

PART I - GENERAL

1.1 SCOPE

The work covered by this specification consists of furnishing all labor, equipment, materials and accessories, and performing all operations required for the correct installation of Nomaco Insulation flexible closed cell Polyolefin Insulation for applications on underground piping located above the ground water table, maximum service temperature of 160°F. See Technical Bulletin TA8 for additional commentary. **The installation guidelines outlined in this document are Nomaco Insulation recommendations and are intended to ensure a successful installation. Any variations other than what is supported by this document may cause unwanted side effects and compromise the purpose and design of the insulation.**

1.2 REFERENCES

- A. ASTM C177 Thermal Conductivity (k) by Guarded Hot Plate Apparatus
- B. ASTM C335 Thermal Conductivity (k) for Pipe Insulation
- C. ASTM C411 Upper Temperature Limit
- D. ASTM C518 Thermal Conductivity (k) by Heat Flow Meter Apparatus
- E. ASTM C1427 Standard Specifications for Preformed Flexible Cellular Polyolefin Foam Insulation
- F. ASTM D1622 Density
- G. ASTM D3575 Density
- H. ASTM E84 Surface Burning Characteristics
- I. ASTM E96 Water Vapor Permeability

1.3 QUALITY ASSURANCE

- A. Insulation materials will be manufactured under a strict quality control program assuring quality product delivered to the job site. Insulation material that has become damaged shall not be installed.
- B. Workmanship: all insulation to be installed by a qualified applicator and applied in accordance with the manufacturer's recommendations.
 - 1. All work shall comply with all applicable federal, state and local codes and laws. This shall include, but shall not be limited to, the Occupational Safety and Health Act.
 - 2. All work shall conform to accepted industry and trade standards for commercial and industrial insulations.
 - 3. Surfaces to be insulated shall be cleaned free of dirt, scale, moisture, oil and grease.

1.4 DELIVERY AND STORAGE OF MATERIALS

- A. Deliver all materials to the job site and protect the insulation from dirt, water, chemical and mechanical damage before, during and after installation. Damaged insulation shall not be installed and it shall be removed from the project site.
- B. Deliver insulation, and where applicable, coverings, cements, adhesives, coatings, etc. to the site in factory supplied containers with the manufacturer's stamp or label affixed showing warning statement, name of manufacturer and brand.
- C. Storage and transport of materials should utilize the manufacturer's carton, original shipment packaging, or approved white reflective packaging. Damage to the insulation may result from improper packaging.

PART 2- PRODUCTS

2.1 NOMACO INSULATION POLYOLEFIN INSULATION

- A. Products must be manufactured by Nomaco Insulation and identified by their container with one of the following trade names: ARCTICFLEX, THERMA-CEL SEAM SEAL, THERMA-CEL SHEET.
- B. Pipe (tubular) insulation must display the ASTM E84 (25/50) flame spread and smoke developed ratings. Any material submitted claiming to be a similar, like, or equal must demonstrate (meet or exceed) the same physical characteristics as Nomaco Insulation manufactured insulation (i.e., pre-slit/pre-glued products, non-porous, and non-fibrous). In addition, materials must meet the following criteria:
 - 1. Material shall have a density ranging from 1.5 to 1.8 lb/ft³ (ASTM D1622).
 - 2. Material must have a maximum thermal conductivity (k) of 0.25 Btu-in/hr-ft²-°F @ 75°F mean temperature (ASTM C518, ASTM C177 or ASTM C335).
 - 3. Material must have a maximum Water Vapor Transmission rate of 0.00 Perm-in (ASTM E96, Desiccant Method).
 - 4. Material up to 1" thick, when tested in accordance with ASTM E84, shall have a flame spread rating not greater than 25 and a smoke developed rating not greater than 50.

2.2 PIPE INSULATION

- A. THERMA-CEL SEAM SEAL (tubular): black-pigmented, longitudinally pre-slit tubular pipe insulation with closure system consisting of pressure sensitive adhesive and protective release tape applied at the factory. Allows precision-cut angles and pre-cut pieces to be joined by the application of industry standard contact adhesives. See appropriate price list for available tube and pipe sizes, standard wall thicknesses, and lengths.
- B. ARCTICFLEX (tubular): same as above, but white pigmented.

