

SADDLEBACK COMMUNICATIONS

CONDUIT AND MANHOLE SPECIFICATIONS
Condensed Version

SALT RIVER PIMA MARICOPA INDIAN COMMUNITY

UPDATED COPY FOUND AT

<http://www.saddlebackcomm.com/developers.htm>

ISSUE #6 November 2006

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NOTE:

This Conduit specification represents the minimum acceptable conduit and manhole standards allowed by Saddleback Communications in the SRPMIC Community. These specifications are to be adhered to whenever the conduit and/or manhole system is constructed for use by Saddleback Communications.

The following is a compilation of Saddleback Communications telephone conduit specifications for providing construction guidelines for Developers. Additional detailed information can be acquired from the Saddleback Communications Engineering at 480 850-7037 or on the web at <http://www.saddlebackcomm.com/developers.htm>.

GENERAL

In accordance with the Arizona Law (revised statutes 40.360.21, 22, 24, 26 and 28), the Developer will at least forty-eight (48) hours prior to commencing excavation, call the Blue Stake Center between the hours of 7:30 A.M. and 4:30 P.M., Monday through Friday, for information concerning the location of buried utilities in the area of construction. The telephone number to call is 602 263-1100. **Saddleback Communications is not a member of Blue Stake, excavators must make a separate call directly to 480 850-7150 Option 2 to obtain locates for Saddleback communications telephone facilities.**

When the Developer decides to place the conduit structure, the Developer's Superintendent is responsible for providing final "As-Built" document plans. The Saddleback Engineering personnel will review these "As-Built" plans to ensure they are complete. **Inspections of all facilities are required prior to backfilling.** Call 480 850-7037 24 hours in advance to schedule an inspection.

Unless otherwise specified, all structures shall be a minimum of **36 inches** below final grade when joint with power and **48 inches** when placed alone.

If telephone conduits are in a joint trench with electric cable or conduit then a minimum of **12 inches separation** must be maintained at all times.

Laterals off mainline conduit structures serving as building entrances must have a minimum of 24" of cover.

1. TRENCH

1.01 The Developer should include in the trench costs, backfilling, water settling, sand shading, sand slurring, concrete encasement, and ABC backfilling when required. Granular sand shading may be required at manhole end walls to cover the splaying portion of the conduits. If approved by Saddleback Personal, on site screening can be used to obtain the proper bedding, shading and backfill material. ABC backfill is required at all road crossings.

2. CONDUIT

2.01 All 4" plastic (PVC) conduits shall be Telephone Duct Type C which complies with NEMA Standard TC-10 and Bellcore CA08546. Saddleback uses conduit manufactured by Carlon **part# 68515W-020 (white)**. If other suppliers are used provide product specifications to Saddleback Engineering for approval prior to placement. All changes must be approved by Saddleback Communications Engineering in writing.

2.02 For Multi-Cell raceway systems (Quad duct) use schedule 40 composed of four 1 ¼" pipes. Saddleback Communications uses conduit manufactured by Carlon **part# I4SFGA-020(Orange, Green, Blue, Yellow)**. Carlon

Terminator Ring **part# IRS4** must be used at each vault when installing Quad-duct. If other suppliers are used provide product specifications to Saddleback Engineering for approval prior to placement. All changes must be approved by Saddleback Communications Engineering in writing.

2.03 During construction and after the duct structure is completed, the ends of the conduits shall be plugged to prevent water washing mud into the conduits or manholes. Particular care shall be taken to keep the conduits clean of concrete, dirt, and any other substance during the course of construction.

2.04 After duct structures have been completed, all conduits shall be mandreled (see page 9)and/or swabbed to make certain that no particles of earth, sand or gravel have been left in the conduit. Where connection is made to a conduit that is of different material than the conduit being installed, a suitable coupling of a type recommended by the conduit manufacturer shall be used.



2.05 All conduits shall be stored to avoid warping or deterioration. All plastic conduits shall be stored on a flat surface and protected from the direct rays of the sun

2.06 Plastic conduit joints shall be made up in accordance with the manufacturer's recommendations for the particular conduit and coupling selected. **Conduit joint couplings shall be made watertight.** Plastic conduit joints shall be made up by brushing a plastic solvent cement on the inside of a plastic coupling fitting and on the outside of the conduit ends. The conduit and fittings shall then be slipped together with a quick one-quarter turn twist to set the joint tightly.

2.07 The installation of the telephone conduit system will be equipped with 2500 lb calibrated pulling tape (mule tape) in accordance with the plans and specifications provided by Saddleback Communications.

Typical Joint Trench Placement with Power

3 PREPARING CABINET LOCATIONS

3.01 Saddleback Communications installs cabinets in all developments. The developer provides all the conduits required for such cabinets. Templates are provided by Saddleback to insure proper conduit placement. Contact engineering two days in advance for delivery.



3.02 The developer is also responsible for power requirements to the cabinets and must include Saddleback engineers in the Salt River Project PACE process during electrical design.

Typical placement with templates.

MANHOLE

All manholes must be Utility Vault 612 TA-3. Manholes can be ordered from the following: Utility Vault Company, P.O. Box 610, Chandler, Arizona, 85224-

0610, (480) 963-2678. See 612 TA-3 manhole specifications at the end of document.

The manholes are to be below ground enclosures used for telephone cable installation and which Saddleback personnel will enter for installation and maintenance of underground cables and conductors

Manholes are to be constructed and installed in a manner so as to preclude water seepage or leakage through side walls, top, and collars. When setting manhole sections, all adjoining surfaces must be clean. Use Conseal gaskets, or equivalent to seal manhole sections.

Each manhole is to be equipped with frame, cover, ladder, bonding ribbon and racking hardware. Manhole covers are to be Saddleback Communications covers if Saddleback Communications is to own the conduit system. Covers can be obtained from East Jordan Iron Works, Inc., P.O. Box 439, East Jordan, MI 49727, Product No. NCR03-2404D, Catalog No. 1810A1VH. The ladder is to be removable in order to facilitate cable installation. See attached manhole racking sheets at the end of the document for proper placement of racking hardware. **All hardware must be place by the developer as shown on the racking sheets. No leaving it piled in the middle of the manhole. Install it properly.**

Shade material at the manhole end walls and splayed duct structure shall consist of granular sand or other approved material by Saddleback engineering. **Splayed duct structure is defined as the conduit within 40 feet of the manhole end walls.** The two acceptable methods of placing this shade material are as follows:

Slightly raise the bottom ducts leaving the manhole end walls ducts to allow adequate placement of granular sand or other approved material. Carefully place the material up to the top of the manhole in minimum of 36 inch lifts. After water settling, wait a minimum of 48 hours before placing the backfill material to final grade. (See Page 10, typical side view) Wait a minimum of 48 hours before placing the backfill material to final grade.

