

VAPOR CONTROL SYSTEM INSTALLATION
for
DOUBLE SKIN TANK BARGES "7031" AND "7032"
for
CONOCO, INC.
DOMESTIC MARINE OPERATIONS
April 5, 2002

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VAPOR CONTROL SYSTEM INSTALLATION
for
DOUBLE SKIN TANK BARGES "7031" AND "7032"

I. INTENT AND TECHNICAL APPROACH

The enclosed information is being submitted to obtain approval for the installation and use of a vapor control system. The information is structured to address (1) the regulations of 33 CFR Parts 154, 155, 156 and 46 CFR Parts 30, 32, 35 and 39 as revised and amended June 21, 1990 (re: gasoline, crude oil and benzene) and (2) the guidelines of the enclosure to USCG letter of 24 August 1993 and as revised 20 September 1993 (i.e. GUIDELINES FOR DETERMINING THE MAXIMUM LIQUID TRANSFER RATE FOR A TANK VESSEL TRANSFERRING A FLAMMABLE OR COMBUSTIBLE CARGO USING A VAPOR CONTROL SYSTEM). It is desired that U.S.C.G. authorize use of the vapor control system with all 46 CFR Subchapter "O" and "D" cargoes for which the system meets applicable regulations (e.g. benzene, gasoline and crude oil) as well as other U.S.C.G. "in-house guidelines.

The technical approach used herein to determine maximum liquid transfer rate imposed by (a) the capacity of the cargo tank venting system (see 46 CFR 39.20-11), and (b) the pressure drop between the most remote tank and the shore connection (see 46 CFR 39.30-1(d)(3)) is summarized as follows:

1. Pertinent vessel and piping system parameters are obtained for (a) maximum design working pressure, (b) pressure vacuum valve setting and flow characteristics, and (c) piping system parameters (see APPENDIX E-1).
2. Cargoes for which the vapor control system is to be used are identified (see APPENDIX E-2).
3. Cargo data is obtained for (a) USCG vapor control system category, (b) specific gravity of cargo vapor and (c) saturated vapor pressure at 115 degrees F (see APPENDIX E-2).
4. The vapor-air mix density, specific gravity, and growth rate (VGR) are determined for each cargo for which adequate data is available (see APPENDIX E-2).

5. The pressure drop across the PV valve, piping system losses, pressure at the tank most remote from the PV valve, and MAXIMUM LIQUID TRANSFER RATE as limited by the vapor control system are determined (see APPENDIX E-3).

These parameters are based on a vapor-air mix flow rate of "VGR" times a "liquid transfer rate" equal to the lesser of 5,000 BBL/HR (i.e., an owner/operator criteria) or the maximum flow rate which results in a pressure at the most remote tank not exceeding the cargo tank MAXIMUM DESIGN WORKING PRESSURE (see SECTION VI below).

6. A set of graphs is developed for various values of vapor growth rate (VGR) (see APPENDIX G). The values of VGR bracket the values determined in the above described analysis. Each set consists of five graphs - i.e., one graph for each of five conditions of pressure at the shore connection loading header ranging from -1.0 PSIG to 1.0 PSIG. Each graph shows the relationship between the "pressure drop" from the most remote tank to the shore connection and the "liquid flow rate" for a range of cargo vapor-air specific gravity. The pressure drop is based on a vapor-air mix flow rate of "VGR" times the noted liquid transfer rate.

Each graph page contains a description of the intended procedure for its use.

APPENDIX F provides a detailed illustration of the pressure drop calculation process.

APPENDIX H provides a detailed listing by cargo of the pressure drop from the most remote tank to the shore connection for a 1.0 PSIG pressure at the shore connection.

II. BARGE TYPE AND DESCRIPTION:

Each of the two (2) vessels of concern is a 240'-0" X 42'-0" X 12'-0" double skin tank barge intended for service on rivers, lakes, bays and sounds. Each barge is equipped with a raked end and a box end. Each barge has six (6) cargo tanks, and is served by a cargo pump, and a transverse load and unload header.

III. INDIVIDUAL BARGE DATA:

<u>NAME</u>	<u>BUILDER</u>	<u>HULL NUMBER</u>
7031	Trinity/Madisonville	2109-1
7032	Trinity/Madisonville	2109-2

IV. CARGO PRODUCT(S):

The vapor control system is to be used with cargo product(s) listed in APPENDIX E and as otherwise authorized by U.S.C.G.

V. CARGO HOSES:

The vessel will not carry cargo vapor hoses. Accordingly, and with reference to 46 CFR 39.30-1(c), hoses are not included in the pressure drop calculations presented by this analysis.

VI. MAXIMUM ALLOWABLE WORKING PRESSURE (MAWP):

Per previous documentation, the barge structure is designed for a maximum allowable working pressure (MAWP) of 3.0 psig.

(Note: This maximum allowable working pressure is considered appropriate for both pressure and vacuum conditions.)

VII. MAXIMUM LIQUID TRANSFER RATE:

The maximum liquid transfer rate (MLTR) is to be 5,000 BBL/Hr unless otherwise limited by (1) the maximum capacity of the cargo tank venting system (see APPENDIX E-3) or (2) by the sum of the "shore connection pressure" plus the "pressure drop" from the most remote tank to the shore connection being in excess of 80% of the P-V valve setting as determined from the graphs of APPENDIX G for specific loading conditions.

VIII. VAPOR CONTROL SYSTEM (46 CFR 39.20-1):

FIGURE 1 and TABLE LM-1 provide a diagram and list of material, respectively, of the vapor control system and related equipment.

When the vapor control system is to be used:

A. Pressure/vacuum valves (if any) other than the vapor control system pressure/vacuum valve(s) will be removed and the connections sealed with standard threaded pipe caps or equal.

B. Above-deck vapor piping will be lettered and painted in accordance with 46 CFR 39.20-1(d).

C. The shore connection flange will be in accordance with 46 CFR 39.20-1(f).

IX. CARGO GAUGING SYSTEM:

A. One (1) visual tank level indicator (i.e., sight glass) will be installed at the access hatch to each cargo tank to provide liquid level determination in accordance with 46 CFR 39.20-3(a). Descriptive literature is provided in TABLE LM-1 and in APPENDIX A.

B. One (1) high level indicating device (i.e., dipstick) will be installed in each cargo tank to indicate when the liquid level in the cargo tank is within about 3.28 feet of the tank top in accordance with 46 CFR 39.20-3 (b). Descriptive literature is provided in TABLE LM-1 and in APPENDIX B.

X. LIQUID OVERFILL PROTECTION (46 CFR 39.20-9):

Primary tank barge liquid overfill protection will be provided by installation of a high level alarm/shutdown system which complies with the requirements of 46 CFR 39.20-9 (b). Additional tank barge liquid overfill protection will be provided by installation of spill valves ~~(installed over rupture disks)~~ which comply with the requirements of 46 CFR 39.20-9(d). Each spill valve will serve two (2) cargo tanks (P/S) by use of an adapter. Descriptive literature on both protection measures is provided in TABLE LM-1 and in APPENDIX C.

Calculations for the allowable flow of the spill valve (without exceeding the MAX DESIGN WORKING PRESSURE) are provided as APPENDIX I; however, these flow rates do not govern the MAX LIQUID TRANSFER RATE since primary liquid overfill protection is provided by the high level alarm and shutdown system.

APPENDIX J provides a summary comparison of the spill valve and the P/V transfer rates.

XI. VAPOR OVERPRESSURE AND VACUUM PROTECTION (46 CFR 39.20-11):

To satisfy the requirements of 46 CFR 39.20-11, the cargo tank venting system is to be fitted with one (1) pressure vacuum relief valve. Descriptive literature is provided in TABLE LM-1 and in APPENDIX D. It will be installed in the above deck vapor control piping.

A. VAPOR OVERPRESSURE (LOADING) PROTECTION

APPENDIX E develops the maximum liquid (cargo loading) transfer rate for which the pressure in the cargo tank most remote from the P/V valve does not exceed the MAXIMUM DESIGN WORKING PRESSURE. The calculations therein are in general accordance with the USCG-provided GUIDELINES FOR DETERMINING THE MAXIMUM LIQUID TRANSFER RATE FOR A TANK VESSEL TRANSFERRING A FLAMMABLE OR COMBUSTIBLE CARGO USING A VAPOR CONTROL SYSTEM.

B. VAPOR VACUUM PROTECTION

It is possible that cargo loading may suddenly be stopped while the shore facility compressor continues to draw a vacuum. In that instance, the P/V valve is required to have sufficient vacuum capability to intake air in quantity equal to the MAXIMUM LIQUID TRANSFER RATE at a pressure (vacuum) which does not exceed the MAXIMUM DESIGN WORKING VACUUM.

With reference to the vacuum curve information in APPENDIX D, the P/V valve has the following vacuum capacity at a vacuum of ~~-1.0~~ ^{0.5} PSIG, a pressure which is less than the -3.0 PSIG MAXIMUM DESIGN WORKING VACUUM:

CARGO PRODUCT WITH HIGHEST REQ'D AIR FLOW RATE	HIGHEST REQUIRED AIR FLOW RATE (MATR)		PV VALVE VACUUM CAPACITY AIR	
	(BBL/HR)	(FT ³ /HR)	(BBL/HR)	(FT ³ /HR)
VARIOUS	5,000	28,074	5,877	33,000

Since the capacity at higher vacuum exceeds the highest required air flow rate, the cargo tank venting system will:

a. Prevent a vacuum in the cargo tank vapor space, whether generated by withdrawal of cargo or vapor at maximum rates, that exceeds the MAXIMUM DESIGN WORKING VACUUM for any tank connected to the vapor collection system; and

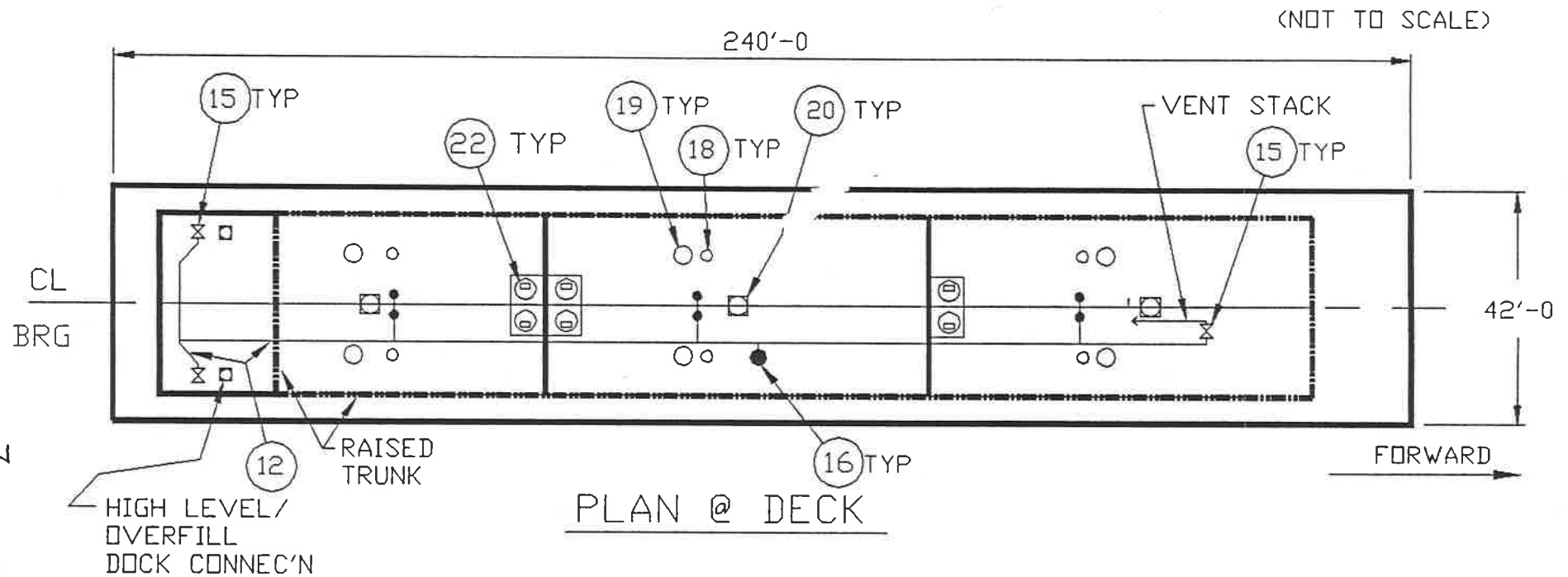
b. Not relieve at a vacuum corresponding to a vacuum in the cargo tank vapor space of less than 0.5 PSIG below atmospheric pressure.

XII. OPERATIONAL REQUIREMENTS (46 CFR 39.30-1):

To satisfy the requirements of 46 CFR 39.30-1(b) and (d), data is developed showing the relationship between "pressure drop" through the vapor control system from the most remote cargo tank to the vessel shore connection and "liquid transfer rate" for various values of vapor-air mix growth rate, vapor-air mix specific gravity, and pressure at the shore connection.

Detailed support calculations for the data are voluminous, and repetitive. Accordingly, an illustrative sample calculation and graph (vice complete calculations and graphs for all individual products) are provided as APPENDIX F. The calculation procedure is in general accordance with the USCG-provided GUIDELINES FOR DETERMINING THE MAXIMUM LIQUID TRANSFER RATE FOR A TANK VESSEL TRANSFERRING A FLAMMABLE OR COMBUSTIBLE CARGO USING A VAPOR CONTROL SYSTEM. Output results from the complete calculations are presented in the graphs of APPENDIX G. Further, a listing is provided, by cargo, of the pressure drop from the most remote cargo tank to the shore connection for a 1.0 PSIG pressure at the shore connection. Descriptive literature similar to those graphs and table is to be included in the vessel "TRANSFER PROCEDURES" by the owner-operator.

CONOCO, INC.



PIECE MARK	DESCRIPTION
12	PIPING (8")
15	SHUTOFF VALVE (8")
16	PV VALVE
22	VISUAL TANK LEVEL INDICATOR (SIGHTGLASS)
18	HIGH LEVEL INDICATOR (DIPSTICK)
19	HIGH LEVEL SENSOR ALARM & SHUTDOWN DEVICE
20	SPILL VALVE

DIAGRAM OF VAPOR CONTROL SYSTEM
FIGURE 1

VAPOR CONTROL SYSTEM INSTALLATION

CONOCO, INC.

TABLE LM-1
LIST OF MATERIAL
FOR VAPOR CONTROL SYSTEM

PIECE MARK	ITEM	QTY	SIZE	SPECIFICATION
12	PIPING		8"	SCHED 40, STEEL, ASTM A-53 OR A-106 GRADE B
	FITTINGS			2" & SMALLER: 3000# FORGED STEEL SCR'D ASTM 105; AND
	FLANGES			2 1/2" & LARGER: BUTT WELD SCHED 40 ASTM A234 GR B, ANSI B-16.9 150# SLIP-ON OR WELD NECK FLANGES, STEEL ASTM A-105, ANSI B-16.5; AND/OR 150# FF WELD NECK FLANGES, ASTM A 181
15	VALVE	3	8"	BUTTERFLY VALVE, STEEL W/S.S. TRIM, KEYSTONE OR EQUAL, 150#
16	P.V. VALVE	1	8"	MIDLAND, MODEL A-883, S.S., SET AT 1.5 PSIG PRESSURE, & -0.5 PSIG VACUUM
18	HIGH LEVEL INDICATING DEVICE	6	N/A	MIDLAND MODEL B-610, MAGNETIC DIPSTICK, 300 SERIES STAINLESS STEEL WETTED PARTS
19	HIGH LEVEL SENSOR ALARM & SHUTDOWN SYSTEM	1	N/A	MIDLAND MODEL B-595 TANK HIGH LEVEL AND OVERFILL SENSOR (ONE SENSOR IN EACH TANK)
20	SPILL VALVE	3	10"	MIDLAND MODEL A-7103, SET @ 1.75 PSIG
22	VISUAL TANK LEVEL INDICATOR	6	N/A	ERL MODEL SGM-1 MARINE SIGHT GLASS

Jan '75

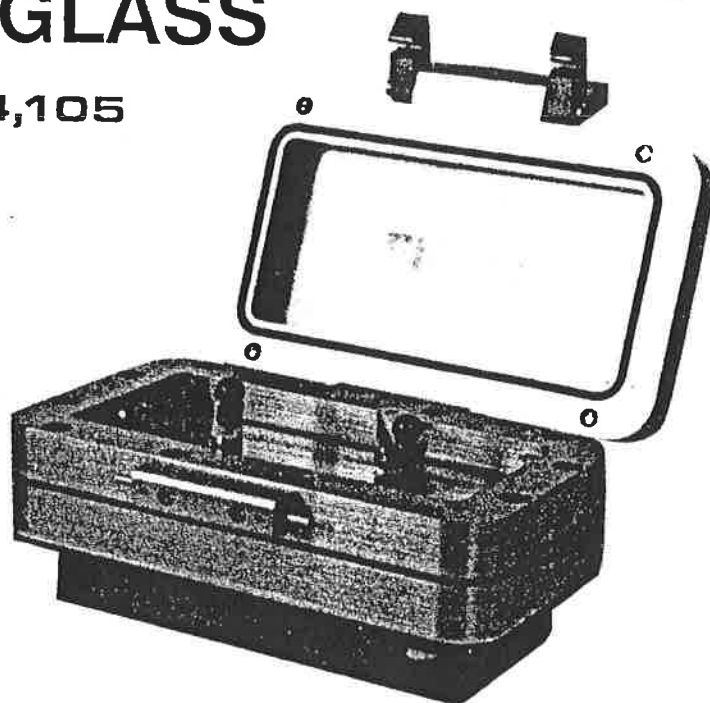


ERL
MARINE PRODUCTS DIVISION

MARINE SIGHT GLASS

U.S. PATENT NO. 5,284,105

FULL-VIEW
Model SGM-1

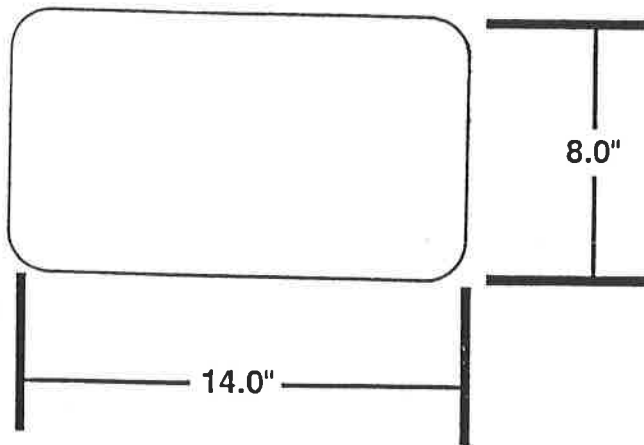


You will notice immediately that ERL has done something radically different with the new SGM-1. Starting with a "clean sheet of paper" and state-of-the-art CAD technology ERL set out to create a marine sight glass that would be better than the best. The SGM-1 gives the largest and clearest sealed-view into your cargo hold, for the money, of any marine sight glass on the market.

COMPARE THESE FEATURES TO THE OTHER MARINE SIGHT GLASSES.

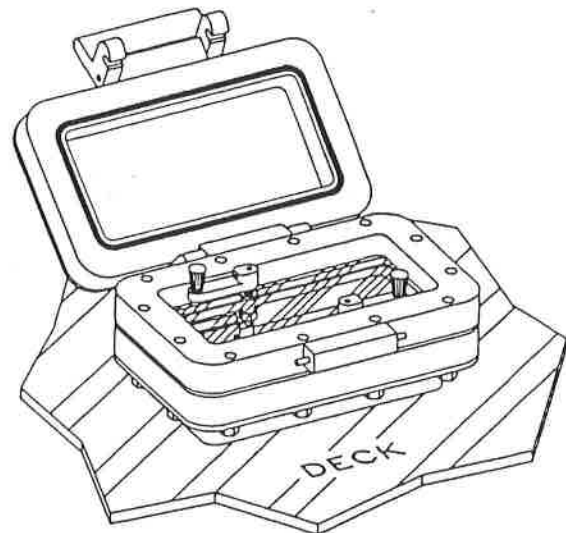
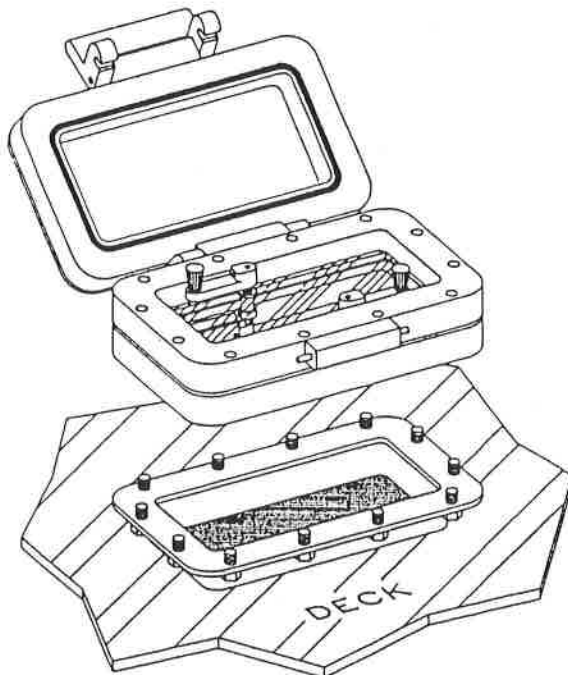
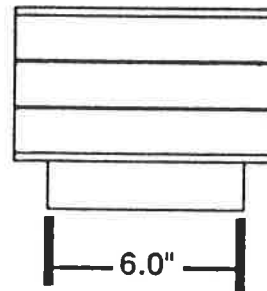
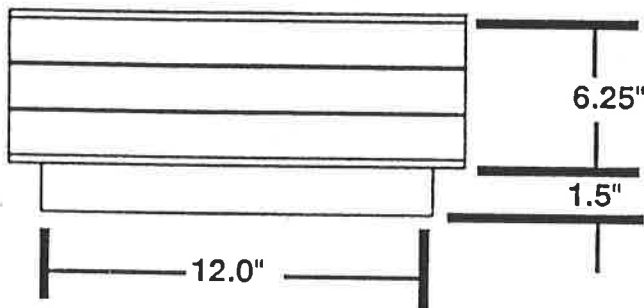
- * A full 59 Sq. Inches of viewing area (34 Sq. Inches is wiped). Wiper blades can be readily changed and are standard size, off-the-shelf, Viton or EPDM "O" rings.
- * 3/4" thick #7740 Pyrex ground and polished plate glass is stress relieved with ground edges and radiused corners.
- * The SGM-1 and all mounting hardware is 303 Stainless Steel except for the aluminum glass cover and the carbon-steel deck mounting flange. All gaskets (supplied) are industrial quality Teflon or Buna N.
- * The SGM-1 is the easiest, safest and most economical way to comply with USCG regulations on Marine Vapor Control Systems by giving the clearest visual gaging/inspection of your cargo.
- * The unique carbon-steel deck mounting flange makes shipyard installation easy and prevents damage to the sight glass, which can occur during installation of ordinary weld-in-place sight glasses.

SPECIFICATIONS



Marine Sight Glass Model SGM-1

Weight	=	58 lbs.
Viewing Area	=	59 Sq. In.
Wiped Area	=	34.1 Sq. In.

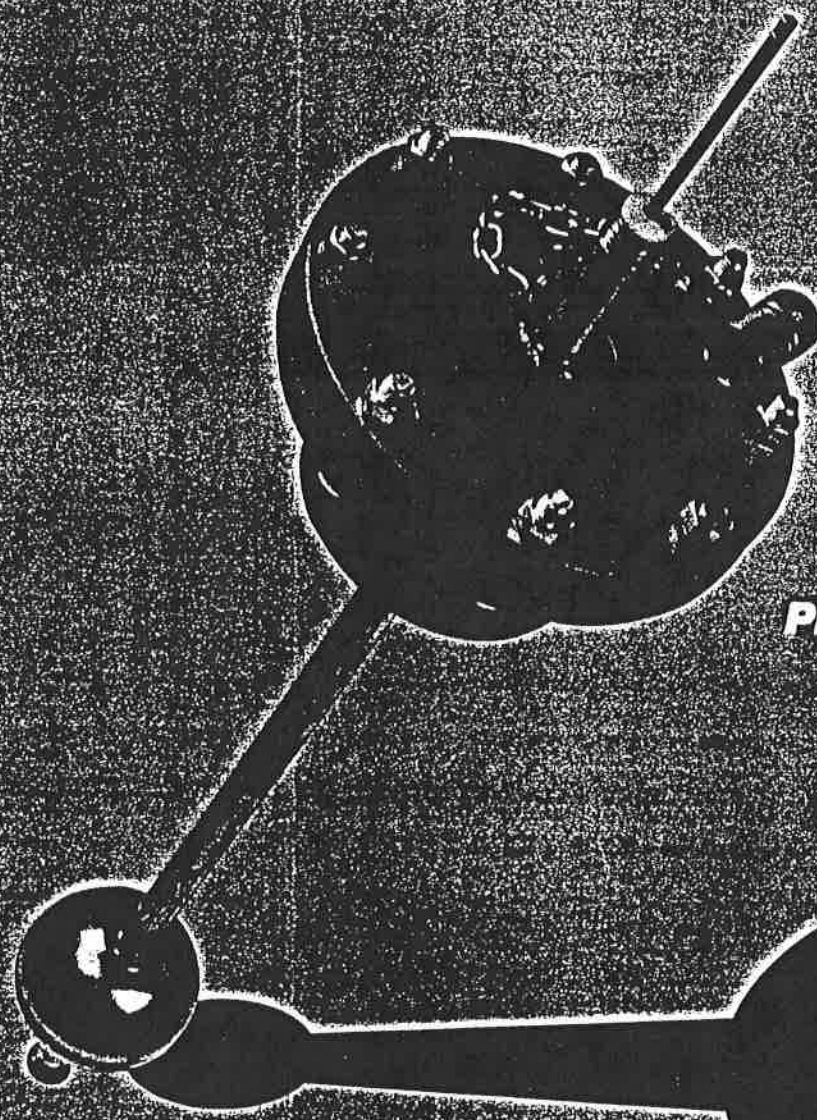


ERL MARINE PRODUCTS DIVISION
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NEW ALBANY, IN 47151-1026

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FAX 1-812-944-8808

NEW from
the MARINE
DIVISION of
MIDLAND
MANUFACTURING

Reed 75



**THE
B-610
—AN
UNMATCHED
HIGH LIQUID
LEVEL
INDICATOR
FOR
RELIABLE
PERFORMANCE
AND
SIMPLIFIED
INSTALLATION**



**30 years experience
is behind the design of the
B-610 for tank barges,
container vessels and tankers.**

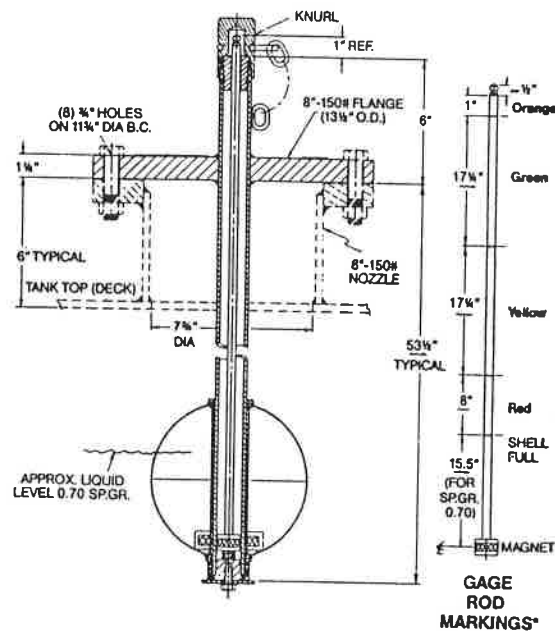
Midland's new high liquid level indicator for marine applications is a refinement of a gage design proven in the most demanding kinds of service. You can depend on it for exceptional accuracy, durability and vapor emission control—plus fast, economical installation. Complies with CFR 39.20-3(b)(1) U.S.C.G. Regulations. Approved for use on Coast Guard certificated vessels.

MIDLAND B-610/Principles of Operation

1. A rigid teflon-covered indicator gage rod, color-coded to industry standards, incorporates a powerful magnet at its base.
2. The gage rod moves up and down inside a 1½" O.D. stainless steel tube (comparable to extra strong pipe) that is sealed to prevent product from the tank entering the tube.
3. As the product rises in the upper level of the tank, a high strength (pressure-tested to 400 psi) spherical stainless steel float moves up the outside of the sealed tube.
Recessed in the float is a high-intensity ring magnet. The magnetic linkage between the float and the rod causes them to move together. As the product level in the tank increases, the rod rises accordingly—and its color code alerts the tankerman to retard the loading rate and stop in time to prevent possible overfilling.
4. When loading is completed, the indicator gage rod is pushed down to rest at the bottom of the stainless steel tube; and a protective weather cover is put back in place on top of the gaging device housing.