2.3 SHEET INSULATION

- A. THERMA-CEL SHEET: black or white-pigmented insulation in sheet form. See appropriate price list for available dimensions, standard thicknesses, configurations.

ACCESSORIES

- A. **R-320 and R-620** Contact Adhesive: standard air-drying contact adhesive (brush or roller applied) formulated for adhering mitered and circumferential (butt) joints of polyolefin insulation. R-320 is beige / tan colored. R-620 is black colored.
- B. **Insulation Tape** Rolls: pre-glued black or white 1/8" thick Insulation Tape with release backing designed for use with polyolefin insulation and is used for applications where insulation integrity needs to be maintained and polyolefin insulation cannot be readily installed.

2.5 JACKETING

A jacket is NOT required for direct burial since the polyolefin insulation is only recommended for use in underground applications where the pipes are located above the ground water table.

2.6 ADHESIVES

- A. **Field-applied Contact Adhesives.** Because of the unacceptable performance of some adhesive systems, please refer to Technical Bulletin for a list of recommended adhesives to be used in conjunction with polyolefin insulation.

ENGINEERING NOTES:

1. The recommended contact adhesives are all subject to specific service temperature ranges. The contact adhesive manufacturer should be contacted to verify correct application for service temperatures anticipated. (The contact adhesive, when applied on joints or when applied between layers of insulation is not exposed to the extreme temperatures experienced by the reactor or piping. Therefore, the design temperature of the adhesive will be much less demanding and must be estimated)
2. It is very important that contact adhesive be allowed to flash fully prior to joining two impermeable substrates such as polyolefin insulation. Contact adhesive will not continue to flash under an impermeable substrate and therefore, will not set up properly.
3. The flash time of a contact adhesive is dependent upon relative humidity and temperature. Relatively speaking, the lower the temperature or the higher the relative humidity, the longer the time required for the contact adhesive to fully flash.
4. A contact adhesive will be slightly tacky, yet dry to the touch when fully flashed.

2.7 COATINGS

- A. Not applicable to underground applications where the pipes are located above the ground water table.

2.8 PIPING SYSTEMS

- A. Chilled water piping.
- B. HCFC, Ammonia, Glycol, Brine Refrigeration (pipe or defrost temperature not to exceed 210°F).
- C. Freeze protection/prevention (with appropriate heat trace, not to exceed 210°F).
- D. Domestic hot and cold piping.
- E. Refrigerant suction and liquid lines (pipe or defrost temperature not to exceed 210°F).
- F. Condensate piping.

PART 3- EXECUTION

3.1 WORKMANSHIP

- A. Installation shall be performed by a qualified insulation contractor who specializes in industrial and/or commercial mechanical systems.

3.2 PREPARATION FOR INSTALLATION

- A. Apply insulation to approved and pressure tested piping systems (if applicable).
- B. Ensure surfaces are clean and dry prior to installation.
- C. Do not apply insulation to wet or frosted surfaces.

