



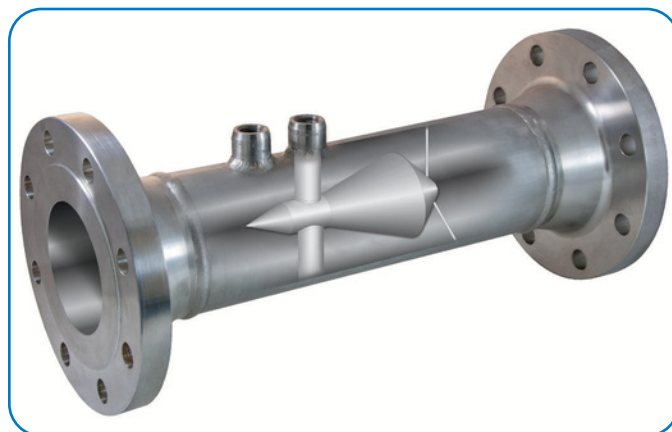
Differential Pressure Meter Cone

DESCRIPTION

The Preso Cone Differential Pressure Flow Meter has a cone-shaped element which shapes the flow profile ahead of the differential pressure (DP) measurement port without impacting the flow against a sharp surface, creating an extremely stable signal for measurement with minimal wear on the cone edge.

BENEFITS

- Precise accuracy and repeatability
- Cost effective
- Wide variety of fluids
- Little or no straight run piping requirements
- No additional flow conditioning devices needed
- Low maintenance and long life
- No moving parts
- Wide flow range
- Low head loss



OPERATING PRINCIPLE

The Preso Cone differential pressure meter utilizes the center element to straighten the flow and create an ideal dynamic which allows differential pressure technology to be used in a unique way providing extensive flexibility in a wide variety of applications.

SPECIFICATIONS

Applications	Liquids, steam, air and industrial gases	
Pipe Sizes	Wafer	1...4 in. (25...102 mm)
	Threaded and Socket Weld	1/2...2 in. (12...51 mm)
	Flanged Mount	1...24 in. (25...609 mm)
	Butt Weld	1/2...24 in. (12...609 mm)
Repeatability	± 0.1% or better	
Flow Range	10:1 and greater	
Accuracy	± 0.5% of actual flow	
Standard Beta Ratio	0.40...0.80 (special betas available)	
Permanent Pressure Loss	Varies with beta ratio and DP	
Installation Piping Requirements	Typically 0...3 diameters upstream and 0...1 diameters downstream of the cone are required, depending on fittings or valves in the adjacent pipeline	
Construction Materials	304/304L, 316/316L stainless steel, A106 carbon steel, other materials on request	
End Fittings	Threaded (NPT), flange, wafer, socket, and butt weld, other end connections on request	
Approvals	CRN	





PART NUMBER CONSTRUCTION

Flanged – 316/316L

316/316L Body - 316/316L Element
FLANG ED

PGF

		2			
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Continued on
Next Page

PIPE SIZE

1 in.
1-1/4 in.
1-1/2 in.
2 in.
2-1/2 in.
3 in.
4 in.
5 in.
6 in.
8 in.
10 in.
12 in.
14 in.
16 in.
Other

C
D
E
F
G
H
I
J
K
L
M
N
O
P
X

PIPE SCHEDULE

Standard**
10
20
30
40
60
80
100
120
140
160
XH
XXH
5S
40S
80S
Other

A
B
C
D
E
F
G
H
J
K
L
M
N
O
P
Q
X

BODY / ELEMENT MATERIAL

316/316L body-316/316L element
Other

2
X

PROCESS CONNECTION

RF ange 150#
RF ange 300#
RF ange 600#
RF ange 900#
Other

A
B
C
D
X

INSTRUMENT CONNECTION

2 in. RF ange 150# (2 in. and up)
2 in. RF ange 300# (2 in. and up)
2 in. RF ange 600# (2 in. and up)
3 in. RF ange 150# (3 in. and up)
3 in. RF ange 300# (3 in. and up)
3 in. RF ange 600# (3 in. and up)
3 in. RF ange 900# (3 in. and up)
1/4 in. NPT (1...3 in. NPS)
1/2 in. NPT (3 in. and up)
1/2 in. socket weld
Other

