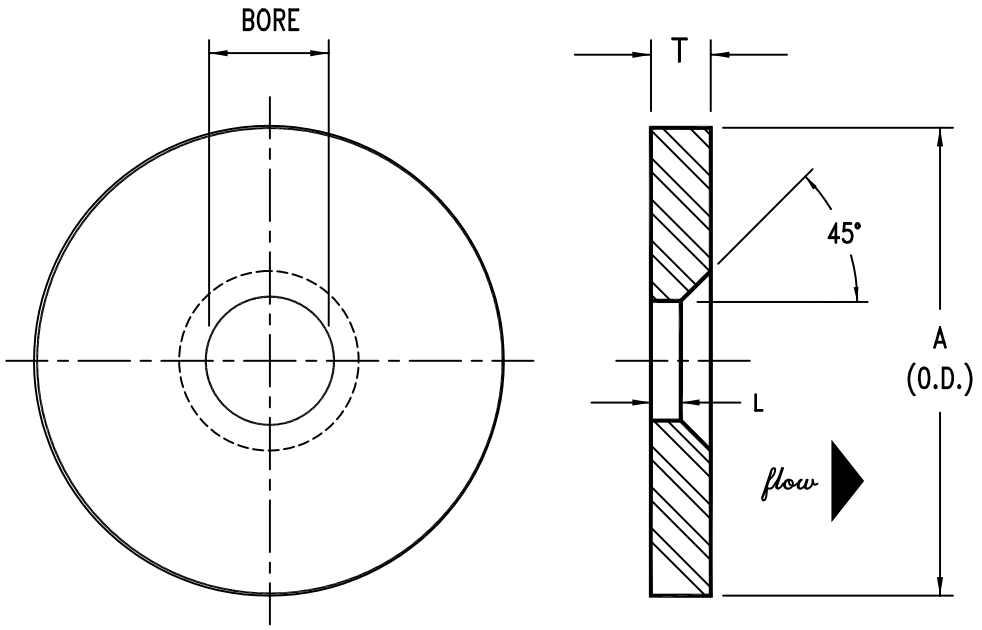
SEGMENTAL BORE

The segmental bore is located in the same way that the eccentric bore is. These bores are used primarily for slurries or extremely dirty gases where the flow may contain impurities heavier than fluid.
Accuracy is ±2% for beta ratio between 0.35 to 0.75.



500 UNIVERSAL ORIFICE PLATES

UNIVERSAL ORIFICE PLATES ARE MANUFACTURED FOR USE WITH RTJ PLATE HOLDERS AND ARE INTERCHANGEABLE WITH MOST ORIFICE FITTINGS. EACH PLATE IS CAREFULLY MANUFACTURED TO MEET OR EXEED STANDARDS SET BY A.G.A., I.S.A., A.N.S.I., A.S.M.E., AND A.P.I. RECOMMENDATIONS.



500 UNIVERSAL ORIFICE PLATE DIMENSIONS

NOM. PIPE SIZE	A	L	T	*WEIGHT
1"	1.312"	0.02"	0.125"	0.05 LBS
1.5"	2"	0.03"	0.125"	0.11 LBS
2"	2.437"	0.03"	0.125"	0.17 LBS
2.5"	2.812"	0.03"	0.125"	0.2 LBS
3"	3.437"	0.03"	0.125"	0.3 LBS
4"	4.406"	0.06"	0.125"	0.5 LBS
5"	6"	0.06"	0.125"	1 LBS
6"	6.437"	0.06"	0.125"	1.2 LBS
8"	8.437"	0.125"	0.25"	2 LBS
10"	10.687"	0.125"	0.25"	3.2 LBS
12"	12.593"	0.25"	0.25"	8.8 LBS
14"	14"	0.25"	0.25"	10.9 LBS
16"	16"	0.25"	0.375"	14.2 LBS
18"	18"	0.25"	0.375"	18 LBS
20"	20"	0.375"	0.375"	33.4 LBS
24"	24"	0.375"	0.375"	48.1 LBS

NOTES:
DIMENSION "A" DOES NOT INCLUDE SEAL RING.
L = T (PLATE THICKNESS) FOR RESTRICTION APPLICATIONS.
*BLANK WEIGHT.

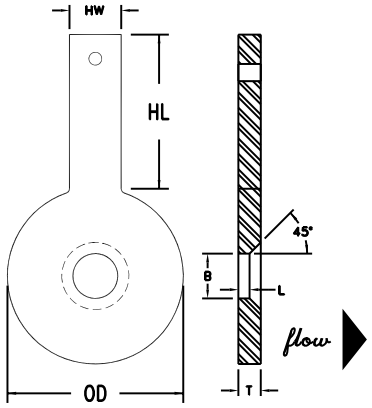
REV. 2, 09/23/03

DWG NO CATUOP.DWG

AITKEN 520 TYPE ORIFICE PLATES

SPECIFICATIONS:

520 PADDLE TYPE ORIFICE PLATES ARE MANUFACTURED FOR USE WITH RAISED FACE ORIFICE FLANGES AND HOLDING BLOCKS. EACH PLATE IS CAREFULLY MANUFACTURED TO MEET OR EXEED STANDARDS SET BY A.G.A., I.S.A., A.N.S.I., A.S.M.E., AND A.P.I. RECOMMENDATIONS.



NOM. PIPE SIZE	125# 150#	250# 300#	400#	600#	900#	1500#	2500#	ALL PRESSURE RATINGS			
	OD	OD	OD	OD	OD	OD	OD	HL	HW	L	T
0.5"	1.875"	2.125"	2.125"	2.125"	2.5"	2.5"	2.75"	4"	1"	0.015"	0.125"
0.75"	2.25"	2.625"	2.625"	2.625"	2.75"	2.75"	3"	4"	1"	0.015"	0.125"
1"	2.625"	2.875"	2.875"	2.875"	3.125"	3.125"	3.375"	4"	1"	0.02"	0.125"
1.25"	3"	3.25"	3.25"	3.25"	3.5"	3.5"	4.125"	4"	1"	0.025"	0.125"
1.5"	3.375"	3.75"	3.75"	3.75"	3.875"	3.875"	4.625"	4"	1"	0.03"	0.125"
2"	4.125"	4.375"	4.375"	4.375"	5.625"	5.625"	5.75"	4"	1"	0.0313"	0.125"
2.5"	4.875"	5.125"	5.125"	5.125"	6.5"	6.5"	6.625"	4"	1"	0.0313"	0.125"
3"	5.375"	5.875"	5.875"	5.875"	6.625"	6.875"	7.75"	4"	1"	0.0313"	0.125"
4"	6.875"	7.125"	7"	7.625"	8.125"	8.25"	9.25"	4"	1"	0.0625"	0.125"
5"	7.75"	8.5"	8.375"	9.5"	9.75"	10"	11"	4"	1"	0.0625"	0.125"
6"	8.75"	9.875"	9.75"	10.5"	11.375"	11.125"	12.500"	6"	1.5"	0.0625"	0.125"
8"	11"	12.125"	12"	12.625"	14.125"	13.875"	15.25"	6"	1.5"	0.125"	0.25"
10"	13.375"	14.25"	14.125"	15.75"	17.125"	17.125"	18.75"	6"	1.5"	0.125"	0.25"
12"	16.125"	16.625"	16.5"	18"	19.625"	20.5"	21.625"	6"	1.5"	0.125"	0.25"
14"	17.75"	19.125"	19"	19.375"	20.5"	22.75"	–	6"	1.5"	0.125"	0.25"
16"	20.25"	21.25"	21.125"	22.25"	22.625"	25.25"	–	6"	1.5"	0.25"	0.375"
18"	21.5"	23.375"	23.25"	24"	25"	27.625"	–	6"	1.5"	0.25"	0.375"
20"	23.75"	25.625"	25.375"	26.75"	27.375"	29.625"		6"	1.5"	0.25"	0.375"
22"	26"	27.75"	27.5"	28.875"	–	–	–	6"	1.5"	0.25"	0.375"
24"	28.125"	30.375"	30.125"	31"	32.875"	35.5"	–	6"	1.5"	0.25"	0.5"
30"	34.625"	37.375"	37.25"	38.125"	–	–	–	6"	1.5"	0.5"	0.5"
36"	41.125"	43.875"	43.875"	44.375"	–	–	–	6"	1.5"	0.5"	*0.5"

B – TO BE SPECIFIED BY CUSTOMER.
ALL DIMENSIONS ARE IN INCHES.

*A.G.A. / M.P.M.S. / I.S.A. TABLES DO NOT COVER THIS SIZE. SUGGESTED THICKNESS SHOWN.
NOTE: AITKEN STANDARD ORIFICE PLATES COMPLY WITH A.G.A. / A.P.I. / A.N.S.I. STANDARDS, WHEN NOT SPECIFIED BY CUSTOMER.

RECOMMENDED PLATE THICKNESS APPLIES TO STEEL PLATES AT A MAXIMUM OF 150°F AND A SPECIFIED MAXIMUM ALLOWABLE ALLOWABLE DIFFERENTIAL PRESSURE. REFER TO MPMS 14.3.2, TABLE 2-3..

L = T (PLATE THICKNESS) FOR RESTRICTION APPLICATIONS.

520 ORIFICE PLATE WEIGHTS

(BLANK WEIGHT IN POUNDS)

NOM. PIPE SIZE	125# 150#	250# 300#	400#	600#	900#	1500#	2500#	ISA PLATE THICKNESS
0.5"	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.125"
0.75"	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.125"
1"	0.3	0.3	0.3	0.3	0.4	0.4	0.6	0.125"
1.25"	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.125"
1.5"	0.4	0.5	0.5	0.5	0.5	0.5	0.7	0.125"
2"	0.6	0.6	0.6	0.6	1	1	1	0.125"
2.5"	0.8	0.8	0.8	0.8	1.3	1.3	1.3	0.125"
3"	0.9	1.1	1.1	1.1	1.3	1.4	1.8	0.125"
4"	1.4	1.5	1.5	2.6	2.7	2.9	3.5	0.125"
5"	1.8	2.1	2.1	2.6	2.7	2.9	3.5	0.125"
6"	2.4	3	2.9	3.4	3.9	3.7	4.4	0.125"
8"	7.4	8.8	8.6	9.4	11.6	11.4	13.6	0.25"
10"	10.6	11.8	11.6	14.4	17	17	20.2	0.25"
12"	14.8	15.7	15.4	18.3	21.7	23.7	26.3	0.25"
14"	17.8	20.6	20.4	21.2	23.7	29.1	–	0.25"
16"	34.5	38	37.5	41.6	43	53.5	–	0.375"
18"	38.9	45.9	45.4	48.4	52.5	64	–	0.375"
20"	47.4	59.1	54	60	62.8	73.5	–	0.375"
22"	56.7	64.6	64.6	69.9	–	–	–	0.375"
24"	88.4	103.1	101.1	107.3	120.7	140.7	–	0.5"
30"	133.7	155.7	155.7	162	–	–	–	0.5"
36"	188.5	209.6	209.6	219.4	–	–	–	*0.5"

*A.G.A. / M.P.M.S. / I.S.A. TABLES DO NOT COVER THIS SIZE. SUGGESTED THICKNESS SHOWN.

