

ULTRA-THERM

Guide Specifications

GENERAL

All steam, condensate returns, drip and discharge, hot water, or process piping, to be installed overhead or underground between manholes and buildings or between buildings, as shown on plans, shall be installed in PERMA-PIPE ULTRA-THERM prefabricated insulated pipe conduit, with all necessary fittings, anchors, expansion loops and conduit accessories, etc., as hereinafter specified.

CONDUIT

All conduit straight lengths shall be welded smoothwall of not less than 10 gauge wall thickness black steel for all sizes and shall be tested at the factory to insure air and watertight welds prior to any fabrication or application of the fiberglass cladding. The steel conduit shall be cleaned and made free of all loose scale and mill coatings by shot blasting to clean, bright metal, and care shall be taken to maintain the surfaces free of oil and grease before application of coatings.

The conduit surface shall be cladded with a polyester fiberglass cladding in accordance with ASTM 2996. The cladding shall be filament wound fiberglass on straight sections and chopped spray applied to fitting assemblies to a minimum thickness of 100 mils.

Final outside cladding shall be capable of maintaining dielectric strength at 35,000 volts.

Conduit closures of suitable length complete with pipe insulation shall be furnished by the system manufacturer and shall be cylindrical in form, of 10 gauge steel with a single horizontal side split.

Installation of closures shall occur in the field by the contractor at points of field joints between straight units or fabricated fittings, and shall be welded centrally over conduit ends between such adjacent units. After welding, a pressure test using 15 lbs. air shall be made, and all welds shall be examined and checked for leaks by applying a soapy solution to the weld area. Any leaks shall be rewelded and the system retested until airtight at 15 lbs. pressure.

The contractor shall furnish all necessary equipment and labor to perform the air test, including air compressor, gauges, conduit caps, temporary pipe and connections, etc., and complete the test to the satisfaction of the architect and/or engineer.

Upon completion of test and as soon thereafter as possible, all field welds on closures shall be cleaned of all welding slag, burned coating, mud, etc. by wire brushing. Closure shall then be covered in accordance with the system manufacturer's instructions, using materials supplied. Finished closure shall then be spark tested as hereinbefore specified for straight units.

Additional conduit accessories as hereinafter specified shall have all exposed surfaces coated with the same coating as conduit. The whole system, prior to

backfill, shall be subjected to a final spark test, and any electrical leaks caused by scuffing or other physical damage to coating shall be repaired.

PIPE AND PIPE-SUPPORT GUIDES

All piping in conduit shall be as hereinafter specified for the service required. All ferrous pipe field joints shall be welded by competent mechanics and hammer tested under hydrostatic pressure of 250 psig or one and one-half times the design pressure, whichever is greater. Concealed pipe welds in prefabricated conduit fittings shall be factory tested the same as specified for field welds prior to assembly.

Piping shall be suitably spaced and supported in conduit by specially designed full round insulating support- guides which permit the pipe to expand and/or contract freely without stress or wear on the pipe or insulation as well as provide for drainage and free air circulation.

EXPANSION LOOPS, ELLS AND TEES

Prefabricated ells, loops and tees shall be furnished and installed where shown on plans and shall consist of pipe, insulation, and conduit conforming to the same specification as hereinbefore specified for straight runs.

Expansion loops shall be of proper design in accordance with stress limits indicated by ANSI B 31.1. Code for pressure piping. Loop piping shall be installed in conduit suitably sized to handle indicated pipe movement.

ALTERNATE: Where space does not permit the use of loops, expansion joints in manholes shall be provided.

END SEALS AND GLANDS

Terminal ends of conduits inside manholes, pits, or building walls shall be equipped with end seals consisting of a steel bulk head plate welded to the pipe and conduit. Where there is no anchor within five feet of a terminal end, conduits shall be equipped with gland seals consisting of a packed stuffing box and gland follower mounted on a steel plate welded to end of conduit. End seals or gland seals shall be equipped with drain and vent openings located diametrically opposite on the vertical center line of the mounting plate and shall be shipped to the job site with plugs in place. Terminate all conduits 2" beyond the inside the inside face of manhole or building walls to protect any exposed piping insulation from damp-wall condensation.

