



3612 S. WEST STREET
WICHITA, KS 67217
P: (316) 522-8900
F: (316) 522-1472

DATE: 2/13/24

ATTENTION: Alan Blough / Nowak Construction

FROM: Dane Fugleberg / Wichita Winwater

NOTES:

Water distribution system submittal information for Falcon Falls East 2nd Addition Phase 1 - Wichita, KS.

Approved as Submitted

Kyle Kerns, P.E.
City of Wichita

02/14/2024 9:30:38 AM

AWWA C900 MANUFACTURER'S CERTIFICATION

This is to certify the pipe manufactured by Sanderson Pipe meets or exceeds the applicable engineering standards listed below for 4" through 12" C900 pipe.

Materials

Comply with ASTM D1784 for PVC 1120 cell classification 12454. Materials used in the manufacture of our certified C900 pipe are NSF/ANSI 14 and 61 listed.

Dimensions/Testing

All pipe meets or exceeds the performance requirements listed in the current version of ANSI/AWWA C900, UL1285 and FM 1612. Each C900 pipe is hydrostatic tested to at least two times the pressure class per AWWA C900-16 standards. Testing records are maintained and available upon request.

Markings on the Pipe

Identification of nominal pipe size (CI diameter), PVC, dimension ratio, ANSI/AWWA pressure class, test pressure for hydrostatic tested pipe, AWWA designation number (ANSI/AWWA C900), manufacture's name and code. Additional certified seals printed on the pipe are: NSF-pw, NSF-61, UL1285, and Factory Mutual (FM 1612 Approved for DR18 at 185 PSI and DR14 at 250 PSI only).

Joints

Integral bell joint system complies with the requirements of ASTM D3139.

Gasket

All gaskets are NSF approved and comply with ASTM F477 standards.

Color

Standard C900 pressure pipe is blue. Purple (marked "Caution – Do Not Drink Reclaimed Water") and green (marked "Sewer Force Main") is available upon request. The purple and green C900 pipe will not carry the NSF-pw, NSF-61, UL1285, or Factory Mutual seals.

Length/Chamfer

Manufactured in 20 foot lay lengths with a 15 degree chamfer.

Tapping

It is extremely important to use the proper procedures and tools while tapping pipe. Sanderson Pipe Corporation recommends strict compliance with the requirements as specified in AWWA C605.

Installation

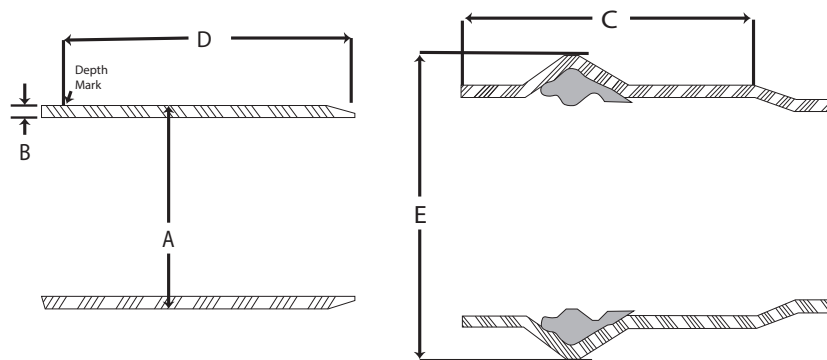
Sanderson Pipe Corporation recommends using installation procedures outlined in AWWA C605, Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water. The AWWA Manual M23, and Handbook of PVC Pipe Design and Construction (from Uni-Bell/PVC Pipe Association) are additional resource guides for design and installation.



C900

SANDERSON PIPE CORPORATION

Pipe Size	Outside Diameter (A)	Minimum Wall (B)		
		DR-25 (165 PSI)	DR-18 (235 PSI)	DR-14 (305 PSI)
4"	4.800"	0.192"	0.267"	0.343"
6"	6.900"	0.276"	0.383"	0.493"
8"	9.050"	0.362"	0.503"	0.646"
10"	11.100"	0.444"	0.617"	0.793"
12"	13.200"	0.528"	0.733"	0.943"



Pipe Size	Dimensions		
	*(C) Bell Length	*(D) Insertion / Reference Mark	(E) Approximate Bell OD Clearance
4"	5.50"	4.50"	6.50"
6"	6.25"	5.25"	9.25"
8"	7.50"	6.50"	11.875"
10"	8.75"	7.75"	14.500"
12"	9.25"	8.25"	16.875"

*May vary up to $\pm \frac{1}{2}$ "



Made with Pride in the USA

sandersonpipe.com

Pittsburg, KS
Clarksville, TN
Sanderson, FL

PRODUCT SPECIFICATION

C900/RJIB CERTA-LOK® WITH FLUID-TITE® GASKET PVC PRESSURE PIPE

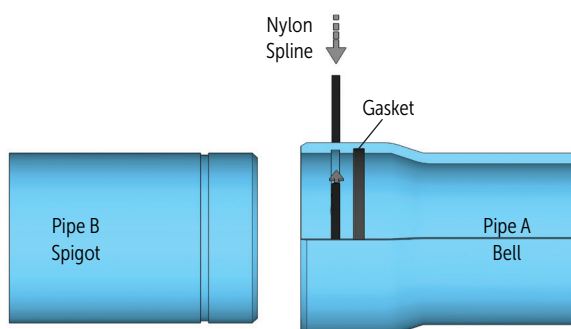
Restrained Joint Integral Bell

Our C900/RJIB Certa-Lok PVC Pressure Pipe is manufactured to meet the demands of today's municipal needs for water and wastewater pressure applications. This unique integral bell restrained joint pipe system is designed for trenchless applications with robust tensile strength for pulling multiple segments underground. The smooth curve at the bell specifically reduces friction and allows for quick and easy assembly without interrupting the pulling process.

A segmented PVC pipe solution, this product reduces the jobsite footprint and minimizes community disruption with a reduced need for jobsite staging area and traffic control. The Fluid-Tite gasket offered in sizes 6" through 16" has a superior sealing surface for a leak-free joint and greater deflection capability.

INSTALLATION METHODS

- Horizontal directional drilling (HDD)
- Static pipe-bursting
- Open-cut
- Carrier pipe inside casings



SHORT FORM SPECIFICATION

Pipe Standard:	C900
Diameter Std.:	Cast Iron Outside Diameter (CIOD)
Nominal Sizes:	6", 8", 10", 12", 16"
Dimension Ratios & Pressure Ratings:	DR 25 – 165 psi DR 18 – 235 psi (185 psi) [†] DR 14 – 305 psi (250 psi) [†]
Lay Length:	10', 20'
Pipe Compound:	ASTM D1784 Cell Class 12454
Pipe Joint Std.:	ASTM D3139
Max. Angular Joint Deflection: [‡]	0.5°
Gasket Standard:	ASTM F477, UL 157
Gasket Material Offering:	EPDM** Optional - Nitrile (NBR)
Installation Std.:	AWWA C605

[†]FM 1612 calculates pressure ratings differently than AWWA with DR 18 as 185 psi and DR 14 as 250 psi.

[‡]See Installation Guide for more information.

*Excludes 16" nominal size.

**As of January 2022, EPDM gaskets will start replacing the previous default gasket material option – IR/SBR

Applications	Potable Water	Waste-water	Reclaimed Water
Pipe Color:	Blue	Green	Purple
Certifications:	NSF 14 NSF 61 FM 1612 [†] * UL 1285*	None	None

*See Certification Letter for full explanation and list of exceptions.



Only products bearing the NSF Mark are Certified



Nitrile Gaskets for inside HDPE Casing

PRODUCT SPECIFICATION

C900/RJIB CERTA-LOK® WITH FLUID-TITE® GASKET

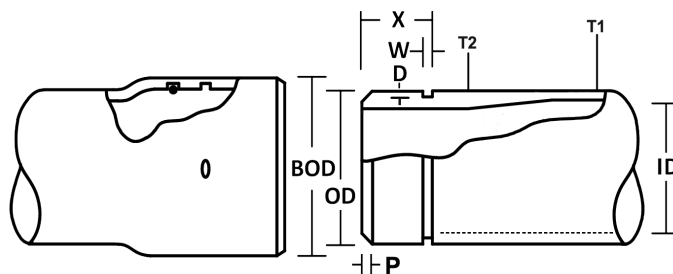
PVC PRESSURE PIPE | Restrained Joint Integral Bell

C900/RJ CERTA-LOK PIPE											
Nom. Size	Outside Diameter (OD)	DR	Pipe								
			Min. Wall Thickness (T1)	Spigot End Wall Thickness (T2)	Internal Diameter (ID)	X	W	D	P	BOD	Weight (lb/ft)
6"	6.900	18	0.383	0.513	6.134	3.000	0.500	0.145	0.271	7.816	5.3
		14	0.493	0.661	5.914					8.030	6.6
8"	9.050	18	0.503	0.674	8.044	3.163	0.500	0.145	0.634	10.262	9.1
		14	0.646	0.866	7.758					10.542	11.5
10"	11.100	18	0.617	0.890	9.866	3.625	0.750	0.215	0.634	12.781	13.7
		14	0.793	1.105	9.514					13.177	17.3
12"	13.200	18	0.733	1.085	11.734	3.625	0.750	0.215	0.634	15.247	19.4
		14	0.943	1.325	11.314					15.681	24.5
16"	17.400	25	0.696	0.884	16.008	3.673	0.875	0.265	0.634	19.261	23.3
		18	0.967	1.205	15.466					19.881	31.9

Notes:

1. These dimensions are for estimating purposes only. All dimensions are in inches unless otherwise specified.
2. DR = Dimension Ratio
3. AWWA Pressure Class @ 73°F and includes 2:1 safety factor.
4. Maximum Pull Force based on actual testing and includes 2:1 safety factor.
5. Internal diameter calculated using nominal outside diameter and minimum wall thickness.
6. Additional wall thickness provides additional joint strength in machined areas. This has been calculated to have a negligible effect on flow performance.
7. Contact Technical Services for assistance with mandrel sizing.
8. 16" nominal size is not listed to UL 1285 or FM 1612.

PERFORMANCE DATA					
Nom. Size	DR	Pressure Class (psi)	Min. Bend Radius (ft)	Max. Pull Force (lbf)	*Max % Change per 20' Stick
6"	18	235	144	20,100	7
	14	305		22,300	
8"	18	235	188	27,500	5.25
	14	305		31,000	
10"	18	235	232	49,500	4.37
	14	305		52,600	
12"	18	235	275	60,000	3.68
	14	305		60,000	
16"	25	165	363	68,500	2.8
	18	235		72,000	



*Refer to "Changing Direction of PVC Pipelines" Technical Bulletin for more information.