MIDLAND B-610/Key Design Features

- A. Exceptionally high-strength magnets avoid accidental separation of the rod and float.
- B. The float and rod are magnetically linked as soon as the float begins to rise. Consequently, there is no need for the tankerman to engage the rod.
- C. 300 series stainless steel wetted parts assure complete corrosion resistance to most types of commodities.
- D. Heavy-duty float and gage tube will withstand forces generated by surges, impact or Butterworth cleaning operations.
- E. The extra-large 7½" diameter float remains buoyant in all services—even down to .51 specific gravity (e.g. propane).
- F. Our standard mounting is an 8"-150# ANSI (or ASA) heavy-duty steel flange. Alternative mountings and sizes are available.
- G. In addition, a companion 8" nozzle can be supplied. This is designed to be welded to the tank from the outside, eliminating any need for internal welding and scaffolding.
- H. The protective stainless steel weather cover can be removed by hand. The cover is chained to the housing to prevent misplacement.
- I. The gage rod, when equipped with additional magnets, can activate audible and visible signals, as well as system shutdown when used in conjunction with Midland B-594 or B-596 sensors. (U.S. Patent No. 4,924,703)



For more details and prompt service,
please write or call...

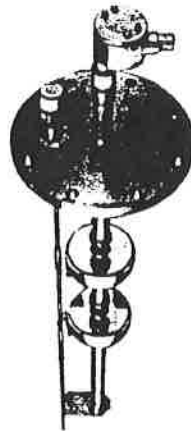


7733 Gross Point Road
Skokie, IL 60077
(708) 677-0333
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FAX # (708) 677-0138



Midland Model B-595

TANK HIGH LEVEL AND OVERFILL SENSOR

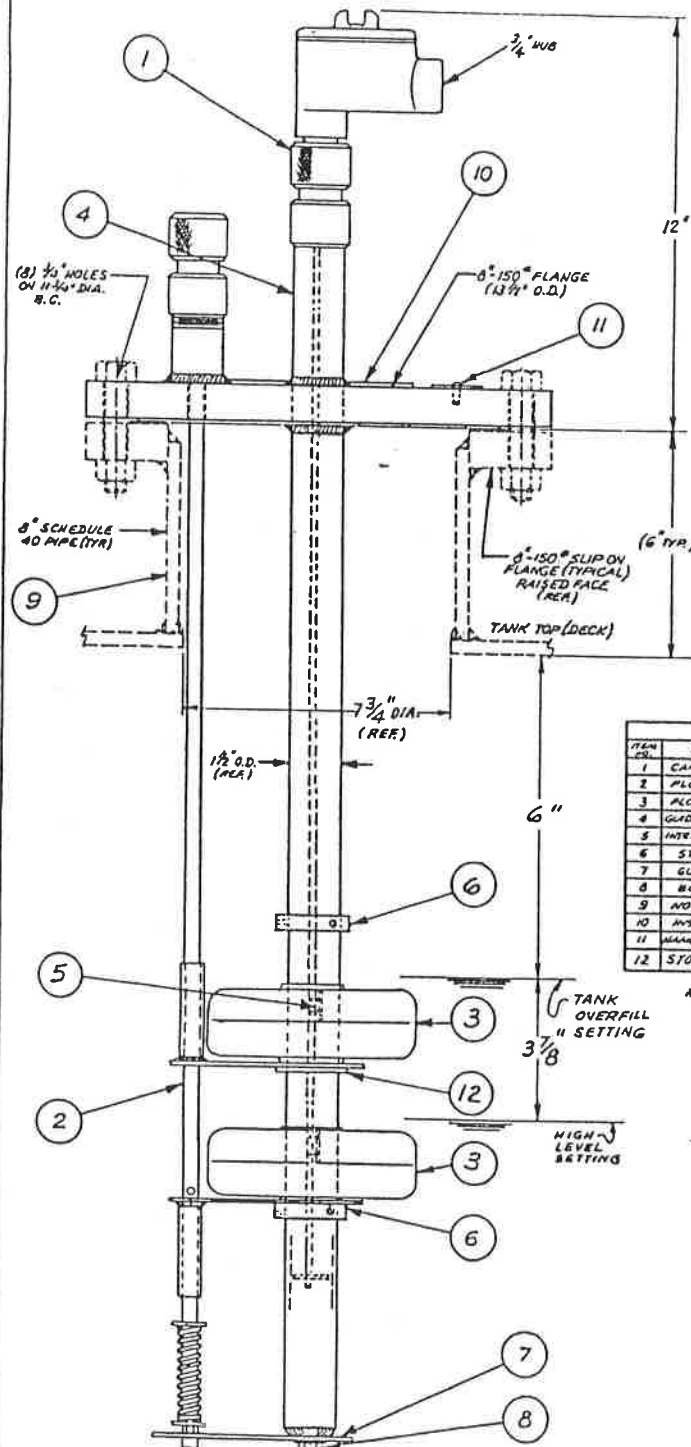


Intrinsically safe dual level alarm sensors provide independent HIGH LEVEL alarm and tank OVERFILL alarm signals to Barge Inlet connector. An 8" 150# ANSI mounting flange with integral float guide tube allows single point access for both HIGH LEVEL and OVERFILL alarm sensors. A stainless steel manual lifting handle sequentially checks float travel freedom and alarm function for each float. Approved for use on Coast Guard certificated vessels.

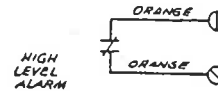
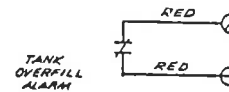
SPECIFICATIONS:

- | | |
|----------------------------|---|
| Operation: | Each alarm sensor is activated independently by a dedicated float. |
| Sensor: | Form C Contact (SPDT)
Contact Rating - 24 Vdc @ 250 mA max
Contact Resistance - 0.200 ohms max
Shock without False Operation - 100 g's
Operating Temperature - 40 to +105 C
Cycle Life - 40,000,000
Sensor meets Mil Spec S 554433C |
| Materials of Construction: | All stainless steel wetted parts, including mounting flange with Explosion Proof watertight conduit. |





WIRING DIAGRAM



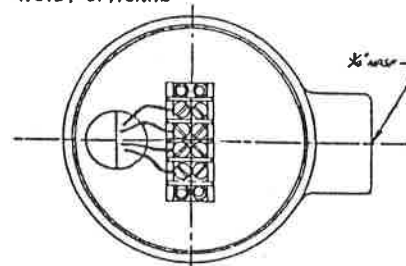
CONTACTS SHOWN IN NON-ALARM CONDITION

PROXIMITY SENSOR SPECIFICATIONS

CONTACT FORM C (SPDT)
CONTACT RATING 24 VDC @ 250 MA MAX.
CONTACT RESISTANCE 0.200 OHMS MAX.
SHOCK WITHOUT FALSE OPERATION 100 G'S
OPERATING TEMPERATURE -40 TO +135 °C
CYCLE LIFE 40,000,000
PER MIL. SPEC S-55433 C
UL RECOGNIZED COMPONENT -
FILE E 61760
CSA FILE LR 43615-2

BILL OF MATERIAL				
ITEM NO.	PART NAME	MATERIAL	QTY.	PART NO.
1	CAP/OUTLET BOX	STAINLESS/ALUMINUM	1	395-1-AS
2	FLOAT ARM ASSEMBLY	STAINLESS STEEL	1	595-3-SS
3	FLOAT W/ MAGNET	STAINLESS STEEL	2	595-3-SS
4	GUIDE PLATE & RANGE ASST.	STAINLESS STEEL	1	595-4-SS
5	INTERNAL SENSOR ASSY.	PLASTIC & WIRE	1	595-5-AS
6	STOP COLLAR	STAINLESS STEEL	2	595-6-SS
7	GUIDE PLATE	STAINLESS STEEL	1	595-7-SS
8	WOLF, LYN	STAINLESS STEEL	1	610-8-SS
9	NOZZLE ASSEMBLY	STEEL	1	610-9-CS
10	INSTRUCTION PLATE	PLASTIC	1	595-10-PL
11	WASHER/DRIVE SCREWS	STAINLESS STEEL	1	595-11-SS
12	STOP RING	STAINLESS STEEL	1	595-12-SS

* NOTE: OPTIONAL

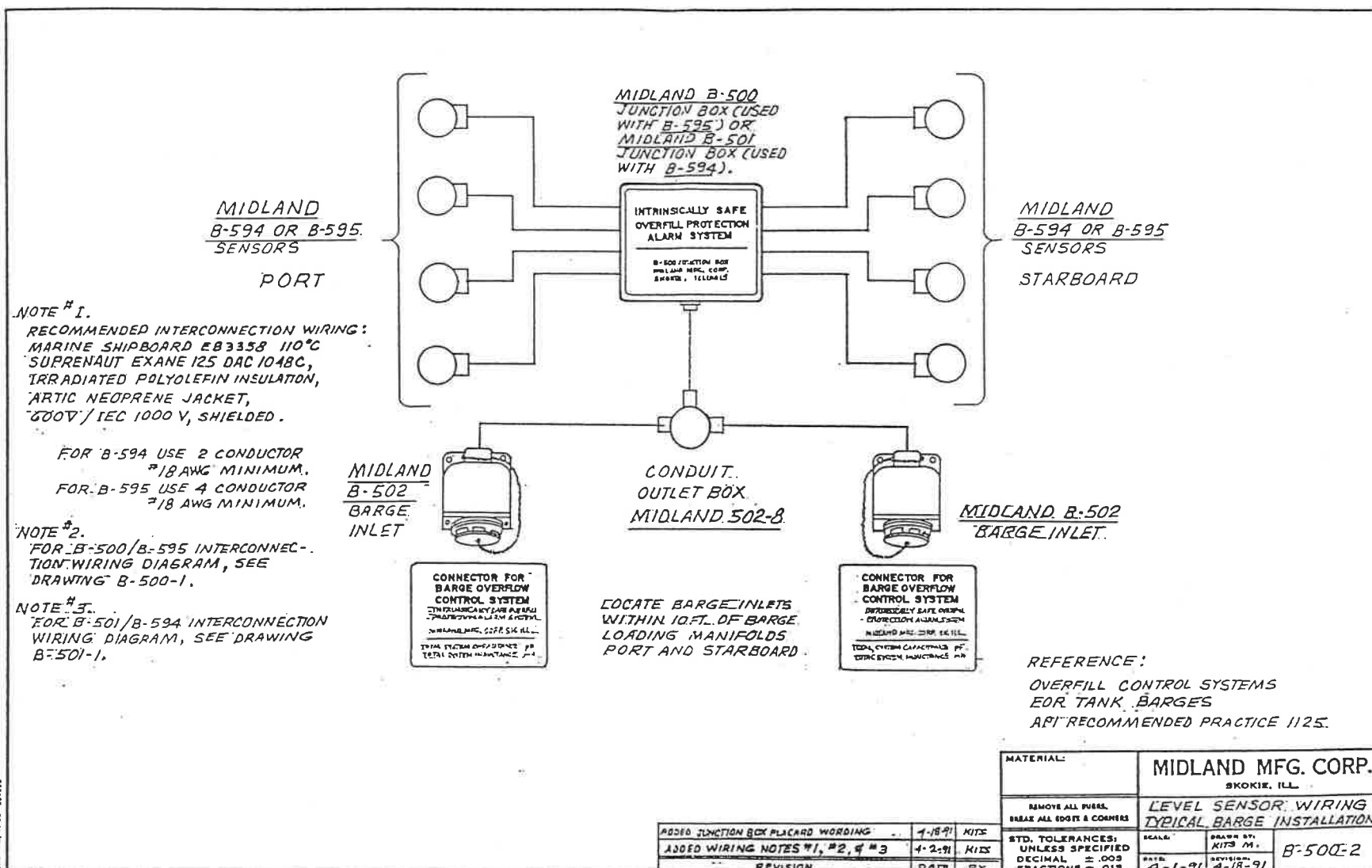


OUTLET BOX TOP VIEW

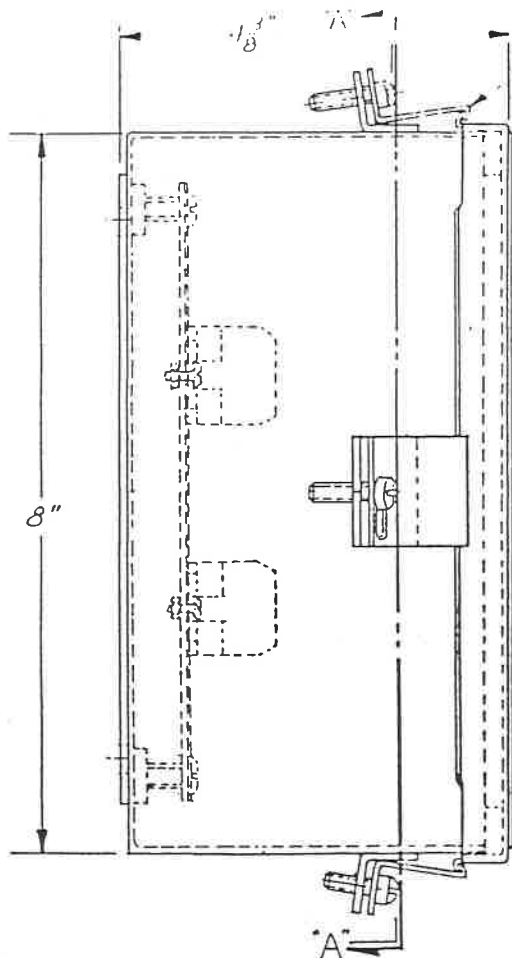
MEETS 46 CFR 39.20-7

MIDLAND MODEL B-595

C-1-c



C-1-d



SIDE VIEW

ITEM	PART NAME	MATERIAL	QTY.	PART NO.
(1)	BOX WITH COVER	STAINLESS STEEL	1	500-1-SS
(2)	PANEL	STAINLESS STEEL	1	500-2-SS
(3)	PANEL NAMEPLATE	PLASTIC	1	500-3-PL
(4)	COVER NAMEPLATE	PLASTIC	1	500-4-PL
(5)	TERMINAL STRIPS	PLASTIC & METAL	2	500-5-PL
(6)	PAN HEAD SCREW	STAINLESS STEEL	6	500-6-SS
(7)	SCREW, LKW, NUT	STAINLESS STEEL	4	500-7-SS

DOOR LATCH
(6 PLACES)

1

2

3

4

5

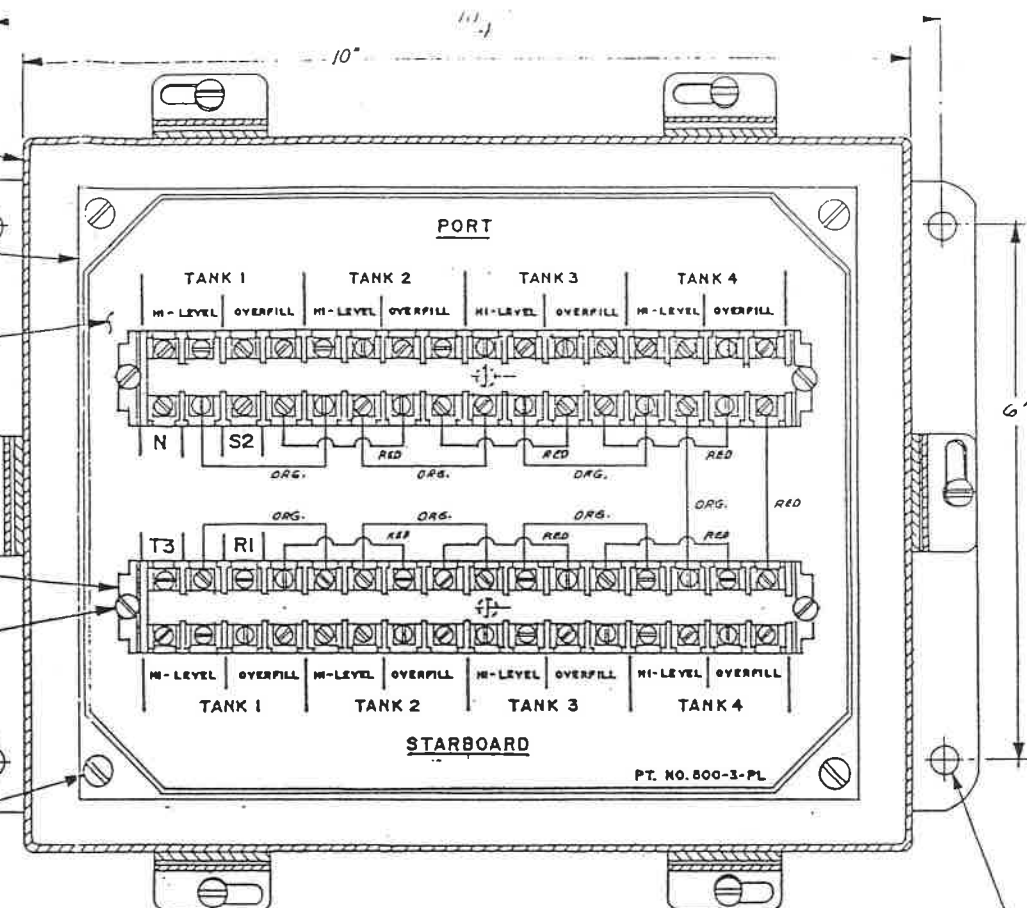
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INTRINSICALLY SAFE OVERFILL PROTECTION ALARM SYSTEM

B-500 JUNCTION BOX
MIDLAND MFG. CORP.
SKOKIE, ILLINOIS

COVER NAMEPLATE

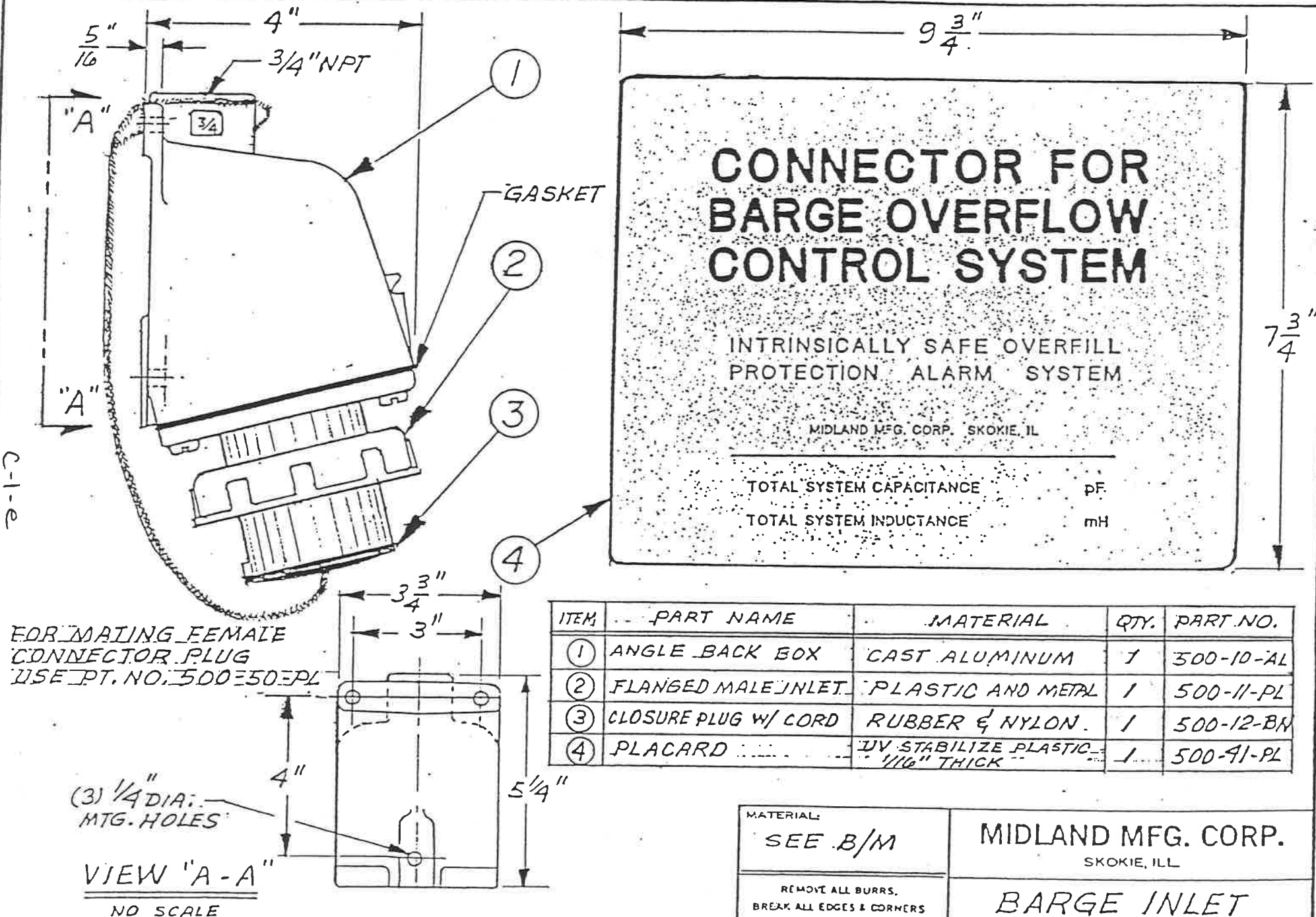


SECTION "A-A"

USED WITH B595
DUAL LEVEL SENSORS.

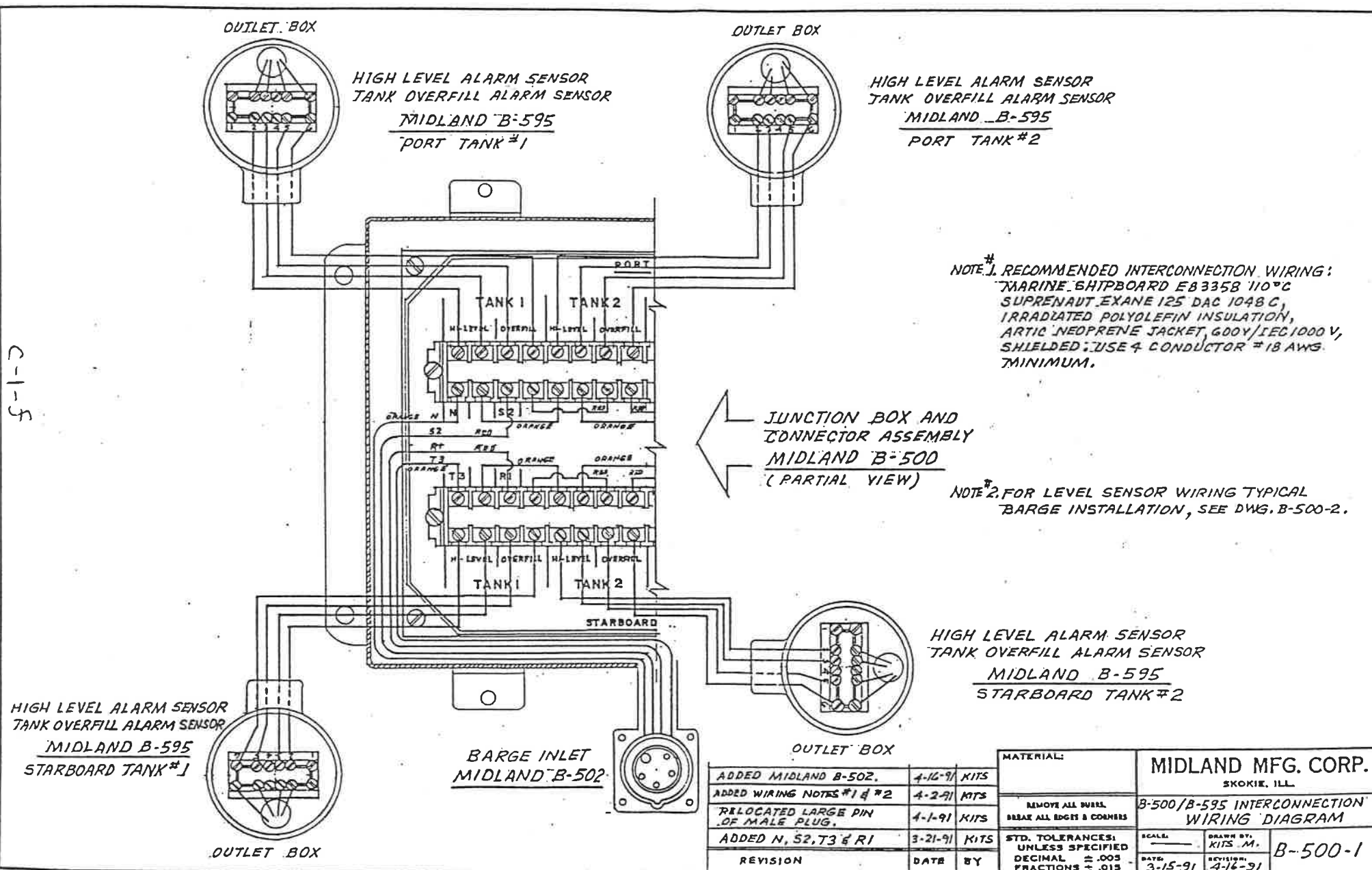
REMOVED ITEM 8 THRU 13.	4-8-71	NTM	MATERIALS NEMA 4X ENCLOSURE	MIDLAND MFG. CORP. SKOKIE, ILL.
ADDED NOTE	3-17-71	NTM	REMOVED ALL NOTES UNLESS ALL SHOWN & CORRECT	JUNCTION BOX AND CONNECTOR ASSEMBLY
ADDED "USED WITH" NOTE	3-17-71	NTM	STD. TOLERANCES IN UNLESS SPECIFIED REFINISH = 0.006	FULL B-500
CHANGED TITLE	3/14/71	NTM		

C-1-e



ADDED MATING PLUG NOTE.	5/8/91	K.M.
REVISION	DATE	BY

C-1-5



MATERIAL:			MIDLAND MFG. CORP.	
ADDED MIDLAND B-502.			4-16-91	KITS
ADDED WIRING NOTES #1 & #2			4-2-91	MTS
RELOCATED LARGE PIN OF MALE PLUG.			4-1-91	KITS
ADDED N, S2, T3 & R1			3-21-91	KITS
REVISION			DATE	BY
REMOVE ALL BURL BREAK ALL EDGES & CORNERS			MIDLAND MFG. CORP. SKOKIE, ILL.	
STD. TOLERANCES: UNLESS SPECIFIED DECIMAL ± .005 FRACTIONS ± .015			B-500/B-595 INTERCONNECTION WIRING DIAGRAM	
SCALE: _____			DRAWN BY: KITS M.	B-500-1
DATE: 3-15-91			REVISION: 4-16-91	

ENERGY STORED IN AN INDUCTOR $\frac{LI^2}{2}$ JOULES*

ENERGY STORED IN A CAPACITOR $\frac{CV^2}{2}$ JOULES*

WHERE: L = HENRYS
I = AMPERES
C = FARADS
V = VOLTS

GIVEN SPECIFICATIONS:

- 1) API RECOMMENDED PRACTICE 1125, FEBRUARY 1991, PARA 2.3.3
MAXIMUM VOLTAGE 20.66 VOLTS D.C.
MAXIMUM CURRENT 155 MILLIAMPS
- 2) CFR 39.20-9(b)(4) MAXIMUM LIMIT OF 20 MICROJOULES OF STORED ENERGY.

GIVEN TEST DATA:

TYPICAL MEASURED VALUES FOR B-594 OR B-595 SENSOR CIRCUIT.
INDUCTANCE 1.5 MICROHENRYS
CAPACITANCE 18 PICO FARADS

FIND: STORED ENERGY IN SENSOR CIRCUIT.

CALCULATIONS:

$$\begin{aligned}\text{INDUCTIVE ENERGY } \frac{LI^2}{2} \text{ JOULES} &= \frac{(1.5 \times 10^{-6})(155 \times 10^{-3})^2}{2} \\ &= 18.018 \times 10^{-12} \text{ JOULES} = \underline{0.0180} \text{ MICROJOULES}\end{aligned}$$

$$\begin{aligned}\text{CAPACITIVE ENERGY } \frac{CV^2}{2} \text{ JOULES} &= \frac{(18 \times 10^{-12})(20.66)^2}{2} \\ &= 3841 \times 10^{-12} \text{ JOULES} = \underline{.0038} \text{ MICROJOULES}\end{aligned}$$

GIVEN TEST DATA:

TYPICAL MEASURED VALUES FOR AN EIGHT TANK BARGE CIRCUIT WITH B-594 OR B-595 SENSORS:
INDUCTANCE .195 MILLIHENRYS
CAPACITANCE 1880 PICO FARADS

FIND: STORED ENERGY IN THE EIGHT TANK BARGE CIRCUIT.