3.3 INSTALLATION DETAILS

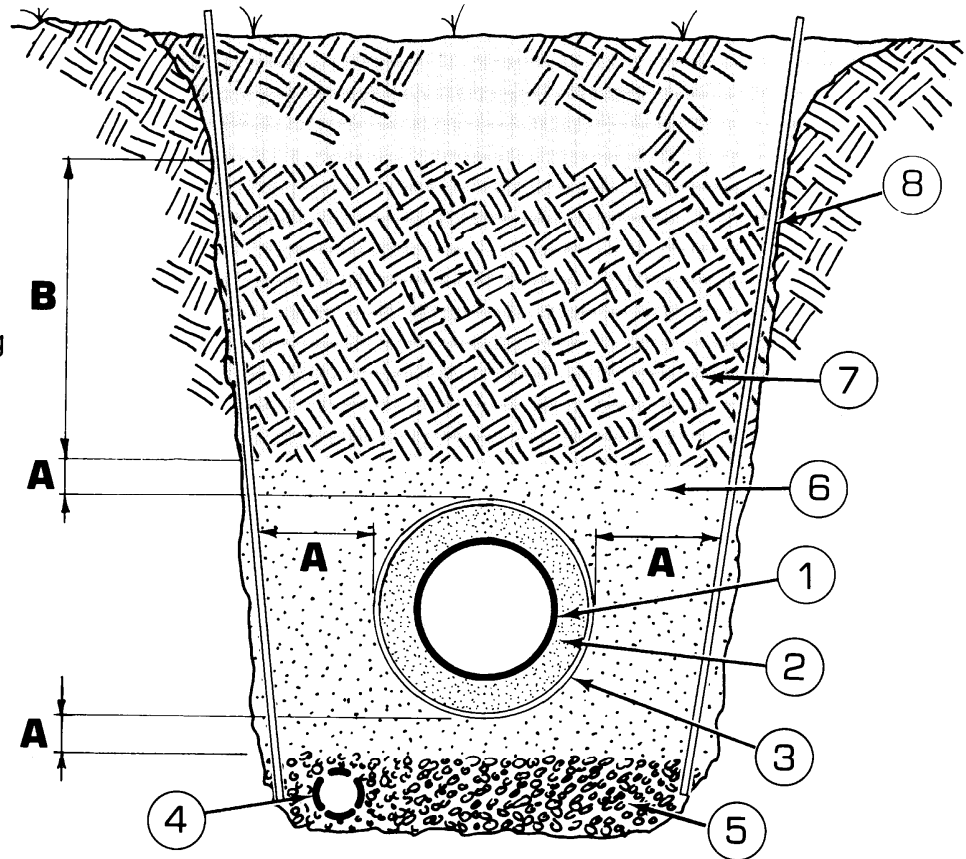
- A. Refer to submittal drawings for Box Trench and Direct Burial ground preparation requirements prior to installing insulation.
- B. In direct burial applications increase wall thickness by 1/2 inch to compensate for compression of the insulation by backfill.

- C. Use THERMA-CEL SEAM SEAL, ARCTICTFLEX, (pre-slit, pre-glued tubular insulation) or THERMA-CEL SHEET, (field fabricated insulation sections). All longitudinal and circumferential joints must be sealed with an approved adhesive.
- D. Compression fit insulation on continuous runs. Install an additional 2 inches (2") of insulation for every 6 feet (6') of measured pipe, or 3-1/2 inches (3-1/2") for every 10 feet (10') of measured pipe to allow for any contraction.
- E. When using THERMA-CEL SEAM SEAL, ARCTICTFLEX, (pre-slit, pre-glued tubular insulation), firm and even pressure along the entire longitudinal seam is required to properly engage the pressure sensitive adhesive.
- F. When using THERMA-CEL SHEET, (field fabricated insulation sections) a field fabricated shiplap joint is recommended for the longitudinal seam on single sheet thickness 3/4" or higher. A bevel joint is recommended on single sheet thickness less than 3/4".
- G. Miter cut all elbows and tees using an approved adhesive to seal all joints.
- H. Use field mitered tubular insulation, or sheet in conjunction with tubular insulation, when insulating unions, flanges, reducers, hand valves, control valves, etc.
- I. When installing polyolefin insulation a temporary method to isolate the exposed insulation from sunlight until it is buried should be incorporated. Only a reflective covering should be used such as white or a polished surface.
- J. When installing a nested insulation system joints should be staggered and should follow manufacturer recommended guidelines.
- K. Where adhesion between the pipe system and insulation or between nested insulation layers is desired use only approved adhesives.*

*

DIRECT BURIAL

- A — Minimum dimension surrounding insulation.
 B — Minimum backfill dimension.



Ground Water Table

SUBMITTAL DATA

MATERIALS:

1. Piping located above the ground water table.
2. Nomaco Insulation closed-cell flexible polyolefin insulation.
3. Waterproofing jacketing or membrane (NOT REQUIRED).
4. Drain pipe (as required).
5. Gravel.
6. Sand backfill

A Dimension: Minimum of 6 inches (6") on all sides.

7. Rock backfill

B Dimension: Minimum of 3 feet (3'), to be determined by the traffic above the line.

8. Trenching and shoring (if required).

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NOMACO.