PRODUCT SPECIFICATION

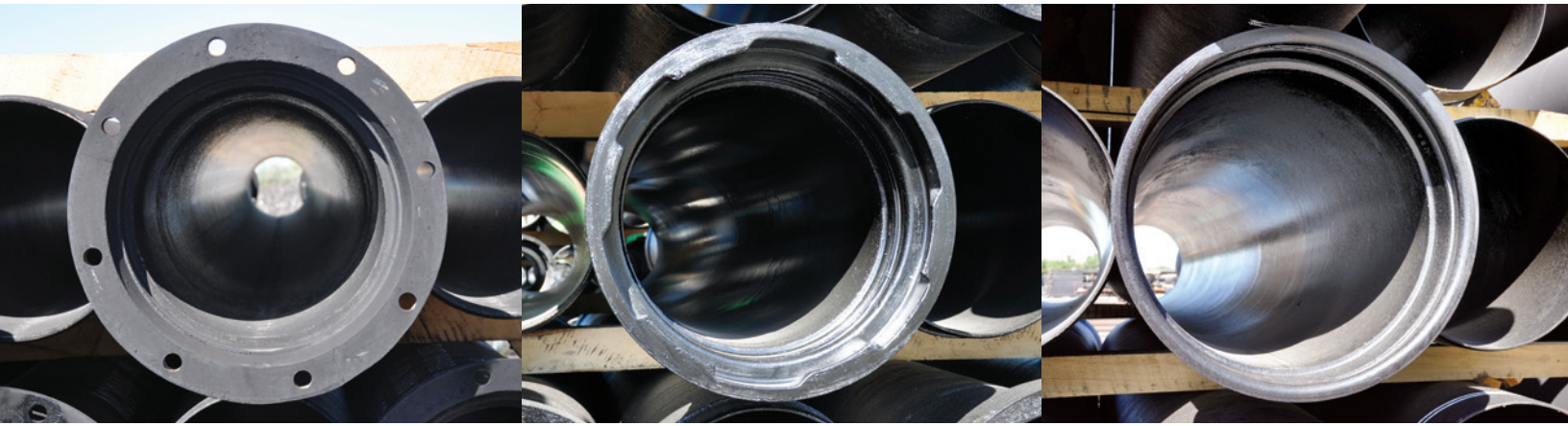
C900/RJIB CERTA-LOK® WITH FLUID-TITE® GASKET

PVC PRESSURE PIPE | Restrained Joint Integral Bell

C900/RJIB CERTA-LOK ACCESSORIES								
Application	Nom. Size	Splines				Gaskets		
		Material	Size	Length	Part Number	Material	Shape	Part Number
Standard	6"	Nylon	0.250x0.375	24	S0624TN0	EPDM	Profile	GSPR030600
						NBR (Nitrile)	Profile	GSPR550600
	8"	Nylon	0.250x0.375	32	S0832TN0	EPDM	Profile	GSPR030800
						NBR (Nitrile)	Profile	GSPR550800
	10"	Nylon	0.375x0.625	39	S1039TN0	EPDM	Profile	GSPR031000
						NBR (Nitrile)	Profile	GSPR551000
	12"	Nylon	0.375x0.625	46	S1246TN0	EPDM	Profile	GSPR031200
						NBR (Nitrile)	Profile	GSPR551200
	16"	Nylon	0.500x0.750	60	S1660TN0	IR/SBR	Profile	GSPR001600

Some or all of these products are protected by patents. Visit www.westlakepipe.com/patents for more information.

MCWANE DUCTILE IRON PIPE



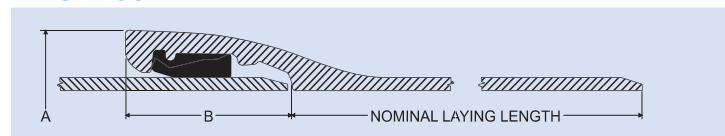
Boltless restrained joint systems • Multiple design options available from 3"–36" •
Fast and easy installation • 350 psi pressure rating • Independently tested



IRON STRONG

mcwaneductile.com

TYTON® JOINT PIPE

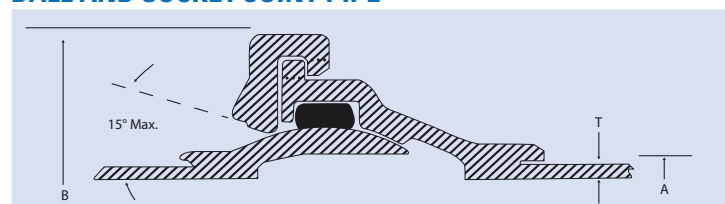


Tyton® Joint

Pipe Size In.	Pipe Thickness In.		Outside Diameter	*Dimensions In.	
	From	To		A	B
3	.25	.40	3.96	5.80	3.00
4	.25	.41	4.80	7.10	3.15
6	.25	.43	6.90	8.63	3.38
8	.25	.45	9.05	10.94	3.69
10	.26	.47	11.10	13.32	3.75
12	.28	.49	13.20	15.06	3.75
14	.28	.51	15.30	17.80	5.00
16	.30	.52	17.40	19.98	5.00
18	.31	.53	19.50	22.00	5.00
20	.33	.54	21.60	24.12	5.25
24	.33	.56	25.80	28.43	5.50
30	.34	.63	32.00	35.40	6.55
36	.38	.73	38.30	41.84	7.00

*Nominal laying length is 18 ft.

BALL AND SOCKET JOINT PIPE



Pipe Size In.	Thickness		A Pipe O.D.	B Retainer O.D.	Full Length Weight - Lb.**			Safe End Pull Lb.
	Class (A21.51)	T			As Shipped	Under Water		
						Full of Air	Full of Water	
6	55	.40	6.90	13.88	545	240	465	50,000
8	55	.42	9.05	16.63	770	240	655	70,000
10	55	.44	11.10	19.13	1005	220	860	95,000
12	55	.46	13.20	22.00	1270	155	1080	120,000
14	56	.51	15.30	24.50	1655	160	1410	145,000
16	56	.52	17.40	27.00	1990	45	1685	165,000
18	56	.53	19.50	30.00	2375	-70	2015	195,000
	58*	.59			2560	110	2170	
20	56	.54	21.60	32.75	2810	-200	2375	210,000
	59*	.63			3110	100	2635	
24	56	.56	25.80	38.25	3700	-620	3110	260,000
	62*	.74			4415	95	3715	
30	58	.71	32.00	46.25	5855	-900	4920	335,000
	61*	.83			6435	-180	5360	
36	57	.78	38.30	54.25	8145	-1300	6880	400,000
	59*	.88			8725	-725	7330	

* Thickness required to overcome buoyancy.

** Weights listed are for 18'-0" laying lengths. Nominal full lengths vary by size.

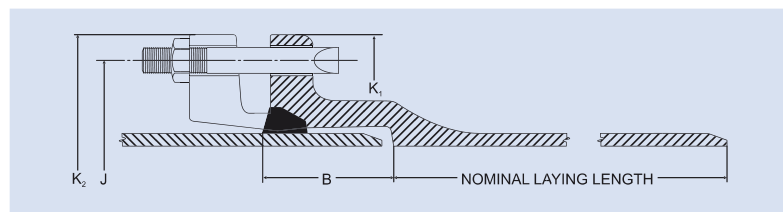
Pipe, Bell, Ball and Retainer are ductile iron.

Dimensions and weights are subject to manufacturing tolerances.

6 in. - 24 in. pressure rating: 350 psi

30 in. - 36 in. pressure rating: 250 psi

MECHANICAL JOINT PIPE



Pipe Size In.	Pipe Thickness In.		Outside Diameter	*Dimensions In.						Bolts		Bell Weight Lb.	Gland** Bolts Gasket Weight Lb.
	From	To		In.	B	J	K1	K2	No.	Size In.	Length In.		
3	.25	.40	3.96	2.50	6.19	7.62	7.69	4	5/8	3	11	7	
4	.26	.41	4.80	2.50	7.50	9.06	9.12	4	3/4	3-1/2	16	10	
6	.25	.43	6.90	2.50	9.50	11.06	11.12	6	3/4	3-1/2	18	16	
8	.27	.45	9.05	2.50	11.75	13.31	13.37	6	3/4	4	24	25	
10	.29	.47	11.10	2.50	14.00	15.62	15.62	8	3/4	4	31	30	
12	.31	.49	13.20	2.50	16.25	17.88	17.88	8	3/4	4	37	40	
14	.33	.51	15.30	3.50	18.75	20.25	20.25	10	3/4	4-1/2	61	45	
16	.34	.52	17.40	3.50	21.00	22.50	22.50	12	3/4	4-1/2	74	55	
18	.35	.53	19.50	3.50	23.25	24.75	24.75	12	3/4	4-1/2	85	65	
20	.36	.54	21.60	3.50	25.50	27.00	27.00	14	3/4	4-1/2	98	85	
24	.38	.56	25.80	3.50	30.00	31.50	31.50	16	3/4	5	123	105	

* Nominal laying length is 18 ft.

** Weight shown for regular grey cast iron follower gland, corton bolts and rubber gasket.

STANDARD DIMENSIONS AND WEIGHTS OF 3" THROUGH 36" PUSH-ON JOINT DUCTILE IRON PIPE

Pipe Size In.	Pressure Class psi	Nominal Thickness In.	OD* In.	Wt. of Barrel Per Ft. † Lb.	Tyton® Joint		
					Wt. of Bell Lb.	Wt. Per Lgth. ‡ Lb.	Avg. Wt. Per Ft. ‡ Lb.
3	350	0.25	3.96	8.90	7.00	185	9.20
4	350	0.25	4.80	10.90	9.00	225	11.30
6	350	0.25	6.90	16.00	11.00	300	16.60
8	350	0.25	9.05	21.10	17.00	395	22.00
10	350	0.26	11.10	27.10	24.00	510	28.40
12	350	0.28	13.20	34.80	29.00	655	36.40
14	250	0.28	15.30	40.40	45.00	770	42.90
	300	0.30	15.30	43.30	45.00	825	45.80
	350	0.31	15.30	44.70	45.00	850	47.20
16	250	0.30	17.40	49.30	54.00	940	52.30
	300	0.32	17.40	52.50	54.00	1000	55.50
	350	0.34	17.40	55.80	54.00	1060	58.80
18	250	0.31	19.50	57.20	59.00	1090	60.50
	300	0.34	19.50	62.60	59.00	1185	65.90
	350	0.36	19.50	66.20	59.00	1250	69.50
20	250	0.33	21.60	67.50	74.00	1290	71.60
	300	0.36	21.60	73.50	74.00	1395	77.60
	350	0.38	21.60	77.50	74.00	1470	81.60
24	200	0.33	25.80	80.80	95.00	1550	86.10
	250	0.37	25.80	90.50	95.00	1725	95.80
	300	0.40	25.80	97.70	95.00	1855	103.00
	350	0.43	25.80	104.90	95.00	1985	110.20
30**	150	0.34	32.00	103.50	139.00	2000	111.20
	200	0.38	32.00	115.50	139.00	2220	123.20
	250	0.42	32.00	127.50	139.00	2435	135.20
	300	0.45	32.00	136.50	139.00	2595	144.20
	350	0.49	32.00	148.40	139.00	2810	156.10
36**	150	0.38	38.30	138.50	184.00	2675	148.70
	200	0.42	38.30	152.90	184.00	2935	163.10
	250	0.47	38.30	170.90	184.00	3260	181.10
	300	0.51	38.30	185.30	184.00	3520	195.50
	350	0.56	38.30	203.20	184.00	3840	213.40

† Including bell; calculated weight of pipe rounded off to the nearest 5 lb.

‡ Including bell; average weight per foot, based on calculated weight of pipe before rounding.

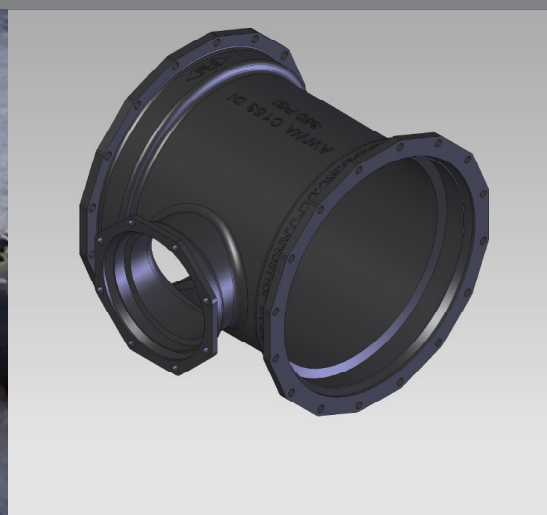
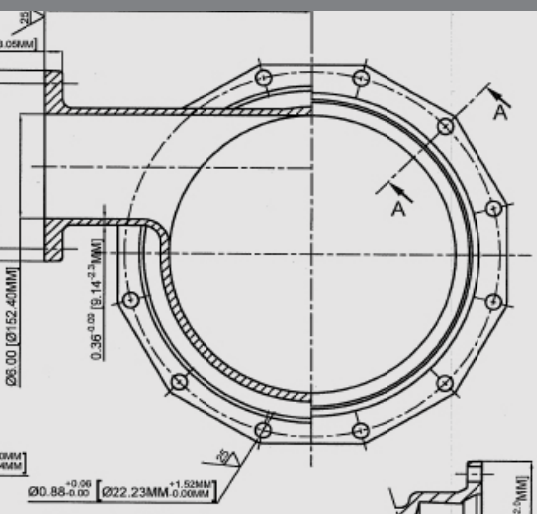
* Tolerances of OD of spigot end: 3-12 in. = +0.06 in. & -0.06 in.; 14-24 in. = +0.05 in. & -0.08 in.; 30-36 in. = +0.08 in. & -0.06 in.

