NACE Standard TM0172-2015
Item No. 21204

Determining Corrosive Properties of Insoluble Petroleum Product Pipeline Cargoes

ABSTRACT

This standard provides a uniform method of testing the corrosive properties of petroleum product pipeline cargoes. this standard provides guidelines for performing the test method described in ASTM D665, modified so that it is applicable to gasoline and other petroleum products, and so that it permits analysis within a single working day. this short test is particularly applicable to a batch control procedure because of the need for prompt release of cargoes and because time is limited during the working day.

KEYWORDS

need keywords

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Foreword

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..

Petroleum products that are not water soluble are not corrosive. However, the interior surfaces of liquid petroleum product pipelines are subject to general surface corrosion caused by the presence of any water component in the product. Moisture may have condensed from the product or may have entered the product when stored in tankage via floating roof seals or vents. Water may have been introduced into the product during maintenance or processing operations. The specifications for many petroleum products commonly allow up to 0.5% water content. In any event, the resulting general surface corrosion can typically be controlled with the appropriate use of corrosion inhibitors. Usually, the amount of internal corrosion protection provided to the pipeline is proportional to the corrosion inhibitor concentration in the liquid petroleum products being transported. More protection is commonly required in a static pipeline than in a flowing pipeline.

The purpose of this standard is to provide a test method to determine the corrosive properties of liquid petroleum products (e.g., gasoline and distillate fuels) and other liquid hydrocarbon products that are not water soluble. This standard provides guidelines for performing the test method described in ASTM[(1)] D665[1] with modifications to make it applicable to liquid petroleum and other hydrocarbon products that are not water soluble, and to permit analysis within a single work day. This short test is particularly applicable to a batch control procedure because of the need for prompt release of pipeline batch shipments and because time is limited during the work day.

This standard test method is intended to be used by corrosion engineers, corrosion technicians, corrosion consultants, scientists, and others concerned with determining the corrosive properties of liquid petroleum and other hydrocarbon products that are not soluble in water, for transport through a pipeline.

This standard was originally published in 1972 and revised in 1976 by Unit Committee T-3P on Internal Corrosion of Product Pipelines and Tanks. It was reaffirmed with editorial changes in 1986 and 1993 by Unit Committee T-10E on Internal Corrosion of Pipelines. It was revised in 2001 by Task Group (TG) 042, "Revision of NACE Standard TM0172, Determining Corrosive Properties of Cargoes in Petroleum Product Pipelines." TG 042 is administered by Specific Technology Group (STG) 35, "Pipelines, Tanks, and Well Casings." It was revised in 2015 by TG 382, "Internal Corrosion of Pipelines: Review of NACE Standard TM0172." TG 382 is administered by STG 35, "Pipelines, Tanks, and Well Casings." It is issued under the auspices of STG 35.

(1) ASTM International (ASTM), 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959.

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Figures

Section 1: General

1.1 This standard provides a test method to determine the corrosive properties of liquid petroleum products (e.g., gasoline and distillate fuels), and other liquid hydrocarbon products that are not water soluble, for transport through a steel pipeline. Information on the test specimen, test apparatus, test procedure, and rating of the exposed test specimen is included.

1.2 In this test method, the surface of a cylindrical steel test specimen is prepared and then immersed in the test liquid to be evaluated. The test liquid is stirred and maintained at a prescribed temperature. After a 3.5 h exposure, the test specimen is removed and rated by the percentage of the test specimen surface area that has corroded.

1.3 This test method is commonly performed in three standard variants.

1.3.1 First test liquid variation—original product

The test liquid is the liquid petroleum or other hydrocarbon product itself, which is used to determine the corrosiveness of that original product. This test liquid variation is appropriate when the product is stable (no expected compositional, thermal, or other physical changes are expected during pipeline transport and/or storage) and when the pipeline transport and storage system is sealed from possible outside contamination.

1.3.2 Second test liquid variation—original product plus distilled water addition

The test liquid is the liquid petroleum or other hydrocarbon product itself plus an addition of distilled water. A 10% distilled water addition has been shown to be adequately conservative for evaluating the impact of possible contamination on the corrosiveness of the liquid product in all but the most extreme cases. This test liquid variation is used when it is believed that the original product may undergo compositional or physical changes (such as cooling that causes water to condense out of the product) or when outside contaminants may enter the liquid product during transport or storage (such as when stored in tanks under atmospheric conditions).

1.3.3 Third test liquid variation—original product or original product with distilled water addition plus corrosion inhibitor addition

The test liquid is the liquid petroleum or other hydrocarbon product, or the liquid petroleum or other hydrocarbon product that has been artificially contaminated with distilled water, plus the addition of a corrosion inhibitor. Both the corrosion inhibitor formulation and concentration can be tested to determine the adequacy of a proposed or ongoing treatment program.

1.4 This test method does not predict corrosiveness in a standing aqueous phase, nor does it predict microbiologically influenced corrosion (MIC) or underdeposit corrosion (UDC).

1.5 This test method is not appropriate for evaluating the corrosiveness of liquid hydrocarbons that are water soluble.