



CRYOCOR-K Specification Guide

STANDARD SPECIFICATION

CKSG
16.101

3.29.16

Preinsulated Copper Piping Systems suitable for transporting Cryogenic Fluids and Gases.

Part 1 – General

1.1 Preinsulated Piping - Furnish a complete system of factory preinsulated copper piping for the specified service. All preinsulated pipe, fittings, insulating materials, and technical support shall be provided by the Preinsulated Piping System manufacturer.

1.2 The system shall be **CRYOCOR-K** manufactured by **Thermacor Process Inc.**, of Fort Worth, Texas.

Part 2 – Products

2.1 Carrier pipe shall be cleaned and capped Type K Copper tube, conforming to ASTM B-88. (*At the Engineer's option*, ACR Type L copper tube may be used.) All copper piping shall have ends cut square for socket brazing. Straight sections of factory insulated pipe shall be 20-foot in length and shall have 6" of exposed pipe at each end for field joint fabrication. Field joining of piping shall utilize approved methods of silver soldering or brazing with alloys melting at or above 1100°F; 50-50 tin-lead solder is not acceptable.

2.2 Insulation shall be polyurethane foam either spray applied or injected with one shot into the annular space between carrier pipe and jacket with a minimum thickness of one inch. Insulation shall be rigid, 90-95% closed cell polyurethane with a 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K-Factor) of 0.14 and shall conform to ASTM C-591. Maximum operating temperature shall not exceed 250°F. Insulation thickness shall be specified by calling out appropriate carrier pipe and jacket size combinations as listed on drawing CKSG 13.103 or 13.104.

2.3 Jacketing material shall be either extruded white polyvinyl chloride, consisting of clean, virgin NSF approved Class 12454-B PVC compound, conforming to ASTM D-1784, Type 1, Grade 1 or high density polyethylene (HDPE). PVC jacket shall have a wall thickness in mils equal to ten times the nominal jacket diameter and shall not be less than 60 mils. HDPE shall have a wall thickness not less than 125 mils for jacket sizes equal to or less than 12" or 150 mils for jacket sizes greater than 12" to 16". No FRP, HDUP, or tape jacket allowed.

2.4 Moisture barrier end seals shall be factory applied, sealed to the jacket and carrier pipe. End seals shall be certified as having passes 20-foot head pressure test. End seals shall be mastic. Field applied end seals shall be installed at each field cut to the piping before continuing with the installation.

2.5 Straight run joints are insulated using urethane foam to the thickness specified, jacketed with either an HDPE or PVC sleeve and sealed with pressure sensitive, polyethylene backed, rubberized bitumen adhesive tape, 30 mils thick, or a heat shrink sleeve or tape. Above ground installations shall use white, pressure sensitive PVC tape.

2.6 Fittings are Thermacor SC (standard components) factory prefabricated and preinsulated with urethane to the thickness specified, jacketed with a molded fitting cover or a PVC fitting cover wrapped with polyethylene backed, pressure sensitive rubberized bitumen adhesive tape, 30 mils thick. Carrier pipe fittings shall be silver soldered or brazed with alloys melting at or above 1100°F; 50-50 tin-lead solder is not acceptable. Fittings include expansion loops, elbows, tees, reducers and anchors. (*At the Engineer's option*, fittings may be field insulated with liquid urethane foam insulation, jacketed with a PVC fitting cover and then wrapped with polyethylene backed, pressure sensitive rubberized bitumen adhesive tape, 30 mils thick. Above ground installations shall use white, pressure sensitive PVC tape.)

2.7 Expansion/contraction compensation will be accomplished utilizing factory prefabricated and preinsulated expansion elbows, Z-bends, expansion loops and anchors specifically designed for the intended application. External expansion compensation utilizing flexible expansion bolsters minimum one inch thick extending on either side, both inside and outside the radius of the fittings, is used with all fittings having expansion in excess of 1/2".

Part 3 – Execution

3.1 Prefabricated systems shall be provided as SC (standard components) fittings and factory insulated straight pipe sections for field engineering per the contract drawings. (*At the Engineer's option*, field fabricated fittings insulated with kits provided by the system manufacturer.)

(Continued)



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3.2 Underground systems shall be buried in a trench of not less than two (2) feet deeper than the top of the pipe and not less than eighteen inches wider than the combined O.D. of all piping systems. A minimum thickness of 24 inches of compacted backfill over the top of the pipe will meet H-20 highway loading.

3.3 Trench bottom shall have a minimum of 6" of sand, pea gravel, or specified backfill material, as approved by the engineer, as a cushion for the piping. All field cutting of the pipe shall be performed in accordance with the manufacturer's installation instructions.

3.4 A hydrostatic pressure test of the carrier pipe shall be performed per the engineer's specification with a factory recommendation of one and one-half times the normal system operating pressure for not less than two hours. Care shall be taken to insure all trapped air is removed from the system prior to the test. *Appropriate safety precautions shall be taken to guard against possible injury to personnel in the event of a failure.*

3.5 Field service, if required by project specifications, will be provided by a certified manufacturer's representative or company field service technician. The technician will be available at the job to check unloading, storing, and handling of pipe, joint installation, pressure testing and backfilling techniques. This service will be added into the cost as part of the project technical services required by the preinsulated pipe manufacturer.