Manual of Petroleum Measurement Standards Chapter 19.3—Evaporative Loss Measurement

Part C—Weight Loss Test Method for the Measurement of Rim-Seal Loss Factors for Internal Floating-roof Tanks

FIRST EDITION, JULY 1998

REAFFIRMED, MAY 2023

American Petroleum Institute

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FOREWORD

This standard provides rules for testing the rim seals of internal floating roofs under laboratory conditions to provide evaporative rim-seal loss factors. It was prepared by Task Group II of the API Environmental Technical Advisory Group (ETAG).

Testing programs conducted by API, which began in the mid-1970s and extended through 1982, provided the information on which the current evaporative rim-seal loss factors are based for common, generic types of external, covered, and internal floating-roof rim seals. These rim-seal loss factors are published in API Publication Chapter 19.2, "Evaporative Loss From Floating-Roof Tanks," for use in estimating the evaporative loss of petroleum stocks from external, covered, and internal floating-roof tanks. These rim-seal loss factors and the test methods used to develop them have been widely accepted by oil companies, manufacturers, industry groups, regulatory agencies, and general interest groups. API has not, however, tested or developed evaporative rim-seal loss factors for proprietary designs of individual manufacturers. By publishing this test method, API is making the test method available to interested parties who wish to test particular rim seals under the auspices of API.

API certification of an evaporative loss factor developed through this program is subject to the following three-step process:

(a) The testing shall be performed in laboratories licensed by API. The requirements to qualify for licensure are presented in API *Manual of Petroleum Measurement Standards*, Chapter 19.3, Part G, "Certified Loss Factor Testing Laboratory Registration;"
(b) Testing and determination of test results shall be performed as specified herein; and
(c) The evaluation of these test results and the certification of an evaporative loss factor for the item tested shall then be conducted in accordance with API *Manual of Petroleum Measurement Standards*, Chapter 19.3, Part F, "Evaporative Loss Factor for Storage Tanks Certification Program."

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Suggested revisions are invited and should be submitted to the Measurement Coordinator, American Petroleum Institute, 200 Massachusetts Avenue, NW, Washington, DC 20001.

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Chapter 19.3—Evaporative Loss Measurement

PART C—WEIGHT LOSS TEST METHOD FOR THE MEASUREMENT OF RIM-SEAL LOSS FACTORS FOR INTERNAL FLOATING-ROOF TANKS

0 Introduction

The purpose of this standard is to establish a uniform method for measuring evaporative rim-seal loss factors of rim seals used on internal floating-roof tanks. These rim-seal loss factors are to be determined in terms of loss rate and seal gap area for certification purposes.

It is not the purpose of this standard to specify procedures to be used in the design, manufacture, or field installation of rim seals. Furthermore, equipment should not be selected for use solely on the basis of evaporative-loss considerations. Many other factors, such as tank operation, maintenance, and safety, are important in designing and selecting tank equipment for a given application.

1 Scope

This test method may be used to establish evaporative rim-seal loss factors for rim seals used on internal floating-roof tanks. The test method involves measuring the weight loss of a test assembly over time. This standard specifies the test apparatus, the instruments, the test procedure, and the calculation procedures to be used. The variables that are to be measured are defined, and quality provisions are stipulated. The format for reporting the values of both the test results and their associated uncertainty are also specified.

This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2 Normative References

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

2.1 API NORMATIVE STANDARDS

API

Manual of Petroleum Measurement Standards, Chapter 19.2, "Evaporative Loss From Floating-Roof Tanks"

MPMS Chapter 19.3, Part F, "Evaporative Loss Factor for Storage Tanks Certification Program"

MPMS Chapter 19.3, Part G, "Certified Loss Factor Testing Laboratory Registration"

Publ 2517 *Evaporative Loss from External Floating-Roof Tanks*

Publ 2519 *Evaporation Loss from Internal Floating-Roof Tanks*

2.2 ASTM NORMATIVE STANDARDS

ASTM[1]

D323, *Test Method for Vapor Pressure of Petroleum Products (Reid Method)*

E220, *Method for Calibration of Thermocouples by Comparison Techniques*

E230, *Temperature-Electromotive Force (EMF) Tables for Standardized Thermocouples*

3 Terminology

3.1 DEFINITIONS

3.1.1 data acquisition: The process of receiving signals from the sensors, determining the values corresponding to the signals, and recording the results.

3.1.2 deck: That part of a floating roof which provides buoyancy and structure, and which covers the majority of the liquid surface in a bulk liquid storage tank. The deck has an annular space around its perimeter to allow it to rise and descend (as the tank is filled and emptied) without binding against the tank shell. This annular space is closed by a flexible device called a rim seal. The deck may also have penetrations, closed by deck fittings, which accommodate some functional or operational feature of the tank.

3.1.3 deck fitting: The device which substantially closes a penetration in the deck of a floating roof in a bulk liquid storage tank. Such penetrations are typically for the purpose of accommodating some functional or operational feature of the tank.

3.1.4 deck seam: Certain types of internal floating roofs are constructed of deck sheets or panels that are joined by mechanical means at deck seams. Such mechanically joined seam devices have an associated deck seam loss. Other types of internal or external floating roofs are constructed of metal

[1]ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428.