CALCULATIONS:

$$\begin{aligned}\text{INDUCTIVE ENERGY} &= \frac{LI^2}{2} \text{ JOULES} \\ &= \frac{(.195 \times 10^{-3})(155 \times 10^{-3})^2}{2} \\ &= 2342 \times 10^{-9} \text{ JOULES} = \underline{2.342} \text{ MICROJOULES}\end{aligned}$$

$$\begin{aligned}\text{CAPACITIVE ENERGY } \frac{CV^2}{2} \text{ JOULES} \\ &= \frac{(1880 \times 10^{-12})(20.66)^2}{2} \\ &= 401225 \times 10^{-12} \text{ JOULES} = \underline{0.4012} \text{ MICROJOULES}\end{aligned}$$

FIND: TOTAL STORED ENERGY

$$2.342 \text{ MICROJOULES} + .401 \text{ MICROJOULES} = 2.743 \text{ MICROJOULES.}$$

CONCLUSION: PER CFR 39.20-9(b)(4) THE TOTAL STORED ENERGY MAXIMUM LIMIT OF 20 MICROJOULES IS NOT EXCEEDED BY THE CALCULATED VALUE OF 2.743 MICROJOULES.

*NOTE: REFERENCE - ELECTRONIC DESIGNERS' HANDBOOK MC GRAW HILL 1957 pp 1-3

MIDLAND MFG. CORP.

SKOKIE, ILL.

STORED ENERGY CALCULATIONS FOR
COMPLIANCE WITH 46 CFR 39.20-9(b)(4)

SK 062591

DRAWN BY:
GB/RHD

REVISION:

SCALE:
DATE:
6-25-91

MATERIAL:

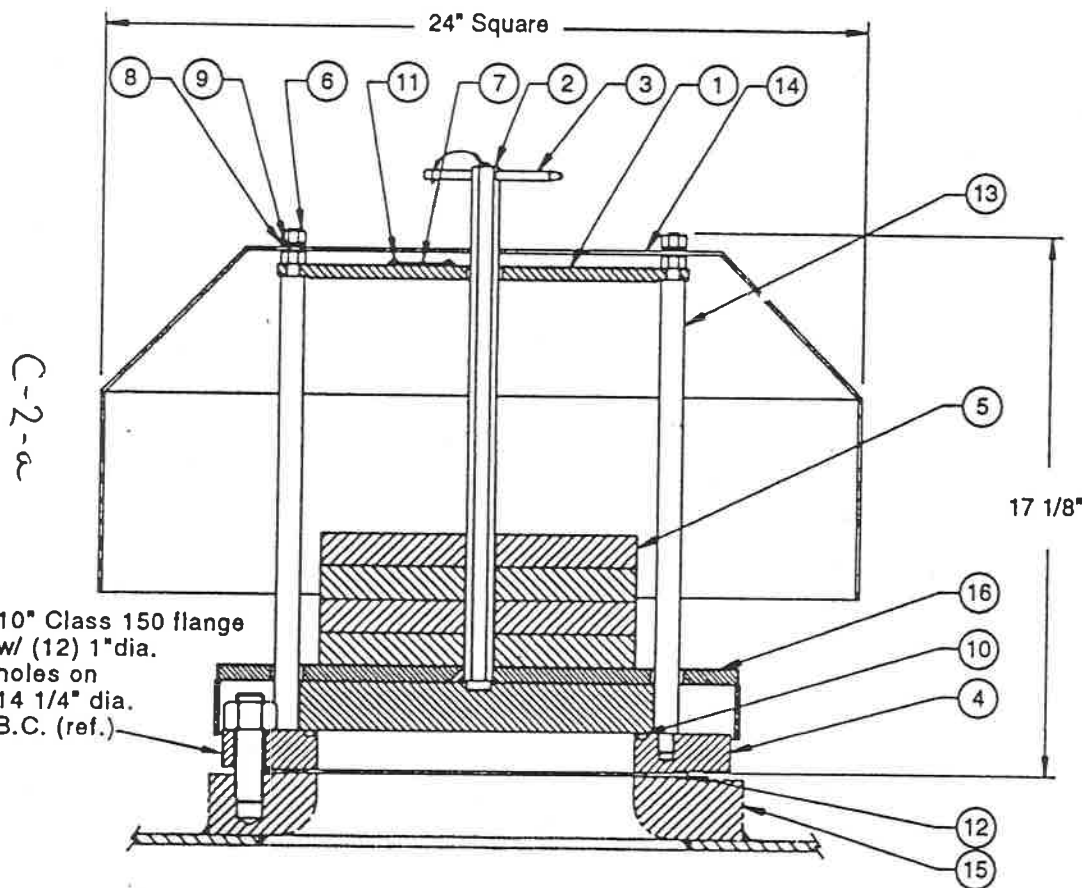
REMOVE ALL BURRS.
BREAK ALL EDGES & CORNERS

STD. TOLERANCES:
UNLESS SPECIFIED
DECIMAL $\pm .005$
FRACTIONS $\pm .015$



MIDLAND MANUFACTURING CORP. SKOKIE, IL. PHONE 708-677-0333 OR FAX 708-677-0138

9/27/93



Maintains set pressure on tank while relieving and automatically recloses vapor tight when pressure is less than 90% of set opening pressure, as required by 7.1.9 of ASTM F 1271.

CERTIFIED AS COMPLYING WITH ASTM F 1271-90 SPECIFICATION

ITEM NO.	QTY.	PART NAME	A-7103	
			MATERIAL	PART NUMBERS
1	1	TOP GUIDE	316 STAINLESS STEEL	7103-1-MO
2	1	POPPET ASSEMBLY	316L STAINLESS STEEL	7103-2-MOL
3	1	PIN	316 STAINLESS STEEL	763-3-MO
4	1	BASE	316 STAINLESS STEEL	7103-4-MO
5	SPECIFY	WEIGHT	316 STAINLESS STEEL	SEE TABLE
6	8	NUT	316 STAINLESS STEEL	763-6-MO
7	1	NAMEPLATE	316 STAINLESS STEEL	763-7-MO
8	8	WASHER	316 STAINLESS STEEL	763-8-MO
9	4	LOCK WASHER	316 STAINLESS STEEL	763-9-MO
10	1	SEAL	VITON ⁽²⁾	7103-10-VA
11	2	DRIVE SCREW	18-8-STAINLESS STEEL	763-11-SS
12	1	GASKET ⁽¹⁾	VITON ⁽²⁾	7103-12-VA
13	4	SHOULDER BOLT	NITRONIC 60	7103-13-SS
14	1	DEFLECTOR	316L STAINLESS STEEL	782-141-MOL
15	1	FLANGE ASSEMBLY ⁽¹⁾	CARBON & STAINLESS STEEL	7103-15-CS/SS
16	1	POPPET SKIRT	316L STAINLESS STEEL	7103-16-MOL

NOTE: 1 Required, order separately. 2 Alternate material available.

SET OPENING PRESSURE (PSI)	SPILL VALVE PART NUMBER	QUANTITY	WEIGHT PART NUMBER	RATED FLOW @ 120% OF SET OPENING PRESSURE 1.0 SP. GR. (BBL/HR.)
1.00	A-7103-16	—	—	4239
1.25	A-7103-20	1	7103-54-MO	4740
1.30	A-7103-21	1	7103-54-MO	4834
		1	7103-51-MO	
1.50	A-7103-24	2	7103-54-MO	5192
1.75	A-7103-28	3	7103-54-MO	5608
2.00	A-7103-32	4	7103-54-MO	5995

For information about other set pressures and flow rates contact Midland.

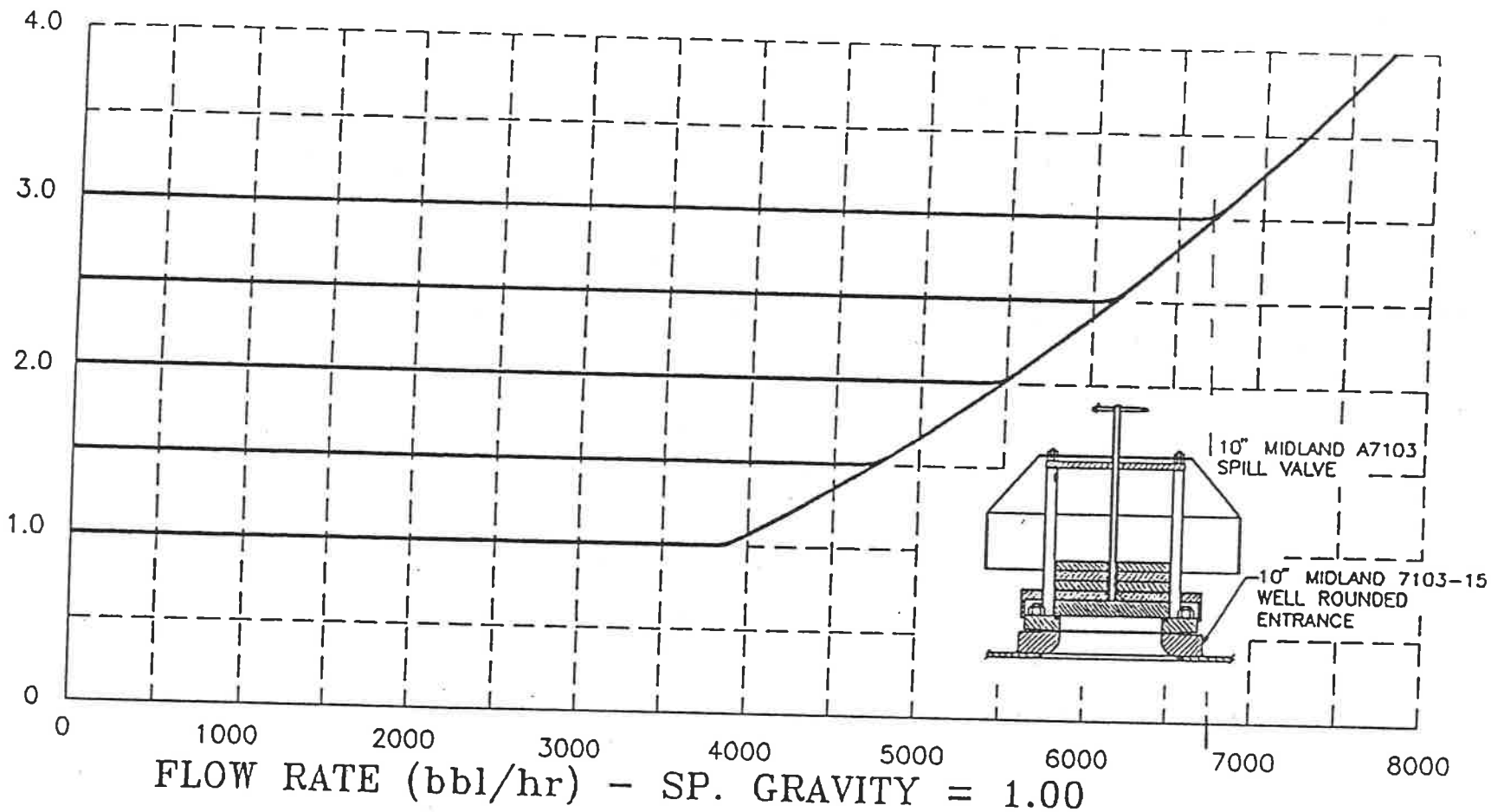
MARINE EQUIPMENT

10" SPILL VALVES

A-7103

C-2-b

PRESSURE AT CARGO TANK TOP (psi)



NOTES:

- 1) THESE CURVES ARE FOR VALVES MOUNTED ON HORIZONTAL FLANGES WITHIN 3" OF TANK TOP ON A WELL ROUNDED ENTRANCE
- 2) THESE CURVES ARE BASED ON 1990 TESTS BY AN INDEPENDENT LABORATORY
- 3) TO DETERMINE PRESSURE, ENTER HORIZONTAL AXIS AT DESIRED FLOW RATE, MOVE UP TO CURVE, TURN AND MOVE TO LEFT VERTICAL AXIS TO READ PRESSURE
- 4) TO DETERMINE FLOW RATE AT A TANK PRESSURE, ENTER VERTICAL AXIS AT DESIRED PRESSURE, MOVE HORIZONTALLY TO CURVE, TURN DOWN TO READ FLOW RATE

CERTIFIED AS COMPLYING WITH
ASTM F1271-90 SPECIFICATION

CAD FILE: 0058

MATERIAL:
ALL 300 SERIES
STAINLESS STEEL

REMOVE ALL BURRS.
BREAK ALL EDGES &
CORNERS

STANDARD TOLERANCES
UNLESS SPECIFIED
DECIMAL: $\pm .005$
FRACTIONS $\pm .015$

MIDLAND MFG. CORP.
SKOKIE, IL, U.S.A.

10" SPILL VALVE CAPACITIES
WITH MIDLAND ROUNDED ENTRANCE

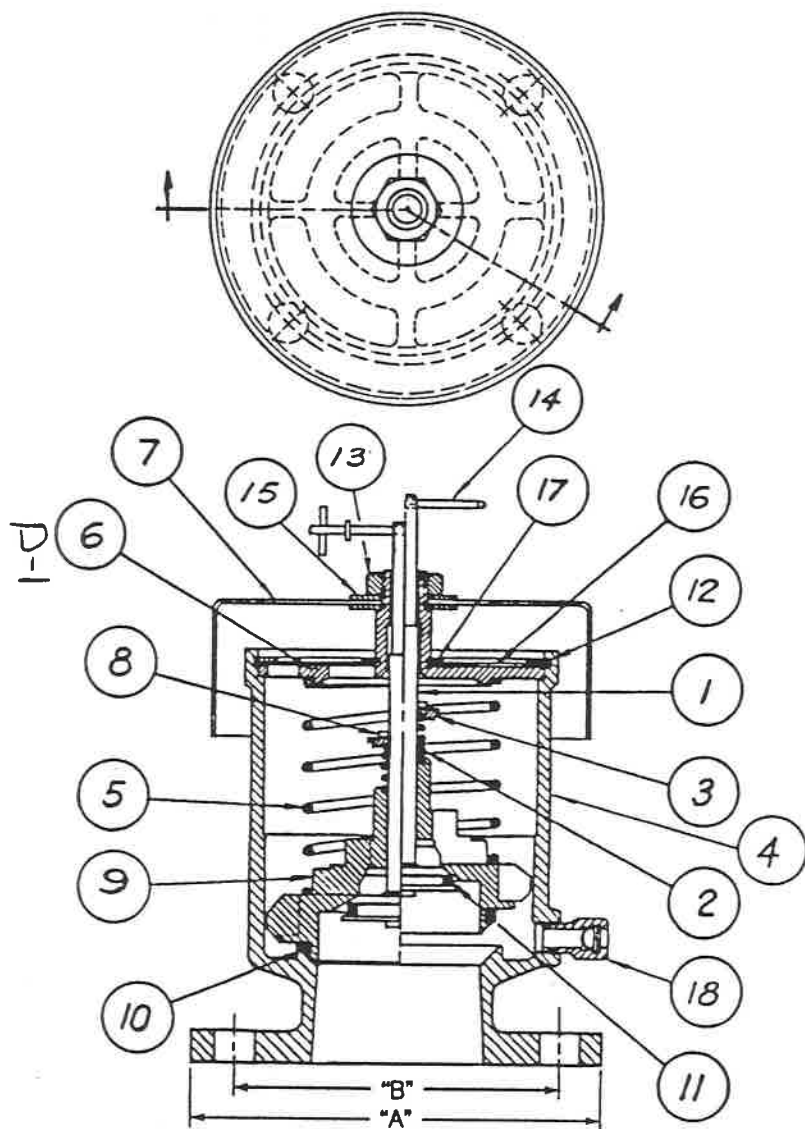
SCALE: DRAWN BY:
DATE: 2/7/92 MAGGIO
REVISION: 2/11/92

A702-9



FLC'D

9/29/92



ITEM NO.	QTY.	PART NAME	MATERIAL	
			BRASS TRIM	STAINLESS TRIM
1	1	POPPET	STAINLESS	STAINLESS
2	1	VACUUM SPRING ⁽²⁾	STAINLESS	STAINLESS
3	1	SPRING SEAT	STAINLESS	STAINLESS
4	1	BODY	BRASS	STAINLESS
5	1	PRESSURE SPRING ⁽²⁾	STAINLESS	STAINLESS
6	1	FOLLOWER	BRASS	STAINLESS
7	1	WEATHER CAP	STAINLESS	STAINLESS
8	1	PIN	STAINLESS	STAINLESS
9	1	VACUUM HOUSING	BRASS	STAINLESS
10	1	PRESSURE SEAL	BUNA N ⁽¹⁾	BUNA N ⁽¹⁾
11	1	VACUUM SEAL	BUNA N ⁽¹⁾	BUNA N ⁽¹⁾
12	1	SPIRAL RETAINING RING	STAINLESS	STAINLESS
13	1	NUT	STAINLESS	STAINLESS
14	1	LIFT PIN	STAINLESS	STAINLESS
15	2	WASHER	STAINLESS	STAINLESS
16	1	FLAME SCREEN ⁽³⁾	STAINLESS	STAINLESS
17	1	SPIRAL RETAINING RING	STAINLESS	STAINLESS
18	1	DRAIN SCREEN ASSEMBLY	STAINLESS	STAINLESS

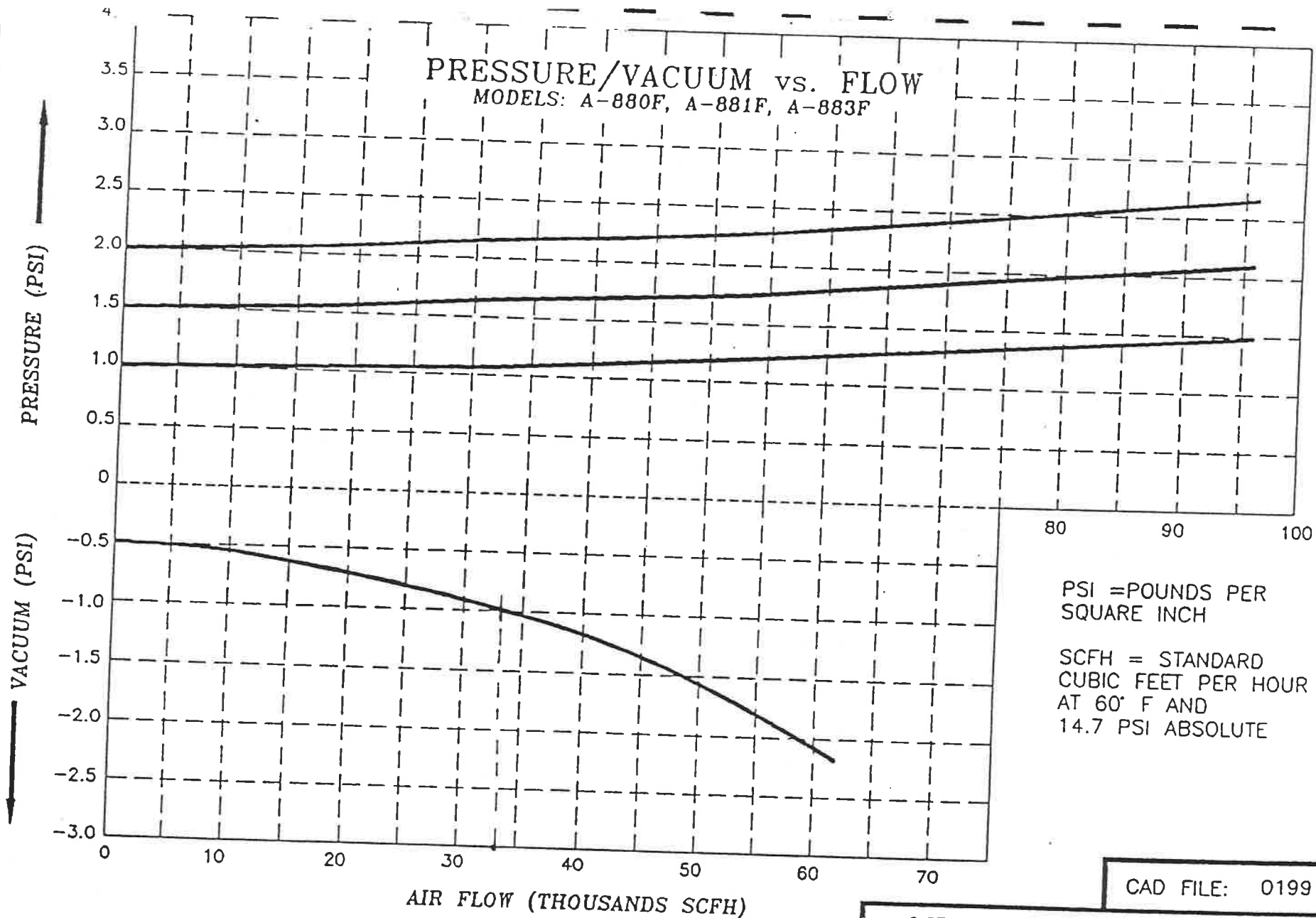
NOTES: ⁽¹⁾Alternate material available ⁽²⁾Varies according to setting
⁽³⁾30 x 30 x 0.0065 wire mesh

SETTING RANGE (PSI)	
PRESSURE	0.8 to 2.0
VACUUM	0.5 TO 1.0

Specified pressure and vacuum settings desired when ordering.

VALVE MATERIAL	MODEL SUFFIX
BRASS	-BR
STAINLESS	-SS

VALVE SIZE	O.D. FLANGE	BOLT CIRCLE 150# ASA	NUMBER AND SIZE OF BOLT HOLES	VALVE NO.
	"A"	"B"		
2-1/2"	7	5-1/2"	(4) 3/4"	A-828-F
3"	7-1/2"	6"	(4) 3/4"	A-833-F
4"	9"	7-1/2"	(8) 3/4"	A-843-F
5"	10"	8-1/2"	(8) 7/8"	A-853-F
6"	11"	9-1/2"	(8) 7/8"	A-863-F
8"	13-1/2"	11-3/4"	(8) 7/8"	A-883-F
10"	16"	14-1/4"	(12) 1"	A-8103-F



NOTES:

- 1) THIS DATA IS FROM ACTUAL TESTS OF APRIL 1992 BY AN INDEPENDENT LABORATORY
- 2) FLOW TESTING WAS PERFORMED IN ACCORDANCE WITH API 2000 WITH PRESSURES MEASURED AT THE VALVE INLET

CAD FILE: 0199

MIDLAND MFG. CORP.
SKOKIE, IL, U.S.A.

8" PRESSURE-VACUUM VALVE CAPACITIES
PRESSURE/VACUUM vs. FLOW

SCALE:

DRAWN BY:

Maggio

DATE:

11/23/92

REVISION:

A800-19

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO Mwc	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
46 CFR SUBCHAPT O, TABLE 151	***	*****	****	*****	*****	*****	*****	-----	-----	-----	*****	*****	*****
ACETIC ACID	AAC	1.05	1	60.052	2.07	0.92	16.200	0.057	0.943	0.076	0.081	1.061	1.018
ACETIC ANHYDRIDE	ACA	1.08	1	102.050	3.50	0.40	16.200	0.025	0.975	0.076	0.081	1.062	1.008
ACETONITRILE	ATN	0.78	3	41.053	1.41	0.03	16.200	0.002	0.998	0.076	0.076	1.001	1.001
ACRYLIC ACID	ACR	1.05	2	72.064	2.48	0.40	16.200	0.025	0.975	0.076	0.079	1.037	1.008
ACRYLONITRILE	ACN	0.81	4	53.064	1.80	5.00	16.200	0.309	0.691	0.076	0.095	1.247	1.100
ADIPONITRILE	ADN	0.95	1	108.000	3.73	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
ALUMINUM SULFATE SOLUTION	ASX	1.76											
AMINOETHYLETHANOLAMINE	AEE	1.03	1	104.150	3.59	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
AMMONIUM BISULFITE SOLN (70% OR LESS)	ABX	1.44	1			NF/NC							
AMMONIUM HYDROXIDE (28% OR LESS NH3)	AMH		3	35.050	1.21	NF/NC							
ANTHRACENE OIL (COAL TAR FRACTION)	AHO												
BENZENE	BNZ	0.88	1	78.114	2.80	4.50	16.200	0.278	0.722	0.076	0.114	1.500	1.250
BENZENE HYDROCARBON MIXTURES (W/ACETYLENES) (W/10% BENZENE OR MORE)	BHB	0.84	1		2.80	7.30	16.200	0.451	0.549	0.076	0.138	1.811	1.146
BENZENE HYDROCARBON MIXTURES (W/10% BENZENE OR MORE)	BHB	0.84	1		2.80	7.30	16.200	0.451	0.549	0.076	0.138	1.811	1.146
BENZENE, TOLUENE, XYLENE MIXTURES (HAVING 10% BENZENE OR MORE)	BTX	0.84	1	106.080	2.80	7.30	16.200	0.451	0.549	0.076	0.138	1.811	1.146
iso-BUTYL ACRYLATE	BAI	0.88	2	128.170	4.42	0.60	16.200	0.037	0.963	0.076	0.086	1.127	1.012
n-BUTYL ACRYLATE	BTC	0.90	2	128.170	4.40	0.40	16.200	0.025	0.975	0.076	0.083	1.084	1.008
BUTYL ACRYLATE (SEE ISO- & N- BUTYL ACRYLATE)	BAR	0.90	2		4.42	0.60	16.200	0.037	0.963	0.076	0.086	1.127	1.012
BUTYL METHACRYLATE	BMH	0.88	2	142.200	4.90	0.29	16.200	0.018	0.982	0.076	0.081	1.070	1.006
iso-BUTYRALDEHYDE	BAD	0.80	1	72.107	2.50	7.80	16.200	0.481	0.519	0.076	0.131	1.722	1.156
n-BUTYRALDEHYDE	BTR	0.80	1	72.107	2.50	7.80	16.200	0.481	0.519	0.076	0.131	1.722	1.156
BUTYRALDEHYDES (CRUDE)	BFA	0.82	1	72.060	2.48	8.00	16.200	0.494	0.506	0.076	0.132	1.731	1.160
BUTYRALDEHYDE (ISO-, N-)	BAE	0.82	1		2.48	8.00	16.200	0.494	0.506	0.076	0.132	1.731	1.160
CAMPOR OIL (LIGHT)	CPO	0.92	8										
CARBON TETRACHLORIDE	CBT	1.59	3	153.820	5.31	NF/NC							
CAUSTIC POTASH SOLUTION	CPS	1.50	1			NF/NC							
CAUSTIC SODA SOLUTION	CSS	1.50	1			NF/NC							
CHLOROBENZENE	CRB	1.11	1	112.559	3.88	0.80	16.200	0.049	0.951	0.076	0.087	1.142	1.016
CHLOROFORM	CRF	1.48	3	119.380	4.12	NF/NC							
CHLOROSULFONIC ACID	CSA	1.79											
COAL TAR NAPHTHA SOLVENT	NCT	0.88	1		3.66	0.20	16.200	0.012	0.988	0.076	0.079	1.033	1.004
CREOSOTE (COAL TAR)	CCT	1.07	1		3.72	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
CREOSOTE (WOOD)	CWD	1.07	1		3.72	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
CRESOLS (ALL ISOMERS)	CRS	1.05	1	108.130	3.72	0.06	16.200	0.004	0.996	0.076	0.077	1.010	1.001
CRESOLS WITH LESS THAN 5% PHENOL (SEE CRESOLS (ALL ISOMERS))	CRS	1.05	1										
CRESOLS WITH 5% OR MORE PHENOL (SEE PHENOL)	CFP	1.07	3		3.72	0.05	16.200	0.003	0.997	0.076	0.077	1.008	1.001
CRESYLATE SPENT CAUSTIC	CSC	1.55	1			NF/NC							
CRESYLIC ACID, SODIUM SALT SOLUTION, SEE CRESYLATE SPENT CAUSTIC	CAX (TAR ?)		1										
CROTONALDEHYDE	CTA	0.85	4	70.050	2.41	2.00	16.200	0.123	0.877	0.076	0.089	1.174	1.040

