

*Looks Good  
New*

INSULATION WEATHERPROOF SEALING PROCEDURE

PROJECT 1295

The original Adipic Acid Project (9098) had equipment pieces insulated and stored over twelve (12) months before being placed into service. For various reasons rainwater leaked into the insulation systems, which deteriorated the insulation and corroded the metal jackets. The current project (1295) has similar storage time; however, we are following this procedure to insure quality workmanship and to prevent costly rework.

The major differences between the two systems are as follows:

1. Project 1295 is using calcium silicate insulation instead of unibestos. Calcium silicate insulation has greater resistance to water. Also a mixture of rainwater and calcium silicate will not form as corrosive a salt that will corrode the metal jacket as unibestos.
2. Single and double "Z" laps are being employed on Project 1295 instead of the single laps used on Project 9098. These "Z" laps are orientated to form a water-tight seal even when the equipment is stored in the horizontal position.

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3. Stainless steel bands are being installed on 12" centers; instead of 18" centers as used on the old project. This provides a tighter joint; therefore, the use of sheetmetal screws can be kept to a minimum. The band tags are installed using 1/8" pop rivets instead of sheetmetal screws.
4. Insulation joints are being sealed with a double layer of weatherproof sealant and reinforced with a layer of fiberglass. The old method used one layer of foamseal with no reinforcing. Foster GPM and Foster Elastalor sealants; which are now being used, are better sealants than the old foamseal. Foamseals become brittle and crack after six (6) months of service while the Foster sealants do not.
5. The large, field-erected tanks are sealed at the bottom with a 2" thick foamglass insulation block. This keeps moisture from seeping up through the base.
6. The jacket material presently used is an epoxy-coated, (both sides) 16 mill, aluminum metal, with a paper moisture barrier glued to the inside, employing a waterproof, 3 mill, layer of polyethylene. The old jacket material was not epoxy-coated on the inside and the paper moisture barrier was glued to the inside with a water-soluble glue.
7. Inspections are being made every two (2) weeks to ensure that these joints are tight and the caulking has not cracked on any of the insulated pieces of equipment.

Outlined below are the procedures to be followed for insulating the three major types of vessels for weather protection.

I. SEALING INSULATION ON SMALL VESSELS (REFER TO FIG. I)

- A. After the insulation block has been installed, joints at the reinforcing bands, etc. are caulked with a layer of white Foster GPM sealant and (Glassfab) reinforcing.
- B. The 3' or 4' wide metal jacket is then installed around the tank in bands. Three sections are required to make up a complete band. The first section installed is one with "Z" laps on both ends. This section is orientated on the tank; as to provide a water-tight seal. The next section is installed with a single "Z" lap. The last section is installed with open ends. Small stainless steel bands are then installed on 12" centers. This procedure is repeated until the entire tank is covered.
- C. The joints are then caulked a second time with Foster Elastalor Sealant #9544.
- D. The tank insulation is then inspected every two (2) weeks.

II. SEALING INSULATION ON FIELD-ERECTED TANKS (REFER TO FIG. II)

- A. A 2" thick foamglass block is installed around the tank base to prevent moisture from seeping up into the calcium silicate block.
- B. After the block has been installed the metal jacket is then installed in bands around the tank.

B. (continued)

Four sections are required to complete a band around the tank. Two sections with "Z" laps on both ends are installed 180° apart, and two sections with open ends are fitted between the "Z" laps.

- C. The insulation and inspection are the same as outlined in Procedure I.

III. SEALING INSULATION ON COLUMNS (REFER TO FIG. III)

- A. The jacket is installed on the columns in the same manner as outlined in Procedure I.
- B. Sealing around the "T"-shaped stiffening rings is different. On top of the stiffening ring, block insulation is installed to completely fill the void between the ring and the column plate. This area is then caulked with Foster GPM sealant and with glassfab reinforcing. The metal jacket is then installed over and around the flange on stiffening ring. (Refer to Sketch III for details). The joints are then caulked again with the Foster Elastalor Sealant. Underneath the stiffening rings the insulation is sealed in the same manner as outlined in Procedure I.
- C. The columns are then inspected every two (2) weeks.

