WESTMINSTER COMPANY
EXTERIOR SEWER

UNACCOMPANIED ENLISTED PERSONNEL HOUSING
MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA
N62470-82-C-2244

CATALOG DATA

"It is hereby certified that the (material) (equipment) shown and marked in this submittal, shop drawings, catalog cut(s), etc., and approved/proposed to be incorporated into Contract Number N62470-82-C-2244, is in compliance with the contract drawings and specifications, and can be installed in the allocated space, and is ✓ approved for use ____ submitted for Government approval.

Authorized Reviewer [signature] Date 4/26/84

Signature CQC Rep J.C. McComber Date 4/27/84

J-M PIPE

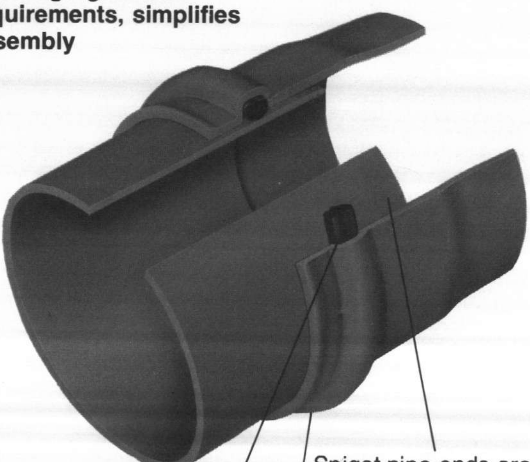
Ring-Tite® PVC Gravity Sewer Pipe and Fittings

FERGUSON ENTERPRISES, INC.
136 Center St. (24 Road)
Jacksonville, N. C. 28540
Phone (919) 353-9088

Reviewed ✓
Checked ✓
Certified
By James Gorman
So-Par Utilities Co., Inc.
Date 3/23/84

Ring-Tite PVC Gravity Sewer Pipe And Fittings

Ring-Tite joint meets exacting tightness requirements, simplifies assembly



"Locked-in" rubber sealing ring provides tight, flexible seal. Meets requirements of ASTM D-3212 — "Joints for Drain and Sewer Pipes using Flexible Elastomeric Seals."

Spigot pipe ends are supplied from factory with bevels.

The bell is an integral part of the pipe section with the same strength.

Figure 1

Meets ASTM D3034-SDR 35

Introduction

The growing demand for an effective all-out attack on water pollution highlights the need for improved sanitary sewage collection systems. A modern system needs pipe with improved design for reserve strength and stiffness to increase load-bearing capacity – all within the framework of maximizing sewer system capacity at reasonable cost. Ring-Tite PVC sewer pipe is designed to meet this need.

Applications

J-M PVC sewer pipe is suitable for conveying domestic sanitary sewage as well as certain industrial wastes. For further information regarding the suitability of PVC for conveying various chemicals, contact your J-M pipe representative.

Advantages

1. Chemical Resistant:
J-M Ring-Tite PVC sewer pipe is unaffected by the fluids found in ordinary domestic sewage. It is immune to sewer gases and the sulfuric acid generated by the completion of the hydrogen sulfide cycle. It is immune to corrosive soils — both alkaline or acidic.

2. Abrasion Resistant:
J-M Ring-Tite PVC sewer pipe has excellent resistance to abrasion, gouging and scoring — superior to that of most common piping materials.

3. Flow Characteristics:
J-M Ring-Tite PVC sewer pipe with long lengths, smooth interior, and factory-made close tolerance joints provides a Manning "n" coefficient of .009. High-carrying capacity makes possible the use of flatter grades or smaller diameter pipe. Ask your J-M sales representative for a flow nomograph and the report "Hydraulic Characteristics of PVC Sewer Pipe in Sanitary Sewers," a joint study by Johns-Manville and Utah State University.

Through research and technology we proudly offer "locked-in" rubber ring PVC sewer pipe. This factory-made joint eliminates the need to insert rings in the field. Joint design and close manufacturing tolerances allow this joint to pass a 25 psi hydrostatic test in the laboratory and provides the basis for exacting infiltration/exfiltration specifications. Be secure in the future by designing with J-M Ring-Tite PVC sewer pipe with low infiltration – specify infiltration not to exceed 50 gallons/inch diameter/mile/day.

Call for ASTM D-3034 SDR35 with 20% More Wall Thickness in 8, 10, 12 and 15-inch sizes — Provides Greater External Load-Carrying Capacity. This allows for the design and construction of PVC gravity sewer systems (4″-15″) consistent with best engineering practices. A uniform minimum "pipe stiffness," ($F/\Delta y$ = 46 psi) means no weak links. It also means that J-M PVC sewer pipe in 8, 10, 12 & 15″ diameters has 60 to 75 percent greater pipe stiffness than SDR 42 and SDR 41 PVC sewer pipe. This increased "pipe stiffness" provides the extra needed at that critical time when the pipe is first being installed in the trench and undergoing bedding and backfill.

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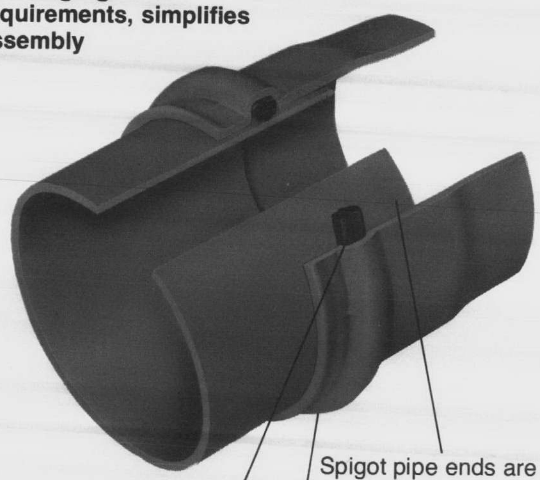

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External Loads

Background

Loads imposed on buried conduits have, in past practice, been calculated by using the Marston load formula. For trench loads Marston has a formula for rigid pipe and another formula for flexible pipe. It is important to recognize that under identical conditions of bury the soil load generated on a flexible conduit is less than the load generated on a rigid conduit. The comparitive load on a rigid conduit verses the load on a flexible conduit is expressed as the ratio of trench width to the flexible pipe O.D.

By definition, a flexible conduit is one which will deflect before reaching failure.

Marston's Formulas for Soil Loads

Rigid Pipe $W = C_d\ w\ B_d^2$
Flexible Pipe $W = C_d\ w\ B_c\ B_d$

Where:
W = Load on pipe (lb/lin. ft.)
C_d = Load Coefficient
w = Soil unit weight (lb/Ft³
B_d = Ditch width (ft.)
B_c = O.D. of pipe (ft.)

Prism Load

Loads imposed on buried conduits have been calculated by using the Marston load formulas for rigid and flexible pipe. However, it has been determined that the Marston formula for flexible pipe may not determine the maximum long term load – the "Prism Load" formula is more accurate. The "Prism Load" is the weight of the column of soil directly above the pipe. Thus, precautions in keeping the trench narrow are unnecessary for a flexible pipe installation. The important thing is to compact the haunching material from the pipe out to the undisturbed trench walls. Therefore, J-M suggests that the maximum long term load be determined by the prism load for design.

Prism Load: $P_v = wH$ (lbs/ft²)

Where:
P_v = Pressure at the top of the pipe due to the weight of the soil (lb/ft²)
w = Soil unit weight—(lb/ft³)
H = Depth from top of pipe to top of ground (ft.)

Note: To convert prism load (lb./ft.²) to lb./linear ft., multiply by the O.D. of the pipe in feet, or:
$W = wHB_c$

Live Loads

Live loads imposed on buried conduits from traffic must also be considered in a design and become more important at shallow depths. The combination of soil load and live load must be added together to design for the maximum load as shown in curves above.

The soil load and live load must be added to determine the total external load on a buried conduit. This combined load should be used for design. Figure 2 illustrates the magnitude of soil and live loads separately and also charts the magnitude of the combined or total loads. The curves in figure 2 apply only for H20 highway loading and a soil weight of 120 lbs./cu. ft.

At shallow depths of cover — 3 feet and less, flexible conduits can deflect and rebound under dynamic loading conditions if the trench width is not sufficiency bridged. Unless special precautions are taken to bridge the trench in shallow installations, the breaking up of flexible road surfaces may result. Therefore, for shallow installations under flexible road surfaces (less than 3 feet), J-M recommends Class 1* material be used in the pipe zone and **up** to the road elevation. This recommendation is not meant to conflict with the design engineer's specifications and his specifications will govern.

*see page 6 for definition of Class 1.

H20 Highway Load

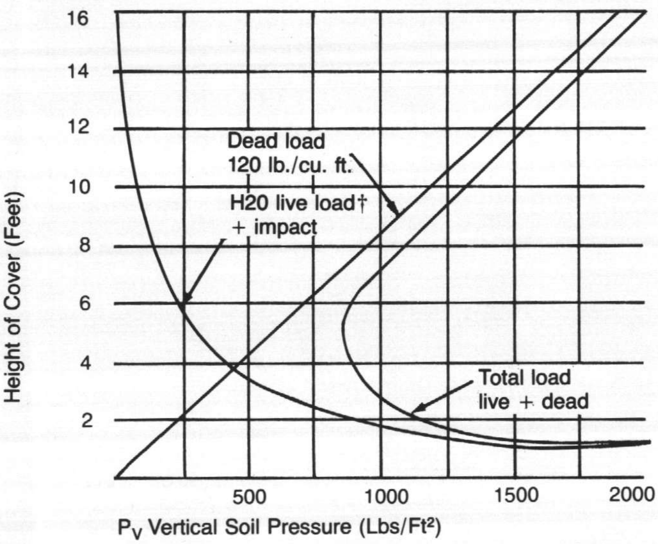
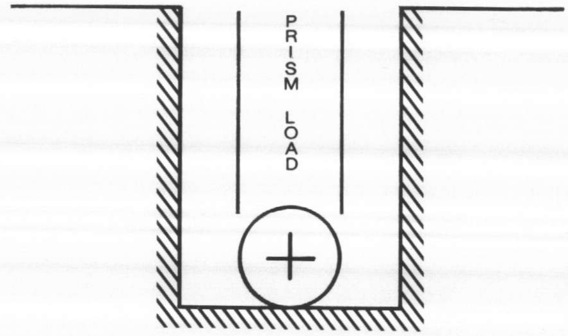


Figure 2

Note: To convert vertical soil pressure to load on pipe—pounds per lineal foot—multiply by O.D. of pipe in ft.

†Live load applied on assumed area of 36″ x 40″.

Prism Loads on Flexible PVC Sewer Pipe (lb./lin. ft.)



Height of Cover Feet	Soil Wt. lb/ft³	4	6	8	10	12	15
3	100	105	157	210	263	313	383
	110	116	173	231	289	343	421
	120	126	188	252	315	375	459
	130	137	204	273	341	406	497
4	100	141	209	280	350	417	510
	110	155	230	308	385	458	561
	120	169	251	336	420	500	612
	130	183	272	364	455	542	663
5	100	176	262	350	438	521	638
	110	193	288	385	481	573	701
	120	211	314	420	525	625	765
	130	228	340	455	569	677	829
6	100	211	314	420	525	625	765
	110	232	345	462	578	688	842
	120	253	377	504	630	750	918
	130	274	408	546	683	813	995
7	100	246	366	490	613	729	893
	110	271	403	539	674	802	982
	120	295	439	588	735	875	1,071
	130	319	476	637	796	948	1,160
8	100	281	418	560	700	834	1,020
	110	309	460	616	770	917	1,122
	120	337	502	672	840	1,000	1,224
	130	365	544	728	910	1,084	1,326
9	100	316	471	630	788	938	1,148
	110	348	518	693	866	1,032	1,262
	120	379	565	756	945	1,125	1,377
	130	411	612	819	1,024	1,219	1,492
10	100	351	523	700	875	1,042	1,275
	110	387	575	770	963	1,146	1,403
	120	421	628	840	1,050	1,250	1,530
	130	456	680	910	1,138	1,355	1,658
11	100	386	575	770	963	1,146	1,403
	110	425	633	847	1,059	1,261	1,543
	120	463	690	924	1,155	1,375	1,683
	130	502	748	1,001	1,251	1,490	1,823
12	100	421	628	840	1,050	1,251	1,530
	110	464	690	924	1,155	1,375	1,683
	120	505	753	1,008	1,260	1,500	1,836
	130	548	816	1,092	1,365	1,626	1,989
13	100	456	680	910	1,138	1,355	1,658
	110	503	748	1,001	1,251	1,490	1,823
	120	548	816	1,092	1,365	1,626	1,989
	130	593	884	1,183	1,479	1,761	2,155
14	100	491	732	980	1,225	1,459	1,785
	110	541	805	1,078	1,348	1,605	1,964
	120	590	879	1,176	1,470	1,751	2,142
	130	639	952	1,274	1,593	1,896	2,321

Height of Cover Feet	Soil Wt. lb/ft³	4	6	8	10	12	15
15	100	527	785	1,050	1,313	1,563	1,913
	110	580	863	1,155	1,444	1,719	2,104
	120	632	941	1,260	1,575	1,876	2,295
	130	684	1,020	1,365	1,706	2,032	2,486
16	100	562	837	1,120	1,400	1,667	2,040
	110	618	920	1,232	1,540	1,834	2,244
	120	674	1,004	1,344	1,680	2,001	2,448
	130	730	1,088	1,456	1,820	2,167	2,652
17	100	597	889	1,190	1,488	1,771	2,168
	110	657	978	1,309	1,636	1,949	2,384
	120	716	1,067	1,428	1,785	2,126	2,601
	130	776	1,156	1,547	1,934	2,303	2,818
18	100	632	941	1,260	1,575	1,876	2,295
	110	696	1,035	1,386	1,733	2,063	2,525
	120	758	1,130	1,512	1,890	2,251	2,754
	130	821	1,224	1,638	2,048	2,438	2,984
19	100	667	994	1,330	1,663	1,980	2,423
	110	734	1,093	1,463	1,829	2,178	2,665
	120	800	1,192	1,596	1,995	2,376	2,907
	130	867	1,292	1,729	2,161	2,574	3,149
20	100	702	1,046	1,400	1,750	2,084	2,550
	110	773	1,150	1,540	1,925	2,292	2,805
	120	842	1,255	1,680	2,100	2,501	3,060
	130	913	1,360	1,820	2,275	2,709	3,315
21	100	737	1,098	1,470	1,838	2,188	2,678
	110	812	1,208	1,617	2,021	2,407	2,945
	120	885	1,318	1,764	2,205	2,626	3,213
	130	958	1,428	1,911	2,389	2,845	3,481
22	100	772	1,151	1,540	1,925	2,292	2,805
	110	850	1,265	1,694	2,117	2,522	3,086
	120	927	1,381	1,848	2,310	2,751	3,366
	130	1,004	1,496	2,002	2,503	2,980	3,647
23	100	807	1,203	1,610	2,013	2,397	2,933
	110	889	1,323	1,771	2,214	2,636	3,226
	120	969	1,444	1,932	2,415	2,876	3,519
	130	1,049	1,564	2,093	2,616	3,116	3,812
24	100	842	1,255	1,680	2,100	2,501	3,060
	110	927	1,381	1,848	2,310	2,751	3,366
	120	1,011	1,506	2,016	2,520	3,001	3,672
	130	1,095	1,632	2,184	2,730	3,251	3,978
25	100	878	1,308	1,750	2,187	2,605	3,188
	110	966	1,438	1,925	2,406	2,866	3,506
	120	1,053	1,569	2,100	2,625	3,126	3,825
	130	1,141	1,700	2,275	2,844	3,387	4,144

Pipe Diameter (Inches)

Table 1

Pipe Deflection

Deflection is defined as the change in vertical inside diameter of a flexible conduit when subjected to a vertical load. The amount of deflection that will occur in any flexible conduit is a function of three factors:

1. Pipe Stiffness ($F/\Delta y$)
2. Soil Stiffness
3. Load on the pipe

It is important to recognize that flexible conduits perform differently in the ground than they do under laboratory flat plate loading. The interaction of pipe stiffness and soil stiffness combine to give flexible conduits a high effective strength when buried.

Methods for Predicting Pipe Deflection

The most commonly used approach in predicting deflection has been the modified "Iowa Deflection Formula."

Modified Iowa Formula:

$$\Delta y = \frac{D_L K w r^3}{EI + .061 E' r^3}$$

Where:

Δy = vertical deflection (Inches)
D_L = lag factor (1.5 maximum)
K = bedding factor
w = earth load (lb/in.)
r = mean radius (in.) $\left(\frac{OD-t}{2}\right)$
E = modulus of elasticity (lb/in^2)
I = moment of intertia $t^3/12$(in^3)
E' = soil stiffness (lb/in^2)

Although considered a conservative approach, considerable variation in predicted deflection will result depending upon the choice of empirical constants E', K and D_L.

Empirical methods of predicting deflection have evolved in recent years which eliminate the guesswork inherent in the Iowa method. When design is based on actual laboratory test and previous field measurements it is unnecessary to know the actual load acting on the pipe or the soil stiffness. Thus an installation can be designed with a known factor of safety provided enough empirical data is available.

To accommodate the problem of having to establish data for the number of trench widths that are found in the field, the prism load was chosen because it represents the maximum loading condition on a flexible pipe. Time lag to account for future settlement of the backfill can be included by choosing long-term values of deflection.

J-M has developed through laboratory tests and actual field data the maximum long term deflection chart, Figure 3, shown on page 6. This chart eliminates the guesswork in predicting deflection and gives the design engineer a quick ready reference. This chart is for PVC SDR 35 Sewer pipe only. The values given for deflection limits are the ultimate long term deflection that will occur in a particular soil class having a given density (compaction) in the haunching area of the pipe zone for various heights of cover (feet).

Use of Maximum Long Term Deflection Chart

1. Where live loads are not a factor or not involved in the total external load on the pipe, the chart can be used directly to determine the limit of the maximum long-term deflection of the PVC pipe.

Example: If an 8″ PVC SDR 35 Sewer Pipe is installed in Class IV material, having 85% compaction in the pipe zone and with 12 feet of cover, what will be the maximum long term deflection limit?

Answer: Pipe will never deflect more than 5% (color code — dark green).

2. Where live loads must be considered, determine, first, the combined total external load on the pipe. Next determine the equivalent prism load (without live load) for the particular pipe size involved using the table of prism loads, Table 1. Read across to the left for the height of cover (ft.) for the equivalent prism load. Using this height of cover with the bedding class and proctor density, enter the maximum long term deflection chart, Figure 3, to determine the maximum long term deflection limit.

Example: If a 12″ PVC SDR 35 Sewer Pipe is installed in Class III material, having 65% compaction in the pipe zone, with 3 feet of cover, and 120 lbs./ft^3 soil, and H-20 (highway load) live load are imposed on the buried pipe, what will be the maximum long term deflection limit?

Answer: 1. The combined (dead and live) load on the pipe will be approximately 1000 lbs./ft^2 or 1000 x 1 ft. (pipe diameter in feet) = 1000 lbs./lin ft. (per Figure 2). Enter table of prism loads (Table 1) under column 12 — Pipe Diameter (inches) — and read down until nearest figure to 1000 is reached, across from soil wt. of 120 lbs./ft.^{3}. In this case, 1000 appears opposite 120 lbs./ft.^{3}. and 8 ft. — height of cover. This represents the equivalent prism load for the combined (dead and live) load given above. Now enter maximum long term deflection chart and read the maximum long term deflection color code for Class III bedding classification, 65% density, and 8 ft. of cover. Dark green — maximum long term deflection will not exceed 5%.

In working with these charts, it becomes apparent that:

1. Soil density in the pipe zone plays a greater role than soil type in the control of deflection in buried flexible conduits.

2. The amount of deflection is independent of pipe size, providing all pipe sizes are SDR 35. Note pipe size does not appear in the chart for maximum long term deflections.