STDVAP1

E-2-a

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO Mw	SPECIF GRAV OF CARGO SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT ³)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT ³)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
CYCLOHEXANONE	CCH	0.95	1	98.145	3.40	0.02	16.200	0.001	0.999	0.076	0.076	1.003	1.000
CYCLOHEXYLAMINE	CHA	0.87	1		3.42	0.62	16.200	0.038	0.962	0.076	0.083	1.093	1.012
DECYL ACRYLATE (iso-, n-)	DAT	0.89	2	212.330	7.30	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
DICHLOROBENZENE (ALL ISOMERS)	DBX	1.30	3		5.07	0.10	16.200	0.006	0.994	0.076	0.078	1.025	1.002
1,1-DICHLOROETHANE	DCH	1.18	1	98.960	3.41	9.90	16.200	0.611	0.389	0.076	0.188	2.473	1.198
2,2-DICHLOROETHYL ETHER	DEE	1.22	1	143.000	4.90	0.04	16.200	0.002	0.998	0.076	0.077	1.010	1.001
DICHLOROMETHANE (ALSO KNOWN AS METHYLENE CHLORIDE)	DCM	1.32	5	84.940	2.93	NF/NC							
2,4-DICHLOROPHENOXYACETIC ACID DIETHANOLAMINE SALT SOLUTION	DDE												
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION	DAD		1										
2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	NDTI												
1,1-,1,2- OR 1,3- DICHLOROPROPANE	DPX	1.16	3	112.960	3.90	6.30	16.200	0.389	0.611	0.076	0.162	2.128	1.126
1,3-DICHLOROPROPENE	DPU	1.23	4	110.980	3.84	5.50	16.200	0.340	0.660	0.076	0.150	1.964	1.110
DICHLOROPROPENE, DICHLOROPROPANE MIXTURES	DMX	1.21	1		3.90	6.30	16.200	0.389	0.611	0.076	0.162	2.128	1.126
2,2-DICHLOROPROPIONIC ACID	DCN												
DIETHANOLAMINE	DEA	1.09	1	105.140	3.65	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
DIETHYLAMINE	DEN	0.71	3	73.139	2.50	1.00	16.200	0.062	0.938	0.076	0.083	1.093	1.020
DIETHYLENETRIAMINE	DET	0.96	1	103.170	3.48	0.04	16.200	0.002	0.998	0.076	0.077	1.006	1.001
DIETHYL ETHER, SEE ETHYL ETHER	DEH			74.123	2.56								
DIISOBUTYLAMINE	DBU	0.75	3	129.247	4.46	0.46	16.200	0.028	0.972	0.076	0.084	1.098	1.009
DIISOPROPANOLAMINE	DIP	0.98	1	133.190	4.59	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
DIISOPROPYLAMINE	DIA	0.72	3	101.193	3.50	3.70	16.200	0.228	0.772	0.076	0.120	1.571	1.074
N,N-DIMETHYLACETAMIDE	DAC	0.95	3		3.00	0.20	16.200	0.012	0.988	0.076	0.078	1.025	1.004
DIMETHYLETHANOLAMINE	DMB	0.89	1		3.03	0.50	16.200	0.031	0.969	0.076	0.081	1.063	1.010
DIMETHYLFORMAMIDE	DMF	0.95	1	73.090	2.51	0.30	16.200	0.019	0.981	0.076	0.078	1.028	1.006
1,4-DIOXANE	DOX	1.04	1		3.03	1.84	16.200	0.114	0.886	0.076	0.094	1.231	1.037
DI-N-PROPYLAMINE	DNA	0.74	3	58.080	3.50	1.50	16.200	0.093	0.907	0.076	0.094	1.232	1.030
ETHANOLAMINE	MEA	1.02	1	61.080	2.10	0.03	16.200	0.002	0.998	0.076	0.076	1.002	1.001
ETHYL ACRYLATE	EAC	0.93	2	100.118	3.50	2.00	16.200	0.123	0.877	0.076	0.100	1.309	1.040
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	0.80	6	45.060	1.56	15.50	16.200	0.957	0.043	0.076	0.117	1.536	1.310
N-ETHYLBUTYLAMINE	EBA	0.74	3	101.190	3.50	1.20	16.200	0.074	0.926	0.076	0.090	1.185	1.024
N-ETHYLCYCLOHEXYLAMINE	ECC	0.86	1	127.140	4.40	0.50	16.200	0.031	0.969	0.076	0.084	1.105	1.010
ETHYLENE CYANOHYDRIN	ETC	1.04	1	71.080	2.45	0.01	16.200	0.001	0.999	0.076	0.076	1.001	1.000
ETHYLENEDIAMINE	EDA	0.91	1	60.099	2.10	0.90	16.200	0.056	0.944	0.076	0.081	1.061	1.018
ETHYLENE DIBROMIDE	EDB	2.17				NF/NC							
ETHYLENE DICHLORIDE	EDC	1.26	1	98.960	3.42	4.00	16.200	0.247	0.753	0.076	0.122	1.598	1.080
ETHYLENE GLYCOL PROPYL ETHER	EGP	0.91	1		4.80	0.60	16.200	0.037	0.963	0.076	0.087	1.141	1.012
2-ETHYLHEXYL ACRYLATE	EAI	0.89	2	184.200	6.35	0.02	16.200	0.001	0.999	0.076	0.077	1.007	1.000
ETHYLIDENE NORBORNENE	ENB	0.90	3		4.10	0.33	16.200	0.020	0.980	0.076	0.081	1.063	1.007
ETHYL METHACRYLATE	ETM	0.92	2		3.94	1.00	16.200	0.062	0.938	0.076	0.090	1.182	1.020
2-ETHYL-3-PROPYLACROLEIN	EPA	0.85	1	126.190	4.35	0.12	16.200	0.007	0.993	0.076	0.078	1.025	1.002
FERRIC CHLORIDE SOLUTIONS	FCS												
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	1.13	1		1.03	0.15	16.200	0.009	0.991	0.076	0.076	1.000	1.003

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MWC	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
FORMIC ACID	FMA	1.22	1		1.60	2.10	16.200	0.130	0.870	0.076	0.082	1.078	1.042
FURFURAL	FFA	1.20	1	96.085	3.31	0.15	16.200	0.009	0.991	0.076	0.078	1.021	1.003
GLUTARALDEHYDE SOLUTION (50% OR LESS)	GTA		1			NF/NC							
HEXAMETHYLENEDIAMINE SOLUTION	HMC	0.93	1	116.140	4.00	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
HEXAMETHYLENEIMINE	HMI	0.88	1		1.00	0.50	16.200	0.031	0.969	0.076	0.076	1.000	1.010
HYDROCHLORIC ACID SPENT (15% OR LESS)	HCS	1.21											
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-))													
ISOPRENE	IPR	0.69	7	68.120	2.35	23.00	16.200	1.420	-0.420	0.076	0.222	2.917	1.460
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT 3% OR MORE) (INCLUDING:	KPL												
MESITYL OXIDE	MSO	0.86	1		3.50	0.67	16.200	0.041	0.959	0.076	0.084	1.103	1.013
METHYL ACRYLATE	MAM	0.95	2	86.091	3.00	4.10	16.200	0.253	0.747	0.076	0.115	1.506	1.082
METHYLCYCLOPENTADIENE DIMER	MCK	0.94	1		0.93	0.15	16.200	0.009	0.991	0.076	0.076	0.999	1.003
METHYL DIETHANOLAMINE	MDE	1.04	1		4.10	0.10	16.200	0.006	0.994	0.076	0.078	1.019	1.002
2-METHYL-5-ETHYLPYRIDINE	MEP	0.92	1	121.000	4.18	0.16	16.200	0.010	0.990	0.076	0.079	1.031	1.003
METHYLENE CHLORIDE (SEE DICHLOROMETHANE)													
METHYL METHACRYLATE	MMM	0.94	2	100.110	3.45	2.02	16.200	0.125	0.875	0.076	0.099	1.306	1.040
2-METHYLPYRIDINE	MPR	0.95	3	93.129	3.20	0.50	16.200	0.031	0.969	0.076	0.081	1.068	1.010
alpha-METHYLSTYRENE	MSR	0.89	2	118.179	4.08	0.40	16.200	0.025	0.975	0.076	0.082	1.076	1.008
MORPHOLINE	MPL	1.00	1	87.122	3.00	0.80	16.200	0.049	0.951	0.076	0.084	1.099	1.016
NITRIC ACID (70% OR LESS)	NCD												
NITROPROPANE (-1, OR -2)	NPM	0.99	1	89.090	3.06	1.05	16.200	0.065	0.935	0.076	0.086	1.134	1.021
OCTYL NITRATES (ALL ISOMERS)	ONE	1.00	1		6.00	0.31	16.200	0.019	0.981	0.076	0.083	1.096	1.006
OLEUM	OLM	1.98			2.76	0.01	16.200	0.001	0.999	0.076	0.076	1.001	1.000
PENTACHLOROETHANE	PCE	1.67				NF/NC							
1, 3-PENTADIENE	PDE	0.68	7	68.060	2.36	17.06	16.200	1.053	-0.053	0.076	0.185	2.432	1.341
PERCHLOROETHYLENE (SAME AS TETRACHLOROETHYLENE)	PER	1.62	1	165.820	5.72	NF/NC							
PHOSPHORIC ACID	PAC	1.83											
POLYETHYLENE POLYAMINES	PEB	0.99	1		5.00	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
POLYMETHYLENE POLYPHENYL ISOCYANATE	PPI	1.20	1		13.79	0.00							
POTASSIUM HYDROXIDE SOLUTION (SEE CAUSTIC POTASH SOLUTION)													
iso-PROPANOLAMINE	MPA	0.96	1	76.000	2.59	0.08	16.200	0.005	0.995	0.076	0.077	1.008	1.002
PROPANOLAMINE (iso-, n-)	PAX	0.96	1		2.59	0.08	16.200	0.005	0.995	0.076	0.077	1.008	1.002
PROPIONIC ACID	PNA	1.00	1	74.080	2.56	0.30	16.200	0.019	0.981	0.076	0.078	1.029	1.006
iso-PROPYLAMINE	IPP	0.69	5	59.112	2.04	23.42	16.200	1.446	-0.446	0.076	0.191	2.504	1.468
iso-PROPYL ETHER	IPE	0.72	1		3.50	6.64	16.200	0.410	0.590	0.076	0.154	2.025	1.133
PYRIDINE	PRD	0.98	1	79.102	2.72	1.30	16.200	0.080	0.920	0.076	0.087	1.138	1.026
SODIUM ALUMINATE SOLUTION	SAU												
SODIUM CHLORATE SOLUTION (50% OR LESS)	SDD	1.63	1			NF/NC							
SODIUM DICHROMATE SOL'N (70% OR LESS)	SDL					NF/NC							
SODIUM HYDROXIDE SOLUTION (SEE CAUSTIC SODA SOLUTION)													
SODIUM HYPOCHLORITE SOL'N (15% OR LESS)	SHP	1.10				NF/NC							
SODIUM SULFIDE, HYDROSULFIDE SOLUTIONS (H2S 15 PPM OR LESS)	SSH	1.32											

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C	LIQUID	USCG	MOLEC'R	SPECIF	SATUR'D	TOTAL	PARTIAL	PARTIAL	AIR	VAPOR-	VAPOR-	VAPOR-
	H	SPECIF.	VAP	WEIGHT	GRAV OF	VAPOR	VAP-AIR	VOLUME	VOLUME	WEIGHT	AIR MIX	AIR	AIR
	R	GRAVITY	COL.	OF	CARGO	PRESS	PRESS	OF VAP	OF AIR	DENSITY	WEIGHT	MIX	MIX
	I		SYST	CARGO	VAPOR	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	SPECIFIC	GROWTH
	S		CAT.	MWc	SGv	Pv, 115	Pt, 115	Vv, 115	Va, 115	Wa, 115	Wv-a, 115	Wv-a, 115/	VGR
		(1)	(13)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Wa, 115	(9)
						(15)	(PSIA)			(LBm/	(LBm/		
										FT^3)	FT^3)		
SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (15 PPM<H2S<200 PPM)	SSI	1.32											
SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (H2S GREATER THAN 200 PPM)	SSJ	1.32											
SODIUM THIOCYANATE SOLUTION (56% OR LESS)	STS												
STYRENE MONOMER	STY	0.92		104.150	3.60	0.40	16.200	0.025	0.975	0.076	0.081	1.064	1.008
SULFURIC ACID	SFA	1.84			3.40	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
SULFURIC ACID, SPENT	SAC	1.39				0.01	16.200	0.001	0.999	0.076	0.076	0.999	1.000
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORIDE)	TEC	1.59		147.410	5.09								
TETRAETHYLENEPENTAMINE	TTP	1.00	1		6.80	0.00	16.200	0.000	1.000	0.076	0.076	1.000	1.000
TETRAHYDROFURAN	THF	0.89	1	72.107	1.35	8.50	16.200	0.525	0.475	0.076	0.090	1.184	1.170
1,1,2-TRICHLOROETHANE (VINYL TRICHLORIDE)	TCM	1.44	1	133.390	4.60	1.02	16.200	0.063	0.937	0.076	0.093	1.227	1.020
TRICHLOROETHANE (SEE 1,1,2-TRICHLOROETHANE)													
TRICHLOROETHYLENE	TCL	1.46	1	131.380	4.50	3.46	16.200	0.214	0.786	0.076	0.133	1.748	1.069
1,2,3-TRICHLOROPROPANE	TCN	1.39	3	147.432	5.60	0.15	16.200	0.009	0.991	0.076	0.079	1.043	1.003
TRIETHANOLAMINE	TEA	1.13	1	149.190	5.14	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
TRIETHYLAMINE	TEN	0.73	3	101.193	3.49	2.50	16.200	0.154	0.846	0.076	0.105	1.384	1.050
TRIETHYLENETETRAMINE	TET	0.98	1	146.240	5.04	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
UREA, AMMONIUM NITRATE SOL'N (CONTAINING MORE THAN 2% NH3)	UAS		1										
VALERALDEHYDE (iso-, n-)		0.79	1	86.134	3.00	5.00	16.200	0.309	0.691	0.076	0.123	1.617	1.100
VALERALDEHYDE (iso-)	IVA	0.79	1		3.00	5.00	16.200	0.309	0.691	0.076	0.123	1.617	1.100
VALERALDEHYDE (n-)	VAL	0.84	1		5.93	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VBL		1										
VINYL ACETATE	VAM	0.94	2	86.091	2.97	5.80	16.200	0.358	0.642	0.076	0.130	1.705	1.116
VINYLTOLUENE	VNT	0.90	2		4.08	0.12	16.200	0.007	0.993	0.076	0.078	1.023	1.002

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MwC	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115 (9)	VAPOR- AIR MIX GROWTH RATE VGR (9)
46 CFR SUBCHAPT O BUT NOT TABLE 151													
1,1-DICHLOROPROPANE	DPB	1.16	3		3.90	6.30	16.200	0.389	0.611	0.076	0.162	2.128	1.126
1,1,1-TRICHLOROETHANE		1.51	1	133.390	4.60	NF/NC							
1,2-DICHLOROPROPANE	DPP	1.16	3		3.50	2.60	16.200	0.160	0.840	0.076	0.107	1.401	1.052
1,3 CYCLOPENTADIENE			1										
1,3-DICHLOROPROPANE	DPC	1.16	3		3.90	3.80	16.200	0.235	0.765	0.076	0.128	1.680	1.076
2-METHYL-2-HYDROXY-3-BUTYNE	MHB	0.86	1		2.90	1.14	16.200	0.070	0.930	0.076	0.086	1.134	1.023
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION (70% 3-PENTENENITRILE	DDA												
AEROTHENE TT (1,1,1-TRICHLOROETHANE)	PNT (CRUDE ?)		8	133.390	4.60								
ALKYLBENZENE			1										
AMINOETHYLPIPERAZINE	AEP		1										
BENZENE RAFFINATE (ASSUME VAPOR PROPERTIES SIMILAR TO BENZENE)		0.70			2.80	4.50	16.200	0.278	0.722	0.076	0.114	1.500	1.250
BENZENE SULFONYL CHLORIDE	BSC	1.38	1		6.09	0.00	16.200	0.000	1.000	0.076	0.076	1.000	1.000
BENZYL ACETATE	BZE	1.04	1		5.18	0.02	16.200	0.001	0.999	0.076	0.077	1.005	1.000
BENZYL CHLORIDE (STABILIZED)	BCL	1.10	4		4.36	0.09	16.200	0.006	0.994	0.076	0.078	1.019	1.002
BUTANOL			1										
BUTYL ETHER (n-)	BTE	0.77	3		4.50	0.40	16.200	0.025	0.975	0.076	0.083	1.086	1.008
BUTYLENE OXIDE (1,2-)	BTO	0.83	2		2.49	9.18	16.200	0.567	0.433	0.076	0.140	1.844	1.184
BUTYRIC ACID	BRA	0.96	1		3.00	0.07	16.200	0.004	0.996	0.076	0.077	1.009	1.001
CARBOLIC ACID	CBO	1.04	3		3.25	0.06	16.200	0.004	0.996	0.076	0.077	1.008	1.001
CHLOROACETIC ACID (80% OR LESS)	CHM	1.58			3.26	0.01	16.200	0.001	0.999	0.076	0.076	1.001	1.000
CHLOROPROPIONIC ACID (2- OR 3-)	CPM	1.26	1		3.70	0.02	16.200	0.001	0.999	0.076	0.076	1.003	1.000
CHLOROTOLUENE (m-)	CTM	1.07	1		4.40	0.32	16.200	0.020	0.980	0.076	0.081	1.067	1.006
CHLOROTOLUENE (o-)	CTO	1.08	1		4.40	0.32	16.200	0.020	0.980	0.076	0.081	1.067	1.006
CHLOROTOLUENE (p)	CRN	1.07	1		4.36	0.09	16.200	0.006	0.994	0.076	0.078	1.019	1.002
CHLOROTOLUENES (MIXED ISOMERS)	CHI	1.08	1		4.40	0.53	16.200	0.033	0.967	0.076	0.085	1.111	1.011
CREOSOTE (ALL ISOMERS)	CCW	1.07	1		3.72	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
CRESYLIC ACID TAR	CRX	1.05	1		1.00	0.10	16.200	0.006	0.994	0.076	0.076	1.000	1.002
CYCLOHEPTANE	CYE	0.81	1		3.39	1.40	16.200	0.086	0.914	0.076	0.092	1.207	1.028
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	CYX	0.95	1		3.38	1.00	16.200	0.062	0.938	0.076	0.087	1.147	1.020
CYCLOHEXYL ACETATE	CYC	0.97	1		4.90	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
CYCLOPENTADIENE, STYRENE, BENZENE MIXTURE	CSB	1.50	1		4.55	4.50	16.200	0.278	0.722	0.076	0.151	1.986	1.090
CYCLOPENTANE	CYP	0.74	1		2.40	13.15	16.200	0.812	0.188	0.076	0.163	2.136	1.263
DECANOIC ACID	DCO	5.94	1		5.93	0.00							
DI 2 ETHYLHEXYL PHTHALATE (SEE ALSO ETHYLHEXYL PHTHALATE)		0.98											
DICHLOROISOPROPYL ETHER (2,2'-)	DCI	1.11	1		5.90	0.06	16.200	0.004	0.996	0.076	0.078	1.018	1.001
DICHLOROPROPANE		1.16											
DICHLOROPROPENE		1.23											
DIETHYL SULFATE	DSU	1.18	1		5.30	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY (1)	USCG VAP COL. SYST CAT. (13)	MOLEC'R WEIGHT OF CARGO MwC (1)	SPECIF GRAV OF CARGO VAPOR SGv (2)	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115 (9)	VAPOR- AIR MIX GROWTH RATE VGR (9)
DIETHYLETHANOLAMINE	DAE	0.89	1		4.03	0.18	16.200	0.011	0.989	0.076	0.079	1.034	1.004
DODECYL BENZENE			1										
DODECYLDIMETHYLAMINE TETRADECYLDIMETHYLAMINE MIXTURE	DOT												
DRIPOLENE			1										
ETHANOL (see ethyl alcohol)			1	46.069	1.59								
ETHYL BROMIDE			8	108.966	3.76								
ETHYL TERT-BUTYL ETHER	EBE	0.73	1		3.50	5.00	16.200	0.309	0.691	0.076	0.135	1.772	1.100
ETHYLAMINE	EAM	0.80	6	45.085	1.55	40.80	16.200	2.519	-1.519	0.076	0.182	2.385	1.816
ETHYLENE DICHLORIDE 1,1,2-TRICHLOROETHANE MIXTURE	ETX	1.44	1		4.60	3.70	16.200	0.228	0.772	0.076	0.139	1.822	1.074
ETHYLMERCAPTAN (SAME AS ETHANETHIOL)			6										
ETHYLPHENOL	EPL	1.04	1		4.21	0.02	16.200	0.001	0.999	0.076	0.076	1.004	1.000
FORMALDEHYDE SOLUTION (50% OR MORE), METHANOL MIXTURES	MTM	0.79	1		1.10	6.63	16.200	0.409	0.591	0.076	0.079	1.041	1.133
HYDROSULFIDE			8										
INDENES			8										
ISOBUTYL ACETATE	IBA			116.160	4.01	0.36	16.200	0.022	0.978	0.076	0.081	1.068	1.007
ISOPRENE, PENTADIENE MIXTURE	IPN												
ISO-PROPYL ALCOHOL		0.79	1	60.096	2.07	3.00	16.200	0.185	0.815	0.076	0.091	1.199	1.060
LAURIC ACID	LRA	0.88	1	6.910	0.00								
METHACRYLONITRILE	MET	0.80	2		2.31	3.39	16.200	0.209	0.791	0.076	0.097	1.274	1.068
METHANOL		0.79	1	32.042	1.11								
METHYL STYRENE			2										
METHYL STYRENE, INDENES, ALKYL BENZENE MIXTURES	MIA												
METHYLCYCLOHEXANE	MCY	0.77	1		3.40	2.37	16.200	0.146	0.854	0.076	0.103	1.351	1.047
METHYLHEXANE (SAME AS HEPTANE)			1										
MONOETHANOLAMINE	MEA	1.02		61.084	2.11	0.10	16.200	0.006	0.994	0.076	0.077	1.007	1.002
MONOISOPROPANOLAMINE		0.96		75.110	2.59	0.20	16.200	0.012	0.988	0.076	0.078	1.020	1.004
NAPHTHALENE (MOLTEN)	NTM	1.15	1		4.41	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
NEODECANOIC ACID	NEA	0.92	1		6.00	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
NITRILOTRIACETIC ACID	NAA (&SALTS ?		8			NF/NC							
NITROPHENOL (MOLTEN)	NTP	1.49	1		4.79	0.00							
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NNM	1.05	1		3.06	1.10	16.200	0.068	0.932	0.076	0.087	1.140	1.022
NITROTOLUENE (o-,p-)	NIT	1.16	1		4.72	0.02	16.200	0.001	0.999	0.076	0.076	1.005	1.000
PARALDEHYDE	PDH	0.99	1		4.55	8.30	16.200	0.512	0.488	0.076	0.215	2.819	1.166
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXYDE)	PGS												
PROPIONALDEHYDE	PAD	0.81	2		2.00	13.76	16.200	0.849	0.151	0.076	0.141	1.849	1.275
PROPIONIC ANHYDRIDE	PAH	1.01	1		4.50	0.11	16.200	0.007	0.993	0.076	0.078	1.024	1.002
PROPIONITRILE	PCN	0.70	1		1.90	1.17	16.200	0.072	0.928	0.076	0.081	1.065	1.023
PROPYLAMINE (n-)	PRA	0.72	1		2.04	13.55	16.200	0.836	0.164	0.076	0.142	1.870	1.271
PROPYLBENZENE			1		0.20	4.14	16.200	0.256	0.744	0.076	0.061	0.796	1.083
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	GPY	0.84	1		2.80	7.30	16.200	0.451	0.549	0.076	0.138	1.811	1.146
PYROLYSIS RESIDUAL FUELS		0.89											
SEWAGE, RAW	SWR												

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID	USCG	MOLEC'R	SPECIF	SATUR'D	TOTAL	PARTIAL	PARTIAL	AIR	VAPOR-	VAPOR-	VAPOR-
		SPECIF.	VAP	WEIGHT	GRAV OF	VAPOR	VAP-AIR	VOLUME	VOLUME	WEIGHT	AIR MIX	AIR	AIR
		GRAVITY	COL.	OF	CARGO	@ 115 F	@ 115 F	OF VAP	OF AIR	DENSITY	DENSITY	SPECIFIC	GROWTH
			SYST	CARGO	VAPOR	Pv, 115	Pt, 115	Vv, 115	Va, 115	Wa, 115	Wv-a, 115	Wv-a, 115/	VGR
		(1)	CAT.	MWc	SGv	(3)	(4)	(5)	(6)	(7)	(8)	Wa, 115	(9)
			(13)	(1)	(2)	(15)	(PSIA)			(LBm/ FT^3)	(LBm/ FT^3)		
	***	*****	***	*****	*****	*****	*****	-----	-----	-----	*****	*****	*****
SODIUM SULFIDE (SOLID IN WATER)	SDS	1.53	8										
STYRENE	STY	0.92	2	104.152	3.60	0.40	16.200	0.025	0.975	0.076	0.081	1.064	1.008
STYRENE CRUDE	STX	0.92	2		3.60	0.40	16.200	0.025	0.975	0.076	0.081	1.064	1.008
STYRENE TAR	STT												
TETRAMETHYLBENZENE (1,2,3,5-)	TTB	0.89	1		4.20	0.14	16.200	0.009	0.991	0.076	0.078	1.028	1.003
TOLUIDINE (o-)	TLI	1.00	1		3.69	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
TRICHLOROBENZENE (1,2,4-)	TCB	1.45	1		6.25	0.03	16.200	0.002	0.998	0.076	0.077	1.010	1.001
TRIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N			1										
TRIPHENYLBORANE	TPE		8										
UNDECANOIC ACID	UDA	0.89	1		6.42	0.00							
HYDROCARBON 5-9	HFN	0.85	1		3.40	4.40	16.200	0.272	0.728	0.076	0.126	1.652	1.088

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO Mwc	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115 (9)	VAPOR- AIR MIX GROWTH RATE VGR (9)
46 CFR SUBCHAPTER D, TABLE 30.25-1	***	*****	****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
Acetone	ACT	0.79	1	58.080	2.00	10.00	16.200	0.617	0.383	0.076	0.123	1.617	1.200
Acetophenone	ACP	1.03	1	120.060	4.14	0.60	16.200	0.037	0.963	0.076	0.085	1.116	1.012
Acetyl Tributyl Citrate		1.05		402.460	13.89								
Acrylonitrile-Styrene Copolymer dispersion in Polyether Polyol	ALE												
Alcohols (C13 and above)	ALY												
Alcoholic beverages, N.O.S.													
Alcohol (C6 - C17) (secondary) Poly(3-6)ethoxylates													
Alcohol (C12 - C15) Poly(1-3)ethoxylates													
Alcohol (C12 - C15) Poly(3-11)ethoxylates													
Alkenylsuccinic acid													
Alkenylsuccinic Anhydride													
Alkyl (C9 - C17) Benzenes	AKB												
Alkylbenzenesulfonic acid (4% or less)	ABS												
Alkyl Phthalates (n-)													
Alkyl Succinate Formaldehyde Hydr- oxyamino condensate (3.2% or less)													
Aminoethyldiethanolamine, Aminoethylethanolamine solution													
Amyl Acetate (commercial, iso-, n-, sec-)	AEC	0.87	1		4.50	2.02	16.200	0.125	0.875	0.076	0.109	1.436	1.040
AMYL ACETATE (n-)	AML	0.88	1		4.48	0.33	16.200	0.020	0.980	0.076	0.082	1.071	1.007
AMYL ACETATE (iso-)	IAT	0.88	1		4.48	0.33	16.200	0.020	0.980	0.076	0.082	1.071	1.007
Amyl alcohol (iso-, n-, sec-, primary) (SEE ALSO IAA)	AAI	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amyl alcohol (n-)	AAN	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amyl alcohol (tert-)	AAI												
AMYL ALCOHOL, PRIMARY	APM	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
AMYL ALCOHOL, (sec-)	ASE	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amylene	AMZ												
AMYL ALCOHOL, (iso-)	IAA	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amyl Methyl Ketone	AMK												
Amyl Tallate													
Asphalt	ASP	1.04											
ASPHALT BLENDING STOCKS: Roofers flux	ARF												
ASPHALT BLENDING STOCKS: Straight run residue	ASR												
Behenyl alcohol													
Benzene Tricarboxylic acid Trioctyl Ester													
Benzyl alcohol	BAL	1.05	1	108.140	3.73	0.10	16.200	0.006	0.994	0.076	0.077	1.017	1.002
Bicyclic Terpenel Polyamide salt													
Brake fluid base mixtures (containing Poly(2-8)alkylene (C2-C3)	gBFX												
Butane	BMX	1.03											
Butene, SEE BUTYLENE													
Butene Oligomer	BOL												