If other suppliers are used provide product specifications to Saddleback Engineering for approval prior to placement. All changes must be approved by Saddleback Communications Engineering in writing.

1. CONDUIT CONFIGURATION

1.01 Figure 1A illustrates an 8 duct formation of ducts.

1.02 PLASTIC CONDUIT BUNDLED-

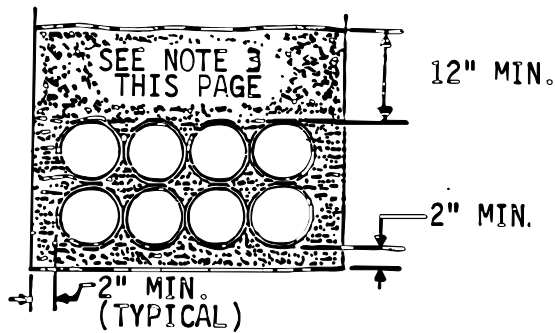


FIGURE 1A - Trench Dimensions - 8 Duct
Formation - Bundled Conduit

2. LAYING CONDUIT

At the trench site, examine each conduit length and remove all mud and other debris such as lath, paper, stones, etc, from the ducts before placing them in the trench.

Place and join the duct sections in the trench. Lengths shorter than 10 feet must not be used at manholes or the cable entrance facility. The first 10 feet of mainline conduit structure at manhole end walls should be level. Stagger joints so that they are not all in the same place for structural integrity.

Use only cement suitable for the kind of duct material being used; cement containers for use with ABS are marked for use with ABS; similarly marked are the containers to be used with PVC. Use only the adhesive supplied with B polypropylene conduit on polypropylene conduit. Solvent cement which is shipped with ABS and PVC conduit must not be used with polypropylene conduit.

Join the conduit as follows:

Wipe any mud or dirt from the end of the duct and from the inside of the coupling or bell. Apply cement to the spigot end of the duct with a natural bristle brush up to the insertion depth line. Polypropylene conduit has been designed with an interference fit bell and spigot joint. If the spigot does not seat in the bell to the insertion line, drive the conduit home using a mallet and a wooden block as a buffer.

If PVC cement seizes before the spigot end is fully seated, use a handsaw to cut out the defective joint. If polypropylene adhesive dries on the spigot end before the joint is made, recoat the spigot end and insert into bell to complete joint.

The PVC cement and polypropylene adhesive should each have about the same consistency as house paint. If it becomes too thick, discard and open a new can. When using polypropylene conduit and if immediate joint strength is required (eg, at field bends and manhole terminators), apply a thin coating of adhesive to the inside of the mating bell (or terminator). Allow a minimum of 5 minutes for adhesive to dry before completing the joint.

Straight lengths of conduit can be used to construct horizontal or vertical bends or sweeps with a radius of 50 feet or more. Duct joints for the entire bend section should be made outside the trench at least 2 hours before placing to help ensure an effective joint. An example of a partially completed bend constructed with straight lengths of conduit is shown in Fig. 3.



Fig. 3 - Partially Completed Bend

Preformed radius bends should be used to construct bends where a direction change with a radius of less than 50 feet is needed.

3. ENCASING

3.01 The concrete used to encase C plastic conduit has a nominal compression strength of 2500 pounds per square inch with 3/8" minus aggregate. The slump should be 9 inches. It is important to use concrete of this type in order to permit adequate distribution and ensure proper encasement of the conduit. When the mix is too dry, flow to the bottom and between the layers of the duct formation will be difficult. When it is too wet, strength will be reduced. **All bend less than 83' radius must be encased.**

3.02 When pouring concrete, adjust the delivery chute so the fall of concrete into the trench is as short as practicable with a maximum fall of

48 inches. Use a splash board to divert the flow of concrete away from the trench sides to avoid dislodging soil and stones.

3.03 Encasement can begin as soon as enough of the duct structure has been completed so that pouring the concrete will not interfere with placing the conduit. Encase the conduit structure by pouring the concrete toward the free ends of the ducts. As the concrete is poured, use slicing bars or other similar tools to work the concrete down the sides of the formation and between ducts. It should be possible to see the concrete flowing along the bed of the trench just ahead of the point where it falls from the chute. This will assure the required minimum of 2 inches of concrete between the first tier of ducts and the bottom of the trench.

4. PLASTIC CONDUIT PLUGS

4.01 The 4-inch Universal Plug illustrated in Fig. 4 on the next page, is a tapered, low density, polyethylene plug.

4.02 The 4-inch Universal Plug is suitable for use in any type of 4-inch diameter round bore conduit. It is designed to prevent the entrance of fluid and debris from the manhole into the duct.

4.03 The tapered end of the 4-inch Universal Plug is inserted into the bore of the duct and pressed firmly home by hand. Do not use a mallet, hammer, etc., to drive the plug into the duct bore.

4.04 The Universal Plug is not designed to withstand a head of water that would develop within the conduit structure from conduit breakage, leaking joints, etc. Do not use the plug in manholes, cable vaults, buildings, etc., where the entering ducts are required to remain sealed against water pressure or gas.

4.05 At the close of each work day, install temporary plugs, such as 4-inch universal plugs, in the ducts to keep out foreign materials.



Figure 4 Typical Universal Plug Arrangement

5. BACKFILLING

5.01 The trench can be backfilled any time after completion of the duct work. The first 12 inches of fill directly above the conduit must be

select granular material thoroughly compacted. The remainder of the trench should be backfilled with select material free of large stones, pavement, frozen material, etc, that might damage the conduit.

5.02 The trench at bends, sweeps, or grade changes, where the conduit structure has been encased, can be backfilled upon completion of the curing process. This backfill must be water settled, water jetted or tamped using lightweight equipment, such as pneumatic or vibrating tampers. If backfill cannot be placed over the concrete upon completion of the curing process, protect the concrete from weather, ie. from drying too rapidly as well as from freezing.

Fig. 4 - 4-inch Universal Plug

8. MANDRELING

8.01 After backfilling, but before any required repaving begins, draw a D conduit mandrel or equivalent (Fig. 5) through all ducts. The mandrel will pass a curve of 15 foot radius. The conduit structure should be mandrelled as follows:

8.02 If the mandrel fails to pass through the duct being tested, either the duct is obstructed or misaligned, or the curve has too small a radius. The conduit must be exposed and the defect corrected. Backfill and repeat the mandrel test in all units of conduit.