RTJ PLATE HOLDERS

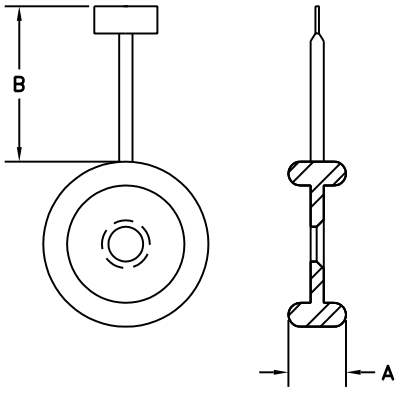
300 – 600 LBS. ANSI

SIZE	A.P.I. RING	A	B	APPROX. GAP
1/2"	R-11	29/32"	4 1/4"	19/32"
3/4"	R-13	1"	4 1/4"	19/32"
1"	R-16	1"	4 1/4"	19/32"
1 1/2"	R-20	1"	4 1/4"	19/32"
2"	R-23	1 1/16"	4 1/4"	19/32"
2 1/2"	R-26	1 1/16"	5 1/4"	19/32"
3"	R-31	1 1/16"	5 1/4"	19/32"
3 1/2"	R-34	1 1/16"	4 1/4"	19/32"
4"	R-37	1 1/16"	5 1/4"	19/32"
5"	R-41	1 1/16"	6 1/4"	19/32"
6"	R-45	1 1/16"	6 1/4"	9/16"
8"	R-49	1 1/16"	6 1/2"	9/16"
10"	R-53	1 3/16"	7 1/2"	23/32"
12"	R-57	1 3/16"	7 1/2"	23/32"
14"	R-61	1 3/16"	7 1/2"	23/32"
16"	R-65	1 3/16"	7 1/2"	23/32"
18"	R-69	1 3/16"	7 1/2"	23/32"
20"	R-73	1 1/4"	7 1/2"	23/32"
24"	R-77	1 7/16"	7 1/2"	13/16"

900 LBS. ANSI

SIZE	A.P.I. RING	A	B	APPROX.
1/2"	R-12	1"	4 1/4"	19/32"
3/4"	R-14	1"	4 1/4"	19/32"
1"	R-16	1"	4 1/4"	19/32"
1 1/2"	R-20	1"	4 1/4"	19/32"
2"	R-24	1 1/16"	5 1/4"	5/8"
2 1/2"	R-27	1 1/16"	5 1/4"	5/8"
3"	R-31	1 1/16"	5 1/4"	17/32"
4"	R-37	1 1/16"	5 1/4"	17/32"
5"	R-41	1 1/16"	6 1/4"	17/32"
6"	R-45	1 1/16"	6 1/4"	17/32"
8"	R-49	1 1/16"	6 1/2"	17/32"
10"	R-53	1 3/16"	7 1/2"	21/32"
12"	R-57	1 3/16"	7 1/2"	11/16"
14"	R-62	1 7/16"	7 1/2"	23/32"
16"	R-66	1 7/16"	7 1/2"	23/32"
18"	R-70	1 9/16"	7 1/2"	3/4"
20"	R-74	1 9/16"	7 1/2"	3/4"
24"	R-78	1 7/8"	9 1/2"	25/32"

HANDLE-TYPE RING-JOINT ORIFICE PLATE HOLDERS ARE FITTED WITH UNIVERSAL ORIFICE PLATES AND USED WITH RING-JOINT ORIFICE FLANGES. CATALOG 560 PLATES ARE A ONE-PIECE INTEGRAL PLATE SEAL. CATALOG 590 PLATES ARE PROVIDED WITH HOLD-DOWN SCREWS TO KEEP THE UNIVERSAL PLATE IN THE HOLDER. UNIVERSAL ORIFICE PLATES ARE SOLD SEPARATELY.



CATALOG 560

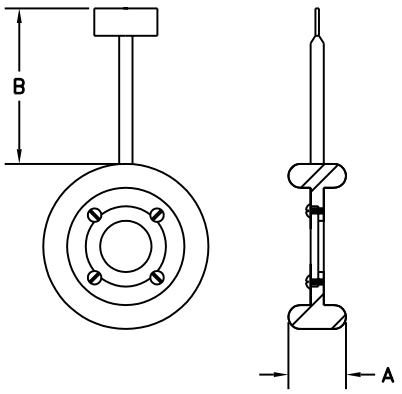
1500 LBS. ANSI

SIZE	A.P.I. RING	A	B	APPROX.
1/2"	R-12	1"	6 1/2"	19/32"
3/4"	R-14	1"	6 1/2"	19/32"
1"	R-16	1"	6 1/2"	19/32"
1 1/2"	R-20	1"	6 1/2"	19/32"
2"	R-24	1 1/16"	6 1/2"	1/2"
2 1/2"	R-27	1 1/16"	6 1/2"	1/2"
3"	R-35	1 1/16"	6 1/2"	1/2"
4"	R-39	1 1/16"	6 1/2"	1/2"
5"	R-44	1 1/16"	6 1/2"	1/2"
6"	R-46	1 3/16"	6 1/2"	9/16"
8"	R-50	1 5/16"	6 1/2"	19/32"
10"	R-54	1 7/16"	7 1/2"	23/32"
12"	R-58	1 11/16"	8 1/2"	9/16"
14"	R-63	1 7/8"	8 1/2"	25/32"
16"	R-67	2"	9 1/2"	7/8"
18"	R-71	2"	9 1/2"	7/8"
20"	R-75	2 1/8"	10 1/2"	7/8"
24"	R-79	2 5/16"	11 1/2"	1"

2500 LBS. ANSI

SIZE	A.P.I. RING	A	B	APPROX.
1/2"	R-13	1"	6 1/2"	19/32"
3/4"	R-16	1"	6 1/2"	19/32"
1"	R-18	1"	6 1/2"	19/32"
1 1/2"	R-23	1 1/16"	6 1/2"	9/16"
2"	R-26	1 3/16"	6 1/2"	5/8"
2 1/2"	R-28	1 3/16"	6 1/2"	5/8"
3"	R-32	1 3/16"	6 1/2"	5/8"
4"	R-38	1 5/16"	6 1/2"	21/32"
5"	R-42	1 7/16"	7 1/2"	21/32"
6"	R-47	1 7/16"	7 1/2"	21/32"
8"	R-51	1 9/16"	8 1/2"	11/16"
10"	R-55	2"	8 1/2"	7/8"
12"	R-60	2 1/8"	9 1/2"	15/16"

NOTE: CATALOG 560 PLATE HOLDERS 1/2" THROUGH 8" HAVE A STANDARD PLATE THICKNESS OF 1/4". ADD 1/8" TO DIMENSIONS "A" AND APPROX. GAP.



CATALOG 590

R-23 & R-26 NOT AVAILABLE IN CATALOG 590

AITKEN

TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: LIQUID

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____

STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Vapor Pressure (psia)				
OPTION 2:				
***Specific Gravity @ Base				
Specific Gravity @ Flow				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Vapor Pressure (psia)				
****OPTION 3: (Database)**				
Water				

⇔*Customer must provide information for either Option1, Option 2, **OR** Option3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are needed for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN
TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET
FLUID TYPE : GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
***Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Air				

⇔*Customer must provide information for either Option 1, Option 2, **OR** Option 3.
**Available for some fluids. Inquire if desired fluid is available on Database.
***These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

AITKEN

TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE: VAPOR

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

Tag No.				
Flange Rating / Face				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
***Density @ Base (lb./cu.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
***Liquid Compressibility @ Base (z)				
Liquid Compressibility @ Flow (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
****OPTION 3: (Database)**				
Steam				

⇔*Customer to provide information; EITHER OPTION 1, OPTION 2, **OR** OPTION3.
** Available for some fluids. Inquire if fluid desired is available on Database.
***These data are required for base/standard conditions. For mass flow, base properties can be omitted.

AITKEN

TEL: (281)441.5438
FAX: (713)699.5186
E-MAIL: aitkensales@schuff.com

BORE CALCULATION DATA SHEET

FLUID TYPE : NATURAL GAS

CUSTOMER: _____ **DATE:** _____
P.O. NO.: _____
STANDARD: ISA _____ AGA _____ ASME _____ OTHER _____
TYPE OF CALCULATION: SIZING _____ FLOW RATE _____ DP _____
TYPE OF DIFFERENTIAL PRODUCER:

- ORIFICE PLATE CONCENTRIC _____ ECCENTRIC _____ SEGMENTAL _____
  QUADRANT _____ RESTRICTION _____
- FLOW NOZZLE: ASME LONG RADIUS _____ OTHER _____
- VENTURI : SHORT FORM _____ LONG FORM _____

TYPE OF TAP: FLANGE _____ CORNER _____ RADIUS _____ PIPE _____

Aitken bore calculations are assumed at volumetric base conditions unless otherwise noted.