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MWC	SPECIF GRAV OF CARGO VAPOR SGV	SATUR'D VAPOR @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
Butyl Acetate (iso-, n-)	BAX	0.87	1	116.160	4.00	0.60	16.200	0.037	0.963	0.076	0.085	1.111	1.012
BUTYL ACETATE (N-)	BCN	0.88	1		4.00	0.80	16.200	0.049	0.951	0.076	0.087	1.148	1.016
Butyl Acetate (sec-)	BTA	0.89	1		4.00	1.50	16.200	0.093	0.907	0.076	0.097	1.278	1.030
Butyl alcohol (iso-, n-, sec-, tert-)			1		2.60	0.90	16.200	0.056	0.944	0.076	0.083	1.089	1.018
BUTYL ALCOHOL (ISO-)	IAL	0.81	1		2.60	0.90	16.200	0.056	0.944	0.076	0.083	1.089	1.018
BUTYL ALCOHOL (N-)	BAN	0.81	1		2.60	0.50	16.200	0.031	0.969	0.076	0.080	1.049	1.010
BUTYL ALCOHOL (SEC-)	BAS	0.81	1		2.60	1.30	16.200	0.080	0.920	0.076	0.086	1.128	1.026
BUTYL ALCOHOL (TERT-)	BAT	0.78	1		2.60	2.80	16.200	0.173	0.827	0.076	0.097	1.277	1.056
Butyl Benzyl Phthalate	BPH	1.12	1		10.80	0.01	16.200	0.001	0.999	0.076	0.077	1.006	1.000
Butylene	BTN												
Butylene Glycol	BUG												
1,3-Butylene Glycol, SEE BUTYLENE GLYCOL													
Butylene Polyglycol, SEE BUTYLENE GLYCOL													
iso-Butyl Formate				102.134	3.53								
n-Butyl Formate													
Butyl Heptyl Ketone	BHK												
Butyl Methyl Ketone, SEE METHYL BUTYL KETONE													
Butyl Stearate													
Butyl Toluene	BUE	0.85	1		5.11	0.10	16.200	0.006	0.994	0.076	0.078	1.025	1.002
Butyrolactone (gamma)	BLA												
Calcium Alkylphenate													
Calcium Alkyl Salicylate													
Calcium Amino Nonyl Phenolate													
Calcium Carboxylate													
Caprolactam solutions	CLS	1.02	1		3.90	0.05	16.200	0.003	0.997	0.076	0.077	1.009	1.001
Carbon black base		0.90											
Cetyl alcohol (HEXADECANOL) SEE ALCOHOLS (C13 AND ABOVE)													
Cetyl-Stearal alcohol													
Cleaning spirit (unleaded)													
Coal tar	COR	1.11											
Cumene	CUM	0.86	1	120.090	4.20	0.60	16.200	0.037	0.963	0.076	0.085	1.119	1.012
Cycloaliphatic resins													
Cyclohexane	CHX	0.78	1	84.162	2.90	4.50	16.200	0.278	0.722	0.076	0.116	1.528	1.090
Cyclohexanol	CHN	0.95	1	100.160	3.45	0.15	16.200	0.009	0.991	0.076	0.078	1.023	1.003
1,3-Cyclopentadiene dimer (molten)	CPD	0.69	2		4.55	0.25	16.200	0.015	0.985	0.076	0.080	1.055	1.005
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)													
Cymene (para-)	CMP	0.86	1		4.62	0.11	16.200	0.007	0.993	0.076	0.078	1.025	1.002
Decahydronaphthalene	DHN	0.89	1		4.76	0.10	16.200	0.006	0.994	0.076	0.078	1.023	1.002
Decaldehyde (iso-)	IDA	0.83	1		5.00	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Decaldehyde (n-)	DAL	0.83	1		5.01	0.00							
Decane	DDC												
Decene	DCE	0.74	1		4.80	0.12	16.200	0.007	0.993	0.076	0.078	1.028	1.002

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MWC	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
Decyl alcohol (all isomers) (DECANOL)	DAX	0.83	1	158.170	5.30	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
DECYL ALCOHOL (iso-)	ISA	0.83	1		5.30	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
DECYL ALCOHOL (n-)	DAN	0.83	1		5.30	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Decylbenzene (n-)	DBZ	0.86	1		7.52	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Detergent Alkylate													
Diacetone alcohol	DAA	0.97	1		4.00	0.10	16.200	0.006	0.994	0.076	0.078	1.019	1.002
Dialkyl (C10-C14) Benzenes	DAB												
Dialkyl (C7-C13) Phthalates	DAH												
Dibutyl Carbinol													
Dibutyl Phthalate (ortho-)	DPA	1.05	1	278.350	9.59	0.00							
Dicyclopentadiene, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	DPT	0.98	2		4.55	0.25	16.200	0.015	0.985	0.076	0.080	1.055	1.005
Diethylbenzene	DEB	0.87	1		4.62	0.08	16.200	0.005	0.995	0.076	0.078	1.018	1.002
Diethylene Glycol	DEG	1.12	1	106.122	3.66	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Diethylene Glycol Butyl Ether	DME	0.95	1		5.50	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Diethylene Glycol Butyl Ether Acetate	DEM												
Diethylene Glycol Dibutyl Ether	DIG												
Diethylene Glycol Diethyl Ether													
Diethylene Glycol Ethyl Ether	DGE												
Diethylene Glycol Ethyl Ether Acetate	DGA	0.99	1		4.62	0.02	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Diethylene Glycol Methyl Ether	DGM	1.03	1		4.14	0.03	16.200	0.002	0.998	0.076	0.077	1.006	1.001
Diethylene Glycol Methyl Ether Acetate	DGR												
Diethylene Glycol Phenyl Ether	DGP												
Diethylene Glycol Phthalate	DGL												
Di-(2-ethylhexyl)adipate	DEH												
Di-(2-ethylhexyl)phthalate	DIE												
Diethyl Phthalate	DPH												
Diglycidyl Ether of Bisphenol A	BDE												
Diheptyl Phthalate	DHP												
Dihexyl Phthalate	DHA												
Diisobutylcarbinol	DBC	0.81	1		4.97	0.09	16.200	0.006	0.994	0.076	0.078	1.022	1.002
Diisobutylene	DBL	0.72	1		3.86	2.00	16.200	0.123	0.877	0.076	0.103	1.353	1.040
Diisobutyl Ketone	DIK	0.81	1		4.90	0.16	16.200	0.010	0.990	0.076	0.079	1.039	1.003
Diisobutyl Phthalate	DIT												
Diisodecyl Phthalate	DID												
Diisononyl Adipate	DNY												
Diisononyl Phthalate	DIN												
Diisocetyl Phthalate	DIO												
Diisopropylbenzene (all isomers)	DIX	0.86	1		5.60	0.03	16.200	0.002	0.998	0.076	0.077	1.009	1.001
Diisopropyl Naphthalene	DII												
Dimethyl Adipate	DLA												
Dimethylbenzene													
Dimethyl Glutarate	DGT												

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY (1)	USCG VAP COL. SYST CAT. (13)	MOLEC'R WEIGHT OF CARGO MWc (1)	SPECIF GRAV OF CARGO VAPOR SGv (2)	SATUR'D VAPOR PRESS @ 115 F Pv,115 (3)	TOTAL VAP-AIR PRESS @ 115 F Pt,115 (4)	PARTIAL VOLUME OF VAP @ 115 F Vv,115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va,115 (6)	AIR WEIGHT DENSITY @ 115 F Wa,115 (7)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a,115 (8)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a,115/ Wa,115 (9)	VAPOR- AIR MIX GROWTH RATE VGR (9)
Dimethyl Phthalate	DTL	1.19	1		6.69	0.00							
Dimethyl Polysiloxane	DMP												
2,2-Dimethylpropane-1,3-diol	DDI												
Dimethyl Succinate	DSE												
Dinonyl Phthalate	DIF	0.97	1		14.40	0.01	16.200	0.001	0.999	0.076	0.077	1.008	1.000
Di(octylphenyl)amine													
Dioctyl Phthalate	DOP	0.98	1		13.47	0.00							
Dipentene	DPN	0.84	1		4.90	0.10	16.200	0.006	0.994	0.076	0.078	1.024	1.002
Diphenyl	DIL	0.99	1	154.212	5.31	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Diphenyl, Diphenyl Ether mixture	DDO	1.07	1		5.86	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Diphenyl Ether	DPE	1.07	1	170.211	5.87	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Diphenyl Ether, Biphenyl Ether mixture	DOB												
Dipropylene Glycol	DPG	1.03	1		4.63	0.07	16.200	0.004	0.996	0.076	0.077	1.016	1.001
Dipropylene Glycol Dibenzoate	DGY												
Dipropylene Glycol Methyl Ether	DPY												
DISTILLATES: Flashed feed stocks	DFF	0.75	1		3.40	2.30	16.200	0.142	0.858	0.076	0.102	1.341	1.046
DISTILLATES: Straight run	DSR	0.73	1		3.40	2.30	16.200	0.142	0.858	0.076	0.102	1.341	1.046
Ditridecyl Phthalate	DTP												
Diundecyl Phthalate	DUP												
Dodecane (all isomers)	DOC			170.340	5.88								
Dodecanol	DDN			186.339	6.43								
Dodecene (all isomers)	DOZ	0.76	1	168.324	5.81	0.02	16.200	0.001	0.999	0.076	0.077	1.006	1.000
DODECENE	DOD	0.76	1		5.81	0.02	16.200	0.001	0.999	0.076	0.077	1.006	1.000
Dodecylbenzene	DDB	0.86			8.40	4.70	16.200	0.290	0.710	0.076	0.240	3.147	1.094
Dodecyl Phenol	DOL												
Drilling mud (low toxicity) (if flammable or combustible)/													
Epoxylated linear alcohols, C11-C15													
Ethane	ETH	0.47		30.070	1.04								
2-Ethoxyethanol	EEO	1.04											
2-Ethoxyethyl Acetate	EEA	1.04											
Ethoxylated alcohols, C11-C15, SEE THE ALCOHOL POLYETHOXYLATES													
Ethoxy Triglycol (crude)	ETG	1.02	1		6.14	0.00							
Ethyl Acetate	ETA	0.90	1	88.107	3.04	4.50	16.200	0.278	0.722	0.076	0.119	1.567	1.090
Ethyl Acetoacetate	EAA	1.03	1		4.48	0.20	16.200	0.012	0.988	0.076	0.079	1.043	1.004
Ethyl alcohol (ETHANOL)	EAL	0.79	1	46.050	1.60	3.50	16.200	0.216	0.784	0.076	0.086	1.130	1.070
Ethyl Amyl Ketone	EAK												
Ethyl Benzene	ETB	0.87	1	106.168	3.56	0.60	16.200	0.037	0.963	0.076	0.083	1.095	1.012
Ethyl Butanol	EBT	0.83	1		3.52	0.12	16.200	0.007	0.993	0.076	0.078	1.019	1.002
Ethyl Butyrate	EBR	0.88	1	116.160	4.00	1.00	16.200	0.062	0.938	0.076	0.090	1.185	1.020
Ethyl Cyclohexane	ECY	0.79	1		3.87	0.50	16.200	0.031	0.969	0.076	0.083	1.089	1.010
Ethylene	ETL			28.054	0.97								
Ethylene Carbonate													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MwC	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR @ 115 F (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt,115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv,115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va,115 (6)	AIR WEIGHT DENSITY @ 115 F Wa,115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a,115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wa,115	VAPOR- AIR MIX GROWTH RATE VGR (9)
Ethylene Glycol	EGL	1.13	1	62.069	2.21	0.01	16.200	0.001	0.999	0.076	0.076	1.001	1.000
Ethylene Glycol Acetate	EGO												
Ethylene Glycol Butyl Ether	EGM												
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EMA	0.94	1		5.52	0.05	16.200	0.003	0.997	0.076	0.077	1.014	1.001
Ethylene Glycol Ether Acetate													
Ethylene Glycol Tert-Butyl Ether													
Ethylene Glycol Diacetate	EGY	1.10	1		5.03	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Ethylene Glycol Dibutyl Ether	EGB												
Ethylene Glycol Ethyl Ether, SEE 2-ETHOXYETHANOL	EGF												
Ethylene Glycol Ethyl Ether Acetate, SEE 2-ETHOXYETHYL ACETATE	EGA												
Ethylene Glycol Isopropyl Ether	EGI												
Ethylene Glycol Methyl Butyl Ether													
Ethylene Glycol Methyl Ether	EME	1.10	1		4.80	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Ethylene Glycol Methyl Ether Acetate	EGT												
Ethylene Glycol Phenyl Ether	EPE	1.10	1		4.80	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixtEDX													
Ethylene-Propylene Copolymer (in liquid mixtures)													
Ethyl-3-Ethoxypropionate	EEP												
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EHA	0.82	1		4.41	0.17	16.200	0.010	0.990	0.076	0.079	1.036	1.003
2-Ethylhexanoic acid	EHO												
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHX	0.84	1	130.230	4.50	0.02	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID													
Ethyl Hexyl Phthalate (SEE ALSO DI 2-ETHYLHEXYL PHTHALATE)	EHE												
Ethyl Hexyl Tallate	EHT												
Ethyl Propionate	EPR	0.89	1		1.60	3.50	16.200	0.216	0.784	0.076	0.086	1.130	1.070
Ethyl Toluene	ETE	0.88	1		4.15	0.28	16.200	0.017	0.983	0.076	0.080	1.054	1.006
Fatty acid (saturated, C13 and above)													
Fatty acid Amides													
Formamide	FAM	1.13	1		1.55	0.10	16.200	0.006	0.994	0.076	0.076	1.003	1.002
Furfuryl Alcohol	FAL	1.13	1		3.40	0.05	16.200	0.003	0.997	0.076	0.077	1.007	1.001
Gas oil, cracked	GOC												
GASOLINE BLENDING STOCKS: Alkylates	GAK	0.75	1		3.40	12.50	16.200	0.772	0.228	0.076	0.217	2.852	1.250
GASOLINE BLENDING STOCKS: Reformates	GRF	0.80	1		3.40	12.50	16.200	0.772	0.228	0.076	0.217	2.852	1.250
GASOLINES: Automotive (containing not over 4.23 grams lead per gaGAT	GAT	0.74	1		3.40	12.50	16.200	0.772	0.228	0.076	0.217	2.852	1.250
GASOLINES: Aviation (containing not over 4.86 grams lead per gallGAV	GAV	0.71	1		3.40	12.50	16.200	0.772	0.228	0.076	0.217	2.852	1.250
GASOLINES: Casinghead (natural)	GCS	0.67	1		3.40	12.50	16.200	0.772	0.228	0.076	0.217	2.852	1.250
GASOLINES: Polymer	GPL	0.75	1		3.40	12.50	16.200	0.772	0.228	0.076	0.217	2.852	1.250
GASOLINES: Straight run	GSR	0.75	1		3.40	12.50	16.200	0.772	0.228	0.076	0.217	2.852	1.250
Glycerine	GCR	1.26	1		3.17	0.00							
Glycerol, SEE GLYCERINE				92.095	3.18								
Glycerol Polyalkoxylate													
Glycerol Triacetate													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

C	LIQUID	USCG	MOLEC'R	SPECIF	SATUR'D	TOTAL	PARTIAL	PARTIAL	AIR	VAPOR-	VAPOR-	VAPOR-
H	SPECIF.	VAP	WEIGHT	GRAV OF	VAPOR	VAP-AIR	VOLUME	VOLUME	WEIGHT	AIR MIX	AIR	AIR
R	GRAVITY	COL.	OF	CARGO	PRESS	PRESS	OF VAP	OF AIR	DENSITY	WEIGHT	MIX	MIX
I		SYST	CARGO	VAPOR	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	GRAVITY	RATE
S		CAT.	MWc	SGv	Pv, 115	Pt, 115	Vv, 115	Va, 115	Wa, 115	Wv-a, 115	Wv-a, 115/	VGR
	(1)	(13)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Wa, 115	(9)
					(15)				(LBm/	(LBm/		
					(PSIA)	(PSIA)			FT^3)	FT^3)		

Glycidyl Ester of Tertiary Carboxylic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACID												
Glycidyl Ester of Tridecyl Acetic acid GLT												
Glycidyl Ester of Versatic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACID												
Glycol Diacetate, SEE ETHYLENE GLYCOL DIACETATE												
Glycols, Resins and Solvents mixtures												
Gylcol Triacetate, SEE GLYCERYL TRIACETATE												
Glyoxal solution (40% or less)												
Grease												
Heptadecane												
Heptane (all isomers) (METHYHEXANE)	HMX	0.68	1	100.120	3.45	2.50	16.200	0.154	0.846	0.076	0.105	1.378 1.050
HEPTANE (N-)	HPT	0.68	1		3.45	2.50	16.200	0.154	0.846	0.076	0.105	1.378 1.050
Heptanoic acid	HEP	0.92	1		4.49	0.01	16.200	0.001	0.999	0.076	0.076	1.002 1.000
Heptanol (all isomers)	HTX	0.82	1		4.00	0.04	16.200	0.002	0.998	0.076	0.077	1.007 1.001
HEPTANOL	HTN	0.82	1		4.00	0.04	16.200	0.002	0.998	0.076	0.077	1.007 1.001
Heptene (all isomers)	HPX	0.70	2		3.40	2.90	16.200	0.179	0.821	0.076	0.109	1.430 1.058
HEPTENE (1-)	HTE	0.70	1		3.40	2.80	16.200	0.173	0.827	0.076	0.108	1.415 1.056
Heptyl Acetate	HPE	0.88	1		5.50	0.10	16.200	0.006	0.994	0.076	0.078	1.028 1.002
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR												
Hexaethylene Glycol												
Hexamethylene Glycol												
Hexamethylenetetramine solutions												
Hexane (all isomers)	HXS	0.66	1	86.110	3.00	7.00	16.200	0.432	0.568	0.076	0.142	1.864 1.140
HEXANE	HXA	0.66	1		3.00	7.00	16.200	0.432	0.568	0.076	0.142	1.864 1.140
Hexanoic acid	HXO	0.93	1		4.00	0.01	16.200	0.001	0.999	0.076	0.076	1.002 1.000
Hexanol	HXN	0.82	1		3.52	1.00	16.200	0.062	0.938	0.076	0.088	1.156 1.020
Hexene (all isomers)	HEX	0.67	2	84.090	2.90	8.00	16.200	0.494	0.506	0.076	0.148	1.938 1.160
HEXENE (1-)	HXE	0.67	1		2.90	8.20	16.200	0.506	0.494	0.076	0.149	1.962 1.164
HEXENE (2-)	HXT	0.67	1		2.90	8.20	16.200	0.506	0.494	0.076	0.149	1.962 1.164
Hexyl Acetate	HAE											
Hexylene Glycol	HXG	0.92	4		1.10	0.01	16.200	0.001	0.999	0.076	0.076	1.000 1.000
Hog Grease, SEE LARD												
2-Hydroxy-4-(methylthio)butanoic acid												
HYDROCARBON 5-9 (MOVED TO SUB-O, NON TABLE 151, 6/24/95)	HPN											
Hydroxy terminated Polybutadiene, SEE POLYBUTADIENE, HYDROXYL TERMINATED/												
Isophorone	IPH	0.93	1		4.75	0.01	16.200	0.001	0.999	0.076	0.076	1.002 1.000
JET FUELS: JP-1 (Kerosene)	JPO	0.80	1		4.50	0.14	16.200	0.009	0.991	0.076	0.078	1.030 1.003
JET FUELS: JP-3	JPT	0.80	1		4.50	8.51	16.200	0.525	0.475	0.076	0.216	2.839 1.170
JET FUELS: JP-4	JPF	0.81	1		4.00	3.40	16.200	0.210	0.790	0.076	0.124	1.630 1.068
JET FUELS: JP-5 (Kerosene, heavy)	JPV	0.82	1		4.00	0.10	16.200	0.006	0.994	0.076	0.078	1.019 1.002
JET FUELS: JP-8	JPE		1									
Kerosene	KRS	0.81	1		4.50	0.15	16.200	0.009	0.991	0.076	0.079	1.032 1.003
Lactic acid												

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO Mwc	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115 (9)	VAPOR- AIR MIX GROWTH RATE VGR (9)
Lard													
Latex, liquid synthetic, including: Styrene-Butadien rubber	LLS												
Latex, liquid synthetic, including: Carboxylated Styrene-Butadien Copolymer													
Magnesium Nonyl Phenol Sulfide													
Magnesium Sulfonate	MSE												
Maleic Anhydride Copolymer													
2-Mercaptobenzothiazol (in liquid mixtures)													
Methane	MTH			16.043	0.55								
3-Methoxy-1-Butanol													
3-Methoxybutyl Acetate	MOA												
1-Methoxy-2-Propyl Acetate	MPO												
Methoxy Trigylcol, SEE TRIETHYLENE GLYCOL METHYL ETHER	MTG												
Methyl Acetate	MTT	0.92	1	74.080	2.60	6.10	16.200	0.377	0.623	0.076	0.122	1.603	1.122
Methyl Acetoacetate	MAE												
Methyl alcohol (SEE METHANOL)	MAL	0.79	1		1.10	6.63	16.200	0.409	0.591	0.076	0.079	1.041	1.133
Methyl Amyl Acetate	MAC	0.86	1		4.97	0.33	16.200	0.020	0.980	0.076	0.082	1.081	1.007
Methyl Amyl alcohol	MAA	0.81	1		3.52	0.43	16.200	0.027	0.973	0.076	0.081	1.067	1.009
Methyl Amyl Ketone	MAK			114.188	3.94								
Methyl Butanol, SEE THE AMYL ALCOHOLS													
Methyl Butenol	MBL												
Methyl n-Butyl Ketone	MBK	0.81	1	100.160	3.50	0.97	16.200	0.060	0.940	0.076	0.088	1.150	1.019
Methyl Butynol	MBY												
Methyl Butyrate	MBU	0.90	1	102.134	3.53	1.26	16.200	0.078	0.922	0.076	0.091	1.197	1.025
Methyl Ethyl Ketone	MEK	0.80	1	72.107	2.50	4.50	16.200	0.278	0.722	0.076	0.108	1.417	1.090
Methyl Formal (DIMETHYL FORMAL)	MTF	0.86	1		2.60	15.42	16.200	0.952	0.048	0.076	0.192	2.523	1.308
Methyl Heptyl Ketone	MHK	0.83	1		4.90	0.06	16.200	0.004	0.996	0.076	0.077	1.014	1.001
Methyl Isobutyl Carbinol, SEE METHYL AMYL ALCOHOL	MIC	0.84											
Methyl Isobutyl Ketone	MIK	0.80	1	100.160	3.45	1.15	16.200	0.071	0.929	0.076	0.089	1.174	1.023
3-Methyl-3-Methoxybutanol													
3-Methyl-3-Methoxybutyl Acetate													
1-Methyl Naphthalene	MNA	1.02	1		4.91	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Methyl Pentene													
2-METHYL-1-PENTENE	MPN	0.69	1		2.90	6.30	16.200	0.389	0.611	0.076	0.132	1.739	1.126
5-METHYL-1-PENTENE	MTN	0.67	1		2.90	8.49	16.200	0.524	0.476	0.076	0.152	1.996	1.170
N-Methyl-2-Pyrrolidone	MPY												
Methyl Tert-Butyl Ether (MTBE)	MBE	0.74	1		3.10	0.04	16.200	0.002	0.998	0.076	0.077	1.005	1.001
Metolachlor	MCO												
Mineral spirits	MNS	0.75	1		4.30	0.20	16.200	0.012	0.988	0.076	0.079	1.041	1.004
Myrcene	MRE	0.80	1		4.70	0.17	16.200	0.010	0.990	0.076	0.079	1.039	1.003
NAPHTHA: Aromatic (Having less than 10% Benzene)		.6 -.85	1										
NAPHTHA: Cracking fraction		.6 -.85	1										
NAPHTHA: Heavy		.6 -.85	1										

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL.	MOLEC'R WEIGHT OF CARGO Mwc	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (Lbm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (Lbm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
NAPHTHA: Paraffinic		.6 -.85	1										
NAPHTHA: Petroleum	PTN	.6 -.85	1										
NAPHTHA: Solvent	NSV	0.87	1		3.50	0.20	16.200	0.012	0.988	0.076	0.078	1.031	1.004
NAPHTHA: Stoddard solvent	NSS	0.78	1		4.30	0.20	16.200	0.012	0.988	0.076	0.079	1.041	1.004
NAPHTHA: Varnish makers' and painters' (75%)	NVM	0.77	1		4.30	0.19	16.200	0.012	0.988	0.076	0.079	1.039	1.004
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt sol	NFS												
Naphthenic acid	NTI	1.02											
Nonane (all isomers)	NAX	0.72	1	128.259	4.40	0.27	16.200	0.017	0.983	0.076	0.080	1.057	1.005
NONANE	NAN	0.72	1		4.40	0.27	16.200	0.017	0.983	0.076	0.080	1.057	1.005
Nonanoic acid (all isomers)	NNA												
Nonanoic, Tridecanoic acid mixture													
Nonene	NON	0.73	2	126.140	4.30	0.35	16.200	0.022	0.978	0.076	0.082	1.071	1.007
Nonyl alcohol (all isomers)	NNS	0.94	1	144.160	5.00	0.10	16.200	0.006	0.994	0.076	0.078	1.025	1.002
NONYL ALCOHOL	NNN	0.94	1		5.00	0.10	16.200	0.006	0.994	0.076	0.078	1.025	1.002
NONYL ALCOHOL (iso-)	NNI	0.94	1		5.00	0.10	16.200	0.006	0.994	0.076	0.078	1.025	1.002
Nonyl Methacrylate Monomer													
Nonyl Phenol	NNP	0.95	1		7.60	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Nonyl Phenol Poly(4-12)ethoxylates	NPE												
Nonyl Phenol Sulfide (90% or less)													
Noxious liquid, N.O.S. (17) ("Trade name," contains "principal components"), Category D (if f													
Non-Noxious liquid, N.O.S. (18) ("Trade name," contains principal components"), Appendix III													
Octadecene													
Octadecenoamide solution (Oleamide)	ODD												
Octane (all isomers)	OAX	0.70	1		3.90	0.79	16.200	0.049	0.951	0.076	0.087	1.141	1.016
OCTANE	OAN	0.70			3.90	0.79	16.200	0.049	0.951	0.076	0.087	1.141	1.016
Octanoic acid (all isomers)	OAA	0.91	1		5.00	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Octanol (all isomers)	OCX	0.83	1		4.48	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
OCTANOL	OTA	0.83	1		4.48	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Octene (all isomers)	OTX	0.72	2	122.200	3.90	0.90	16.200	0.056	0.944	0.076	0.088	1.161	1.018
OCTENE (1-)	OTE	0.72	1		3.86	1.00	16.200	0.062	0.938	0.076	0.090	1.177	1.020
Octyl Acetate													
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	OCX	0.83	1		4.48	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
OCTYL ALCOHOL	IOA	0.83	1		4.48	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Octyl Aldehydes	OAL												
Octyl Decyl Adipate	ODA												
Octyl Epoxytallate	OET												
Octyl Phthalate. SEE DI-(2-ETHYLHEXYL) PHTHALATE													
OIL, EDIBLE: Babassu	OB												
OIL, EDIBLE: Beechnut													
OIL, EDIBLE: Castor	OCA												
OIL, EDIBLE: Cocoa butter													
OIL, EDIBLE: Coconut	OCC	0.95											

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

C	LIQUID	USCG	MOLEC'R	SPECIF	SATUR'D	TOTAL	PARTIAL	PARTIAL	AIR	VAPOR-	VAPOR-	VAPOR-
H	SPECIF.	VAP	WEIGHT	GRAV OF	VAPOR	VAP-AIR	VOLUME	VOLUME	WEIGHT	AIR MIX	AIR	AIR
R	GRAVITY	COL.	OF	CARGO	PRESS	PRESS	OF VAP	OF AIR	DENSITY	WEIGHT	MIX	MIX
I		SYST	CARGO	VAPOR	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	SPECIFIC	GROWTH
S		CAT.	MWc	SGv	Pv, 115	Pt, 115	Vv, 115	Va, 115	Wa, 115	Wv-a, 115	Wv-a, 115/	VGR
	(1)	(13)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Wa, 115	(9)
					(15)				(LBm/	(LBm/		
					(PSIA)	(PSIA)			FT^3)	FT^3)		

OIL, EDIBLE: Cod liver												
OIL, EDIBLE: Corn	OCO	0.96										
OIL, EDIBLE: Cottonseed	OCS											
OIL, EDIBLE: Fish, N.O.S.	OFS	0.96										
OIL, EDIBLE: Grapeseed												
OIL, EDIBLE: Groundnut												
OIL, EDIBLE: Hazelnut												
OIL, EDIBLE: Lard	OLD											
OIL, EDIBLE: Maize												
OIL, EDIBLE: Mustard seed												
OIL, EDIBLE: Nutmeg Butter												
OIL, EDIBLE: Olive	OOL											
OIL, EDIBLE: Palm	OPM											
OIL, EDIBLE: Palm kernel	OPO											
OIL, EDIBLE: Peanut	OPN											
OIL, EDIBLE: Poppy												
OIL, EDIBLE: Raisin seed												
OIL, EDIBLE: Rice bran	ORP											
OIL, EDIBLE: Safflower	OSF											
OIL, EDIBLE: Salad												
OIL, EDIBLE: Sesame												
OIL, EDIBLE: Soya bean	OSB	0.96										
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED		0.95										
OIL, EDIBLE: Sunflower seed	OSN											
OIL, EDIBLE: Tucum	OTC											
OIL, EDIBLE: Vegetable, N.O.S.	OVG	0.96										
OIL, EDIBLE: Walnut												
OIL, FUEL: No. 1 (Kerosene)	OON											
OIL, FUEL: No. 1-D	OOD											
OIL, FUEL: No. 2	OTW	0.88	1	8.00	0.56	16.200	0.035	0.965	0.076	0.095	1.242	1.011
OIL, FUEL: No. 2-D	OTD											
OIL, FUEL: No. 4	OFR	0.90	1	3.40	0.15	16.200	0.009	0.991	0.076	0.078	1.022	1.003
OIL, FUEL: No. 5	OFV	0.94	1	3.40	0.15	16.200	0.009	0.991	0.076	0.078	1.022	1.003
OIL, FUEL: No. 6	OSX	0.95	1	3.40	0.15	16.200	0.009	0.991	0.076	0.078	1.022	1.003
OIL, MISC: Absorption	OAS											
OIL, MISC: Aliphatic												
OIL, MISC: Animal, N.O.S.												
OIL, MISC: Aromatic												
OIL, MISC: Aviation F2300												
OIL, MISC: Clarified	OCF											
OIL, MISC: Coal												
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHYL ESTER												