8.03 The company inspector must present during mandrel operation.

8.04 When connecting new ducts to existing ducts all ducts in the newly combined section of conduit must be mandrelled.

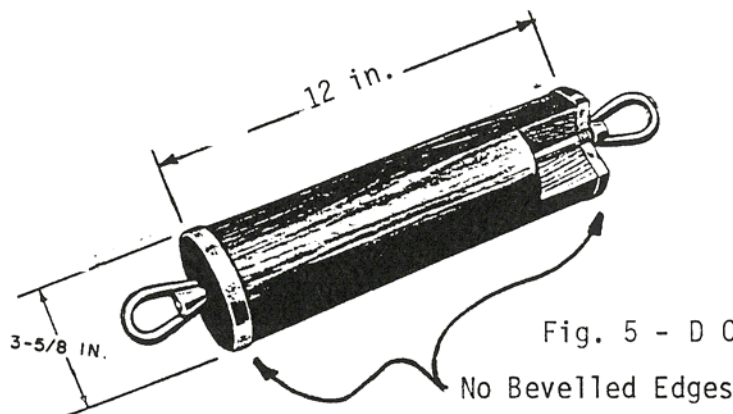


Fig. 5 - D Conduit Mandrel

9. PLUGGING DUCTS

9.01 At the completion of a manhole section, ducts are to be sealed. Where duct sealing is not mandatory, it is desirable to close each duct entrance with a 4-inch universal plug.

9.02 If the ducts are dead ended short of a terminating point, with the intention of extending the run at a later date, they are to be sealed with solid rubber conduit plugs.

9.03 At the close of each work day, install temporary plugs, such as 4-inch universal plugs, in the ducts to keep out foreign materials.

17. INSTALLING THE MANHOLE SECTIONS

17.01 Position the manhole sections and the derrick adjacent to the excavation and in a position that will permit lifting and placing the sections without encountering overhead obstructions. Where possible, avoid creating traffic obstructions. If the excavation walls will not be sloped, shored, sheeted, or otherwise supported, lifting slings used to place the manhole sections into the excavation will have to be detached from ground level or dropped into the manhole sections for later retrieval. Personnel will not be permitted to enter the excavation unless excavation walls are sloped or supported.

17.02 The joint gasket required around the perimeter of the base section and, if used, the top of the extension section may be installed either before or after the sections are placed in the excavation. In either case, the gasket and the entire joint area must be free of dirt and stones when the manhole sections are joined. Use Conseal gasket or equivalent to seal manhole sections.

17.03 Use sealing compound to join rings together. Use mortar inside the rings, to attempt to moisture proof the manhole. Mortar may also be required outside the rings or to adjust the frame and cover to final grade. Consult with Saddleback Engineering for actual requirements.

18. BACKFILLING

18.01 If backfilling cannot be completed on the same date the manhole is placed and there is any possibility of water collecting in the excavation, place water in the base section to prevent flotation or knock out two of the bottom terminators, as instructed by the Saddleback personnel, to prevent the manhole from floating.

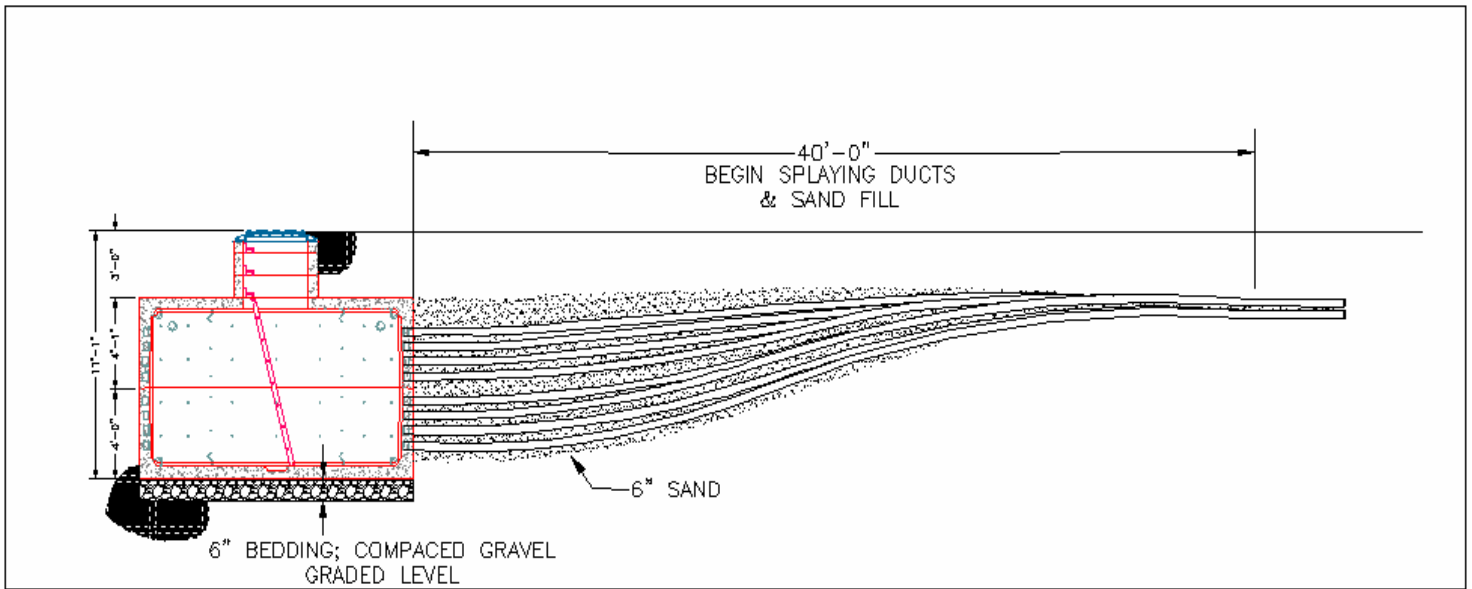
18.02 See for two methods of backfilling conduit at the manhole end walls.

18.03 In an unpaved area, the ground should be graded to a level within 1-inch of the top of the manhole frame and should slope away from the frame to prevent surface water from draining into the manhole.

