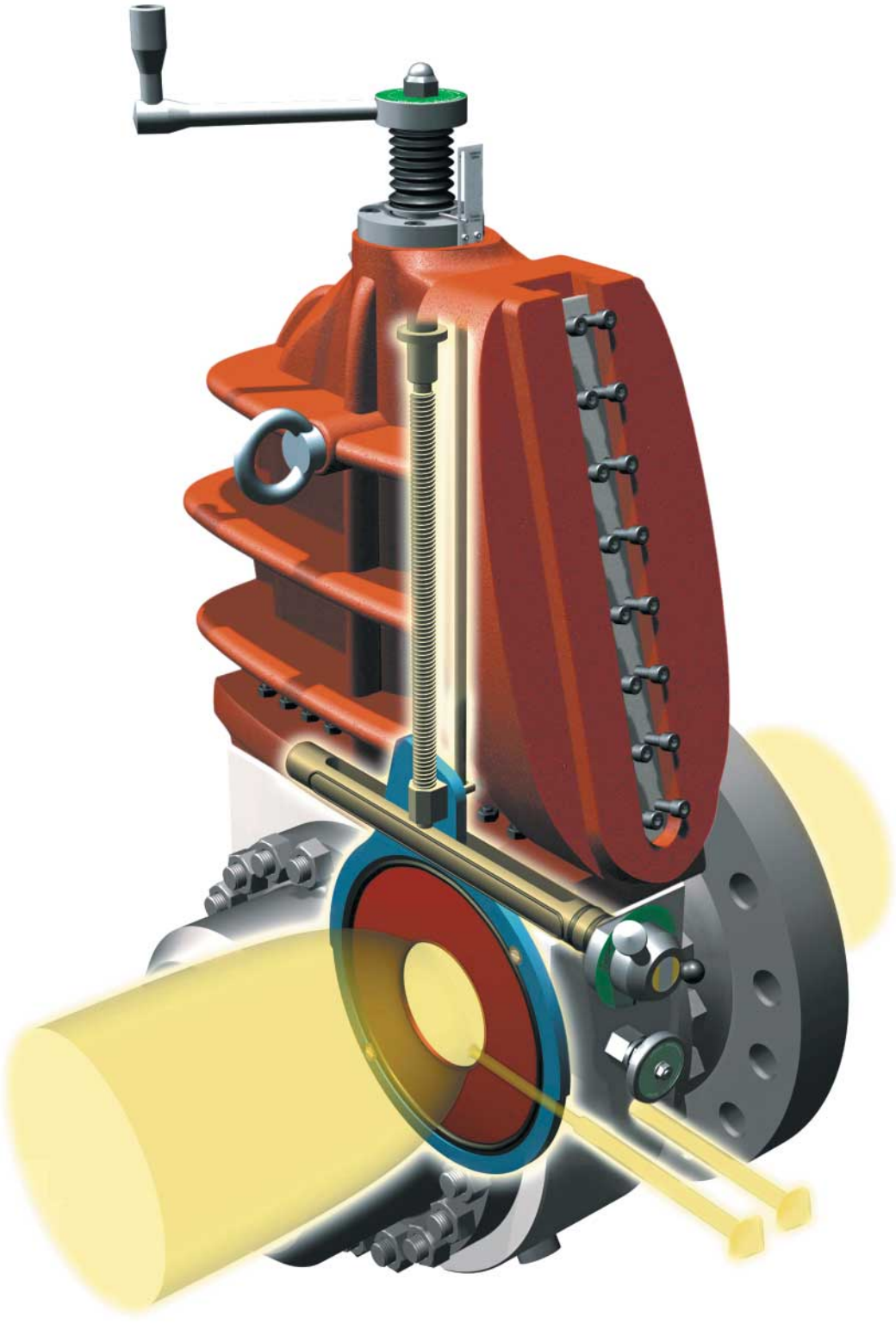
CT 273/US

Pietro Fiorentini (USA), Inc.

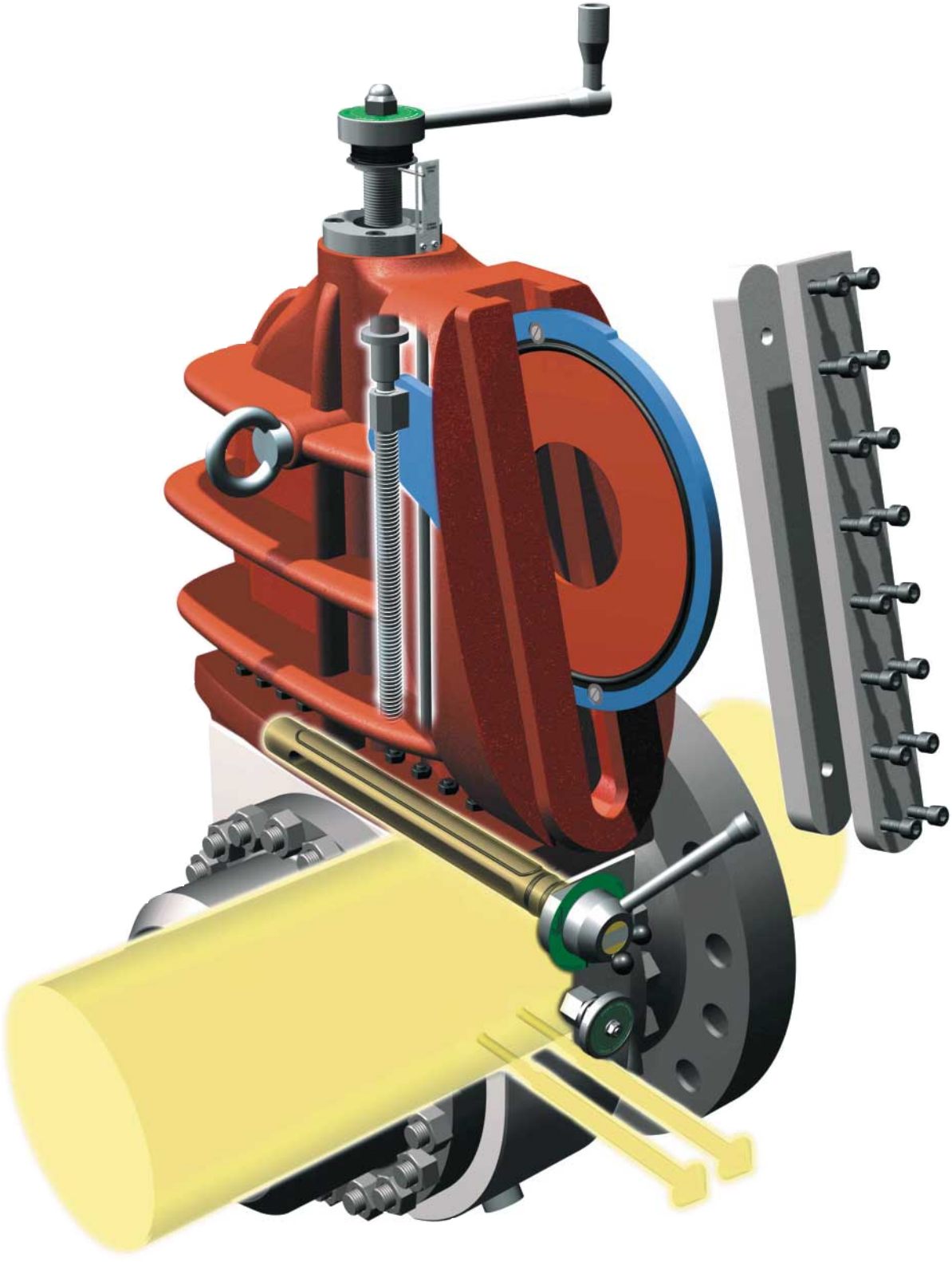
PRESSURIZED ORIFICE FITTINGS

FIOMASTER

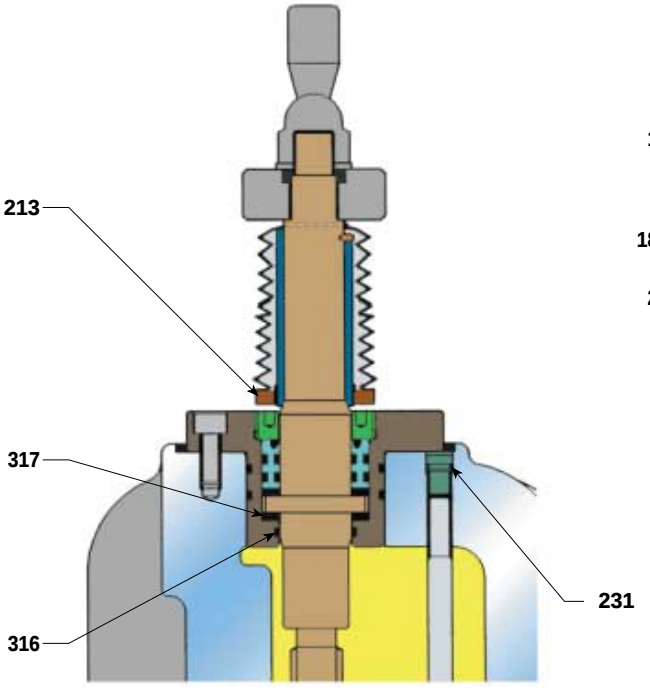


All the component parts of the Pietro Fiorentini pressurized orifice fittings have been designed to guarantee full efficiency over the life of the product. Precision machining on CNC machines and strict quality control guarantee a consistent high quality product.

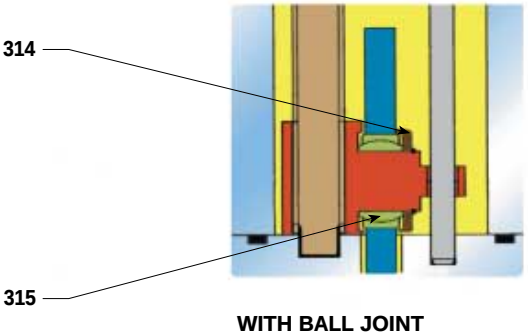
Fig. 930



All Pietro Fiorentini “FIOMASTER” pressurized oriifice fittings are designed and manufactured to current **ISO 5160/API/AGA 14.3** standards.