A
B
C
D
E
F
G
H
I
J
X

BETA RATIO

0.4
0.5
0.6
0.7
0.8
Other

4
5
6
7
8
X

Continued from
Previous Page

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INSTRUMENT VALVE

1/4 in. Needle valve CS
 1/2 in. Needle valve CS
 1/4 in. Needle valve SS
 1/2 in. Needle valve SS
 1/2 in. Gate w/cross CS (steam)
 1/2 in. Gate w/cross SS (steam)
 Other
 Not Required

A
 B
 C
 D
 E
 F
 X
 Z

CALIBRATION

Factory Calibration
 Special Calibration*
 Not Required

1
 2
 Z

TRANSMITTER MOUNTING

None
 Remote Mount
 Mounting Bracket
 Three Valve Manifold
 Five Valve Manifold
 Other

Z
 1
 2
 3
 4
 X

CERTIFICATIONS

None
 Tracable Material
 Certifications NACE MR0-103
 NACE MR0-175
 Items 1 and 2
 Items 1 and 3
 Other

Z
 1
 2
 3
 4
 5
 X

STANDARD NDE TESTING

None
 Hydrostatic Test Only (1/2...12 in. NPS 150# to 900# flange- Others CF)
 5% Radiography of Butt Welds
 100% Radiography of Butt Welds
 5% Magnetic particle/dye penetrant
 100% magnetic particle/dye penetrant
 Items 2 and 4 (1/2...12 in. NP-S Others CF)
 Items 3 and 4 (1/2...12 in. NP-S Others CF)
 Items 3 and 5 (1/2...12 in. NP-S Others CF)
 Other

Z
 1
 2
 3
 4
 5
 6
 7
 8
 X

Note: Items 2-8 also include hydrostatic testing

Other NDE Testing

None
 100% visual inspection with
 report PMI
 Post-Weld Hardness testing
 Items 1 and 2
 Items 1 and 3
 Other

Z
 1
 2
 3
 4
 5
 X

Note on Item 1: 100% visual inspection occurs on all product.
 This is a request for the report.

Hardcoating

None
 Tungsten Carbide (WC) on wedge
 Tungsten Carbide (WC) on center 1/3 of meter
 Chromium Carbide (CrC) on wedge
 Chromium Carbide (CrC) on center 1/3 of meter
 Other

Z
 1
 2
 3
 4
 X



Flanged – Carbon Steel

PGF	-			1			
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Continued on
Next Page**Carbon Steel****FLANGED****PIPE SIZE**

1 in. 1-
1/4 in.
1-1/2 in.
2 in. 2-
1/2 in. 3
in.
4 in.
5 in.
6 in.
8 in.
10 in.
12 in.
14 in.
16 in.
Other

C
D
E
F
G
H
I
J
K
L
M
N
O
P
X

PIPE SCHEDULE

Standard**
10
20
30
40
60
80
100
120
140
160
XH
XXH
5S
40S
80S
Other

A
B
C
D
E
F
G
H
J
K
L
M
N
O
P
Q
X

BODY/ELEMENT MATERIAL

CS body-316/316L element
Other

1
X

PROCESS CONNECTION

RF flange 150#
RF flange 300#
RF flange 600#
RF flange 900#
Other

A
B
C
D
X

INSTRUMENT CONNECTION

2 in. RF flange 150# (2 in. and up)
2 in. RF flange 300# (2 in. and up)
2 in. RF flange 600# (2 in. and up)
3 in. RF flange 150# (3 in. and up)
3 in. RF flange 300# (3 in. and up)
3 in. RF flange 600# (3 in. and up)
3 in. RF flange 900# (3 in. and up)
1/4 in. NPT (1...3 in. NPS)
1/2 in. NPT (3 in. and up)
1/2 in. socket weld
Other