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO Mwc	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
OIL, MISC: Coconut oil, fatty acid													
OIL, MISC: Coconut oil, fatty acid Methyl Ester													
OIL, MISC: Coconut oil, Methyl Ester, SEE COCONUT OIL FATTY ACID METHYL ESTER													
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACIDCFY													
OIL, MISC: Croton													
OIL, MISC: Crude	OIL	0.95	1		3.40	0.15	16.200	0.009	0.991	0.076	0.078	1.022	1.250
OIL, MISC: Diesel	ODS	0.90	1		3.40	0.69	16.200	0.043	0.957	0.076	0.084	1.102	1.014
OIL, MISC: Gas, low pour													
OIL, MISC: Gas, low sulfur													
OIL, MISC: Heartcut distillate													
OIL, MISC: Lanolin													
OIL, MISC: Linseed													
OIL, MISC: Lubricating	OLB	0.90	1		1.00	0.15	16.200	0.009	0.991	0.076	0.076	1.000	1.003
OIL, MISC: Mineral													
OIL, MISC: Mineral seal	OMS												
OIL, MISC: Motor	OMT												
OIL, MISC: Neatsfoot	ONF												
OIL, MISC: Oiticica	OOI												
OIL, MISC: Palm oil, fatty acid Methyl Ester	OPE	0.95											
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID MOPE	MOPE												
OIL, MISC: Penetrating	OPT												
OIL, MISC: Perilla													
OIL, MISC: Pilchard													
OIL, MISC: Pine	OPI												
OIL, MISC: Range	ORG												
OIL, MISC: Residual													
OIL, MISC: Resin	ORS	1.02	1		1.00	0.15	16.200	0.009	0.991	0.076	0.076	1.000	1.003
OIL, MISC: Resinous petroleum													
OIL, MISC: Road	ORD												
OIL, MISC: Rosin	ORN												
OIL, MISC: Seal													
OIL, MISC: Soapstock	OIS												
OIL, MISC: Soya bean (epoxidized)													
OIL, MISC: Sperm	OSP												
OIL, MISC: Spindle	OSD												
OIL, MISC: Spray	OSY												
OIL, MISC: Tall	OTL												
OIL, MISC: Tall, fatty acid	TOF												
OIL, MISC: Tanner's	OTN												
OIL, MISC: Transformer	OTF												
OIL, MISC: Tung	OTG												
OIL, MISC: Turbine	OTB	0.87	1		5.40	0.30	16.200	0.019	0.981	0.076	0.082	1.082	1.006

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MwC	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
CARGO	(1)	(13)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		(9)
OIL, MISC: Whale												
OIL, MISC: White (mineral)												
OIL, MISC: Wood												
alpha-Olefins (C13 - C18)												
Olefins (C13 and above, all isomers)												
Oleic acid												
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)												
Organic Amine 70, SEE AMINOETHYLDIETHANOLAMINE, AMINOETHYL-ETHANOLAMINE SOLUTION												
Palm Stearin												
n-Paraffins (C10 - C20)												
Pentadecanol, SEE SEE ALCOHOLS (C13 AND ABOVE)												
Pentaethylene Glycol												
Pentaethylenehexamine												
Pentane (all isomers)												
PENTANE (iso-)												
PENTANE (n-)												
Pentanoic acid												
Pentene (all isomers)												
PENTENE (1-)												
Petrolatum												
1-Phenyl-1-Xylyl Ethane												
Phosphosulfurized Bicyclic Terpene												
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES												
Pinene												
Polyalkenyl Succinic Anhydride Amine												
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtur												
Polyalkylene Oxide Polyol												
Polamine, Amide mixture												
Polybutadiene, Hydroxyl terminated												
Polybutene												
Polydimethylsiloxane												
Polyethylene Glycol												
Polyethylene Glycol Dimethyl Ether												
Polyglycerol												
Polyisobutylene, SEE POLYBUTENE												
Polymerized Esters												
Poly(20)oxyethylene Sorbitan Monooleate												
Polypropylene												
Polypropylene Glycol												
Polypropylene Glycol Methyl Ether												
Polysiloxane												
Polystyrene Diakyl Maleate												

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG VAP COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MWC	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv, 115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt, 115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv, 115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va, 115 (6)	AIR WEIGHT DENSITY @ 115 F Wa, 115 (7) (LBm/ FT ³)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a, 115 (8) (LBm/ FT ³)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a, 115/ Wa, 115	VAPOR- AIR MIX GROWTH RATE VGR (9)
Potassium Oleate	POE												
Propane	PRP	1.04		44.094	1.52								
n-Propoxypropanol	PXP												
Propyl Acetate (iso-)	IAC	0.89	1		3.52	1.80	16.200	0.111	0.889	0.076	0.097	1.280	1.036
Propyl Acetate (n-)	PAT	0.00	1		3.52	1.85	16.200	0.114	0.886	0.076	0.098	1.288	1.037
Propyl alcohol (iso-)	IPA	0.79	1		2.07	3.00	16.200	0.185	0.815	0.076	0.091	1.198	1.060
Propyl alcohol (n-)	PAL	0.80	1		2.07	1.20	16.200	0.074	0.926	0.076	0.082	1.079	1.024
Propylbenzene (n-)	PBZ	0.86	1	60.060	4.14	0.20	16.200	0.012	0.988	0.076	0.079	1.039	1.004
iso-Propylcyclohexane	IPX	0.80	1	126.243	4.35	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Propylene	PPL	1.04		42.081	1.45								
Propylene-Butylene Copolymer	PBP												
Propylene Dimer	PDR												
Propylene Glycol (1,2-PROPANDIOL)	PPG	1.04	1	76.060	2.62	0.01	16.200	0.001	0.999	0.076	0.076	1.001	1.000
Propylene Glycol Monoalkyl Ether	PGE												
Propylene Glycol Ethyl Ether	PGY												
Propylene Glycol Methyl Ether	PME	0.92	1		3.11	0.70	16.200	0.043	0.957	0.076	0.083	1.091	1.014
Propylene Polymer (in liquid mixtures)													
Propylene Tetramer	PTT	0.29		156.310	1.00	0.02	16.200	0.001	0.999	0.076	0.076	1.000	1.000
Propylene Trimer	PTR												
Pseudocumene, SEE TRIMETHYLBENZENES													
Rum													
Sodium Acetate, Glycol, water solutions													
Sodium Acetate solution	SAN												
Sodium Benzoate solution	SBN												
Sodium Sulfonate													
Stearic acid	SRA												
Stearyl alcohol (Octadecanol)													
Sulfolane	SFL	1.26	1		4.14	0.01	16.200	0.001	0.999	0.076	0.076	1.002	1.000
Tallow	TLO												
Tallow alcohol, SEE ALCOHOLS (C13 AND ABOVE)													
Tallow fatty acid	TFD												
Tallow Alkyl Nitrile													
Tetradecanol	TTN	0.82	1		7.39	0.00							
1-Tetradecene, SEE THE OLEFIN OR ALPHA-OLEFIN ENTRIES	TTD	0.77	1		6.77	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Tetradecylbenzene	TBD												
Tetraethylene Glycol	TTG	1.12	1		6.70	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Tetrahydronaphthalene	THN	0.97	1		4.56	0.04	16.200	0.002	0.998	0.076	0.077	1.009	1.001
Tetrapropylbenzene, SEE ALKYL(C9-C17) BENZENES													
Toluene	TOL	0.87	1	92.141	3.14	1.50	16.200	0.093	0.907	0.076	0.091	1.198	1.030
Triarylphosphate													
Tributyl Phosphate	TBP												
Tricresyl Phosphate (less than 1% of the ortho isomer)	TCP	1.16	1		12.69	0.01	16.200	0.001	0.999	0.076	0.077	1.007	1.000

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C H R I S	LIQUID SPECIF. GRAVITY	USCG COL. SYST CAT.	MOLEC'R WEIGHT OF CARGO MWc	SPECIF GRAV OF CARGO VAPOR SGv	SATUR'D VAPOR PRESS @ 115 F Pv,115 (3) (15) (PSIA)	TOTAL VAP-AIR PRESS @ 115 F Pt,115 (4) (PSIA)	PARTIAL VOLUME OF VAP @ 115 F Vv,115 (5)	PARTIAL VOLUME OF AIR @ 115 F Va,115 (6)	AIR WEIGHT DENSITY @ 115 F Wa,115 (7) (LBm/ FT^3)	VAPOR- AIR MIX WEIGHT DENSITY @ 115 F Wv-a,115 (8) (LBm/ FT^3)	VAPOR- AIR MIX SPECIFIC GRAVITY Wv-a,115/ Wa,115	VAPOR- AIR MIX GROWTH RATE VGR (9)
Tridecane	TRD	0.76	1		6.40	0.02	16.200	0.001	0.999	0.076	0.077	1.007	1.000
Tridecanoic acid	TDN	0.85	1		6.91	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)	TDC	0.77	1		6.29	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
1-Tridecene	TRB												
Tridecylbenzene	TEB	0.86	1		5.60	0.02	16.200	0.001	0.999	0.076	0.077	1.006	1.000
Triethylbenzene	TEG	1.12	1		5.17	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Triethylene Glycol													
Triethylene Glycol Butyl Ether													
Triethylene Glycol Butyl Ether mixture		1.04											
Triethylene Glycol di-(2-ethylbutyrate)	TGD												
Triethylene Glycol Ether mixture													
Triethylene Glycol Ethyl Ether	TGE												
Triethylene Glycol Methyl Ether													
Triethyl Phosphate	TPS	1.07			6.28	0.02	16.200	0.001	0.999	0.076	0.077	1.007	1.000
Triisooctyl Trimellitate	TIP	1.02	8	191.270	6.60								
Triisopropanolamine	TRE	0.89	1		4.20	0.14	16.200	0.009	0.991	0.076	0.078	1.028	1.003
Trimethylbenzenes (all isomers)	TMB	0.89	1		4.14	0.14	16.200	0.009	0.991	0.076	0.078	1.027	1.003
TRIMETHYL BENZENE (1,2,5-)	TMD	0.89	1		4.14	0.14	16.200	0.009	0.991	0.076	0.078	1.027	1.003
TRIMETHYL BENZENE (1,2,3-)	TME	0.89	1		4.14	0.14	16.200	0.009	0.991	0.076	0.078	1.027	1.003
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TPR												
Trimethylol Propane Polyethoxylate													
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate													
2,2,4-Trimethyl-3-pentanol-1-isobutyrate	TMP												
Tripropylene, SEE PROPYLENE TRIMER													
Tripropylene Glycol	TGC												
Tripropylene Glycol Methyl Ether	TGM												
Trixylenyl Phosphate	TRP	1.16	1		14.20	0.00							
Turpentine	TPT												
Turpentine substitute (White spirit), SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)													
Undecanol													
Undecene (1-)	UDC	0.75	1		5.32	0.05	16.200	0.003	0.997	0.076	0.077	1.013	1.001
Undecyl alcohol	UND	0.84	1		5.94	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Undecylbenzene	UDB												
Vinyl Acetate-fumurate Copolymer													
Waxes:	WAX												
WAXES: Candelilla													
WAXES: Carnauba	WAX, WCA												
WAXES: Paraffin	WAX, WPF												
WAXES: Petroleum													
White spirit, SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)													
White spirit (low (15 - 20%) aromatic)	WSL												
Wine, SEE ALCOHOLIC BEVERAGES, N.O.S.													

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C	LIQUID	USCG	MOLEC'R	SPECIF	SATUR'D	TOTAL	PARTIAL	PARTIAL	AIR	VAPOR-	VAPOR-	VAPOR-
	H	SPECIF.	VAP	WEIGHT	GRAV OF	VAPOR	VAP-AIR	VOLUME	VOLUME	WEIGHT	AIR MIX	AIR	AIR
	R	GRAVITY	COL.	OF	CARGO	PRESS	PRESS	OF VAP	OF AIR	DENSITY	DENSITY	MIX	MIX
	I		SYST	CARGO	VAPOR	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	SPECIFIC	GROWTH
	S		CAT.	MWc	SGv	Pv,115	Pt,115	Vv,115	Va,115	Wa,115	Wv-a,115	Wv-a,115/	VGR
		(1)	(13)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Wa,115	(9)
						(15)	(PSIA)			(LBm/ FT^3)	(LBm/ FT^3)		
						(PSIA)	(PSIA)						
Wool grease													
Xylenes (ortho-, meta-, para-)	XLX	0.89	1	106.168	3.66	0.51	16.200	0.031	0.969	0.076	0.083	1.084	1.010
XYLENE (M-)	XLX	0.87	1		3.66	0.51	16.200	0.031	0.969	0.076	0.083	1.084	1.010
XYLENE (O-)	XLO	0.89	1		3.66	0.40	16.200	0.025	0.975	0.076	0.081	1.066	1.008
XYLENE (P-)	XLP	0.86	1		3.66	0.51	16.200	0.031	0.969	0.076	0.083	1.084	1.010
XYLENOL	XYL	1.01	1		3.66	0.10	16.200	0.006	0.994	0.076	0.077	1.016	1.002
Zinc Dialkyldithiophosphate													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE II: VAPOR-AIR MIX DENSITY,
SPECIFIC GRAVITY, & VAPOR GROWTH RATE

CARGO	C	LIQUID	USCG	MOLEC'R	SPECIF	SATUR'D	TOTAL	PARTIAL	PARTIAL	AIR	VAPOR-	VAPOR-	VAPOR-
	H	SPECIF.	VAP	WEIGHT	GRAV OF	VAPOR	VAP-AIR	VOLUME	VOLUME	WEIGHT	AIR MIX	AIR	AIR
	R	GRAVITY	COL.	OF	CARGO	PRESS	PRESS	OF VAP	OF AIR	DENSITY	WEIGHT	MIX	MIX
	I		SYST	CARGO	VAPOR	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	@ 115 F	SPECIFIC	GROWTH
S		CAT.	MWc	SGv	Pv, 115	Pt, 115	Vv, 115	Va, 115	Wa, 115	Wv-a, 115	Wv-a, 115/	VGR	
	(1)	(13)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Wa, 115	(9)	
					(15)	(PSIA)			(LBm/	(LBm/			
									FT^3)	FT^3)			
----- *** ***** -----													
46 CFR SUBCHAPTER D, BUT NOT TABLE 30.25-1													

AROMATIC RESIN OIL 60	ARS	1.02	1		1.00	0.15	16.200	0.009	0.991	0.076	0.076	1.000	1.003
AROMATIC RESIN OIL 80	ARS	1.02	1		1.00	0.15	16.200	0.009	0.991	0.076	0.076	1.000	1.003
AROMATIC RESIN OILS			8										

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PRESS
DROP
THRU
PIP'G PRESS
REMOTE @
TANK REMOTE
TO P/V TANK IS
Wv-a,11 PV + Ptk <
* Htot Ploss MDWP
Ploss Ptk

(PSI) (PSI)

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CARGO	C H I S	MAX LIQUID TRANSF RATE (MLTR) Q1 (10) (BBL/ HR)	VAPOR- AIR MIX FLOW RATE Qv-a (11) (BBL/ HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/ HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU	PIP'G	PRESS	IS	
						FM REMOTE TK	TO PV	FM REMOTE TK	TO PV	REMOTE	@	REMOTE		
						TOTAL LOSS HtotI (FT)	TOTAL LOSS HtotII (FT)	GRAND TOTAL LOSS Htot= I+II (FT)	TANK TO P/V Wv-a,11 * Htot Ploss (PSI)	TANK PVTANK + Ptk (PSI)				
46 CFR SUBCHAPT O, TABLE 151														
ACETIC ACID	AAC	5,000	5092	5244	29446	1.635	*****	83.9	*****	0.0	83.9	0.047	1.68	OK
ACETIC ANHYDRIDE	ACA	5,000	5040	5193	29158	1.635	*****	82.3	*****	0.0	82.3	0.046	1.68	OK
ACETONITRILE	ATN	5,000	5003	5005	28101	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
ACRYLIC ACID	ACR	5,000	5040	5131	28810	1.635	*****	82.4	*****	0.0	82.4	0.045	1.68	OK
ACRYLONITRILE	ACN	5,000	5500	6142	34483	1.665	*****	96.9	*****	0.0	96.9	0.064	1.73	OK
ADIPONITRILE	ADN	5,000	5001	5005	28103	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
ALUMINUM SULFATE SOLUTION	ASX													
AMINOETHYLETHANOLAMINE	AEE	5,000	5001	5005	28101	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
AMMONIUM BISULFITE SOLN (70% OR LESS)	ABX													
AMMONIUM HYDROXIDE (28% OR LESS NH3)	AMH													
ANTHRACENE OIL (COAL TAR FRACTION)	AHO													
BENZENE	BNZ	5,000	6250	7655	42978	1.725	*****	123.6	*****	0.0	123.6	0.098	1.82	OK
BENZENE HYDROCARBON MIXTURES (W/ACETYLENES) (W/10% BENZENE OR MORE)	BMBHA	5,000	5730	7711	43296	1.725	*****	103.4	*****	0.0	103.4	0.099	1.82	OK
BENZENE HYDROCARBON MIXTURES (W/10% BENZENE OR MORE)	BHB	5,000	5730	7711	43296	1.725	*****	103.4	*****	0.0	103.4	0.099	1.82	OK
BENZENE, TOLUENE, XYLENE MIXTURES (HAVING 10% BENZENE OR MORE)	BTX	5,000	5730	7711	43296	1.725	*****	103.4	*****	0.0	103.4	0.099	1.82	OK
iso-BUTYL ACRYLATE	BAI	5,000	5060	5371	30156	1.665	*****	82.7	*****	0.0	82.7	0.049	1.71	OK
n-BUTYL ACRYLATE	BTC	5,000	5040	5247	29462	1.635	*****	82.2	*****	0.0	82.2	0.047	1.68	OK
BUTYL ACRYLATE (SEE ISO- & N- BUTYL ACRYLATE)	BAR	5,000	5060	5371	30156	1.665	*****	82.7	*****	0.0	82.7	0.049	1.71	OK
BUTYL METHACRYLATE	BMH	5,000	5029	5202	29205	1.635	*****	81.9	*****	0.0	81.9	0.046	1.68	OK
iso-BUTYRALDEHYDE	BAD	5,000	5780	7585	42589	1.725	*****	105.5	*****	0.0	105.5	0.096	1.82	OK
n-BUTYRALDEHYDE	BTR	5,000	5780	7585	42589	1.725	*****	105.5	*****	0.0	105.5	0.096	1.82	OK
BUTYRALDEHYDES (CRUDE)	BFA	5,000	5800	7631	42843	1.725	*****	106.2	*****	0.0	106.2	0.097	1.82	OK
BUTYRALDEHYDE (ISO-, N-)	BAE	5,000	5800	7631	42843	1.725	*****	106.2	*****	0.0	106.2	0.097	1.82	OK
CAMPHOR OIL (LIGHT)	CPO													
CARBON TETRACHLORIDE	CBT													
CAUSTIC POTASH SOLUTION	CPS													
CAUSTIC SODA SOLUTION	CSS													
CHLOROBENZENE	CRB	5,000	5080	5429	30483	1.665	*****	83.4	*****	0.0	83.4	0.050	1.72	OK
CHLOROFORM	CRF													
CHLOROSULFONIC ACID	CSA													
COAL TAR NAPHTHA SOLVENT	NCT	5,000	5020	5102	28645	1.635	*****	81.8	*****	0.0	81.8	0.045	1.68	OK
CREOSOTE (COAL TAR)	CCT	5,000	5001	5005	28103	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
CREOSOTE (WOOD)	CWD	5,000	5001	5005	28103	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
CRESOLS (ALL ISOMERS)	CRS	5,000	5006	5031	28248	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
CRESOLS WITH LESS THAN 5% PHENOL (SEE CRESOLS (ALL ISOMERS)	CRS													
CRESOLS WITH 5% OR MORE PHENOL (SEE PHENOL)	CFP	5,000	5005	5026	28219	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
CRESYLATE SPENT CAUSTIC	CSC													
CRESYLIC ACID, SODIUM SALT SOLUTION, SEE CRESYLATE SPENT CAUSTIC	CAX													
CROTONALDEHYDE	CTA	5,000	5200	5635	31636	1.665	*****	87.4	*****	0.0	87.4	0.054	1.72	OK

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C	MAX VAPOR-					PIPE SECT I: LOSS		PIPE SECT II: LOSS		GRAND TOTAL LOSS HtotI (FT)	PRESS		
		LIQUID TRANSF RATE (MLTR) Q1 (10) (BBL/ HR)	MIX FLOW RATE Qv-a (11) (BBL/ HR)	REQUIRED EQUIVALENT Qa (12) (BBL/ HR)	PRESS ACROSS PV VALVE PV (PSI)	FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PRESS THRU PIP'G REMOTE TANK Wv-a,11 * Htot Ploss (PSI)	PRESS @ REMOTE TANK PV + Ploss Ptk (PSI)	IS Ptk < MDWP
CYCLOHEXANONE	CCH	5,000	5002	5009	28126	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
CYCLOHEXYLAMINE	CHA	5,000	5062	5291	29709	1.635	*****	82.9	*****	0.0	82.9	0.048	1.68	OK
DECYL ACRYLATE (iso-, n-)	DAT	5,000	5001	5011	28134	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
DICHLOROBENZENE (ALL ISOMERS)	DBX	5,000	5010	5073	28481	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
1,1-DICHLOROETHANE	DCH	5,000	5990	9419	52886	1.785	*****	111.6	*****	0.0	111.6	0.146	1.93	OK
2,2-DICHLOROETHYL ETHER	DEE	5,000	5004	5028	28231	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
DICHLOROMETHANE (ALSO KNOWN AS METHYLENE CHLORIDE)	DCM													
2,4-DICHLOROPHENOXYACETIC ACID DIETHANOLAMINE SALT SOLUTION	DDE													
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION	DAD													
2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	NDTI													
1,1-,1,2- OR 1,3- DICHLOROPROPANE	DPX	5,000	5630	8213	46110	1.755	*****	99.3	*****	0.0	99.3	0.112	1.87	OK
1,3-DICHLOROPROPENE	DPU	5,000	5550	7778	43673	1.725	*****	96.8	*****	0.0	96.8	0.101	1.83	OK
DICHLOROPROPENE, DICHLOROPROPANE MIXTURES	DMX	5,000	5630	8213	46110	1.755	*****	99.3	*****	0.0	99.3	0.112	1.87	OK
2,2-DICHLOROPROPIONIC ACID	DCN													
DIETHANOLAMINE	DEA	5,000	5001	5005	28102	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
DIETHYLAMINE	DEN	5,000	5100	5331	29931	1.635	*****	84.1	*****	0.0	84.1	0.049	1.68	OK
DIETHYLENETRIAMINE	DET	5,000	5004	5019	28182	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
DIETHYL ETHER, SEE ETHYL ETHER	DEH													
DIISOBUTYLAMINE	DBU	5,000	5046	5288	29691	1.635	*****	82.3	*****	0.0	82.3	0.048	1.68	OK
DIISOPROPANOLAMINE	DIP	5,000	5001	5007	28110	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
DIISOPROPYLAMINE	DIA	5,000	5370	6731	37791	1.695	*****	91.7	*****	0.0	91.7	0.076	1.77	OK
N,N-DIMETHYLACETAMIDE	DAC	5,000	5020	5082	28532	1.635	*****	81.8	*****	0.0	81.8	0.044	1.68	OK
DIMETHYLETHANOLAMINE	DMB	5,000	5050	5206	29229	1.635	*****	82.6	*****	0.0	82.6	0.046	1.68	OK
DIMETHYLFORMAMIDE	DMF	5,000	5030	5100	28634	1.635	*****	82.1	*****	0.0	82.1	0.045	1.68	OK
1,4-DIOXANE	DOX	5,000	5184	5751	32288	1.665	*****	86.4	*****	0.0	86.4	0.056	1.72	OK
DI-N-PROPYLAMINE	DNA	5,000	5150	5715	32088	1.665	*****	85.3	*****	0.0	85.3	0.056	1.72	OK
ETHANOLAMINE	MEA	5,000	5003	5008	28119	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
ETHYL ACRYLATE	EAC	5,000	5200	5949	33399	1.665	*****	86.6	*****	0.0	86.6	0.060	1.72	OK
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	5,000	6550	8117	45576	1.755	*****	135.4	*****	0.0	135.4	0.110	1.86	OK
N-ETHYLBUTYLAMINE	EBA	5,000	5120	5574	31296	1.665	*****	84.7	*****	0.0	84.7	0.053	1.72	OK
N-ETHYLCYCLOHEXYLAMINE	ECC	5,000	5050	5308	29805	1.635	*****	82.4	*****	0.0	82.4	0.048	1.68	OK
ETHYLENE CYANOHYDRIN	ETC	5,000	5001	5003	28092	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
ETHYLENEDIAMINE	EDA	5,000	5090	5243	29439	1.635	*****	83.9	*****	0.0	83.9	0.047	1.68	OK
ETHYLENE DIBROMIDE	EDB													
ETHYLENE DICHLORIDE	EDC	5,000	5400	6825	38322	1.695	*****	92.5	*****	0.0	92.5	0.078	1.77	OK
ETHYLENE GLYCOL PROPYL ETHER	EGP	5,000	5060	5404	30344	1.665	*****	82.7	*****	0.0	82.7	0.050	1.71	OK
2-ETHYLHEXYL ACRYLATE	EAI	5,000	5002	5019	28177	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
ETHYLIDENE NORBORNENE	ENB	5,000	5033	5190	29137	1.635	*****	82.0	*****	0.0	82.0	0.046	1.68	OK
ETHYL METHACRYLATE	ETM	5,000	5100	5544	31125	1.665	*****	84.0	*****	0.0	84.0	0.052	1.72	OK
2-ETHYL-3-PROPYLACROLEIN	EPA	5,000	5012	5074	28488	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
FERRIC CHLORIDE SOLUTIONS	FCS													
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	5,000	5015	5016	28162	1.635	*****	81.7	*****	0.0	81.7	0.043	1.68	OK

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STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

