



CON II

Specification Guide

C2SG
13.101

STANDARD SPECIFICATION

7.01.08

Containment Piping Systems suitable for Fuel Oil, Gasoline, Solvents, and other Hazardous Fluids.

Part 1 - General

1.1 Containment Piping - Furnish a complete system of factory fabricated, pre-engineered steel piping for the specified service. The system shall be provided as specified below and shown on the drawings.

1.2 The system shall be **CON II** as manufactured by **Thermacor Process, L.P.**, of Fort Worth, Texas.

Part 2 – Products

2.1 Carrier pipe shall be steel ASTM A-53, Grade B., ERW (Type E) or seamless (Type S), standard weight for sizes 2" and larger, and shall be ASTM A-106, Grade B, standard weight for sizes 1-1/2" and smaller (Std. Wt is the same as Sch. 40 through 10"). When practical, piping shall be provided in 40-foot double-random lengths. All carbon steel pipe shall have ends cut square and beveled for butt-welding. Straight sections of factory insulated pipe shall have 6" of exposed pipe at each end for field joint fabrication.

2.2 Carrier pipe fittings shall be minimum 2D bends 2" thru 4", butt-weld fittings conforming to ASTM A-234 and ANSI B16.9 for sizes over 2", or shall be socket weld steel fittings conforming to ANSI B16.11 for sizes 2" and below. Where pipe is to be joined to other materials or fittings, suitable socketed adapters or flanges shall be used. Dielectric couplings or flanges with isolation gasket sets shall be used when connecting to dissimilar metals, and at all termination points to provide electrical isolation as needed for proper operation of cathodic protection system.

2.3 Containment pipe shall be 10 gauge, smooth-walled black steel conduit manufactured in accordance with ASTM A-134, A-135, or A-139. The containment casing shall be sized to accommodate any expansion or contraction of the pipe due to temperature changes. All conduit shall be cylindrical and straight with the ends cut square. Containment pipe conduit shall be shot blasted to clean bright metal and factory coated with 30 mil Novacoat or 20 mil FBE. All coated surfaces shall be Holiday tested to 125 volts/ mil and any detected holidays shall be recoated and retested.

2.4 Containment pipe fittings shall be fabricated from the containment pipe material. All pre-fabricated fittings, end plates, and accessories shall be fully welded, liquid tight, and Holiday tested in accordance with 2.3 above. Tees, elbows, and other fittings will be coated and pre-fabricated to straight sections whenever shipping requirements permit.

2.5 Corrosion protection shall be provided using a sacrificial anode cathodic protection system designed by a qualified NACE Corrosion Engineer. The design Engineer shall furnish the soil resistivity for CP design purposes. The Cathodic protection system, complete with test stations, shall be designed for the particular site conditions. System components shall include, but not be limited to, sacrificial anodes (either pre-packed ingots or ribbon anode as appropriate), test stations, shunts, isolation couplings, and gasket sets.

2.6 Pipe supports shall be designed to maintain orientation of the pipes throughout the system and shall permit axial or lateral movement, as required, to accommodate expansion. Conduit straight lengths shall be normally fabricated in 40 foot nominal lengths with five pipe supports per length. Shorter lengths will be fabricated as required and provided with pipe supports not more than nine feet apart and with a pipe support not more than two feet from each end. Centering devices are to be constructed to allow drainage of the system, air flow, and unrestricted installation of leak trace cable (when required).

2.7 Terminal ends of conduits shall be equipped with fully welded end seals consisting of a 1/2" steel bulk head plate welded to the pipe and conduit. If 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 the end of the conduit. End seals or gland seals shall be equipped with 1" drain and vent fittings, as well as feed-through fittings to accommodate the passage of jumper cables to the leak detection sensors (where required). Terminate all conduits 2" beyond the inside face of manhole or building walls.

2.8 Wall sleeves with leak plates shall be provided at all building and manhole entries to provide an effective moisture barrier. The wall sleeve and leak plate shall be electrically isolated from building rebar. The space between the conduit and wall sleeve shall be made watertight by use of Link-Seal® pipe penetration seals or equal assemblies, which will also provide electrical isolation.