Maximum Long-Term Deflections of PVC (SDR 35) Pipe (Percent)

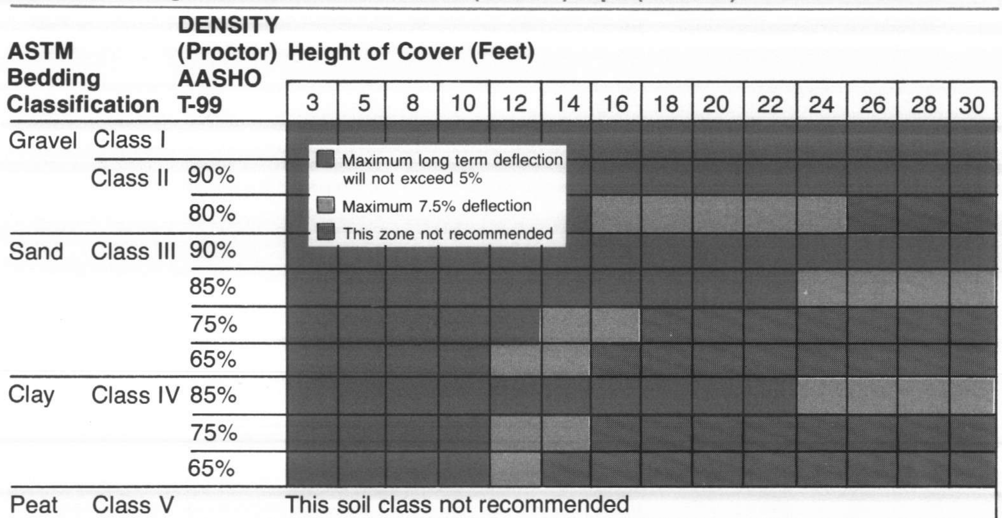


Figure 3

Note: Deflection values shown do not include effect of live load or longitudinal bending.

1. No length of pipe installed under conditions specified will deflect more than is indicated; the pipe will deflect less than the amount indicated if specified density is obtained.
2. External loading based upon soil weight of 120 lbs. per cubic foot.
3. Deflections predicted are based upon pipe which was initially circular prior to installation. Actual deflections may differ because of initial out of roundness caused by storage and/or handling. These variations should be taken into account when measured deflections are compared with those in the table.
4. Bedding classifications are as indicated on page 7 and correspond to ASTM D2321.
5. Deflections listed in table are maximum long term values. The suggested maximum long term value is 7.5 percent which is approximately equal to a 5 percent initial deflection.
6. Initial deflection is deflection taken within the 1st 24 hours after trench is backfilled.

Pipe Zone Terminology

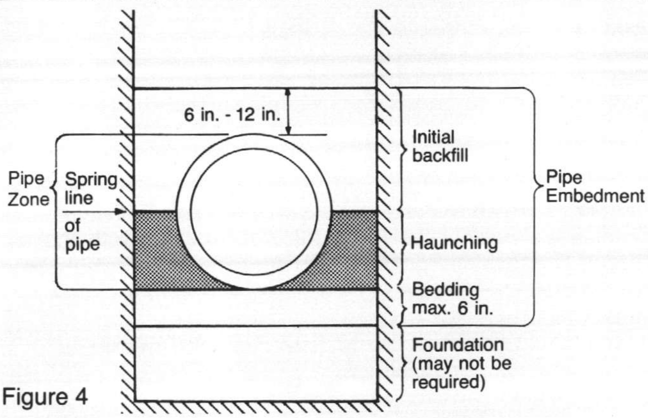


Figure 4

Foundation preparation is only required when the trench bottom is unstable. Any foundation that will support a rigid pipe without causing loss of grade or flexural breaking of pipe will be more than adequate for PVC pipes.

Bedding. The bedding directly underneath the pipe is required only to bring the trench bottom up to grade. It should not be so thick or soft that the pipe will settle and lose grade. The purpose of the bedding is to provide uniform longitudinal support of the pipe.

Haunching. The haunching area is the most important in terms of limiting the deflection of a flexible pipe. This is the area that should be compacted to the proctor densities shown in chart on page 6.

Initial Backfill. Initial backfill begins above the springline of the pipe to a plane 6 inches to 12 inches above the pipe. Compacting soils to levels above the springline gives little additional side support.

Most of the support is accomplished by compacting the soil surrounding the lower half of the pipe.

Caution: If hydro-hammers are used to prepare the bedding and backfill for the road surface, they should not be used within 3 feet of the top of the pipe and then only if the pipe zone soil density has been previously compacted to a minimum 85% standard proctor density.

Pipe Zone Materials
Pipe zone materials include the material in the haunching area and the initial backfill (see figure 4). They include a number of processed materials plus the soil types listed under USCS Soil Classification System (FHA Bulletin No. 373). These materials are grouped into five broad categories according to their suitability for this application, as follows:

Class I. Angular, ¼″ to 1½″ graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone and crushed shells.

Class II. Coarse sands and gravels with maximum particle size of 1½ inch, including variously graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. Soil type GW, GP, SW and SP are included in this class.

Class III. Fine sand and clayey gravels, including fine sands, sand-clay mixtures, and gravel-clay mixtures. Soil types GM, GC and SM and SC are included in this class.

Class IV. Silt, silty clays, and clays, including inorganic clays and silts of medium to high plasticity and liquid limits. Soil types MH, ML, CH and CL are included in this class.

Class V. These materials are not recommended for bedding, haunching or initial backfill.

Key to Pipe Performance
The performance of a flexible conduit does not depend only on the Class of embedment materials used, but more importantly, on the density of the material in the haunching zone. The chart on page 6 shows that SDR 35 PVC sewer pipe will perform in Class III material equally as well as a Class I material with adequate compaction. By utilizing a combination of soil Class and soil density, the design engineer can achieve the most economical installation within recommended deflection limits.

Excavation and Pipe Laying. As with other pipes, the trench for PVC is excavated with bell holes to give uniform bearing along the full length of each pipe section. The ditch should be wide enough to allow for proper placement and compaction of the selected materials in the haunching area.

Sheeting. If soil conditions or regulations require the use of sheeting or boxes, they should be used in a manner as not to disturb the embedment material within two pipe diameters on each side of the pipe.

Compaction Techniques.
Flooding or jetting are commonly used methods for obtaining desired densities of granular embedment materials. If flooding is used, the embedment materials should be allowed to dry **below** optimum moisture before final backfill operations are begun. If jetting is used, desired density of the embedment

Installation

materials should be previously obtained by other methods. Neither flooding or jetting should be used if the possibility of washing away side support exists.

Permissable Horizontal Curvature. When curved sewers are installed J-M Ring-Tite PVC gravity sewer pipe can be safely deflected to the limits shown in table 2. Should design or field conditions dictate tighter radii, 5° deflection sweeps should be used.

Deflection Testing — When Is It Needed?
J-M's position on deflection testing is that routine measurement of deflection of installed PVC Sewer pipe (SDR 35), with minimum pipe stiffness of 46 psi, is totally unnecessary and uneconomical – a superfluous added construction cost for PVC Sewer pipe installations. This position applies to all routine deflection testing whether performed by the "Go-No Go Gauge" method for compliance to maximum deflection limits or by instruments which measure and record actual pipe deflections. When recommended installation practices are followed, including required compaction in the haunching area, pipe deflection will not exceed our recommended long term deflection limit of 7.5%. At this deflection limit, the PVC Sewer pipe will have a minimum factor of safety of 4 in deflection failure. Proof of this position is that more than 150,000,000 ft. of PVC Sewer Pipe are performing satisfactorily in the field today.

On the other hand, where improper installation practices are known or suspected, questionable bedding materials are employed and/or installation conditions are severe, deflection testing of these sections of the sewer pipe installation should be considered advisable by the engineer.

Nominal Size Inches	Min. Radius Feet	Force Req. to Bend—Lbs. At End of 20′ Length	12½′ Length
4	150	6	10
5	150	20	33
8	200	48	78
10	250	95	152
12	300	160	255
15	350	293	468

Liner Offset at Minimum Radii

Nominal Size Inches	20′ Length	12½′ Length
4	24.0 Inches	9.3 Inches
6	15.9	6.3
8	11.9	4.7
10	9.6	3.8
12	8.0	3.1
15	N/A	2.7

Table 2

Fittings and Adaptors

J-M offers a complete line of PVC sewer fittings to be used with PVC Ring-Tite sewer pipe. These fittings offer the same "locked-in" rubber ring feature which eliminates the need for ring insertion in the field.

Rubber gasketed tee and wye saddles are available for field service line taps into previously installed PVC sewer lines, which eliminate the need for field solvent welding. Through the large network of J-M distributors, adaptors are available to connect J-M Ring-Tite PVC sewer pipe to other pipe materials.

The fitting illustrations below are representative only of the types of fittings and adaptors available. Actual configurations or design of fittings may vary with size or manufacturing origin of the fitting. Ask your J-M Sales Representative for more detailed information.

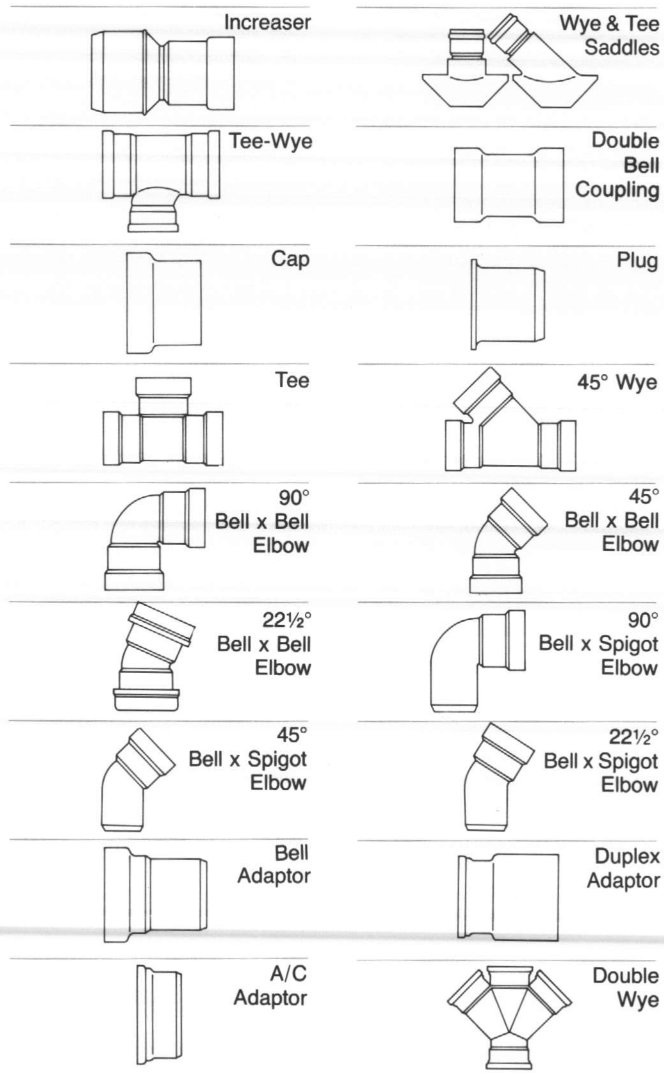


Figure 5

Adaptors for Connecting Various Pipes

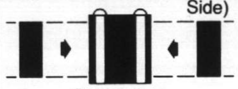
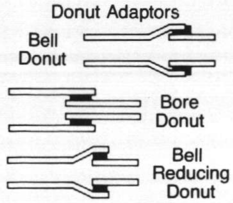
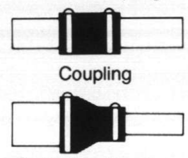
To Connect: 4″ (O.D. = 4.215) and 6″ (O.D. = 6.275) PVC Sewer Pipe to	Joints Inc.  Bushing	Joints Inc. Calder Cpg.	Joints Inc. Bushing (PVC Side)	Fernco, Inc. Donut Adaptors  Bell Donut, Bore Donut, Bell Reducing Donut	Fernco, Inc. Flexible Couplings  Coupling, Reducing Coupling	J-M Pipeline Accessories
1. Transite Machined End	A	AC	D	6″ to 4″ PVC—Bore Red. Donut 6″ to 6″ PVC—N/A	N/A	
2. Transite Plain End	None	AC	D	6″ to 4″ PVC—Bore Red. Donut 6″ to 6″ PVC—N/A	6″ to 6″ PVC—1051-66 6″ to 4″ PVC—1051-64 4″ to 4″ PVC—1051-44	
3. Transite Coupling		N/A		6″ to 6″ PVC—A/C Coup. Donut 6″ to 4″ PVC—N/A	N/A	A-C Adaptor
4. Clay Bell		N/A		6″ to 6″ PVC—Bell Donut 6″ to 4″ PVC—Bell Reducing	N/A	
5. Clay Plain End	None	Clay	J	6″ to 4″ PVC—Bore Donut 6″ to 6″ PVC—N/A	6″ to 6″ PVC—1002-66 6″ to 4″ PVC—1002-64 4″ to 4″ PVC—1002-44	
6. Concrete Bell (C-14)		N/A		6″ to 6″ PVC—Bell Donut 6″ to 4″ PVC—Bell Reducing	N/A	
7. Concrete Plain End (C-14)	None	Clay	J	6″ to 4″ PVC—Bore Donut 6″ to 6″ PVC—N/A	6″ to 6″ PVC—1006.66 6″ to 4″ PVC—N/A 4″ to 4″ PVC—1006-44	
8. Cast Iron Plain End (SW)	None	CIT	None	N/A	6″ to 6″ PVC—1056-66 6″ to 4″ PVC—1056-64 4″ to 4″ PVC—1056-44	4″ PAC Duplex Adaptor with .55 Ring
9. Cast Iron Plain End (XH)	None	CIT	None	N/A	6″ to 6″ PVC—1056-66 6″ to 4″ PVC—1056-64 4″ to 4″ PVC—1056-44	4″ PAC Duplex Adaptor with .375 Ring
10. Cast Iron Hub		N/A		6″ to 6″ PVC—C.I. Hub Donut 6″ to 4″ PVC—C.I. Hub Reducing Donut 4″ to 4″ PVC—C.I. Hub Donut	N/A	
11. PVC, ABS DWV	None	CIT	None	N/A	6″ to 6″ PVC—1056-66 6″ to 4″ PVC—1056-64 4″ to 4″ PVC—1056-44	4″ PAC Duplex Adaptor with .375 Ring

Figure 6

Short Form Specification

Scope
This specification designates general requirements for unplasticized polyvinyl chloride (PVC) Plastic Gravity Sewer Pipe with integral wall bell and spigot joints for the conveyance of domestic sewage.

Materials
Pipe and fittings shall meet the requirements of ASTM Specification D3034 for SDR 35. The pipe shall be colored green for in-ground identification as sewer pipe.

Pipe
Pipe shall be suitable for use as a gravity sewer conduit. Provisions must be made for contraction and expansion at each joint with a rubber ring. The bell shall consist of an integral wall section with a solid cross-section rubber ring, factory assembled, securely locked in place to prevent displacement during assembly. Sizes and dimensions shall be as shown in this specification. Standard laying lengths shall be 20 ft. and 12.5 ft. ±1 inch. At manufacture's option, random lengths of not more than 15% of total footage of each size may be shipped in lieu of standard lengths.

Drop Impact Test
Pipe (6″ long section) shall be subjected to impact from a free falling tup (20-lb. Tup A.) in accordance with ASTM Method of Test D2444. No shattering or splitting (denting is not a failure) shall be evident when the following energy is impacted:

Nominal Size Inches	Ft.-Lbs.
4	150
6	210
8	210
10	220
12	220
15	220

Fittings
All fittings and accessories shall be as manufactured and furnished by the pipe supplier or approved equal and have bell and/or spigot configurations compatible with that of the pipe.

Temperature for Testing
Pipe shall be designed to pass all tests at 73°F (±3°F).

Pipe Stiffness
Minimum "pipe Stiffness" (F/△ y) at 5% deflection shall be 46 psi for all sizes when tested in accordance with ASTM Method of Test D2412, "External Loading Properties of Plastic Pipe by Parallel-Plate Loading."

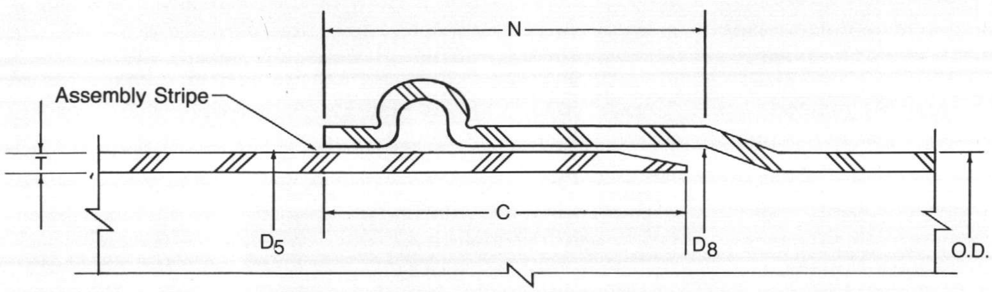
Joint Tightness
Two sections of pipe shall be assembled in accordance with the manufacturer's recommendation. Joint shall be tested in accordance with ASTM D3212, "Joints for Drain and Sewer Plastic Pipe Using Flexible Elastomeric Seals."

Flattening
There shall be no evidence of splitting, cracking, or breaking when the pipe is tested as follows:

Flatten specimen of pipe, six inches long between parallel plates in a suitable press until the distance between the plates is forty percent of the outside diameter of the pipe. The rate of loading shall be uniform and such that the compression is completed within two to five minutes.

Sizes, Dimensions Tolerances and Weights

Bell and Spigot Assembly (Inches)



Pipe Size Inches	Pipe Details Average O.D.	Tol.	Min Wall Thickness	Tol.	C	Bell Details D5	Tol.	D8	Tol.	N(Min)
4	4.215	±.007	0.125	+.020	2.50	4.250	±.020	4.240	±.010	2.598
6	6.275	±.009	0.180	+.028	3.50	6.318	±.023	6.308	±0.13	3.622
8	8.400	±.010	0.240	+.031	4.50	5.460	±.040	8.44	±.020	4.646
10	10.500	±.013	0.300	+.039	5.00	10.570	±.047	10.548	±.024	5.197
12	12.500	±.016	0.360	+.043	5.25	12.575	±.047	12.554	±.024	5.472
15	15.300	±.021	0.440	+.048	5.40	15.362	±.029	15.362	±.029	5.40

Note: 4″-12″ pipe utilizes modified "M" ring, 15″ pipe utilizes an "O" ring.

Sizes, Lengths, Weights

Size Inches	Std. Lengths Feet	Weights (#/Ft.) 20′ Length	12½′ Length	Weights (#/Length) 20′ Length	12½′ Length
4	20.0 & 12.5	1.15	1.16	22.9	14.4
6	20.0 & 12.5	2.47	2.50	49.4	31.2
8	20.0 & 12.5	4.42	4.48	88.5	56.1
10	20.0 & 12.5	6.93	7.03	138.6	87.9
12	20.0 & 12.5	9.91	10.06	198.1	125.8
15	— 12.5	N/A	14.90	N/A	187.5

Figure 7

Customer Service Centers

California
P.O. Box 1587
Stockton, CA 95201
(209) 982-1500

Texas
Highway 75 N.
Denison, TX 75020
(214) 465-6390

Florida
P.O. Box 185
Green Cove Springs, FL 32043
(904) 284-3091

The physical (or chemical) properties of J-M products described herein represent typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check the J-M district office to assure current information.

Warranty
We warrant that our products are manufactured in accordance with the applicable material specifications and are free from defects in workmanship and materials using our specifications as a standard. Every claim under this warranty shall be deemed waived unless in writing and received by J-M Manufacturing Company, Inc. within thirty (30) days of the date the defect was discovered or should have been discovered and within one (1) year of the date of the shipment of the product. J-M MANUFACTURING COMPANY, INC. MAKES NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION, THE WARRANTY OF MERCHANTABILITY OR THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OTHER THAN THE LIMITED WARRANTY SET FORTH ABOVE.

Limitation of Liability
It is expressly understood and agreed that the limit of J-M's liability shall be the resupply of a like quantity of nondefective Product and that J-M shall have no such liability except where the damage or claim results solely from breach of J-M's warranty. IT IS ALSO AGREED THAT J-M SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES FOR ANY ALLEGED NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, OTHER THAN THE LIMITED LIABILITY SET FORTH ABOVE.

J-M PIPE
J-M Manufacturing Company, Inc.
1051 Sperry Road
Stockton, California 95201

J-M Manufacturing Company, Inc. was Formerly a Division of Johns-Manville Sales Corporation.

The information contained herein has not been updated since its last printing in 1982. Should up-to-date verification be required please contact your local J-M sales representative.