CARGO	C H R I S	MAX	VAPOR-					PIPE SECT I: LOSS	PIPE SECT II: LOSS	THRU				
		LIQUID	AIR					FM REMOTE	TK TO PV	FM REMOTE	TK TO PV	PIP'G	PRESS	
		TRANSF	MIX	REQUIRED	AIR							REMOTE	@	
		RATE	FLOW	EQUIVALENT								TANK	REMOTE	
		(MLTR)	RATE									TO P/V	TANK	
	Q1	Qv-a	Qa							GRAND	Wv-a, 11	PV +	Ptk <	
	(10)	(11)	(12)							TOTAL	* Htot	Ploss	MDWP	
	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)						LOSS	Htot=	Ploss	Ptk	
					(PSI)						I+II			
											(FT)	(PSI)	(PSI)	
FORMIC ACID	***													
FURFURAL	FMA	5,000	5210	5409	30369	1.665	*****	87.7	*****	0.0	87.7	0.050	1.72	OK
GLUTARALDEHYDE SOLUTION (50% OR LESS)	FFA	5,000	5015	5068	28457	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
HEXAMETHYLENEDIAMINE SOLUTION	GTA													
HEXAMETHYLENEIMINE	HMC	5,000	5001	5006	28105	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
HYDROCHLORIC ACID SPENT (15% OR LESS)	HMI	5,000	5050	5050	28354	1.635	*****	82.9	*****	0.0	82.9	0.044	1.68	OK
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-))	HCS													
ISOPRENE	IPR	5,000	7300	12467	69999	1.890	*****	164.1	*****	0.0	164.1	0.253	2.14	OK
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT 3% OR MORE) (INCLUDING:	KPL													
MESITYL OXIDE	MSO	5,000	5067	5323	29884	1.635	*****	83.0	*****	0.0	83.0	0.048	1.68	OK
METHYL ACRYLATE	MAM	5,000	5410	6640	37279	1.695	*****	93.1	*****	0.0	93.1	0.074	1.77	OK
METHYLCYCLOPENTADIENE DIMER	MCK	5,000	5015	5013	28148	1.635	*****	81.7	*****	0.0	81.7	0.043	1.68	OK
METHYL DIETHANOLAMINE	MDE	5,000	5010	5058	28397	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
2-METHYL-5-ETHYLPYRIDINE	MEP	5,000	5016	5094	28602	1.635	*****	81.7	*****	0.0	81.7	0.045	1.68	OK
METHYLENE CHLORIDE (SEE DICHLOROMETHANE)														
METHYL METHACRYLATE	MMM	5,000	5202	5944	33372	1.665	*****	86.7	*****	0.0	86.7	0.060	1.72	OK
2-METHYLPYRIDINE	MPR	5,000	5050	5219	29301	1.635	*****	82.6	*****	0.0	82.6	0.047	1.68	OK
alpha-METHYLSTYRENE	MSR	5,000	5040	5228	29354	1.635	*****	82.2	*****	0.0	82.2	0.047	1.68	OK
MORPHOLINE	MPL	5,000	5080	5325	29898	1.635	*****	83.4	*****	0.0	83.4	0.048	1.68	OK
NITRIC ACID (70% OR LESS)	NCD													
NITROPROPANE (-1, OR -2)	NPM	5,000	5105	5435	30516	1.665	*****	84.2	*****	0.0	84.2	0.050	1.72	OK
OCTYL NITRATES (ALL ISOMERS)	ONE	5,000	5031	5266	29568	1.635	*****	81.9	*****	0.0	81.9	0.047	1.68	OK
OLEUM	OLM	5,000	5001	5004	28094	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
PENTACHLOROETHANE	PCE													
1, 3-PENTADIENE	PDE	5,000	6706	10458	58720	1.815	*****	139.5	*****	0.0	139.5	0.179	1.99	OK
PERCHLOROETHYLENE (SAME AS TETRACHLOROETHYLENE)	PER													
PHOSPHORIC ACID	PAC													
POLYETHYLENE POLYAMINES	PEB	5,000	5001	5007	28114	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
POLYMETHYLENE POLYPHENYL ISOCYANATE	PPI													
POTASSIUM HYDROXIDE SOLUTION (SEE CAUSTIC POTASH SOLUTION)														
iso-PROPANOLAMINE	MPA	5,000	5008	5028	28228	1.635	*****	81.5	*****	0.0	81.5	0.043	1.68	OK
PROPANOLAMINE (iso-, n-)	PAX	5,000	5008	5028	28228	1.635	*****	81.5	*****	0.0	81.5	0.043	1.68	OK
PROPIONIC ACID	PNA	5,000	5030	5102	28647	1.635	*****	82.1	*****	0.0	82.1	0.045	1.68	OK
iso-PROPYLAMINE	IPP	5,000	7342	11619	65233	1.890	*****	166.6	*****	0.0	166.6	0.221	2.11	OK
iso-PROPYL ETHER	IPE	5,000	5664	8060	45251	1.755	*****	100.6	*****	0.0	100.6	0.108	1.86	OK
PYRIDINE	PRD	5,000	5130	5473	30727	1.665	*****	85.0	*****	0.0	85.0	0.051	1.72	OK
SODIUM ALUMINATE SOLUTION	SAU													
SODIUM CHLORATE SOLUTION (50% OR LESS)	SDD													
SODIUM DICHROMATE SOL'N (70% OR LESS)	SDL													
SODIUM HYDROXIDE SOLUTION (SEE CAUSTIC SODA SOLUTION)														
SODIUM HYPOCHLORITE SOL'N (15% OR LESS)	SHP													
SODIUM SULFIDE, HYDROSULFIDE SOLUTIONS (H2S 15 PPM OR LESS)	SSH													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX VAPOR-				PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU		PRESS @ TANK REMOTE P/V + Ptk (PSI)	IS Ptk < MDWF	
		LIQUID	AIR	REQUIRED	AIR		FM REMOTE TK	TO PV	FM REMOTE TK	TO PV	REMOTE	PRESS			
		TRANSF	MIX	FLOW	EQUIVALENT		TOTAL		TOTAL		GRAND	TO P/V			
		RATE	RATE	RATE	RATE		LOSS		LOSS		TOTAL	TANK			
		(MLTR)	Qv-a	Qa			HtotI		HtotII		LOSS	LOSS			
		(10)	(11)	(12)							Htot=	Ptk			
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)		(FT)		(FT)		(FT)	(PSI)			(PSI)

SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (15 PPM<H2S<200 PPM)	SSI														
SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (H2S GREATER THAN 200 PPM)	SSJ														
SODIUM THIOCYANATE SOLUTION (56% OR LESS)	STS														
STYRENE MONOMER	STY	5,000	5040	5199	29191	1.635	*****	82.3	*****	0.0	82.3	0.046	1.68	OK	
SULFURIC ACID	SFA	5,000	5001	5005	28100	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
SULFURIC ACID, SPENT	SAC	5,000	5001	5000	28070	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORIDE)	TEC														
TETRAETHYLENEPENTAMINE	TTP	5,000	5000	5001	28079	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
TETRAHYDROFURAN	THF	5,000	5850	6365	35735	1.695	*****	109.6	*****	0.0	109.6	0.069	1.76	OK	
1,1,2-TRICHLOROETHANE (VINYL TRICHLORIDE)	TCM	5,000	5102	5651	31727	1.665	*****	83.7	*****	0.0	83.7	0.054	1.72	OK	
TRICHLOROETHANE (SEE 1,1,2-TRICHLOROETHANE)															
TRICHLOROETHYLENE	TCL	5,000	5346	7067	39679	1.695	*****	90.4	*****	0.0	90.4	0.084	1.78	OK	
1,2,3-TRICHLOROPROPANE	TCN	5,000	5015	5121	28751	1.635	*****	81.6	*****	0.0	81.6	0.045	1.68	OK	
TRIETHANOLAMINE	TEA	5,000	5001	5007	28115	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
TRIETHYLAMINE	TEN	5,000	5250	6177	34681	1.665	*****	88.3	*****	0.0	88.3	0.065	1.73	OK	
TRIETHYLENETETRAMINE	TET	5,000	5001	5007	28114	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
UREA, AMMONIUM NITRATE SOL'N (CONTAINING MORE THAN 2% NH3)	UAS														
VALERALDEHYDE (iso-, n-)		5,000	5500	6995	39272	1.695	*****	96.0	*****	0.0	96.0	0.082	1.78	OK	
VALERALDEHYDE (iso-)	IVA	5,000	5500	6995	39272	1.695	*****	96.0	*****	0.0	96.0	0.082	1.78	OK	
VALERALDEHYDE (n-)	VAL	5,000	5001	5009	28122	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VBL														
VINYL ACETATE	VAM	5,000	5580	7287	40913	1.725	*****	98.5	*****	0.0	98.5	0.089	1.81	OK	
VINYLTOLUENE	VNT	5,000	5012	5069	28460	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK	

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STDVAP1

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM						TABLE III: MAX PRESSURE @ REMOTE TANK FOR "VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE						PRESS DROP THRU PIP'G PRESS @ REMOTE TANK		
CARGO	C H I S	MAX LIQUID TRANSF RATE (MLTR Q1 (10) (BBL/ HR)	VAPOR- AIR MIX FLOW Qv-a (11) (BBL/ HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/ HR)	PRESS ACROSS PV VALVE (FT^3/ HR) (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV		PIPE SECT II: LOSS FM REMOTE TK TO PV		GRAND TOTAL LOSS Htot= I+II (FT)	PIP'G REMOTE TO P/V Wv-a, 11 * Htot (PSI)	PRESS @ REMOTE TANK PV + Ploss (PSI)	IS Ptk < MDWP	
						TOTAL LOSS HtotI (FT)	TOTAL LOSS HtotII (FT)							
46 CFR SUBCHAPT O BUT NOT TABLE 151														

1,1-DICHLOROPROPANE	DPB	5,000	5630	8213	46110	1.755	*****	99.3	*****	0.0	99.3	0.112	1.87	OK
1,1,1-TRICHLOROETHANE														
1,2-DICHLOROPROPANE	DPP	5,000	5260	6227	34960	1.665	*****	88.3	*****	0.0	88.3	0.065	1.73	OK
1,3-CYCLOPENTADIENE														
1,3-DICHLOROPROPANE	DPC	5,000	5380	6974	39156	1.695	*****	91.6	*****	0.0	91.6	0.081	1.78	OK
2-METHYL-2-HYDROXY-3-BUTYNE	MHB	5,000	5114	5445	30573	1.665	*****	84.5	*****	0.0	84.5	0.051	1.72	OK
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION (70% AEROTHENE TT (1,1,1-TRICHLOROETHANE)	DDA													
3-PENTENENITRILE	PNT													
ALKYLBENZENE														
AMINOETHYLPIPERAZINE	AEP													
BENZENE RAFFINATE (ASSUME VAPOR PROPERTIES SIMILAR TO BENZENE)		5,000	6250	7655	42978	1.725	*****	123.6	*****	0.0	123.6	0.098	1.82	OK
BENZENE SULFONYL CHLORIDE	BSC	5,000	5000	5001	28078	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
BENZYL ACETATE	BZE	5,000	5002	5015	28157	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
BENZYL CHLORIDE (STABILIZED)	BCL	5,000	5009	5056	28385	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
BUTANOL														
BUTYL ETHER (n-)	BTE	5,000	5040	5253	29495	1.635	*****	82.2	*****	0.0	82.2	0.047	1.68	OK
BUTYLENE OXIDE (1,2-)	BTO	5,000	5918	8037	45125	1.755	*****	110.1	*****	0.0	110.1	0.107	1.86	OK
BUTYRIC ACID	BRA	5,000	5007	5029	28234	1.635	*****	81.5	*****	0.0	81.5	0.043	1.68	OK
CARBOLIC ACID	CBO	5,000	5006	5027	28224	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
CHLOROACETIC ACID (80% OR LESS)	CHM	5,000	5001	5005	28099	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
CHLOROPROPIONIC ACID (2- OR 3-)	CPM	5,000	5002	5010	28131	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
CHLOROTOLUENE (m-)	CTM	5,000	5032	5198	29186	1.635	*****	82.0	*****	0.0	82.0	0.046	1.68	OK
CHLOROTOLUENE (o-)	CTO	5,000	5032	5198	29186	1.635	*****	82.0	*****	0.0	82.0	0.046	1.68	OK
CHLOROTOLUENE (p)	CRN	5,000	5009	5056	28385	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
CHLOROTOLUENES (MIXED ISOMERS)	CHI	5,000	5053	5327	29907	1.635	*****	82.5	*****	0.0	82.5	0.048	1.68	OK
CREOSOTE (ALL ISOMERS)	CCW	5,000	5001	5005	28103	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
CRESYLIC ACID TAR	CRX	5,000	5010	5010	28130	1.635	*****	81.6	*****	0.0	81.6	0.043	1.68	OK
CYCLOHEPTANE	CYE	5,000	5140	5646	31700	1.665	*****	85.0	*****	0.0	85.0	0.054	1.72	OK
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	CYX	5,000	5100	5462	30666	1.665	*****	84.0	*****	0.0	84.0	0.051	1.72	OK
CYCLOHEXYL ACETATE	CYC	5,000	5001	5007	28113	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
CYCLOPENTADIENE, STYRENE, BENZENE MIXTURE	CSB	5,000	5450	7681	43124	1.725	*****	93.4	*****	0.0	93.4	0.098	1.82	OK
CYCLOPENTANE	CYP	5,000	6315	9230	51825	1.785	*****	124.5	*****	0.0	124.5	0.141	1.93	OK
DECANOIC ACID	DCO													
DI 2 ETHYLHEXYL PHTHALATE (SEE ALSO ETHYLHEXYL PHTHALATE)														
DICHLOROISOPROPYL ETHER (2,2'-)	DCI	5,000	5006	5051	28361	1.635	*****	81.4	*****	0.0	81.4	0.044	1.68	OK
DICHLOROPROPANE														
DICHLOROPROPENE														
DIETHYL SULFATE	DSU	5,000	5001	5008	28116	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR "VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE						PRESS DROP THRU PIP'G PRESS @ TANK REMOTE		PRESS THRU PIP'G PRESS @ TANK REMOTE		PRESS THRU PIP'G PRESS @ TANK REMOTE		PRESS THRU PIP'G PRESS @ TANK REMOTE		
CARGO	C H R I S	MAX LIQUID TRANSF RATE (MLTR) Q1 (10) (BBL/ HR)	VAPOR- AIR MIX FLOW RATE Qv-a (11) (BBL/ HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/ HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV		PIPE SECT II: LOSS FM REMOTE TK TO PV		GRAND TOTAL LOSS Htot=I+II (FT)	TO P/V Wv-a,11 * Htot Ploss (PSI)	TANK PV + Ploss Ptk (PSI)	IS Ptk < MDW	
						TOTAL		TOTAL						
						LOSS		LOSS						
						HtotI		HtotII						
						(FT)		(FT)						
DIETHYLETHANOLAMINE	DAE	5,000	5018	5102	28645	1.635	*****	81.7	*****	0.0	81.7	0.045	1.68	OK
DODECYL BENZENE														
DODECYLDIMETHYLAMINE TETRADECYLDIMETHYLAMINE MIXTURE	DOT													
DRIPOLENE														
ETHANOL (see ethyl alcohol)														
ETHYL BROMIDE														
ETHYL TERT-BUTYL ETHER	EBE	5,000	5500	7321	41103	1.725	*****	95.5	*****	0.0	95.5	0.089	1.81	OK
ETHYLAMINE	EAM	5,000	9080	14023	78736	1.975	*****	253.7	*****	0.0	253.7	0.320	2.29	OK
ETHYLENE DICHLORIDE 1,1,2-TRICHLOROETHANE MIXTURE	ETX	5,000	5370	7249	40700	1.725	*****	91.0	*****	0.0	91.0	0.088	1.81	OK
ETHYLMERCAPTAN (SAME AS ETHANETHIOL)														
ETHYLPHENOL	EPL	5,000	5002	5012	28140	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
FORMALDEHYDE SOLUTION (50% OR MORE), METHANOL MIXTURES	MTM	5,000	5663	5778	32440	1.665	*****	103.6	*****	0.0	103.6	0.057	1.72	OK
HYDROSULFIDE														
INDENES														
ISOBUTYL ACETATE	IBA	5,000	5036	5204	29218	1.635	*****	82.2	*****	0.0	82.2	0.046	1.68	OK
ISOPRENE, PENTADIENE MIXTURE	IPN													
ISO-PROPYL ALCOHOL		5,000	5300	5803	32584	1.665	*****	90.3	*****	0.0	90.3	0.057	1.72	OK
LAURIC ACID	LRA													
METHACRYLONITRILE	MET	5,000	5339	6027	33837	1.665	*****	91.3	*****	0.0	91.3	0.062	1.73	OK
METHANOL														
METHYL STYRENE														
METHYL STYRENE, INDENES, ALKYL BENZENE MIXTURES	MIA													
METHYLCYCLOHEXANE	MCY	5,000	5237	6087	34178	1.665	*****	87.8	*****	0.0	87.8	0.063	1.73	OK
METHYLHEXANE (SAME AS HEPTANE)														
MONOETHANOLAMINE	MEA	5,000	5010	5027	28226	1.635	*****	81.6	*****	0.0	81.6	0.043	1.68	OK
MONOISOPROPANOLAMINE		5,000	5020	5069	28461	1.635	*****	81.8	*****	0.0	81.8	0.044	1.68	OK
NAPHTHALENE (MOLTEN)	NTM	5,000	5001	5006	28109	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
NEODECANOIC ACID	NEA	5,000	5001	5009	28122	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
NITRILOTRIACETIC ACID	NAA													
NITROPHENOL (MOLTEN)	NTP													
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NNM	5,000	5110	5456	30632	1.665	*****	84.4	*****	0.0	84.4	0.051	1.72	OK
NITROTOLUENE (o-,p-)	NIT	5,000	5002	5014	28149	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
PARALDEHYDE	PDH	5,000	5830	9788	54958	1.785	*****	105.3	*****	0.0	105.3	0.157	1.94	OK
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXIDE)	PGS													
PROPIONALDEHYDE	PAD	5,000	6376	8671	48684	1.755	*****	127.5	*****	0.0	127.5	0.125	1.88	OK
PROPIONIC ANHYDRIDE	PAH	5,000	5011	5070	28467	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
PROPIONITRILE	PCN	5,000	5117	5281	29649	1.635	*****	84.8	*****	0.0	84.8	0.048	1.68	OK
PROPYLAMINE (n-)	PRA	5,000	6355	8690	48792	1.755	*****	126.5	*****	0.0	126.5	0.125	1.88	OK
PROPYLBENZENE		5,000	5414	4829	27113	1.635	*****	96.1	*****	0.0	96.1	0.040	1.68	OK
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	GPY	5,000	5730	7711	43296	1.725	*****	103.4	*****	0.0	103.4	0.099	1.82	OK
PYROLYSIS RESIDUAL FUELS														
SEWAGE, RAW	SWR													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H I S	MAX VAPOR-				PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU		PRESS			
		LIQUID	AIR	REQUIRED AIR	PRESS	FM REMOTE TK TO PV		FM REMOTE TK TO PV		PIP'G	PRESS	IS			
		TRANSF	MIX	EQUIVALENT	ACROSS	TOTAL		TOTAL		GRAND	TANK		TANK		
		RATE	FLOW		PV	LOSS		LOSS		LOSS	TO P/V		REMOTE		
		(MLTR)	RATE	-----		HtotI		HtotII		Htot=	Wv-a, 11		PV +	Ptk <	
		Q1	Qv-a	Qa	VALVE					LOSS	* Htot		Ploss	Ptk	MDWP
		(10)	(11)	(12)	PV					I+II					
(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)	(FT)	(FT)	(FT)	(PSI)	(PSI)						

SODIUM SULFIDE (SOLID IN WATER)	***														
STYRENE	SDS														
STYRENE CRUDE	STY	5,000	5040	5199	29192	1.635	*****	82.3	*****	0.0	82.3	0.046	1.68 OK		
STYRENE TAR	STX	5,000	5040	5199	29192	1.635	*****	82.3	*****	0.0	82.3	0.046	1.68 OK		
TETRAMETHYLBENZENE (1,2,3,5-)	STT														
TOLUIDINE (o-)	TTB	5,000	5014	5083	28539	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68 OK		
TRICHLOROBENZENE (1,2,4-)	TLI	5,000	5001	5005	28102	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68 OK		
TRIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N	TCB	5,000	5003	5027	28226	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68 OK		
TRIPHENYLBORANE	TPE														
UNDECANOIC ACID	UDA														
HYDROCARBON 5-9	HFN	5,000	5440	6992	39256	1.695	*****	93.9	*****	0.0	93.9	0.082	1.78 OK		

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

TABLE III: MAX PRESSURE @ REMOTE TANK FOR "VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE														PRESS DROP THRU PIP'G PRESS @ TANK REMOTE	IS
CARGO	C H R I S	MAX	VAPOR-				PIPE SECT I: LOSS		PIPE SECT II: LOSS		GRAND TOTAL LOSS Htot= I+II (FT)	TO P/V TANK Wv-a,11 * Htot Ploss (PSI)	PV + Ptk (PSI)	MDWP	
		LIQUID	AIR	REQUIRED AIR	PRESS	FM REMOTE TK TO PV	FM REMOTE TK TO PV								
		TRANSF	MIX	EQUIVALENT	ACROSS	TOTAL	TOTAL								
		RATE	FLOW		PV	LOSS	LOSS								
		(MLTR)	RATE		PV	LOSS	LOSS								
Q1	Qv-a	Qa	VALVE	HtotI	HtotII										
(10)	(11)	(12)	PV												
(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)	(FT)	(FT)	(FT)	(FT)	(FT)						

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Acetone	ACT	5,000	6000	7630	42842	1.725	*****	113.6	*****	0.0	113.6	0.097	1.82	OK	
Acetophenone	ACP	5,000	5060	5346	30017	1.665	*****	82.7	*****	0.0	82.7	0.049	1.71	OK	
Acetyl Tributuy Citrate															
Acrylonitrile-Styrene Copolymer dispersion in Polyether Polyol	ALE														
Alcohols (C13 and above)	ALY														
Alcoholic beverages, N.O.S.															
Alcohol (C6 - C17) (secondary) Poly(3-6)ethoxylates															
Alcohol (C12 - C15) Poly(1-3)ethoxylates															
Alcohol (C12 - C15) Poly(3-11)ethoxylates															
Alkenylsuccinic acid															
Alkenylsuccinic Anhydride															
Alkyl (C9 - C17) Benzenes	AKB														
Alkylbenzenesulfonic acid (4% or less)	ABS														
Alkyl Phthalates (n-)															
Alkyl Succinate Formaldehyde Hydr- oxyamino condensate (3.2% or less)															
Aminoethyldiethanolamine, Aminoethylethanolamine solution															
Amyl Acetate (commercial, iso-, n-,sec-)	AEC	5,000	5202	6235	35005	1.695	*****	86.4	*****	0.0	86.4	0.066	1.76	OK	
AMYL ACETATE (n-)	AML	5,000	5033	5208	29243	1.635	*****	82.0	*****	0.0	82.0	0.046	1.68	OK	
AMYL ACETATE (iso-)	IAT	5,000	5033	5208	29243	1.635	*****	82.0	*****	0.0	82.0	0.046	1.68	OK	
Amyl alcohol (iso-, n-, sec-, primary) (SEE ALSO IAA)	AAI	5,000	5030	5124	28770	1.635	*****	82.1	*****	0.0	82.1	0.045	1.68	OK	
Amyl alcohol (n-)	AAN	5,000	5030	5124	28770	1.635	*****	82.1	*****	0.0	82.1	0.045	1.68	OK	
Amyl alcohol (tert-)	AAI														
AMYL ALCOHOL, PRIMARY	APM	5,000	5030	5124	28770	1.635	*****	82.1	*****	0.0	82.1	0.045	1.68	OK	
AMYL ALCOHOL, (sec-)	ASE	5,000	5030	5124	28770	1.635	*****	82.1	*****	0.0	82.1	0.045	1.68	OK	
Amylene	AMZ														
AMYL ALCOHOL, (iso-)	IAA	5,000	5030	5124	28770	1.635	*****	82.1	*****	0.0	82.1	0.045	1.68	OK	
Amyl Methyl Ketone	AMK														
Amyl Tallate															
Asphalt	ASP														
ASPHALT BLENDING STOCKS: Roofers flux	ARF														
ASPHALT BLENDING STOCKS: Straight run residue	ASR														
Behenyl alcohol															
Benzene Tricarboxylic acid Trioctyl Ester															
Benzyl alcohol	BAL	5,000	5010	5052	28366	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK	
Bicyclic Terpenel Polyamide salt															
Brake fluid base mixtures (containing Poly(2-8)alkylene (C2-C3)	gBFX														
Butane	BMX														
Butene, SEE BUTYLENE															
Butene Oligomer	BOL														

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX	VAPOR-	PIPE SECT I: LOSS				PIPE SECT II: LOSS				THRU		IS
		LIQUID	AIR	FM REMOTE TK TO PV		FM REMOTE TK TO PV		PIP'G		PRESS				
		TRANSF	MIX					@		TANK				
		RATE	FLOW	EQUIVALENT		ACROSS		TANK		REMOTE				
		(MLTR)	RATE			PV	TOTAL	TOTAL	GRAND	TO P/V	TANK	Ptk	MDWP	
		Q1	Qv-a	Qa		VALVE	HtotI	HtotII	TOTAL	* Htot	Ploss	Ptk		
		(10)	(11)	(12)	(FT^3/	PV			LOSS	LOSS				
		(BBL/	(BBL/	(BBL/	HR)		(FT)	(FT)		I+II				
		HR)	HR)	HR)		(PSI)				(FT)	(PSI)	(PSI)		
Butyl Acetate (iso-, n-)	BAX	5,000	5060	5334	29947	1.635	*****	82.8	*****	0.0	82.8	0.049	1.68	OK
BUTYL ACETATE (N-)	BCN	5,000	5080	5443	30562	1.665	*****	83.4	*****	0.0	83.4	0.051	1.72	OK
Butyl Acetate (sec-)	BTA	5,000	5150	5822	32686	1.665	*****	85.3	*****	0.0	85.3	0.058	1.72	OK
Butyl alcohol (iso-, n-, sec-, tert-)		5,000	5090	5311	29822	1.635	*****	83.8	*****	0.0	83.8	0.048	1.68	OK
BUTYL ALCOHOL (ISO-)	IAL	5,000	5090	5311	29822	1.635	*****	83.8	*****	0.0	83.8	0.048	1.68	OK
BUTYL ALCOHOL (N-)	BAN	5,000	5050	5173	29046	1.635	*****	82.6	*****	0.0	82.6	0.046	1.68	OK
BUTYL ALCOHOL (SEC-)	BAS	5,000	5130	5449	30597	1.665	*****	85.0	*****	0.0	85.0	0.051	1.72	OK
BUTYL ALCOHOL (TERT-)	BAT	5,000	5280	5966	33495	1.665	*****	89.7	*****	0.0	89.7	0.061	1.73	OK
Butyl Benzyl Phthalate	BPH	5,000	5001	5016	28164	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Butylene	BTN													
Butylene Glycol	BUG													
1,3-Butylene Glycol, SEE BUTYLENE GLYCOL														
Butylene Polyglycol, SEE BUTYLENE GLYCOL														
iso-Butyl Formate														
n-Butyl Formate														
Butyl Heptyl Ketone														
Butyl Methyl Ketone,SEE METHYL BUTYL KETONE	BHK													
Butyl Stearate														
Butyl Toluene														
Butyrolactone (gamma)	BUE	5,000	5010	5073	28484	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
Calcium Alkylphenate	BLA													
Calcium Alkyl Salicylate														
Calcium Amino Nonyl Phenolate														
Calcium Carboxylate														
Caprolactam solutions														
Carbon black base	CLS	5,000	5005	5027	28227	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
Cetyl alcohol (HEXADECANOL) SEE ALCOHOLS (C13 AND ABOVE)														
Cetyl-Stearal alcohol														
Cleaning spirit (unleaded)														
Coal tar														
Cumene	COR													
Cycloaliphatic resins	CUM	5,000	5060	5352	30047	1.665	*****	82.7	*****	0.0	82.7	0.049	1.71	OK
Cyclohexane														
Cyclohexanol	CHX	5,000	5450	6736	37823	1.695	*****	94.5	*****	0.0	94.5	0.076	1.77	OK
1,3-Cyclopentadiene dimer (molten)	CHN	5,000	5015	5072	28475	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	CPD	5,000	5025	5161	28976	1.635	*****	81.8	*****	0.0	81.8	0.046	1.68	OK
Cymene (para-)														
Decahydronaphthalene	CMP	5,000	5011	5072	28479	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
Decaldehyde (iso-)	DHN	5,000	5010	5068	28454	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
Decaldehyde (n-)	IDA	5,000	5001	5007	28114	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Decane	DAL													
Decene	DDC													
	DCE	5,000	5012	5082	28534	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX	VAPOR-					PIPE SECT I: LOSS	PIPE SECT II: LOSS	THRU				
		LIQUID	AIR	REQUIRED AIR	PRESS	FM REMOTE TK	TO PV	FM REMOTE TK	TO PV	PIP'G	PRESS	IS		
		TRANSF	MIX	EQUIVALENT	ACROSS					REMOTE	@	REMOTE		
		RATE	FLOW							TANK	REMOTE			
		(MLTR)	RATE		PV					LOSS	TANK	Ptk		
	Q1	Qv-a	Qa	VALVE						GRAND	TO P/V	TANK	Ptk	MDWP
	(10)	(11)	(12)	PV						LOSS	Wv-a,11	PV +	Ptk	
	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)		HtotI		HtotII	Htot=	I+II	Ploss	Ptk	
							(FT)		(FT)	(FT)	(PSI)	(PSI)		
Decyl alcohol (all isomers) (DECANOL)	DAX	5,000	5001	5008	28116	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
DECYL ALCOHOL (iso-)	ISA	5,000	5001	5008	28116	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
DECYL ALCOHOL (n-)	DAN	5,000	5001	5008	28116	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Decylbenzene (n-)	DBZ	5,000	5001	5011	28135	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Detergent Alkylate														
Diacetone alcohol	DAA	5,000	5010	5056	28389	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
Dialkyl (C10-C14) Benzenes	DAB													
Dialkyl (C7-C13) Phthalates	DAH													
Dibutyl Carbinol														
Dibutyl Phthalate (ortho-)	DPA													
Dicyclopentadiene, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	DPT	5,000	5025	5161	28976	1.635	*****	81.8	*****	0.0	81.8	0.046	1.68	OK
Diethylbenzene	DEB	5,000	5008	5053	28369	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
Diethylene Glycol	DEG	5,000	5001	5005	28102	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diethylene Glycol Butyl Ether	DME	5,000	5001	5008	28118	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diethylene Glycol Butyl Ether Acetate	DEM													
Diethylene Glycol Dibutyl Ether	DIG													
Diethylene Glycol Diethyl Ether														
Diethylene Glycol Ethyl Ether	DGE													
Diethylene Glycol Ethyl Ether Acetate	DGA	5,000	5002	5013	28147	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diethylene Glycol Methyl Ether	DGM	5,000	5003	5018	28172	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diethylene Glycol Methyl Ether Acetate	DGR													
Diethylene Glycol Phenyl Ether	DGP													
Diethylene Glycol Phthalate	DGL													
Di-(2-ethylhexyl)adipate	DEH													
Di-(2-ethylhexyl)phthalate	DIE													
Diethyl Phthalate	DPH													
Diglycidyl Ether of Bisphenol A	BDE													
Diheptyl Phthalate	DHP													
Dihexyl Phthalate	DHA													
Diisobutylcarbinol	DBC	5,000	5009	5064	28432	1.635	*****	81.4	*****	0.0	81.4	0.044	1.68	OK
Diisobutylene	DBL	5,000	5200	6049	33962	1.665	*****	86.6	*****	0.0	86.6	0.062	1.73	OK
Diisobutyl Ketone	DIK	5,000	5016	5112	28700	1.635	*****	81.6	*****	0.0	81.6	0.045	1.68	OK
Diisobutyl Phthalate	DIT													
Diisodecyl Phthalate	DID													
Diisononyl Adipate	DNY													
Diisononyl Phthalate	DIN													
Diisooctyl Phthalate	DIO													
Diisopropylbenzene (all isomers)	DIX	5,000	5003	5024	28210	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diisopropyl Naphthalene	DII													
Dimethyl Adipate	DLA													
Dimethylbenzene														
Dimethyl Glutarate	DGT													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX	VAPOR-	PIPE SECT I: LOSS				PIPE SECT II: LOSS				DROPT THRU		
		LIQUID	AIR	FM REMOTE TK TO PV		FM REMOTE TK TO PV		PIP'G	PRESS					
		TRANSF	MIX	REQUIRED AIR	PRESS			REMOTE	@					
		RATE	FLOW	EQUIVALENT	ACROSS			TANK	REMOTE					
		(MLTR)	Qv-a	Qa	PV	TOTAL	TOTAL	GRAND	TO P/V	TANK	IS			
		(10)	(11)	(12)	VALVE	LOSS	LOSS	TOTAL	Wv-a,11	PV +	Ptk <			
		(BBL/	(BBL/	(BBL/	PV	HtotI	HtotII	LOSS	* Htot	Ploss	MDWP			
		HR)	HR)	HR)	(FT^3/	(FT)	(FT)	Htot=	Ploss	Ptk				
					(PSI)			I+II	(PSI)	(PSI)				
								(FT)						
Dimethyl Phthalate	DTL													
Dimethyl Polysiloxane	DMP													
2,2-Dimethylpropane-1,3-diol	DDI													
Dimethyl Succinate	DSE													
Dinonyl Phthalate	DIF	5,000	5001	5022	28195	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Di(octylphenyl)amine														
Diocetyl Phthalate	DOP													
Dipentene	DPN	5,000	5010	5070	28466	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK
Diphenyl	DIL	5,000	5001	5008	28116	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diphenyl, Diphenyl Ether mixture	DDO	5,000	5001	5009	28121	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diphenyl Ether	DPE	5,000	5001	5009	28121	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Diphenyl Ether, Biphenyl Ether mixture	DOB													
Dipropylene Glycol	DPG	5,000	5007	5046	28332	1.635	*****	81.4	*****	0.0	81.4	0.044	1.68	OK
Dipropylene Glycol Dibenzoate	DGY													
Dipropylene Glycol Methyl Ether	DPY													
DISTILLATES: Flashed feed stocks	DFF	5,000	5230	6056	34002	1.665	*****	87.6	*****	0.0	87.6	0.062	1.73	OK
DISTILLATES: Straight run	DSR	5,000	5230	6056	34002	1.665	*****	87.6	*****	0.0	87.6	0.062	1.73	OK
Ditridecyl Phthalate	DTP													
Diundecyl Phthalate	DUP													
Dodecane (all isomers)	DOC													
Dodecanol	DDN													
Dodecene (all isomers)	DOZ	5,000	5002	5017	28168	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
DODECENE	DOD	5,000	5002	5017	28168	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Dodecylbenzene	DDB	5,000	5470	9704	54482	1.785	*****	92.6	*****	0.0	92.6	0.154	1.94	OK
Dodecyl Phenol	DOL													
Drilling mud (low toxicity) (if flammable or combustible)/														
Epoxyated linear alcohols, C11-C15														
Ethane	ETH													
2-Ethoxyethanol	EEO													
2-Ethoxyethyl Acetate	EEA													
Ethoxylated alcohols, C11-C15,SEE THE ALCOHOL POLYETHOXYLATES														
Ethoxy Triglycol (crude)	ETG													
Ethyl Acetate	ETA	5,000	5450	6822	38301	1.695	*****	94.2	*****	0.0	94.2	0.078	1.77	OK
Ethyl Acetoacetate	EAA	5,000	5020	5127	28785	1.635	*****	81.7	*****	0.0	81.7	0.045	1.68	OK
Ethyl alcohol (ETHANOL)	EAL	5,000	5350	5686	31926	1.665	*****	92.5	*****	0.0	92.5	0.055	1.72	OK
Ethyl Amyl Ketone	EAK													
Ethyl Benzene	ETB	5,000	5060	5295	29727	1.635	*****	82.8	*****	0.0	82.8	0.048	1.68	OK
Ethyl Butanol	EBT	5,000	5012	5059	28402	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
Ethyl Butyrate	EBR	5,000	5100	5552	31174	1.665	*****	84.0	*****	0.0	84.0	0.053	1.72	OK
Ethyl Cyclohexane	ECY	5,000	5050	5269	29583	1.635	*****	82.5	*****	0.0	82.5	0.047	1.68	OK
Ethylene	ETL													
Ethylene Carbonate														