** Fastite® Joint



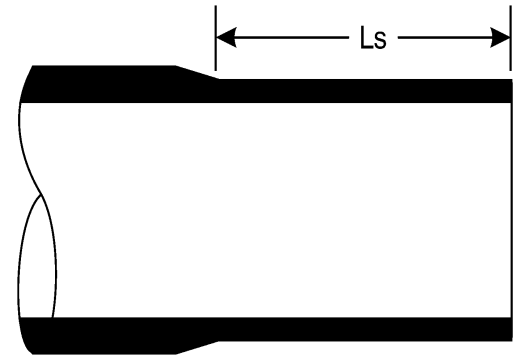
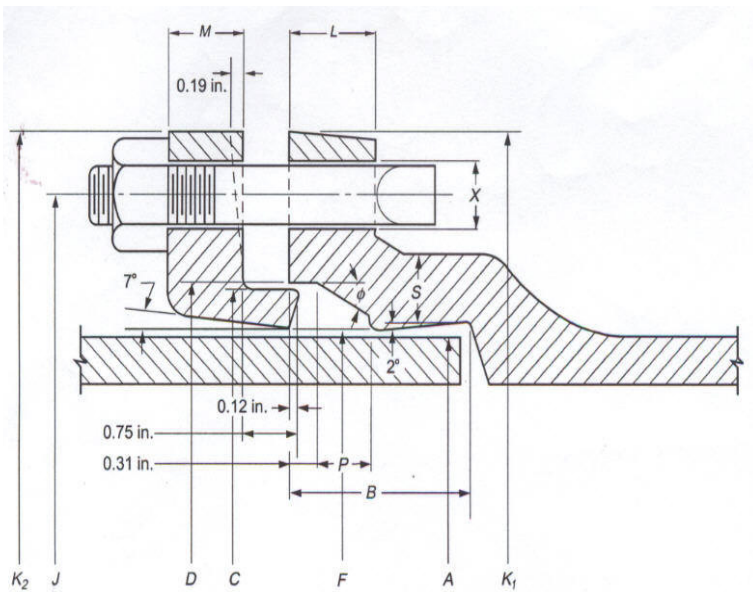
Quality – Service – Commitment – Delivered.

C153 DUCTILE IRON MECHANICAL JOINT FITTINGS



C153 DUCTILE IRON MECHANICAL JOINT FITTINGS BASIC SPECIFICATIONS

SIZES:	2" - 64"
MATERIAL:	Ductile Iron ASTM A536, Grade 65-45-12, 60-42-10 or 70-50-05.
PRESSURE:	350 PSI Water Working Pressure 2" - 24". 250 PSI Water Working Pressure 30" - 48". 150 PSI Water Working Pressure 54" - 64".
TESTING:	- In accordance with ANSI/AWWA C153/A21.53. - In accordance with UL - FM requirements. - All fittings are hydrostatically tested in accordance with SIGMA Quality Management Standard. - All fittings are heat coded to ensure traceability and verification of metallurgical properties in accordance with the prevailing standards and SIGMA Quality Management Standards.
LAYING LENGTH:	- Short body design - straight section of body deleted to provide a compact and lighter fitting without reducing strength or flow characteristics. - In accordance with ANSI/AWWA C153/A21.53.
DEFLECTION:	- Maximum allowable deflection for MJ Joint on a full length pipe is as mentioned below: 3" - 4" = 8 Degrees 6" = 7 Degrees 8" - 12" = 5 Degrees 14" - 48" = 3 Degrees
CEMENT LINING:	Double cement lined in accordance with ANSI/AWWA C104 / A21.4.
COATING:	- Interior of fitting is seal coated (asphaltic material) in accordance with ANSI AWWA C104/A21.4 and NSF61 approved. - Exterior of fitting is seal coated (asphaltic material) in accordance with ANSI/AWWA C153/A21.53 and NSF approved.
GASKETS:	- SBR in accordance with ANSI/AWWA C111/A21.11. - Also available in EPDM, NBR and CR.
T-BOLTS:	Low Alloy corrosion resistant high strength steel in accordance with ANSI/AWWA C111/A21.11.
APPROVALS:	3"-16" Underwriters Laboratories listed and Factory Mutual Approved.
STANDARDS:	- Certified to NSF61 Standard including Annex G. - ANSI/AWWA C153/A21.53 for Compact Ductile Iron Fittings 2"-64" for water and other liquids.
INSTALLATION:	Per ANSI/AWWA C600 and C111 using DIP conforming to C150/C151 and PVC pipe conforming to C900/C905.



Mechanical Joint Details

Plain End Details

Size	A	B	C	D	F	J	K1	K2	L	M	P	S	X	Bolts			PE Ls
														No.	Size	Len	
3	3.96	2.50	4.84	4.94	4.06	6.19	7.62	7.69	0.58	0.62	0.63	0.39	3/4	4	5/8	3.0	5.5
4	4.80	2.50	5.92	6.02	4.90	7.50	9.06	9.12	0.60	0.75	0.75	0.39	7/8	4	3/4	3.5	5.5
6	6.90	2.50	8.02	8.12	7.00	9.50	11.06	11.12	0.63	0.88	0.75	0.43	7/8	6	3/4	3.5	5.5
8	9.05	2.50	10.17	10.27	9.15	11.75	13.31	13.37	0.66	1.00	0.75	0.45	7/8	6	3/4	3.5	5.5
10	11.10	2.50	12.22	12.34	11.20	14.00	15.62	15.62	0.70	1.00	0.75	0.47	7/8	8	3/4	3.5	5.5
12	13.20	2.50	14.32	14.44	13.30	16.25	17.88	17.88	0.73	1.00	0.75	0.49	7/8	8	3/4	3.5	5.5
14	15.30	3.50	16.40	16.54	15.44	18.75	20.25	20.25	0.79	1.25	0.75	0.55	7/8	10	3/4	4.0	8.0
16	17.40	3.50	18.50	18.64	17.54	21.00	22.50	22.50	0.85	1.31	0.75	0.58	7/8	12	3/4	4.0	8.0
18	19.50	3.50	20.60	20.74	19.64	23.25	24.83	24.75	1.00	1.38	0.75	0.68	7/8	12	3/4	4.0	8.0
20	21.60	3.50	22.70	22.84	21.74	25.50	27.08	27.00	1.02	1.44	0.75	0.69	7/8	14	3/4	4.0	8.0
24	25.80	3.50	26.90	27.04	25.94	30.00	31.58	31.50	1.02	1.56	0.75	0.75	7/8	16	3/4	4.5	8.0
30	32.00	4.00	33.29	33.46	32.17	36.88	39.12	39.12	1.31	2.00	1.00	0.82	1 1/8	20	1	5.5	8.0
36	38.30	4.00	39.59	39.76	38.47	43.75	46.00	46.00	1.45	2.00	1.00	1.00	1 1/8	24	1	5.5	8.0
42	44.50	4.00	45.79	45.96	44.67	50.62	53.12	53.12	1.45	2.00	1.00	1.25	1 3/8	28	1 1/4	6.0	8.0
48	50.80	4.00	52.09	52.26	50.97	57.50	60.00	60.00	1.45	2.00	1.00	1.35	1 3/8	32	1 1/4	6.0	8.0

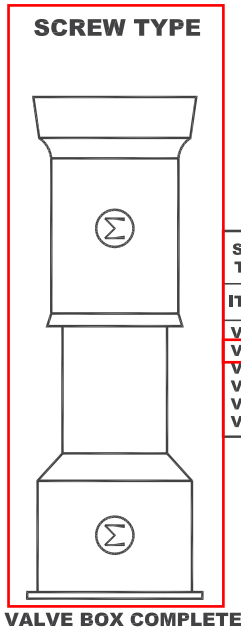
54"- 64" fittings & dimensions available upon request

Valve, Curb, & Service Boxes

Municipal
Construction

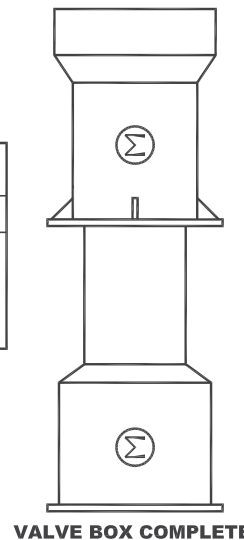
VB261-8 and VB461-8

SCREW TYPE



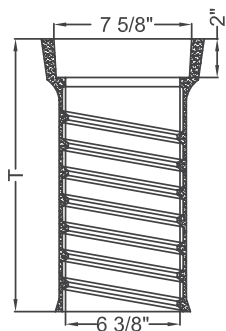
VALVE BOX COMPLETE

SLIP TYPE

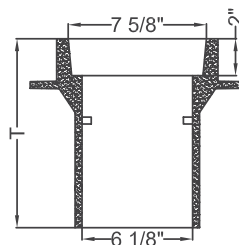


VALVE BOX COMPLETE

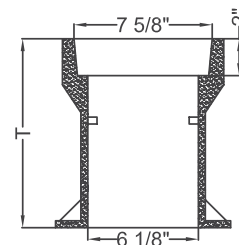
SREW TYPE	SPECIFICATIONS COMMON TO SREW TYPE & SLIP TYPE.						SLIP TYPE
	COMPLETE		TOP		BOTTOM		
ITEM #	HEIGHT RANGE	APPX. WT (LBS.)	LENGTH (T) (INCHES)	APPX. WT (LBS.)	LENGTH (B) (INCHES)	APPX. WT (LBS.)	ITEM #
VB261	18-22	54	10	32	15	32	VB461
VB262	27-37	72	16	41	24	32	VB462
VB264	39-49	81	16	41	36	41	VB464
VB266	39-59	99	26	59	36	41	VB466
VB267	51-71	122	26	59	48	63	VB467
VB268	63-83	131	26	59	60	72	VB468



TOP SECTION

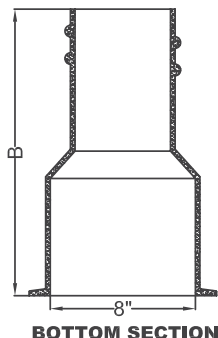


WITH TOP FLANGE



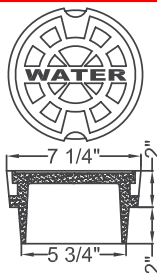
WITH BOTTOM FLANGE

TOP SECTION

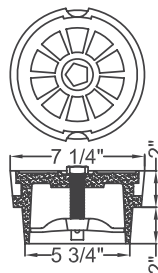


BOTTOM SECTION

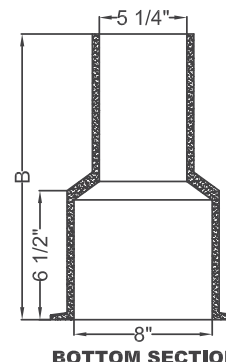
LIDS FIT IN BOTH SREW TYPE & SLIP TYPE VALVE BOXES



VB2600 (5 1/4" DROP LID)



VB2625 (5 1/4" LOCK LID)



BOTTOM SECTION

C
A
S
T
I
N
G



ClowValve.com



RESILIENT WEDGE GATE VALVES

4" THROUGH 20"
MODEL 2638

AWWA C515 250 PSI • UL/FM APPROVED 200 PSI
• NSF 61 CERTIFIED • FULL WATER WAY • FUSION
BONDED EPOXY COATED • 10 YEAR LIMITED



Clow Valve is a division of McWane, Inc.

For Generations

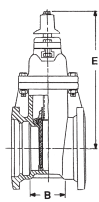
RESILIENT WEDGE VALVE

In 1975, Clow recognized the increased requirements and escalating maintenance cost of water systems in the United States.

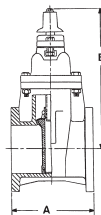
Clow responded by introducing the first R/W (Resilient Wedge) Gate Valve in America. This introduction revolutionized the valve market in the U.S.

Clow was the first to introduce and still leads in the design and technical development of the bubble-tight resilient seating valve.

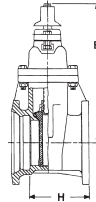
The Clow Resilient Wedge Valve, with its unique features and benefits, was the first to be manufactured with both AWWA and UL/FM approval for all water system requirements.