TRX-11B 4-83

Printed in USA

Johns-Manville

JM

Blue Brute®

Class 100, 150 and 200

Ring-Tite® PVC water pipe

"Locked-in" rings

Meets AWWA C900

Reviewed ✓
Checked —
Certified
By James Gorny
So-Par Utilities Co., Inc.
Date 3/23/84

Johns-Manville

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Checked —
Certified

By James Harry

So-Par Utilities Co., Inc.

Date 3/23/84

For use in municipal water systems, firelines and other critical services.

Strength
Class 100, 150 and 200 Blue Brute water pipes have long-term hydrostatic strength that meet the commonly accepted high safety requirements of municipal water systems. Blue Brute conforms to cast iron O.D.'s and is available in 4″, 6″, 8″, 10″ and 12″ sizes in Class 100 and 150, and 4″, 6″ and 8″ sizes in Class 200.

Meets AWWA C900, Underwriters' Laboratories listed, Factory Mutual and NSF approved
Johns-Manville Blue Brute Class 150 and 200 PVC water pipes are listed for critical use in firelines and water mains. Blue Brute Class 100 is intended for water mains.

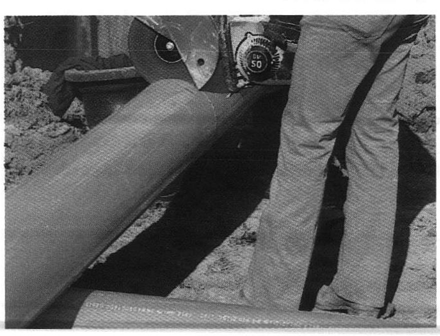
Light weight
A 20 foot length of Class 150, 8″ Blue Brute water pipe weighs approximately 181 pounds. That makes it easy to load, easy to transport and easy to handle. Installers prefer it because it goes into the ground quickly — thus saving on installation costs.

Long laying lengths
A standard laying length of Blue Brute PVC water pipe is 20 feet. That means you can cover a lot of ground during installation. At the same time, you eliminate the cost of unnecessary joints.

Corrosion resistance
Blue Brute is unaffected by electrolytic or galvanic corrosion, or any known soil or water condition. You don't have to worry about tuberculation, or the need for costly lining, wrapping, coating or cathodic protection.

Quality control
Without exception, each length of pipe is hydrostatically tested and subject to inspection by our quality control engineers throughout every step of the manufacturing process.

Flow capacity
This PVC water pipe has a smooth interior that stays smooth over long years of service with no loss in carrying capacity. Its coefficient of flow is C = 150 (H&W) — the best available in common use in water systems. This capacity often allows savings in pumping costs as well as savings on the size of pipe required.

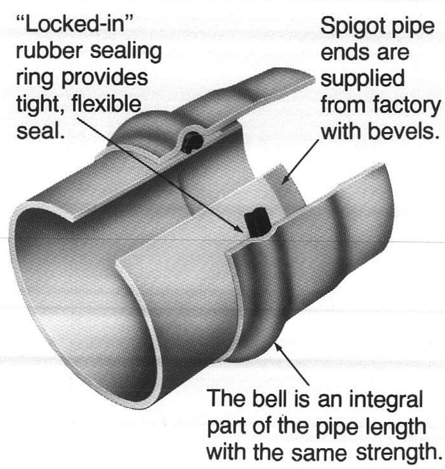


Field cutting
You can cut Blue Brute with a powersaw or an ordinary handsaw. It eliminates the need to invest in costly cutting equipment.

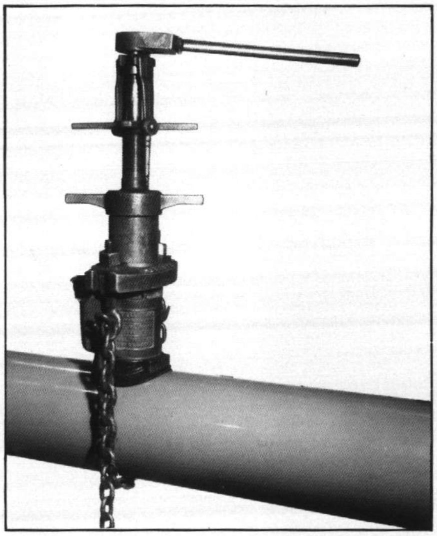
Service life
Because it is nonmetallic, the pipe does not lose strength due to either potable water corrosion or external galvanic or soil corrosion. And its design includes a surge allowance for a 2 ft./sec. stoppage of flow.

Ring-Tite joints with locked-in rings
Blue Brute's Ring-Tite locked-in joint can be assembled quickly. Seated in a deep groove, the locked-in, flexible elastomeric ring provides a tight seal that protects the line from shock, vibration, earth movement and compensates for expansion and contraction of pipe lengths. And there's no field mixing or application of cement. Its a simple push-together joint that remains tight under normal operating conditions.

Ring-Tite joint with "locked-in" ring



Short form specification



Accessories
Blue Brute is backed up by all the items it takes for smooth installation of water pipe. Direct taps can be made with tapping tools. (See detailed instructions on tapping in the "Blue Brute Installation Guide", TR-704A.)

Cast iron O.D.
Available in 4″, 6″, 8″, 10″ and 12″ sizes, this pipe can be connected directly into cast and ductile iron fittings without adaptors or complicated procedures.

Scope
This specification designates general requirements for unplasticized polyvinyl chloride (PVC) plastic class water pipe with integral bell containing a locked-in ring and spigot joints for the conveyance of water and other fluids.

Materials
Pipe shall meet the requirements of AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe". All Class 100 pipe shall meet the requirements of DR 25, Class 150 pipe shall meet the requirements of DR 18 and Class 200 the requirements of DR 14.

Pipe
All pipe shall be suitable for use as pressure conduit. Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a locked-in, solid cross section elastomeric ring which meets the requirements of ASTM F-477. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall and meet the requirements of AWWA C900. Sizes and dimensions shall be as shown in this specification.

Physical requirements
Standard laying lengths
Standard laying lengths shall be 20 feet (± 1″) for all sizes. At least 85% of the total footage of pipe of any class and size shall be furnished in standard lengths. The remaining 15% can be furnished in random lengths. Random lengths shall not be less than 10 feet long. Each standard and random length of pipe shall be tested to four times the class pressure of the pipe for a minimum of 5 seconds. The integral bell shall be tested with the pipe.

Pipe stiffness
The pipe stiffness using F/△y for PVC class water pipe is contained in the table below:

Class	DR	F/△y (psi)
100	25	129
150	18	435
200	14	914

Quick burst test
Randomly selected samples tested in accordance with ASTM D 1599 shall withstand, without failure, pressures listed below when applied in 60-70 seconds.

Class	Minimum burst pressure at 73°F (psi)
100	535
150	755
200	985

Drop impact test
Pipe shall withstand, without failure at 73°F, an impact of a falling missile, Tup C, at the following levels. (Per ASTM D 2444).

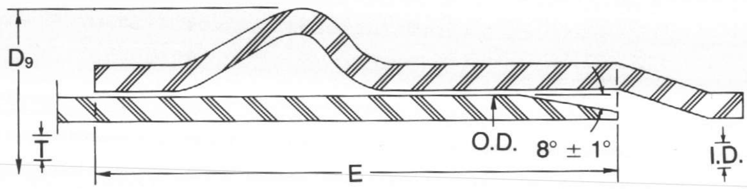
Pipe size (in.)	Impact (ft./lbs.)
4	100
6	100
8	100
10	120
12	120

There shall be no visible evidence of shattering or splitting when the energy is imposed.

Dimensions (average)

Pipe size (in.)	Outside dia. (in.)	Nom. inside dia. (in.)**	T (nom.) thick. (in.)	T (min.) thick. (in.)	E dim. (in.)	D_9	Weight lbs./ft.	Weight, lbs./20 ft. laying length
Class 100 (DR 25)*								
4	4.80	4.39	.204	.192	4.75	6.4	1.8	36.0
6	6.90	6.30	.298	.279	5.50	8.8	3.9	78.0
8	9.05	8.28	.384	.362	6.25	11.4	6.6	132.0
10	11.10	10.16	.470	.444	7.00	13.8	10.0	200.0
12	13.20	12.08	.559	.528	7.80	15.9	14.0	280.0
Class 150 (DR 18)*								
4	4.80	4.23	.283	.267	4.75	6.5	2.5	51.0
6	6.90	6.09	.406	.383	5.50	9.0	5.2	105.0
8	9.05	7.98	.533	.503	6.25	11.6	9.0	181.0
10	11.10	9.79	.654	.617	7.00	14.1	13.6	274.0
12	13.20	11.65	.777	.733	7.80	16.7	19.9	390.0
Class 200 (DR 14)*								
4	4.80	4.07	.364	.343	4.75	6.8	3.2	64.0
6	6.90	5.86	.522	.493	5.50	9.4	6.6	133.0
8	9.05	7.68	.685	.646	6.25	12.1	11.5	230.0

*DR (Dimension Ratio) is the outside diameter divided by the minimum wall thickness T (min.).
**Nominal inside diameter equals the outside diameter minus twice thickness T (nom.).



Flow characteristics and dimensions

Flow chart

Class 100 (DR 25)

Gals./min.	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′
Pipe size (in.)	4	4.39 I.D.	6	6.30 I.D.	8	8.28 I.D.	10	10.16 I.D.	12	12.08 I.D.
100	2.12	0.16								
200	4.24	0.57	2.05	0.10						
300	6.35	1.21	3.07	0.21						
400	8.47	2.07	4.10	0.35	2.38	0.09				
500			5.12	0.53	2.98	0.14				
600			6.15	0.75	3.57	0.20	2.38	0.07		
700			7.17	0.99	4.17	0.27	2.77	0.10		
800			8.20	1.27	4.76	0.34	3.17	0.13	2.24	0.05
900			9.22	1.58	5.36	0.42	3.56	0.16	2.52	0.07
1,000					5.96	0.51	3.96	0.19	2.80	0.08
1,500					8.93	1.09	5.94	0.40	4.20	0.17
2,000							7.92	0.69	5.60	0.29
2,500							9.90	1.04	7.00	0.45
3,000									8.40	0.62
3,500									9.80	0.83

Class 150 (DR 18)

Gals./min.	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′
Pipe size (in.)	4	4.23 I.D.	6	6.09 I.D.	8	7.98 I.D.	10	9.79 I.D.	12	11.65 I.D.
100	2.28	0.19								
200	4.57	0.69	2.20	0.12						
300	6.85	1.46	3.30	0.25						
400	9.13	2.48	4.41	0.42	2.57	0.11				
500			5.51	0.64	3.21	0.17	2.13	0.06		
600			6.61	0.89	3.85	0.24	2.56	0.09		
700			7.71	1.18	4.49	0.32	2.98	0.12	2.11	0.05
800			8.81	1.52	5.13	0.41	3.41	0.15	2.41	0.06
900			9.91	1.89	5.77	0.51	3.84	0.19	2.71	0.08
1,000					6.41	0.61	4.26	0.23	3.01	0.10
1,500					9.62	1.30	6.39	0.48	4.51	0.21
2,000							8.52	0.82	6.02	0.35
2,500									7.52	0.53
3,000									9.03	0.74

Class 200 (DR 14)

Gals./min.	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′	Velocity ft./sec.	Head loss psi/100′
Pipe size (in.)	4	4.07 I.D.	6	5.86 I.D.	8	7.68 I.D.
100	2.47	0.23				
200	4.93	0.83	2.38	0.14		
300	7.40	1.76	3.57	0.30	2.08	0.08
400	9.86	2.99	4.76	0.51	2.77	0.14
500			5.95	0.77	3.46	0.21
600			7.14	1.07	4.16	0.29
700			8.33	1.43	4.85	0.38
800			9.52	1.83	5.54	0.49
900					6.23	0.61
1,000					6.93	0.74

Coefficient of flow is C = 150 (Hazen and Williams).
Velocity and head loss data are based on nominal inside diameter, which is outside diameter minus twice thickness T (nom.).

Warranty
We warrant that our products are manufactured in accordance with our applicable material specifications and are free from defects in workmanship and materials using our specifications as a standard. Every claim under this warranty shall be deemed waived unless received in writing by Johns-Manville Sales Corporation within thirty (30) days of the date the defect was discovered or should have been discovered and within one (1) year of the date of the shipment of the product.
JOHNS-MANVILLE SALES CORPORATION MAKES NO OTHER REPRESENTATION OR WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING WITHOUT LIMITATION, THE WARRANTY OF MERCHANTABILITY OR THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, OTHER THAN THE LIMITED WARRANTY SET FORTH ABOVE.

Limitation of Liability
The limit and exclusive remedy for J-M liability shall be the resupply of a like quantity of nondefective product, regardless of whether the defect was latent or obvious, and J-M shall have no such liability except where the damage or claim results solely from breach of J-M's warranty. J-M SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, OR OTHER DAMAGES FOR ANY ALLEGED NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, OTHER THAN THE LIMITED LIABILITY SET FORTH ABOVE.

The physical (or chemical) properties of Johns-Manville Blue Brute PVC water pipe represent typical average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Check the Johns-Manville district office to assure current information.

For information on other J-M products and systems, call the Product Information Center at (303) 978-4900.

District Sales Offices

Denver
P.O. Box 5771
Denver, CO 80217
(303) 773-2400

Northeastern
P.O. Box 1544
Englewood Cliffs, NJ 07632
(201) 894-1111

Mid-Atlantic
P.O. Box 1544
Englewood Cliffs, NJ 07632
(201) 894-1111

Southeastern
P.O. Box 4487
Atlanta, GA 30302
(404) 449-3300

Midwest
2222 Kensington Court
Oakbrook, IL 60521
(312) 887-7400

Dallas
Denison, TX 75021
(214) 465-6390

San Francisco
2600 Campus Drive
San Mateo, CA 94403
(415) 349-9500

Los Angeles
3701 Long Beach Blvd.
Suite 205
Long Beach, CA 90807
(213) 595-6991

Customer Service Centers

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P.O. Box 185
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Johns-Manville Canada, Inc.
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Etobicoke, Ontario M9C 4Z7
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Ken-Caryl Ranch
Denver, Colorado 80217

MANUFACTURED AND MARKETED BY
J-M Manufacturing Company, Inc.
Formerly a Division of Johns-Manville Sales Corporation

TRX-27 3-81

Printed in USA

FERGUSON ENTERPRISES, INC.

825 S. 17th Street
Wilmington, NC 284[illegible]
Phone (919) [illegible]

Re[illegible] Box [illegible]
Wilmington, NC [illegible]

SO-PAR UTILITIES
HWY. 17 NORTH
JACKSONVILLE, NC 28540

Project: Unaccompanied Enlisted
Personal Housing MCB
Camp Lejeune, N.C.

Location: Camp Johnson

Contractor: So-Par Utilities

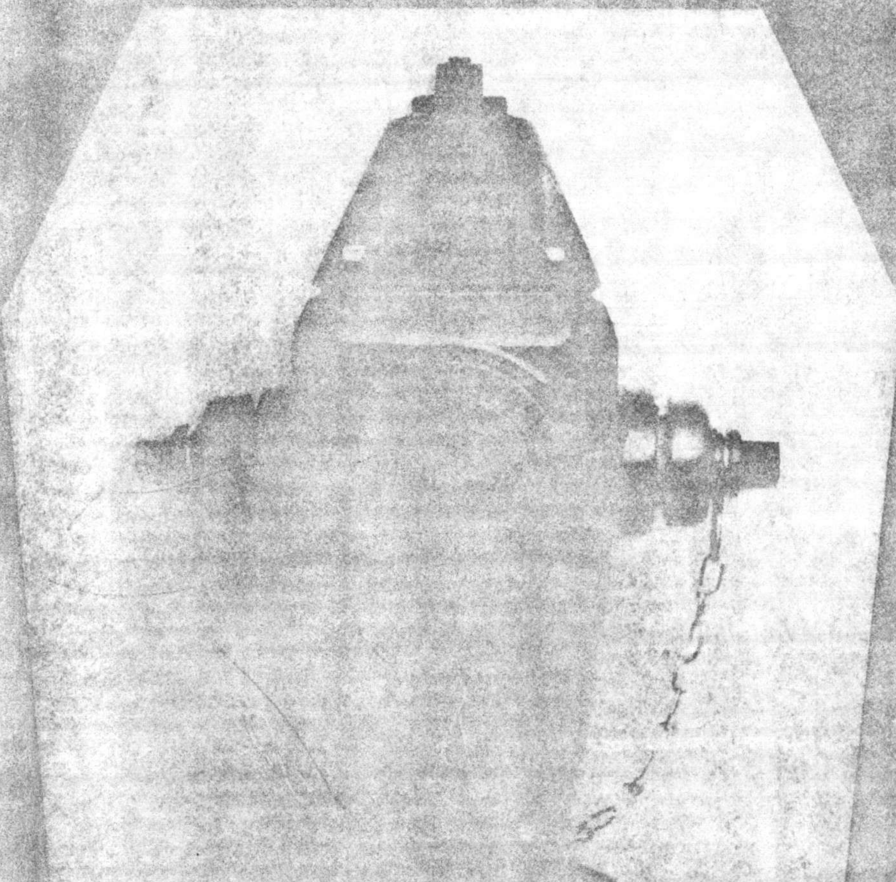
Submitted By: Ferguson Enterprises, Inc.

[illegible]

CLOW

F2500 FIRE HYDRANT
Inspection
Operation
Maintenance

Reviewed
Checked
Certified
By James Gamon
So-Par Utilities Co., Inc.
Date 3/23/84



MEETS OR EXCEEDS AWWA STANDARD C502

Fire hydrants should be flushed, inspected and tested twice a year (spring and fall), to ensure satisfactory operating condition.

Visually inspect for damaged, loose or missing parts.

With main valve fully closed, remove nozzle caps and check for water in the barrel. The presence of water indicates one of the following:

A. Leakage of the main valve.

B. Drains are below ground water table level.

C. Drains obstructed by soil or other foreign material.

D. Nozzle caps replaced prior to allowing barrel to drain.

While nozzle caps are removed, check for thread damage. Wire brush nozzle and cap threads and apply antiseizing lubricant.

Replace nozzle caps and check for free action of cap chains. If chains bind, open cap loop until rotating action is free.

INSPECTION, TESTING AND MAINTENANCE

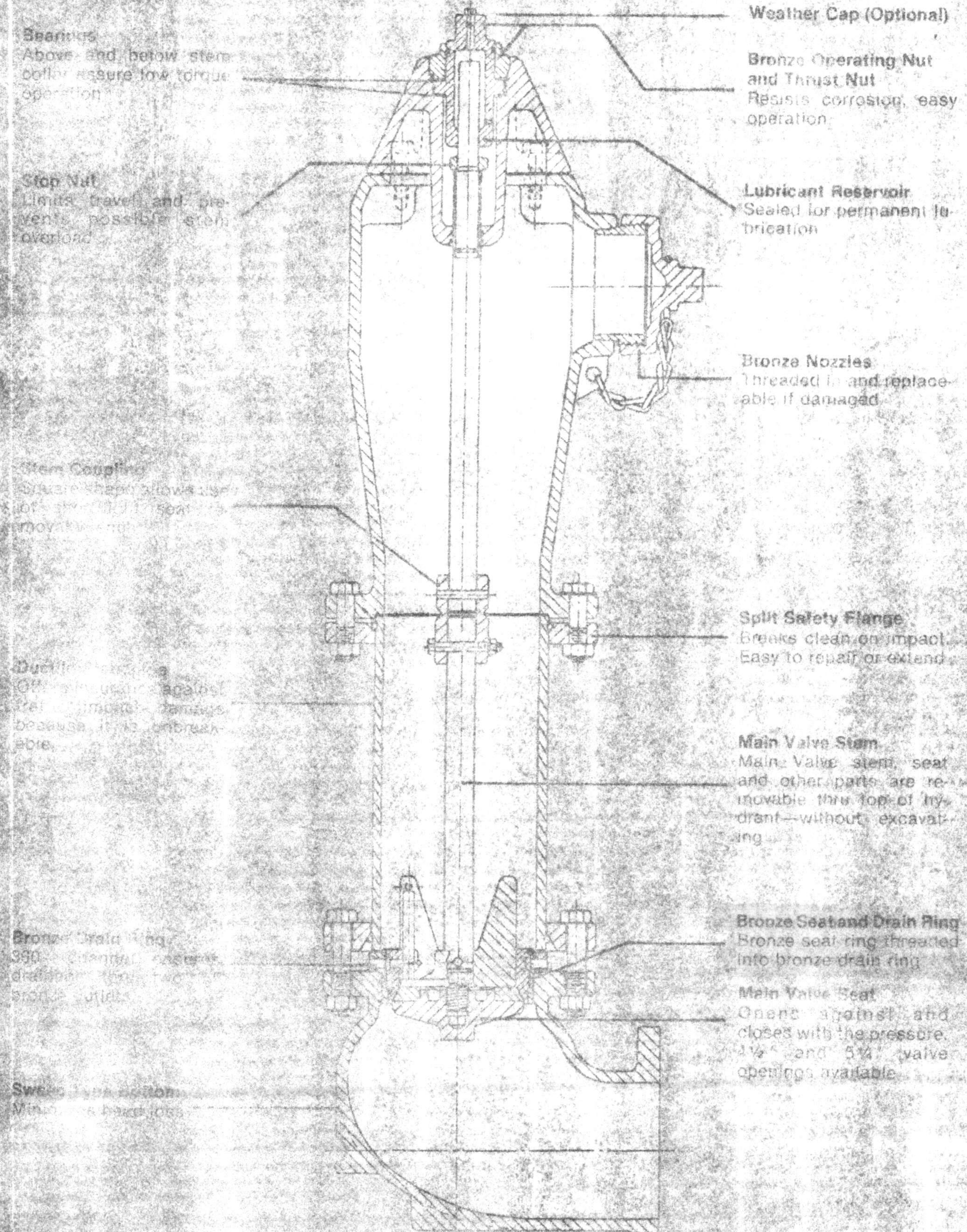
Tighten all caps except one for venting air. Turn the main valve to fully open. After all air has escaped and water appears, tighten cap and check nozzles, flange connections and seals for leakage.