A
B
C
D
E
F
G
H
I
J
X

BETA RATIO

0.4
0.5
0.6
0.7
0.8
Other

4
5
6
7
8
X

Continued from
Previous Page

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<u>INSTRUMENT VALVE</u>							
1/4 in. Needle valve CS	A						
1/2 in. Needle valve CS	B						
1/4 in. Needle valve SS	C						
1/2 in. Needle valve SS	D						
1/2 in. Gate w/cross CS (steam)	E						
1/2 in. Gate w/cross SS (steam)	F						
Other	X						
Not Required	Z						
<u>CALIBRATION</u>							
Factory Calibration		1					
Special Calibration*		2					
Not Required		Z					
<u>TRANSMITTER MOUNTING</u>							
None			Z				
Remote Mount		1					
Mounting Bracket		2					
Three Valve Manifold		3					
Five Valve Manifold		4					
Other		X					
<u>CERTIFICATIONS</u>							
None			Z				
Tracable Material		1					
Certifications NACE MR0-103		2					
NACE MR0-175		3					
Items 1 and 2		4					
Items 1 and 3		5					
Other		X					
<u>STANDARD NDE TESTING</u>							
None			Z				
Hydrostatic Test Only (1/2...12 in. NPS 150# to 900# flange- Others CF)		1					
5% Radiography of Butt Welds		2					
100% Radiography of Butt Welds		3					
5% Magnetic particle/dye penetrant		4					
100% magnetic particle/dye penetrant		5					
Items 2 and 4		6					
Items 3 and 4		7					
Items 3 and 5		8					
Other		X					
Note: Items 2-8 also include hydrostatic testing							
<u>Other NDE Testing</u>							
None						Z	
100% visual inspection with report						1	
PMI (stainless steel only)						2	
Post-Weld Hardness testing (Carbon Steel Only)						2	
Items 1 and 2						3	
Other						X	
<u>Hardcoating</u>							
None							Z
Tungsten Carbide (WC) on wedge							1
Tungsten Carbide (WC) on center 1/3 of meter							2
Chromium Carbide (CrC) on wedge							3
Chromium Carbide (CrC) on center 1/3 of meter							4
Other							X

Flanged – 304/304L


304/304L Body - 316/316L Element
FLANGED

PGF

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		3			
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Continued on
Next Page**PIPE SIZE**

1 in.	C
1-1/4 in.	D
1-1/2 in.	E
2 in.	F
2-1/2 in.	G
3 in.	H
4 in.	I
5 in.	J
6 in.	K
8 in.	L
10 in.	M
12 in.	N
14 in.	O
16 in.	P
Other	X

PIPE SCHEDULE

Standard**	A
10	B
20	C
30	D
40	E
60	F
80	G
100	H
120	J
140	K
160	L
XH	M
XXH	N
5S	O
40S	P
80S	Q
Other	X

BODY/ELEMENT MATERIAL

304L/304L body - 316/316L element	3
Other	X

PROCESS CONNECTION

RF flange 150#	A
RF flange 300#	B
RF flange 600#	C
RF flange 900#	D
Other	X

INSTRUMENT CONNECTION

2 in. RF flange 150# (2 in. and up)	A
2 in. RF flange 300# (2 in. and up)	B
2 in. RF flange 600# (2 in. and up)	C
3 in. RF flange 150# (3 in. and up)	D
3 in. RF flange 300# (3 in. and up)	E
3 in. RF flange 600# (3 in. and up)	F
3 in. RF flange 900# (3 in. and up)	G
1/4 in. NPT (1...3 in. NPS)	H
1/2 in. NPT (3 in. and up)	I
1/2 in. socket weld	J
Other	X

BETA RATIO

0.4	4
0.5	5
0.6	6
0.7	7
0.8	8
Other	X

Continued from
Previous Page

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INSTRUMENT VALVE

1/4 in. Needle valve CS	A
1/2 in. Needle valve CS	B
1/4 in. Needle valve SS	C
1/2 in. Needle valve SS	D
1/2 in. Gate w/cross CS (steam)	E
1/2 in. Gate w/cross SS (steam)	F
Other	X
Not Required	Z

CALIBRATION

Factory Calibration	1
Special Calibration*	2
Not Required	Z

TRANSMITTER MOUNTING

None	0
Remote Mount	1
Mounting Bracket	2
Three Valve Manifold	3
Five Valve Manifold	4
Other	X

CERTIFICATIONS

None	0
Tracable Material	1
Certifications NACE MR0-103	2
NACE MR0-175	3
Items 1 and 2	4
Items 1 and 3	5
Other	X

STANDARD NDE TESTING

None	0
Hydrostatic Test Only	1
5% Radiography of Butt Welds	2
100% Radiography of Butt Welds	3
5% Magnetic particle/dye penetrant	4
100% magnetic particle/dye penetrant	5
Items 2 and 4	6
Items 3 and 4	7
Items 3 and 5	8
Other	X
Note: Items 2-8 also include hydrostatic testing	

Other NDE Testing

None	0
100% visual inspection with report	1
PMI (stainless steel only)	2
Post-Weld Hardness testing (Carbon Steel Only)	2
Items 1 and 2	3
Other	X
Note on Item 1: 100% visual inspection occurs on all product.	
This is a request for the report.	