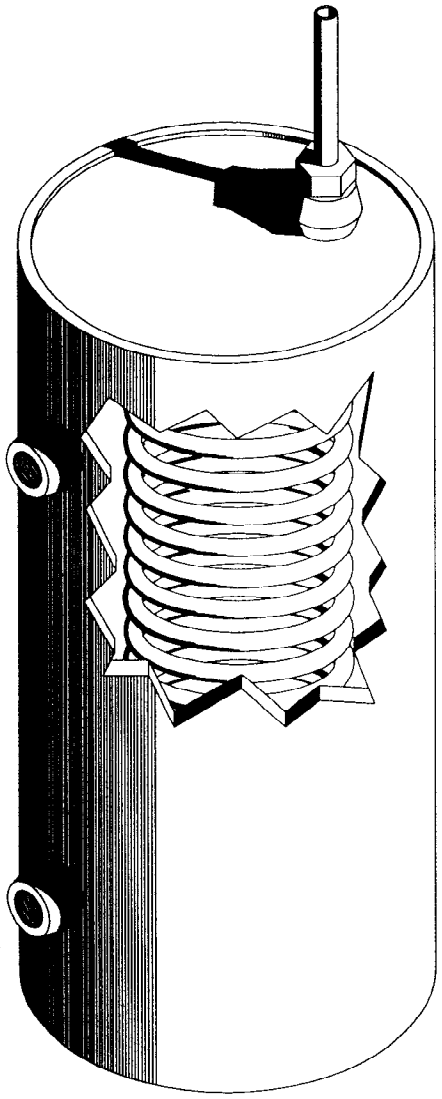
Tag No.				
Flange Rating				
Plate Thickness				
Plate Material				
Drain / Vent				
Line Material				
Fluid Name				
Flowing Pressure (psia / psig)				
Flowing Temperature (°F / °C)				
Max. Flow Rate / Unit of Flow				
Normal Flow Rate / Unit of Flow				
Differential Pressure (In. W.C.)				
Nominal Line Size (Inches)				
Line I.D. / Schedule				
Estimated Bore / Beta				
⇔***FLUID PROPERTIES:**				
OPTION 1:				
**Density @ Base (lb./.ft.)				
Density @ Flow (lb./cu.ft.)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 2:				
Specific Gravity @ Flow **OR** M.W.				
Gas Compressibilty @ Flow (z)				
**Gas Compressibility @ Base (z)				
Viscosity (Cp)				
Isentropic Exponent (Cp/Cv)				
OPTION 3:				
%Nitrogen				
%Carbon Dioxide				
Specific Gravity @ Base				

⇔*Customer to provide information for either Option 1, Option 2, **OR** Option 3.
**These data are required for base/standard flow conditions. For mass flow, these properties can be omitted.

AITKEN

TEL: 281-441-5438 - FAX 713-699-5186

SAMPLE COOLERS



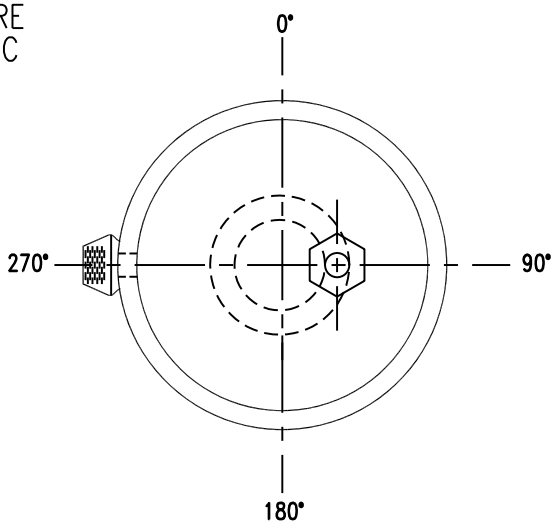
REV.: 4 01/27/09

DWG NO.: CATSMPCS

AITKEN SAMPLE COOLER

HIGH PRESSURE SAMPLE COOLER
SHELL: 125 PSIG @ 100°F (STANDARD)
COIL: 2000 PSIG @ 100°F (STANDARD)

HIGH PRESSURE
TYPE 100 HSC

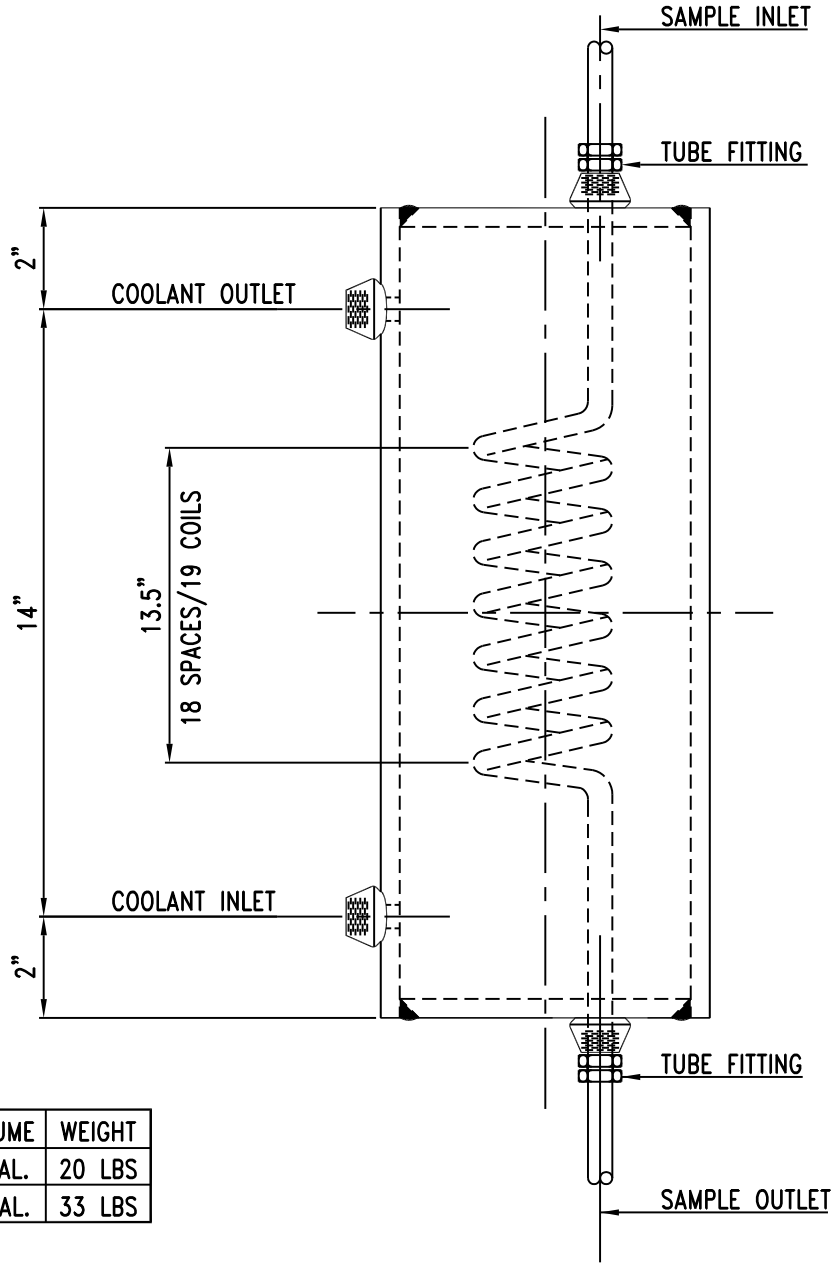


DESIGN CODE:
ASME SECTION VIII, DIV. 1
ASME B31.3 (STANDARD)
NACE MR0175

MATERIALS:
CARBON STEEL BODY & 304 STAINLESS STEEL COIL (STANDARD)
OTHER MATERIALS AVAILABLE

MOUNTING OPTIONS:
LEGS
SUPPORTS
BRACKETS

COATING:
SSPC SP-3, SHOP PRIMER (STANDARD)
SPECIAL COATINGS AVAILABLE



TYPE	HOUSING	COIL	COIL APPROX. SURFACE AREA	VOLUME	WEIGHT
A	4.5"ø	0.375"ø	1.5 SQ.FT.	1 GAL.	20 LBS
B	8.625"ø	0.375"ø	1.5 SQ.FT.	2 GAL.	33 LBS

AITKEN SAMPLE COOLER

HIGH PRESSURE
TYPE 200 HSC
(BOLTED COVER-REMOVABLE COIL)

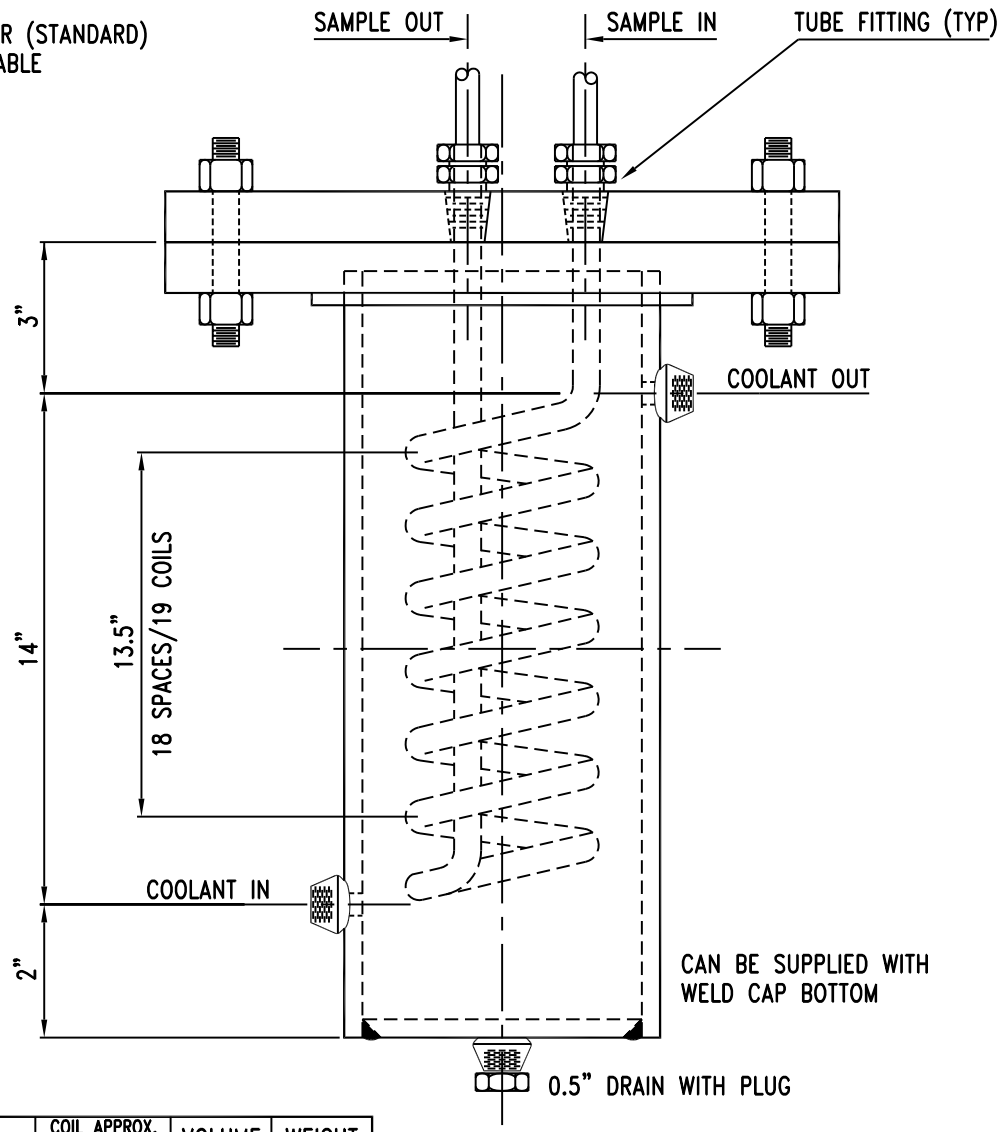
HIGH PRESSURE SAMPLE COOLER
SHELL: 125 PSIG @ 100°F (STANDARD)
COIL: 2000 PSIG @ 100°F (STANDARD)