Fully close the main valve and remove one hose nozzle cap. Place palm of hand firmly over the 2½" nozzle opening. A strong suction will indicate hydrant is draining properly.

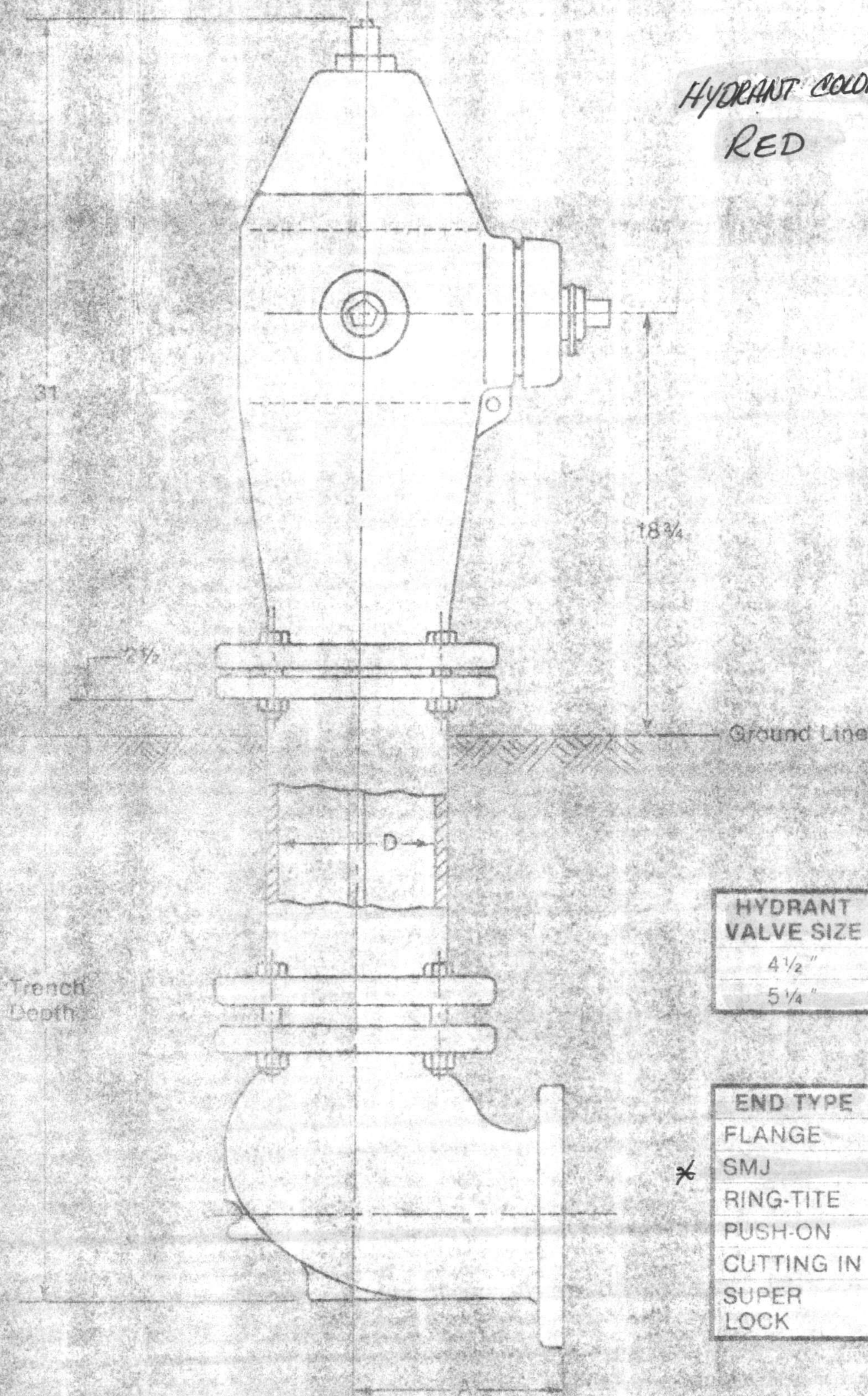
Suggested Installation Practice for "Break-Flange" Hydrant Styles

For hydrants intended to fail at the groundline joint on vehicle impact, it is good practice to install with extra care to ensure that there is adequate soil resistance. In loose or poor load-bearing soil, it is suggested that concrete blocking be installed around the hydrant barrel at or near the ground line.

F2500 Fire Hydrant Features



Dimension Data



HYDRANT COLOR TO BE RED

HYDRANT VALVE SIZE	D
4½"	6.16
5¼"	7.04

END TYPE	A
FLANGE	9
* SMJ	10½
RING-TITE	10½
PUSH-ON	10½
CUTTING IN	10½
SUPER LOCK	10½

* = MECHANICAL JOINT

Reviewed
Checked
Certified
By James Harmon
So-Par Utilities Co., Inc.
Date 3/28/84

CLOW AWWA DOUBLE DISC GATE VALVES

IRON BODY, BRONZE MOUNTED, PARALLEL SEAT

F-5062 Hub Ends
Non-Rising Stem
2" thru 42"

Pressure Ratings

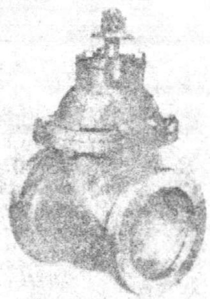
Valve Size Inches	Working Pressure psi Non-Shock Cold Water	Hydrostatic Test Pressure psi
2 thru 12	200	400
14 thru 48	150	300

For
Cutting-In Valves, See Page 127
Tapping Valves, See Page 121

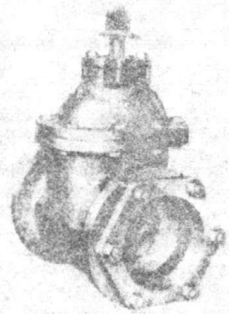
F-5065 Mech. Joint
Non-Rising Stem
2" thru 36"

open left

F-5080* Push-On Ends
For Cast Iron Pipe
4" thru 12" NRS



F-5063 Flanged
and Hub Ends, NRS
4" thru 36"



F-5066 Flanged and
Mechanical Joint, NRS
4" thru 36"

F-5081* Flanged and
Push-On Ends, NRS
4" thru 12"

F-5070 Flanged Ends
Non-Rising Stem
2" thru 48"

F-5068 Threaded Ends
Non-Rising Stem
2" thru 4"

* For cast iron pipe. Can also be furnished for other sizes and types of pipe.

CLOW AWWA DOUBLE DISC GATE VALVES

IRON BODY, BRONZE MOUNTED, PARALLEL SEAT

DESCRIPTION AND ADVANTAGES

Clow AWWA Gate Valves are designed primarily for flow control of water in underground pipe lines. They equal or exceed the requirements established by standards of the American Water Works Association and conform to Federal Specifications WW-V-58b, Type II, Class I.

Clow AWWA Gate Valves are specifically designed for heavy pressure service. Neck, flanges, and bell are made extra heavy to withstand pipe strain and possible shifting. Body, cover, gates, and stem are built for extra strength, with clean and simple internal construction, to assure long service and low maintenance.

All working parts are standardized and interchangeable.

The construction of Clow AWWA Gate Valves is clearly illustrated by the sectional view shown on page 120.

OPERATION OF THE VALVE

Turning the stem releases the wedging pressure on the gates allowing them to move away from their seats before starting upward travel. Further turning of the stem raises the gates into the fully opened position.

When closing the valve, the gates move freely downward without friction, to a position opposite their seats.

As the gates approach the bottom of the valve, the iron hooks come into contact with stops which prevent further downward movement of the hooks. The bronze wedges riding on these hooks spread the gates apart and force them against their seats.

CONSTRUCTION

Body: Cast iron, bronze mounted. Sturdy proportions provide protection against damage.

Stem: Manganese bronze of high tensile and torsional strength, with accurate, perfectly machined threads. Ample diameters assure smooth valve movement.

Stem Nut: Solid bronze. Independent of hooks, gates, and wedges. Stem or stem nut will not bind or spring out of line, as can happen when stem nut is attached to wedges.

Wedges: Independent, solid bronze. 2-inch thru 3-inch valves have integral hook and wedge. 4-inch thru 8-inch have independent solid bronze wedges placed loosely in iron hooks, and are free to adjust to varying positions of the gates. See sectional view on page 120.

In 10-inch and larger valves, each wedge has one long and one short surface. The bottom of each wedge forms a rocker bearing on the iron hooks, letting wedges adjust to varying positions of the gates in closing. The long side is used in closing the valve and the short side in opening it.

Low Torque Thrust Bearing: Valves 4" through 12" are fitted below the stem collar with an exclusive Low Torque Thrust Bearing which provides high load capacity and low friction. This bearing reduces operating torque up to 50%, yet seals perfectly for repacking under pressure.

Gates and Gate Rings: Gates 3-inch and smaller are bronze. Gates 4-inch and larger are high strength cast iron with bronze gate rings rolled into machined and dovetailed grooves under pressure to make gate and ring one inseparable unit. After fitting, gate rings are accurately machined.

Case Rings: Bronze case rings are screwed into place and machined. They can be removed and replaced if necessary.

Packing: O-Ring packing is standard on all non-rising stem gate valves. Rising stem and geared valves are furnished with conventional packing. See page 116.

Operating Nut and Handwheel: All valves except flanged valves and outside screw and yoke valves are supplied with 2-inch square operating nuts of high strength cast iron unless otherwise specified. Flanged valves and outside screw and yoke valves are supplied with handwheels of high strength cast iron unless otherwise specified. Direction of opening is indicated by arrow cast on operating nut skirt or on the rim of the handwheel.

Yoke: Yokes for outside screw and yoke valves are of rugged cast iron. Careful machining assures accurate stem alignment.

Accessories: Valves may be fitted with any of a large number of accessories, detailed on pages 153 through 157: cylinders, electric motor operators, gearing, by-passes, etc.

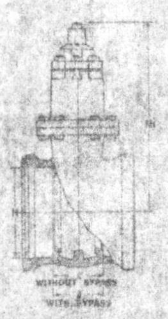
Rollers, Tracks and Scrapers: Recommended for 14" and larger diameter valves to carry weight of the gates for valves installed in a horizontal line in horizontal position. See page 156.

Slides: Recommended for 14" and larger valves installed horizontally in a vertical line. See page 156.

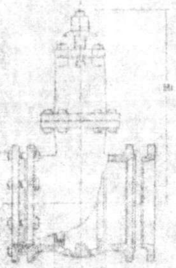
NOTE: All valves open to the left (counter-clockwise) unless otherwise specified.

CLOW AWWA DOUBLE DISC NRS GATE VALVES

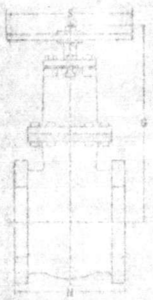
DIMENSIONS



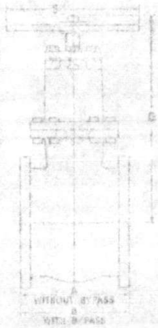
F-5062
Hub Ends



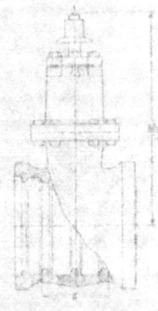
F-5065
Mechanical Joint



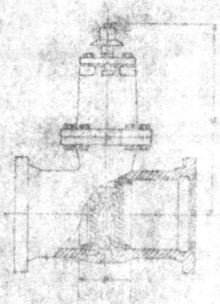
F-5068
Threaded Ends



F-5070
Flanged Ends



F-5080
Push-On Ends
For Cast Iron Pipe



F-5085
Push-On Ends
For PVC Pipe

Dimension M_1,
center of port to top of nut,
O-Ring Packing also apply to
Tapping Valves, Cutting-in Valves
and Auxiliary Valves.

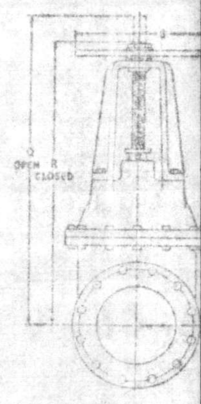
F-5310
Square Bottom Flanged

Dimensions—Inches

Valve Size Inches	Turns to Open	Diam. of Stem	A	B	C	D	G	H	J	K	M_1	N	P
2	5	7/8	7	. . .	3¾	. . .	10¼	3½	3¼	. . .	10¼	5¼	3
2¼	5	7/8	. . .		3¼		10¼		3¼		10¼		
2½	6	7/8	7½	. . .	. . .	. . .	11⅜	. . .		. . .	11⅜	5¾	3⅞
3	7	7/8	8		3⅜	. . .	12¼	4⅝	3½	. . .	12¼	6	3⅛
4	15	1⅛	9		4¾		14	5¾	4¼	5¼	14	9	4½
5	18	1⅛	10				15½				15½		
6	21	1¼	10½		5[illegible]		18	7½	5¼	6¼	18		5¼
8	27	1⅜	11½		6[illegible]		22	10	6½	7	22		6¼
10	33	1⅜	13	. . .	6¾	. . .	25⅞	12⅛	6¾	7¼	25⅞		6½
12	39	1½	14		6¾		29⅛	14⅛	7	7¾	29⅛		
14	45	1⅞	15¾	23	7¼	13¾	36½	16⅜	7¼		39¾		
16	52	1⅞	17	23	9[illegible]	13¾	40¾	[illegible]	9¼		43½		
18	58	2⅛	19	24	9¼	14	43¼	20¾	9¾		46		
20	64	2⅛	20	24	10¼	14½	47¼	23[illegible]	10		50		
24	76	2½	23	28½	10	16	55	27⅜	16		56¾		
30	63	2¾	25	32½	12½	20¼	64¾	33¾	12½		66½		
36	75	3	27	36	23¾	23¾	75⅜	40⅛	23¾		77⅛		
42	88	3½	34	34	20¾	20¾		46½	. . .				
48	100	4	45½	45½	. . .		. . .	52⅛	. . .				

Turns to open are for valves without gearing.

CLOW



F-5072
Flanged Ends
Outside Screw & Yo

Valve Size Inches	Q	R	S
2	13¾	10⅞	7¼
2¼	. . .	. . .	7¼
2½	15½	12½	7¼
3	18⅝	15¼	7¼
4	24	19¾	10
5	27¼	21¾	10
6	31½	24¾	12
8	40½	31½	14
10	47¼	36¼	18
12	58⅜	45⅜	18
14	68	53	22
16	75¾	58¾	22
18	82½	63½	26
20	90¼	69¼	26
24	107	82	30
30	128¼	97	30
36	147½	110	26
42	. . .	. . .	30
48	. . .	. . .	30

Flanges are faced and

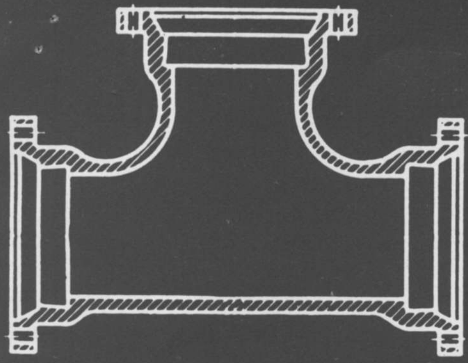
MECHANICAL JOINT FITTINGS

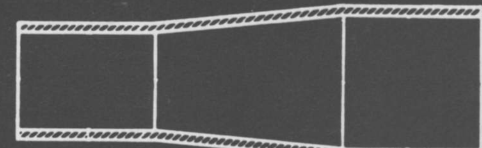
Reviewed ✓
Checked
Certified
By James Gorman
So-Par Utilities Co, Inc.
Date 3/23/84

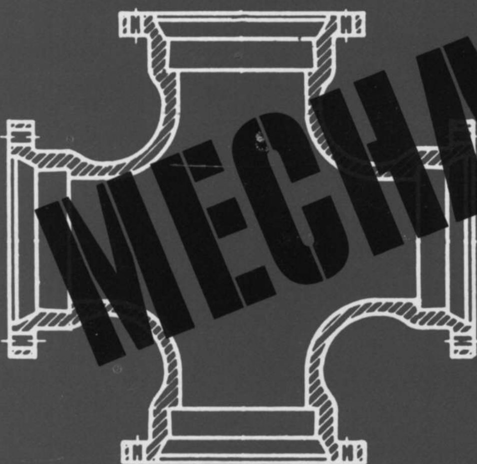
TRINITY VALLEY IRON and STEEL COMPANY

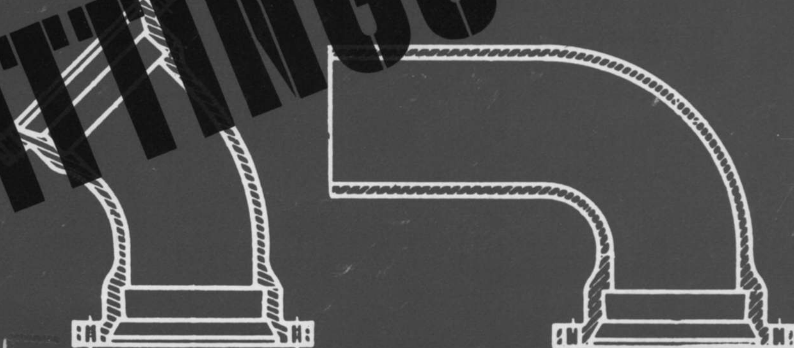
P. O. BOX 2388
FORT WORTH, TEXAS 76113
817-738-1925
TELEX — 794825 ENSCO FTW

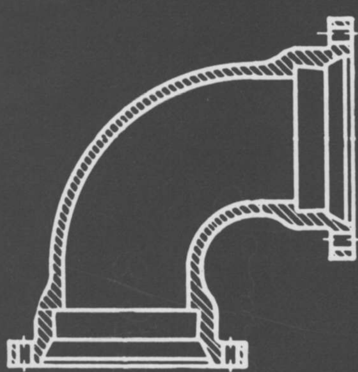
MECHANICAL JOINT FITTINGS

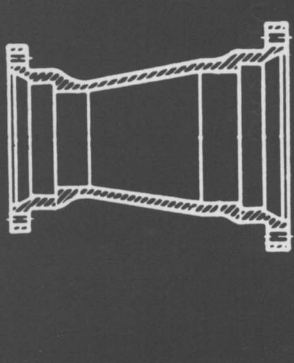












TRINITY VALLEY
IRON and STEEL
COMPANY

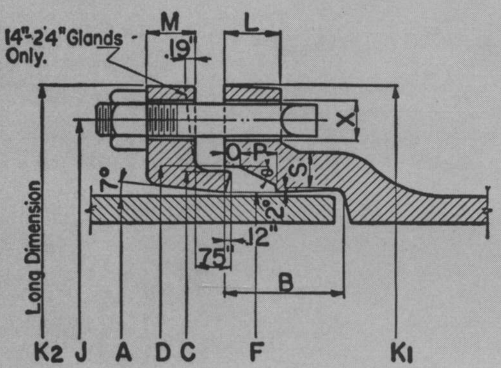
P. O. BOX 2388
FORT WORTH, TEXAS 76113
817-738-1925
TELEX — 794825 ENSCO FTW

Reviewed ✓
Checked ✓
Certified
By James Gorman
So-Par Utilities Co., Inc.
Date 3/23/84

MECHANICAL JOINT DIMENSIONS

Trinity Valley Cast Iron Mechanical Joint Fittings Class 250 are manufactured in accordance with and conform to AWWA specifications C110-71, C111-71—ANSI A21.10, ANSI A21.11 and federal specifications WW-P-421C.

