

Date of Issue: August 2008

Affected Publication: API MPMS Chapter 19.1, *Evaporative Loss from Fixed-Roof Tanks*

ADDENDUM

Please insert the following changes to API MPMS Chapter 19.1:

Changes are reflected in **Red Bold** text.

Page 3, Section 19.1.2.1.2, in the second list under “additional information,” replace:

e. Daily total solar **insulation** on a horizontal surface

with

e. Daily total solar **insolation** on a horizontal surface

Page 4, change the Symbol Description in Table 1 as follows:

I Daily total solar **insulation** on a horizontal surface

with

I Daily total solar **insolation** on a horizontal surface

and

S_R Tank cone **rood** slope

with

S_R Tank cone **roof** slope

Page 5, change the Nomenclature in Table 1 as follows:

LN **liquid** minimum

to

LN **Liquid** minimum

LX **liquid** maximum

to

LX **Liquid** maximum

VI **initial** or normal operating condition of the vapor space

to

VI **Initial** or normal operating condition of the vapor space

and the following equation:

$^{\circ}\text{R} = ^{\circ}\text{F} + 459.61$

to

$^{\circ}\text{R} = ^{\circ}\text{F} + 459.67$

Page 8, change the following in Table 3:

Q = **Stock** annual net throughput

to

Q **Stock** annual net throughput

Page 15, change the following section of Table 4:

Baton Rouge, LA

T_{MAX}	°F	61.1	64.5	71.6	79.2	85.2	90.6	91.4	90.8	87.4	80.1	70.1	63.8	78.0
T_{MIN}	°F	40.5	42.7	49.4	57.5	64.3	70.0	72.8	72.0	68.3	56.3	47.2	42.3	57.0
I	Btu/ ft ² day	785	1054	1379	1681	1X71	1926	1746	1677	1464	1301	920	737	1379

to the following (amended text in red bold)

T_{MAX}	°F	61.1	64.5	71.6	79.2	85.2	90.6	91.4	90.8	87.4	80.1	70.1	63.8	78.0
T_{MIN}	°F	40.5	42.7	49.4	57.5	64.3	70.0	72.8	72.0	68.3	56.3	47.2	42.3	57.0
I	Btu/ ft ² day	785	1054	1379	1681	1871	1926	1746	1677	1464	1301	920	737	1379

Page 16, change the following sections of Table 4:

Lake Charles, LA

T_{MAX}	°F	60.8	64.0	70.5	77.8	84.1	89.4	91.0	90.8	87.5	80.8	70.5	64.0	77.6
T_{MIN}	°F	42.2	44.5	50.8	58.9	65.6	71.4	73.5	72.8	68.9	57.7	48.9	43.8	58.3
I	Btu/ ft ² day	728	1010	1313	1570	1X49	1970	1788	1657	1485	1381	917	706	1365

to the following (amended text in red bold):

T_{MAX}	°F	60.8	64.0	70.5	77.8	84.1	89.4	91.0	90.8	87.5	80.8	70.5	64.0	77.6
T_{MIN}	°F	42.2	44.5	50.8	58.9	65.6	71.4	73.5	72.8	68.9	57.7	48.9	43.8	58.3
I	Btu/ ft ² day	728	1010	1313	1570	1849	1970	1788	1657	1485	1381	917	706	1365

Detroit, MI

T_{MAX}	°F	30.6	33.5	43.4	57.7	69.4	79.0	83.1	X1.5	74.4	62.5	47.6	35.4	58.2
T_{MIN}	°F	16.1	18.0	26.5	36.9	46.7	56.3	60.7	59.4	52.2	41.2	31.4	21.6	38.9
I	Btu/ ft ² day	417	680	1000	1399	1716	1866	1835	1576	1253	876	478	344	1120

to the following (amended text in red bold):

T_{MAX}	°F	30.6	33.5	43.4	57.7	69.4	79.0	83.1	81.5	74.4	62.5	47.6	35.4	58.2
T_{MIN}	°F	16.1	18.0	26.5	36.9	46.7	56.3	60.7	59.4	52.2	41.2	31.4	21.6	38.9
I	Btu/ ft ² day	417	680	1000	1399	1716	1866	1835	1576	1253	876	478	344	1120

Billings, MT

T_{MAX}	°F	29.9	37.9	44.0	55.9	66.4	76.3	86.6	84.3	72.3	61.0	44.4	36.0	57.9
T_{MIN}	°F	11.8	18.8	23.6	33.2	43.3	51.6	58.0	56.2	46.5	37.5	25.5	18.2	35.4
I	Btu/ ft ² day	486	763	1190	1526	1913	2174	2384	2022	1470	9X7	561	421	1325

to the following (amended text in red bold):

T_{MAX}	°F	29.9	37.9	44.0	55.9	66.4	76.3	86.6	84.3	72.3	61.0	44.4	36.0	57.9
T_{MIN}	°F	11.8	18.8	23.6	33.2	43.3	51.6	58.0	56.2	46.5	37.5	25.5	18.2	35.4
I	Btu/ ft ² day	486	763	1190	1526	1913	2174	2384	2022	1470	987	561	421	1325