Hardcoating

None	0
Tungsten Carbide (WC) on wedge	1
Tungsten Carbide (WC) on center 1/3 of meter	2
Chromium Carbide (CrC) on wedge	3
Chromium Carbide (CrC) on center 1/3 of meter	4
Other	X

*Standard calibration is performed at Badger Meter with five data points (0.5 percent accuracy)

** Pipe schedule "Standard" is schedule 40 up to 10" and 3.75" wall at 12" and larger.

Wafer Mount



316/316L Body, 316/316L Element

PGW

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Next Page**PIPE SIZE**

1 in.	C	150#	C	1
1 in.	C	300#	C	2
1 in.	C	600#	C	3
1 in.	C	900/1500#	C	4
1-1/4 in.	D	150#	D	1
1-1/4 in.	D	300#	D	2
1-1/4 in.	D	600#	D	3
1-1/4 in.	D	900/1500#	D	4
1-1/2 in.	E	150#	E	1
1-1/2 in.	E	300#	E	2
1-1/2 in.	E	600#	E	3
1-1/2 in.	E	900/1500#	E	4
2 in.	F	150#	F	1
2 in.	F	300#	F	2
2 in.	F	600#	F	3
2 in.	F	900/1500#	F	4
2-1/2 in.	G	150#	G	1
2-1/2 in.	G	300#	G	2
2-1/2 in.	G	600#	G	3
2-1/2 in.	G	900/1500#	G	4
3 in.	H	150#	H	1
3 in.	H	300#	H	2
3 in.	H	600#	H	3
3 in.	H	900#	H	4
3 in.	H	1500#	H	5
4 in.	I	150#	I	1
4 in.	I	300#	I	2
4 in.	I	600#	I	3
4 in.	I	900#	I	4
4 in.	I	1500#	I	5
Other			X	X

SCHEDULE

Standard**	A
10	B
20	C
30	D
40	E
120	J
160	L
XH	M
XXH	N
5S	O
40S	P
80S	Q
Other	X

BODY/ELEMENT MATERIAL

CS body-316/316L element	1
316/316L body-316/316L element	2
304L/304L body - 316/316L element	3
Other	X

INSTRUMENT CONNECTION

1/4 in. NPT (1...3 in. NPS)	H
1/2 in. NPT (3 in. and up)	I
1/2 in. socket weld	J
Other	X

BETA RATIO

0.4	4
0.5	5
0.6	6
0.7	7
0.8	8
Custom	X

Continued from
Previous Page

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INSTRUMENT VALVE

1/4 in. Needle valve CS	A
1/2 in. Needle valve CS	B
1/4 in. Needle valve SS	C
1/2 in. Needle valve SS	D
1/2 in. Gate w/cross CS (steam)	E
1/2 in. Gate w/cross SS (steam)	F
Other	X
Not Required	Z

CALIBRATION

Factory Calibration	1
Special Calibration*	2
Not Required	Z

TRANSMITTER MOUNTING

None	Z
Remote Mount	1
Mounting Bracket	2
Three Valve Manifold	3
Five Valve Manifold	4
Other	X

CERTIFICATIONS

None	Z
Tracable Material	1
Certifications NACE MR0-103	2
NACE MR0-175	3
Items 1 and 2	4
Items 1 and 3	5
Other	X

STANDARD NDE TESTING

None	Z
Hydrostatic Test Only	1
5% Radiography of Butt Welds	2
100% Radiography of Butt Welds	3
5% Magnetic particle/dye penetrant	4
100% magnetic particle/dye penetrant	5
Items 2 and 4	6
Items 3 and 4	7
Items 3 and 5	8
Other	X

Note: Items 2-8 also include hydrostatic testing**Other NDE Testing**

None	Z
100% visual inspection with report	1
PMI (stainless steel only)	2
Post-Weld Hardness testing (Carbon Steel Only)	2
Items 1 and 2	3
Other	X