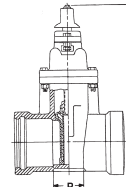
F-6100
MECHANICAL JOINT
4" – 20"



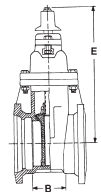
F-6102
FLANGED
4" – 20"



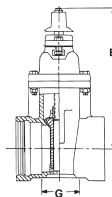
F-6106
FLANGED X MECHANICAL JOINT
4" – 20"



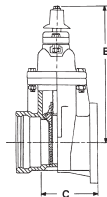
F-6110
PUSH ON FOR SDR PVC
4" – 12"



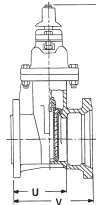
F-6111
MECHANICAL CUTTING IN JOINT
4" – 12"



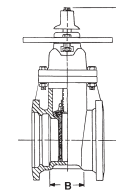
F-6112
TYTON ENDS FOR D.I. AND C900 PVC PIPE
4" – 16"



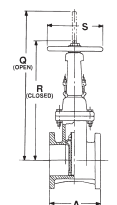
F-6113
FLANGED X TYTON
4" – 12"



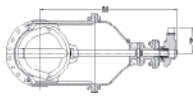
F-6114
MECHANICAL JOINT FOR TAPPING
4" – 20"



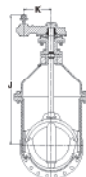
F-6120
MECHANICAL JOINT POST INDICATOR VALVE
4" – 16"



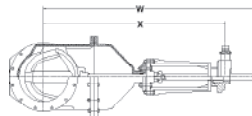
F-6136
FLANGED OS&Y
4" – 16"



BEVEL GEARING
HORIZONTAL INSTALLATION
ALL END STYLES
14" – 20"



SPUR GEARING
VERTICAL INSTALLATION
ALL END STYLES
14" – 20"



OS&Y BEVEL GEARING
HORIZONTAL INSTALLATION
ALL END STYLES
14" – 20"



OS&Y SPUR GEARING
VERTICAL INSTALLATION
ALL END STYLES
14" – 20"

VALVE SIZE	A	B	C	E	G	H	J	K	M	N	P	Q	R	S	U	V	NO GEAR*	GEARED*	W	X	Y
4"	9	4-1/2	6-3/4	14-3/4	4-5/8	6-3/4	—	—	—	—	4-1/2	22-3/4	18-1/4	10	6-3/4	9-1/4	13-1/2	—	—	—	—
6"	10-1/2	5-1/2	7-7/8	19	5-1/4	8	—	—	—	—	5	30-1/8	23-3/4	12	8	10-1/2	19-1/2	—	—	—	—
8"	11-1/2	8-1/8	8-1/2	22-1/2	5-5/8	9-3/4	—	—	—	—	5-1/2	37-3/4	29-1/4	14	10-3/4	13-1/4	25-1/2	—	—	—	—
10"	13	10-1/2	10	26-1/2	7	11-3/4	—	—	—	—	7	45-3/4	35-3/8	18	11-3/4	14-7/8	31-1/2	—	—	—	—
12"	14	10-3/4	11-1/4	30	8-1/2	12-7/8	—	—	—	—	8-1/2	53-1/8	40-3/8	18	12-3/8	15	37-3/4	—	—	—	—
14"	15	10	—	37-3/4	10-1/2	13-1/2	52-1/8	8	48-5/8	9-1/8	—	74-3/4	59-3/4	22	13-1/4	16-3/4	52	100	76	59-7/8	64-1/2
16"	16	10	—	37-3/4	10-1/2	13	51-1/8	8	47-5/8	9-1/8	—	74-3/4	59-3/4	22	12-3/4	16-1/4	52	100	76	59-7/8	64-1/2
18"	17	11-3/4	—	—	—	14-7/8	58	12	55-3/4	10-1/8	—	—	—	—	14-5/8	18-1/8	—	189	90-7/8	70-1/8	74-5/8
20"	18	11	—	—	—	14-1/2	57	12	54-3/4	10-1/8	—	—	—	—	14-1/2	18	—	189	90-7/8	70-1/8	74-5/8

NOTE: It is recommended that valves be installed with stems vertical when used in raw sewage, or sludge applications, or in water with excessive sediment. Flanged end connections are not recommended for buried service. * **No. of turns to full open**

ENGINEERING FEATURES

THRUST BEARINGS

Delrin thrust bearings above and below the thrust collar reduce friction and minimize operating torque.

STAINLESS STEEL HARDWARE

304 stainless steel nuts and bolts provide long-life corrosion protection.

COPPER ALLOY STEM

Long, trouble-free life with high strength, non-corrosive copper alloy stem and stem nut.

100% COATED WEDGE

100% coated wedge ensures bubble-tight seal every time up to 250 PSI. With twin seal design.

ELLIPTICAL BOLT HOLES

Hole design on MJ connection eliminates the need for anti-rotation bolts.

EASY STORAGE

Pads on the bottom of all valves keep valve in upright position for easier storage and protection from the elements.

LIFTING LUG

Integrated lifting lugs on follower plate for setting the valve into position. Available 4"–16".



REPLACEABLE O-RINGS

Two O-ring seals are replaceable with the valve fully open and subjected to full-rated working pressure.

NO FLAT GASKETS

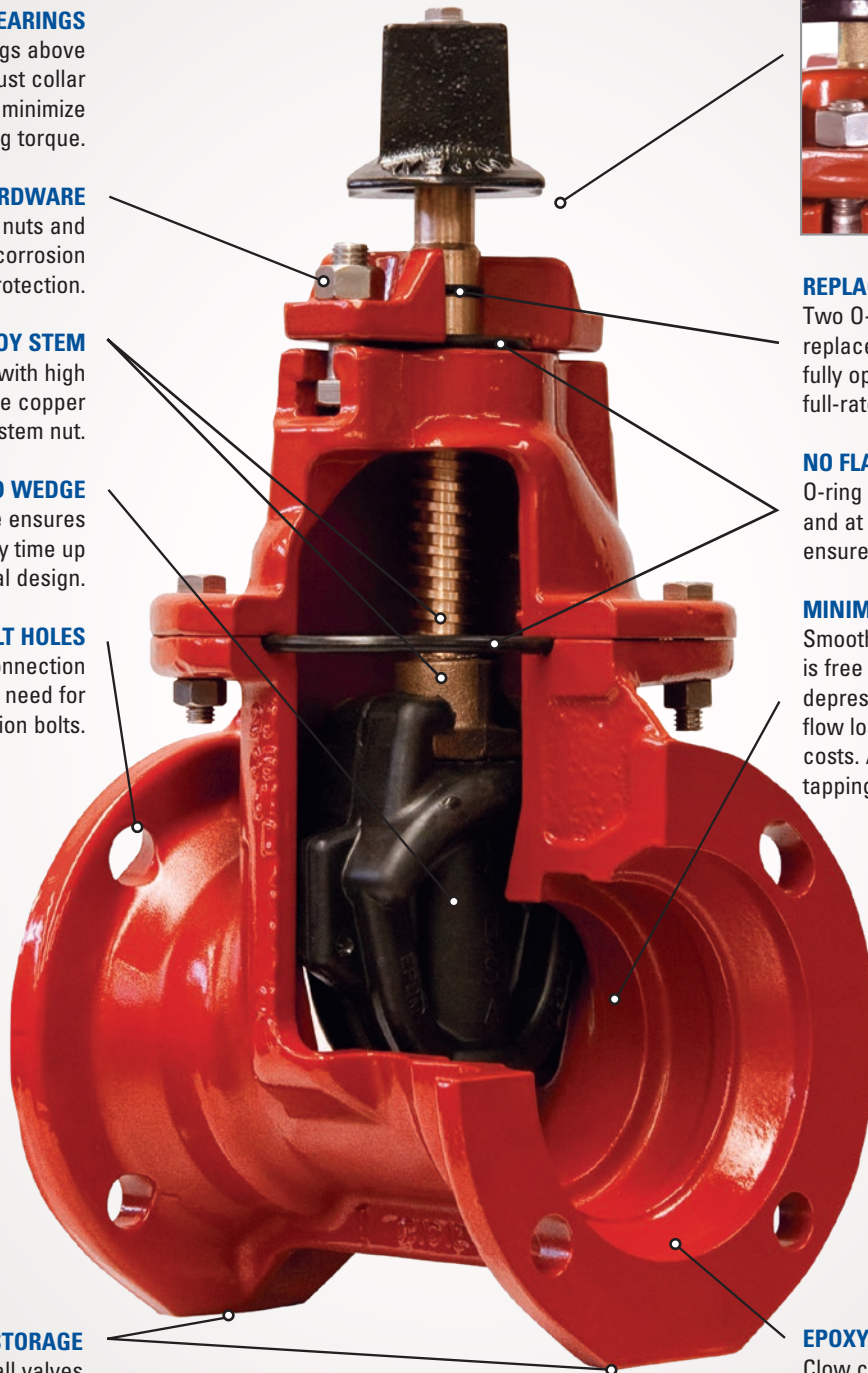
O-ring seals at the stuffing box and at the bonnet to body flanges ensure the best possible seal.

MINIMAL FLOW LOSS

Smooth, unobstructed waterway is free of pockets, cavities, and depressions allowing for minimal flow loss and lower pumping costs. All valves accept full size tapping cutter.

EPOXY COATING

Clow corrosion resistant fusion-bonded epoxy coating, conforming to AWWA C550 and NSF 61 Certified, protects both inside and outside of valve.



VALVE RATING: All valves are rated at 250 PSI for AWWA service and hydrostatically tested to 500 PSI.

All 4"–12", 18" and 20" valves are rated at 200 PSI for UL/FM service. All 14" and 16" valves are rated at 250 PSI for UL/FM service.

RECOMMENDED SPECIFICATIONS

1. Valves shall conform to the latest revision of AWWA Standard C515 covering resilient seated gate valves for water supply service.
2. The valves shall have a ductile iron body, bonnet, and O-ring plate. The wedge shall be totally encapsulated with rubber.
3. The sealing rubber shall be permanently bonded to the wedge per ASTM D429.
4. Valves shall be supplied with O-ring seals at all pressure retaining joints. No flat gaskets shall be allowed.
5. The valves shall be either non-rising stem or rising stem, opening by turning left or right, and provided with 2" square operating nut or a handwheel with the word "Open" and an arrow to indicate the direction to open.
6. Stems shall be cast copper alloy with integral collars in full compliance with AWWA. All stems shall operate with copper alloy stem nuts independent of wedge and of stem (in NRS valves).
7. Stems shall have two O-rings located above thrust collar and one O-ring below. Stem O-rings shall be replaceable with valve fully opened and subjected to full pressure. The stems on 4" – 20" shall also have two low torque thrust bearings located above and below the stem collar to reduce friction during operation.
8. Waterway shall be smooth, unobstructed and free of all pockets, cavities and depressions in the seat area. Valves 4" and larger shall accept a full size tapping cutter.
9. The body, bonnet and O-ring plate shall be fusion-bonded epoxy coated, both interior and exterior on body and bonnet. Epoxy shall be applied in accordance with AWWA C550 and be NSF 61 Certified.
10. Each valve shall have maker's name, pressure rating, country of origin, and year in which it was manufactured cast in the body. Prior to shipment from the factory, each valve shall be tested by hydrostatic pressure equal to the requirements of AWWA C515 (and UL/FM where applicable).
11. Valves shall have all component parts cast and assembled in the USA and shall be manufactured by the Clow Valve Company.

COMMITTED TO ENVIRONMENTAL RESPONSIBILITY

Clow Valve Company is committed to protecting our natural resources through environmentally responsible manufacturing practices, including the use of 80+% recycled content in our hydrants and valves.



CLOW
VALVE CO.

902 South 2nd Street
Oskaloosa, IA 52577
Ph 641-673-8611
Fx 641-673-8269



POCKET ENGINEER
Available for iOS + Android
or online at pe.mcwane.com.



*PATENT PENDING
REVISION A-2018



ClowValve.com

CLOW
VALVE CO.

clowvalve.com



MEDALLION HYDRANT

AWWA C502 • UL LISTED • FM APPROVED
NSF 61/372 CERTIFIED • 250 PSI WORKING PRESSURE
10-YEAR LIMITED WARRANTY



Clow Valve, A Division of McWane, Inc.

For Generations

MEDALLION HYDRANT

FIRE PROTECTION

The Clow Medallion hydrant was designed and built to provide unsurpassed fire protection. Utilizing computer-developed data, Clow engineers painstakingly sculpted interior surfaces to provide the smoothest possible waterway, resulting in the lowest possible loss of head through the hydrant.

The result? More water to the nozzles faster. With the Clow Medallion, it's performance that counts.