(Continued)



CON II

Specification Guide

C2SG
13.102

STANDARD SPECIFICATION

3.14.07

2.9 Field joints shall be made at straight sections of pipe. Carrier pipe shall be welded in accordance with ANSI B31.1. Conduit pipe shall be joined using a one piece, 10 gauge split sleeve welded to the adjacent casing sections. After pressure testing, the 10 gauge sleeve is covered with a heat shrink sleeve.

Part 3 – Execution

3.1 The installing contractor shall be responsible to excavate, string conduit, weld test, place in trench, backfill, or otherwise treat and install the system as per the specifications and directions furnished by the manufacturer and approved by the engineer in accordance with the plans and specifications.

3.2 The conduit shall be air tested at 15 psi. Test pressure shall be held for two hours. Repair any conduit leaks and retest prior to making joint closures.

3.3 Pre-engineered systems shall be provided with all straight pipe and fittings factory pre-insulated and pre-fabricated to job dimensions.

3.4 Underground systems shall be buried in a trench not less than two 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 placed over the top of the pipe will meet H-20 highway loading.

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

3.6 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.*

3.7 Field Service is required and will be provided by a certified manufacturer's representative or company field service technician. The manufacturer's representative is to instruct the installation contractor in the prescribed method of system assembly, joint assembly, containment casing joint closure and coating, Holiday testing, and the installation of the leak detection sensors and alarm module. A final report shall state that the installation is in accordance with the manufacturer's recommendations, and that the installation is in accordance with the plans and specifications.

3.8 All valves and equipment shall be supported independently from the pipe. Valves shall be anchored to prevent the turning movement resulting from their operation from being transmitted to the pipe.

3.9 All piping shall be installed to slope for drainage of the system in case of leakage in the carrier pipe.



CON II

Specification Guide

C2SG
13.103

LEAK DETECTION SPECIFICATION

7.01.08

Containment Piping Systems suitable for Fuel Oil, Gasoline, Solvents, and other Hazardous Fluids.

Part 1 - General

1.1 Containment Piping - Furnish a complete system of factory fabricated, pre-engineered steel piping for the specified service. The system shall be provided as specified below and shown on the drawings.

1.2 The system shall be **CON II** as manufactured by **Thermacor Process, L.P.**, of Fort Worth, Texas.

Part 2 – Products

2.1 Carrier pipe shall be steel ASTM A-53, Grade B., ERW (Type E) or seamless (Type S), standard weight for sizes 2" and larger, and shall be ASTM A-106, Grade B, standard weight for sizes 1-1/2" and smaller (Std. Wt is the same as Sch. 40 through 10"). When practical, piping shall be provided in 40-foot double-random lengths. All carbon steel pipe shall have ends cut square and beveled for butt-welding. Straight sections of factory insulated pipe shall have 6" of exposed pipe at each end for field joint fabrication.

2.2 Carrier pipe fittings shall be minimum 2D bends 2" thru 4", butt-weld fittings conforming to ASTM A-234 and ANSI B16.9 for sizes over 2", or shall be socket weld steel fittings conforming to ANSI B16.11 for sizes 2" and below. Where pipe is to be joined to other materials or fittings, suitable socketed adapters or flanges shall be used. Dielectric couplings or flanges with isolation gasket sets shall be used when connecting to dissimilar metals, and at all termination points to provide electrical isolation as needed for proper operation of cathodic protection system.

2.3 Containment pipe shall be 10 gauge, smooth-walled black steel conduit manufactured in accordance with ASTM A-134, A-135, or A-139. The containment casing shall be sized to accommodate any expansion or contraction of the pipe due to temperature changes. All conduit shall be cylindrical and straight with the ends cut square. Containment pipe conduit shall be shot blasted to clean bright metal and factory coated with 30 mil Novacoat or 20 mil FBE. All coated surfaces shall be Holiday tested to 2500 volts and any detected holidays shall be recoated and retested.