Trinity Valley mechanical joint fittings sizes 4″-12″ are listed by Underwriters Laboratories Inc.



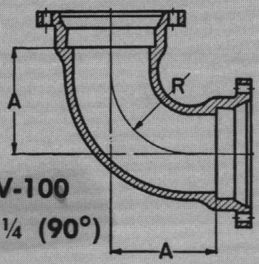
Size	Bolts			Wt. of Bell, lb.		Weight of Gland, Bolts and Gasket, lbs.	Pipe Barrel O. D.	Pipe Pattern
	No.	Size	Lgth.	Pipe	Fittings			
2	2	5/8	3	5	5	5	2.50	------
2¼	2	5/8	3	6	6	6	2.75	------
3	4	5/8	3	11	11	7	3.96	BCD
4	4	3/4	3½	16	16	10	4.80	A
6	6	3/4	3½	22	23	16	6.90	A
8	6	3/4	4	30	31	25	9.05	AB
10	8	3/4	4	40	41	30	11.10	AB
12	8	3/4	4	50	51	40	13.20	AB
14	10	3/4	4	78	79	45	15.30	AB
16	12	3/4	4½	95	97	55	17.40	AB
18	12	3/4	4½	113	117	65	19.50	AB
20	14	3/4	4½	134	140	85	21.60	AB
24	16	3/4	5	177	185	105	25.80	AB

Dimensions in inches

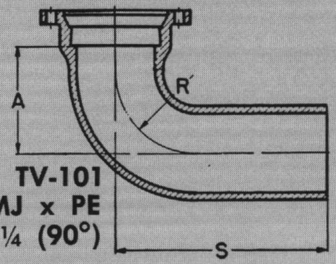
Size	A	B	C	D	F	ϕ	X	J	K_1	K_2	L	M	O	P	S
3	±.06 3.96	2.50	±.04 4.84	+.06 −.04 4.94	+.07 −.03 4.06	28°	+.06 −.0 3/4	±.06 6.19	−.06 7.62	−.12 7.69	−.06 .94	−.06 .62	.31	.63	−.05 .47
4	±.06 4.80	2.50	±.04 5.92	+.06 −.04 6.02	+.07 −.03 4.90	28°	+.06 −.0 7/8	±.06 7.50	−.06 9.06	−.12 9.12	−.06 1.00	−.06 .75	.31	.75	−.05 .55
6	±.06 6.90	2.50	±.04 8.02	+.06 −.04 8.12	+.07 −.03 7.00	28°	+.06 −.0 7/8	±.06 9.50	−.06 11.06	−.12 11.12	−.06 1.06	−.06 .88	.31	.75	−.05 .60
8	±.06 9.05	2.50	±.04 10.17	+.06 −.04 10.27	+.07 −.03 9.15	28°	+.06 −.0 7/8	±.06 11.75	−.06 13.31	−.12 13.37	−.08 1.12	−.08 1.00	.31	.75	−.05 .66
10	±.06 11.10	2.50	+.06 −.04 12.22	+.06 −.04 12.34	+.07 −.03 11.20	28°	+.06 −.0 7/8	±.06 14.00	−.06 15.62	−.12 15.62	−.08 1.19	−.08 1.00	.31	.75	−.06 .72
12	±.06 13.20	2.50	+.06 −.04 14.32	+.06 −.04 14.44	+.07 −.03 13.30	28°	+.06 −.0 7/8	±.06 16.25	−.06 17.88	−.12 17.88	−.08 1.25	−.08 1.00	.31	.75	−.06 .79
14	+.05 −.08 15.30	3.50	+.07 −.05 16.40	+.07 −.05 16.54	+.06 −.07 15.44	28°	+.06 −.0 7/8	±.06 18.75	−.08 20.25	−.12 20.25	−.12 1.31	−.12 1.25	.31	.75	−.08 .85
16	+.05 −.08 17.40	3.50	+.07 −.05 18.50	+.07 −.05 18.64	+.06 −.07 17.54	28°	+.06 −.0 7/8	±.06 21.00	−.08 22.50	−.12 22.50	−.12 1.38	−.12 1.31	.31	.75	−.08 .91
18	+.05 −.08 19.50	3.50	+.07 −.05 20.60	+.07 −.05 20.74	+.06 −.07 19.64	28°	+.06 −.0 7/8	±.06 23.25	−.08 24.75	−.15 24.75	−.12 1.44	−.12 1.38	.31	.75	−.08 .97
20	+.05 −.08 21.60	3.50	+.07 −.05 22.70	+.07 −.05 22.84	+.06 −−.07 21.74	28°	+.06 −.0 7/8	±.06 25.50	−.08 27.00	−.15 27.00	−.12 1.50	−.12 1.44	.31	.75	−.08 1.03
24	+.05 −.08 25.80	3.50	+.07 −.05 26.90	+.07 −.05 27.04	+.06 −.07 25.94	28°	+.06 −.0 7/8	±.06 30.00	−.08 31.50	−.15 31.50	−.12 1.62	−.12 1.56	.31	.75	−.08 1.08

Refer to current price sheet for items manufactured by, and available through, Trinity Valley Iron and Steel Company.

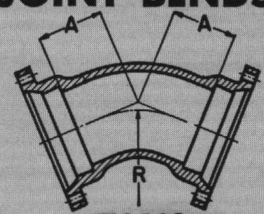
MECHANICAL JOINT BENDS



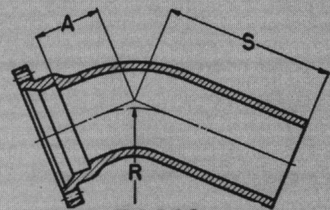
TV-100
MJ ¼ (90°)



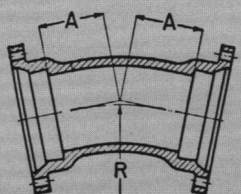
TV-101
MJ x PE
¼ (90°)



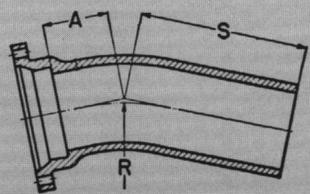
TV-102
MJ ⅛ (45°)



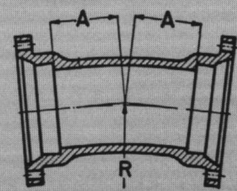
TV-103
MJ x PE ⅛ (45°)



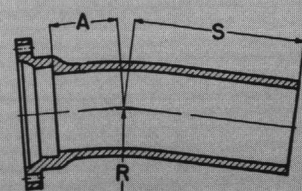
TV-104
MJ 1/16 (22½°)



TV-105
MJ x PE 1/16 (22½°)



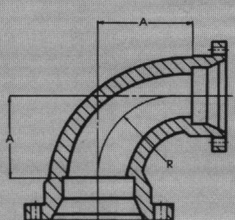
TV-106
MJ 1/32 (11¼°)



TV-107
MJ x PE 1/32 (11¼°)

	¼ BENDS (90°)					⅛ BENDS (45°)					1/16 BENDS (22½°)					1/32 BENDS (11¼°)				
	Dimensions			Weights		Dimensions			Weights		Dimensions			Weights		Dimensions			Weights	
SIZE	R	A	S	TV-100	TV-101	R	A	S	TV-102	TV-103	R	A	S	TV-104	TV-105	R	A	S	TV-106	TV-107
2	2.69	3.5	......	12	......	2.87	2.0	......	12	......	3.47	1.5	......	12	......	7.00	1.5	......	12	......
2¼	2.69	3.5	......	18	......	2.85	2.0	......	16	......	3.42	1.5	......	16	......	6.9	1.5	......	16	......
3	4.0	5.5	13.5	35	35	3.62	3.0	11.0	30	30	7.56	3.0	11.0	30	30	15.25	3.0	11.0	30	30
4	4.5	6.5	14.5	55	50	4.81	4.0	12.0	50	45	10.06	4.0	12.0	50	45	20.31	4.0	12.0	50	45
6	6.0	8.0	16.0	85	80	7.25	5.0	13.0	75	70	15.06	5.0	13.0	75	70	30.50	5.0	13.0	75	70
8	7.0	9.0	17.0	125	120	8.44	5.5	13.5	110	105	17.62	5.5	13.5	110	105	35.50	5.5	13.5	110	105
10	9.0	11.0	19.0	190	190	10.88	6.5	14.5	155	155	22.62	6.5	14.5	160	160	45.69	6.5	14.5	160	160
12	10.0	12.0	20.0	255	255	13.25	7.5	15.5	215	215	27.62	7.5	15.5	220	220	55.81	7.5	15.5	220	220
14	11.5	14.0	22.0	380	365	12.06	7.5	15.5	300	280	25.12	7.5	15.5	300	285	50.75	7.5	15.5	305	285
16	12.5	15.0	23.0	490	470	13.25	8.0	16.0	380	360	27.62	8.0	16.0	385	365	55.81	8.0	16.0	385	365
18	14.0	16.5	24.5	625	600	14.50	8.5	16.5	470	445	30.19	8.5	16.5	480	455	60.94	8.5	16.5	480	455
20	15.5	18.0	26.0	790	755	16.88	9.5	17.5	595	565	35.19	9.5	17.5	605	575	71.06	9.5	17.5	610	575
24	18.5	22.0	30.0	1215	1175	18.12	11.0	19.0	865	825	37.69	11.0	19.0	880	840	76.12	11.0	19.0	885	845

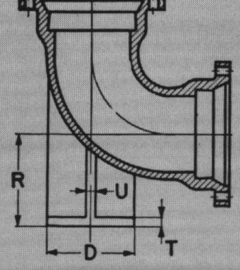
NOTE: Weights shown do not include joint accessories. See page 2 for accessory weight information.



MJ Reducing ¼ Bends (90°)

TV-108

Size	Dimensions		Weight
	R	A	TV-108
4x3	4.5	6.5	45
6x4	6.0	8.0	70
8x4	7.0	9.0	90
8x6	7.0	9.0	105



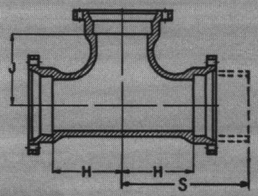
TV-109

Bases will be furnished not faced and not drilled unless otherwise specified.

MJ Base ¼ Bends (90°)

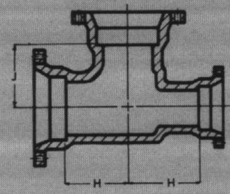
Size	Dimensions				Base	Total Wts
	R	D	T	U	Wt.	TV-109
3	4.88	5	.56	.50	10	45
4	5.50	6	.62	.50	10	65
6	7.00	7	.69	.62	20	105
8	8.38	9	.94	.88	40	165
10	9.75	9	.94	.88	45	235
12	11.25	11	1.00	1.00	65	320
14	12.50	11	1.00	1.00	70	450
16	13.75	11	1.00	1.00	75	565
18	15.00	13.5	1.12	1.12	115	740
20	16.00	13.5	1.12	1.12	120	910
24	18.50	13.5	1.12	1.12	130	1345

MECHANICAL JOINT TEES

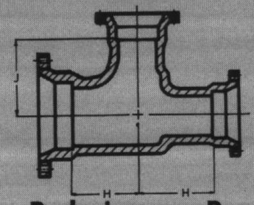


TV-110
MJ

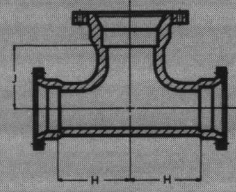
TV-111
MJ x PE x MJ



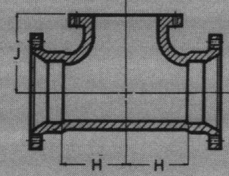
Reducing on Run
TV-112
MJ



Reducing on Run
and Branch
TV-113



Bullhead
TV-114



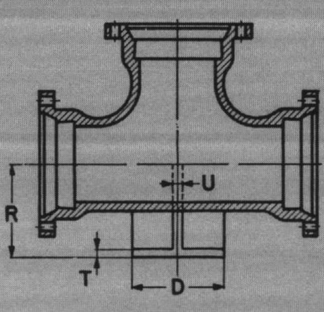
MJ x MJ x Flange
TV-115

SIZE			DIMENSIONS			WEIGHTS		
Run	Run	Branch	H	J	S	TV-110, 112, 113, 114	TV-111	TV-115
2	2	2	3.5	3.5	-----	22	-------	-------
2¼	2¼	2¼	3.5	3.5	-----	26	-------	-------
3	3	3	5.5	5.5	13.5	55	55	50
4	4	2	6.5	6.5	14.5	65	60	60
4	4	3	6.5	6.5	14.5	75	70	70
4	4	4	6.5	6.5	14.5	80	75	70
4	4	6	8.0	8.0	-----	115	-------	-------
6	4	4	8.0	8.0	-----	110	-------	-------
6	4	6	8.0	8.0	-----	115	-------	-------
6	6	2	8.0	8.0	-----	100	-------	-------
6	6	3	8.0	8.0	16.0	110	105	105
6	6	4	8.0	8.0	16.0	115	110	109
6	6	6	8.0	8.0	16.0	125	120	115
6	6	8	9.0	9.0	-----	185	-------	-------
8	6	4	9.0	9.0	-----	155	-------	-------
8	6	6	9.0	9.0	-----	165	-------	-------
8	6	8	9.0	9.0	-----	175	-------	-------
8	8	3	9.0	9.0	17.0	155	150	150
8	8	4	9.0	9.0	17.0	165	160	159
8	8	6	9.0	9.0	17.0	175	170	165
8	8	8	9.0	9.0	17.0	185	180	175
10	10	4	11.0	11.0	19.0	235	235	229
10	10	6	11.0	11.0	19.0	250	250	237
10	10	8	11.0	11.0	19.0	260	260	250
10	10	10	11.0	11.0	19.0	310	310	295
12	12	4	12.0	12.0	20.0	315	315	309
12	12	6	12.0	12.0	20.0	325	325	315
12	12	8	12.0	12.0	20.0	340	340	330
12	12	10	12.0	12.0	20.0	390	390	377
12	12	12	12.0	12.0	20.0	410	410	401
14	14	4	14.0	14.0	22.0	470	455	510
14	14	6	14.0	14.0	22.0	485	470	475
14	14	8	14.0	14.0	22.0	500	480	490
14	14	10	14.0	14.0	22.0	515	500	502

SIZE			DIMENSIONS			WEIGHTS		
Run	Run	Branch	H	J	S	TV-110, 112, 113, 114	TV-111	TV-115
14	14	12	14.0	14.0	22.0	540	525	530
14	14	14	14.0	14.0	22.0	585	570	575
16	16	4	15.0	15.0	23.0	600	575	575
16	16	6	15.0	15.0	23.0	615	590	605
16	16	8	15.0	15.0	23.0	625	605	615
16	16	10	15.0	15.0	23.0	645	620	632
16	16	12	15.0	15.0	23.0	660	640	651
16	16	14	15.0	15.0	23.0	710	690	630
16	16	16	15.0	15.0	23.0	740	720	730
18	18	6	13.0	15.5	21.0	670	645	665
18	18	8	13.0	15.5	21.0	685	655	675
18	18	10	13.0	15.5	21.0	700	670	690
18	18	12	13.0	15.5	21.0	715	690	705
18	18	14	16.5	16.5	24.5	865	840	850
18	18	16	16.5	16.5	24.5	905	880	885
18	18	18	16.5	16.5	24.5	945	920	915
20	20	6	14.0	17.0	22.0	830	800	820
20	20	8	14.0	17.0	22.0	845	810	835
20	20	10	14.0	17.0	22.0	860	825	850
20	20	12	14.0	17.0	22.0	875	840	865
20	20	14	14.0	17.0	22.0	910	875	890
20	20	16	18.0	18.0	26.0	1095	1060	1075
20	20	18	18.0	18.0	26.0	1140	1110	1120
20	20	20	18.0	18.0	26.0	1185	1155	1165
24	24	6	15.0	19.0	23.0	1145	1105	1125
24	24	8	15.0	19.0	23.0	1160	1115	1140
24	24	10	15.0	19.0	23.0	1170	1130	1150
24	24	12	15.0	19.0	23.0	1185	1145	1165
24	24	14	15.0	19.0	23.0	1220	1180	1200
24	24	16	15.0	19.0	23.0	1245	1200	1225
24	24	18	22.0	22.0	30.0	1660	1615	1640
24	24	20	22.0	22.0	30.0	1720	1680	1700
24	24	24	22.0	22.0	30.0	1815	1775	1795

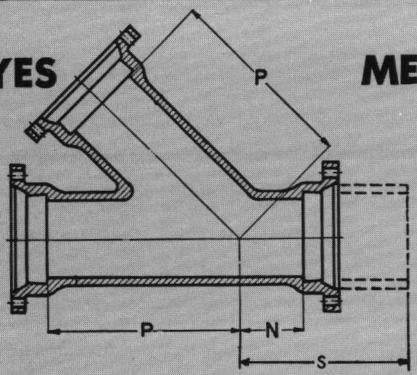
MECHANICAL JOINT BASE TEES

TV-116
MJ Base Tee



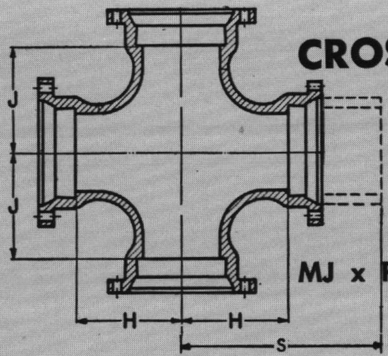
SIZE	DIMENSIONS R	D	T	U	Base Wt.	Total Wts. TV-116
3	4.88	5.0	.56	.50	5	60
4	5.50	6.0	.62	.50	10	90
6	7.00	7.0	.69	.62	15	140
8	8.38	9.0	.94	.88	30	215
10	9.75	9.0	.94	.88	30	340
12	11.25	11.0	1.00	1.00	45	455
14	12.50	11.0	1.00	1.00	50	635
16	13.75	11.0	1.00	1.00	50	790
18	15.00	13.5	1.12	1.12	75	1020
20	16.00	13.5	1.12	1.12	75	1260
24	18.50	13.5	1.12	1.12	80	1895

WYES MECHANICAL JOINT CROSSES



TV-117
MJ

TV-118
MJ x PE x MJ



TV-119
MJ

TV-120
MJ x PE x MJ x MJ

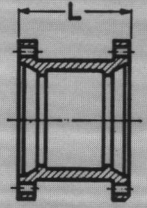
SIZE		DIMENSIONS			WEIGHTS	
Run	Branch	N	P	S	TV-117	TV-118
3	3	3.0	10.0	11.0	60	60
4	3	3.0	12.0	11.0	80	75
4	4	3.0	12.0	11.0	90	85
6	4	3.5	14.5	11.5	130	125
6	6	3.5	14.5	11.5	145	140
8	4	4.5	17.5	12.5	190	185
8	6	4.5	17.5	12.5	205	200
8	8	4.5	17.5	12.5	230	225
10	4	5.0	20.5	13.0	270	270
10	6	5.0	20.5	13.0	285	285
10	8	5.0	20.5	13.0	310	310
10	10	5.0	20.5	13.0	340	340
12	4	5.5	24.5	13.5	380	380
12	6	5.5	24.5	13.5	400	400
12	8	5.5	24.5	13.5	425	425
12	10	5.5	24.5	13.5	450	450
12	12	5.5	24.5	13.5	490	490
14	6	6.0	27.0	14.0	570	555
14	8	6.0	27.0	14.0	595	580
14	10	6.0	27.0	14.0	625	610
14	12	6.0	27.0	14.0	685	695
14	14	6.0	27.0	14.0	750	760
16	6	6.5	30.0	14.5	735	715
16	8	6.5	30.0	14.5	760	740
16	10	6.5	30.0	14.5	800	780
16	12	6.5	30.0	14.5	835	815
16	14	6.5	30.0	14.5	930	940
16	16	6.5	30.0	14.5	990	1000
18	10	7.0	32.0	15.0	975	950
18	12	7.0	32.0	15.0	1015	990
18	14	7.0	32.0	15.0	1075	1050
18	16	7.0	32.0	15.0	1175	1195
18	18	7.0	32.0	15.0	1255	1270
20	12	8.0	35.0	16.0	1260	1230
20	14	8.0	35.0	16.0	1320	1290
20	16	8.0	35.0	16.0	1375	1345
20	18	8.0	35.0	16.0	1510	1530
20	20	8.0	35.0	16.0	1525	1535
24	14	9.0	40.5	17.0	1865	1825
24	16	9.0	40.5	17.0	1925	1885
24	18	9.0	40.5	17.0	1990	1950
24	20	9.0	40.5	17.0	2105	2135
24	24	9.0	40.5	17.0	2390	2425

NOTE: Weights shown do not include joint accessories. See page 2 for accessory weight information.