Hardcoating

None	Z
Tungsten Carbide (WC) on wedge	1
Tungsten Carbide (WC) on center 1/3 of meter	2
Chromium Carbide (CrC) on wedge	3
Chromium Carbide (CrC) on center 1/3 of meter	4
Other	X

Socket Weld Mount



SOCKET WELD MOUNT

PGS

-

		2	G		
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Continued on
Next Page**PIPE SIZE**

1 in.	C
1-1/4 in.	D
1-1/2 in.	E
2 in.	F
Other	X

SCHEDULE

Standard**	A
10	B
20	C
30	D
40	E
120	J
160	L
XH	M
XXH	N
5S	O
40S	P
80S	Q
Other	X

BODY / ELEMENT MATERIAL

CS body-316/316L element	1
316/316L body-316/316L element	2
304L/304L body - 316/316L element	3
Other	X

PROCESS CONNECTION

Socket Weld	G
Other	X

INSTRUMENT CONNECTION

1/4 in. NPT (1...3 in. NPS)	H
1/2 in. NPT (3 in. and up)	I
1/2 in. socket weld	J
Other	X

BETA RATIO

0.4	4
0.5	5
0.6	6
0.7	7
0.8	8
Custom	X

Continued from
Previous Page

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INSTRUMENT VALVE

1/4 in. Needle valve CS	A
1/4 in. Needle valve SS	C
Other	X
Not Required	Z

CALIBRATION

Factory Calibration	1
Special Calibration*	2
Not Required	Z

TRANSMITTER MOUNTING

None	Z
Remote Mount	1
Mounting Bracket	2
Three Valve Manifold	3
Five Valve Manifold	4
Other	X

CERTIFICATIONS

None	Z
Tracable Material	1
Certifications NACE MR0-103	2
NACE MR0-175	3
Items 1 and 2	4
Items 1 and 3	5
Other	X

STANDARD NDE TESTING

None	Z
Hydrostatic Test Only	1
5% Radiography of Butt Welds	2
100% Radiography of Butt Welds	3
5% Magnetic particle/dye penetrant	4
100% magnetic particle/dye penetrant	5
Items 2 and 4	6
Items 3 and 4	7
Items 3 and 5	8
Other	X
Note: Items 2-8 also include hydrostatic testing	

Other NDE Testing

None	Z
100% visual inspection with report	1
PMI (stainless steel only)	2
Post-Weld Hardness testing (Carbon Steel Only)	2
Items 1 and 2	3
Other	X

Hardcoating

None	Z
Tungsten Carbide (WC) on wedge	1
Tungsten Carbide (WC) on center 1/3 of meter	2
Chromium Carbide (CrC) on wedge	3
Chromium Carbide (CrC) on center 1/3 of meter	4
Other	X

Threaded NPT

Continued on
Next Page

PGT	-			2	F		
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THREADED NPT

<u>PIPE SIZE</u>						
1 in.	C					
1-1/4 in.	D					
1-1/2 in.	E					
2 in.	F					
Other	X					
<u>SCHEDULE</u>						
Standard**	A					
10	B					
20	C					
30	D					
40	E					
120	J					
160	L					
XH	M					
XXH	N					
5S	O					
40S	P					
80S	Q					
Other	X					
<u>BODY / ELEMENT MATERIAL</u>						
CS body-316/316L element	1					
316/316L body-316/316L element	2					
304L/304L body - 316/316L element	3					
Other	X					
<u>PROCESS CONNECTION</u>						
NPT	F					
Other	X					
<u>INSTRUMENT CONNECTION</u>						
1/4 in. NPT (1...3 in. NPS)	H					
1/2 in. NPT (3 in. and up)	I					
1/2 in. socket weld	J					
Other	X					
<u>BETA RATIO</u>						
0.4	4					
0.5	5					
0.6	6					
0.7	7					
0.8	8					
Custom	X					

Continued from
Previous Page

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INSTRUMENT VALVE

1/4 in. Needle valve CS	A
1/4 in. Needle valve SS	C
Other	X
Not Required	Z

CALIBRATION

Factory Calibration	1
Special Calibration*	2
Not Required	Z

TRANSMITTER MOUNTING

None	Z
Remote Mount	1
Mounting Bracket	2
Three Valve Manifold	3
Five Valve Manifold	4
Other	X