MAINTENANCE

Extraordinary steps are taken in both the design and manufacturing process to ensure that the Clow Medallion can be routinely serviced and repaired easily. All working parts are readily accessible from the top of the hydrant and are built from the highest-quality materials.

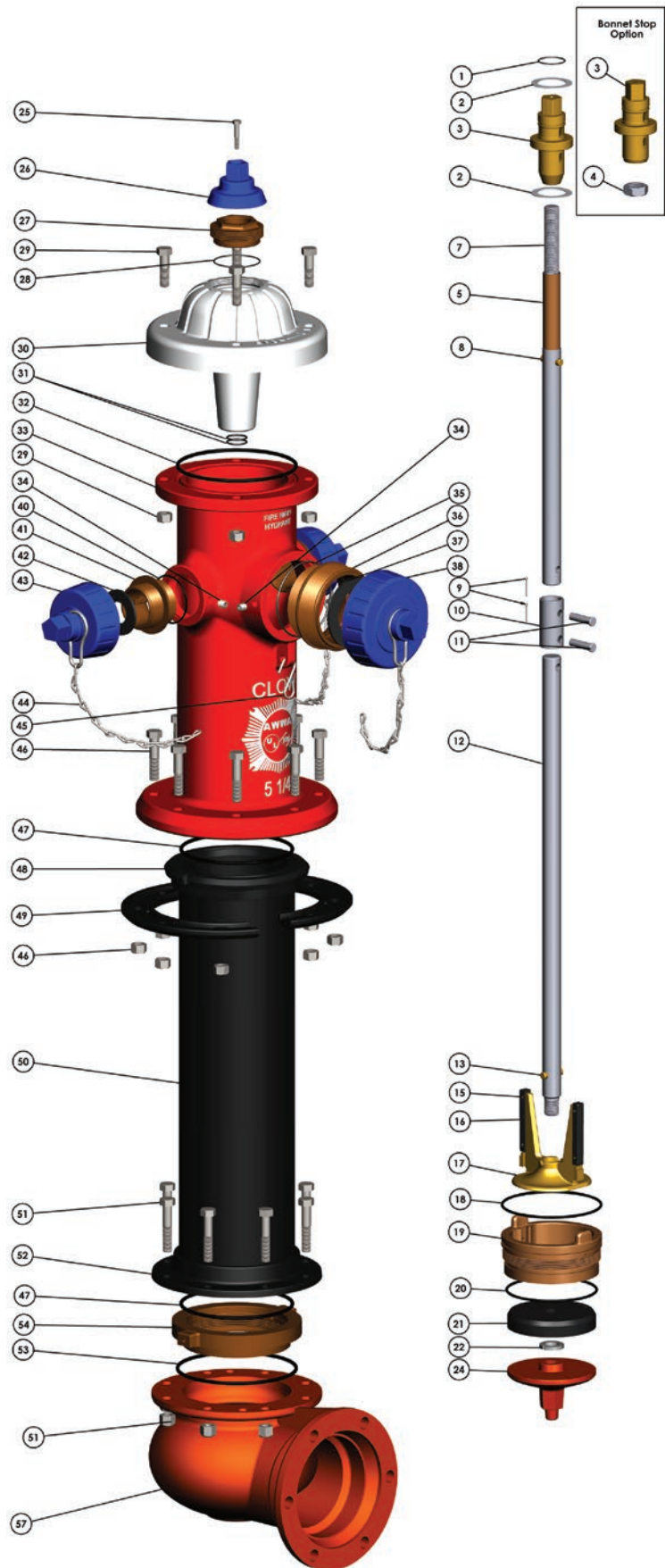
10-YEAR LIMITED WARRANTY

The Clow Medallion carries a 10-year limited warranty on materials and workmanship. The hydrant also equals or exceeds all applicable American Water Works Association (AWWA) requirements. It has been listed by Underwriters Laboratories (UL) and is approved by Factory Mutual Approvals (FM).



MEDALLION HYDRANT PARTS ASSEMBLY

ITEM NO.	DESCRIPTION	MATERIAL	QTY.
1	Operating Nut O-Ring	Rubber	1
2	Thrust Bearing	Plastic	2
3	Operating Nut	Copper Alloy	1
4	Bonnet Stop	Zinc Plated Steel	1
5	Upper Stem Sleeve	Copper Alloy	1
7	Upper Stem	Steel	1
8	Pin	Stainless Steel	1
9	Cotter Pin	Stainless Steel	2
10	Safety Stem Coupling	Stainless Steel	1
11	Safety Coupling Pin	Stainless Steel	2
12	Lower Stem	Steel	1
13	Pin	Stainless Steel	1
15	Pin	Stainless Steel	4
16	Drain Valve Facing	Plastic	2
17	Upper Valve Plate	Copper Alloy	1
18	Seat Ring Upper O-Ring	Rubber	1
19	Seat Ring	Copper Alloy	1
20	Seat Ring Lower O-Ring	Rubber	1
21	Main Valve Seat	Rubber	1
22	Lock Washer	Stainless Steel	1
24	Lower Valve Plate	Cast Iron	1
25	Hex Head Bolt	Zinc Plated Steel	1
26	Weather Cap	Gray Iron	1
27	Thrust Nut	Copper Alloy	1
28	Thrust Nut O-Ring	Rubber	1
29	Hex Head Bolt & Nut	Zinc Plated Steel	4
30	Bonnet	Gray Iron	1
31	Stem O-Ring	Rubber	2
32	Bonnet O-Ring	Rubber	1
33	Nozzle Section	Gray Iron	1
34	Socket Set Screw	Stainless Steel	3
35	Pumper O-Ring	Rubber	1
36	Pumper Nozzle	Copper Alloy	1
37	Pumper Nozzle Gasket	Rubber	1
38	Pumper Cap	Gray Iron	1
40	Hose O-Ring	Rubber	2
41	Hose Nozzle	Copper Alloy	1
42	Hose Nozzle Gasket	Rubber	2
43	Hose Nozzle Cap	Gray Iron	2
44	Nozzle Cap Chain	Zinc Plated Steel	3
45	Chain "S" Hook	Zinc Plated Steel	1
46	Hex Head Bolt & Nut	Zinc Plated Steel	8
47	Barrel O-Ring	Rubber	1
48	Barrel Upper Flange	Ductile Iron	1
49	Safety Flange	Gray Iron	2
50	Barrel	Ductile Iron	1
51	Hex Head Bolt & Lock Nut	Stainless Steel	8
52	Barrel Lower Flange	Ductile Iron	1
53	Drain Ring O-Ring	Rubber	1
54	Drain Ring	Copper Alloy	1
57	Shoe	Ductile Iron	1



ENGINEERING FEATURES

MOISTURE PROTECTION

Durable cast iron weather cap combines with one piece copper alloy operating nut and O-rings to provide reliable, corrosion-resistant operation under all weather conditions.

LUBRICATION RESERVOIR

O-ring sealed reservoir may be filled easily without disassembly.

TGIC

Coating provides a longer-lasting, more durable finish.

STAINLESS STEEL SAFETY STEM COUPLING SYSTEM

Breakaway parts shear cleanly below the top of the barrel, reducing nozzle section damage or opening of the main valve.

COPPER ALLOY UPPER VALVE PLATE

Solid design for added strength and durability.

COPPER ALLOY TO COPPER ALLOY

Copper alloy seat ring threads into copper alloy drain ring for corrosion-resistant protection.

COMPRESSION SEATING

High-durometer rubber valve closes with the water pressure for a positive seal.

PADS

Pads on hydrant shoe give large surface areas for standing and blocking hydrant.

ANTI-FRICTION

Thrust bearings above and below the copper alloy thrust collar provide low-torque operation even at 250 PSI working pressure.

BONNET SEALS

Standard O-rings secure mating flanges and sealing throughout the Medallion. All O-rings are dependable and easy to replace.

COPPER ALLOY NOZZLES

Mechanically locked, corrosion-resistant, field-replaceable copper alloy nozzles have O-ring seals for water-tight connections.

DRAIN VALVE

Plastic valve facing provides tight, life-long seal. Copper alloy seat ring has 360 degree drain channel. Double ports flush with each use.

LOWER VALVE PLATE

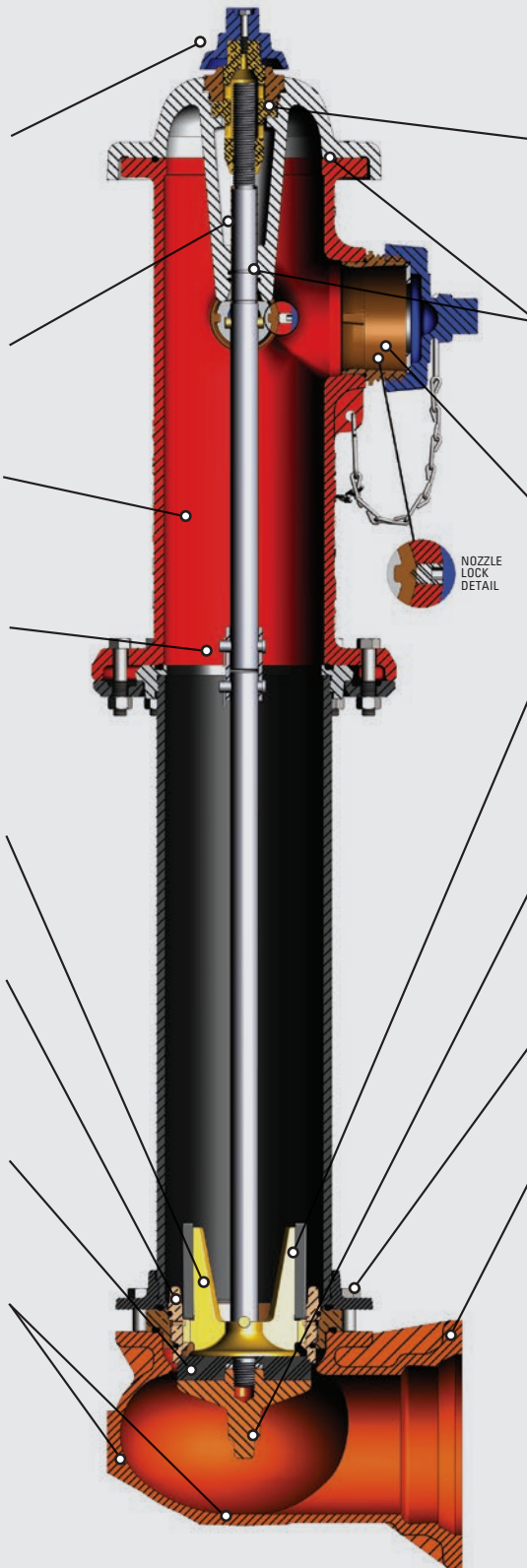
Bottoms out in the ductile iron shoe. Prevents seat from falling below the seat ring.

NUTS & BOLTS

All fasteners below grade are stainless steel.

DUCTILE IRON HYDRANT SHOE

Shaped for low turbulence and maximum flow, the shoe is offered in a variety of end connections. Comes standard with epoxy coating inside and out.



The Medallion hydrant meets the definition of low lead based on the Safe Drinking Water Act.