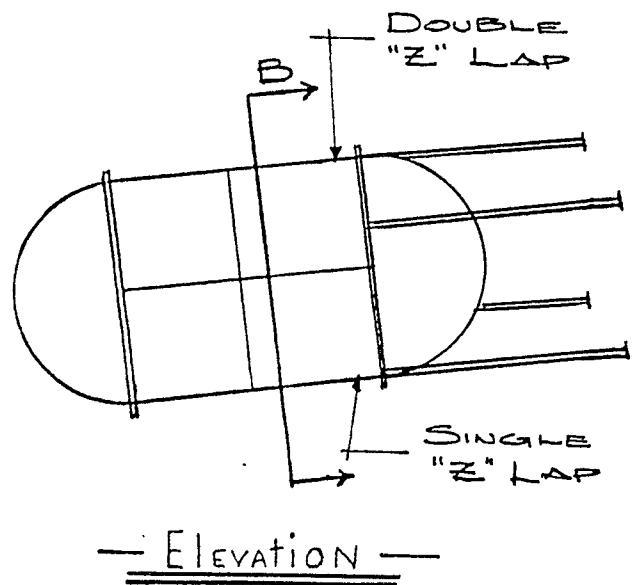
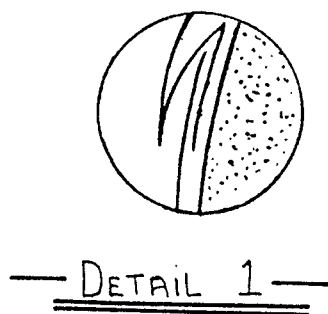
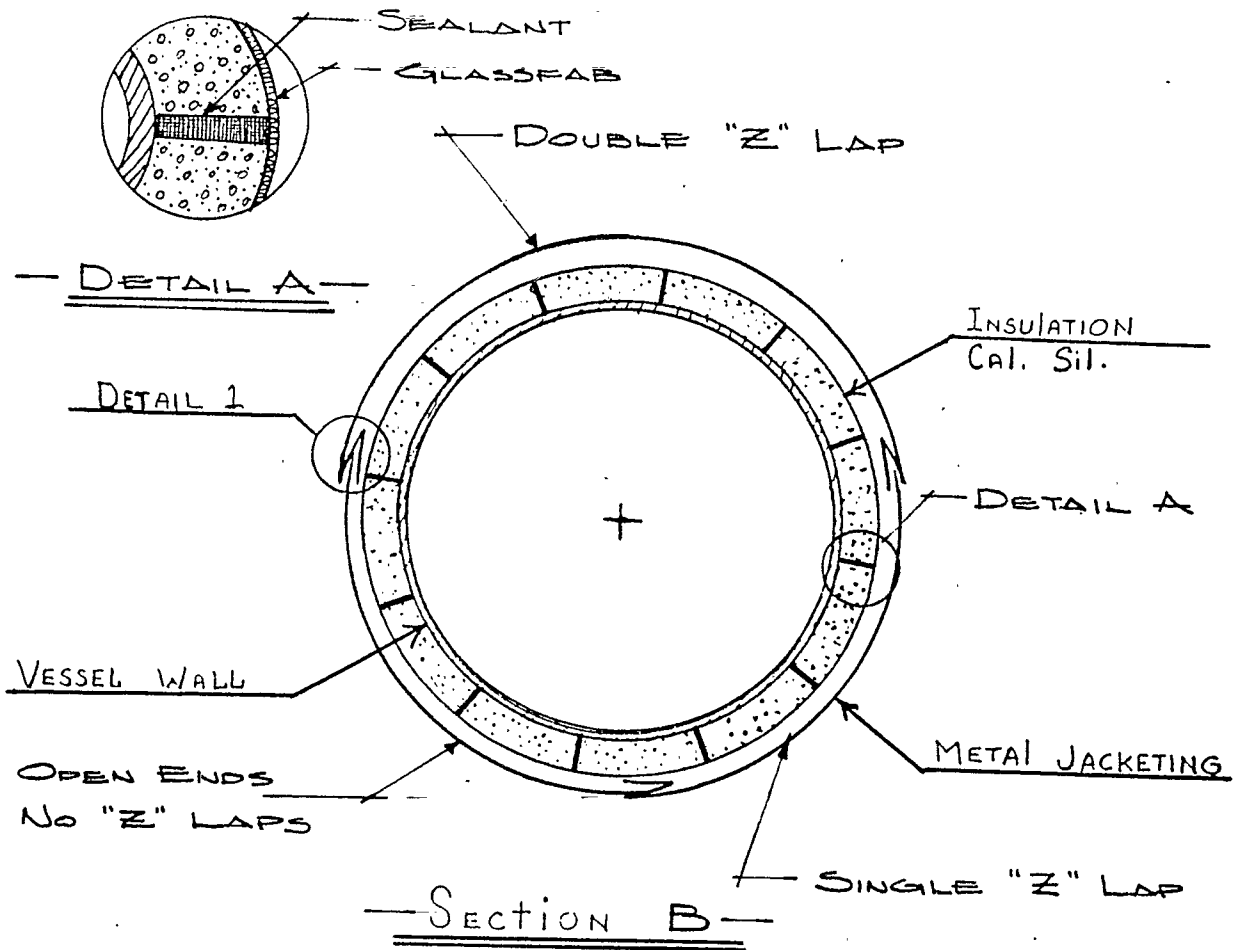