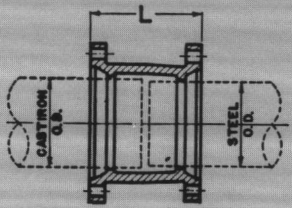
Refer to current price sheet for items manufactured by, and available through, Trinity Valley Iron and Steel Co.

SIZE		DIMENSIONS			WEIGHTS	
Run	Branch	H	J	S	TV-119	TV-120
2	2	3.5	3.5	-------	27	-------
2¼	2¼	3.5	3.5	-------	30	-------
3	3	5.5	5.5	13.5	70	70
4	2	6.5	6.5	14.5	60	-------
4	3	6.5	6.5	14.5	90	85
4	4	6.5	6.5	14.5	105	100
6	3	8.0	8.0	16.0	125	120
6	4	8.0	8.0	16.0	140	135
6	6	8.0	8.0	16.0	160	155
8	3	9.0	9.0	17.0	170	165
8	4	9.0	9.0	17.0	185	180
8	6	9.0	9.0	17.0	205	200
8	8	9.0	9.0	17.0	235	230
10	4	11.0	11.0	19.0	260	260
10	6	11.0	11.0	19.0	285	285
10	8	11.0	11.0	19.0	310	310
10	10	11.0	11.0	19.0	380	380
12	4	12.0	12.0	20.0	340	340
12	6	12.0	12.0	20.0	360	360
12	8	12.0	12.0	20.0	385	385
12	10	12.0	12.0	20.0	460	460
12	12	12.0	12.0	20.0	495	495
14	4	14.0	14.0	22.0	500	475
14	6	14.0	14.0	22.0	525	505
14	8	14.0	14.0	22.0	550	535
14	10	14.0	14.0	22.0	585	570
14	12	14.0	14.0	22.0	630	615
14	14	14.0	14.0	22.0	710	695
16	4	15.0	15.0	23.0	630	610
16	6	15.0	15.0	23.0	650	630
16	8	15.0	15.0	23.0	675	655
16	10	15.0	15.0	23.0	710	690
16	12	15.0	15.0	23.0	745	725
16	14	15.0	15.0	23.0	830	810
16	16	15.0	15.0	23.0	895	875
18	6	13.0	15.5	21.0	705	680
18	8	13.0	15.5	21.0	730	705
18	10	13.0	15.5	21.0	760	735
18	12	13.0	15.5	21.0	790	765
18	14	16.5	16.5	24.5	990	965
18	16	16.5	16.5	24.5	1060	1035
18	18	16.5	16.5	24.5	1130	1105
20	6	14.0	17.0	22.0	865	835
20	8	14.0	17.0	22.0	890	860
20	10	14.0	17.0	22.0	920	890
20	12	14.0	17.0	22.0	955	920
20	14	14.0	17.0	22.0	1025	990
20	16	18.0	18.0	26.0	1245	1215
20	18	18.0	18.0	26.0	1330	1300
20	20	18.0	18.0	26.0	1415	1385
24	6	15.0	19.0	23.0	1180	1140
24	8	15.0	19.0	23.0	1200	1160
24	10	15.0	19.0	23.0	1230	1190
24	12	15.0	19.0	23.0	1260	1220
24	14	15.0	19.0	23.0	1325	1285
24	16	15.0	19.0	23.0	1375	1335
24	18	22.0	22.0	30.0	1865	1820
24	20	22.0	22.0	30.0	1965	1925
24	24	22.0	22.0	30.0	2155	2115

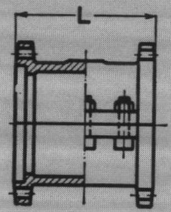
MECHANICAL JOINT SLEEVES



MJ SOLID
TV-121 — Short
TV-122 — Long



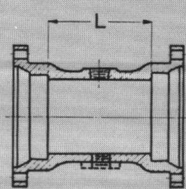
MJ Transition
TV-123



MJ Split
TV-124 — Short
TV-125 — Long

Size	MJ Sleeve				MJ Transition Sleeve		MJ Split Sleeve			
	TV-121		TV-122		TV-123		TV-124		TV-125	
	Short		Long				Short		Long	
	L	Wt.	L	Wt.	L	Wt.	L	Wt.	L	Wt.
2	8	12	----	------	------	------	10	26	----	--------
2¼	8	15	----	------	------	------	----	------	----	--------
3	7.5	25	12	30	7.5	25	10	65	15	90
4	7.5	35	12	45	7.5	35	10	90	15	115
6	7.5	45	12	65	7.5	45	10	125	18	165
8	7.5	65	12	85	7.5	65	10	150	18	215
10	7.5	85	12	115	7.5	85	10	190	18	270
12	7.5	110	12	145	7.5	110	10	235	18	335
14	9.5	165	15	225	15	235	11	425	18	530
16	9.5	200	15	275	15	285	11	490	18	620
18	9.5	240	15	330	15	340	11	560	18	715
20	9.5	275	15	380	15	390	11	655	18	840
24	9.5	360	15	505	15	520	11	915	18	1150

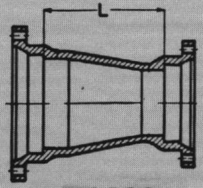
MECHANICAL JOINT TAPPED TEES AND CROSSES



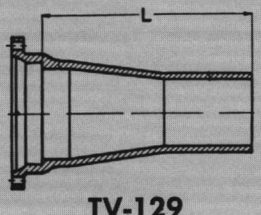
TV-126 Tapped Tee **TV-127** Tapped Cross

Dimension		Weights	
Size	L	TV-126	TV-127
2″	8	11	11
2¼″	8	14	14
3″	8	35	35
4″	8	45	45
6″	8	70	70
8″	8	95	95
10″	8	130	130
12″	8	165	165
14″	8	235	235
16″	8	290	290
18″	8	350	350
20″	8	420	420
24″	8	555	555

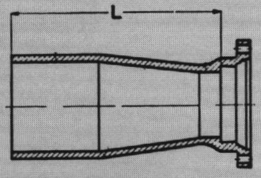
MECHANICAL JOINT REDUCERS



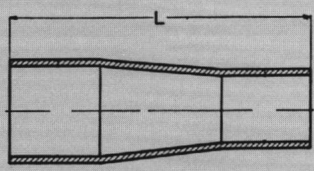
TV-128
MJ Reducer



TV-129
MJ Large End Bell Reducer



TV-130
MJ Small End Bell Reducer



TV-131
Plain End — Plain End Reducer

SIZE	LAYING LENGTHS (L)				WEIGHTS			
	MJ	MJ-SEB	MJ-LEB	PE x PE	MJ	MJ-SEB	MJ-LEB	PE x PE
3x2	6	14	14	22	25	25	20	20
4x2	7	15	15	23	30	30	30	25
4x2¼	7	15	15	23	30	30	30	25
4x3	7	15	15	23	40	35	40	35
6x2	9	17	17	25	45	45	45	40
6x2¼	9	17	17	25	45	45	45	40
6x3	9	17	17	25	55	50	55	50
6x4	9	17	17	25	60	60	60	55
8x3	11	19	19	27	75	70	75	70
8x4	11	19	19	27	80	80	80	75
8x6	11	19	19	27	95	90	90	85
10x4	12	20	20	28	105	100	100	100
10x6	12	20	20	28	115	115	115	115
10x8	12	20	20	28	135	130	130	130
12x4	14	22	22	30	135	130	130	130
12x6	14	22	22	30	150	150	145	145
12x8	14	22	22	30	165	165	165	165
12x10	14	22	22	30	190	190	185	185
14x6	16	24	24	32	200	185	200	185
14x8	16	24	24	32	220	205	220	205
14x10	16	24	24	32	245	230	245	230
14x12	16	24	24	32	270	255	275	260
16x6	18	26	26	34	250	230	250	230
16x8	18	26	26	34	270	250	270	250
16x10	18	26	26	34	300	280	300	280
16x12	18	26	26	34	325	305	330	310
16x14	18	26	26	34	370	350	355	335
18x8	19	27	27	35	320	295	320	295
18x10	19	27	27	35	350	325	350	325
18x12	19	27	27	35	380	355	385	360
18x14	19	27	27	35	425	400	410	385
18x16	19	27	27	35	465	440	445	420
20x10	20	28	28	36	410	380	410	380
20x12	20	28	28	36	440	410	445	415
20x14	20	28	28	36	485	455	470	440
20x16	20	28	28	36	530	500	510	475
20x18	20	28	28	36	575	545	550	520
24x12	24	32	32	40	610	570	615	575
24x14	24	32	32	40	660	620	645	605
24x16	24	32	32	40	705	655	685	645
24x18	24	32	32	40	760	720	735	695
24x20	24	32	32	40	815	775	785	745

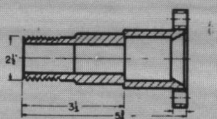
NOTE: Weights shown do not include joint accessories. See page 2 for accessory weight information.

Trinity Valley mechanical joint fittings sizes 4"-12" are listed by Underwriters Laboratories Inc.

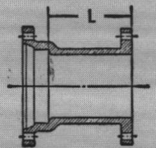
AWWA C110-71, C111-71; ANSI A-21.10, ANSI A-21.11. Class 250.

Refer to current price sheet for items manufactured by, and available through, Trinity Valley Iron and Steel Co.

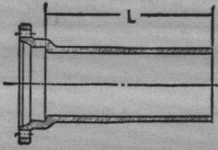
MECHANICAL JOINT ADAPTERS



TV-132
MJ x MIPT Adapter

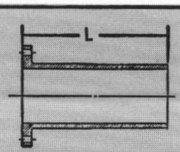


TV-133
MJ x Flange

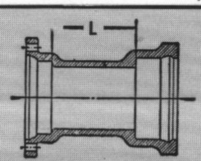


TV-134
MJ x PE

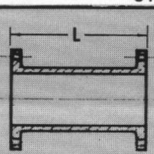
SIZE	TV-132		TV-133		TV-134	
	L	Wt.	L	Wt.	L	Wt.
2x2½	3½	8	----	------	----	------
2¼x2½	3½	9	----	------	----	------
3	------	----	8	30	16	35
4	------	----	8	40	16	45
6	------	----	8	60	16	65
8	------	----	8	85	16	95
10	------	----	8	115	16	125
12	------	----	8	155	16	165
14	------	----	8	210	16	220
16	------	----	8	260	16	270
18	------	----	8	305	16	325
20	------	----	8	365	16	385
24	------	----	8	495	16	515



TV-135
Flange x PE

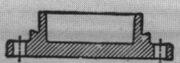


TV-136
MJ x Bell

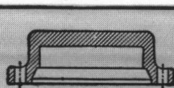


TV-137
Flange x Flange

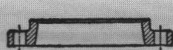
SIZE	TV-135		TV-136		TV-137	
	L	Wt.	L	Wt.	L	Wt.
3	16	30	8	40	8	30
4	16	40	8	55	8	40
6	16	55	8	80	8	60
8	16	85	8	115	8	85
10	16	115	8	150	8	115
12	16	155	8	190	8	165
14	16	195	8	255	8	195
16	16	240	8	320	8	240
18	16	280	8	385	8	280
20	16	335	8	465	8	340
24	16	455	8	620	8	455



TV-140



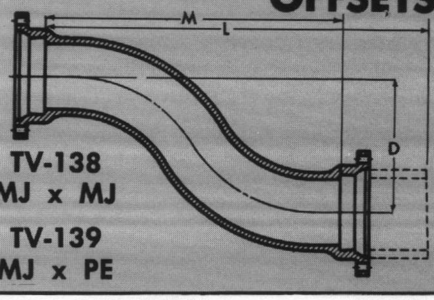
TV-141



TV-142

PLUGS		CAPS		GLANDS	
Size	Weight	Size	Weight	Size	Weight
2	5	2	5	2	3
2¼	6	2¼	6	2¼	4
3	14	3	13	3	5
4	20	4	20	4	6
6	30	6	30	6	11
8	50	8	45	8	18
10	65	10	55	10	20
12	85	12	75	12	30
14	115	14	130	14	35
16	150	16	175	16	45
18	195	18	215	18	55
20	225	20	250	20	70
24	330	24	370	24	90

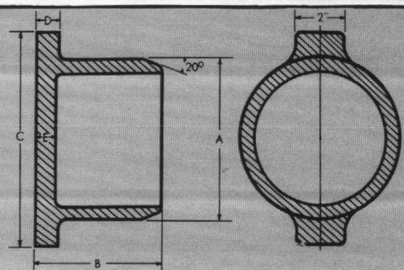
MECHANICAL JOINT OFFSETS



TV-138
MJ x MJ

TV-139
MJ x PE

SIZE	DIMENSIONS			WEIGHTS	
	M	L	D	TV-138	TV-139
3	19	27	6	50	50
3	22	30	12	60	60
3	30	38	18	75	75
4	19	27	6	75	70
4	22	30	12	85	80
4	30	38	18	105	100
4	26	34	24	140	125
6	20	28	6	110	105
6	26	34	12	135	130
6	33	41	18	165	160
6	22.25	30.25	24	190	185
8	21	29	6	160	155
8	28	36	12	200	195
8	35	43	18	245	240
8	34.25	42.25	24	315	310
10	22	30	6	220	220
10	30	38	12	280	280
10	38	46	18	340	340
12	26	34	6	320	320
12	37	45	12	420	420
12	48	56	18	520	520
14	27	35	6	435	420
14	38	46	12	560	545
14	49	57	18	680	665
16	27	35	6	535	515
16	40	48	12	715	690
16	50	58	18	850	830
18	28	36	6	565	540
18	40	48	12	720	695
18	51	59	18	865	840
20	28	36	6	670	640
20	40	48	12	855	825
20	52	60	18	1040	1010
24	28	36	6	895	855
24	40	48	12	1140	1100
24	52	60	18	1385	1345



PUSH-ON JOINT PLUGS

Size	A	B	C	D	E	Wt.
2	2.50	3⅞	4½	⅝	⅝	5
2¼	2.75	3⅞	4¾	⅝	⅝	6
3	3.96	4⅜	6¼	¾	¾	10
4	4.80	5⅛	6¾	1	¾	14
6	6.90	5¼	9	1	¾	25
8	9.05	5⅝	11¼	1 1/16	¾	35
10	11.10	5¾	13½	1⅛	¾	45
12	13.20	5 13/16	15¾	1 3/16	¾	65

Reviewed
Checked
Certified
By James Gorman
So-Par Utilities Co., Inc.
Date 3/23/84

CLOW TAPPING VALVES AND SLEEVES FOR CAST IRON AND PVC PIPE

DESCRIPTION AND ADVANTAGES

In use, tapping sleeves are bolted around the main, and the bolts tightened. The valve is bolted to the flanged outlet of the sleeve and with the valve open, the tapping machine is bolted on and the tap made. The cutter is then withdrawn, the valve closed, and the machine removed. Tapping is accomplished with no interruption of service.

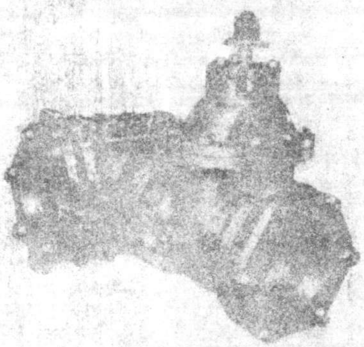
Tapping sleeves are built in two sections for easy installation, and assembled around the main without halting service. Mechanical joint tapping sleeves are furnished complete with joint accessories.

Oversize seat rings on the tapping valves permit entry of the tapping machine cutters. One end of the Push-on tapping valve has a standard flange for bolting to the sleeve; the other end has a regular Push-On bell with a flange for bolting to any standard tapping machine.

All mechanical joint tapping valves are provided with a standardized mechanical joint outlet for use with cast iron or ductile iron pipe. In all other respects these valves are similar to the Clow AWWA gate valves as regards operation and materials.

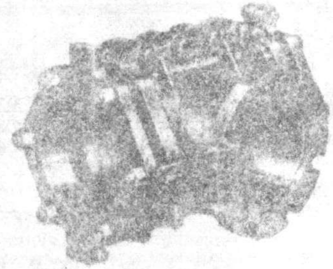
With one gasket
4" thru 12" Tapping Sleeves and Crosses fit all classes of Cast Iron Pipe.
For 14" and 16" specify either AB or CD pipe diameter.

MECHANICAL JOINT TAPPING VALVES AND SLEEVES



F-5093
Mechanical Joint Valve
2" thru 24"

Not illustrated
F-5220
Mechanical Joint
Tapping Cross
4"x2" thru 16"x12"

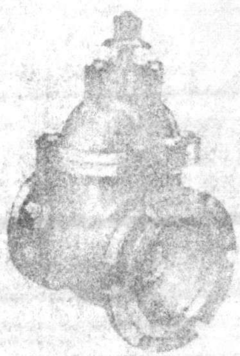


F-5205
Mechanical Joint Sleeve
4"x2" thru 16"x12"

Pressure Ratings

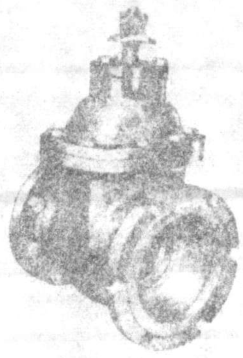
Valve Size Inches	Working Pressure psi Non-Shock Cold Water	Hydrostatic Test Pressure psi
2 thru 12	200	400
14 thru 24	150	300

PUSH-ON JOINT TAPPING VALVES



F-5082 Valve with Push-On Joint for PVC Pipe with the same O.D. as Steel Pipe

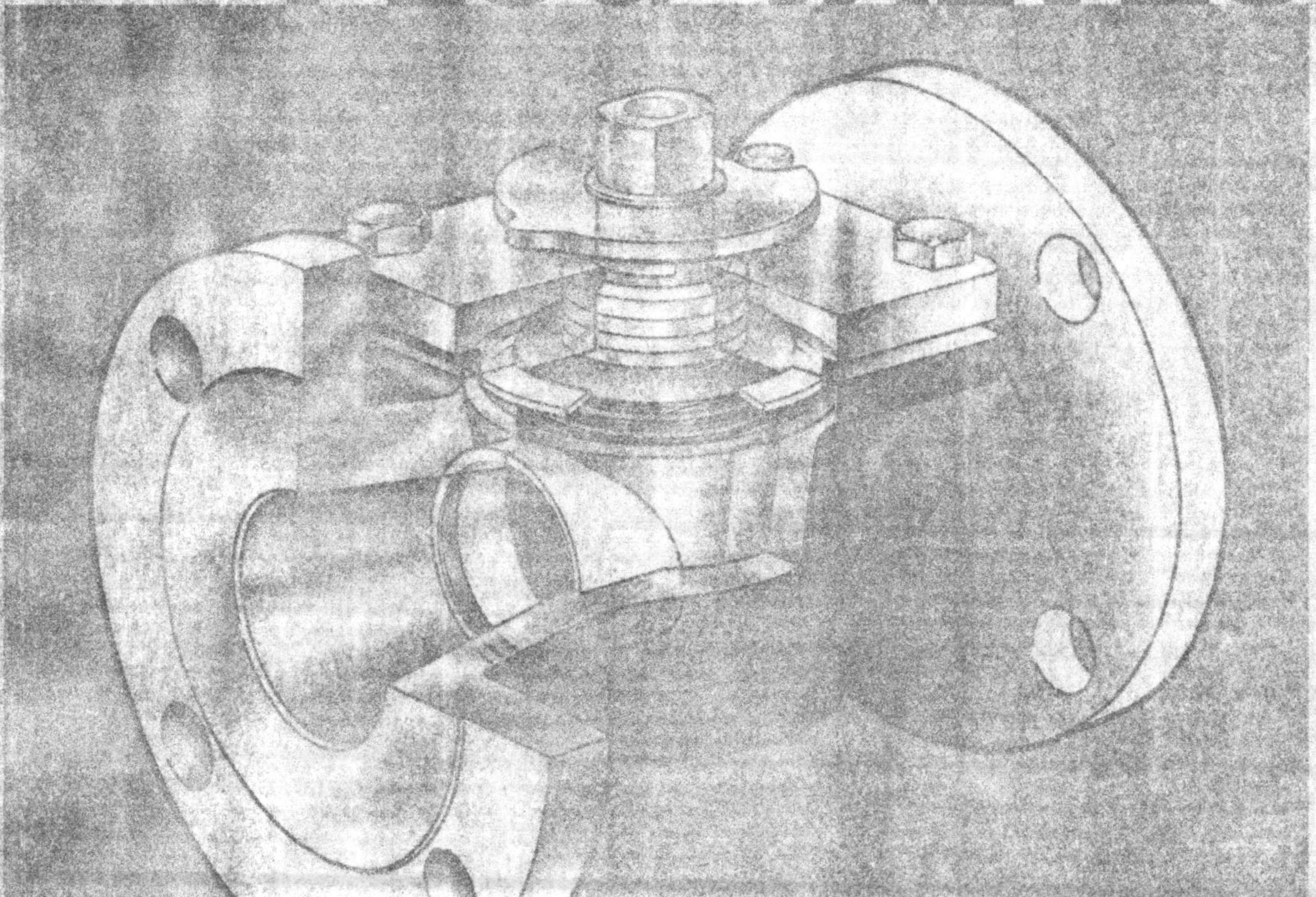
Note
The F-5082 Tapping Valve is used with either the F-5205 Sleeve or the Style 3450 Sleeve and Vegadrill shown on page 126.
The F-5211 Valve is used with the F-5205 Sleeve