MEDALLION HYDRANT
GENERAL DIMENSION LAYOUT
CLOW VALVE COMPANY

F-2545

See Following
Storz Submittal

Color: Wichita Spec Color
Aluminum Body Red
Red Caps & Bonnet

32 3/4

19 3/8

2 1/2

Ground Line

Trench Depth

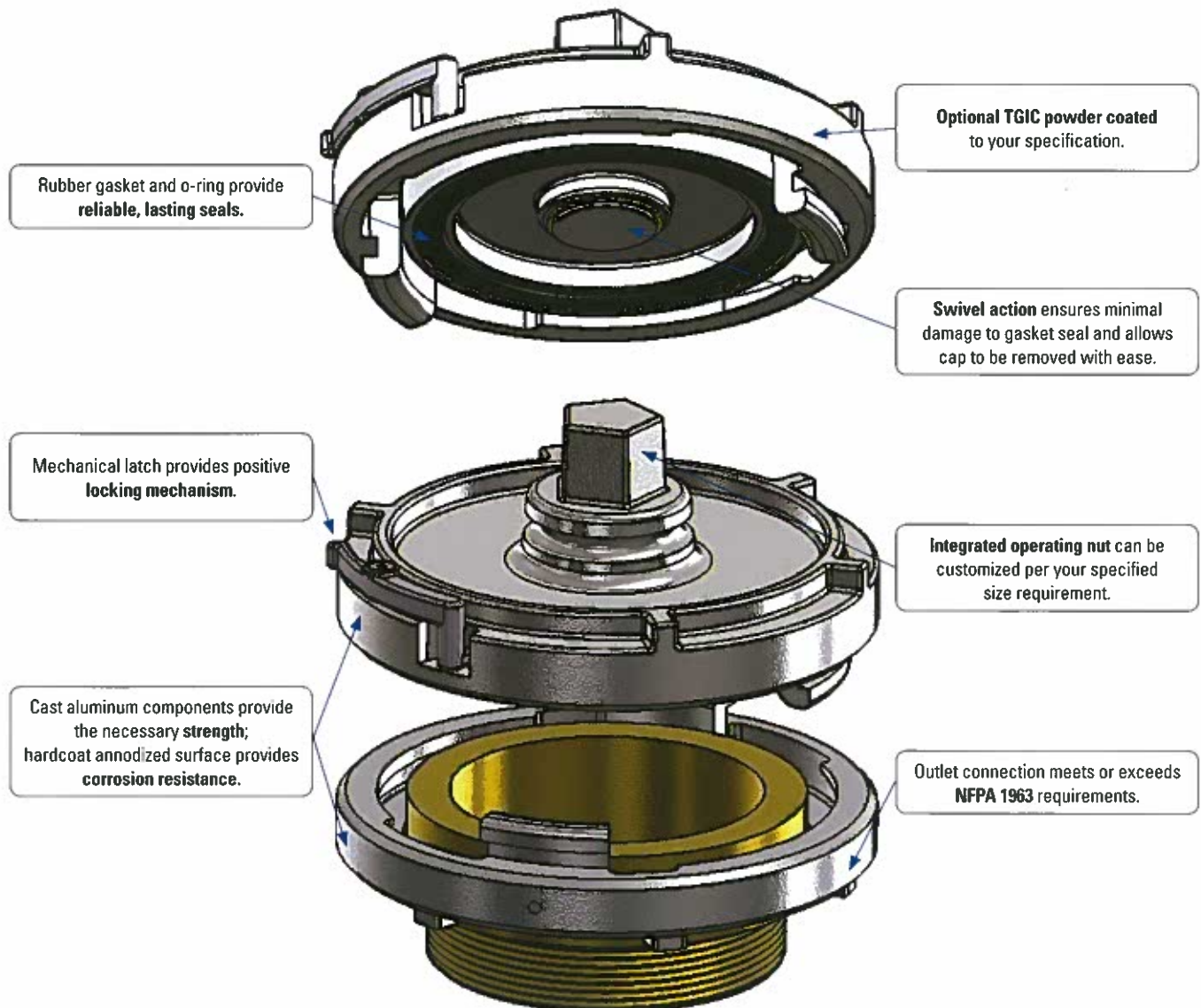
HYDRANT VALVE SIZE	D
4 1/2"	6.16 ± .14
5 1/4"	7.04 ± .14

END TYPE	A
Flange	8 1/8"
SMJ	9"
Tyton	9 5/8"

A

THE CLOW STORZ CONNECTION

- Clow Storz Connection is UL/FM Rated at 250 PSI.
- Storz cap comes with a hardcoat anodized surface as a standard but can be painted per specification requirement upon request.
- Outlet connection meets or exceeds NFPA 1963 requirements and has an added locking mechanism feature.
- The integrated op nut feature provides easy removal of the cap without having to have a special tool. Op nuts can be provided per specification size requirement.



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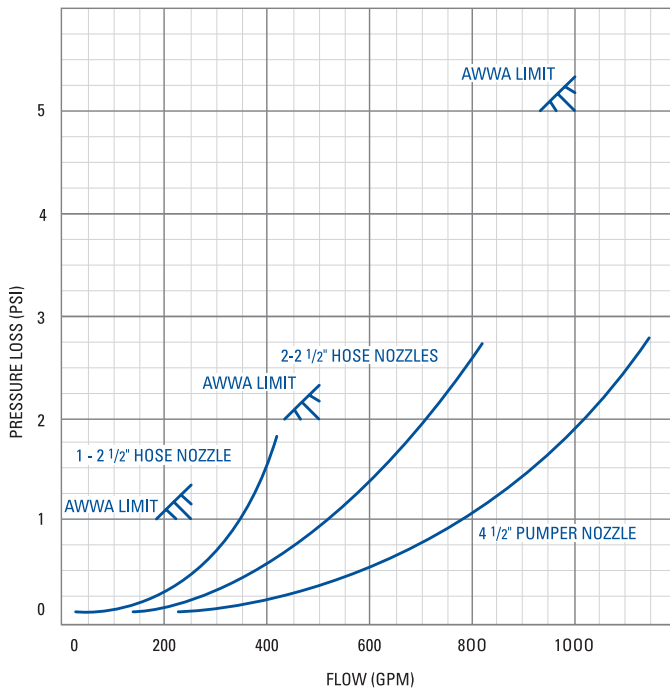
ClowValve.com

*PATENT PENDING



PRODUCT DATA

PRESSURE LOSS VS. FLOW



ACCESSORIES

SEAT REMOVAL WRENCH — A light-weight universal combination tool is used to remove the main valve components. The copper alloy seat ring unthreads from the drain ring by engaging the wrench with the upper stem pin.

THRUST NUT WRENCH — The wrench fits the thrust nut for easy removal.

LUBRICATION — The lubrication reservoir is filled with grease during manufacture. To add lubrication, remove the weather cap and put the lubricant into the reservoir through the opening on the top of the operating nut, or remove operating nut and fill lubrication reservoir with food grade grease or oil.

EXTENSION KIT — Contains everything required to extend the stem and barrel. Available in 6" increments.

SAFETY FLANGE REPAIR KIT — Includes safety flange, stem coupling and pins, flange O-rings, all bolts, nuts, and hardware to repair a hydrant damaged due to a traffic accident.

MAIN VALVE SEAT REPAIR KIT — Contains two drain valve facings and pins, seat ring O-rings, lower valve plate lock washer, main valve seat, container of lubrication.

BONNET REPAIR KIT — Complete with O-rings for the bonnet, stem, and thrust nut. Operating nut thrust washers and lubrication.

RECOMMENDED SPECIFICATIONS

1. Fire hydrant shall be manufactured in accordance with AWWA Standard C502, be listed by Underwriters Laboratories, Inc., and be FM Approved.
2. Fire hydrant shall be designed for 250 PSI working pressure and tested to 500 PSI hydrostatic pressure.
3. Fire hydrant shall be backed by manufacturer's 10-year limited warranty.
4. Fire hydrant shall be dry-top, center stem, 4-bolt bonnet construction having an O-ring sealed lubrication reservoir.
5. Fire hydrant shall be manufactured with operating nut and thrust nut made of copper alloy, with bearings located both above and below the thrust collar, and with operating nut protected by a cast-iron weather shield.
6. Fire hydrant shall be manufactured with nozzles mechanically locked into the nozzle section and having O-ring seals.
7. Fire hydrant shall be a "Traffic Model," complete with safety flanges and stainless steel stem coupling. Nozzle section must rotate 360 degrees.
8. Fire hydrant shall be manufactured with a main valve seat ring of copper alloy threaded into a copper alloy drain ring. A 360-degree drain channel shall have a minimum of two tapped drain outlets.
9. Fire hydrant shall have a solid copper alloy upper valve plate with two rubber facings that activate the drain ports.
10. Fire hydrant shall be manufactured with a lower valve plate that bottoms out in the shoe for a maximum opening. Both lower valve plate and shoe shall have fusion bonded epoxy coating.
11. Fire hydrant shall be manufactured with a main valve opening of 4 1/2" or 5 1/4".
12. Nozzle section shall be coated inside and out with TGIC coating.
13. Fire hydrant shall be the Clow Medallion as manufactured by the Clow Valve Company or approved equal.

DETECTABLE TAPE (5.0 MIL)

Solid Aluminum Foil Core • Virgin Clear Polypropylene Film Laminated Top Structure
Virgin Clear Polyethylene Film Laminated Base Structure • Reverse Printed Polypropylene Structure
Acid, Alkali, Chemical, and Oil Resistant • Direct Burial Rated • Made in the USA



Applications and Information

- **Pro-Line's Detectable Marking Tape** is used for detecting, locating, identifying, and protecting buried utility lines for gas, water, sewer, telecommunication, and electrical markets. The width of tape used, is determined by the size of, and depth at which the underground utility line is buried. The depth at which detectable tape is buried, is determined by the width of the tape used.
- **DETECT:** Aluminum core is detected through means of inductive locating.
- **LOCATE:** Line is located and marked after inductive locating is performed.
- **IDENTIFY:** Utility type is identified by both the APWA color-code and utility legend printed on the marking tape.
- **PROTECT:** Detectable tape works 24 hours a day and year round, even if tape is not inductively located during excavation, the tape provides a "stop-sign" effect that is highly visible.

Standards and References

Pro-Line's Detectable Marking Tape meets or exceeds all applicable ASTM specifications.

- ASTM D2103-08: Standard Specification for Polyethylene Films and Sheeting.
- ASTM D882-09: Standard Test Method for Tensile Properties and Elongation of Thin Plastic Sheeting.
- ASTM D2578-08: Standard Test Method for Wetting Tension of Polyethylene and Polypropylene Films.
- ASTM D792-08: Standard Test Methods for Density of Plastics by Displacement.
- ASTM D671-93: Standard Test Method for Flexural Fatigue of Plastics.

Construction

Pro-Line's Detectable Marking Tape consists of a minimum 5.0 mil overall thickness. Construction is 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a 0.35 solid aluminum foil core and then laminated to a 3.75 mil clear virgin polyethylene film. Tape is printed with our APWA Color-Coded, patented "Diagonally Striped" design with big, bold, black lettering to identify a specific buried utility line.

Specifications

DETECTABLE UNDERGROUND MARKING TAPE

Underground marking tape shall be a (2", 3", 4", 6", or 12" width), detectable marking tape, with a minimum 5.0 mil overall thickness. Tape shall be manufactured using a 0.8 mil clear virgin polypropylene film, reverse printed and laminated to a **0.35 mil solid aluminum foil core**, and then laminated to a 3.75 mil clear virgin polyethylene film. Tape shall be printed using a diagonally striped design for maximum visibility, and meet the APWA Color-Code standard for identification of buried utilities. Detectable marking tape shall be **Pro-Line Safety Products** or approved equal and made in the USA.