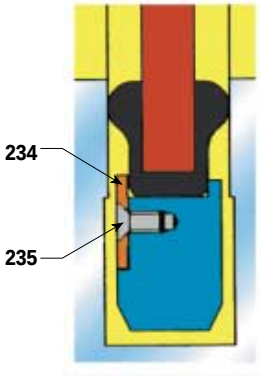


ROLLER BEARING



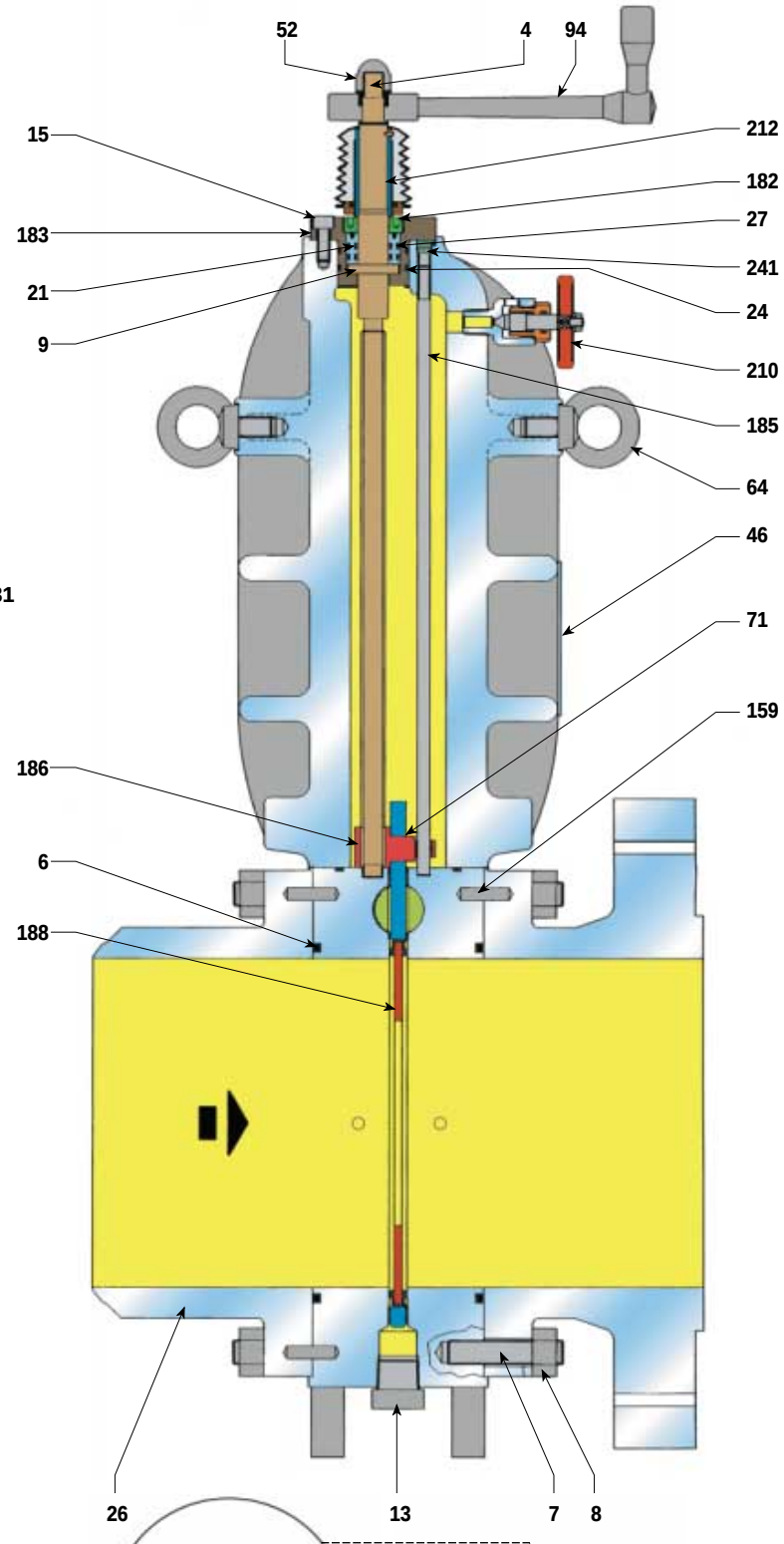
WITH BALL JOINT

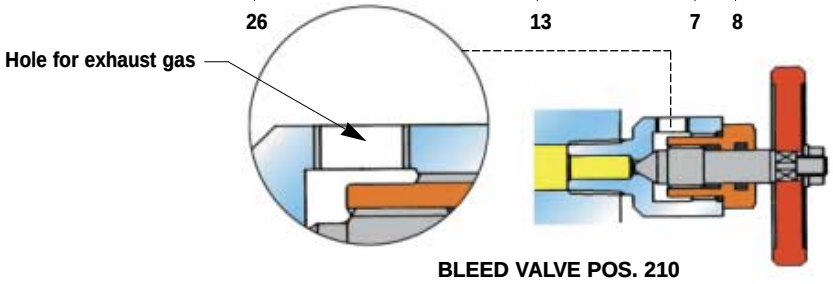
ND 16" through 24"



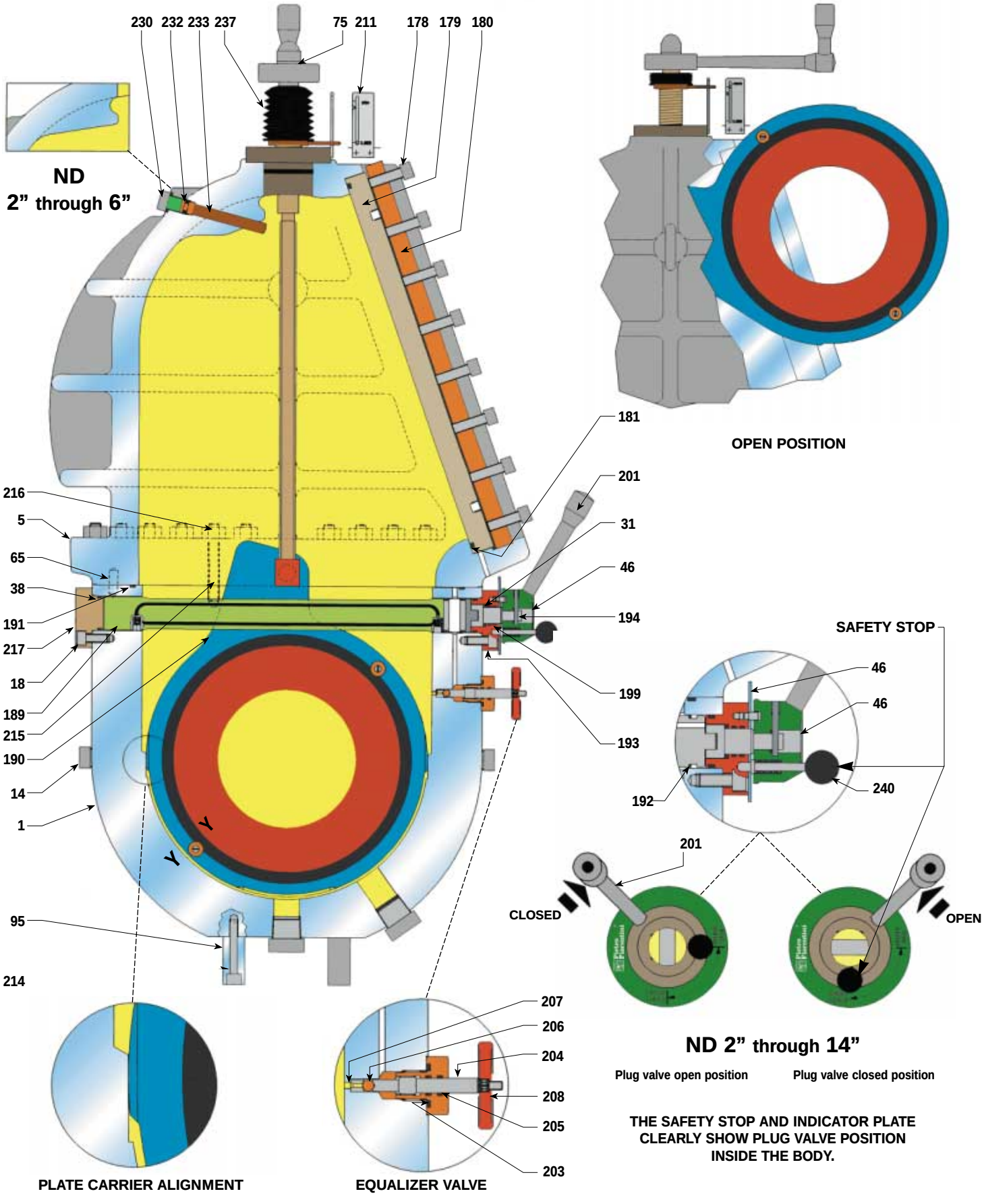
SAFETY WASHER

CUT WAY Y-Y





BLEED VALVE POS. 210


230 232 233 237
75 211
178 179 180
ND
2" through 6"
181
201
31
46
194
199
193
216
5
65
38
191
217
18
189
215
190
14
1
95
214
OPEN POSITION
SAFETY STOP
46
46
240
192
201
CLOSED
OPEN
ND 2" through 14"
Plug valve open position
Plug valve closed position
THE SAFETY STOP AND INDICATOR PLATE CLEARLY SHOW PLUG VALVE POSITION INSIDE THE BODY.
207
206
204
208
205
203
PLATE CARRIER ALIGNMENT
EQUALIZER VALVE

Pietro Fiorentini (USA), Inc.

COSTRUCTION MATERIALS

Fig. 930

POS.	DESCRIPTION	MATERIALS	NOTES
1	BODY	ST 52-3 DIN 17100	1-3
4	STEM	AISI 410	
5	BONNET	ASTM A216-WCB	
6	O RING	BUNA-N	
7	STUD BOLT	ASTM A193-B7	2
8	NUT	ASTM A194-2H	2
9	THURST BEARING	CS-DRY BEARING	
13	DRAIN PLUG	AISI 316	
14	PLUG	AISI 316	
15	CAP SCREW	AISI 316	
18	CAP SCREW	AISI 316	
20	SPRING	AISI 302	
21	O RING	BUNA-N	
24	O RING	BUNA-N	
26	TAIL PIECE	ASTM A105	
27	SLEEVE	BRONZE	
31	THRUST PLATE	PTFE	
38	O RING	BUNA-N	
46	NAME PLATE	INOX	
52	NUT	ISO 898/1-6S	2
64	EYEBOLT	STEEL	2
65	PIN	AISI 4140	2
71	RETAINING RING	STEEL	
75	WASHER	ASTM A283-GrC	2
94	HANDWHEEL	AISI 316+410	
95	SUPPORT LEGS	AISI 1035	2
159	PIN	AISI 4140	2
178	SCREW	AISI 316	
179	BONNET	AISI 1035	1-3
180	CLAMP	AISI 1035	1
181	O RING	BUNA-N	
182	BUSHING RETAINER	AISI 304	
183	UPPER BUSHING	AISI 410	
185	DRIVE BAR	AISI 316	
186	LEAD SCREW	BRONZE	
187	THRUST BEARING	CS-DRY BEARING	
188	ORIFICE PLATE	AISI 316+BUNA-N	
189	PLUG VALVE	AISI 410+BUNA-N	
190	PLATE HOLDER	ASTM A203-B	1-3
191	O RING	BUNA-N	
192	O RING	BUNA-N/PTFE	
193	BONNET	AISI 410	
194	STEM	AISI 410+Cr	
199	O RING	BUNA-N	
200	THRUST PLATE	PTFE	
201	WRENCH HEAD	AISI 316+410	
203	O RING	BUNA-N	
204	STEM	AISI 420	
205	O RING	BUNA-N	
206	BALL	AISI 316	
207	SEAT	DEVLON	
208	EQUALIZER VALVE	AISI 410	
210	BLEED VALVE	AISI 410	
211	INDICATOR	AISI 316	
212	INDICATOR BUSHING	BRONZE	
213	INDICATOR NUT	AISI 410	
214	CAP SCREW	ISO 898/1-8.8	2
215	STUD BOLT	ASTM A193-B7	2
216	NUT	ASTM A194-2H	2
217	BONNET	AISI 410	
230	PLUG	STEEL	
231	O RING	BUNA-N	
232	BUSHING	ASTM A105	
233	SHAFT	BRONZE	
234	WASHER	AISI 316	
235	SCREW	AISI 316	
237	PROTECTOR	RUBBER	
240	SAFETY STOP	AISI 316	
241	PLUG	AISI 316	
244	FLOW DIRECTION	AISI 316	
306	GEAR BOX	STEEL	
308	KEY	AISI 4140	
314	BUSHING RETAINER	AISI 410	
315	BALL JOINT	STEEL	
316	O RING	BUNA-N	
317	ROLLER BEARING	STEEL	