DESIGN CODE:
ASME SECTION VIII, DIV. 1
ASME B31.3 (STANDARD)
NACE MR0175

MATERIALS:
CARBON STEEL BODY & 304 STAINLESS STEEL COIL (STANDARD)
OTHER MATERIALS AVAILABLE

MOUNTING OPTIONS:
LEGS
SUPPORTS
BRACKETS

COATING:
SSPC SP-3, SHOP PRIMER (STANDARD)
SPECIAL COATINGS AVAILABLE



TYPE	HOUSING	COIL	COIL APPROX. SURFACE AREA	VOLUME	WEIGHT
A	6.625"ø	0.375"ø	2.5 SQ.FT.	1 GAL.	80 LBS
B	8.625"ø	0.5"ø	3.5 SQ.FT.	2 GAL.	125 LBS
C	10.75"ø	0.5"ø	5 SQ.FT.	3 GAL.	186 LBS

AITKEN SAMPLE COOLER

LOW PRESSURE
TYPE 100 SC
(OPEN TOP)

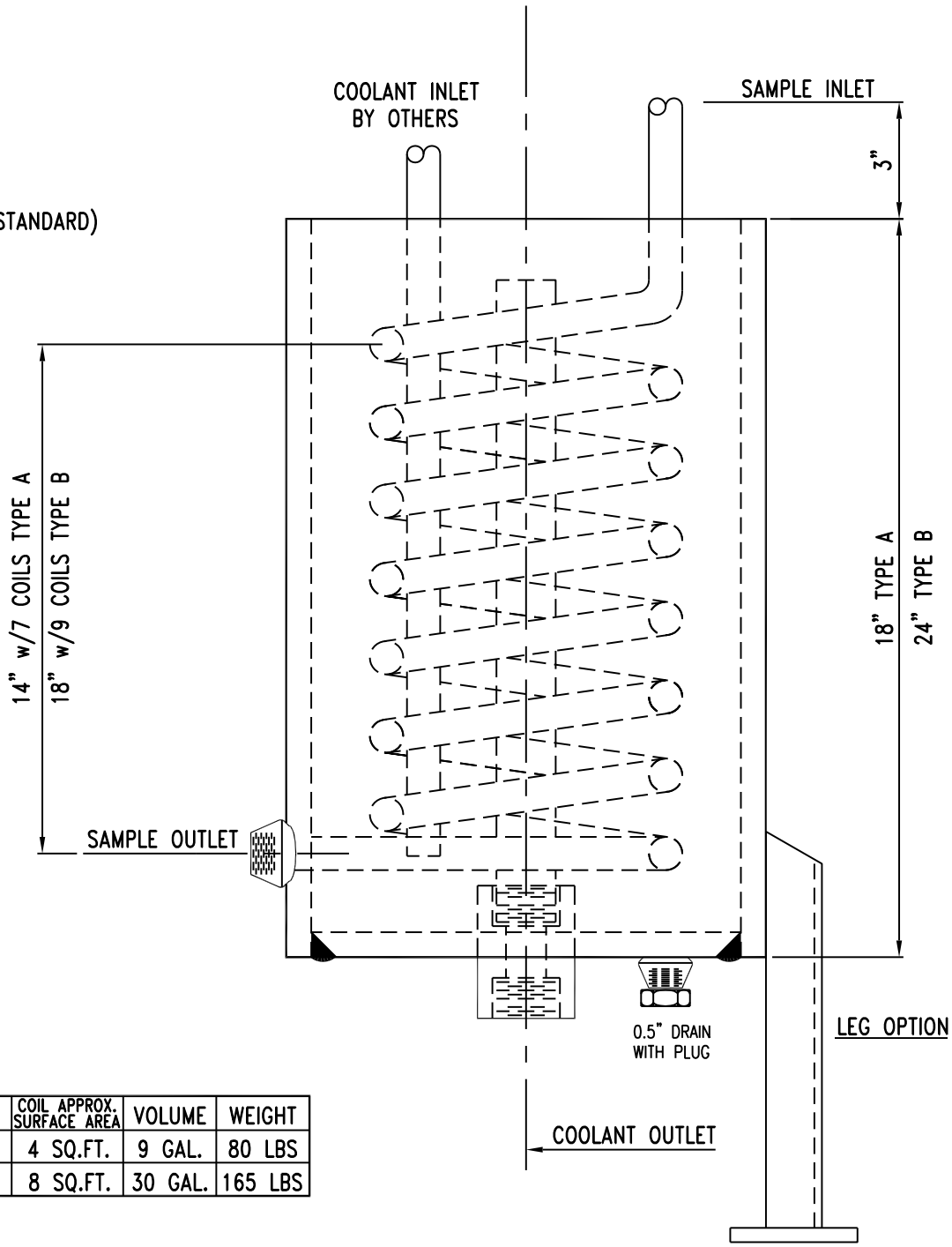
LOW PRESSURE SAMPLE COOLER
COOLANT @ ATMOSPHERIC PRESSURE

DESIGN CODE:
ASME B31.3 (STANDARD)
NACE MR0175

MATERIALS:
CARBON STEEL BODY & 304 STAINLESS STEEL COIL (STANDARD)
OTHER MATERIALS AVAILABLE

MOUNTING OPTIONS:
LEGS
SUPPORTS
BRACKETS

COATING:
SSPC SP-3, SHOP PRIMER (STANDARD)
SPECIAL COATINGS AVAILABLE



TYPE	HOUSING	COIL	COIL APPROX. SURFACE AREA	VOLUME	WEIGHT
A	12.75"ø	0.5" S/40	4 SQ.FT.	9 GAL.	80 LBS
B	20"	0.75" S/40	8 SQ.FT.	30 GAL.	165 LBS

Standard English Conversion Tables

Length

Convert From	Convert To	Multiply By
Inches	Feet	0.0833
Inches	Yards	0.0278
Feet	Inches	12
Feet	Yards	0.3333
Feet	Miles	0.0001894
Yards	Feet	3
Yards	Miles	0.0005682

Area

Convert From	Convert To	Multiply By
Sq inches	Sq feet	0.00694
Sq inches	Sq yards	0.000772
Sq feet	Sq inches	144
Sq feet	Sq yards	0.11111
Sq yards	Sq inches	1,296
Sq yards	Sq feet	9
Sq yards	Acres	0.000207
Acres	Sq feet	43,560
Acres	Sq yards	4,840

Volume

Convert From	Convert To	Multiply By
Cu inches	Cu feet	0.0005787
Cu inches	Cu yards	0.00002143
Cu inches	US gal	0.004329
Cu feet	Cu inches	1,728
Cu feet	Cu yards	0.03704
Cu feet	US gal	7.481
Cu yards	Cu inches	46,656
Cu yards	Cu feet	27

Weight

Convert From	Convert To	Multiply By
Grains	Ounces	0.002286
Ounces	Grains	437.5
Ounces	Pounds	0.0625
Pounds	Ounces	16
Pounds	US tons	0.0005
Pounds	Long tons	0.000446
US tons	Pounds	2,000
Long tons	Pounds	2,240

Sheet Information

Gauge	Thickness (Inches)	Wt. Per Sq. Ft. (Lbs)
10	0.1345	5.625
11	0.1196	5
12	0.1046	4.375
14	0.0747	3.125
16	0.0598	2.5
18	0.0478	2
20	0.0359	1.5
22	0.0299	1.25
24	0.0239	1

Steel Plate Weight

Thickness (Inches)	Wt. Per Sq. Ft. (Lbs)
3/16	7.66
1/4	10.21
5/16	12.76
3/8	15.32
1/2	20.42
5/8	25.53
3/4	30.63
7/8	35.74
1	40.84

Drill Sizes for Pipe Taps

Nominal Pipe Size	Tap Drill Size	Decimal Equivalent	Number of Threads Per Inch	Thread Engagement
1/8	11/32	0.34375	27	1/4
1/4	7/16	0.4375	18	3/8
3/8	37/64	0.578125	18	3/8
1/2	23/32	0.71875	14	1/2
3/4	59/64	0.921875	14	9/16
1	1 5/32	1.15625	11 1/2	11/16
1 1/4	1 1/2	1.5	11 1/2	11/16
1 1/2	1 47/64	1.734375	11 1/2	11/16

Conversions of Liquid Measures and Weights

To Convert / Convert From	U.S. Gallon	Imperial Gallon	U.S. Pint	U.S. Pound *H_2O	U.S. Cubic Foot	U.S. Cubic Inch	Liter	Cubic Meter
U.S. Gallon	1	0.833	8	8.337	0.13368	231	3.78533	0.003785
Imperial Gallon	1.2009	1	9.6075	10	0.16054	277.42	4.54596	0.004546
U.S. Pint	0.125	0.1041	1	1.042	0.01671	28.875	0.473166	0.000473
U.S. Pound *H_2O	0.11995	0.1	0.9596	1	0.016035	27.708	0.45405	0.000454
U.S. Cubic Foot	7.48052	6.2289	59.8442	62.365	1	1728	28.31702	0.02832
U.S. Cubic Inch	0.004329	0.00361	0.034632	0.0361	0.0005787	1	0.016387	0.000016
Liter	0.26418	0.219976	2.113423	2.202	0.035315	61.0251	1	0.001
Cubic Meter	264.17	219.969	2113.34	2202	35.31446	61023.38	999.972	1