Las Vegas, NV

T_{MAX}	°F	56.0	62.4	68.3	77.2	87.4	98.6	104.5	101.9	94.7	X1.5	66.0	57.1	79.6
T_{MIN}	°F	33.0	37.7	42.3	49.8	59.0	68.6	75.9	73.9	65.6	53.5	41.2	33.6	52.8
I	Btu/ ft ² day	978	1340	1824	2319	2646	2778	2588	2355	2037	1540	1086	881	1864

to the following (amended text in red bold):

T_{MAX}	°F	56.0	62.4	68.3	77.2	87.4	98.6	104.5	101.9	94.7	81.5	66.0	57.1	79.6
T_{MIN}	°F	33.0	37.7	42.3	49.8	59.0	68.6	75.9	73.9	65.6	53.5	41.2	33.6	52.8
I	Btu/ ft ² day	978	1340	1824	2319	2646	2778	2588	2355	2037	1540	1086	881	1864

Buffalo, NY

T_{MAX}	°F	30.0	31.4	40.4	54.4	65.9	75.6	80.2	78.2	71.7	60.2	47.0	65.0	55.8
T_{MIN}	°F	17.0	17.5	25.6	36.3	46.3	56.4	61.2	59.3	52.7	47.2	33.6	22.5	39.3
I	Btu/ ft ² day	349	546	XX9	1315	1597	1804	1776	1513	1152	7X4	403	283	1034

to the following (amended text in red bold):

T_{MAX}	°F	30.0	31.4	40.4	54.4	65.9	75.6	80.2	78.2	71.7	60.2	47.0	65.0	55.8
T_{MIN}	°F	17.0	17.5	25.6	36.3	46.3	56.4	61.2	59.3	52.7	47.2	33.6	22.5	39.3
I	Btu/ ft ² day	349	546	889	1315	1597	1804	1776	1513	1152	784	403	283	1034

Page 17, change the following section of Table 4:

Columbia, SC

T_{MAX}	°F	56.02	59.5	67.1	77.0	83.8	89.2	91.9	91.0	85.5	76.5	67.1	58.X	75.3
T_{MIN}	°F	33.2	34.6	41.9	50.5	59.1	66.1	70.1	69.4	63.9	50.3	40.6	34.7	51.2
I	Btu/ ft ² day	762	1021	1355	1747	1895	1947	1842	1703	1439	1211	921	722	1380

to the following (amended text in red bold):

T_{MAX}	°F	56.02	59.5	67.1	77.0	83.8	89.2	91.9	91.0	85.5	76.5	67.1	58.8	75.3
T_{MIN}	°F	33.2	34.6	41.9	50.5	59.1	66.1	70.1	69.4	63.9	50.3	40.6	34.7	51.2
I	Btu/ ft ² day	762	1021	1355	1747	1895	1947	1842	1703	1439	1211	921	722	1380

Table 5—Solar Absorptance (α) for Selected Tank Surfaces^a

Surface Color	Shade or Type	Solar Absorptance (α) (dimensionless) Surface Condition	
		Good	Poor
Aluminum	Specular	0.39	0.49
Aluminum	Diffuse	0.60	0.68
Beige/Cream		0.35	0.49
Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.50
Tan		0.43	0.55
White	—	0.17	0.34
Aluminum ^b	Mill finish, unpainted	0.10	0.15

Notes:

^a If specific information is not available, a white shell and roof, with the paint in good condition, can be assumed to represent the most common or typical tank surface in use.

^b This refers to aluminum as the base metal, rather than aluminum-colored paint.

with the following (additional text in red bold):

Table 5—Solar Absorptance (α) for Selected Tank Surfaces^a

Surface Color	Shade or Type	Solar Absorptance (α) (dimensionless) Surface Condition	
		Good	Poor
Aluminum	Specular	0.39	0.49
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Brown		0.58	0.67
Gray	Light	0.54	0.63
Gray	Medium	0.68	0.74
Green	Dark	0.89	0.91
Red	Primer	0.89	0.91
Rust	Red iron oxide	0.38	0.50
Tan		0.43	0.55
White	—	0.17	0.34
Aluminum ^b	Mill finish, unpainted	0.10	0.15
Black		0.97	0.97

Notes:

^a If specific information is not available, a white shell and roof, with the paint in good condition, can be assumed to represent the most common or typical tank surface in use.

^b This refers to aluminum as the base metal, rather than aluminum-colored paint.

Page 20 Section 19.1.2.2.2.6, amend the following equation:

$$= (T_{AX} - T_{AN}) = (T_{MAX} + 459.6 - T_{MIN} + 459.6) = (T_{MAX} - T_{MIN})$$

to

$$= (T_{AX} - T_{AN}) = (T_{MAX} + 459.6) - (T_{MIN} + 459.6) = (T_{MAX} - T_{MIN})$$

Page 20 Section 19.1.2.2.2.8.1.2, replace:

U. S

with

U.S.

Page 37 Section 19.1.2.2.2.11, amend the following equation (39b):

$$\Delta P_v = \frac{0.05 B P_{VA} \Delta T_v}{T_{LA}^2}$$

to

$$\Delta P_v = \frac{0.50 B P_{VA} \Delta T_v}{T_{LA}^2}$$