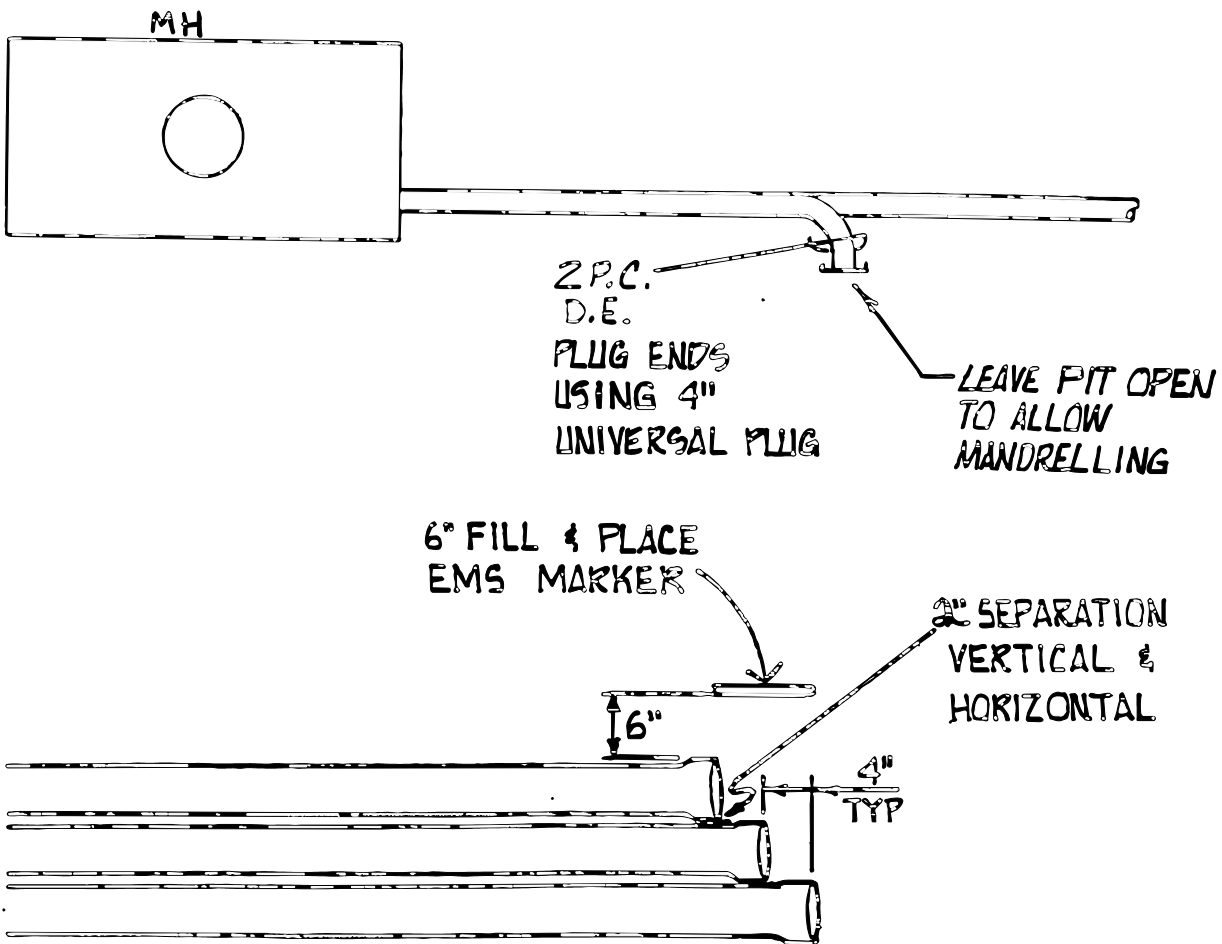
19.03 DETAILED BEDDING. SHADING AND BACKFILL REQUIREMENTS

Bedding is defined as a minimum of 2 inches of compacted material underneath the proposed conduit. Shading is defined as the compacted material placed over the bedding material to a minimum of 12 inches above the topmost conduit. Backfill is defined as the compacted material placed above the shading material to final grade.

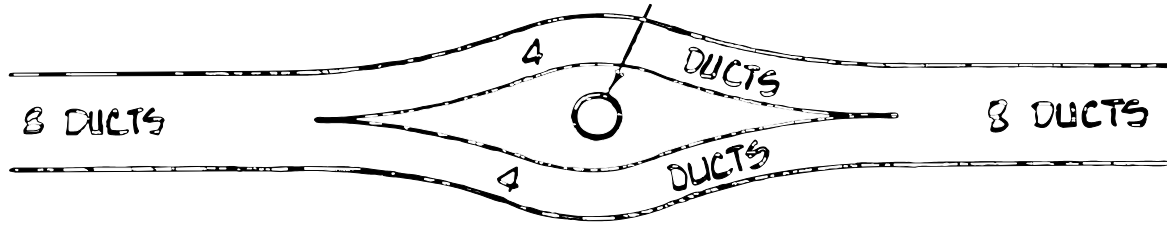
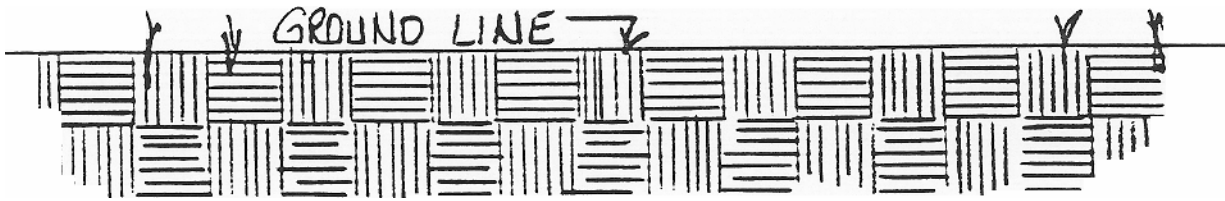
All bedding, shading and backfill material is to be free of all organic material, rubbish, debris, frozen material and other objectionable materials. If approved by Saddleback personnel, on site screening can be used to obtain the proper bedding, shading and backfill material. All bedding, shading, backfill and ABC material must be water settled, water jetted or tamped using lightweight equipment, such as pneumatic or vibrating tampers. All materials must be compacted to a minimum of 95% or meet the appropriate city, county, state or local governmental agency compaction requirements, whichever is greatest.