CERTIFICATIONS

None	Z
Tracable Material	1
Certifications NACE MR0-103	2
NACE MR0-175	3
Items 1 and 2	4
Items 1 and 3	5
Other	X

STANDARD NDE TESTING

None	Z
Hydrostatic Test Only	1
5% Radiography of Butt Welds	2
100% Radiography of Butt Welds	3
5% Magnetic particle/dye penetrant	4
100% magnetic particle/dye penetrant	5
Items 2 and 4	6
Items 3 and 4	7
Items 3 and 5	8
Other	X

Note: Items 2-8 also include hydrostatic testing**Other NDE Testing**

None	Z
100% visual inspection with report	1
PMI (stainless steel only)	2
Post-Weld Hardness testing (Carbon Steel Only)	2
Items 1 and 2	3
Other	X

Hardcoating

Z
1
2
3
4
X

Butt Weld



PGB	-			2	E		
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Next Page

BUTT WELD MOUNT

PIPE SIZE					
1 in.	C				
1-1/4 in.	D				
1-1/2 in.	E				
2 in.	F				
2-1/2 in.	G				
3 in.	H				
4 in.	I				
5 in.	J				
6 in.	K				
8 in.	L				
10 in.	M				
12 in.	N				
14 in.	O				
16 in.	P				
Other	X				
PIPE SCHEDULE					
Standard**	A				
10	B				
20	C				
30	D				
40	E				
60	F				
80	G				
100	H				
120	J				
140	K				
160	L				
XH	M				
XXH	N				
5S	O				
40S	P				
80S	Q				
Other	X				
BODY /ELEMENT MATERIAL					
CS body-316/316L element		1			
316/316L body-316/316L element		2			
304L/304L body - 316/316L element		3			
Other		X			
PROCESS CONNECTION					
Butt Weld			E		
Other			X		
INSTRUMENT CONNECTION					
2 in. RF flange 150# (2 in. and up)				A	
2 in. RF flange 300# (2 in. and up)				B	
2 in. RF flange 600# (2 in. and up)				C	
3 in. RF flange 150# (3 in. and up)				D	
3 in. RF flange 300# (3 in. and up)				E	
3 in. RF flange 600# (3 in. and up)				F	
3 in. RF flange 900# (3 in. and up)				G	
1/4 in. NPT (1...3 in. NPS)				H	
1/2 in. NPT (3 in. and up)				I	
1/2 in. socket weld				J	
Other				X	
BETARATIO					
0.4					4
0.5					5
0.6					6
0.7					7
0.8					8
Other					X

Continued from
Previous Page

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INSTRUMENT VALVE

1/4 in. Needle valve CS	A
1/2 in. Needle valve CS	B
1/4 in. Needle valve SS	C
1/2 in. Needle valve SS	D
1/2 in. Gate w/cross CS (steam)	E
1/2 in. Gate w/cross SS (steam)	F
Other	X
Not Required	Z

CALIBRATION

Factory Calibration	1
Special Calibration*	2
Not Required	Z

TRANSMITTER MOUNTING

None	Z
Remote Mount	1
Mounting Bracket	2
Three Valve Manifold	3
Five Valve Manifold	4
Other	X

CERTIFICATIONS

None	Z
Tracable Material	1
Certifications NACE MR0-103	2
NACE MR0-175	3
Items 1 and 2	4
Items 1 and 3	5
Other	X

STANDARD NDE TESTING

None	Z
Hydrostatic Test Only	1
5% Radiography of Butt Welds	2
100% Radiography of Butt Welds	3
5% Magnetic particle/dye penetrant	4
100% magnetic particle/dye penetrant	5
Items 2 and 4	6
Items 3 and 4	7
Items 3 and 5	8
Other	X

Note: Items 2-8 also include hydrostatic testing**Other NDE Testing**

None	Z
100% visual inspection with report	1
PMI (stainless steel only)	2
Post-Weld Hardness testing (Carbon Steel Only)	2
Items 1 and 2	3
Other	X

Hardcoating

None	Z
Tungsten Carbide (WC) on wedge	1
Tungsten Carbide (WC) on center 1/3 of meter	2
Chromium Carbide (CrC) on wedge	3
Chromium Carbide (CrC) on center 1/3 of meter	4
Other	X



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