2.4 Containment pipe fittings shall be fabricated from the containment pipe material. All pre-fabricated fittings, end plates, and accessories shall be fully welded, liquid tight, and Holiday tested in accordance with 2.3 above. Tees, elbows, and other fittings will be coated and pre-fabricated to straight sections whenever shipping requirements permit.

2.5 Corrosion protection shall be provided using a sacrificial anode cathodic protection system designed by a qualified NACE Corrosion Engineer. The design Engineer shall furnish the soil resistivity for CP design purposes. The Cathodic protection system, complete with test stations, shall be designed for the particular site conditions. System components shall include, but not be limited to, sacrificial anodes (either pre-packed ingots or ribbon anode as appropriate), test stations, shunts, isolation couplings, and gasket sets.

2.6 Pipe supports shall be designed to maintain orientation of the pipes throughout the system and shall permit axial or lateral movement, as required, to accommodate expansion. Conduit straight lengths shall be normally fabricated in 40 foot nominal lengths with five pipe supports per length. Shorter lengths will be fabricated as required and provided with pipe supports not more than nine feet apart and with a pipe support not more than two feet from each end. Centering devices are to be constructed to allow drainage of the system, air flow, and unrestricted installation of leak trace cable (when required).

2.7 Terminal ends of conduits shall be equipped with fully welded end seals consisting of a 1/2" steel bulk head plate welded to the pipe and conduit. If 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 the end of the conduit. End seals or gland seals shall be equipped with 1" drain and vent fittings, as well as feed-through fittings to accommodate the passage of jumper cables to the leak detection sensors (where required). Terminate all conduits 2" beyond the inside face of manhole or building walls.

2.8 Wall sleeves with leak plates shall be provided at all building and manhole entries to provide an effective moisture barrier. The wall sleeve and leak plate shall be electrically isolated from building rebar. The space between the conduit and wall sleeve shall be made watertight by use of Link-Seal® pipe penetration seals or equal assemblies, which will also provide electrical isolation.

(Continued)



CON II

Specification Guide

C2SG
13.104

LEAK DETECTION SPECIFICATION

3.14.07

2.9 Field joints shall be made at straight sections of pipe. Carrier pipe shall be welded in accordance with ANSI B31.1. Conduit pipe shall be joined using a one piece, 10 gauge split sleeve welded to the adjacent casing sections. After pressure testing, the 10 gauge sleeve is covered with a heat shrink sleeve.

2.10 Electronic leak detection is to be installed with a TraceTek Probe system as manufactured by Raychem Corporation for continuous detection of leaks. (Select TraceTek 1000 for Aqueous chemicals, TraceTek 5000 for solvents and fuels. If TraceTek 5000 is selected and the engineer desires to monitor also for ground water leakage through the containment pipe, a TraceTek 1000 system can be supplied in tandem.)

Part 3 – Execution

3.1 The installing contractor shall be responsible to excavate, string conduit, weld test, place in trench, backfill, or otherwise treat and install the system as per the specifications and directions furnished by the manufacturer and approved by the engineer in accordance with the plans and specifications.

3.2 The conduit shall be air tested at 15 psi. Test pressure shall be held for two hours. Repair any conduit leaks and retest prior to making joint closures.

3.3 Pre-engineered systems shall be provided with all straight pipe and fittings factory pre-insulated and pre-fabricated to job dimensions.

3.4 Underground systems shall be buried in a trench not less than two 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 placed over the top of the pipe will meet H-20 highway loading.

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

3.6 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.*

3.7 Field Service is required and will be provided by a certified manufacturer's representative or company field service technician. The manufacturer's representative is to instruct the installation contractor in the prescribed method of system assembly, joint assembly, containment casing joint closure and coating, Holiday testing, and the installation of the leak detection sensors and alarm module. A final report shall state that the installation is in accordance with the manufacturer's recommendations, and that the installation is in accordance with the plans and specifications.

3.8 All valves and equipment shall be supported independently from the pipe. Valves shall be anchored to prevent the turning movement resulting from their operation from being transmitted to the pipe.