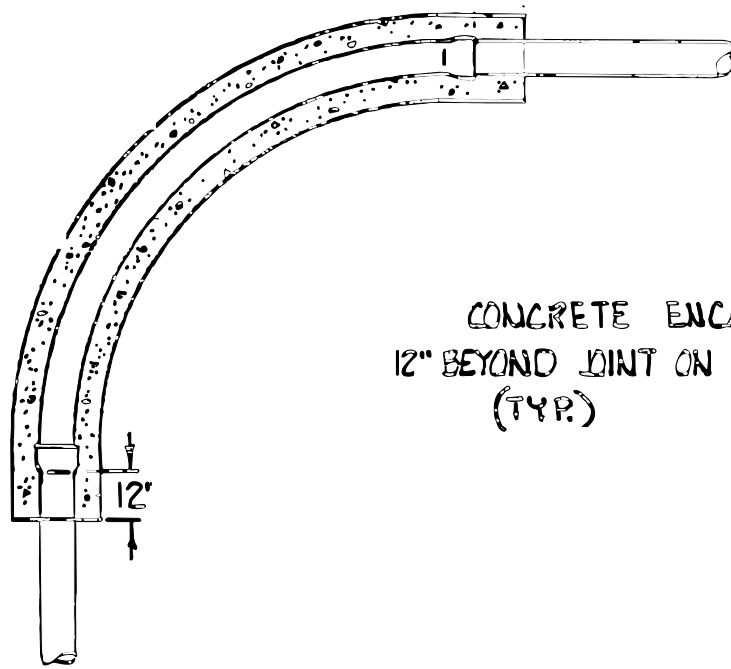
TYPICAL CONDUIT AND MANHOLE DETAIL



DEAD END POINTS
UTILIZE COUPLING END



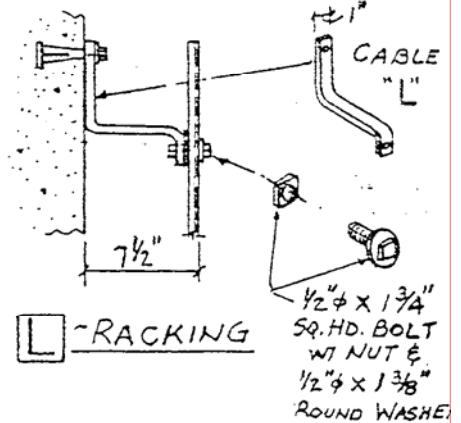
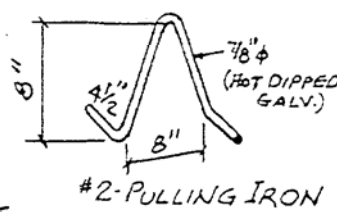
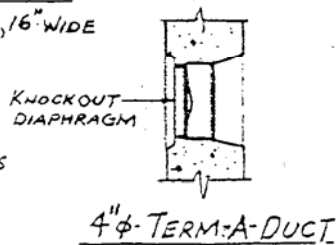
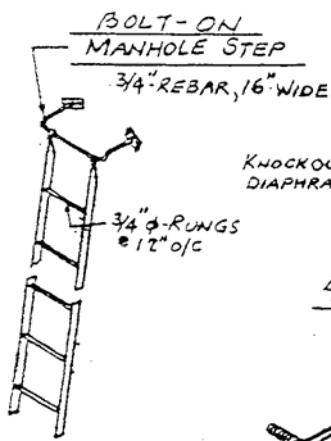
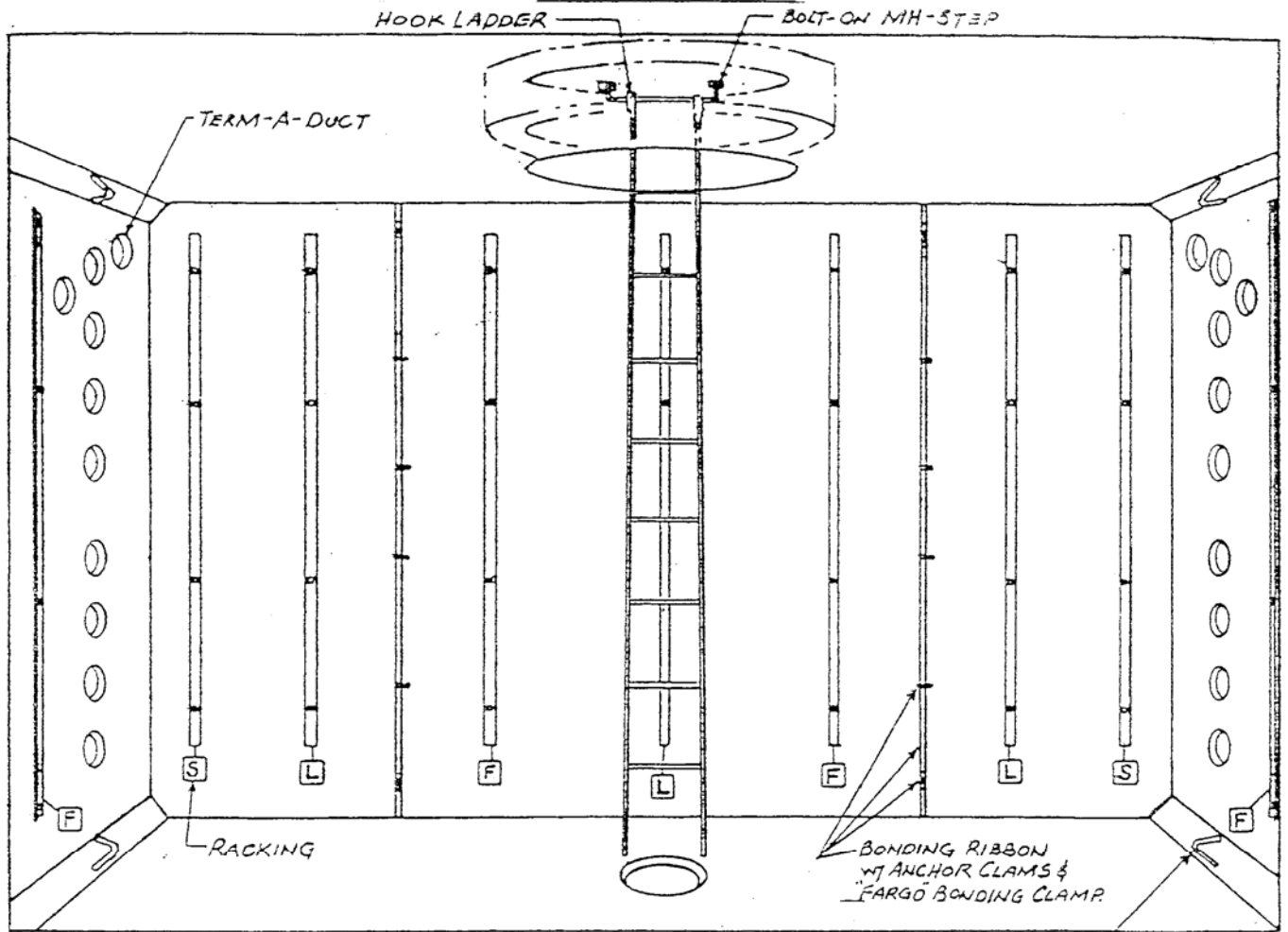
NOT ALLOWED DO NOT SPLIT DUCTS



CONCRETE ENCASI
12" BEYOND JOINT ON BO
(TYP.)

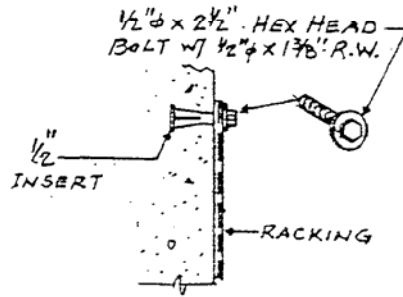
ALL BENDS LESS THAN 83' (EIGHTY THREE FEET) RADIUS REQUIRE ENCASEMENT AS SHOWN ABOVE

RACKING



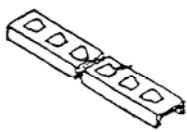
HOOK LADDER
(NOT DIPPED GALV.)