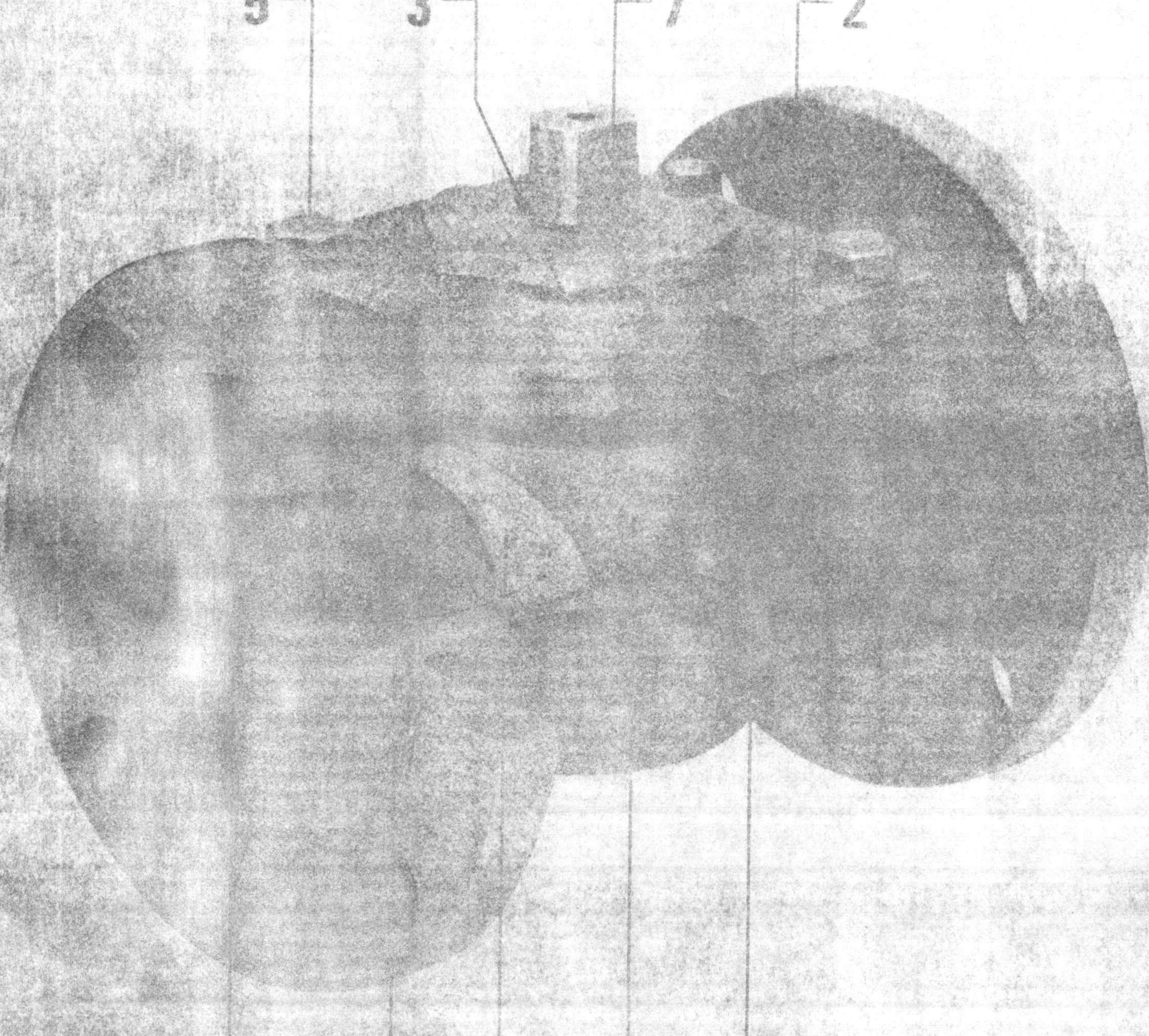
F-5211 Valve with Push-On Joint for Cast Iron Pipe or PVC Pipe with the same O.D. as Cast Iron Pipe

Reviewed
Checked
Certified
By James Gorman
So-Par Utilities Co, Inc.
Date 3/23/84

DeZURIK® PERMASEAL® PLUG VALVES



design and construction



REV. JANUARY 1979
REV. MARCH 1981
REV. FEBRUARY 1982

Unique design of the DeZURIK Permaseal non-lubricated plug valve centers around a tapered plug and two individual seats to provide a double seal and bi-directional shutoff. Design features provide long life for a broad range of applications:

1. Self-adjusting plug Compressed Belleville washers maintain positive contact between the tapered plug and the seats. The Belleville washers are located between the plug and the cover distributing a constant thrust on the plug to compensate for seat wear as well as for thermal expansion and contraction. The Permaseal design does not rely on line pressure for tight sealing.

2. Self-aligning double seat Tapered design of the plug provides automatic self-alignment of the two separate seats. Unique seat design combined with the self-adjusting plug seals both ports at the same time and provides bi-directional shutoff for working pressures to 740 psi (ANSI 300).

3. Dynamic stem seal Thrust from the Belleville washers also provides a self-adjusting stem seal. Uniform pressure on the multiple ring packing continuously adjusts for wear to assure a long life stem seal and reduce maintenance.

4. Seat wiping action Wiping action of the plug on the raised seats prevents the trapping of material that can cause excessive wear.

5. Top entry allows ease of maintenance Top entry design allows seat replacement without removing the valve from the line. Worn seats are quickly removed and new seats inserted without special tools. External indication of seat wear is provided by the position stop plate. As the seats wear, the stop plate moves closer to the valve cover. When contact is made, the seats should be replaced. The stop plate also restricts downward plug movement to prevent metal to metal contact that could cause plug damage. A grounding spring is located between the plug stem and stop lug to prevent static electricity buildup.

6. High flow capacity Straight-through flow and a large port minimize turbulence and pressure loss.

7. Low torque, quarter turn operation Because the Permaseal plug contacts only the seats and not the body walls, torque is much less than in a sleeved or lined valve and remains constant. This lower torque allows the use of smaller actuators for lower cost.

8. Choice of actuators Optional actuators include a complete line of manual or powered models: lever, handwheel, double acting cylinder, spring return cylinder and electric motor.

9. Variety of seat materials Seat options meet a wide range of application requirements. Seat materials include PTFE, Reinforced PTFE and UHMW* polyethylene, all of which provide drip tight shutoff. A carbon graphite seat is available for high temperature applications where drip tight shutoff is not required.

10. Choice of body and plug materials A choice of body and plug materials includes: 316 stainless steel, carbon steel, Alloy 20, and others.

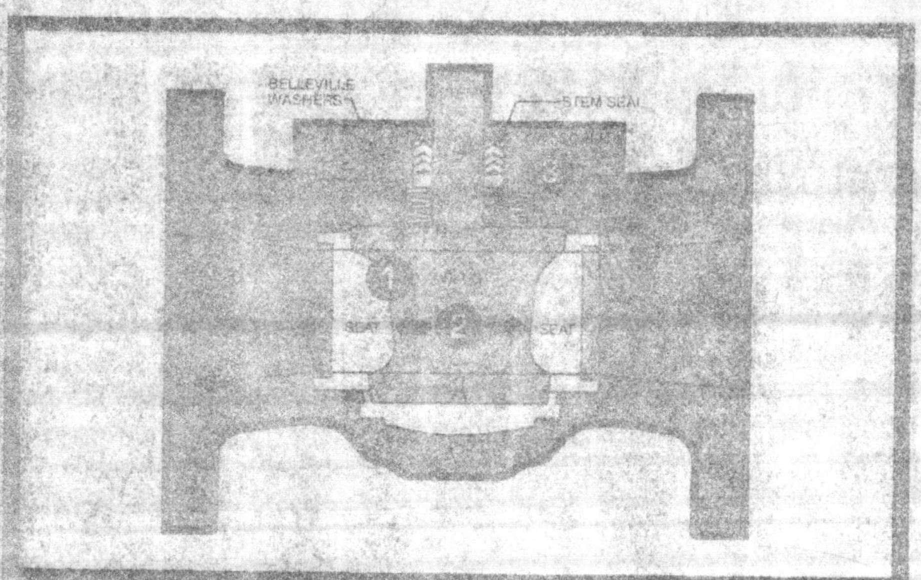
11. Body designs The versatile Permaseal design offers a variety of models including: two-way and three-way flow patterns, partial, full, and bolt-on jackets, double block and bleed plus flush through valves.

12. Choice of end connections Options include: ½"-2" threaded, ½"-6" flanged, ½"-2" socket weld, ½"-6" butt weld. Raised face flanges are standard for all ratings and materials.

13. Temperature ratings to 1000 °F Seat materials engineered to application requirements provide the right seat for temperatures to 1000 °F.

14. ANSI 150 and 300 ratings Valves in sizes from ½"-6" can be furnished in ANSI 150 and 300 lb. models.

*Ultra-high molecular weight.



Reviewed
Checked
Certified
By James Gorman
So-Par Utilities Co., Inc.
Date 3/23/84

CLOW LIST 115 HORIZONTAL SWING CHECK VALVES

IRON BODY, BRONZE MOUNTED

4" THRU 12"

(See Page 137 for other sizes and details)

DESCRIPTION

Clow horizontal swing check valves are used whenever fluid flow must be in only one direction and where any reverse flow must be prevented. These valves are suitable for installation in pumping stations, filtration plants, sewage plants, fire protection systems, industrial plants, and other installations where flow must be regulated. Clow check valves can be used in either horizontal or vertical installations and are designed with ample safety factor.

DESIGN AND CONSTRUCTION

End Types Available

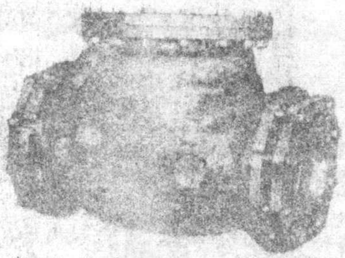
Flanged	4"–12"
Mechanical Joint	4"–12"

Valves are regularly manufactured iron body bronze mounted and can be supplied plain, or with optional weight and lever or spring and lever. The optional weight or spring can assist gates in closing; allow a predetermined head to accumulate against the gate before it is opened; or to assist the gate in opening.

When required, special options are available on the Clow check valve including leather or rubber faced gates. Aluminum gates can be furnished for air service in certain sizes.

Pressure Rating

Valve Size Inches	Non-Shock Cold Water	Hydrostatic Test Pressure psi
4 thru 12	175	350

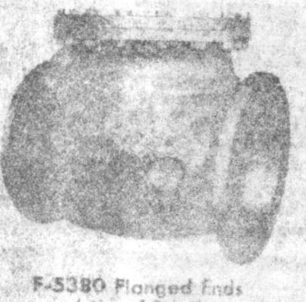


F-5385 Mechanical Joint 4 thru 12-inch

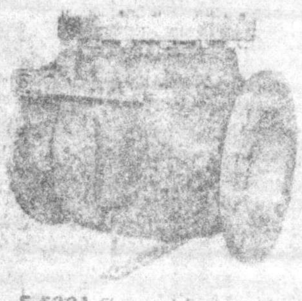
Not illustrated

F-5386—Mechanical Joint, Outside Spring and Lever

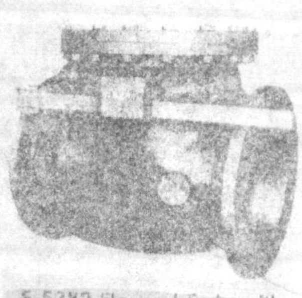
F-5387—Mechanical Joint, Outside Lever and Weight



F-5380 Flanged Ends 4 thru 12-inch



F-5381 Flanged Ends, with Outside Spring and Lever 4 thru 12-inch



F-5382 Flanged Ends, with Outside Lever and Weight 4 thru 12-inch

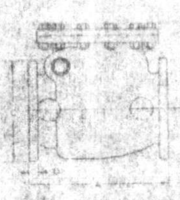
ORDERING INFORMATION

Please furnish all the information requested below:

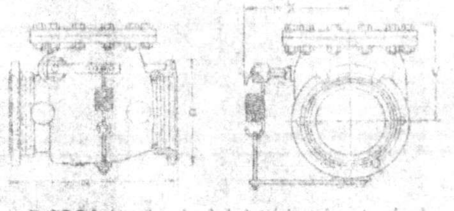
1. **Quantity.**
2. **Size.**
3. **Type:** Whether plain, outside lever and weight, or outside lever and spring.
4. **End Types:** Whether flanged or Mechanical Joint.
5. **Special Features:** Leather or rubber facings, aluminum or bronze gates, etc.

CLOW LIST 115 HORIZONTAL SWING CHECK VALVES

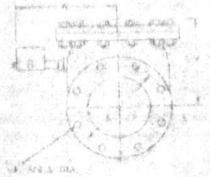
4" thru 12"
DIMENSIONS



F-5380 Flanged Ends



F-5386 Mechanical Joint, showing typical dimensions of Outside Spring and Lever



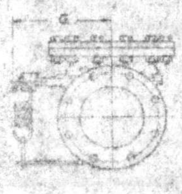
F-5382 Flanged Ends, showing Outside Lever and Weight

Dimensions—Inches

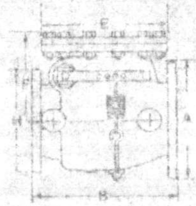
Valve Size in Inches		4	6	8	10	12
A	Face to face of flanges	13	16	18	22	26
C	Diameter of end flanges	9	11	13½	16	19
D	Thickness of end flanges	15/16	1	1⅛	1 3/16	1¼
E	Diameter of bolt circle	7½	9½	11¾	14¼	17
F	Number and diameter of bolts	8-⅝	8-¾	8-¾	12-⅞	12-⅞
N	Face to face of mechanical joints	14¼	17¾	20¾	[illegible]	27
Q	Outside diameter of mechanical joint end	9⅝	11 5/16	13⅝	15 13/16	18 1/16
V	Center line of port to top of cover	7 13/16	9¾	11½	14 1/16	15⅜
W	Center line of valve to end of hinge pin of valve with weight and lever	10⅝	12 5/16	12¾	14½	15¼
X	Center line of valve to outside of spring	9⅞	11 11/16	12¼	13⅞	14⅝

Flanges faced and drilled to ANSI 125 pound template, unless otherwise instructed.

INCREASING HORIZONTAL SWING CHECK VALVES



F-5388 Flanged Ends, showing Outside Spring and Lever



F-5388 Side View Flanged Ends, showing Outside Spring and Lever

Dimensions—Inches

Valve Size Inches	A	B	E	F	G	H
4x6	11	13½	10½	7 11/16	9⅞	9
4x8	13½	15	10½	[illegible]	9⅞	9
6x8	13½	16¼	13½	9¾	11 11/16	11

CHECK VALVE ORDERING INFORMATION

Please furnish all the information requested below:

1. Quantity.

2. Size.

3. Type: Whether plain, outside lever and weight, or outside lever and spring.

4. End Types: Whether flanged or Mechanical Joint.

5. Special Features: Leather or rubber facings, aluminum or bronze gauges, etc.

CERTIFICATES OF CONFORMANCE

J-M Manufacturing Company, Inc.
P. O. Box 185
Green Cove Springs, Florida 32043

J-M Manufacturing Company, Inc.

March 13, 1984

So-Par Utilities Co., Inc.
P. O. Box 384
Jacksonville, N.C. 28540

REF: UNACCOMPANIED EM HOUSE
CAMP JOHNSON
JACKSONVILLE, N.C. 28540

Gentlemen:

This is to certify that J-M Manufacturing Co., Inc. proposes to furnish the below listed materials manufactured in accordance with the specifications for the above listed project. These specifications are also listed below opposite the material to which they refer. We further cerfity that we will furnish a notorized certificate of compliance, if requested, that we have furnished materials to the specifications as listed:

Quantity	Size	Material	Specifications
4220 ft.	8"	CLASS 150 DR 18	AWWA C-900
2820 ft.	6"	CLASS 150 DR 18	AWWA C-900
280 ft.	4"	CLASS 150 DR 18	AWWA C-900
340 ft.	2"	"RING-TITE" 160 SDR 26	ASTM D-2241

Sincerely,

L. G. Foster

L. G. Foster
Physical Distribution Manager

STATE OF FLORIDA

COUNTY OF CLAY

On the 13 day of MARCH, 1984, before me came L.G. FOSTER, to me known to be the individual described in and who executed the fore-foing instrument and acknowledged that he executed the same.

Reviewed
Checked
Certified
By
So-Par Utilities Co., Inc.
Date 3/23/84

Carmen Costa
Notary Public

NOTARY PUBLIC STATE OF FLORIDA AT LARGE
MY COMMISSION EXPIRES OCT. 29 1984
BONDED THRU GENERAL INS. UNDERWRITERS

Trinity Valley
3400 BRYCE P.O. BOX 2388 FORT WORTH, TEXAS 76113 TELEPHONE (817) 738-1925
iron & steel company

March 7, 1984

FERGUSON ENTERPRISES, INC.
136 Center Street (24 Rd)
Jacksonville, NC 28540

Reference: MATERIAL FURNISHED BY TRINITY VALLEY IRON AND STEEL COMPANY TO FERGUSON ENTERPRISES, INC., JACKSONVILLE, NORTH CAROLINA FOR SO-PAR UTILITIES, UNACCOMPANIED ENLISTED PERSONNEL HOUSING, MARINE CORP. BASE, CAMP LE JUENE, NORTH CAROLINA.

This is to certify that the Cast Iron Mechanical Joint Fittings manufactured by us will conform to ANSI/AWWA C110/A21.10-82 Specifications covering Class 250 Short Body Fittings and ANSI/AWWA C111/A21.11-80 for Mechanical Joints.

Sincerely,

TRINITY VALLEY IRON & STEEL CO.

HEW

H.E. Ward
Vice President of Sales

SUBSCRIBED AND SWORN TO
BEFORE ME THIS 7TH DAY
OF MARCH, 1984.

Amanda K. Bare
Notary Public
Tarrant County, Texas.
My commission expires 8/15/87.

Reviewed
Checked
Certified
By James Sowers
So-Par Utilities Co., Inc.
Date 3/23/84

Pipe/Valve Division
Clow Corporation

South Second Street
P.O. Box 350
Oskaloosa, IA 52577

515 673-8611

CERTIFICATE OF COMPLIANCE

This is to certify that the product below supplied by Clow Corporation is in compliance with the following specifications.

