NACE SP0200-2014
(formerly RP0200)
Item No. 21091

Standard Practice

Steel-Cased Pipeline Practices

Revised 2014-06-26
Reaffirmed 2008-03-20
Approved 2000-01-14
NACE International
15835 Park Ten Place
Houston, Texas 77084
+1 281 228-6200

ISBN 1-57590-094-7

Foreword

This standard practice details acceptable practices for the design, fabrication, installation, and maintenance of steel-cased metallic pipelines. It is intended for use by personnel in the pipeline industry.

The use of cased carrier pipe for pipelines crossing under highways and railroads has been common practice in the industry. The first cased crossings were made using large diameter pipe. The carrier pipe was mechanically coupled and pushed through the casing, and the coupling or collars were in direct contact with it. When coatings came into general use, isolating spacers were made of hemp rope saturated with pipe-coating enamel. End seals consisting of either concrete or pipe-coating enamel were poured into each end of the casing. The current practice for installing cased carrier pipe has changed only slightly since the beginning of its use. External loading of the carrier pipe has now been eliminated by the installation of heavy-wall casing pipe, and isolating spacers are used to prevent electrical contact between the casing and the carrier pipe. End seals are used to keep electrolyte (e.g., mud, water) out of the annular space between the carrier pipe and casing.

This standard was originally prepared in 2000 by NACE Task Group T-10A-18, a component of Unit Committee T-10A, "Cathodic Protection." It is based on NACE Publication 10A192, "State of the Art Report on Cased Pipeline Practices," written by the same task group in 1992. This standard was reaffirmed in 2008 by Specific Technology Group (STG) 35, "Pipelines, Tanks, and Well Casings," and revised in 2014 by Task Group (TG) 412, "Pipelines, Steel-Cased." It is also sponsored by STG 05, "Cathodic/Anodic Protection." It is issued by NACE International under the auspices of STG 35.

In NACE standards, the terms *shall, must, should*, and *may* are used in accordance with the definitions of these terms in the NACE Publications Style Manual. The terms *shall* and *must* are used to state a requirement, and are considered mandatory. The term *should* is used to state something good and is recommended but is not considered mandatory. The term *may* is used to state something considered optional.

Standard Practice

Steel-Cased Pipeline Practices

Contents

Section 1: General

1.1 Steel casings are used to install and maintain pipeline crossings such as those at road and railroad right-of-ways. This standard details acceptable practices for the design, fabrication, installation, maintenance, and monitoring of steel-cased pipelines.

1.2 The use of cased crossings should take into account load considerations, unstable soil conditions, protection from third-party damage, sound engineering practices, and regulatory requirements.

1.3 This standard does not imply that utilization of casings is mandatory or necessary.

1.4 This standard does not imply that cased crossings, whether electrically isolated or electrically shorted, contribute to corrosion of a carrier pipe within a cased crossing. However, cased crossings may adversely affect the integrity of the carrier pipe by shielding cathodic protection (CP) current to the pipe or reducing the CP effectiveness on the pipe in the vicinity of the casing, including if the casing is coated and electrolytic contact exists between the casing and carrier pipe (see Paragraph 3.2.3 in Casing Design).

1.5 The practices contained in this standard may or may not be applicable to casings installed prior to its issuance. It is presumed that all practices described in this standard are performed in a safe manner.

Section 2: Definitions

Carrier Pipe: A pipe inside a casing, which carries a product such as a gas and/or a liquid.

Casing: A metallic pipe used to protect the carrier pipe. Also referred to as *Encasement Pipe*.

Dogleg: A term used to describe a vent pipe that is offset, which may cause the below-ground portion to appear to be shaped like the rear leg of a dog. The vent is offset as necessary to place the above-ground portion in a more acceptable location (e.g., to locate it off a right-of-way or to locate it where it is less susceptible to potential damage).

End Seal: A dielectric material to seal the end of a casing to assist in preventing water and soil ingress.