BONDING RIBBON
LEAD CLAMP

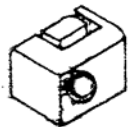


F FLUSHMOUNT
RACKING

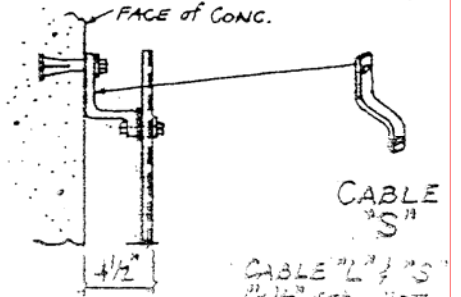
L-RACKING
1/2\"/>



RACKING

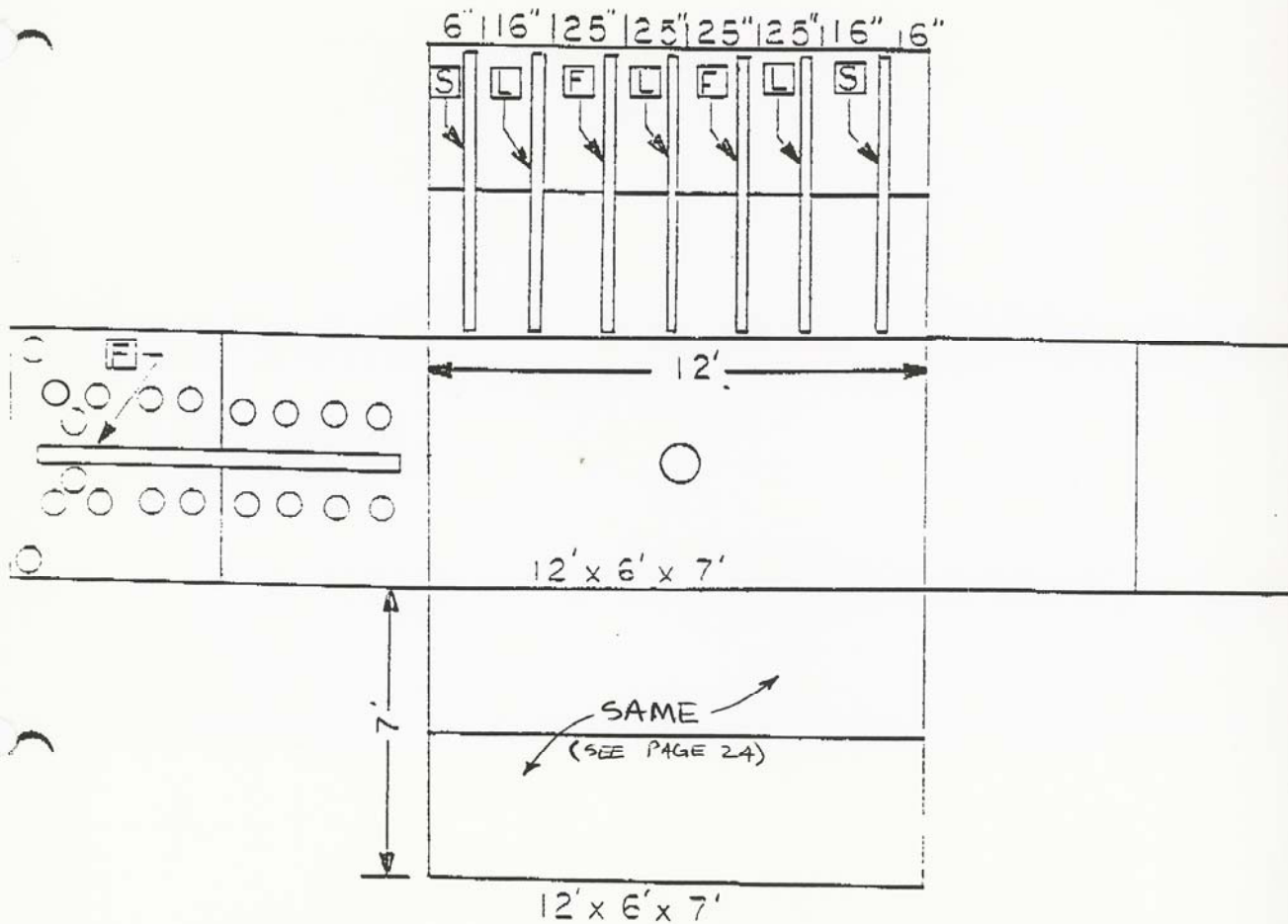


"FARGO" BONDING
RIBBON CLAMP



S RACKING

CABLE "L" / "S"
1/2\"/>



RACK CABLE	47 HOLE	16 ea.
SUPPORT RACK	CABLE L	24 ea.
SUPPORT RACK	CABLE S	16 ea.
WASHERS ROUND	1/2 X 1 3/8	80 ea.
WASHERS ROUND	3/4 X 2	24 ea.
SQUARE HEAD BOLTS W/NUTS	1/2 X 1 3/4	56 ea.
FARGO CLAMP	164P TYPE	8 ea.
SCREWS	14 X 1 TYPE	16 ea.
BONDING RIBBON CLAMP	1122549	16 ea.
BONDING RIBBON	1 ROLL = 70'	
MANHOLE REOUTRES		30'+
LADDER	8'	1 ea.
FRAME & COVER	30" SG	1 ea.

