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Evaporative Loss from Floating-roof Tanks

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Contents

	Page
1	Scope..... 1
2	Normative References 2
3	Symbols 2
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.....	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_{fdd} 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 ²).....	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
D.4 IFRT Emission Factor Comparison for a Ladder/Guidepole Combination	84
H.1 Assumed Distribution of Time for a Floating Roof in Each Height Range	91
H.2 Assumed Floating Roof Height Distribution versus Survey Results	91
I.1 Noncontact Deck Seams	94
I.2 Contact Deck Seams	94
J.1 Documentation Records	95

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:

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

- a) 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;
- b) 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;
- c) to estimate losses from storage tanks that do not have a floating roof (API MPMS 19.1^[53] addresses this);
- d) to estimate losses from landing floating roofs (API MPMS 19.6.1 ^[8] addresses this);
- e) to estimate losses from cleaning storage tanks (API MPMS 19.6.2 ^[9] 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.