Electrolytic Couple: Ionic contact between two metallic structures via an electrolyte. Electrolyte inside the casing that is in contact with the carrier pipe is an example of electrolytic couple.

Filler: A product placed in the annular space between the carrier pipe and the casing pipe to inhibit corrosion and assist in preventing the ingress of electroyte.

Isolator or Spacer: A dielectric device specifically designed to electrically isolate a carrier pipe from a casing and provide support for the carrier pipe.

Metallic Short: Direct metallic contact between two metallic structures.

Split Sleeve: A method of in situ casing installation by welding two halves of the casing (split sleeve) together around the carrier pipe.

Test Leads: Electrical wiring attached to the casing and or carrier pipe for conducting electrical tests.

Section 3: Design

3.1 Carrier Design

3.1.1 Unless prohibited by regulation or right-of-way agreement, consideration should be given to adding supplementary carrier pipe wall thickness or pipe burial depth, in lieu of casing (refer to API[(1)] RP 1102[1] or other applicable standards).

3.1.2 The carrier pipe shall be effectively coated, with consideration being given to the application of supplementary coating. See NACE SP0169[1] for details.

3.1.3 The carrier pipe shall be properly supported inside and outside the casing to prevent metallic contact between the casing and the carrier pipe. See NACE SP0286[2] for details.

3.2 Casing Design

3.2.1 The casing should be kept as short in length as possible.

3.2.2 For pipelines 200 mm (8.0 in) in diameter and larger, the diameter of the casing should be a minimum of 100 mm (4.0 in) larger than that of the carrier pipe. For pipelines smaller than 200 mm (8.0 in) in diameter, the diameter of the casing is normally a minimum of 50 mm (2.0 in) larger than that of the carrier pipe.

3.2.2.1 Selection of casing diameter should also take into consideration the dimensions of isolators and thickness of coatings to be installed on the carrier pipe. This is particularly important if there are additional coatings, such as concrete or epoxy-polymer concrete.

3.2.2.2 Casing diameter selection must also consider adequate clearance for pipe with bell and spigot joints, flange joints, etc.

3.2.3 Casings can be coated or uncoated. However, the use of coated or nonmetallic casings may result in shielding problems.

3.2.4 Vent pipes should be installed on both ends of a casing, one on top of the casing at the high elevation end and one on the bottom of the casing at the low elevation end. The vents should be positioned so that they are not directly over or under any isolating spacer or end seal. Care should be taken that the casing vents are not blocked during installation of the carrier pipe.

3.2.5 The casing vent hole should be at least one-half the diameter of the vent pipe (25 mm [1.0 in] minimum). The casing vent pipe should be a minimum of 50 mm (2.0 in) in diameter.

3.2.6 The casing and carrier pipe shall be properly supported for the entire length of the pipe, especially near the ends, to prevent sagging, metallic contact and carrier pipe stress. Refer to Paragraphs 4.3 and 4.4.

3.2.7 Casing end seals shall be designed to prevent ingress of water and debris.

3.2.8 Vent pipes shall be designed, using standard industry methods, to prevent intrusion of water and debris.

3.3 Metallic Isolation Design

3.3.1 Sufficient electrically nonconductive spacing material shall be specified to prevent metallic contact between the carrier pipe and the casing, provide adequate support, and minimize coating damage during installation. Refer to Paragraph 4.4.

3.3.2 Casing isolators shall be carefully selected to ensure they have the mechanical strength required to withstand the actual installation, considering all conditions including pipe weight, length of casing, weight of the product the carrier pipe will be conveying, conditions of weld beads, deflections in the casing, and other field conditions. Selection should include an evaluation of the ability of the casing isolators to provide electrical isolation after enduring the rigors of installation, and to position the carrier pipe for proper end seal application. (See NACE SP0286 for additional information.)

(1) American Petroleum Institute (API), 1220 L St. NW, Washington, DC 20005-4070.