TABLE 1: DETECTABLE TAPE CONSTRUCTION (Polypropylene, Aluminum Foil, and Polyethylene)

PROPERTY	2" WIDTH	3" WIDTH	4" WIDTH	6" WIDTH	12" WIDTH
Nominal Overall Thickness	5.0 mil	5.0 mil	5.0 mil	5.0 mil	5.0 mil
Aluminum Foil Core Thickness	0.35 mil	0.35 mil	0.35 mil	0.35 mil	0.35 mil
Polyethylene Film Thickness	3.75 mil	3.75 mil	3.75 mil	3.75 mil	3.75 mil
Polypropylene Film Thickness	0.80 mil	0.80 mil	0.80 mil	0.80 mil	0.80 mil
Polypropylene Print Method	Reverse Printed	Reverse Printed	Reverse Printed	Reverse Printed	Reverse Printed
Print Design #1 (Patented)	Diagonal Striped	Diagonal Striped	Diagonal Striped	Diagonal Striped	Diagonal Striped
Print Design #2 (Custom)	Solid Block	Solid Block	Solid Block	Solid Block	Solid Block
Print Design #3 (Custom)	Solid Flood	Solid Flood	Solid Flood	Solid Flood	Solid Flood
Print Design Color-Code	APWA Color-Code	APWA Color-Code	APWA Color-Code	APWA Color-Code	APWA Color-Code

**Diagonal striped design is a PATENTED design of Pro-Line Safety Products that enhances tape visibility for superior protection.*

**Please note that there may be a nominal + or - 10% difference throughout the overall thickness.*

TABLE 2: TESTING SPECIFICATIONS (Physical and Mechanical Properties)

TEST DESCRIPTION	STANDARD	2" WIDTH	3" WIDTH	4" WIDTH	6" WIDTH	12" WIDTH
Aluminum Foil Core	MFG. SPECS	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade
Polyethylene Film	MFG. SPECS	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade
Polypropylene Film	MFG. SPECS	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade	Virgin Grade
Adhesive Type	MFG. SPECS	AV1257/CA100	AV1257/CA100	AV1257/CA100	AV1257/CA100	AV1257/CA100
Adhesive Bond Strength	BOILING WATER	5 hrs W/O Peel	5 hrs W/O Peel	5 hrs W/O Peel	5 hrs W/O Peel	5 hrs W/O Peel
Printed Inks	MFG. SPECS	Chromabond	Chromabond	Chromabond	Chromabond	Chromabond
Print Repeat	MFG. SPECS	Varies by Legend	Varies by Legend	Varies by Legend	Varies by Legend	Varies by Legend
Coefficient Friction	ASTM D4521-96	0.247 Static	0.247 Static	0.247 Static	0.247 Static	0.247 Static
Density	ASTM D792-66	1.09 g/cm ³	1.09 g/cm ³	1.09 g/cm ³	1.09 g/cm ³	1.09 g/cm ³
Elongation (MD)	ASTM D882-80A	139%	139%	139%	139%	139%
Elongation (TD)	ASTM D882-80A	80%	80%	80%	80%	80%
Flexural Fatigue	ASTM D671-93	Pliable Hand	Pliable Hand	Pliable Hand	Pliable Hand	Pliable Hand
Printability	ASTM D2578-08	45 Dynes	45 Dynes	45 Dynes	45 Dynes	45 Dynes
Tensile Strength	ASTM D882-09	15,000 psi	15,000 psi	15,000 psi	15,000 psi	15,000 psi

WEIGHTS, MEASUREMENTS AND PACKAGING

PRODUCT PART NO.	SIZE (WIDTH)	NOMINAL OVERALL THICKNESS	NOMINAL THICKNESS OF STRUCTURAL MATERIALS			RECOMMENDED BURIAL DEPTHS FOR DETECTION	PRODUCT WEIGHT PER ROLL	STANDARD PACKAGING
			ALUMINUM FOIL THICKNESS	POLYETHYLENE THICKNESS	POLYPROPYLENE THICKNESS			
10311XXX3	2" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	6-9 inches	4.75 lbs	9 / CARTON
10312XXX3	3" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	9-12 inches	7.13 lbs	6 / CARTON
10313XXX3	4" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	12-15 inches	9.50 lbs	4 / CARTON
10314XXX3	6" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	15-18 inches	14.25 lbs	3 / CARTON
10316XXX3	12" x 1000'	5.0 MIL	0.35 MIL	3.75 MIL	0.80 MIL	18-24 inches	28.50 lbs	1 / CARTON

****FOR CUSTOM LEGENDS OR SIZES CALL 800.554.3424****

PRINT LEGEND	PART #
CAUTION BURIED CHILLED WATER LINE BELOW	103
CAUTION BURIED GEOTHERMAL LINE BELOW	128
CAUTION BURIED POTABLE WATER LINE BELOW	115
CAUTION BURIED WATER LINE BELOW	125
CAUTION BURIED FORCE MAIN BELOW	208
CAUTION BURIED FORCE MAIN BELOW	308
CAUTION BURIED SANITARY SEWER LINE BELOW	318
CAUTION BURIED SEWER LINE BELOW	319
CAUTION BURIED STORM DRAIN LINE BELOW	321
CAUTION BURIED STORM SEWER LINE BELOW	322

PRINT LEGEND	PART #
CAUTION BURIED CATV LINE BELOW	402
CAUTION BURIED COMMUNICATION LINE BELOW	404
CAUTION BURIED FIBER OPTIC CABLE BELOW	406
CAUTION BURIED TELEPHONE LINE BELOW	423
CAUTION BURIED NON-POTABLE WATER LINE	512
CAUTION BURIED RECLAIMED WATER LINE BELOW	517
CAUTION BURIED ELECTRIC LINE BELOW	605
CAUTION BURIED HIGH VOLTAGE LINE BELOW	610
CAUTION BURIED GAS LINE BELOW	809
CAUTION BURIED PIPELINE BELOW	814



PRO-LINE SAFETY PRODUCTS COMPANY
 1099 ATLANTIC DRIVE, UNIT 1 • WEST CHICAGO, IL 60185
TOLL FREE: 800.554.3424



HDD-CCS PE45

(DIRECTIONAL DRILLING)

Tracer Wire • Horizontal Directional Drilling Copper Clad Steel (HDD-CCS) • 21% IACS Conductivity • Corrosion Resistant High-Density, High Molecular Weight Polyethylene (HMWPE-HDPE) Insulation • Moisture, Chemical, and Oil Resistant Impact, Crush, and Abrasion Resistant • RoHS Compliant • Direct Burial Rated • 30 Volts • Made in the USA

“PRO-TRACE® HDD-CCS -- DIRECTIONAL BORING DONE RIGHT THE FIRST TIME -- EVERY TIME!”



Applications and Information

- **PRO-TRACE® HDD-CCS PE45** conductor is equal to copper in signal tracing performance for tracer wire applications not exceeding 30 Volts. Tracer wire is used to conductively locate buried utility lines for the gas, water, sewer, telecommunication, and electrical markets.
- **PRO-TRACE® HDD-CCS PE45** has almost **700%** the break load of copper, which allows 1 wire to be installed in directional boring, plow-in, or open trench applications.
- Has 1-3% elongation, providing the perfect balance between tensile strength, ductility, and decreasing brittleness.
- Considerably lower in cost and great price stability compared to copper.
- RoHS Compliant, made in the USA, and works with connectors you already use.

Standards and References

PRO-TRACE® HDD-CCS PE45 conductors meets or exceeds all applicable ASTM specifications, and requirements of the National Electrical Code.

- ASTM B869: Specification for 21% Conductivity, Hard Drawn, Copper-Clad Steel Wire
- ASTM B170: Specification for Oxygen-Free Electrolytic Copper
- ASTM D1248: Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

Construction

PRO-TRACE® HDD-CCS PE45 is an extra high-strength, copper clad steel tracer wire. A high carbon steel core, metallurgically bonded with a copper cladding, that is uniform and continuous, creating a bi-metal conductor that acts as one and is corrosion resistant. The high break load allows only 1 conductor to be used in any tracer wire application while providing the perfect balance between break load, ductility, and decreasing brittleness. It is the best performing tracer wire on the market.

PRO-TRACE® HDD-CCS PE45 is protected with a 45 mil, high-density, high molecular weight polyethylene (HDPE) insulation. HDPE provides an excellent balance of surface smoothness, processing ease and electrical consistency. HDPE insulation provides superior strength against underground elements that help prevent accidental breaks caused by rocks in shifting soil conditions.

Specification Example

Tracer wire for directional boring installation shall be a 12 AWG solid, PRO-TRACE HDD-CCS PE45. Conductor shall be hard-drawn, 21% IACS, copper clad steel, utilizing a AISI 1065 high carbon steel core (required to meet break load), with rated break load of 1,330 lbs (260,000 psi). Conductor shall be extruded with a 45 mil, high-density, high molecular weight polyethylene (HMW-HDPE) pursuant to ASTM D1248 standard. Tracer wire shall be PRO-TRACE HDD-CCS PE45 as manufactured by **Pro-Line Safety Products** and made in the USA.

Specification Updated: 6.6.2012 17:18:00 CST

PRO-TRACE® is a registered trademark of Pro-Line Safety Products Co.

TABLE 1: CONDUCTOR (Physical, Mechanical and Electrical Properties)

PROPERTY	12 AWG	10 AWG	8 AWG
Conductor Type	HDD-CCS	HDD-CCS	HDD-CCS
Conductor Temper	Hard-Drawn	Hard-Drawn	Hard-Drawn
Steel Grade	AISI 1065	AISI 1065	AISI 1065
Copper Grade	UNS C10200	UNS C10200	UNS C10200
Rated Break Load	1,330 lbs	1,940 lbs	2,785 lbs
Rated Tensile Strength	260,000 psi	238,000 psi	215,000 psi
Minimum Elongation	1.0%	1.0%	1.0%
Copper Thickness (% of Diameter)	3.0%	3.0%	3.0%
Minimum Copper Weight (Per 1,000')	13.0%	13.0%	13.0%
Nominal DC Resistance	7.562 ohms	4.756 ohms	2.991 ohms

TABLE 2: INSULATION (Physical, Mechanical and Electrical Properties)

TEST DESCRIPTION	ASTM STANDARD	TYPICAL VALUES
Density @ 23°C	ASTM D792	0.945 g/cm ³
Melt Flow Rate	ASTM D1238	0.70 g/10 min
Tensile Strength	ASTM D638	3,400 psi
Tensile Strength Retention	ASTM D638	90% after 48 hours @ 100°C
Tensile Elongation	ASTM D638	500%
Tensile Elongation Retention	ASTM D638	90% after 48 hours @ 100°C
Environmental Stress Cracking	ASTM D1693	0 failures @ 48 hours
Thermal Stress Cracking	ASTM D2951	0 failures @ 96 hours
Brittleness Temperature	ASTM D746	-76° C
Melting Temperature	ASTM D3418	260°C
Oxidative Induction Time	ASTM D3895	170 min @ 200°C
Dielectric Constant	ASTM D1531	2.32 @ 1 MHz
Dissipation Factor	ASTM D1531	0.00006 @ 1 MHz
DC Volume Resistivity Test @ 23°C	ASTM D257	> 1 x 10 ¹⁵ ohm-cm

PRODUCT PART NO.	PRODUCT DESCRIPTION	RATED BREAK LOAD	RATED TENSILE STRENGTH	HDPE INSULATION THICKNESS	NOMINAL O.D.	APPROX. WEIGHT PER 1,000 FT		STANDARD PACKAGES
						COPPER WEIGHT	FINISHED WEIGHT	
WEIGHTS, MEASUREMENTS AND PACKAGING								
74642XXXX	12 SOL HDD-CCS PE45	1,330 lbs	260,000 psi	0.045"	0.171"	2.3007	27.00	500' / 1000' / 2500'
74643XXXX	10 SOL HDD-CCS PE45	1,940 lbs	238,000 psi	0.045"	0.192"	3.6592	40.00	500' / 1000' / 2500'
74644XXXX	8 SOL HDD-CCS PE45	2,785 lbs	215,000 psi	0.045"	0.219"	5.8189	58.00	500' / 1000' / 2500'

INSULATION COLOR & REEL SIZE			
COLOR	500' REEL	1000' REEL	2500' REEL
BLACK	0132	0141	0147
BLUE	0232	0241	0247
GREEN	0532	0541	0547
ORANGE	0632	0641	0647
PURPLE	0832	0841	0847
RED	0932	0941	0947
WHITE	1132	1141	1147
YELLOW	1232	1241	1247

SOME COLORS AND SIZES MAY BE SUBJECT TO MINS

REEL & PACKAGING INFORMATION					
SIZE	LENGTH	MATERIAL	REEL DIMENSION	ARBOR HOLE	PALLET QUANTITY
12 AWG	500	PLYWOOD (TREATED)	8" x 6"	1.625"	108,000 FT
	1000	PLYWOOD (TREATED)	12" x 6"	1.625"	112,000 FT
	2500	PLYWOOD (TREATED)	12" x 12"	1.625"	120,000 FT
10 AWG	500	PLYWOOD (TREATED)	8" x 9"	1.625"	72,000 FT
	1000	PLYWOOD (TREATED)	12" x 6"	1.625"	64,000 FT
	2500	PLYWOOD (TREATED)	16" x 10"	2.5"	67,500 FT
8 AWG	500	PLYWOOD (TREATED)	12" x 6"	1.625"	48,000 FT
	1000	PLYWOOD (TREATED)	12" x 9"	1.625"	48,000 FT
	2500	PLYWOOD (TREATED)	16" x 12"	2.5"	45,000 FT



Specification Updated: 6.6.2012 17:18:00 CST

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SAFETY PRODUCTS
A DIVISION OF PRO-PAK IND, INC.