**EAST JORDAN
IRON WORKS, INC.**
P.O. BOX 439
EAST JORDAN, MI. 49727
1-800-874-4100
FAX 231-536-4458

DRAWN smh	DATE 09/26/00
APPROVED	DATE

COVER

PRODUCT NO.
NCR03-2404C

CATALOG NO.
1810A1VH

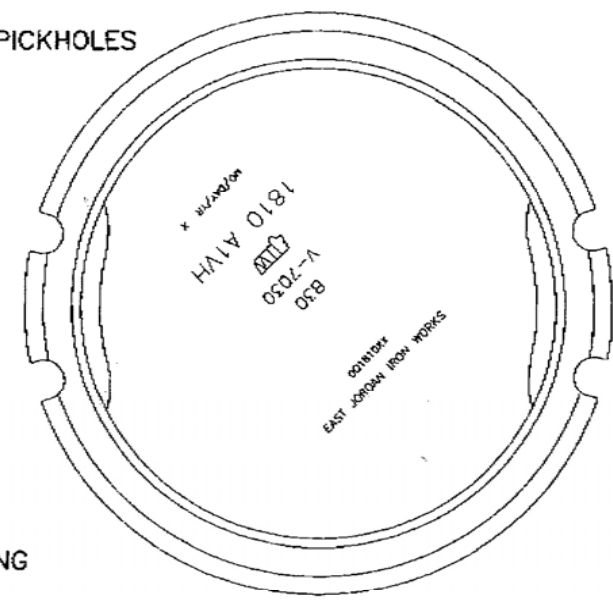
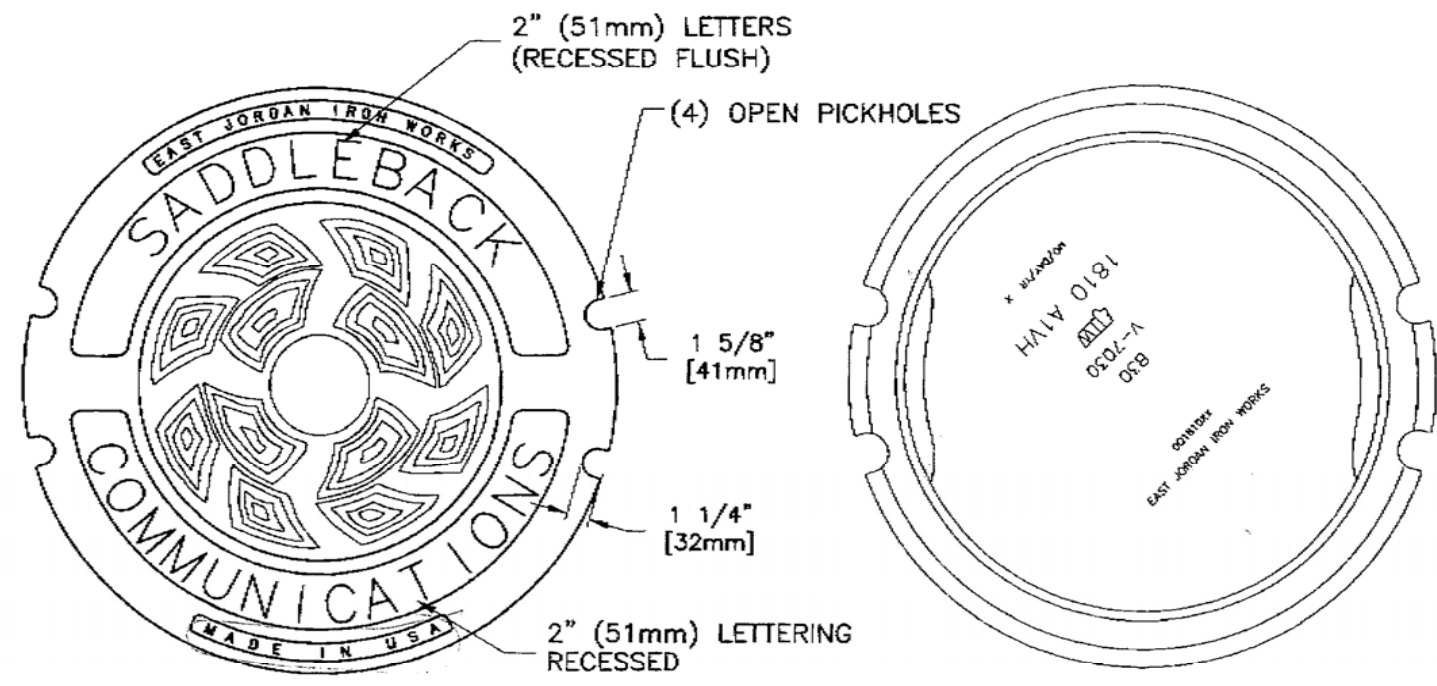
REF. PRODUCT DRAWING
001810XX