Water (H_2O) @ 60 °F (15.6 °C) **1 Barrel = 42 Gallons (Petroleum Measure)**

Conversions of Pressure and Head

To Convert / Convert From	Lb/In^2	Lb/Ft^2	kg/cm^2	kg/m^2	In. H_2O (68°F)	Ft. H_2O (68°F)	In. Mercury (32°F)	mm Mercury (32°F)	†Bar	†Mpa
Lb/In^2	1	144	0.07031	703.07	27.7276	2.3106	2.30602	51.715	0.06895	0.006895
Lb/Ft^2	0.00695	1	0.00049	4.88241	0.1926	0.01605	0.01414	0.35913	0.000479	0.0000479
kg/cm^2	14.2233	2048.155	1	10000	394.38	32.865	28.959	735.559	0.98067	0.098067
kg/m^2	0.00142	0.20477	0.0001	1	0.03944	0.00329	0.00289	0.07356	0.000098	0.0000098
In. *H_2O	0.03609	5.1972	0.00253	25.375	1	0.08333	0.07343	1.8651	0.00249	0.000249
Ft. *H_2O	0.43278	62.3205	0.03043	304.275	12	1	0.88115	22.3813	0.029839	0.0029839
In. **Mercury	0.49115	70.7262	0.03453	345.316	13.6185	1.1349	1	25.4001	0.033864	0.0033864
Mm **Mercury	0.01934	2.7845	0.00136	13.59509	0.53616	0.04468	0.03937	1	0.00133	0.0001333
†Bar	14.5038	2088.55	1.01972	10197.2	402.156	33.513	29.53	750.062	1	0.1
†Mpa	145.038	20885.5	10.1972	101972	4021.56	335.13	295.3	7500.62	10	1

***Water (H_2O) @ 68 °F (20 °C)** ****Mercury @ 32 °F (0 °C)** **†Mpa (megapascal) = 10 Bar**

Conversions of Flow Rates

Convert To / Convert From	U.S. Gal/min	Imp gal/min	U.S. million gal/day	Cu ft per sec (sec-ft)	Cu Meters per hour	Liters per sec	Barrels (42 gal) per min	Barrels (42 gal) per day
U.S. gal/min	1	0.8327	0.00144	0.00223	0.2271	0.0631	0.0238	34.286
Imp gal/min	1.201	1	0.00173	0.002676	0.2727	0.0758	0.02859	41.176
US Million gal/day	694.4	578.25	1	1.547	157.7	43.8	16.53	23810
Cu ft/sec	448.83	373.7	0.646	1	101.9	28.32	10.686	15388
Cu m/sec	15852	13200	22.83	3535	3600	1000	377.4	-
Cu m/min	264.2	220	0.3804	0.5886	60	16.667	6.29	9058
Cu m/hr	4.403	3.67	0.00634	0.00928	1	0.2778	0.1048	151
Liters/sec	15.85	13.2	0.0228	0.0353	3.6	1	0.3773	543.3
Liters/min	0.2642	0.22	0.00038	0.000589	0.06	0.0167	0.00629	9.058
Barrels (42 gal)/min	42	34.97	0.0605	0.0937	9.538	2.65	1	1440
Barrels (42 gal)/day	0.0292	0.0243	0.000042	0.000065	0.00662	0.00184	0.00069	1

To use above conversion charts, locate the unit to be converted in the left hand column. Then follow the conversion factors across the row for the desired conversion unit. Use this factor to multiply with your numerical value to convert.

Example: Convert 5 psi to inches of water. From the Conversion of Pressure and Head Chart,
5 (psi) x 27.7276 (Conversion factor) = 138.638 inches of water.

SI Units and Conversion Tables

Length

Convert From	Convert To	SI Symbol	Multiply By
Feet	Meter	m	0.03048006
Inch	Millimeter	mm	25.4
Microinches	Micrometer	μm	0.025 4
Statute miles	Kilometer	km	1.609

Area

Convert From	Convert To	SI Symbol	Multiply By
Sq inches	Sq millimeter	mm^2	645.163
Sq inches	Sq centimeter	cm^2	6.4516
Sq inches	Sq meter	m^2	0.000 645
Sq feet	Sq meter	m^2	0.092 90
Acres	hectare	ha	0.404 7

Volume

Convert From	Convert To	SI Symbol	Multiply By
Cu inches	Cu millimeter	mm^3	16387
Cu inches	Cu centimeter	cm^3	16.387
Cu inches	Cu meter	m^3	0.000 016 39
Cu feet	Cu meter	m^3	0.028 32
Fluid ounce	Milliliter	mL	29.57
Quarts (US)	Liter	L	0.946 4
Gallons (US)	Liter	L	3.785

Mass

Convert From	Convert To	SI Symbol	Multiply By
Pounds	Kilogram	kg	0.453 59
Ton (short)	Metric ton	t	0.907 2
Ton (long)	Metric ton	t	1.016

Pressure

Convert From	Convert To	SI Symbol	Multiply By
lbs/in^2	Pascal	Pa	6,895
lbs/in^2	Kilopascal	kPa	6.895
lbs/in^2	Megapascal	MPa	0.006 895
lbs/in^2	Bar	Bar	0.068940
Bar	Kilopascal	kPa	100
Millibar	Pascal	Pa	100

Velocity

Convert From	Convert To	SI Symbol	Multiply By
Feet/Second	Meter/Second	m/s	0.304 8
Feet/Second	cm/sec	cm/sec	30.48
Feet/Minute	Meter/Second	m/s	0.005 08
Miles/Hour	Kilometer/Hour	km/h	1.609

Conversion Temperature Table

°C		°F	°C		°F	°C		°F	°C		°F	°C		°F
-73.3	***-100***	-148	-3.3	***26***	78.8	21.1	***70***	158	110	***230***	446	354	***670***	1238
-67.8	***-90***	-130	-2.8	***27***	80.6	21.7	***71***	159.8	115	***240***	464	360	***680***	1256
-62.2	***-80***	-112	-2.2	***28***	82.4	22.2	***72***	161.6	121	***250***	482	365	***690***	1274
-59.5	***-75***	-103	-1.7	***29***	84.2	22.8	***73***	163.4	127	***260***	500	371	***700***	1292
-56.7	***-70***	-94	-1.1	***30***	86	23.3	***74***	165.2	132	***270***	518	376	***710***	1310
-53.9	***-65***	-85	-0.6	***31***	87.8	23.9	***75***	167	138	***280***	536	382	***720***	1328
-51.1	***-60***	-76	0	***32***	89.6	24.4	***76***	168.8	143	***290***	554	387	***730***	1346
-48.4	***-55***	-67	0.6	***33***	91.4	25	***77***	170.6	149	***300***	572	393	***740***	1364
-45.6	***-50***	-58	1.1	***34***	93.2	25.6	***78***	172.4	154	***310***	590	399	***750***	1382
-42.8	***-45***	-49	1.7	***35***	95	26.1	***79***	174.2	160	***320***	608	404	***760***	1400
-40	***-40***	-40	2.2	***36***	96.8	26.7	***80***	176	165	***330***	626	410	***770***	1418
-37.2	***-35***	-31	2.8	***37***	98.6	27.2	***81***	177.8	171	***340***	644	415	***780***	1436
-34.4	***-30***	-22	3.3	***38***	100.4	27.8	***82***	179.6	177	***350***	662	421	***790***	1454
-31.6	***-25***	-13	3.9	***39***	102.4	28.3	***83***	181.4	182	***360***	680	426	***800***	1472
-28.8	***-20***	-4	4.4	***40***	104	28.9	***84***	183.2	188	***370***	698	432	***810***	1490
-26.1	***-15***	5	5	***41***	105.8	29.4	***85***	185	193	***380***	716	438	***820***	1508
-23.3	***-10***	14	5.6	***42***	107.6	30	***86***	186.8	199	***390***	734	443	***830***	1526
-20.6	***-5***	23	6.1	***43***	109.4	30.6	***87***	188.6	204	***400***	752	449	***840***	1544
-17.8	***0***	32	6.7	***44***	111.2	31.1	***88***	190.4	210	***410***	770	454	***850***	1562
-17.2	***1***	33.8	7.2	***45***	113	31.7	***89***	192.2	215	***420***	788	460	***860***	1580
-16.7	***2***	35.6	7.8	***46***	114.8	32.2	***90***	194	221	***430***	806	465	***870***	1598
-16.1	***3***	37.4	8.3	***47***	116.6	32.8	***91***	195.8	226	***440***	824	471	***880***	1616
-15.6	***4***	39.2	8.9	***48***	118.4	33.3	***92***	197.6	232	***450***	842	476	***890***	1634
-15	***5***	41	9.4	***49***	120.2	33.9	***93***	199.4	238	***460***	860	482	***900***	1652
-14.4	***6***	42.8	10	***50***	122	34.4	***94***	201.2	243	***470***	878	487	***910***	1670
-13.9	***7***	44.6	10.6	***51***	123.8	35	***95***	203	249	***480***	896	493	***920***	1688
-13.3	***8***	46.4	11.1	***52***	125.6	35.6	***96***	204.8	254	***490***	914	498	***930***	1706
-12.8	***9***	48.2	11.7	***53***	127.4	36.1	***97***	206.6	260	***500***	932	504	***940***	1724
-12.2	***10***	50	12.2	***54***	129.2	36.7	***98***	208.4	265	***510***	950	510	***950***	1742
-11.7	***11***	51.8	12.8	***55***	131	37.2	***99***	210.2	271	***520***	968	515	***960***	1760
-11.1	***12***	53.6	13.3	***56***	132.8	37.8	***100***	212	276	***530***	986	520	***970***	1778
-10.6	***13***	55.4	13.9	***57***	134.6	43	***110***	230	282	***540***	1004	526	***980***	1796
-10	***14***	57.2	14.4	***58***	136.4	49	***120***	248	288	***550***	1022	532	***990***	1814
-9.4	***15***	59	15	***59***	138.2	54	***130***	266	293	***560***	1040	538	***1000***	1832
-8.9	***16***	60.8	15.6	***60***	140	60	***140***	284	299	***570***	1058	565	***1050***	1922
-8.3	***17***	62.6	16.1	***61***	141.8	65	***150***	302	304	***580***	1076	593	***1100***	2012
-7.8	***18***	64.4	16.7	***62***	143.6	71	***160***	320	310	***590***	1094	620	***1150***	2102
-7.2	***19***	66.2	17.2	***63***	145.4	76	***170***	338	315	***600***	1112	648	***1200***	2192
-6.7	***20***	68	17.8	***64***	147.2	83	***180***	356	321	***610***	1130	675	***1250***	2282
-6.1	***21***	69.8	18.3	***65***	149	88	***190***	374	326	***620***	1148	704	***1300***	2372
-5.6	***22***	71.6	18.9	***66***	150.8	93	***200***	392	332	***630***	1166	734	***1350***	2462
-5.0	***23***	73.4	19.4	***67***	152.6	99	***210***	410	338	***640***	1184	760	***1400***	2552
-4.4	***24***	75.2	20	***68***	154.4	100	***212***	413	343	***650***	1202	787	***1450***	2642
-3.9	***25***	77	20.6	***69***	156.2	104	***220***	428	349	***660***	1220	815	***1500***	2732

Note: °C = Degrees Centigrade °F = Degrees Fahrenheit

Example how to use table: Convert 70 degrees fahrenheit to centigrade. Find your value (70) in the bold letters. To the left, under the column °C, is your conversion for centigrade. Answer: 70°F = 21.1°C Note, for converting centigrade to fahrenheit the same procedure would be used, except you would go to the right hand column for degrees fahrenheit. Therefore, 70 degrees centigrade would equal to 158 degrees fahrenheit.