PRO-LINE SAFETY PRODUCTS COMPANY
1099 ATLANTIC DRIVE, UNIT 1 • WEST CHICAGO, IL 60185
TOLL FREE: 800.554.3424



2 INCH CATHODIC TEST STATIONS

- The 15" ABS plastic box has a 2 $\frac{3}{8}$ " I.D. and is available in multiple upper tube styles for installation at grade level.
 - Made from SUPERIOR GRADE ABS plastic. It's long lasting and won't rust, rot or corrode.
 - "Adjustable to grade" test stations are available upon request.
 - Terminal blocks are secured in place beneath the lid. Wires are automatically pulled up when the lid is removed.
- 
- 0, 1, 2, or 5 terminals are available.
 - All terminals are made of solid brass.
 - Boxes are flared and squared to prevent pull-out, turning or settling.
 - Cast iron lids are marked "Test". Plastic lids are marked "Test Station" and include a metal reflector for locating.
 - One piece locking lids are standard. No parts to lose.
 - You may order custom lids for an additional charge.
 - A permanent "Real" magnet is in every box for easy location with electronic locator.
 - Terminal Jumpers are available upon request.
 - Test terminals can be incorporated with Handley valve boxes.
 - Underground installation protects the station from vandalism and is esthetically superior. However, above ground test stations are also available.
 - Test lids are available for marker posts. See marker post spec sheet to order.

Mesa Products, Inc.
4445 S. 74th E. Ave.
Tulsa, OK 74145 US
Phone:918-627-3188 • **Fax:**918-627-2676
E-Mail: sales@mesaproducts.com • **Web site:**www.mesaproducts.com

Item # AGRA-CTS, AGRA Condulet Test Station

QUOTE

Cathodic protection test stations require many arrangements. AGRA therefore offers sub-assemblies, so that each corrosion engineer may order only the components needed. All units are based on 3/4" rigid galvanized conduit. 1" units optional.

Complete assemblies include 40" x 3/4" rigid galvanized conduit with plastic end bushing. The test cover can accommodate up to 4 terminals.



HP High Potential Mag Anode



The sacrificial anode of choice is the high potential magnesium anode case of 'primary magnesium'. State of the art production techniques yield a higher open circuit voltage (driving) potential than conventional H-1 alloy anodes. These anodes produce potentials of 1.75 Volts with a "certified" minimum current efficiency of 50%, allowing protection levels to be achieved using fewer anodes. As a result you have a higher current output anode making it ideal for use in higher resistivity soils, while also performing very well in lower resistance environments. High Potential Anodes are cast to meet ASTM B843, Alloy M1C.

Product Chemistry and Testing

The anodes meet or exceed the chemistry industry standard for high potential anodes. The chemistry is per ASTM B843 Industry Standard for high potential anodes-Alloy M1C.

Casting parameters are continuously checked to control production variables. Anodes are individually weighed to ensure they meet weight requirements. They are physically inspected for excessive shrink cavities, core security, and general physical appearance to ensure highest quality.

Each production run is tested as per ASTM specification G97 Standard Test Method for Laboratory Evaluation of Magnesium Sacrificial Anode Test Specimens for Underground Applications. This tests the anodes for voltage potential and current efficiency performance. Often times the importance of current efficiency is overlooked when evaluating magnesium anodes. Current efficiency is the percent of metal consumed in producing useful cathodic protection to the total metal consumed. Because anodes must be installed in a corrosive environment to produce useful amount of current, the environment also promotes self-corrosion of the anode material. Electrical currents produced by self-corrosion cannot be used to advantage; the higher the percent of current efficiency, the better the anode, which also translates into longer life. A quality high potential magnesium anode should have a minimum current efficiency of 50%.

MESA Manufacturing Process

Each bare cast anode is closely examined for shrinkage voids, core centering and length, and weight conformity. Any inconsistency results in rejection. A coiled lead wire of #12 TW insulated solid copper is silver soldered (45% silver) to the galvanized steel core. Standard wire length is 10 feet long. The 45% silver in the solder is critical to ensuring a 'stronger than the wire itself' connection. The core cavity is filled with electrical sealing compound to assure a fully insulated and protected connection. Bare anodes are centered in cotton bags, then surrounded with a backfill mixture consisting of 75% hydrated gypsum, 20% bentonite, and 5% sodium sulfate. This backfill lowers the anode to earth resistance, draws moisture to the anode for best performance, and creates a uniform environment for the anode to

consume itself evenly. The packaged anodes are then inserted into multi wall paper sacks, palletized, and film wrapped for shipping.

Chemical Composition

Element	Content %
Aluminum	0.01% Max
Manganese	0.50 - 1.3%
Silicon	0.05% Max
Copper	0.02% Max
Nickel	0.001% Max
Iron	0.03% Max
Others Each	0.05% Max
Magnesium	Remainder

Sizes Available

Anode Type	Bare Weight	Packaged Weight	Shipping Package	Bare			Packaged	
				W	H	L	D	OL
1R8	1	5	6 per box	1-3/4"	1-3/4"	8"	3-1/4"	9"
3D3	3	8	5 per box	3-1/2"	3-3/4"	5"	6"	10"
5D3	5	17	5 per box	3-1/2"	3-3/4"	8-1/2"	6"	12"
9D2	9	35	2 per box	2-3/4"	3"	27"	5-1/2"	32"
9D3	9	27	2 per bag	3-1/2"	3-3/4"	14"	6"	17"
17D2	17	60	1 per bag	2-3/4"	2-3/4"	50-1/4"	6	55"
17D3	17	45	1 per bag	3-1/2"	4"	25-3/4"	6-1/2"	29"
20D2	20	70	1 per bag	2-3/4"	3-3/4"	59-3/4"	5"	66"
32D3	32	91	1 per bag	3-1/2"	3-3/4"	45-1/4"	6-1/2"	53"
32D5	32	70	1 per bag	5-1/2"	5"	20-1/2"	8"	28"
40D3	40	96	1 per bag	3-1/2"	3-3/4"	59-3/4"	6-1/2"	66"
48D5	48	100	1 per bag	5-1/2"	5-3/4"	31"	8"	38"
60S4	60	125	1 per bag	4"	4"	60"	7"	64"

PRO-TRACE® TW CONNECTOR (PATENT #7335050)

Silicone Filled Tracer Wire Connector • Made from Polycarbonate • Impact and Crush Resistant • Water and Corrosion Proof
Moisture, Chemical, and Oil Resistant • Connector for use in Damp, Wet and Submersible Locations
300 Volts Max • RoHS Compliant • Direct Burial Rated

“PRO-TRACE® TW CONNECTOR -- CONFIDENCE & RELIABILITY -- IT'S FOOL PROOF INSTALLATION”



Applications and Information

- **PRO-TRACE® TW Connector** is used for underground splices or connections for tracer wire and other applications not exceeding 300 Volts. The silicone filled connector is used to splice or branch-off multiple tracer wires to maintain continuity and provides corrosion proof protection from the underground elements.
- **PRO-TRACE® TW Connector** is superior to twist-on connectors, providing better strain relief and performance along with easier installation. They are fool proof, minimizing damage and error during installation and while in service.
- **PRO-TRACE® TW Connector** is a patented technology that uses applied hand pressure to close and lock in the connections with ease and is superior to wire nuts (twist-on). With wire nuts, wires are inserted and torqued until tight. If too much torque is applied the threading inside can become “stripped”. If too little torque is applied the wires may become loose.
- **PRO-TRACE® TW Connector** is the best connector in the market specifically designed for tracer wire with a strain relief considerably stronger than DryConn or 3M Connectors.
- **PRO-TRACE® TW Connector** is designed to work with copper, copper-clad steel (CCS), and stainless steel. See table 4 for wire combinations.

Standards and References

PRO-TRACE® TW Connector meets or exceeds all applicable UL standards, and requirements of the National Electrical Code.

- Sealed Wire Connection System for use in Damp, Wet, Raintight, Watertight, Submersible and Direct Bury Locations

Construction

PRO-TRACE® TW Connector is injection molded from polycarbonate that has outstanding temperature and high-impact resistance. It is superior to breaking and cracking. The outer housing is clear in color and provides visual confidence with each installation. The rotating handle is color coded to meet the APWA color code. The inner housing features a locking mechanism made from zinc and uses applied hand pressure that securely closes and locks the wire inside with ease. A corrosion proof silicone sealant fills the inner housing and provides longevity for each installation.

Specification Example

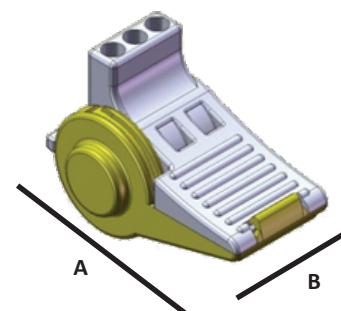
Tracer wire shall be a 12 AWG solid, PRO-TRACE® HF-CCS PE30. Tracer wire shall consist of a dead soft annealed, 21% IACS conductivity, copper clad steel conductor with a minimum break load of 282 lbf (55,000 psi) to ensure flexibility and strength. Conductor shall be extruded with a 30 mil, high density polyethylene insulation, and blue in color to meet the APWA color code of the buried utility line. Tracer wire shall be rated for direct burial use at 30 volts and RoHS compliant. Tracer wire shall be PRO-TRACE® HF-CCS PE30 as manufactured by Pro-Line Safety Products and made in the USA. If tracer wire connectors are necessary, contractor shall use a PRO-TRACE® TW Connector (Part No: 73901) rated for direct burial use filled with silicone sealant to prevent corrosion at connection points.

TABLE 1: WIRE COMBINATIONS (Conductor and Insulation Type Compatibility)

CONDUCTOR TYPES							INSULATION TYPES		
SIZE	COPPER SD/MHD/HD	HF-CCS PRO-TRACE®	HS-CCS PRO-TRACE®	HD-CCS PRO-TRACE®	HDD-CCS PRO-TRACE®	STAINLESS TYPE 304	PVC/NYLON	PVC	LDPE, HDPE, XLPE
14 AWG	1-3 WIRES	1-3 WIRES	1-3 WIRES	-----	-----	-----	THHN or THWN	TW, UF, THW, TWU	PE30, PE45, XHHW-2, USE-2
12 AWG	1-3 WIRES	1-3 WIRES	1-3 WIRES	NO	1-3 WIRES	1-3 WIRES	THHN or THWN	TW, UF, THW, TWU	PE30, PE45, XHHW-2, USE-2
10 AWG	1-3 WIRES	NO	NO	NO	1-3 WIRES	1-3 WIRES	THHN or THWN	TW, UF, THW, TWU	PE30, PE45, XHHW-2, USE-2

TABLE 2: CONNECTOR (Physical and Electrical Properties)

MEASUREMENTS	TYPICAL VALUES
Connector Size	2.375" (A) x 1.375" (B)
Maximum Voltage	300 Volts
Wire Range	Min #14 / Max #10 (See Table 1)
Temperature Rating	105°C (221°F)
Silicone Sealant Temperature	-40°F to 400°F



PRODUCT PART NO.	PRODUCT DESCRIPTION	PACKAGING		APPROX WEIGHT PER 100	STOCK
		INNER CARTON	MASTER CARTON		
WEIGHTS, MEASUREMENTS AND PACKAGING					
739010250	PRO-TRACE TW CONNECTOR MIN #14 MAX #10 300V BLUE	100/Inner	600/Master	9.862 lbs	YES
739011250	PRO-TRACE TW CONNECTOR MIN #14 MAX #10 300V YELLOW	100/Inner	600/Master	9.862 lbs	YES
***** ADDITIONAL COLORS AVAILABLE WITH MIN RUN CALL FOR DETAILS *****					

Installation Instructions

STEP #1



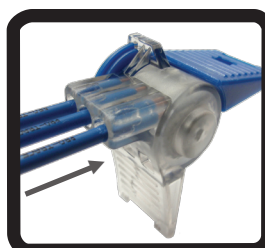
Open wings (handles) to 90 degrees position

STEP #2



Strip wires to 5/8". Use the strip guide molded into the connector for reference.

STEP #3



Insert striped wires into connector. The striped ends of the wires should be visible through the clear housing on the back.

STEP #4



Hold wires in place while squeezing wings (handles) together until the latch snaps shut.



Specification Dated: 10.21.2010 09:20:40 CST

PRO-LINE
SAFETY PRODUCTS
A DIVISION OF PRO-PAK IND, INC.

PRO-LINE SAFETY PRODUCTS COMPANY
1099 ATLANTIC DRIVE, UNIT 1 • WEST CHICAGO, IL 60185
TOLL FREE: 800.554.3424

PATENT #7335050

PRO-TRACE® TW CONNECTOR