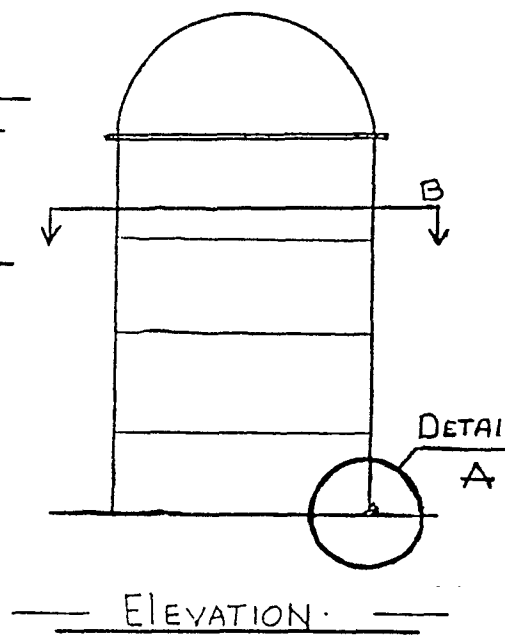
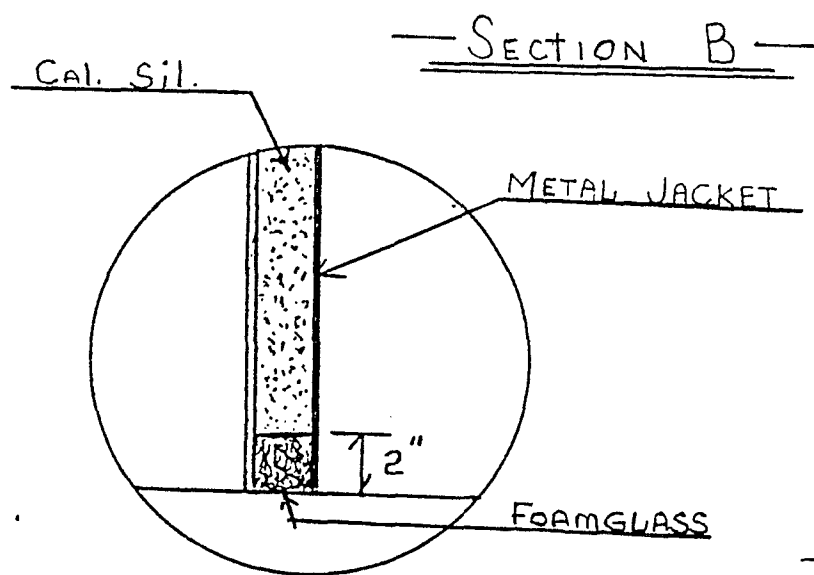
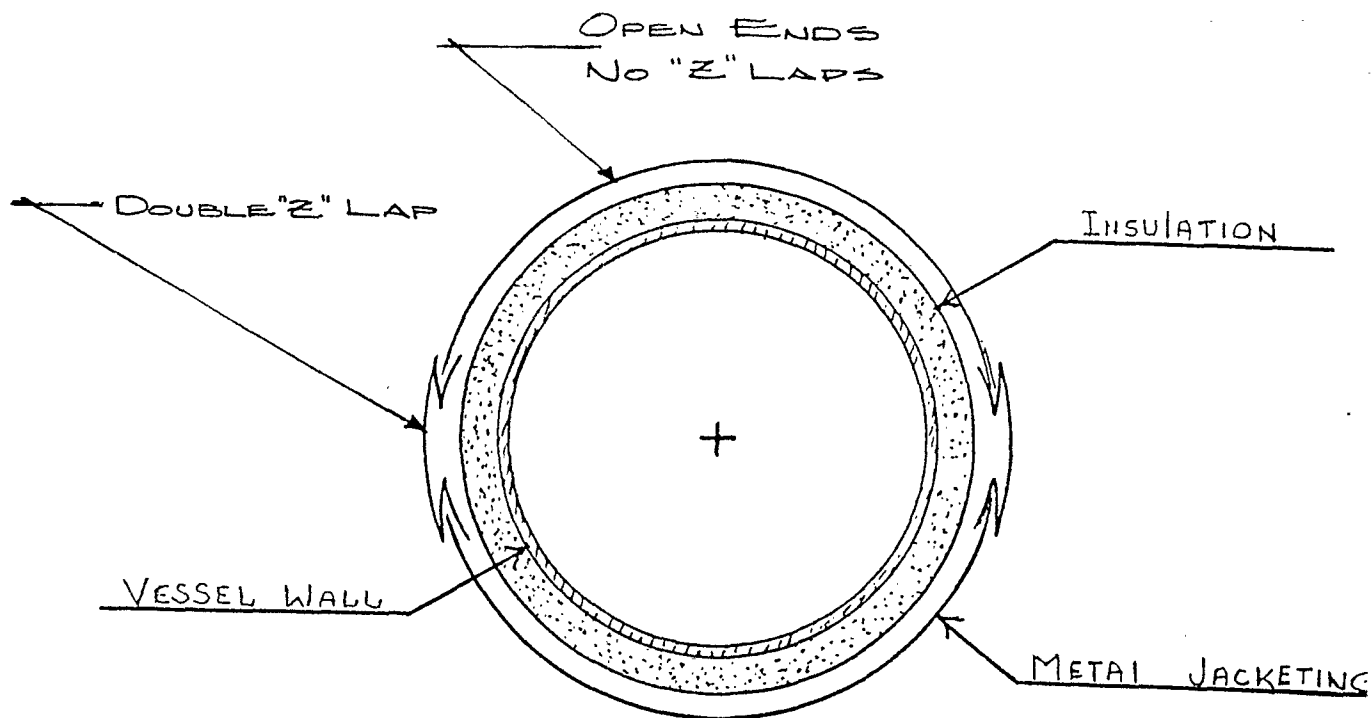