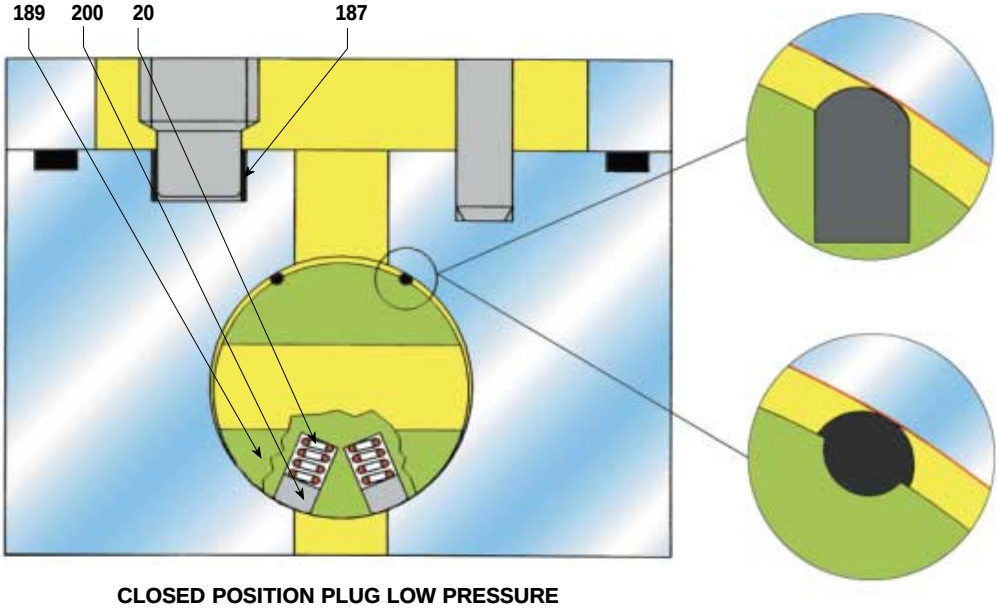
NOTES

1 Electroless Nickel plated.

2 Zinc coated.

3 Alternative ISO Fe 510.

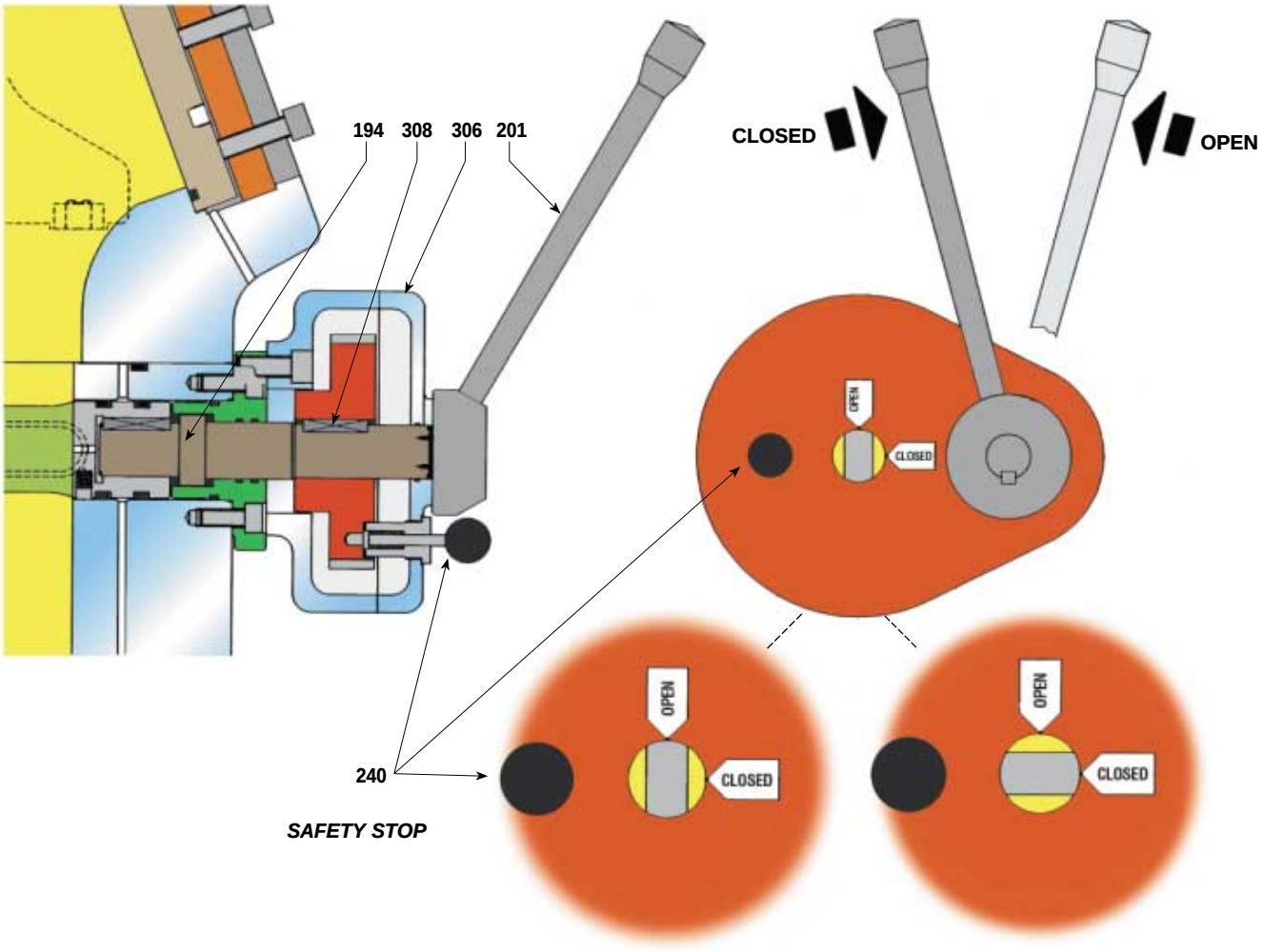
CS Carbon steel



ND 18" through 24"
VULCANIZED RUBBER

ND 2" through 16"
VULCANIZED RUBBER

CLOSED POSITION PLUG LOW PRESSURE SPRING ENERGIZED.



ND 16" through 24"
GEAR OPERATED

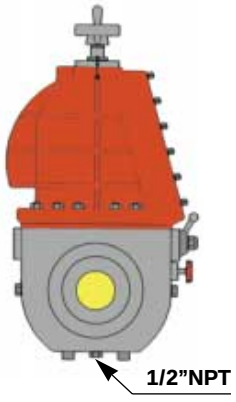
Plug valve open position

Plug valve closed position

THE INDICATOR PLATE CLEARLY SHOW PLUG VALVE POSITION INSIDE THE BODY.

Fig. 930-1 — CLASS 150

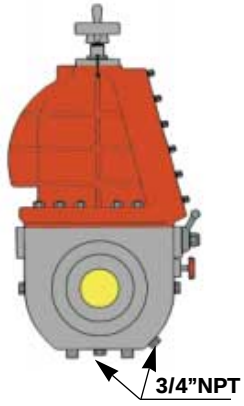
ND	RF	RF+BW	BW	D	B	E	F	H	N	P	S	R	WEIGHT RF	WEIGHT RF+BW	WEIGHT BW
2		10 5/8		2.067	4	8 1/4	5 1/4	14 5/8	4.75	6.00	4 5/8	1/8	117	106	93
3		10 3/4		3.068	4 1/2	9	6 3/8	16 1/4	6.00	7.50	5 1/4	1/8	152	139	123
4		11		4.026	5 1/2	9 3/8	7 3/8	18	7.50	9.00	6	1/8	216	196	172
6		11 1/4		6.065	6 1/4	11 3/4	10 1/8	23 7/8	9.50	11.00	8	1/8	374	395	324
8		12 1/2		8.071	7 1/2	12 3/8	12 3/8	27 3/8	11.75	13.50	9 1/4	1/8	572	550	528
10		13		10.136	10 3/4	13 3/4	14 1/2	31 3/4	14.25	16.00	10 3/4	1/8	814	748	682
12		14		12.090	11 3/8	16 1/2	17 3/4	37	17.00	19.00	13	1/4	1230	1148	1135
14		15		13.250	12	19 1/2	19 1/4	42 1/8	18.75	21.00	14 1/4	1/4	1562	1364	1232
16		16		❊	13 5/8	21 1/2	19 1/4	47 1/4	21.25	23.50	15 3/8	1/4	2156	2024	1958
18		18 3/8		❊	14 7/8	24 1/4	24 7/8	50 7/8	22.75	25.00	18 1/8	1/4	2706	2398	2189
20		19 1/4		❊	16 1/4	25 1/4	26 1/2	56 1/4	25.00	27.50	20	3/8	3819	3634	3388
24		22 1/2		❊	19 3/4	27 1/2	31 1/2	63 3/8	29.50	32.00	22	3/8	5588	5478	5170
Inches													LBS		



DRAIN PLUG
ND 2" through 4"

Fig. 930-3 — CLASS 300

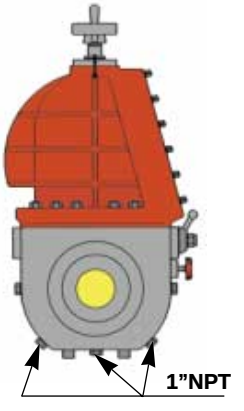
ND	RF	RF+BW	BW	D	B	E	F	H	N	P	S	R	WEIGHT RF	WEIGHT RF+BW	WEIGHT BW
2		10 5/8		2.067	4	8 1/4	5 1/4	14 5/8	5.00	6.50	4 5/8	1/8	123	112	99
3		11 1/8		3.068	4 1/2	9	6 3/8	16 1/4	6.62	8.25	5 1/4	1/8	167	149	132
4		12		4.026	5 1/2	9 3/8	7 3/8	18	7.88	10.00	6	1/8	237	213	193
6		14		6.065	6 1/4	11 3/4	10 1/8	23 7/8	10.62	12.50	8	1/8	473	433	369
8		14		8.071	7 1/2	12 3/8	12 3/8	27 3/8	13.00	15.00	9 1/4	1/8	651	600	550
10		15 1/2		10.136	10 3/4	13 3/4	14 1/2	31 3/4	15.25	17.50	10 3/4	1/8	864	770	704
12		17		12.090	11 3/8	16 1/2	17 3/4	37	17.75	20.50	13	1/4	1383	1298	1184
14		19		13.250	12	19 1/2	19 1/4	42 1/8	20.25	23.00	14 1/4	1/4	1705	1452	1350
16		22 1/2		❊	13 5/8	21 1/2	19 1/4	47 1/4	22.50	26.50	15 3/8	1/4	2574	2450	2167
18		21 3/4		❊	14 7/8	24 1/4	24 7/8	50 7/8	24.75	28.00	18 1/8	1/4	3165	2882	2607
20		22 7/8		❊	16 1/4	25 1/4	26 1/2	56 1/4	27.00	30.50	20	3/8	4316	3949	3654
24		26 7/8		❊	19 3/4	27 1/2	31 1/2	63 3/8	32.00	36.00	22	3/8	6402	5841	5544
Inches													LBS		



DRAIN PLUG
ND 6" through 10"