FlexTherm

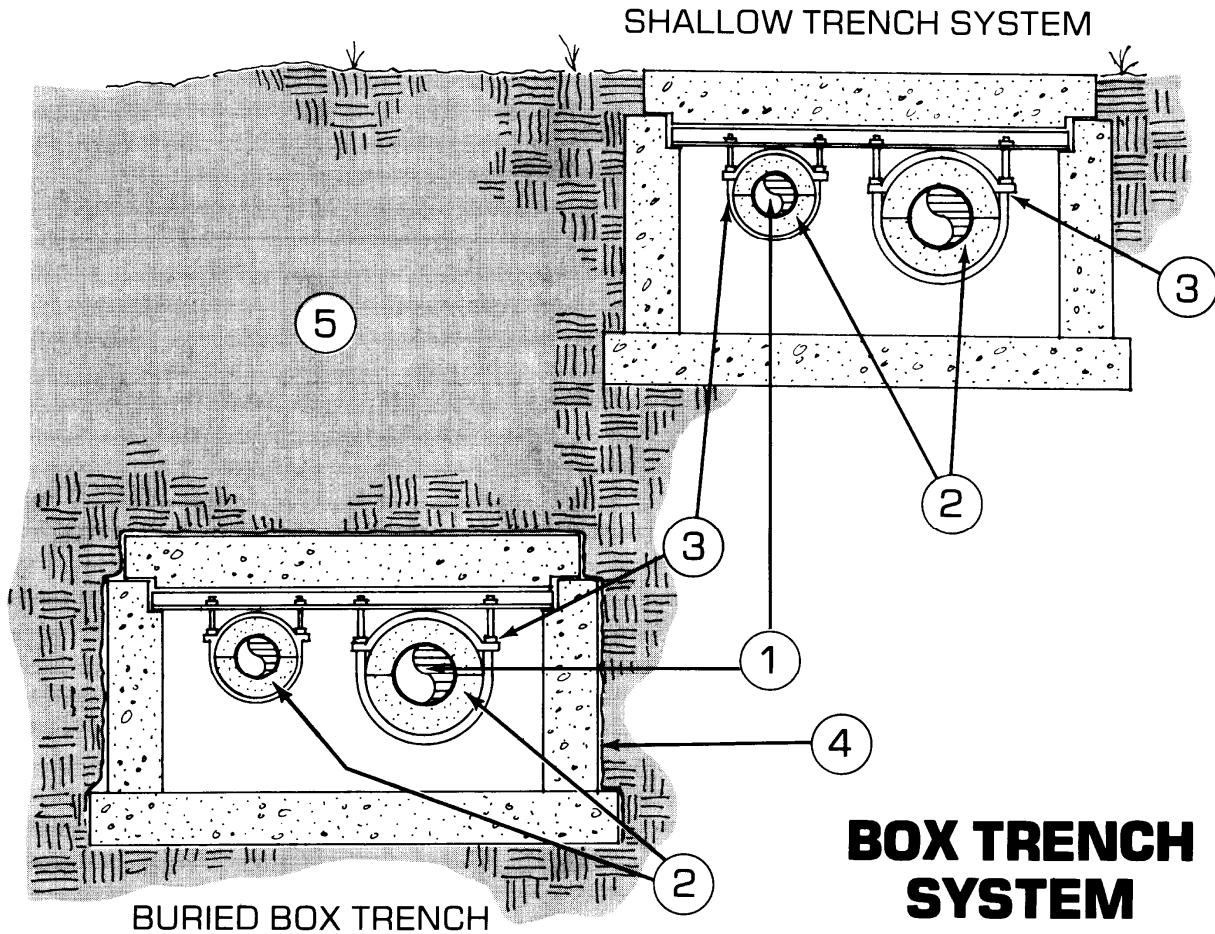
CRYflex

therma-cel

IMCA

TC-DB-0409

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SUBMITTAL DATA

MATERIALS:

1. Piping located above the ground water table.
2. Nomaco Insulation closed-cell flexible polyolefin insulation.
3. Support hangers (U-bolt shown requiring high density inserts and metal shields). Optional supports are pipe shoe on rollers or standard and split ring hangers.
4. Waterproof membrane (around outside of concrete encasement).
5. Backfill.

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