EST. WT.
COVER: 285 LBS 129kg

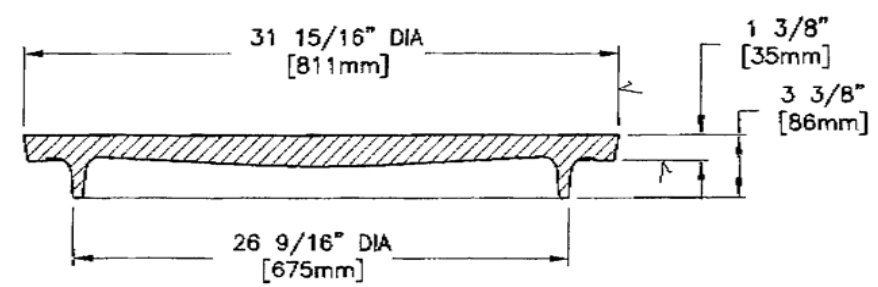
OPEN AREA
N/A

MAT'L SPEC.
COVER - GRAY IRON
ASTM A48 CL35B

LOAD RATING
HEAVY DUTY

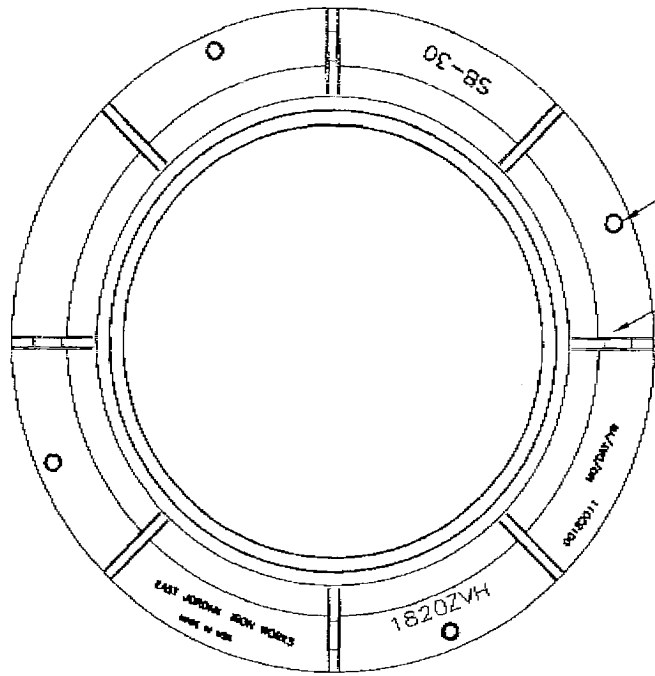


BOTTOM OF COVER



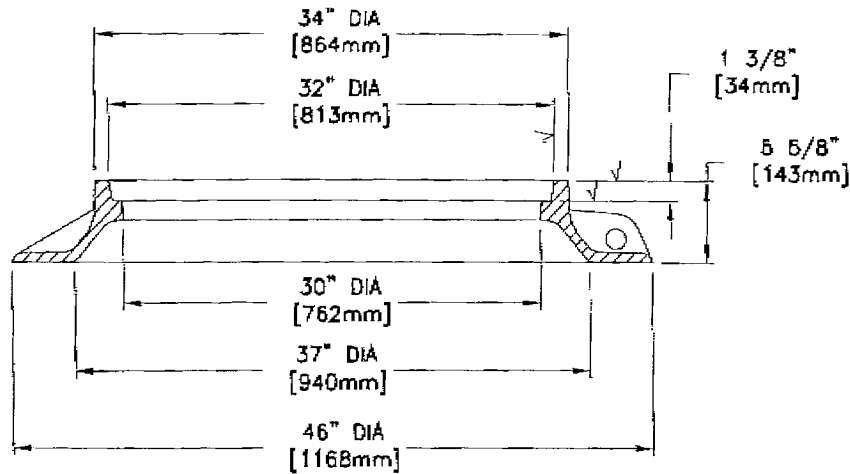
COVER SECTION

✓ MACHINED SURFACE



(4) 1" DIA. (25mm)
HOLES ON 43 1/2"
(1105mm) BOLT CIRCLE

(4) 1 1/2" DIA.
(38mm) HOLES
ON ALT. RIBS



FRAME SECTION

√ MACHINED SURFACE

**EAST JORDAN
IRON WORKS, INC.**
P.O. BOX 439
EAST JORDAN, MI. 49727
1-800-874-4100
FAX 231-536-4458

DRAWN SMH	DATE 01/28/02
APPROVED	DATE

**BASE FLANGE
MANHOLE FRAME
SB-30"**

PRODUCT NO.
00182010-DIPPED

CATALOG NO.
1820ZVH

REF. PRODUCT DRAWING
00182011

EST. WT.
FRAME: 295 LBS 134kg

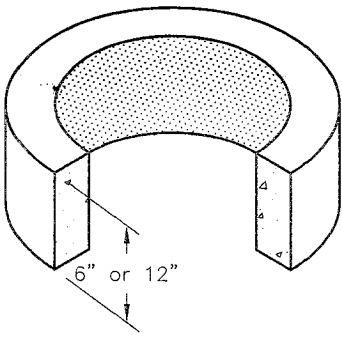
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N/A

MAT'L SPEC.

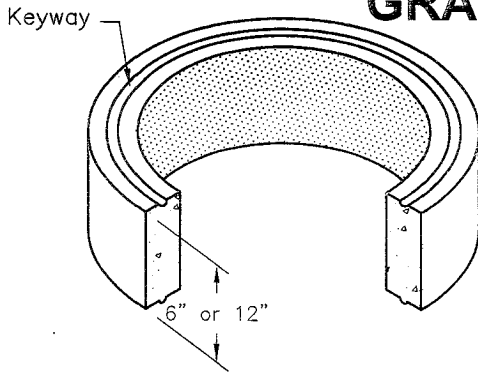
FRAME - GRAY IRON
ASTM A48 CL35

LOAD RATING
HEAVY DUTY

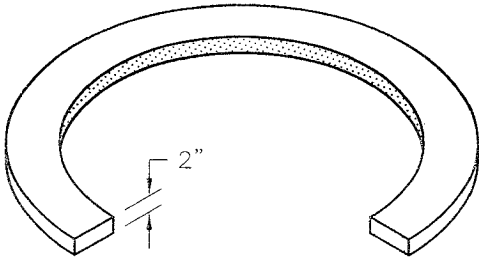
GRADE RINGS



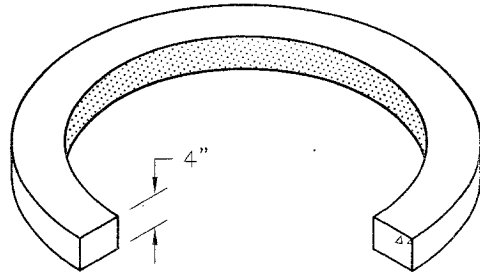
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 24" Inside diameter
 34" Outside diameter
 6" - 250 lbs. / 12" - 500lbs.



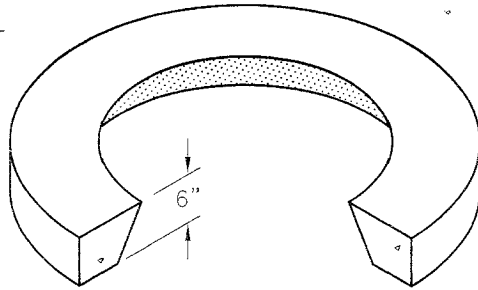
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 40" Outside diameter
 6" - 300 lbs. / 12" - 600lbs.



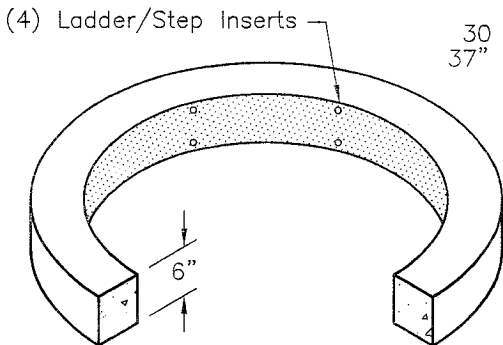
NO. GR3702
 37" Inside diameter
 48" Outside diameter
 130 lbs.



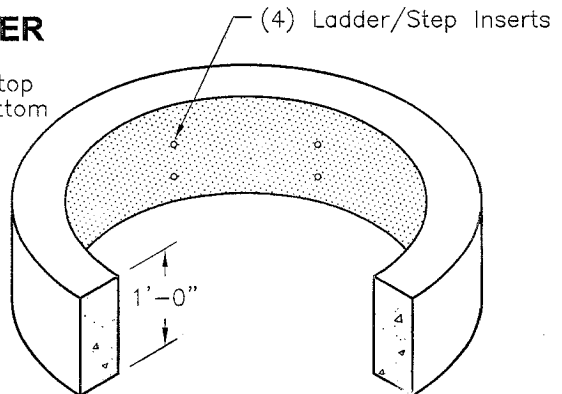
NO. GR3704
 37" Inside diameter
 48" Outside diameter
 260 lbs.



NO. GR3006 REDUCER
 48" Outside diameter
 30" Inside diameter at top
 37" Inside diameter at bottom
 430 lbs.



NO. GR3706
 37" Inside diameter
 48" Outside diameter
 390 lbs.



NO. GR3712
 37" Inside diameter
 48" Outside diameter
 780 lbs.



UTILITY VAULT™

P.O. Box 610
 Chandler, Arizona 85244
 Version 2002

PHONE: (480) 963-2678
 FAX: (480) 899-1937

* ITEMS SHOWN ARE SUBJECT
 TO CHANGE WITHOUT NOTICE