Fig. 930-6 — CLASS 600

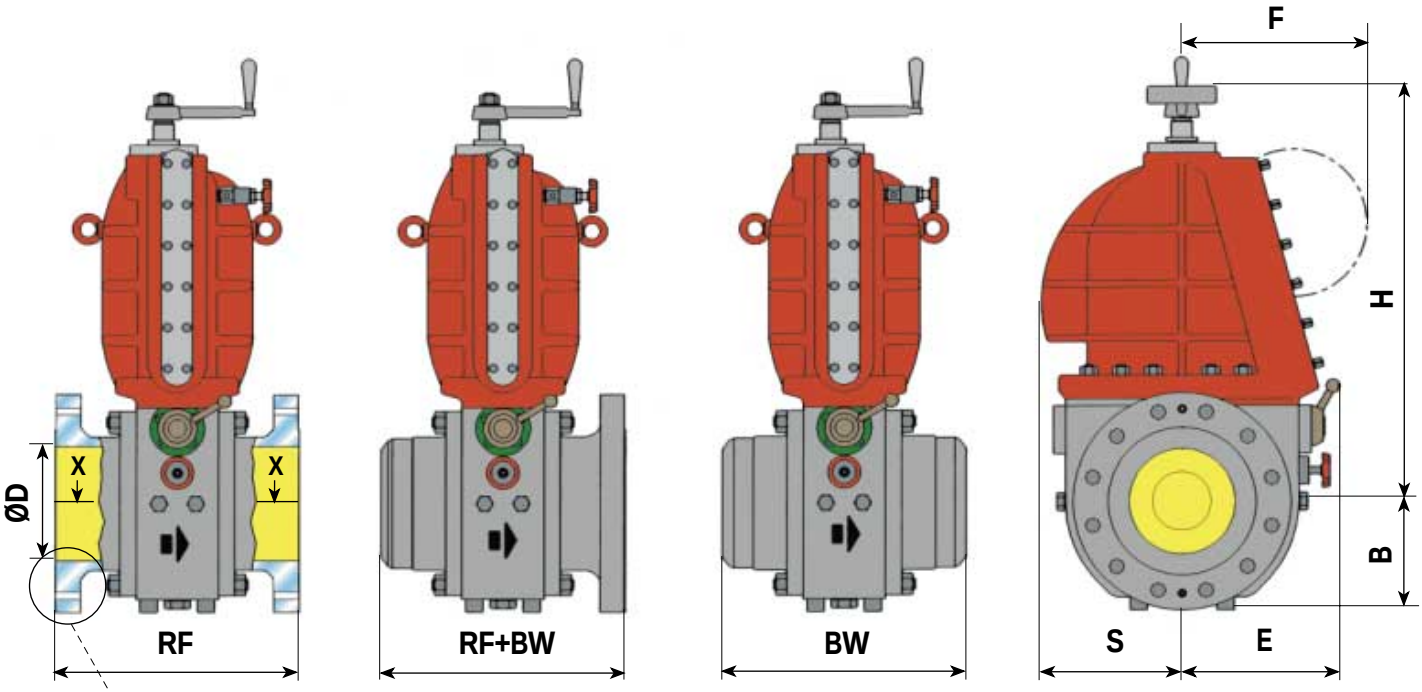
ND	RF	RF+BW	BW	D	B	E	F	H	N	P	S	R	WEIGHT RF	WEIGHT RF+BW	WEIGHT BW
2		10 5/8		2.067	4	8 1/4	5 1/4	14 5/8	5.00	6.50	4 5/8	1/8	129	119	106
3		14		3.068	4 1/2	9	6 3/8	16 1/4	6.62	8.25	5 1/4	1/8	180	163	147
4		13 1/4		4.026	5 1/2	9 3/8	7 3/8	18	8.50	10.75	6	1/8	286	253	222
6		16		6.065	6 1/4	11 3/4	10 1/8	23 7/8	11.50	14.00	8	1/8	532	462	374
8		17 1/2		7.981	7 1/2	12 3/8	12 3/8	27 3/8	13.75	16.50	9 1/4	1/8	803	690	594
10		18 13/16		10.020	10 3/4	13 3/4	14 1/2	31 3/4	17.00	20.00	10 3/4	1/8	1089	915	814
12		20 1/16		11.938	11 3/8	16 1/2	17 3/4	37	19.25	22.00	13	1/4	1647	1469	1295
14		20 3/4		13.125	12	19 1/2	19 1/4	42 1/8	20.75	23.75	14 1/4	1/4	1969	1716	1463
16		23		❊	13 5/8	21 1/2	19 1/4	47 1/4	23.75	27.00	15 3/8	1/4	2849	2600	2310
18		26 3/4		❊	14 7/8	24 1/4	24 7/8	50 7/8	25.75	29.25	18 1/8	1/4	3865	3388	2915
20		28		❊	16 1/4	25 1/4	26 1/2	56 1/4	28.50	32.00	20	3/8	5192	4367	4008
24		32 1/2		❊	19 3/4	27 1/2	31 1/2	63 3/8	33.00	37.00	22	3/8	7436	6578	6270
Inches													LBS		

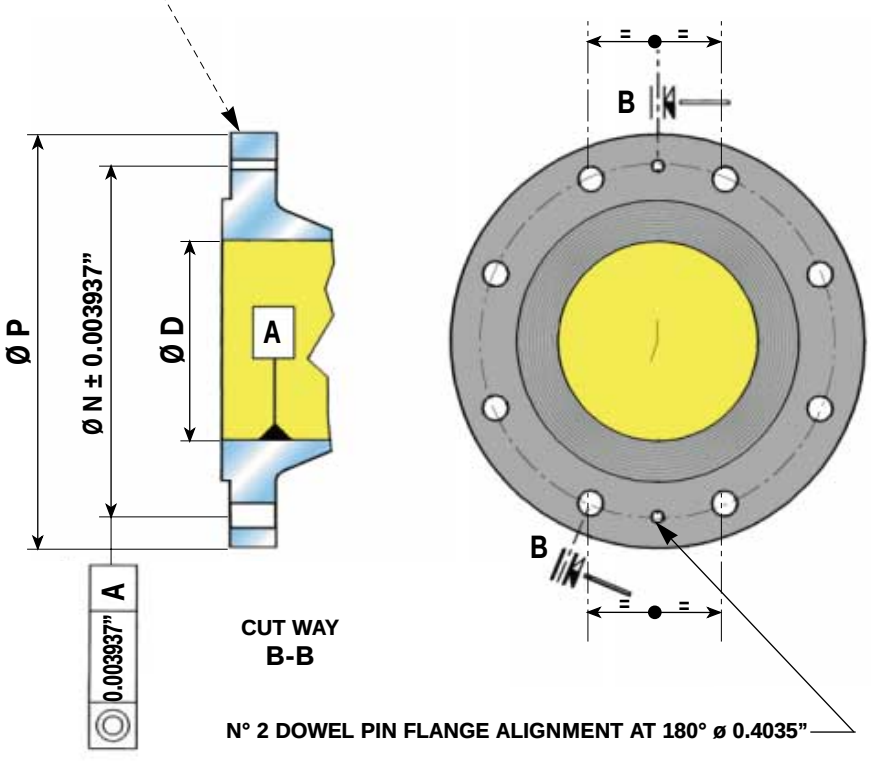


DRAIN PLUG
ND 12" through 24"

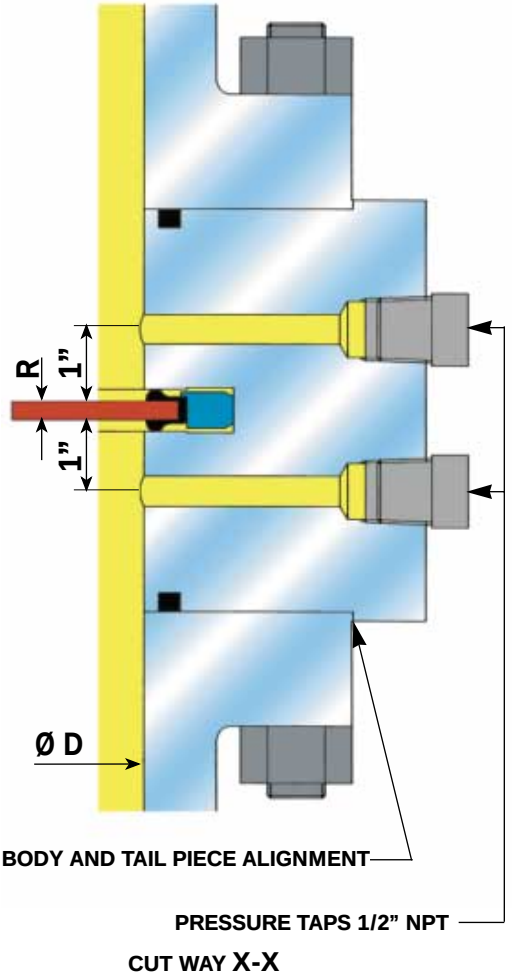
❊ To be specified by purchaser.

Line Bore tollerances "D"
10 - inch sizes and smaller ± .0019685"
12 - inch sizes and larger ± .0031496"



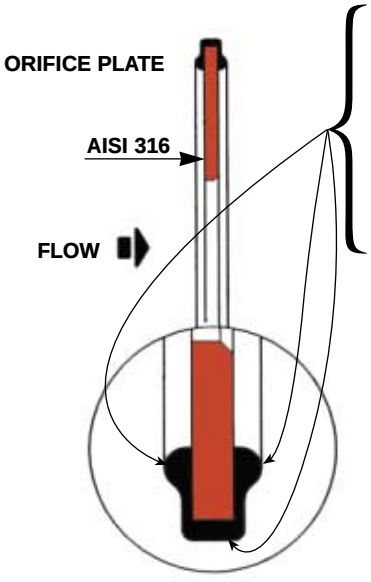


FLANGE EXAMPLE



PRECISION VACUUM-MOLDING FROM 75-80 SHORE SYNTHETIC NITRILE RUBBER

INTERCHANGEABILITY OF ORIFICE PLATE, PERFECT TIGHTNESS AT LOW DIFFERENTIAL PRESSURE



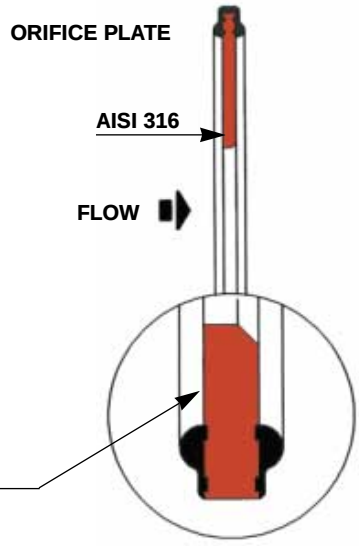
After vacuum-molding the rubber, the orifice plate surfaces in contact with the body are finished by machining. This operation removes burr or any depressions caused by shrinkage of the rubber.

ND 2" through 16"

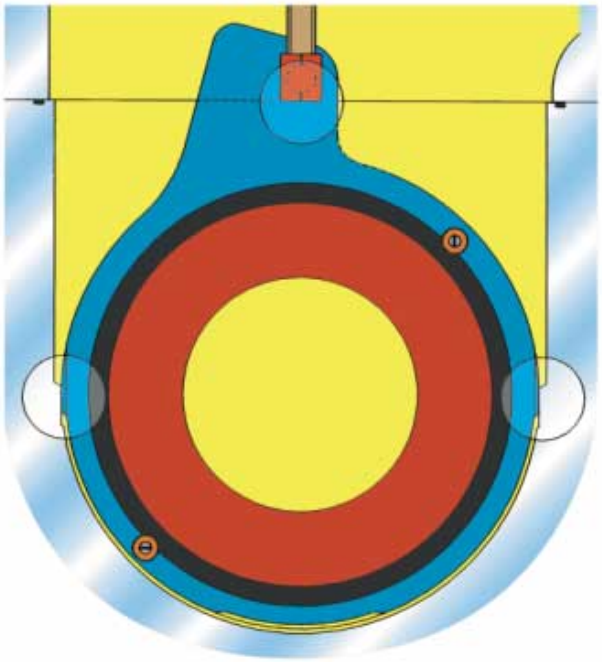
ROUGHNESS OF THE ORIFICE PLATE SURFACES.