Flange Bolt Tightening Sequence

To assemble and tighten a bolted flange connection is a simple task. In order to obtain a leak proof connection, a few simple procedures should be followed.

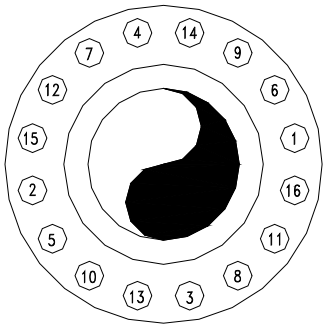
1. Before assembling the flanges, bolting and gasket, you should ensure the flange gasket seating surface and gasket are free of dirt, metal shavings, weld slag or any debris which could cause an uneven seat.

2. The gasket should line up evenly with the inside bore of the flange. No portion of the gasket should extend into the bore of the flange.

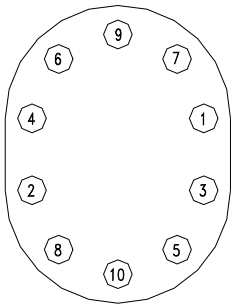
3. Tighten bolts. The flange faces should be parallel and the bolts should be tightened uniformly. See below for bolt tightening sequence.

   -Do not snug up bolts on the first pass. This can tilt the flanges out of a parallel seat.
   -When using an impact wrench set the wrench at about 1/2 the final torque for the first pass.

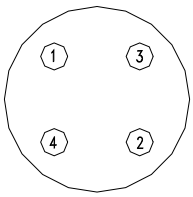
   -Always pay particular attention for bolting that will be inaccessible for tightening or hard-to-reach bolting.



1.) Circular Multibolt Pattern



2.) Non-circular Multibolt Pattern



3.) Circular Four Bolt Pattern

Tightening Sequence:

Tightening sequence for round flanges in figure 1. The first pass, lightly tighten the first bolt then move directly across or 180 degrees for the second bolt, then move 1/4 turn around the circle or 90 degrees for the third bolt and directly across for the fourth. Continue this sequence until all bolts are tightened.

When tightening an oval flange, start from the closest bolt from the short centerline and then alternate from side to side as shown in figure 2.

When tightening a four-bolt flange, use a criss-cross pattern as shown in figure 3.

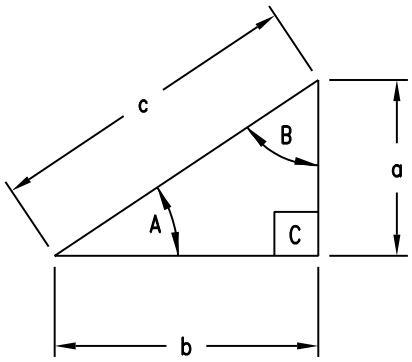
Material Specifications

P-No. / Group No.	Nominal Steel Designation	Forgings (flanges, couplings, weldolets,..etc.)	Wrought Fittings (elbows, reducers, tees, weld caps…etc.)	Pipe	Plate	Remarks
1/1	Carbon	SA-105	SA-234-WPB	SA-106-B	SA-516-70 or SA-36	SA-36 for Non-pressure retaining parts.
		SA-350-LF2	SA-420-WPL6	SA-333 Gr. 6	SA-516-70	Cold Temperature Service
4/1	1Cr – 1/2Mo	SA-182-F12	SA-234-WP12	SA-335-P12	SA-387-12	Alloy Steel
	1 1/4Cr – 1/2Mo	SA-182-F11	SA-234-WP11	SA-335-P11	SA-387-11	
5A/1	2 1/4Cr – 1/2Mo	SA-182-F22	SA-234-WP22	SA-335-P22	SA-387-22	Alloy Steel
5B/1	5Cr –1/2Mo	SA-182-F5	SA-234-WP5	SA-335-P5	SA-387-5	Alloy Steel
	9Cr – 1 Mo	SA-182-F9	SA-234-WP9	SA-335-P9	SA-387-9	
8/1	18Cr – 8Ni	SA-182-F304	SA-403-WP304	SA-312-TP304	SA-240-304	Stainless Steel
	18Cr – 8Ni	SA-182-F304H	SA-403-WP304H	SA-312-TP304H	SA-240-304H	
	16Cr – 12Ni – 2Mo	SA-182-F316	SA-403-WP316	SA-312-TP316	SA-240-316	Stainless Steel
	16Cr – 12Ni – 2Mo	SA-182-F316H	SA-403-WP316H	SA-312-TP316H	SA-240-316H	
	18Cr – 8 Ni	SA-182-F304L	SA-403-WP304L	SA-312-TP304L	SA-240-304L	Low Carbon Stainless Steel
	16Cr – 12Ni – 2Mo	SA-182-F316L	SA-403-WP316L	SA-312-TP316L	SA-240-316L	Low Carbon Stainless Steel
43	67Ni – 30Cu	SB164		SB-165	SB-127	Monel
45	35Ni- 35Fe-20Cr-Cb	SB-462	SB-366	SB-729	SB-463	Alloy 20

Bolting Material Specification

Material	Specification	Description	Remarks
Carbon Steel	SA-193-B7	Stud	
Carbon Steel	SA-194-2H	Nut	
Carbon Steel	SA-193-B7M	Stud	Nace
Carbon Steel	SA-194-2HM	Nut	Nace
Carbon Steel	SA-320-L7	Stud	Low Temp. Service (-150°F)
Carbon Steel	SA-194-4	Nut	Low Temp. Service (-150°F)
304 Stainless Steel	SA-193-B8	Stud	
304 Stainless Steel	SA-194-8	Nut	
316 Stainless Steel	SA-193-B8M	Stud	
316 Stainless Steel	SA-194-8M	Nut	

Solutions for Right Triangles



Solving For	*Known Sides and Angles*	*Formula*	*Example*
A	a, b	$\tan A = \frac{a}{b}$	Side a = 3 Side b = 6 $\tan A = \frac{3}{6} = \tan^{-1}\frac{3}{6}$ A = 26.5651°
A	a,c	$\sin A = \frac{a}{c}$	Side a = 3 Side c = 8 $\sin A = \frac{3}{8} = \sin^{-1}\frac{3}{8}$ A = 22.0243°
A	B	A = 90° - B	Angle B = 30° Angle A = 90° - 30° A = 60°
B	a,b	$\tan B = \frac{b}{a}$	Side a = 3 Side b = 6 $\tan B = \frac{6}{3} = \tan^{-1}\frac{6}{3}$ B = 63.4349°
B	a, c	$\cos B = \frac{a}{c}$	Side a = 3 Side c = 8 $\cos B = \frac{3}{8} = \cos^{-1}\frac{3}{8}$ B = 67.9757°
B	A	B = 90° - A	Angle B = 40° Angle B = 90° - 40° B = 50°
a	b, A	a = b x tan A	Side b = 6 Angle A = 35° a = 6 x tan 35° = 6 x 0.7002 a = 4.2012
a	c, A	a = c x sin A	Side c = 8 Angle A = 42° a = 8 x sin 42° = 8 x 0.6691 a = 5.3528
b	c, A	b = c x cos A	Side c = 8 Angle A = 15° b = 8 x cos 15° = 8 x 0.9659 b = 0.7272
b	a, A	b = a x cot A	Side a = 3 Angle A = 20° b = 3 x cot 20° = 3 x 2.7475 b = 8.2425
b	a, c	$b = \sqrt{c^2 - a^2}$	Side a = 3 Side c = 8 $b = \sqrt{8^2 - 3^2}$ b = 7.4162
c	a, A	$c = \frac{a}{\sin A}$	Side a = 3 Angle A = 22° $c = \frac{3}{\sin 22°} = \frac{3}{0.3746}$ c = 8.009
c	b, A	$c = \frac{b}{\cos A}$	Side b = 3 Angle A = 22° $c = \frac{6}{\cos 22°} = \frac{6}{0.9272}$ c = 6.4711
c	a, b	$c = \sqrt{a^2 + b^2}$	Side a = 3 Side b = 6 $c = \sqrt{3^2 + 6^2}$ c = 6.7082

EQUIVALENTS OF API GRAVITY, BAUME′ GRAVITY, SPECIFIC GRAVITY, AND WEIGHT DENSITY AT 60°F / 60°F

API GRAVITY	BAUME′ GRAVITY	SPECIFIC GRAVITY(G)	WEIGHT DENSITY (Lb/ft^3)
6	4.099	1.0291	64.18
8	2.049	1.0143	63.26
10	10.00	1.0000	62.37
12	11.98	0.9861	61.50
14	13.96	0.9725	60.65
16	15.94	0.9593	59.83
18	17.92	0.9465	59.03
20	19.89	0.9340	58.25
22	21.87	0.9218	57.87
24	23.85	0.9100	56.75
26	25.83	0.8984	56.03
28	27.81	0.8871	55.32
30	29.79	0.8762	54.64
32	31.77	0.8654	53.97
34	33.75	0.8550	53.32
36	35.72	0.8448	52.69
38	37.70	0.8348	52.06
40	39.68	0.8251	51.46
42	41.66	0.8155	50.86
44	43.64	0.8063	50.28
46	45.62	0.7972	49.72
48	50.60	0.7883	49.16
50	50.58	0.7796	48.62
52	51.55	0.7711	48.09
54	53.53	0.7628	47.57
56	55.51	0.7547	47.07
58	57.49	0.7467	46.57
60	59.47	0.7389	46.08
62	61.45	0.7313	45.61
64	63.43	0.7238	45.14
66	65.41	0.7165	44.68
68	67.39	0.7093	44.23
70	69.36	0.7022	43.79
72	71.34	0.6953	43.36
74	73.32	0.6886	42.94
76	75.30	0.6819	42.53
78	77.28	0.6754	42.12
80	79.26	0.6690	41.72
82	81.24	0.6628	41.33
84	83.22	0.6566	40.95
86	85.19	0.6506	40.57
88	87.17	0.6446	40.20
90	89.15	0.6388	39.84
92	91.13	0.6331	39.48
94	93.11	0.6275	39.13
96	95.09	0.6220	38.79
98	97.07	0.6166	38.45
100	99.05	0.6112	38.12