LEAKPLATES

To provide an effective moisture barrier, conduits shall be equipped with leakplates in building or manhole walls -- but only when there is an anchor plate within 5 feet outside the wall. Leakplates shall consist of a steel plate flange 4" larger in outside diameter than the conduit, welded to the conduit only and located in the wall approximately 6" from the end of the conduit. Wall sleeves are recommended where leakplates are not furnished.

ANCHORS

Prefabricated plate anchors shall be furnished and installed where shown on plans and shall consist of a steel plate welded to pipe and conduit. The steel plate shall be 3/8" thick for 65/8" to 103/4" conduit, 1/2" thick for 12 " to 22" conduit and " thick for conduit over 22".

A concrete block shall be cast over the plate and conduit and shall be large enough for firm anchorage into undisturbed trench sidewalls and/or bottom. The

concrete block to be at least 30" in length and extended a minimum of 9" beyond the top and bottom of anchor plate.

PIPE INSULATION

All pipe or pipes in conduits, shall be insulated as hereinafter specified.

ENERGY MONITORING SYSTEM

The secondary containment system manufacturer shall furnish a PAL-AT cable type energy monitoring system. The piping shall be designed to allow pulling of the leak detection cable into the conduit pipe, both during and after piping installation. Containment pull ports shall be located a maximum of 500 feet apart for straight runs and reduced by 150 feet for every 90o change in direction. The leak detection/location system shall consist of a microprocessor based panel capable of continuous monitoring of a sensor string for leaks/faults. The unit shall have a sensing range of [2000] [5000] feet per cable [with up to eight cables per panel]. The alarm unit(s) shall operate on the principle of pulsed energy reflection and be capable of mapping the entire length of the sensor cable and storing the digitized system map in nonvolatile memory. The alarm units shall provide continuous indication that the sensor cable is being monitored.

After proper acknowledgment of a minor leak, the energy monitoring system shall be capable of monitoring the entire sensing string for additional leaks, even if they are smaller than the leak previously acknowledged. The system shall be capable of accounting for minor installation irregularities, static moisture and puddles (such as condensation) with no loss in accuracy or sensitivity. The system shall locate the point of origin of the first leak or fault within + 1% of the distance from the last calibration point to the leak or + 5 feet, whichever is greater. The monitoring unit shall report and record, to nonvolatile memory, the type of fault, distance, date and time of an alarm.

The system manufacturer shall have at least ten years of experience with energy monitoring sensor cable technology and provide a factory trained representative at two on-site meetings for pre-construction and sensor/electronics installation.

The systems shall have multi-level security passwords for access to operating functions, with recording of all password entries to nonvolatile memory.

The alarm unit(s) shall be enclosed in a modified NEMA 12 enclosure and have a two line by forty character display providing status and alarm data. The monitoring unit(s) [shall be field connected to an] [shall have a factory mounted] alarm horn. The monitoring unit shall be U.L. Listed and FM approved to provide connections for intrinsically safe sensor circuits for use in a Class I, Division I, Groups C and D hazardous locations.

The system shall be tested and found to comply with the limits for a Class A Digital device, pursuant to part 15 of the FCC rules and so labeled.

Ability to locate a leak shall not depend on battery backed-up functions. In the event of power failure, system conditions and parameters shall be stored in nonvolatile memory allowing the units to automatically resume monitoring without resetting, upon restoration of power.

The monitoring unit(s) power requirements shall be 120/240 VAC, 100 VA, 50/60 Hz, single phase. Monitoring units shall be equipped with an RS-232

communication port and a common alarm relay for the panel and one relay per cable. SPDT relays are rated for 250 VAC, 10A.

The sensor cable, connectors (probes) and jumpers shall be supplied by the manufacturer of the monitoring unit(s). The cable sensing principal shall provide for continuous monitoring while short lengths of the cable are in contact with liquids, without altering the systems sensitivity and/or accuracy. The sensor cable shall be of fluoropolymer and polymer coated wire construction, with no metal parts. Cable shall detect all fluids. The sensor cable can be flushed and dried in place and shall not require replacement. The cable shall have a breaking strength of 100 pounds

MANUFACTURER'S FIELD INSTALLATION INSTRUCTOR

Who is technically qualified to determine whether or not the installation is being made in accordance with the manufacturer's recommendation shall be present during critical periods of installation and test of the system. On completion of the installation, the contractor shall deliver to the owner a certificate from the manufacturer stating that the installation has been made in accordance with the manufacturer's recommendations.

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