API/AGA 14.3 Rep N°3 SECTION: 2.4.1	Pietro Fiorentini ND 2" ÷ 24"
50 microinches (1.2 Ra)	32 microinches (0.8 Ra)

Temperature limits: -20° F +250° F



ND 18" through 24"



THREE POINTS OF CONTACT

This system enables the fitting to meet internal concentricity tolerances of the orifice plate as required by ISO 5167/API/AGA 14.3 standards.

max (ε) ECCENTRICITY FOR 0,75 BETA (β)

SIZE	Dm	API/AGA 14.3 Report N°3 Section: 2.6.2.1	Pietro Fiorentini
2	2.066	0.005905	0.005905
3	3.068	0.009055	0.007874
4	4.025	0.011811	0.009842
6	6.066	0.018110	0.011811
8	8.070	0.024015	0.013779
10	10.019	0.030315	0.015748
12	11.937	0.036220	0.017716
14	13.125		0.019685
16	15.000	0.045275	0.021653
18	17.125		0.023622
20	19.000	0.057086	0.027559
24	23.251	0.070078	0.031496
inches			

API/AGA 14.3 Report N°3 Section: 2.6.2.1

ECCENTRICITY (ε)

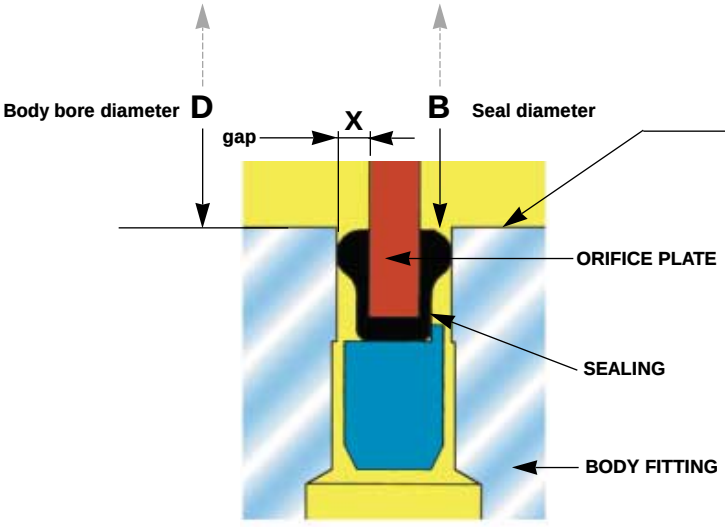
$$\varepsilon_{max} = \frac{0.0025\ Dm}{0.1+2.3\ (\beta_{max})^4}$$

where:

ε_{max} Allowable plate bore eccentricity measured parallel to the axis of the pressure taps;

Dm is the mean bore diameter;

β_{max} is the maximum beta ratio of the diameters used.



ROUGHNESS OF INTERNAL BODY SURFACES

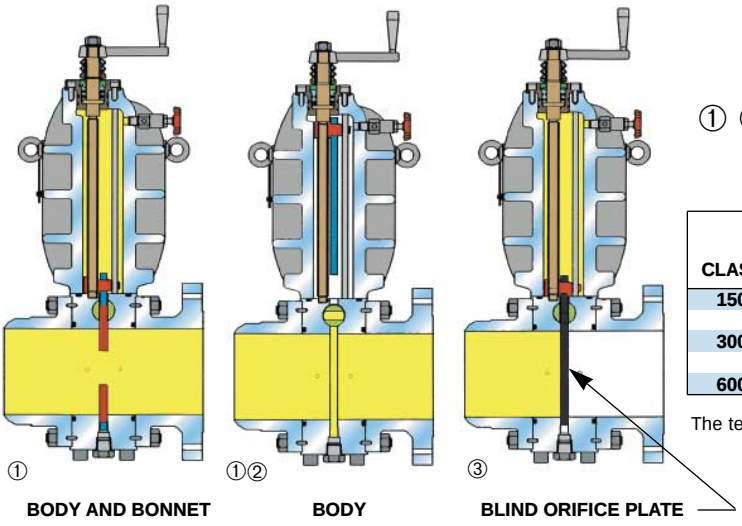
API/AGA 14.3 Report N°3 SECTION: 2.5.1.1	Pietro Fiorentini ND 2" ÷ 24"
300 microinches per Beta ≤ 0.6 200 microinches per Beta > 0.6	63 microinches per Beta ≤ 0.75 (1.6 Ra)

API/AGA 14.3 Report N°3 - SECTION: 2.5.1.4

The orifice plate surfaces '**B**' must not protrude into the bore '**D**'.

API/AGA 14.3 Report N°3 - SECTION: 2.5.1.4.2

In all Pietro Fiorentini pressurized orifice fittings, the distance '**X**' is less than 0.25 inches.

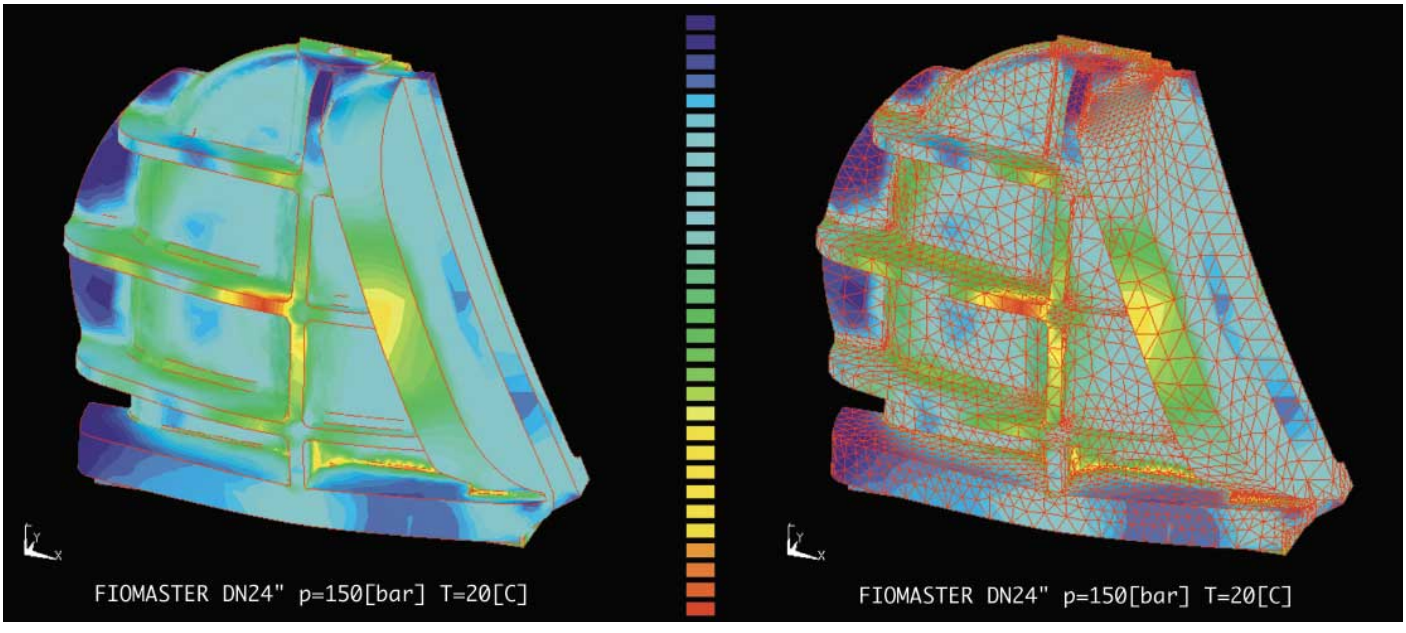


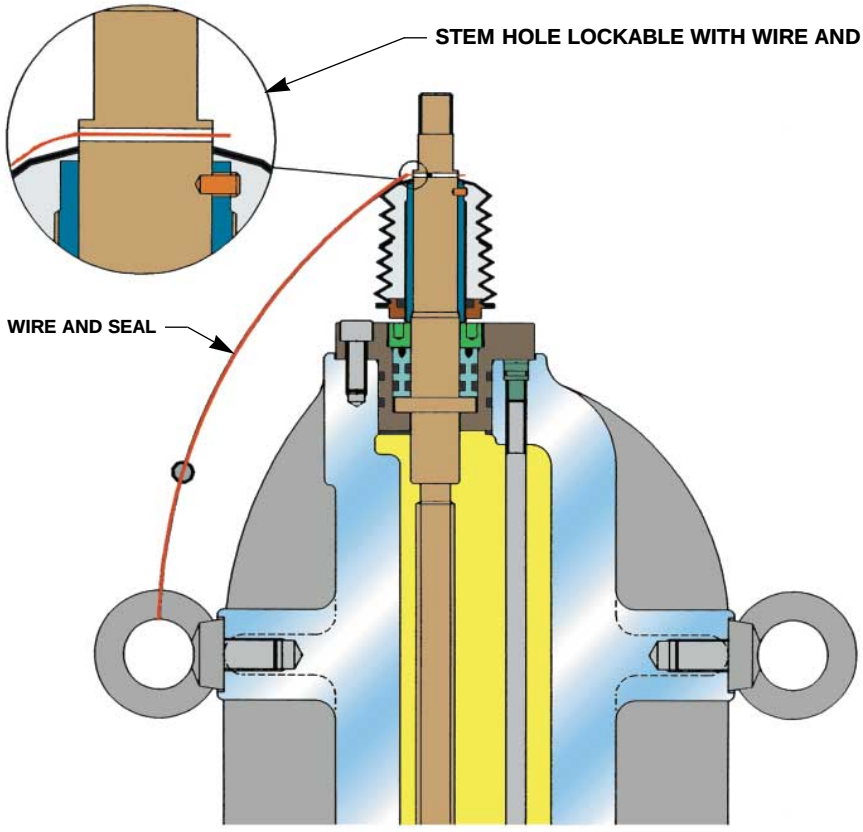
① ② TEST PRESSURE IN ACCORDANCE TO API 6D

	HYDROSTATIC TEST	PNEUMATIC TEST	
CLASS	① BODY AND BONNET psi	② BODY psi	③ PLATE psi
150	425	80	2.9
300	1100	80	2.9
600	2175	80	2.9

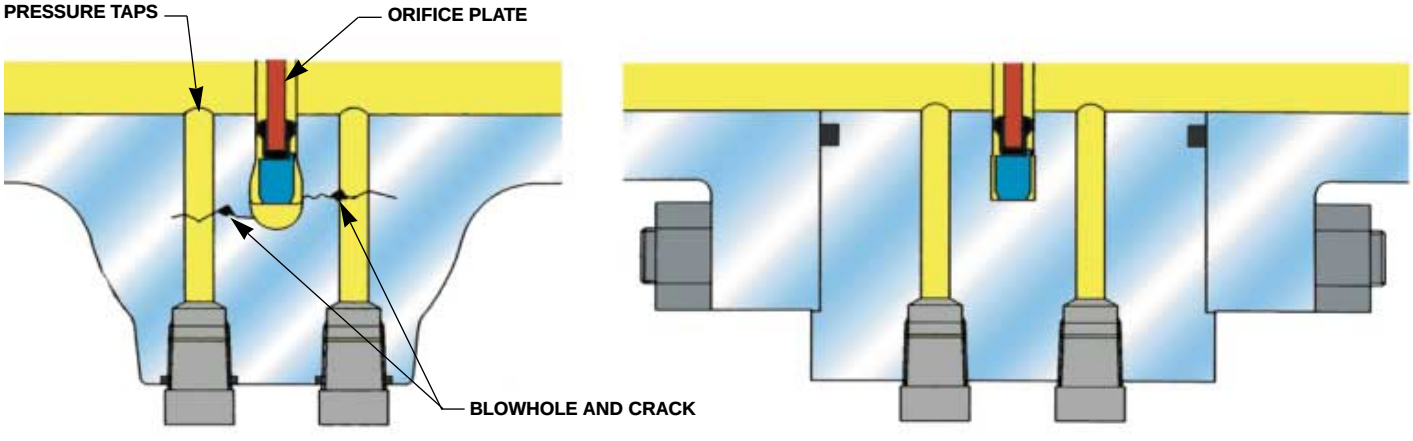
The test pressures listed are **NOT** valve operating pressure ratings.