The above table is based on the weight of oil @ 60°F in air to the same weight of water @ 60°F in air.
The relation of Degrees Baume′ or API to Specific Gravity is expressed by the following formulas:

For liquids lighter than water:

$$\text{Degrees Baume}' = \frac{140}{G} - 130$$

$$\text{Degrees A.P.I.} = \frac{141.5}{G} - 131.5$$

For liquids heavier than water:

$$\text{Degrees Baume}' = 145 - \frac{145}{G}$$

Hardness Conversion

Brinell	Brinell	Rock-well C	Rock-well A	Rock-well B	Shore Sciero-Scope
10mm Ball 3000 kg Dia of impression		Brale 150 kg Load	Brale 60 kg Load	1/4" Brale 100 kg Load	
-	-	80	92	-	-
-	-	79	91.5	-	-
-	-	78	91	-	-
-	-	77	90.5	-	-
-	-	76	90	-	-
-	-	75	89.5	-	-
-	-	74	89	-	-
-	-	73	88.5	-	-
-	-	72	88	-	-
-	-	71	87	-	-
2.2	780	70	86.5	-	106
-	760	69	86	-	103
2.25	745	68	85.5	-	100
-	725	67	85	-	97
2.3	712	66	84.5	-	95
-	697	65	84	-	93
2.35	682	64	83.5	-	91
-	668	63	83	-	89
2.4	653	62	82.5	-	87
-	640	61	81.5	-	86
2.45	627	60	81	-	84
-	615	59	80.5	-	82
2.5	601	58	80	-	81
-	590	57	79.5	-	80
2.55	578	56	79	-	78
-	567	55	78.5	-	77
2.6	555	54	78	120	75
-	545	53	77.5	120	74
2.65	534	52	77	119	72
2.7	514	51	76.5	119	70
2.75	495	50	76	118	67
2.8	477	49	75.5	117	65
-	470	48	74.5	117	64
2.85	461	47	74	116	63
2.9	444	46	73.5	115	61
2.95	429	45	73	115	59
3	415	44	72.5	114	57
-	408	43	72	114	56
3.05	401	42	71.5	113	55
3.1	388	41	71	112	54
3.15	375	40	70.5	111	52
3.2	363	39	70	111	51
3.25	352	38	69.5	110	49
-	346	37	69	110	48
3.3	341	36	68.5	109	47

Brinell	Brinell	Rock-well C	Rock-well A	Rock-well B	Shore Sciero-scope
10mm Ball 3000 kg Dia of impression		Brale 150 kg Load	Brale 60 kg Load	1/4" Brale 100 kg Load	
3.35	331	35	68	109	46
3.4	321	34	67.5	108	45
3.45	311	33	67	108	44
3.5	302	32	66.5	107	43
3.55	293	31	66	106	42
3.6	285	30	65.5	105	40
3.65	277	29	65	104	39
3.7	269	28	64.5	104	38
3.75	262	27	64	103	38
-	258	26	63.5	102	37
3.8	255	25	63	102	37
3.85	248	24	62.5	101	36
3.9	241	23	62	101	35
-	238	22	61.5	100	34
3.95	235	21	61	99	34
4	229	20	60	98	33
4.05	223	-	59.5	97	32
4.1	217	-	59	96	31
4.15	212	-	58	95	31
4.2	207	-	57.5	94	30
4.25	202	-	57	93	30
4.3	197	-	56.5	92	29
4.35	192	-	56	91	28
4.4	187	-	55.5	90	28
4.45	183	-	55	89	27
4.5	179	-	54	88	27
4.55	174	-	53.5	87	26
4.6	170	-	53	86	26
4.65	166	-	52.5	85	25
4.7	163	-	52	84	25
4.75	159	-	51	83	24
4.8	156	-	50.5	82	24
4.85	153	-	50	81	23
4.9	149	-	49.5	80	23
4.95	146	-	49	79	22
5	143	-	48.5	78	22
5.05	140	-	48	77	21
5.1	137	-	47	76	21
5.15	134	-	46.5	75	21
5.15	134	-	46	74	21
5.2	131	-	45.5	73	20
5.2	131	-	45	72	20
5.25	128	-	44.5	71	20
5.3	126	-	44	70	20
-	-	-	-	-	-

Note: For reference only. Above conversion and equivalent hardness numbers are approximate, due to the numerous types of equipment and methods of testing.

AITKEN

PIPE DATA

Nominal Pipe Size Inches	Outside Diameter Inches	Schedule	Schedule No.	Stainless Steel Schedule No.	Wall Thickness Inches	Inside Diameter Inches	Weight Pounds per Foot
1/8	0.405	…	10	10S	0.049	0.307	0.19
1/8	0.405	…	30	…	0.057	0.291	0.21
1/8	0.405	STD	40	40S	0.068	0.269	0.24
1/8	0.405	XS	80	80S	0.095	0.215	0.31
1/4	0.540	…	10	10S	0.065	0.410	0.33
1/4	0.540	…	30	…	0.073	0.364	0.36
1/4	0.540	STD	40	40S	0.088	0.364	0.42
1/4	0.540	XS	80	80S	0.119	0.302	0.54
3/8	0.675	…	10	10S	0.065	0.545	0.42
3/8	0.675	…	30	…	0.073	0.529	0.47
3/8	0.675	STD	40	40S	0.091	0.493	0.57
3/8	0.675	XS	80	80S	0.126	0.423	0.74
1/2	0.840	…	5	5S	0.065	0.710	0.54
1/2	0.840	…	10	10S	0.083	0.674	0.67
1/2	0.840	…	30	…	0.095	0.650	0.76
1/2	0.840	STD	40	40S	0.109	0.622	0.85
1/2	0.840	XS	80	80S	0.147	0.546	1.09
1/2	0.840	…	160	…	0.188	0.464	1.31
1/2	0.840	XXS	…	…	0.294	0.252	1.71
3/4	1.050	…	5	5S	0.065	0.920	0.69
3/4	1.050	…	10	10S	0.083	0.884	0.86
3/4	1.050	…	30	…	0.095	0.860	0.97
3/4	1.050	STD	40	40S	0.113	0.824	1.13
3/4	1.050	XS	80	80S	0.154	0.742	1.47
3/4	1.050	…	160	…	0.219	0.612	1.94
3/4	1.050	XXS	…	…	0.308	0.434	2.44
1	1.315	…	5	5S	0.065	1.250	0.87
1	1.315	…	10	10S	0.109	1.097	1.40
1	1.315	…	30	…	0.114	1.087	1.46
1	1.315	STD	40	40S	0.133	1.049	1.68
1	1.315	XS	80	80S	0.179	0.957	2.17
1	1.315	…	160	…	0.250	0.815	2.84
1	1.315	XXS	…	…	0.358	0.599	3.66
1 1/4	1.660	…	5	5S	0.065	1.530	1.11
1 1/4	1.660	…	10	10S	0.109	1.442	1.81
1 1/4	1.660	…	30	…	0.117	1.426	1.93
1 1/4	1.660	STD	40	40S	0.140	1.380	2.27
1 1/4	1.660	XS	80	80S	0.191	1.278	3.00
1 1/4	1.660	…	160	…	0.250	1.160	3.76
1 1/4	1.660	XXS	…	…	0.382	0.896	5.21

PIPE DATA
(Cont.)

Nominal Pipe Size Inches	Outside Diameter Inches	Schedule	Schedule No.	Stainless Steel Schedule No.	Wall Thickness Inches	Inside Diameter Inches	Weight Pounds Per Foot
1 1/2	1.900	…	5	5S	0.065	1.770	1.28
1 1/2	1.900	…	10	10S	0.109	1.682	2.09
1 1/2	1.900	…	30	…	0.125	1.650	2.37
1 1/2	1.900	STD	40	40S	0.145	1.610	2.72
1 1/2	1.900	XS	80	80S	0.200	1.500	3.63
1 1/2	1.900	…	160	…	0.281	1.338	4.86
1 1/2	1.900	XXS	…	…	0.400	1.100	6.41
2	2.375	…	5	5S	0.065	2.245	1.61
2	2.375	…	10	10S	0.109	2.157	2.64
2	2.375	…	30	…	0.125	2.125	3.00
2	2.375	STD	40	40S	0.154	2.067	3.65
2	2.375	XS	80	80S	0.218	1.939	5.02
2	2.375	…	160	…	0.344	1.687	7.46
2	2.375	XXS	…	…	0.436	1.503	9.03
2 1/2	2.875	…	5	5S	0.083	2.709	2.48
2 1/2	2.875	…	10	10S	0.120	2.755	3.53
2 1/2	2.875	…	30	…	0.188	2.499	5.40
2 1/2	2.875	STD	40	40S	0.203	2.469	5.79
2 1/2	2.875	XS	80	80S	0.276	2.323	7.66
2 1/2	2.875	…	160	…	0.375	2.125	10.01
2 1/2	2.875	XXS	…	…	0.552	1.771	13.69
3	3.500	…	5	5S	0.083	3.334	3.03
3	3.500	…	10	10S	0.120	3.260	4.33
3	3.500	…	30	…	0.188	3.124	6.65
3	3.500	STD	40	40S	0.216	3.068	7.58
3	3.500	XS	80	80S	0.300	2.900	10.25
3	3.500	…	160	…	0.438	2.624	14.32
3	3.500	XXS	…	…	0.600	2.300	18.58
3 1/2	4.000	…	5	5S	0.083	3.834	3.48
3 1/2	4.000	…	10	…	0.120	3.760	4.97
3 1/2	4.000	…	30	…	0.188	3.624	7.65
3 1/2	4.000	STD	40	40S	0.226	3.548	9.11
3 1/2	4.000	XS	80	80S	0.318	3.364	12.50
4	4.500	…	5	5S	0.083	4.334	3.92
4	4.500	…	10	10S	0.120	4.260	5.61
4	4.500	…	30	…	0.188	4.124	8.66
4	4.500	STD	40	40S	0.237	4.026	10.79
4	4.500	XS	80	80S	0.337	3.826	14.98
4	4.500	…	120	…	0.438	3.624	19.00
4	4.500	…	160	…	0.531	3.438	22.51
4	4.500	XXS	…	…	0.674	3.152	27.54

PIPE DATA
(Cont.)