FIG. I - PRE-INSUL.-VESSEL  
LAYING DOWN

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DETAIL A

FIG II - LARGE VERTICAL TANK

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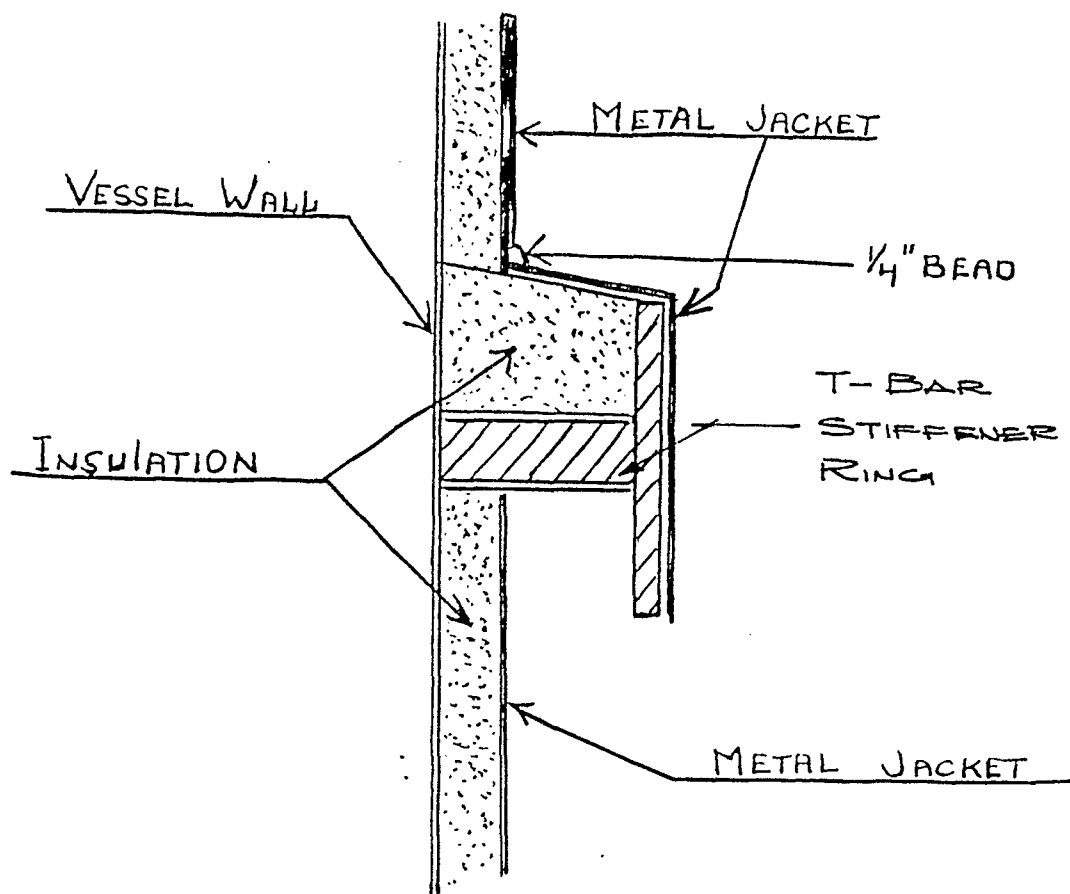