STRESS ANALYSIS FINITE ELEMENTS





After fitting the Pietro Fiorentini pressurized orifice fittings, it is possible to lock the stem with the wire and seal to prevent tampering with the concentricity of the orifice plate inside the body.

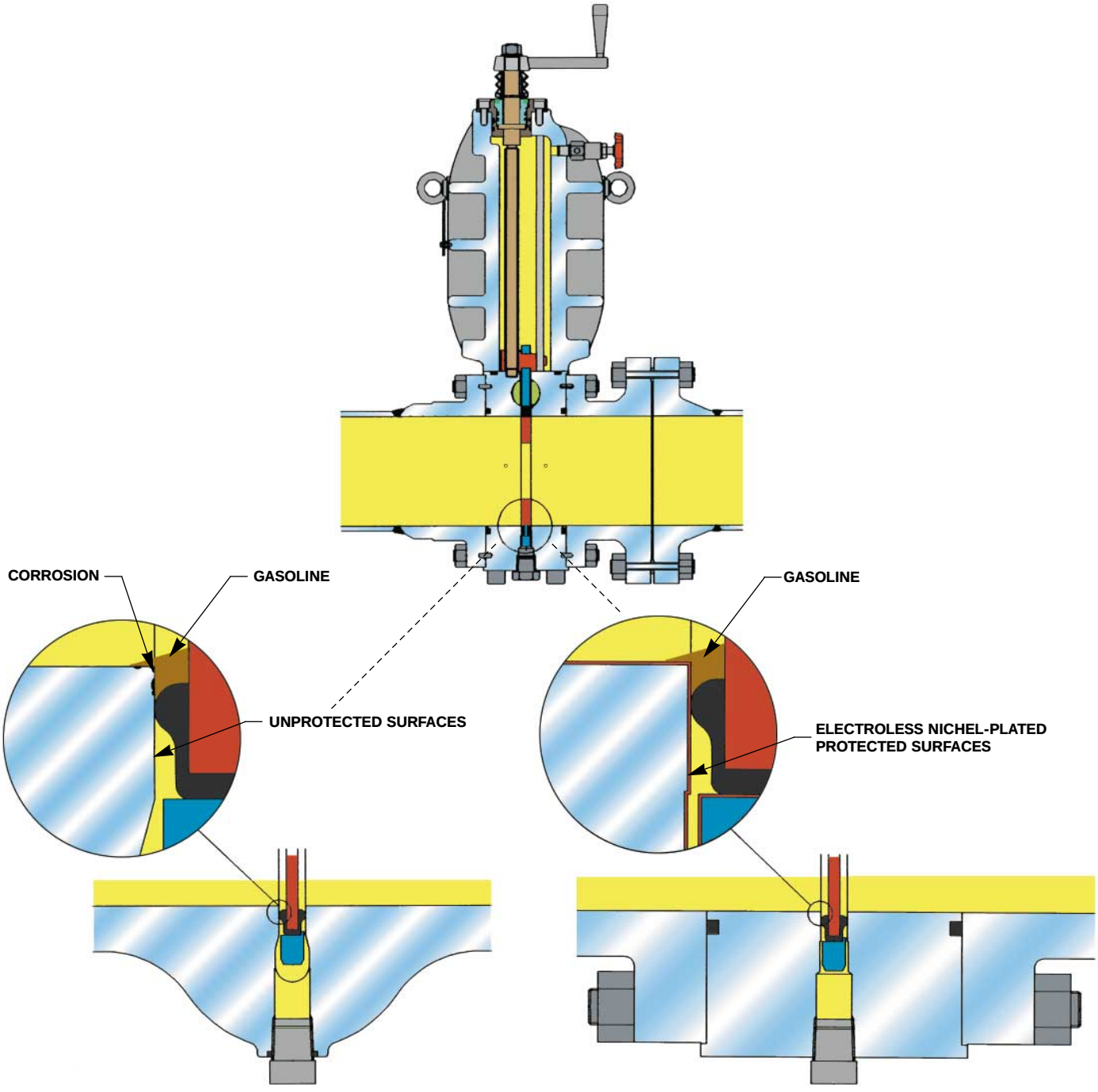


CAST VERSION

It is quite common in the cast version for there to be blowholes or internal cracks in the wall of the body and these cannot be detected in final testing.
If they are communicating, these casting defects falsify the control signal in the pressure taps and change the quantity of gas passing through the orifice plate.

PIETRO FIORENTINI FORGED SOLUTION

The body of the Pietro Fiorentini pressurized orifice fittings is constructed of forged steel. This particularly innovative version eliminates the casting defects and makes inspection of the material by ultrasonic or X-rays more secure before machining.



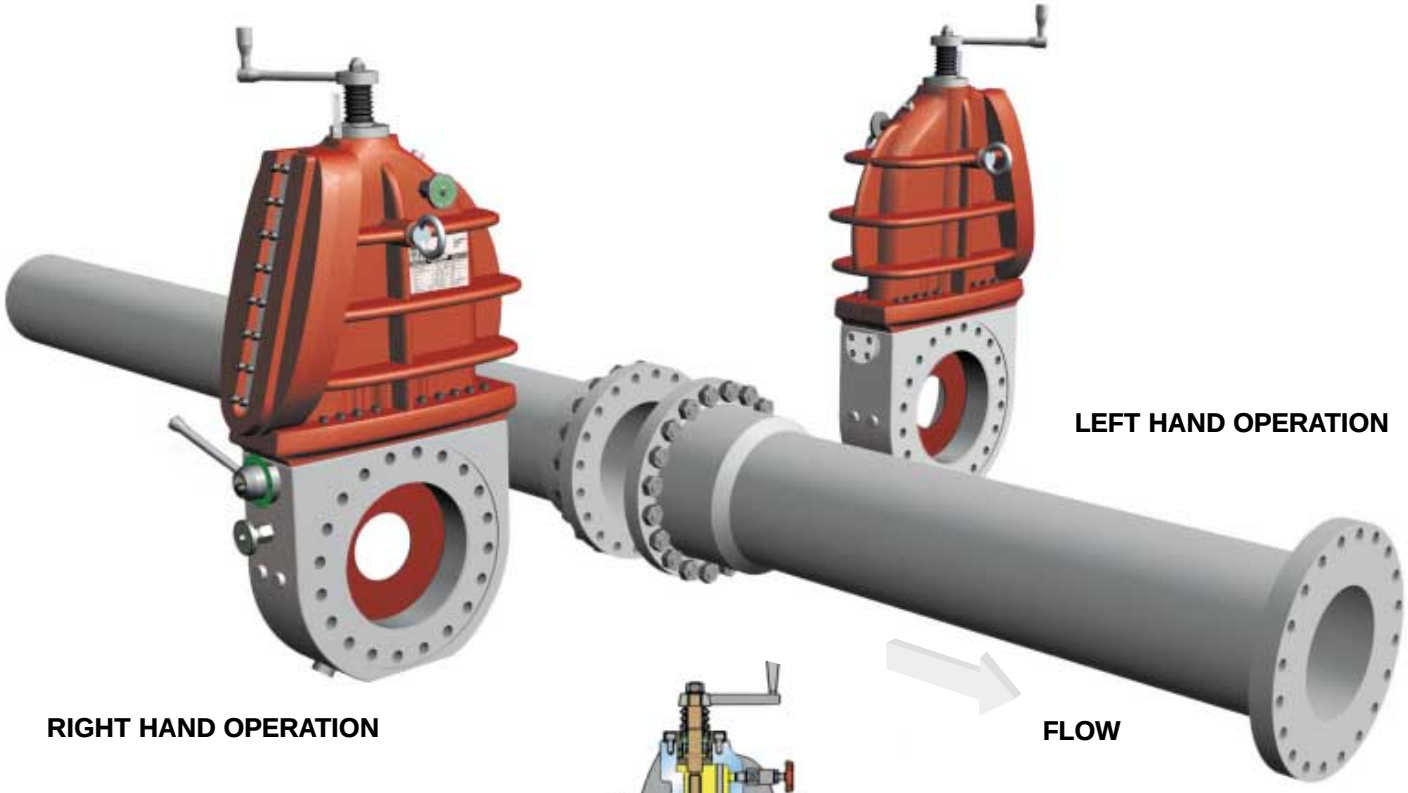
CAST VERSION WITH UNPROTECTED SURFACES

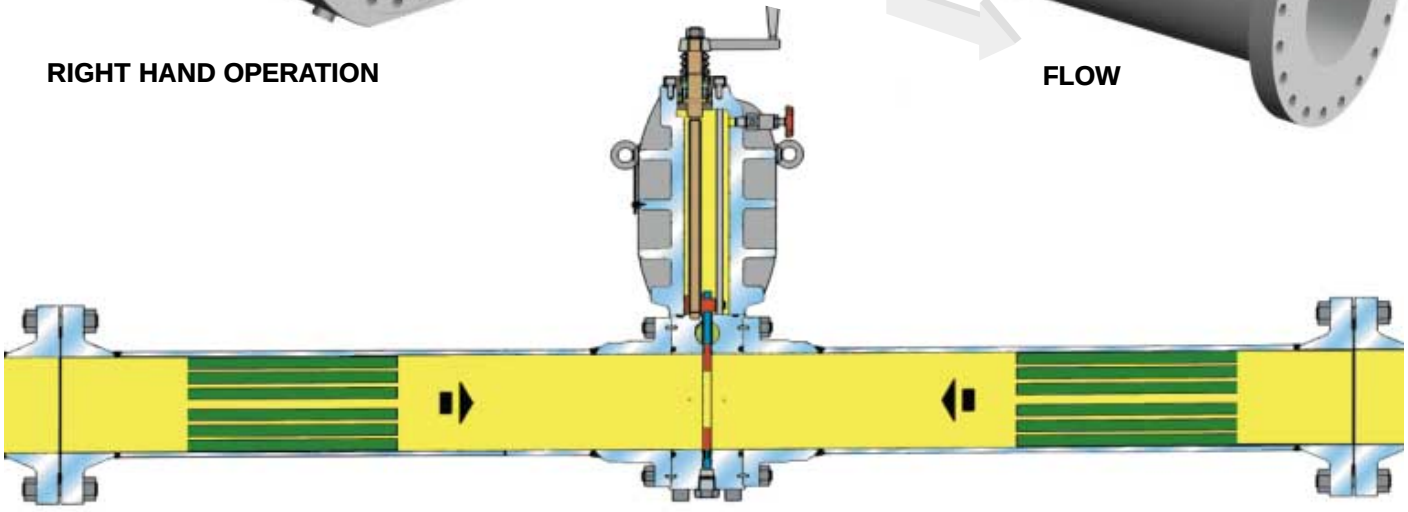
In many cases during operation, various materials deposits on the bottom of the orifice plate of the pressurized orifice fittings. This liquid corrodes the surfaces and solidifies over time. For this reason, other manufacturers recommended operating the pressurized orifice fittings every month or so as not to let the gasoline solidify which would make it difficult to extract the orifice plate.