Nominal Pipe Size Inches	Outside Diameter Inches	Schedule	Schedule No.	Stainless Steel Schedule No.	Wall Thickness Inches	Inside Diameter Inches	Weight Pounds Per Foot
5	5.563	…	5	5S	0.109	5.345	6.36
5	5.563	…	10	10S	0.134	5.295	7.77
5	5.563	STD	40	40S	0.258	5.047	14.62
5	5.563	XS	80	80S	0.375	4.813	20.78
5	5.563	…	120	…	0.500	4.563	27.04
5	5.563	…	160	…	0.625	4.313	32.96
5	5.563	XXS	…	…	0.750	4.063	38.55
6	6.625	…	5	5S	0.109	6.407	7.60
6	6.625	…	10	10S	0.134	6.357	9.29
6	6.625	STD	40	40S	0.280	6.065	18.97
6	6.625	XS	80	80S	0.432	5.761	28.57
6	6.625	…	120	…	0.562	5.501	36.39
6	6.625	…	160	…	0.719	5.187	45.35
6	6.625	XXS	…	…	0.864	4.897	53.16
8	8.625	…	5	5S	0.109	8.407	9.93
8	8.625	…	10	10S	0.148	8.329	13.40
8	8.625	…	20	…	0.250	8.125	22.36
8	8.625	…	30	…	0.277	8.071	24.70
8	8.625	STD	40	40S	0.322	7.981	28.55
8	8.625	…	60	…	0.406	7.813	35.64
8	8.625	XS	80	80S	0.500	7.625	43.39
8	8.625	…	100	…	0.594	7.437	50.95
8	8.625	…	120	…	0.719	7.187	60.71
8	8.625	…	140	…	0.812	7.001	67.76
8	8.625	XXS	…	…	0.875	2.875	72.42
8	8.625	…	160	…	0.906	6.813	74.69
10	10.750	…	5	5S	0.134	10.482	15.19
10	10.750	…	10	10S	0.165	10.420	18.65
10	10.750	…	20	…	0.250	10.250	28.04
10	10.750	…	30	…	0.307	10.136	34.24
10	10.750	STD	40	40S	0.365	10.020	40.48
10	10.750	XS	60	80S	0.500	9.750	54.74
10	10.750	…	80	…	0.594	9.562	64.43
10	10.750	…	100	…	0.719	9.312	77.03
10	10.750	…	120	…	0.844	9.062	89.29
10	10.750	XXS	140	…	1.000	8.750	104.13
10	10.750	…	160	…	1.125	8.500	115.64
12	12.750	…	5	5S	0.156	12.438	20.98
12	12.750	…	10	10S	0.180	12.390	24.17
12	12.750	…	20	…	0.250	12.250	33.38
12	12.750	…	30	…	0.330	12.090	43.77
12	12.750	STD	…	40S	0.375	12.000	49.56

PIPE DATA
(Cont.)

Nominal Pipe Size Inches	Outside Diameter Inches	Schedule	Schedule No.	Stainless Steel Schedule No.	Wall Thickness Inches	Inside Diameter Inches	Weight Pounds Per Foot
12	12.750	…	40	…	0.406	11.938	53.52
12	12.750	XS	…	80S	0.500	11.750	65.42
12	12.750	…	60	…	0.562	11.626	73.15
12	12.750	…	80	…	0.688	11.374	88.63
12	12.750	…	100	…	0.844	11.062	107.32
12	12.750	XXS	120	…	1.000	11.750	125.49
12	12.750	…	140	…	1.125	10.500	139.67
12	12.750	…	160	…	1.312	10.126	160.27
14	14.000	…	5	5S	0.156	13.688	23.07
14	14.000	…	…	10S	0.188	13.624	27.73
14	14.000	…	10	…	0.250	13.500	36.71
14	14.000	…	20	…	0.312	13.376	45.61
14	14.000	STD	30	…	0.375	13.250	54.57
14	14.000	…	40	…	0.438	13.124	63.44
14	14.000	XS	…	…	0.500	13.000	72.09
14	14.000	…	60	…	0.594	12.812	85.05
14	14.000	…	80	…	0.750	12.500	106.13
14	14.000	…	100	…	0.938	12.124	194.96
14	14.000	…	120	…	1.094	11.812	150.79
14	14.000	…	140	…	1.250	11.500	170.21
14	14.000	…	160	…	1.406	11.188	189.11
16	16.000	…	5	5S	0.165	15.670	27.90
16	16.000	…	…	10S	0.188	15.624	31.75
16	16.000	…	10	…	0.250	15.500	42.05
16	16.000	…	20	…	0.312	15.376	51.27
16	16.000	STD	30	…	0.375	15.250	93.27
16	16.000	XS	40	…	0.500	15.000	82.77
16	16.000	…	60	…	0.656	14.688	107.50
16	16.000	…	80	…	0.844	14.312	136.61
16	16.000	…	100	…	1.031	13.938	164.82
16	16.000	…	120	…	1.219	13.562	192.43
16	16.000	…	140	…	1.438	13.124	223.64
16	16.000	…	160	…	1.594	12.812	245.25
18	18.000	…	5	5S	0.165	17.670	31.43
18	18.000	…	…	10S	0.188	17.624	35.76
18	18.000	…	10	…	0.250	17.500	47.39
18	18.000	…	20	…	0.312	17.376	58.94
18	18.000	STD	…	…	0.375	17.250	70.59
18	18.000	…	30	…	0.438	17.124	82.15
18	18.000	XS	…	…	0.500	17.000	93.45
18	18.000	…	40	…	0.562	16.876	104.67
18	18.000	…	60	…	0.750	16.500	138.17
18	18.000	…	80	…	0.938	16.124	170.92

PIPE DATA
(Cont.)

Nominal Pipe Size Inches	Outside Diameter Inches	Schedule	Schedule No.	Stainless Steel Schedule No.	Wall Thickness Inches	Inside Diameter Inches	Weight Pounds Per Foot
18	18.000	…	100	…	1.156	15.688	207.96
18	18.000	…	120	…	1.375	15.250	244.14
18	18.000	…	140	…	1.562	14.876	274.22
18	18.000	…	160	…	1.781	14.438	308.50
20	20.000	…	5	5S	0.188	19.624	39.78
20	20.000	…	…	10S	0.218	19.564	46.27
20	20.000	…	10	…	0.250	19.500	52.73
20	20.000	STD	20	…	0.375	19.250	78.60
20	20.000	XS	30	…	0.500	19.000	104.13
20	20.000	…	40	…	0.594	18.812	123.11
20	20.000	…	60	…	0.812	18.376	166.40
20	20.000	…	80	…	1.031	17.938	208.87
20	20.000	…	100	…	1.281	17.438	256.10
20	20.000	…	120	…	1.500	17.000	296.37
20	20.000	…	140	…	1.750	16.500	341.09
20	20.000	…	160	…	1.969	16.062	379.17
22	22.000	…	5	5S	0.188	21.624	43.80
22	22.000	…	…	10S	0.218	21.564	50.94
22	22.000	…	10	…	0.250	21.500	58.07
22	22.000	STD	20	…	0.375	21.250	86.61
22	22.000	XS	30	…	0.500	21.000	114.81
22	22.000	…	60	…	0.875	20.250	197.41
22	22.000	…	80	…	1.125	19.750	250.81
22	22.000	…	100	…	1.375	19.250	302.88
22	22.000	…	120	…	1.625	18.750	353.61
22	22.000	…	140	…	1.875	18.250	403.00
22	22.000	…	160	…	2.125	17.750	451.06
24	24.000	…	5	5S	0.218	23.564	55.37
24	24.000	…	10	10S	0.250	23.500	63.41
24	24.000	STD	20	…	0.375	23.250	94.62
24	24.000	XS	…	…	0.500	23.000	125.49
24	24.000	…	30	…	0.562	22.876	140.68
24	24.000	…	40	…	0.688	22.624	171.29
24	24.000	…	60	…	0.969	22.062	238.35
24	24.000	…	80	…	1.219	21.562	296.58
24	24.000	…	100	…	1.531	20.938	367.39
24	24.000	…	120	…	1.812	20.376	429.39
24	24.000	…	140	…	2.062	19.876	483.12
24	24.000	…	160	…	2.344	19.312	542.13
26	26.000	…	10	…	0.312	25.376	85.60
26	26.000	STD	…	…	0.375	25.250	102.63
26	26.000	XS	20	…	0.500	25.000	136.17

PIPE DATA
(Cont.)

Nominal Pipe Size Inches	Outside Diameter Inches	Schedule	Schedule No.	Stainless Steel Schedule No.	Wall Thickness Inches	Inside Diameter Inches	Weight Pounds Per Foot
28	28.000	…	10	…	0.312	27.376	92.26
28	28.000	STD	…	…	0.375	27.250	110.64
28	28.000	XS	20	…	0.500	27.000	146.85
28	28.000	…	30	…	0.625	26.750	182.73
30	30.000	…	5	5S	0.250	29.500	79.43
30	30.000	…	10	10S	0.312	29.376	98.93
30	30.000	STD	…	…	0.375	29.250	118.62
30	30.000	XS	20	…	0.500	29.000	157.53
30	30.000	…	30	…	0.625	29.750	196.08
32	32.000	…	10	…	0.312	31.376	105.59
32	32.000	STD	…	…	0.375	31.250	126.66
32	32.000	XS	20	…	0.500	31.000	168.21
32	32.000	…	30	…	0.625	30.750	209.43
32	32.000	…	40	…	0.688	30.624	230.08
34	34.000	…	10	…	0.312	33.376	112.25
34	34.000	STD	…	…	0.375	33.250	134.67
34	34.000	XS	20	…	0.500	33.000	178.89
34	34.000	…	30	…	0.625	32.750	222.78
34	34.000	…	40	…	0.688	32.624	244.77
36	36.000	…	10	…	0.312	35.376	118.92
36	36.000	STD	…	…	0.375	35.250	142.68
36	36.000	XS	20	…	0.500	35.000	189.57
36	36.000	…	30	…	0.625	34.750	236.13
36	36.000	…	40	…	0.750	34.500	382.35