

# **Manual of Petroleum Measurement Standards Chapter 19.2**

## **Evaporative Loss from Floating-roof Tanks**

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## Contents

	Page
1	Scope..... 1
2	Normative References ..... 2
3	Symbols ..... 3
4	Procedure for Estimating Loss..... 3
4.1	General ..... 3
4.2	Standing Loss $L_s$ ..... 4
4.3	Working Loss $L_w$ ..... 22
5	Sample Problems ..... 23
5.1	General ..... 23
5.2	EFRT Sample Problem ..... 23
5.3	IFRT Sample Problem ..... 27
5.4	Domed EFRT Sample Problem ..... 30
6	Equipment Descriptions ..... 34
6.1	Components ..... 34
6.2	Types of Floating-Roof Tanks ..... 59
7	Loss Mechanisms ..... 60
7.1	General ..... 60
7.2	Standing Loss ..... 61
7.3	Working Loss ..... 63
8	Development of Estimation Methods ..... 63
8.1	General ..... 63
8.2	Standing Loss ..... 63
8.3	Working Loss ..... 68
	Annex A (informative) Development of Rim-Seal Loss Factors..... 70
	Annex B (informative) Development of Rim-Seal Relationship Between Airflow Rate and Wind Speed ..... 74
	Annex C (informative) Development of Diameter Function ..... 76
	Annex D (informative) Development of Deck-Fitting Loss Factors..... 78
	Annex E (informative) Development of Vapor Pressure Function ..... 85
	Annex F (informative) Development of Product Factors..... 87
	Annex G (informative) Development of Clingage Factors ..... 89
	Annex H (informative) Development of Fitting Wind-Speed Correction Factor ..... 90
	Annex I (informative) Development of Deck-Seam Loss Factors..... 93
	Annex J (informative) Documentation Records ..... 95

## Contents

	Page
Annex K (informative) SI Units .....	96
Bibliography.....	97

## Figures

1	EFRT with Pontoon Floating Roof .....	36
2	EFRT with Double-deck Floating Roof.....	37
3	IFRT with Noncontact Deck .....	38
4	Domed EFRT .....	39
5	Vapor-mounted Primary Seals .....	41
6	Liquid-mounted Primary Seals.....	43
7	Mechanical-shoe Primary Seals .....	44
8	Secondary Seals.....	46
9	Access Hatch .....	47
10	Fixed-roof Support Column.....	47
11	Gauge Float (Automatic Gauge).....	48
12	Gauge Hatch Sample Ports .....	49
13	Vacuum Breaker .....	50
14	Deck Drains .....	51
15	Deck Leg.....	52
16	Rim Vent .....	53
17	Vertical Ladder .....	54
18	Unslotted (Unperforated) Guidepole.....	55
19	Slotted (Perforated) Guidepole .....	56
20	Ladder/Guidepole Combination .....	57
C.1	Calculated Losses as a Function of Diameter Exponent.....	77
D.1	IFRT Deck Fitting Emission Factors—Effect of Ladder Sleeve on Emission Reduction.....	83

## Tables

1	Symbols .....	2
2	Rim-Seal Loss Factors .....	6
3a	Deck-Fitting Loss Factors—Other-than-guidepole Deck Fittings .....	9
3b	Deck-fitting Loss Factors—Unslotted (Unperforated) Guidepoles .....	13
3c	Deck-fitting Loss Factors—Slotted (Perforated) Guidepoles.....	14
4	Typical Number of Columns $N_{fc}$ for Tanks with Column-Supported Roofs.....	15
5	Typical Number of Vacuum-Breakers $N_{rvb}$ and Deck Drains $N_{fdl}$ for API 650 Annex C Decks (EFRTs and Domed EFRTs) .....	15
6	Typical Number of Deck Legs $N_{fdl}$ for API 650 Annex C Floating Roofs .....	16
7	Deck-Seam Length Factors $S_g$ .....	18
8	Clingage Factors $C_L$ for Steel Tanks (bbl/1000 ft <sup>2</sup> ).....	22
9	Effective Column Diameter $D_C$ for Typical Column Construction .....	23
D.1	Summary of Deck Fittings Selected for Data Regression, and Associated Loss Factors for Each .....	81
D.2	Net Liquid Surface Area for a Ladder/Guidepole Combination .....	82
D.3	Emission Factors for IFRT Ladder Sleeves .....	83

## Contents

	Page
<b>D.4</b> IFRT Emission Factor Comparison for a Ladder/Guidepole Combination .....	84
<b>H.1</b> Assumed Distribution of Time for a Floating Roof in Each Height Range .....	91
<b>H.2</b> Assumed Floating Roof Height Distribution versus Survey Results .....	91
<b>I.1</b> Noncontact Deck Seams .....	94
<b>I.2</b> Contact Deck Seams .....	95
<b>J.1</b> Documentation Records .....	95

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# Evaporative Loss from Floating-roof Tanks

## 1 Scope

This standard contains methodologies for estimating the total evaporative losses of hydrocarbons from external floating-roof tanks (EFRTs), freely vented internal floating-roof tanks (IFRTs), and domed external floating-roof tanks (domed EFRTs).

The methodologies provide loss estimates for general equipment types based on laboratory, test-tank, and field-tank data.

Types of floating roofs, rim-seal systems, and deck fittings are described for information only.

The equations estimate average annual losses from floating-roof tanks for various types of tank construction, floating-roof construction, rim-seal systems, and deck fittings, as well as for various liquid stocks, stock vapor pressures, tank sizes, and wind speeds (EFRTs).

The equations were developed for:

- stocks with a true vapor pressure greater than ~0.1 psia;
- average wind speeds ranging from 0 miles per hour (mph) to 15 mph (EFRTs); and
- tank diameters greater than 20 ft.

The estimation techniques become more approximate when these conditions are not met.

When this standard is used to estimate losses from non-freely vented (closed vent) internal or domed external floating-roof tanks (tanks vented only through a pressure-vacuum relief vent, blanketed with an inert gas, vented to a vapor processing unit, or otherwise restricted from being freely vented), refer to the methodology in API TR 2569 [7].

The equations are not intended to be used in the following applications.

- to estimate losses from unstable or boiling stocks (i.e. stocks with a true vapor pressure greater than the atmospheric pressure at the tank location) or from petroleum liquids or petrochemicals for which the vapor pressure is not known or cannot readily be predicted;
- to estimate losses from tanks in which the materials used in the rim seal, deck fittings, or deck seams have either deteriorated or been significantly permeated by the stored stock;
- to estimate losses from storage tanks that do not have a floating roof (API MPMS 19.1<sup>[53]</sup> addresses this);
- to estimate losses from landing floating roofs (API MPMS 19.6.1<sup>[8]</sup> addresses this);
- to estimate losses from cleaning storage tanks (API MPMS 19.6.2<sup>[9]</sup> addresses this).

The estimation procedures were developed to provide estimates of typical losses from floating-roof tanks that are properly maintained and in normal working condition. Losses from poorly maintained tanks can be greater. Because the loss equations are based on equipment conditions that represent a large population of tanks, a loss estimate for a group of floating-roof tanks will be more accurate than a loss estimate for an individual tank. The estimation can be improved by using detailed field information, including climatic data and operational data for the appropriate time period.