ENP - PIETRO FIORENTINI SOLUTION

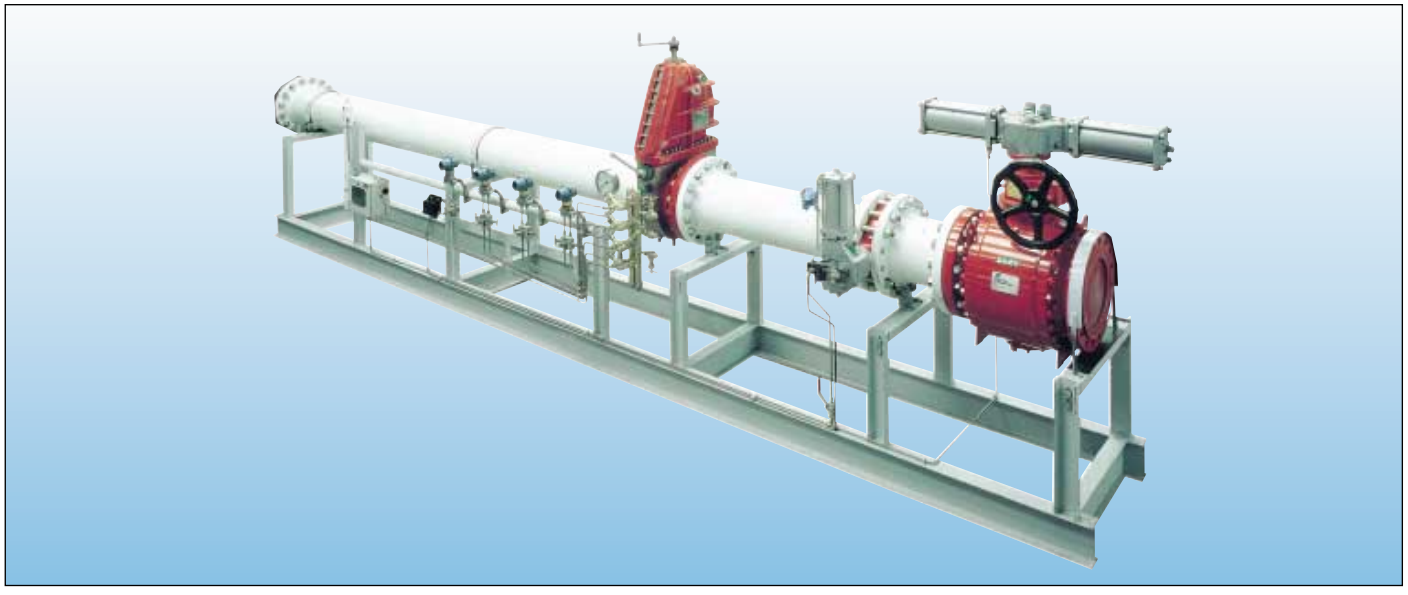
Pietro Fiorentini has solved this problem by deploying electroless nickel-plating the body of the pressurized orifice fittings so as to protect all the surfaces, particularly the sealing ones, from corrosion. In this case, when the foreign substance solidifies, it does not stick to the electroless nickel-plated surfaces of the body or make it difficult to extract the orifice plate.

ASSEMBLY DETAILS PRESSURIZED ORIFICE FITTINGS Fig. 930



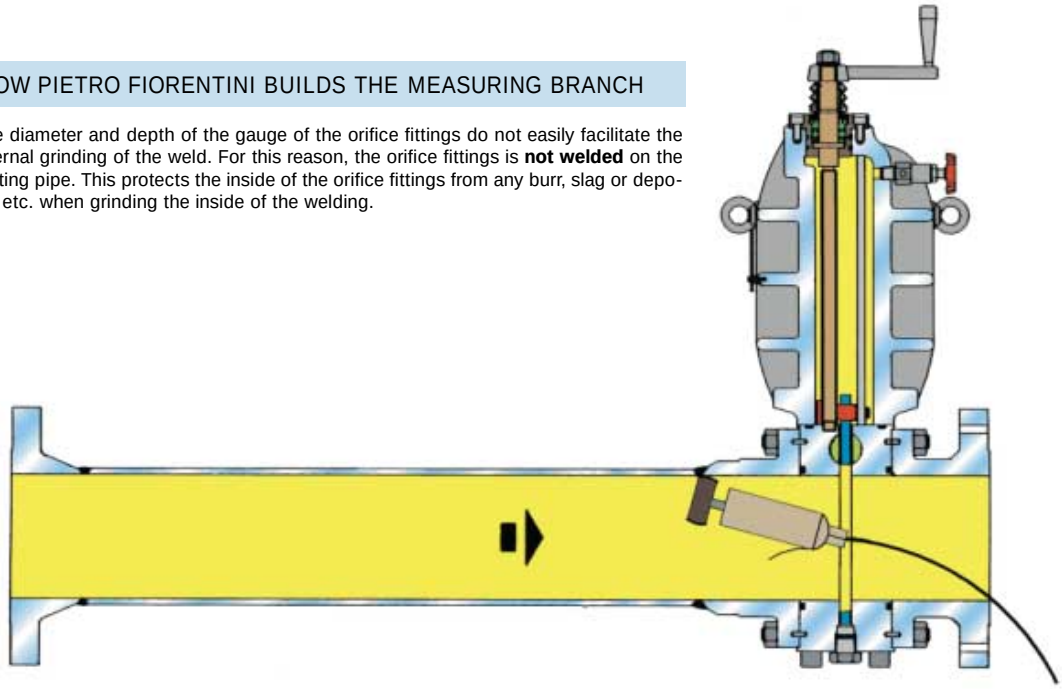


REVERSE FLOW

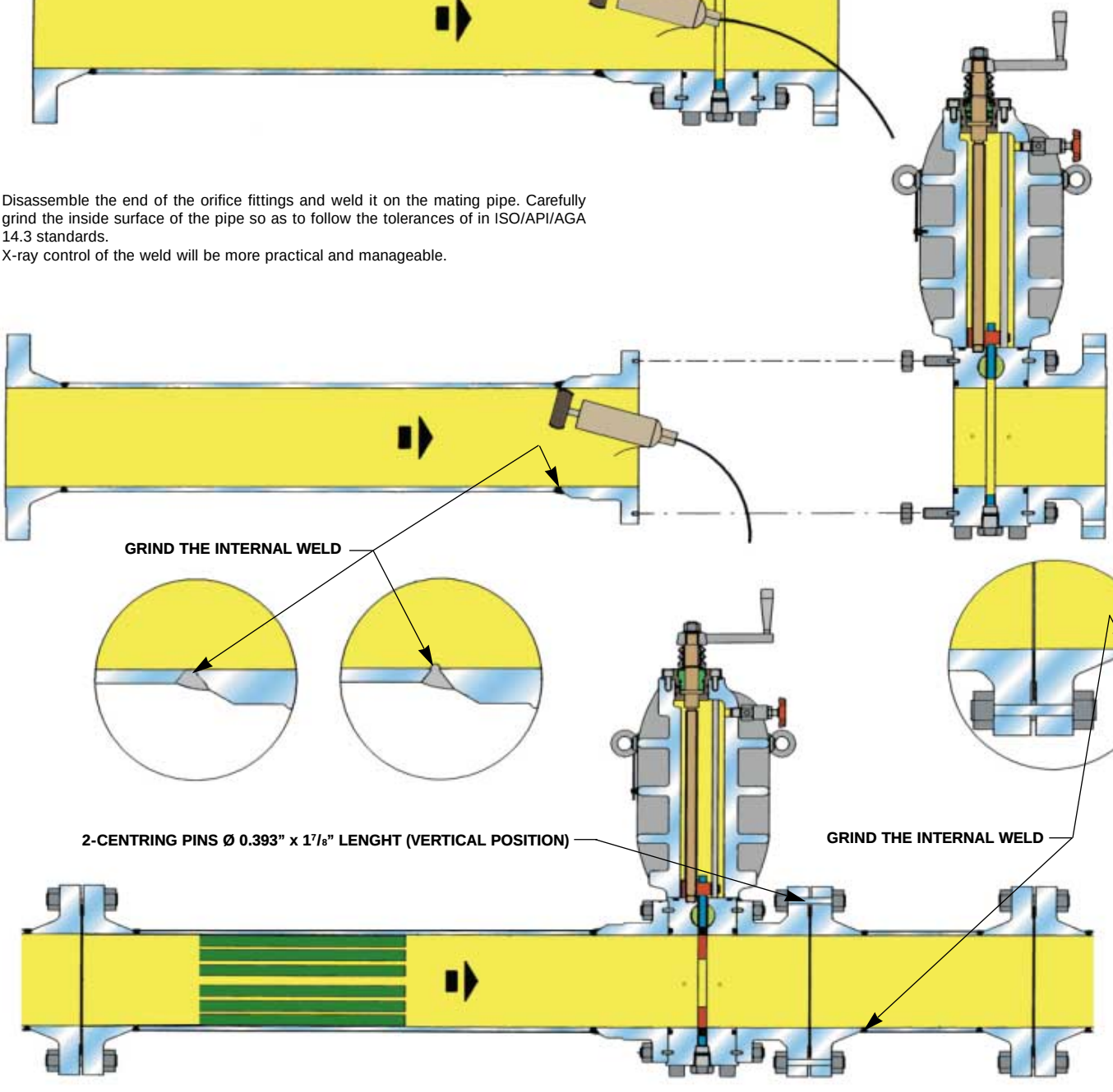


HOW PIETRO FIORENTINI BUILDS THE MEASURING BRANCH

The diameter and depth of the gauge of the orifice fittings do not easily facilitate the internal grinding of the weld. For this reason, the orifice fittings is **not welded** on the mating pipe. This protects the inside of the orifice fittings from any burr, slag or deposit, etc. when grinding the inside of the welding.



Disassemble the end of the orifice fittings and weld it on the mating pipe. Carefully grind the inside surface of the pipe so as to follow the tolerances of in ISO/API/AGA 14.3 standards.
X-ray control of the weld will be more practical and manageable.



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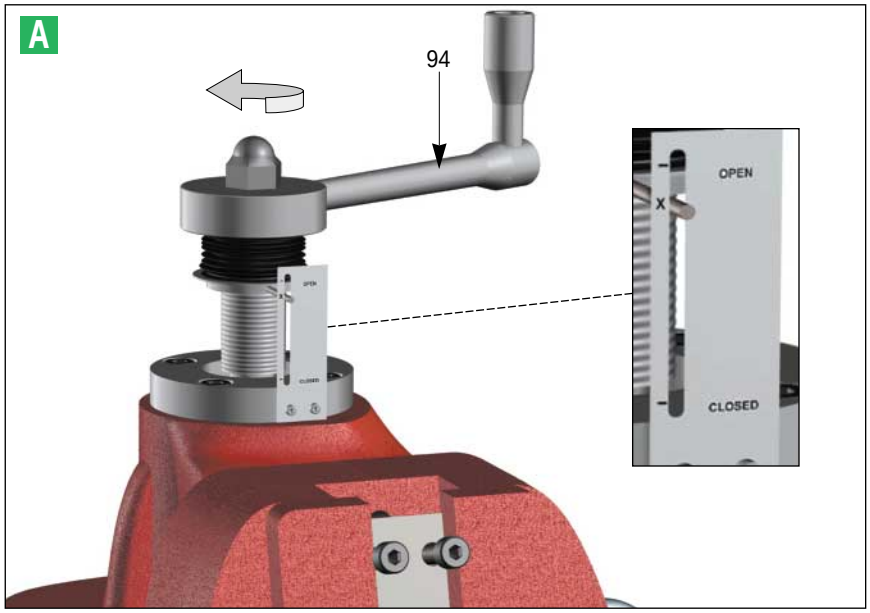
OPERATING INSTRUCTIONS TO REMOVE ORIFICE PLATE