FIG. III - T-BAR STIFFENER RING

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→ A.D. BEDSOLE 570

Appendix A

TO: ~~N. E. HUCKINS~~  
ENGINEERING DEPARTMENT  
LOUVIERS BUILDING

FROM: M. F. HENNESSEY, JR.  
Name

VICTORIA

Plant

CORROSION OF PIPING AND EQUIPMENT UNDER THERMAL INSULATION

1. How many failures caused by corrosion of metal from the outside have been observed on insulated piping or equipment? Include only instances where pipe or equipment had to be replaced or repaired because there was a leak or crack in the metal which originated from the outside under insulation.

NUMBER OF FAILURES THAT OCCURRED

|                       | <u>Within a<br/>Year of<br/>Turnover</u> |                  | <u>More Than<br/>One Year<br/>After Turnover</u> |                  |
|-----------------------|------------------------------------------|------------------|--------------------------------------------------|------------------|
|                       | <u>Piping</u>                            | <u>Equipment</u> | <u>Piping</u>                                    | <u>Equipment</u> |
| Carbon Steel - Primed | _____                                    | _____            | _____                                            | _____            |
| - Unprimed            | _____                                    | _____            | _____                                            | 4                |
| Stainless Steel       | 3                                        | -                | -                                                | 3                |

2. Keeping water out of the insulation would prevent corrosion of carbon steel; however, more rigorous control techniques during and after application of insulation could be costly. Priming of all carbon steel would offer protection against corrosion prior to startup, but this protection would diminish with time after exposure to elevated temperature. Priming would be an added cost; however, it has been common practice to prime carbon steel equipment.

In your judgment, do the problems which you have observed justify any of the following:

- a. Protective coating or priming for carbon steel pipe before insulating. Yes
- b. More rigorous control measures during application and to minimize inleakage of water (See Appendix C). Yes

3. Other comments or observations related to this matter; include results of recent inspections?

See Attached Comments

H. E. Huckins  
June 1976

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Carbon Steel Equipment - Primer

1. NH<sub>3</sub> Sphere - wrong type insulation - a water absorbing styrofoam - stayed wet. Insulation replaced - no corrosion.
2. 2 NH<sub>3</sub> Storage Tanks - Diamine Area - Plate coil severely corroded and developed leaks (not primed). Vessel was primed but "Unibestos" used on cold service - vessel stayed wet. Sandblasted, primed and reinsulated.

Stainless Steel Piping (Replaced)

1. About 50 feet 10" pipe - NRD - 1st year
2. About 150 feet 2" to 4" pipe - NRD - 1st year
3. Stainless steel instruments lines - H<sub>2</sub> - 1st year.

Stainless Steel Equipment

(Vessels painted with "Thermalox 70" prior to insulating.)

1. PAK Storage Tank - Op. 14 Wall 6-76
2. Adipic Acid Holdup Tank - Op. 4 Well and Floor 2-75
3. RML Tank - Op. 15 Wall 3-75

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