MILITARY STANDARD

PROCEDURE FOR DETERMINING NORMAL

LOSS EXPECTANCIES FOR

PETROLEUM LIQUIDS

TO ALL HOLDERS OF MIL-STD-1408

1. THE FOLLOWING PAGES OF MIL-STD-1408 HAVE BEEN REVISED AND SUPERSEDE THE PAGES LISTED:

NEW PAGE	DATE	SUPERSEDED PAGE	DATE
5	21 July 1982	5	1 December 1978
6	1 December 1978	(PREPRINTED WITHOUT CHANGE)	

2. RETAIN THIS NOTICE AND INSERT BEFORE TABLE OF CONTENTS.

3. Holders of MIL-STD-1408 will verify that page changes and additions indicated above have been entered. This notice page will be retained as a check sheet. This issuance, together with appended pages, is a seperate publication. Each notice is to be retained by stocking points until the Military Standard is completely revised or canceled.

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5.2 Breathing loss expectancies (fixed roof bulk tanks).

5.2.1 Loss determination. The chart of Figure 2 shall be used to determine the expected annual breathing loss of volatile petroleum products from a fixed cone roof tank in good physical condition. The true vapor pressure is taken from the vapor pressure chart (see Figure 1). The outage will vary during operations, but will be taken as the average from the period under consideration.

5.2.2 Tank roof and shell paint. Evaporation loss data indicate that roof and shell paint types (colors) have a decided effect upon breathing losses. The breathing loss, as determined from Figure 2, includes the paint color/condition factor.

5.2.3 Tank condition. The breathing loss determined as above is based on a tank in good physical condition; i.e., gas-tight roof, gas-tight manhole and gaging hatch, tank equipped with pressure-vacuum vent, and roof painted white. Consequently, the poorer the physical condition of a tank and fittings, the higher the breathing loss. To include the physical condition factor, the calculated breathing loss is multiplied by the tank condition factor listed in table I. The condition factor is based upon the degree of leakage of the tank roof and fitting. It is determined as the sum of all individual items which contribute to increased losses from the tank in question.

TABLE I. Tank condition factor.

Condition	Factor
Base factor for:	
Gastight tank and fitting	1.0
Add for:	
Leaky float gage	0.1
Leaky gage hatch	0.2
Leaky manhole cover	0.3
Open vent	0.5
Leaky roof construction	0.5

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Example: A tank 48 feet in diameter has been calculated to have an annual breathing loss of 185 barrels (see 5.6 for example). Tank condition indicates an open vent, non-gastight gage hatch, and non-gastight float gage; thus, 185 x (1.0 + 0.5 + 0.2 + 0.1) = 333 barrels (breathing and condition loss). Tank condition loss = 333 - 185 = 148 barrels.

5.4.2 Ecomonics of repair and maintenance. Table I may be used as a rough guide for justifying the cost of maintaining or repairing leaky roofs and fittings.

5.3 Working loss expectancies (fixed roof bulk tanks).

5.3.1 General statement. Working loss is applicable only to fixed roof tanks for the purpose of this standard. Working loss is a term used to describe the losses attending tank filling and emptying operations. Vapors expelled when a petroleum liquid is delivered to a tank are filling losses. Additional fuel evaporation into ullage space following tank dispensing operations is called emptying losses.

5.3.2 Working loss determination. The chart on Figure 3 shall be used for above ground fixed cone roof and underground bulk storage tanks to determine the expectant working loss of volatile petroleum liquids. The true vapor pressure is taken from the vapor pressure chart (see Figure 1) using the Reid vapor pressure and the average liquid body temperature. Throughput, as used in Figure 3, is the total additive volume of fluid pumped into the tank for the period under consideration.

5.4 Transportation loss expectancies.

5.4.1 General statement. Transportation loss is that loss sustained while bulk petroleum liquids are loaded into, transported by, and discharged form barges, tankers, tank cars, tank trucks, and pipelines.

5.4.2 Barges and tankers. Transportation loss expectancy data presented in Table II reflect losses to be expected in transportation of petroleum determined by shore tank gages. Loss expectancies of crude oil may vary widely according to the volatility of the crude. When no other data is available, the loss is assumed to be the same as motor gasoline. Experience factors for each crude oil, if available, should be used in place of the factor shown in Table II.