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TO REMOVE ORIFICE PLATE

FIOMA
OPERAT

A ROTATE TO X (INDICATOR) Pos. 94

B PULL Pos. 240
ROTATE TO CLOSED Pos. 201

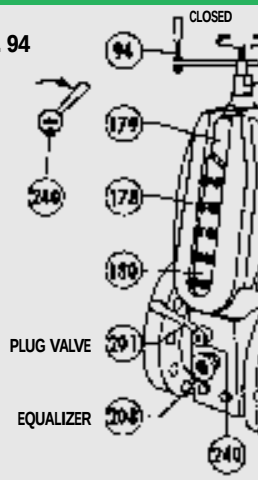
C CLOSE Pos. 208

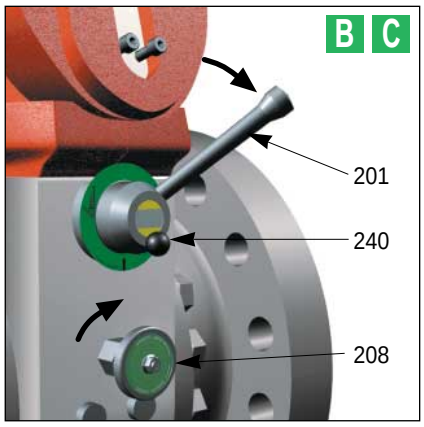
D OPEN Pos. 210

E LOOSEN Pos. 178

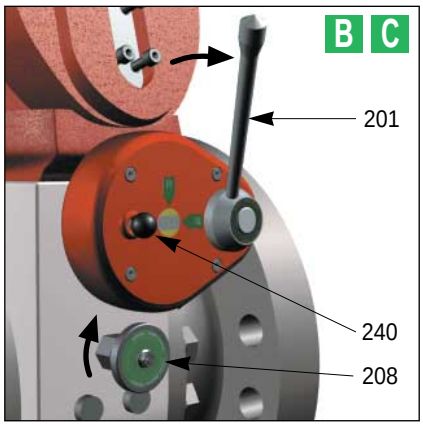
F REMOVE Pos. 180-179

G ROTATE TO OPEN Pos. 94

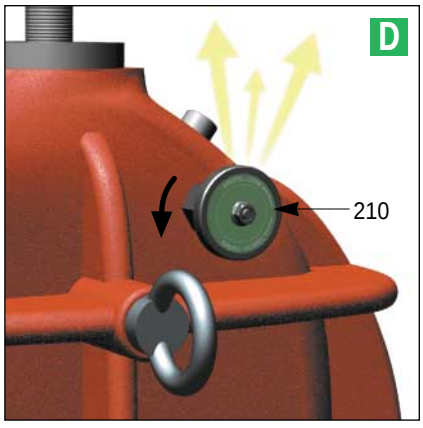




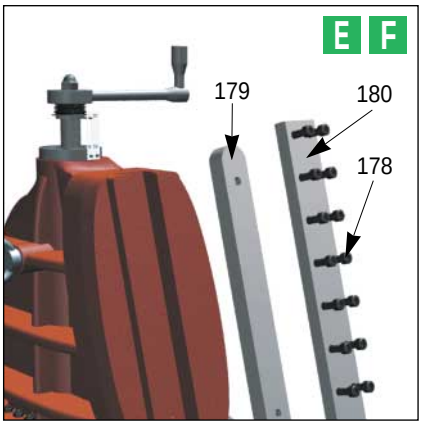
ND 2" through 14"

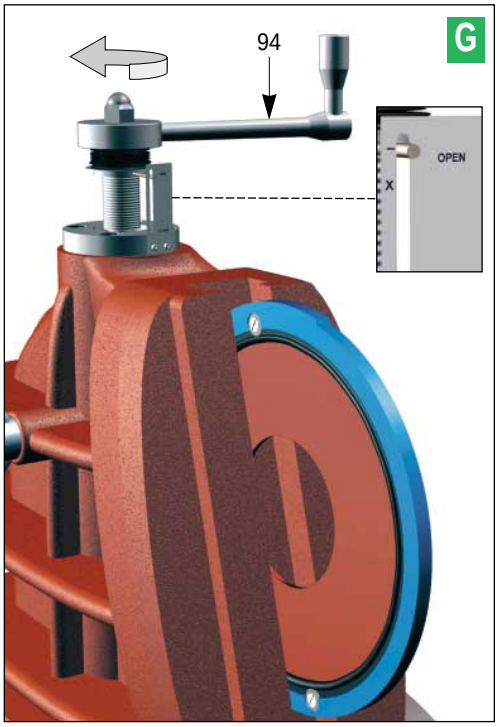


ND 16" through 24"



Bleed internal pressure completely.

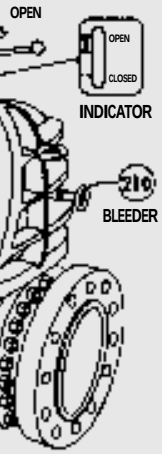




OPERATING INSTRUCTIONS TO REPLACE ORIFICE PLATE Fig. 930

10628 Rockley Road
Houston, Texas 77099 (USA)

STER
ION



AA ROTATE TO X (INDICATOR) Pos. 94

BB REPLACE Pos. 179-180

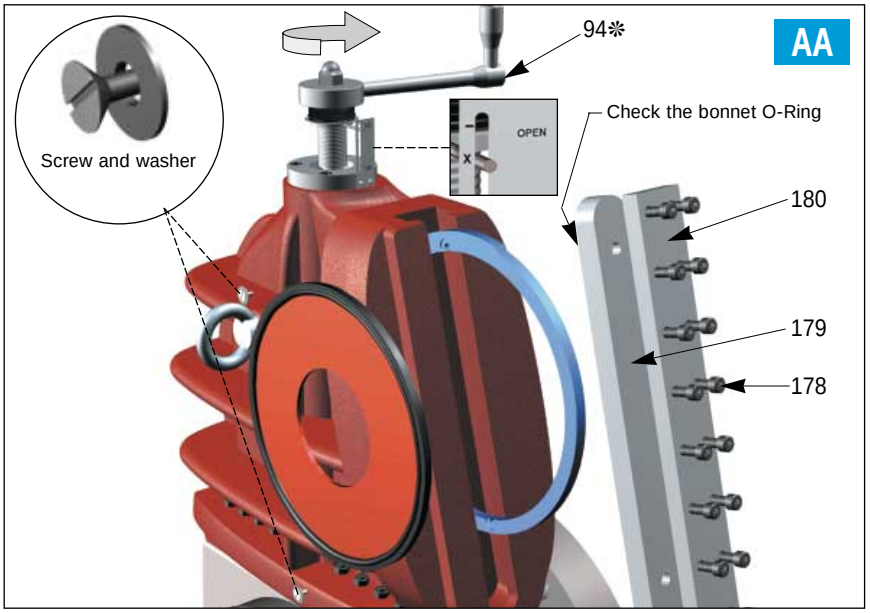
CC TIGHTEN (14 ft · Lbs) max Pos. 178

DD CLOSE Pos. 210

EE OPEN Pos. 208

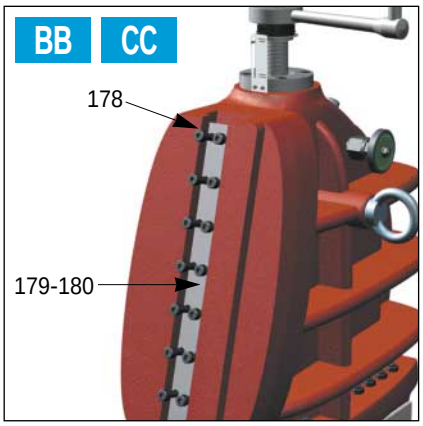
FF PULL Pos. 240
ROTATE TO OPEN Pos. 201

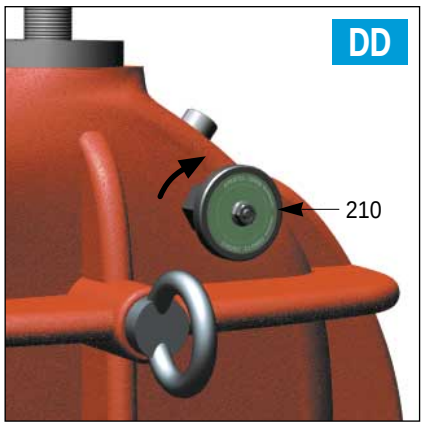
GG ROTATE TO CLOSED Pos. 94

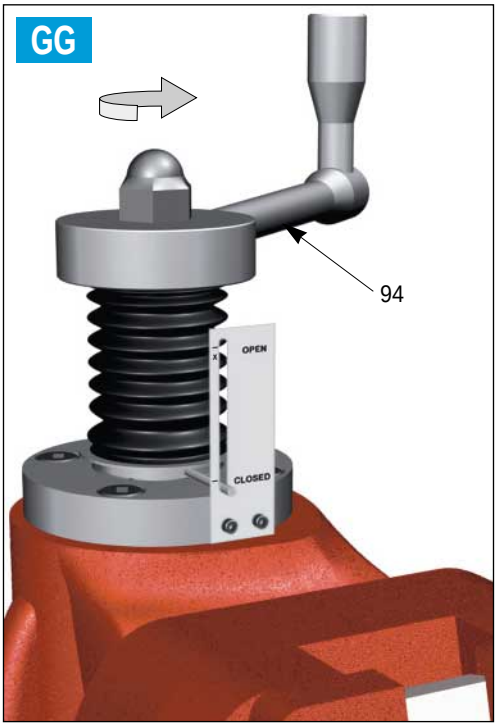


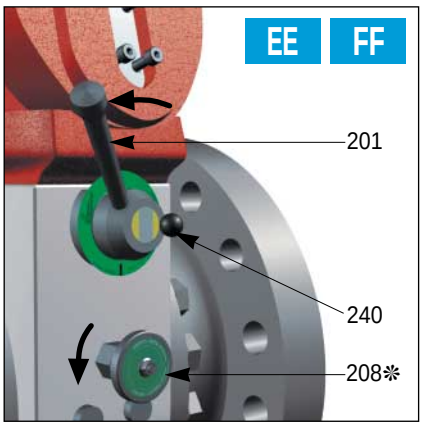
❊ Do not rotate plate holder onto plug valve.

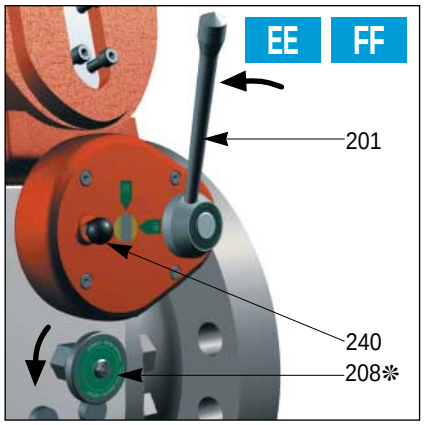
Note: Cover the bonnet opening with a protective sheet before assembling the screw and washer.











❊ Open and wait for few minutes.

ND 2” through 14” **ND 16” through 24”**

LIMITED WARRANTY

Seller warrants the Goods to be free from defects in materials manufactured by Seller and in Seller's workmanship for a period of one (1) year from the date of shipment by the Seller (the "Warranty Period"). Resale goods and those products incorporated into the Goods shall carry only the warranty extended by the original manufacturer to the original purchaser.
THIS LIMITED WARRANTY (A) IS IN LIEU OF, AND DISCLAIMS AND EXCLUDES, ALL OTHER WARRANTIES, STATUTORY, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR OF CONFORMITY TO MODELS OR SAMPLES; (B) does not apply to any Goods which have be (i) repaired, altered or improperly installed, (ii) subject to improper use or storage, (iii) used or incorporated with other materials, or equipment, after Buyer or anyone using the Goods, has, or reasonably should have, knowledge of any defect or nonconformance of the Goods, or (iv) manufactured, fabricated or assembled by anyone other than the seller; (C) shall not be effective unless Buyer notifies Seller in writing of any purported defect or nonconformance within thirty (30) days after Buyer discovers or should have reasonably discovered such purported defect or nonconformance; and (D) shall only extend to Buyer and not to any subsequent buyers or users of the Goods. Buyer shall provide Seller access to the Goods to which Buyer claims purported defect or nonconformance; upon request by Seller, Buyer shall at its own risk and expense, promptly return the Goods in question to Seller's Plant. Seller shall, at its option, promptly repair or replace F.O.B. point of manufacture, that portion of the Goods found by Seller to be defective. Goods repaired and parts replaced during the Warranty Period shall be in warranty for the remainder of the original Warranty Period. A letter signed by an officer of Seller can only modify this warranty.

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