ANSI/AWWA C502-80

Sold To: Ferguson Entr.
136 Center St
Jacksonville, NC 28540

CLOW

Shipped To: Unaccompanied
Enlisted Personnel Hsng.
Marine Corp-Base Station
Camp LeJeune, NC

Certification Mailed To: ~~Sold to~~ ~~12 copies~~

Quantity	Product Number	Clow SO Number	Customer PO Number
	2536		

Product Description: Clow 2500 Fire Hydrant

Fred Story
Fred Story, Quality Control Mgr.

Gary L Capps
Gary Capps, Order Entry Supvr.

State of Iowa
ss
County of Mahaska

Subscribed and sworn to before me this 9th day of March, 1984.

Edna P. Ferguson, Notary Public
My commision expires August 31, 1986

Reviewed ✓
Checked ✓
Certified
By James Young
So-Par Utilities Co., Inc.
Date 3/23/84

J-M Manufacturing Company, Inc.
P. O. Box 712
Butner, North Carolina 27509

J-M Manufacturing Company, Inc.

3-19-84
(DATE)

So-Par Utilities Co. Inc.
(NAME OF PURCHASER)

P.O. Box 384
(ADDRESS OF PURCHASER)

Jacksonville N.C. 28540
(ADDRESS OF PURCHASER)

CERTIFICATE OF INSPECTION

"THIS IS TO CERTIFY THAT J-M MANUFACTURING COMPANY, INC., STANDARD INSPECTION PROCEDURE HAS BEEN USED IN THE INSPECTION OF THE MATERIALS COVERED BY THIS ORDER. THIS INSPECTION INDICATES THAT THE MATERIAL TESTED FOR J-M MANUFACTURING COMPANY, INC., ORDER NO. ________ (YOUR ORDER NO. PBU G4 01348) COMPLIES WITH THE MATERIAL REQUIREMENTS OF SPECIFICATION ________ AWWA-C900-75 ."

MATERIAL:

DIAMETER	CLASS/TYPE	FT. SHIPPED
8"x20	150 DR18	4220
6"x20	150 DR18	2820
4"x20	150 DR18	280

BY: ________
SUPERVISOR OR MANAGER
QUALITY CONTROL

J-M Manufacturing Company, Inc.
P. O. Box 712
Butner, North Carolina 27509

J-M Manufacturing Company, Inc.

3-19-84
(DATE)

So. Par. Utilities Co. Inc.
(NAME OF PURCHASER)

P. O. Box 384
(ADDRESS OF PURCHASER)

Jacksonville N.C 28540
(ADDRESS OF PURCHASER)

CERTIFICATE OF INSPECTION

"THIS IS TO CERTIFY THAT J-M MANUFACTURING COMPANY, INC., STANDARD INSPECTION PROCEDURE HAS BEEN USED IN THE INSPECTION OF THE MATERIALS COVERED BY THIS ORDER. THIS INSPECTION INDICATES THAT THE MATERIAL TESTED FOR J-M MANUFACTURING COMPANY, INC., ORDER NO. ________ (YOUR ORDER NO. PBU G-4 01348) COMPLIES WITH THE MATERIAL REQUIREMENTS OF SPECIFICATION ________ ASTM-D 2241."

MATERIAL:

DIAMETER	CLASS/TYPE	FT. SHIPPED
6" x 20	160 SDR 26	340

BY: ________
SUPERVISOR OR MANAGER
QUALITY CONTROL

QUALITY CONCRETE

N.C. PRODUCTS
CORPORATION
CONCRETE PIPE-CONCRETE BLOCK
PRESTRESSED CONCRETE

632 PERSHING RD.
AREA CODE 919
TEL. 834-2557
P. O. BOX 27077
ZIP 27611

RALEIGH, NORTH CAROLINA

April 24, 1984

Resident Engineer
Camp Lejeune, N. C.

Dear Sir: RE: Unaccompanied Enlisted Personnel Housing
Contract N62470-82-C-2244

In accordance with request of Westminster Company, Prime Contractor, and So-Par Utilities, P. O. Box 384, Jacksonville, N. C. 28540, Sub-Contractor on above project, we wish to advise that the Precast Concrete Manholes and Joint Materials we propose to furnish to this project meet the following applicable specifications:

ASTM C-478, Precast Reinforced Concrete Manhole Sections.

AASHTO M-198 for Type B, Flexible Plastic Gaskets for Pipe Joints, Certified by the Manufacturer, (NCDOT Sect. 932-1 (F)).

Trusting the above will comply with your requirements, we remain,

Yours very truly,

N. C. PRODUCTS CORP.

Paul D. Gardner

Paul D. Gardner
Asst. Sales Manager - Pipe

AFFIDAVIT

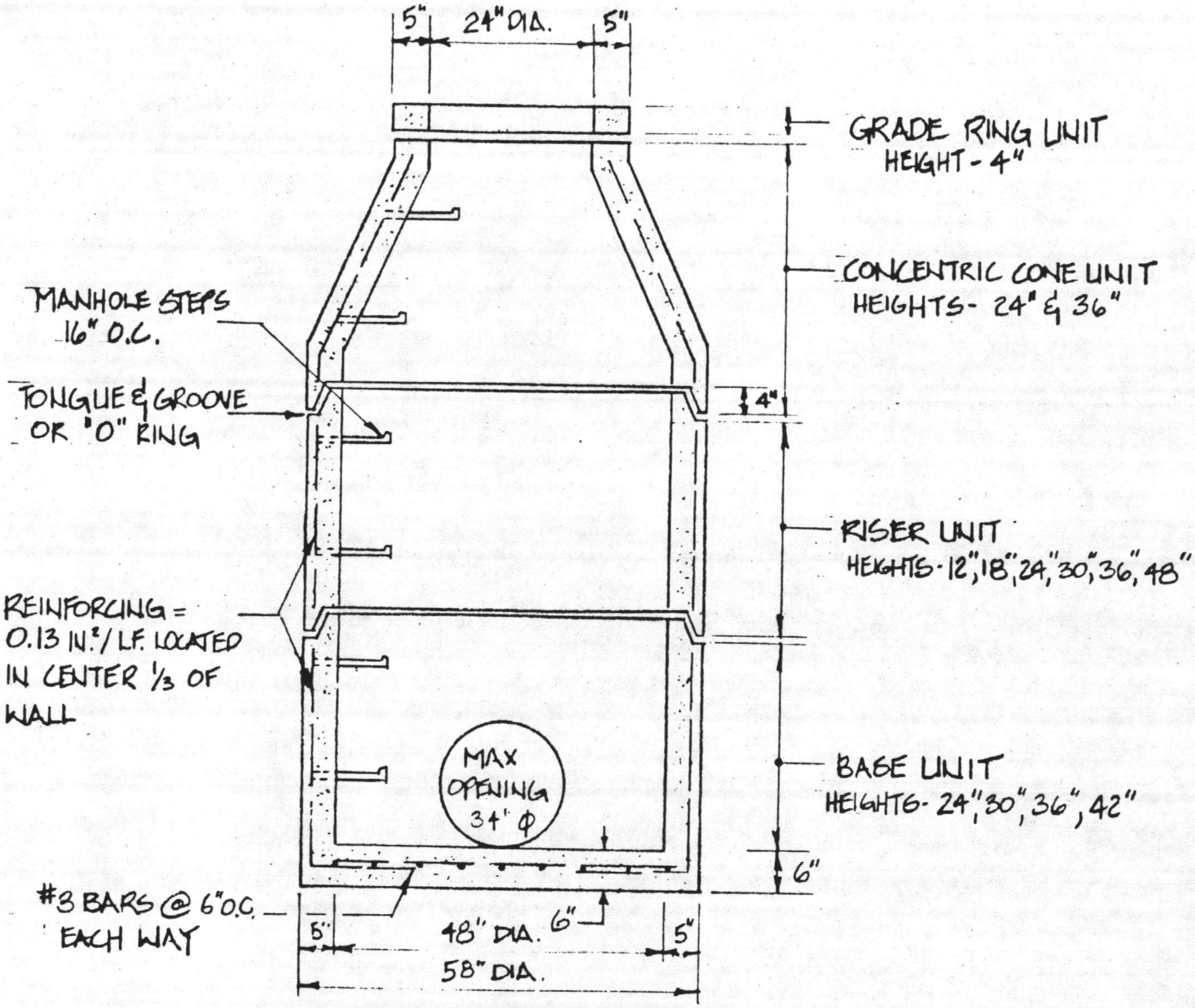
State of North Carolina
County of Wake

Personally appeared before me, Robert H. Andrews, a Notary Public, this 24th day of April 1984, Paul D. Gardner, a resident of Raleigh, N. C., who deposes and swears he is Asst. Sales Manager - Pipe for N. C. PRODUCTS CORP. and that the statement as made above is correct and true in accordance with his best knowledge and belief.

Notary Public: Robert H. Andrews

My Commission Expires: July 6, 1986.

Reviewed
Checked
Certified
By James Gomez
So-Par Utilities Co., Inc.
Date 4/25/84



NOTES

1. ALL UNITS ARE CONSTRUCTED IN ACCORDANCE W/ AND REINFORCING EQUALS OR EXCEEDS AASHO SPECIFICATION M199-73 I (ASTM C478) "PRECAST REINFORCED CONCRETE MANHOLE SECTIONS."
2. CONCRETE IS 4000 PSI PER AASHO M199.
3. MANHOLE STEPS ARE M.A. INDUSTRIES MODEL PS-1PF, STEEL REINFORCED PLASTIC.
4. ALL UNITS ARE POURED MONOLITHICLY AND STEAM CURED.
5. PIPE OPENINGS, SIZE AND LOCATION ARE TO SUIT SPCIFIC MANHOLE USE.

QUALITY CONCRETE

N.C. PRODUCTS
CORPORATION
CONCRETE PIPE · CONCRETE BLOCK
PRESTRESSED CONCRETE

RALEIGH, NORTH CAROLINA

632 PERSHING RD.
AREA CODE 919
TEL. 834-2557
P.O. BOX 27077
ZIP 27611

Circular Pipe • Arched Pipe
Elliptical Pipe

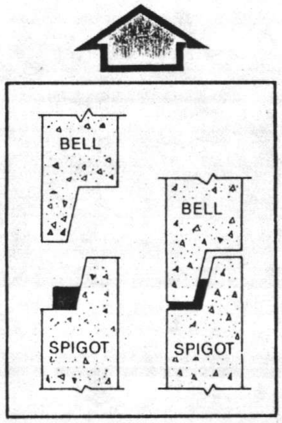
PIPE SIZE (ID)	CONSEAL SIZES RECOMMENDED 1/64″ to 1/4″*	5/16″ to 1/2″*	9/16″ to 11/16″*	PIECES PER JOINT 1/2″ to 1″ SIZE 36″ STRIP	1-1/4″ to 2″ SIZE 42″ STRIP
12″	1/2″	3/4″	1″	1	—
15″	1/2″	3/4″	1″	2	—
18″	1/2″	3/4″	1″	2	—
21″	1/2″	3/4″	1″	2	—
24″	3/4″	1″	1-1/4″	3	2
27″	3/4″	1″	1-1/4″	3	2-1/2
30″	3/4″	1″	1-1/4″	4	3
33″	3/4″	1″	1-1/4″	4	3
36″	3/4″	1″	1-1/4″	4	3
39″	1″	1-1/4″	1-1/4″	4	3-1/2
42″	1″	1-1/4″	1-1/2″	4	3-1/2
45″	1″	1-1/4″	1-1/2″	5	4
48″	1″	1-1/4″	1-1/2″	5	4
54″	1-1/4″	1-1/2″	1-3/4″	—	4-1/2
60″	1-1/4″	1-1/2″	1-3/4″	—	5
66″	1-1/4″	1-1/2″	1-3/4″	—	5-1/2
72″	1-1/4″	1-1/2″	2″	—	6
78″	1-1/4″	1-1/2″	2″	—	6-1/2
84″	1-1/2″	1-3/4″	2″	—	7
90″	1-1/2″	1-3/4″	2″	—	7-1/2
96″	1-1/2″	1-3/4″	2″	—	8
102″	1-1/2″	2″	2″	—	8
108″	1-1/2″	2″	2″	—	9

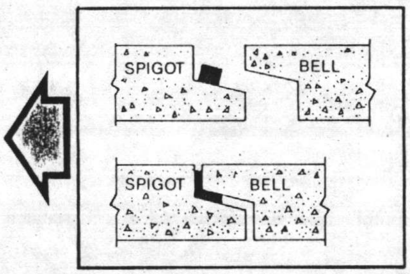
* Annular space—Determine by subtracting tongue OD from groove ID, and dividing by 2. For example: if tongue OD is 55″ and groove ID is 56″, annular space is (56-55) ÷ 2 = 1/2″.

INSTALLATION NOTE: Remove dirt and loose particles from surfaces to be joined. Primer is not usually required; however, if temperature is below 40°F, or installation is in a wet hole, or a dust condition exists, apply Concrete Sealants Primer CS-100 to joint. Remove strip or roll ConSeal from carton, and place on joint surface. On horizontal installations, place ConSeal on upper 180° of spigot, and place ConSeal on lower 180° of bell, allowing sufficient overlap of seals, then push the two surfaces together.

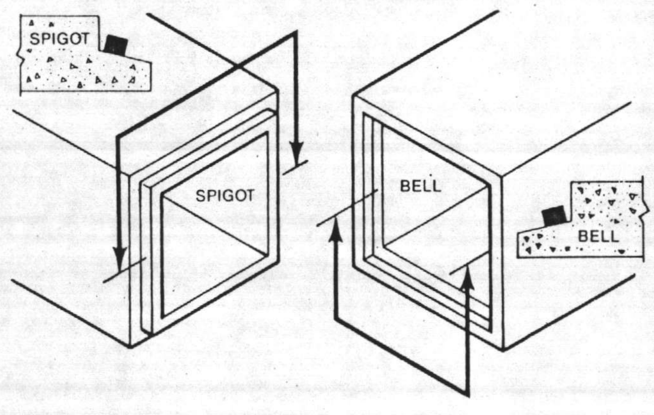
Sewer Manholes • Wet Wells

ID OF STRUCTURE	CONSEAL SIZES RECOMMENDED 1/64″ to 1/4″*	5/16″ to 1/2″*	9/16″ to 11/16″*	PIECES PER JOINT 1/2″ to 1″ SIZE 36″ STRIP	1-1/4″ to 1-3/4″ SIZE 42″ STRIP
42″	3/4″	1″	1-1/4″	4	3-1/2
48″	3/4″	1″	1-1/4″	5	4
54″	1″	1″	1-1/2″	5-1/2	4-1/2
60″	1″	1-1/2″	1-1/2″	6	5
66″	1″	1-1/2″	1-1/2″	6-1/2	5-1/2
72″	1″	1-1/2″	1-1/2″	7	6
84″	1″	1-1/2″	1-3/4″	8	7
96″	1″	1-1/2″	1-3/4″	9	8





Box Culvert Installation



Apply ConSeal on upper half of spigot and lower half of bell. Allow sufficient overlap of ConSeal to form a joined seal.

CONCRETE SEALANTS INC

8917 S. Palmer Road
P.O. Box 176
New Carlisle, Ohio 45344
Telephone: (513) 845-8776

Associate american concrete pipe association Member

Form CS501-4/83

Printed in USA

DEWEY BROS., INC.
FOUNDERS, MACHINISTS, MILL SUPPLIES
METAL BUILDING SUPPLIES-STEEL FABRICATORS
TELEPHONE 734-3411 GOLDSBORO, N. C.

LETTER OF TRANSMITTAL

TO: So-Par Utilities Co.
P. O. Box 384
Jacksonville, NC 28540
Attention: Jim Corman

Date: April 24, 1984
S. O. No.
Ref:

Gentlemen:

We are sending you ☒ Herewith ☐ Under Separate Cover:

Copies	Dwg. No.	Dated	Title
2	MH-RCR-2001		manhole ring & cover

For Your:

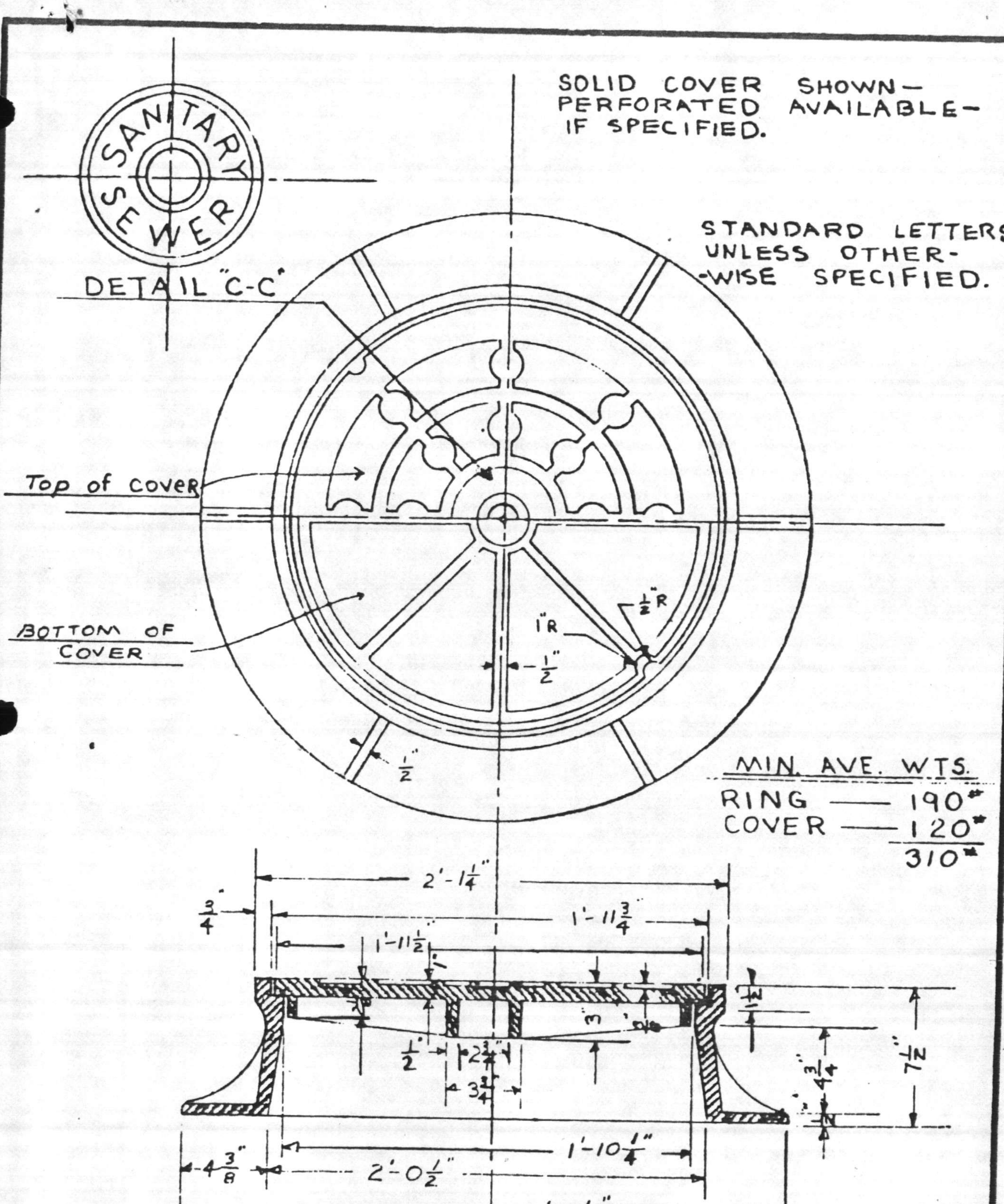
☒ Approval: Please return one print marked "Approved" or "Approved as noted".

☐ File and Field Use.

REMARKS: Reviewed ✓
Checked ✓
Certified

By [signature]
So-Par Utilities Co., Inc.
Date 4/25/84

Very truly yours,
DEWEY BROS., Inc.
Howard Tyndall
By:
Howard Tyndall aWard



SCALE = 1'-0"	DRAWN BY R. G. B.	DEWEY BROS., INC. MUNICIPAL & CONSTRUCTION CASTINGS GOLDSBORO, N. C.	TOTAL WEIGHT 310 #
A.S.T.M. CLASS A-48-30 Min	APPROVED W. R. H.		DATA SHEET NO.
MATERIAL GRAY C.I.	DATE 7-22-63	TITLE Manhole Ring & Cover	CODE NO MH RCR-2001