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX	VAPOR-	PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU	PRESS	IS				
		LIQUID	AIR	FM REMOTE TK TO PV		FM REMOTE TK TO PV		PIP'G	@					
		TRANSF	MIX	REQUIRED AIR	PRESS	TOTAL	TOTAL	TANK	REMOTE					
		RATE	FLOW	EQUIVALENT	ACROSS	LOSS	LOSS	TO P/V	TANK					
	(MLTR)	RATE			PV			GRAND	TOTAL	LOSS	LOSS	Wv-a, 11	PV +	Ptk
	Q1	Qv-a	Qa		VALVE			TototI	TototII	Totot=	Totot=	* Htot	Ploss	MDWP
	(10)	(11)	(12)		PV					I+II	I+II	Ploss	Ptk	
	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)			(FT)	(FT)	(FT)	(FT)	(PSI)	(PSI)	
Ethylene Glycol	***													
Ethylene Glycol Acetate	EGL	5,000	5001	5003	28089	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Ethylene Glycol Butyl Ether	EGO													
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EGM													
Ethylene Glycol Ether Acetate	EMA	5,000	5005	5040	28297	1.635	*****	81.4	*****	0.0	81.4	0.044	1.68	OK
Ethylene Glycol Tert-Butyl Ether														
Ethylene Glycol Diacetate	EGY	5,000	5001	5007	28114	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Ethylene Glycol Dibutyl Ether	EGB													
Ethylene Glycol Ethyl Ether, SEE 2-ETHOXYETHANOL	EGF													
Ethylene Glycol Ethyl Ether Acetate, SEE 2-ETHOXYETHYL ACETATE	EGA													
Ethylene Glycol Isopropyl Ether	EGI													
Ethylene Glycol Methyl Butyl Ether														
Ethylene Glycol Methyl Ether	EME	5,000	5001	5007	28112	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Ethylene Glycol Methyl Ether Acetate	EGT													
Ethylene Glycol Phenyl Ether	EPE	5,000	5001	5007	28112	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixtEDX	EDX													
Ethylene-Propylene Copolymer (in liquid mixtures)														
Ethyl-3-Ethoxypropionate	EEP													
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EHA	5,000	5017	5106	28668	1.635	*****	81.7	*****	0.0	81.7	0.045	1.68	OK
2-Ethylhexanoic acid	EHO													
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHX	5,000	5002	5013	28145	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID														
Ethyl Hexyl Phthalate (SEE ALSO DI 2-ETHYLHEXYL PHTHALATE)	EHE													
Ethyl Hexyl Tallate	EHT													
Ethyl Propionate	EPR	5,000	5350	5686	31926	1.665	*****	92.5	*****	0.0	92.5	0.055	1.72	OK
Ethyl Toluene	ETE	5,000	5028	5163	28989	1.635	*****	81.9	*****	0.0	81.9	0.046	1.68	OK
Fatty acid (saturated, C13 and above)														
Fatty acid Amides														
Formamide	FAM	5,000	5010	5019	28177	1.635	*****	81.6	*****	0.0	81.6	0.043	1.68	OK
Furfuryl Alcohol	FAL	5,000	5005	5024	28205	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
Gas oil, cracked	GOC													
GASOLINE BLENDING STOCKS: Alkylates	GAK	5,000	6250	10555	59261	1.815	*****	120.8	*****	0.0	120.8	0.182	2.00	OK
GASOLINE BLENDING STOCKS: Reformates	GRF	5,000	6250	10555	59261	1.815	*****	120.8	*****	0.0	120.8	0.182	2.00	OK
GASOLINES: Automotive (containing not over 4.23 grams lead per gaGAT	GAT	5,000	6250	10555	59261	1.815	*****	120.8	*****	0.0	120.8	0.182	2.00	OK
GASOLINES: Aviation (containing not over 4.86 grams lead per gallGAV	GAV	5,000	6250	10555	59261	1.815	*****	120.8	*****	0.0	120.8	0.182	2.00	OK
GASOLINES: Casinghead (natural)	GCS	5,000	6250	10555	59261	1.815	*****	120.8	*****	0.0	120.8	0.182	2.00	OK
GASOLINES: Polymer	GPL	5,000	6250	10555	59261	1.815	*****	120.8	*****	0.0	120.8	0.182	2.00	OK
GASOLINES: Straight run	GSR	5,000	6250	10555	59261	1.815	*****	120.8	*****	0.0	120.8	0.182	2.00	OK
Glycerine	GCR													
Glycerol, SEE GLYCERINE														
Glycerol Polyalkoxylate														
Glycerol Triacetate														

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX LIQUID TRANSF RATE (MLTR Q1 (10) (BBL/ HR)	VAPOR- AIR MIX FLOW RATE Qv-a (11) (BBL/ HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/ HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS		PIPE SECT II: LOSS		GRAND TOTAL LOSS Htot= I+II (FT)	THRU PIP'G REMOTE TANK TO P/V Wv-a,11 * Htot Ploss (PSI)	PRESS @ REMOTE TANK PV + Ploss Ptk (PSI)	IS Ptk < MDWP
						FM REMOTE TK TO PV		FM REMOTE TK TO PV					
						TOTAL		TOTAL					
						LOSS		LOSS					
						HtotI		HtotII					
						(FT)		(FT)					

Glycidyl Ester of Tertiary Carboxylic acid, SEE GLYCIDYL ESTER OF TRID													
Glycidyl Ester of Tridecyl Acetic acid GLT													
Glycidyl Ester of Versatic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC													
Glycol Diacetate, SEE ETHYLENE GLYCOL DIACETATE													
Glycols, Resins and Solvents mixtures													
Gylcol Triacetate, SEE GLYCERYL TRIACETATE													
Glyoxal solution (40% or less)													
Grease													
Heptadecane													
Heptane (all isomers) (METHYHEXANE)	HMX	5,000	5250	6163	34604	1.665	*****	88.3	*****	0.0	88.3	0.064	1.73 OK
HEPTANE (N-)	HPT	5,000	5250	6163	34604	1.665	*****	88.3	*****	0.0	88.3	0.064	1.73 OK
Heptanoic acid	HEP	5,000	5001	5006	28109	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68 OK
Heptanol (all isomers)	HTX	5,000	5004	5023	28200	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68 OK
HEPTANOL	HTN	5,000	5004	5023	28200	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68 OK
Heptene (all isomers)	HPX	5,000	5290	6325	35513	1.695	*****	89.3	*****	0.0	89.3	0.068	1.76 OK
HEPTENE (1-)	HTE	5,000	5280	6280	35262	1.695	*****	89.0	*****	0.0	89.0	0.067	1.76 OK
Heptyl Acetate	HPE	5,000	5010	5079	28518	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68 OK
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR													
Hexaethylene Glycol													
Hexamethylene Glycol													
Hexamethylenetetramine solutions	HTS												
Hexane (all isomers)	HXS	5,000	5700	7783	43696	1.725	*****	102.3	*****	0.0	102.3	0.101	1.83 OK
HEXANE	HXA	5,000	5700	7783	43696	1.725	*****	102.3	*****	0.0	102.3	0.101	1.83 OK
Hexanoic acid	HXO	5,000	5001	5006	28105	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68 OK
Hexanol	HXN	5,000	5100	5482	30782	1.665	*****	84.0	*****	0.0	84.0	0.051	1.72 OK
Hexene (all isomers)	HEX	5,000	5800	8075	45338	1.755	*****	105.7	*****	0.0	105.7	0.108	1.86 OK
HEXENE (1-)	HXE	5,000	5820	8152	45769	1.755	*****	106.3	*****	0.0	106.3	0.110	1.87 OK
HEXENE (2-)	HXT	5,000	5820	8152	45769	1.755	*****	106.3	*****	0.0	106.3	0.110	1.87 OK
Hexyl Acetate	HAE												
Hexylene Glycol	HXG	5,000	5001	5001	28080	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68 OK
Hog Grease, SEE LARD													
2-Hydroxy-4-(methylthio)butanoic acid	HBA												
HYDROCARBON 5-9 (MOVED TO SUB-O, NON TABLE 151, 6/24/95)	HFN												
Hydroxy terminated Polybutadiene, SEE POLYBUTADIENE, HYDROXYL TERMINAT													
Isophorone	IPH	5,000	5001	5007	28111	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68 OK
JET FUELS: JP-1 (Kerosene)	JPO	5,000	5014	5089	28575	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68 OK
JET FUELS: JP-3	JPT	5,000	5851	9858	55348	1.815	*****	106.1	*****	0.0	106.1	0.159	1.97 OK
JET FUELS: JP-4	JPF	5,000	5340	6817	38275	1.695	*****	90.5	*****	0.0	90.5	0.078	1.77 OK
JET FUELS: JP-5 (Kerosene, heavy)	JPV	5,000	5010	5056	28389	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68 OK
JET FUELS: JP-8	JPE												
Kerosene	KRS	5,000	5015	5096	28610	1.635	*****	81.6	*****	0.0	81.6	0.045	1.68 OK
Lactic acid													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX	VAPOR-					PIPE SECT I: LOSS		PIPE SECT II: LOSS		DROF		IS
		LIQUID	AIR	REQUIRED AIR		PRESS	FM REMOTE TK TO PV	FM REMOTE TK TO PV	PIP'G	PRESS	THRU	THRU		
		TRANSF	MIX	EQUIVALENT	ACROSS			REMOTE	@	REMOTE	REMOTE	REMOTE		
		RATE	FLOW		PV	TOTAL	TOTAL	TANK	TANK	TANK	TANK			
		(MLTR)	RATE			LOSS	LOSS	GRAND	TO P/V	REMOT	IS			
		Q1	Qv-a	Qa	VALVE				Wv-a,11	PV +	Ptk			
		(10)	(11)	(12)	PV	HtotI	HtotII	LOSS	* Htot	Ploss	MDWP			
		(BBL/	(BBL/	(BBL/	(FT^3/			Htot=	Ploss	Ptk				
		HR)	HR)	HR)	HR)	(PSI)	(FT)	(FT)	I+II	(PSI)	(PSI)			

Lard		***												
Latex, liquid synthetic, including: Styrene-Butadien rubber	LLS													
Latex, liquid synthetic, including: Carboxylated Styrene-Butadien Copo														
Magnesium Nonyl Phenol Sulfide														
Magnesium Sulfonate	MSE													
Maleic Anhydride Copolymer														
2-Mercaptobenzothiazol (in liquid mixtures)														
Methane	MTH													
3-Methoxy-1-Butanol														
3-Methoxybutyl Acetate	MOA													
1-Methoxy-2-Propyl Acetate	MPO													
Methoxy Trigylcol, SEE TRIETHYLENE GLYCOL METHYL ETHER	MTG													
Methyl Acetate	MIT	5,000	5610	7102	39873	1.695	*****	99.8	*****	0.0	99.8	0.085	1.78	OK
Methyl Acetoacetate	MAE													
Methyl alcohol (SEE METHANOL)	MAL	5,000	5663	5778	32440	1.665	*****	103.6	*****	0.0	103.6	0.057	1.72	OK
Methyl Amyl Acetate	MAC	5,000	5033	5233	29379	1.635	*****	82.0	*****	0.0	82.0	0.047	1.68	OK
Methyl Amyl alcohol	MAA	5,000	5043	5209	29246	1.635	*****	82.4	*****	0.0	82.4	0.046	1.68	OK
Methyl Amyl Ketone	MAK													
Methyl Butanol, SEE THE AMYL ALCOHOLS														
Methyl Butenol	MBL													
Methyl n-Butyl Ketone	MBK	5,000	5097	5465	30685	1.665	*****	83.9	*****	0.0	83.9	0.051	1.72	OK
Methyl Butynol	MBY													
Methyl Butyrate	MBU	5,000	5126	5608	31485	1.665	*****	84.9	*****	0.0	84.9	0.054	1.72	OK
Methyl Ethyl Ketone	MEK	5,000	5450	6487	36421	1.695	*****	94.8	*****	0.0	94.8	0.071	1.77	OK
Methyl Formal (DIMETHYL FORMAL)	MTF	5,000	6542	10391	58343	1.815	*****	132.7	*****	0.0	132.7	0.177	1.99	OK
Methyl Heptyl Ketone	MHK	5,000	5006	5042	28309	1.635	*****	81.4	*****	0.0	81.4	0.044	1.68	OK
Methyl Isobutyl Carbinol, SEE METHYL AMYL ALCOHOL	MIC													
Methyl Isobutyl Ketone	MIK	5,000	5115	5542	31116	1.665	*****	84.5	*****	0.0	84.5	0.052	1.72	OK
3-Methyl-3-Methoxybutanol														
3-Methyl-3-Methoxybutyl Acetate														
1-Methyl Naphthalene	MNA	5,000	5001	5007	28113	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Methyl Pentene														
2-METHYL-1-PENTENE	MPN	5,000	5630	7424	41684	1.725	*****	100.1	*****	0.0	100.1	0.092	1.82	OK
5-METHYL-1-PENTENE	MTN	5,000	5849	8263	46394	1.755	*****	107.3	*****	0.0	107.3	0.113	1.87	OK
N-Methyl-2-Pyrrolidone	MPY													
Methyl Tert-Butyl Ether (MTBE)	MBE	5,000	5004	5017	28169	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
Metolachlor	MCO													
Mineral spirits	MNS	5,000	5020	5121	28754	1.635	*****	81.8	*****	0.0	81.8	0.045	1.68	OK
Myrcene	MRE	5,000	5017	5114	28710	1.635	*****	81.7	*****	0.0	81.7	0.045	1.68	OK
NAPHTHA: Aromatic (Having less than 10% Benzene)														
NAPHTHA: Cracking fraction														
NAPHTHA: Heavy														

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CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX LIQUID TRANSF RATE (MLTR) Q1 (10) (BBL/ HR)	VAPOR- AIR MIX FLOW RATE Qv-a (11) (BBL/ HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/ HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU		PRESS @ TANK REMOTE Ptk	IS Ptk < MDWP		
						FM REMOTE	TK TO PV	FM REMOTE	TK TO PV	PIP'G REMOTE TANK	PIP'G PRESS @ TANK				
						TOTAL LOSS	TOTAL LOSS	GRAND TOTAL LOSS	GRAND TOTAL LOSS	GRAND TOTAL LOSS	GRAND TOTAL LOSS				
						HtotI (FT)	HtotII (FT)	Htot=I+II (FT)	Htot=I+II (FT)	Htot=I+II (FT)	Htot=I+II (FT)				

NAPHTHA: Paraffinic	PTN														
NAPHTHA: Petroleum	NSV	5,000	5020	5097	28617	1.635	*****	81.8	*****	0.0	81.8	0.045	1.68	OK	
NAPHTHA: Solvent	NSS	5,000	5020	5121	28754	1.635	*****	81.8	*****	0.0	81.8	0.045	1.68	OK	
NAPHTHA: Stoddard solvent	NVM	5,000	5019	5115	28720	1.635	*****	81.7	*****	0.0	81.7	0.045	1.68	OK	
NAPHTHA: Varnish makers' and painters' (75%)	NFS														
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt sol	NTI														
Naphthenic acid	NAX	5,000	5027	5168	29014	1.635	*****	81.9	*****	0.0	81.9	0.046	1.68	OK	
Nonane (all isomers)	NAN	5,000	5027	5168	29014	1.635	*****	81.9	*****	0.0	81.9	0.046	1.68	OK	
NONANE	NNA														
Nonanoic acid (all isomers)															
Nonanoic, Tridecanoic acid mixture															
Nonene	NON	5,000	5035	5211	29260	1.635	*****	82.1	*****	0.0	82.1	0.047	1.68	OK	
Nonyl alcohol (all isomers)	NNS	5,000	5010	5072	28475	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK	
NONYL ALCOHOL	NNN	5,000	5010	5072	28475	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK	
NONYL ALCOHOL (iso-)	NNI	5,000	5010	5072	28475	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68	OK	
Nonyl Methacrylate Monomer															
Nonyl Phenol	NNP	5,000	5001	5011	28136	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
Nonyl Phenol Poly(4-12)ethoxylates	NPE														
Nonyl Phenol Sulfide (90% or less)															
Noxious liquid, N.O.S. (17) ("Trade name," contains principal componen															
Non-Noxious liquid, N.O.S. (18) ("Trade name," contains principal comp															
Octadecene															
Octadecenoamide solution (Oleamide)	ODD														
Octane (all isomers)	OAX	5,000	5079	5426	30467	1.665	*****	83.3	*****	0.0	83.3	0.050	1.72	OK	
OCTANE	OAN	5,000	5079	5426	30467	1.665	*****	83.3	*****	0.0	83.3	0.050	1.72	OK	
Octanoic acid (all isomers)	OAA	5,000	5001	5007	28114	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
Octanol (all isomers)	OCX	5,000	5001	5006	28109	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
OCTANOL	OTA	5,000	5001	5006	28109	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
Octene (all isomers)	OTX	5,000	5090	5485	30795	1.665	*****	83.7	*****	0.0	83.7	0.051	1.72	OK	
OCTENE (1-)	OTE	5,000	5100	5532	31060	1.665	*****	84.0	*****	0.0	84.0	0.052	1.72	OK	
Octyl Acetate															
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	OCX	5,000	5001	5006	28109	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
OCTYL ALCOHOL	IOA	5,000	5001	5006	28109	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK	
Octyl Aldehydes	OAL														
Octyl Decyl Adipate	ODA														
Octyl Epoxytallate	OET														
Octyl Phthalate. SEE DI-(2-ETHYLHEXYL) PHTHALATE															
OIL, EDIBLE: Babassu	OB														
OIL, EDIBLE: Beechnut															
OIL, EDIBLE: Castor	OCA														
OIL, EDIBLE: Cocoa butter															
OIL, EDIBLE: Coconut	OCC														

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX VAPOR-				PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU				
		LIQUID	AIR					FM REMOTE TK TO PV	FM REMOTE TK TO PV	PIP'G	PRESS			
		TRANSF	MIX	REQUIRED AIR	PRESS					REMOTE	@			
		RATE	FLOW	EQUIVALENT	ACROSS					TANK	REMOTE			
		(MLTR)	RATE		PV					LOSS	LOSS	GRAND	TO P/V	TANK
		Q1	Qv-a	Qa	VALVE							Wv-a,11	PV +	Ptk <
		(10)	(11)	(12)	PV							* Htot	Ploss	MDWP
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)						Htot=	Ploss	Ptk
												I+II		
												(FT)	(PSI)	(PSI)

OIL, EDIBLE: Cod liver														
OIL, EDIBLE: Corn	OCO													
OIL, EDIBLE: Cottonseed	OCS													
OIL, EDIBLE: Fish, N.O.S.	OFS													
OIL, EDIBLE: Grapeseed														
OIL, EDIBLE: Groundnut														
OIL, EDIBLE: Hazelnut														
OIL, EDIBLE: Lard	OLD													
OIL, EDIBLE: Maize														
OIL, EDIBLE: Mustard seed														
OIL, EDIBLE: Nutmeg Butter														
OIL, EDIBLE: Olive	OOL													
OIL, EDIBLE: Palm	OPM													
OIL, EDIBLE: Palm kernel	OPO													
OIL, EDIBLE: Peanut	OPN													
OIL, EDIBLE: Poppy														
OIL, EDIBLE: Raisin seed														
OIL, EDIBLE: Rice bran	ORP													
OIL, EDIBLE: Safflower	OSF													
OIL, EDIBLE: Salad														
OIL, EDIBLE: Sesame														
OIL, EDIBLE: Soya bean	OSB													
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED														
OIL, EDIBLE: Sunflower seed	OSN													
OIL, EDIBLE: Tucum	OTC													
OIL, EDIBLE: Vegetable, N.O.S.	OVG													
OIL, EDIBLE: Walnut														
OIL, FUEL: No. 1 (Kerosene)	OON													
OIL, FUEL: No. 1-D	OOD													
OIL, FUEL: No. 2	OTW	5,000	5056	5635	31636	1.665	*****	82.2	*****	0.0	82.2	0.054	1.72	OK
OIL, FUEL: No. 2-D	OTD													
OIL, FUEL: No. 4	OFR	5,000	5015	5070	28469	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
OIL, FUEL: No. 5	OFV	5,000	5015	5070	28469	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
OIL, FUEL: No. 6	OSX	5,000	5015	5070	28469	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
OIL, MISC: Absorption	OAS													
OIL, MISC: Aliphatic														
OIL, MISC: Animal, N.O.S.														
OIL, MISC: Aromatic														
OIL, MISC: Aviation F2300														
OIL, MISC: Clarified	OCF													
OIL, MISC: Coal														
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHYL														

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX LIQUID TRANSF RATE (MLTR) Q1 (10) (BBL/ HR)	VAPOR- AIR MIX FLOW RATE Qv-a (11) (BBL/ HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/ HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS		PIPE SECT II: LOSS		GRAND TOTAL LOSS Htot= I+II (FT)	PRESS DROP THRU PIP'G REMOTE TANK TO P/V Wv-a,11 * Htot Ploss (PSI)	PRESS @ REMOTE TANK PV + Ploss Ptk (PSI)	IS Ptk < MDWP
						FM REMOTE TK TO PV		FM REMOTE TK TO PV					
						TOTAL		TOTAL					
						LOSS		LOSS					
						HtotI		HtotII					
***						(FT)		(FT)					
OIL, MISC: Coconut oil, fatty acid													
OIL, MISC: Coconut oil, fatty acid Methyl Ester OCM													
OIL, MISC: Coconut oil, Methyl Ester, SEE COCONUT OIL FATTY ACID METHY													
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACIDCFY													
OIL, MISC: Croton													
OIL, MISC: Crude OIL 5,000 6250 6319 35479 1.695 ***** 125.6 ***** 0.0 125.6 0.068 1.76 OK													
OIL, MISC: Diesel ODS 5,000 5069 5322 29880 1.635 ***** , 83.1 ***** 0.0 83.1 0.048 1.68 OK													
OIL, MISC: Gas, low pour													
OIL, MISC: Gas, low sulfur													
OIL, MISC: Heartcut distillate													
OIL, MISC: Lanolin													
OIL, MISC: Linseed													
OIL, MISC: Lubricating OLB 5,000 5015 5015 28158 1.635 ***** 81.7 ***** 0.0 81.7 0.043 1.68 OK													
OIL, MISC: Mineral													
OIL, MISC: Mineral seal OMS													
OIL, MISC: Motor OMT													
OIL, MISC: Neatsfoot ONF													
OIL, MISC: Oiticica OOI													
OIL, MISC: Palm oil, fatty acid Methyl Ester OPE													
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID MOPE													
OIL, MISC: Penetrating OPT													
OIL, MISC: Perilla													
OIL, MISC: Pilchard													
OIL, MISC: Pine OPI													
OIL, MISC: Range ORG													
OIL, MISC: Residual													
OIL, MISC: Resin ORS 5,000 5015 5015 28158 1.635 ***** 81.7 ***** 0.0 81.7 0.043 1.68 OK													
OIL, MISC: Resinous petroleum													
OIL, MISC: Road ORD													
OIL, MISC: Rosin ORN													
OIL, MISC: Seal													
OIL, MISC: Soapstock OIS													
OIL, MISC: Soya bean (epoxidized)													
OIL, MISC: Sperm OSP													
OIL, MISC: Spindle OSD													
OIL, MISC: Spray OSY													
OIL, MISC: Tall OTL													
OIL, MISC: Tall, fatty acid TOF													
OIL, MISC: Tanner's OTN													
OIL, MISC: Transformer OTF													
OIL, MISC: Tung OTG													
OIL, MISC: Turbine OTB 5,000 5030 5231 29370 1.635 ***** 81.9 ***** 0.0 81.9 0.047 1.68 OK													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR "VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE														
CARGO	C H R I S	MAX	VAPOR-					PIPE SECT I: LOSS	PIPE SECT II: LOSS	PRESS				
		LIQUID	AIR					FM REMOTE TK TO PV	FM REMOTE TK TO PV	THRU	PIP'G	PRESS		
		TRANSF	MIX	REQUIRED AIR	PRESS					REMOTE	@	REMOTE		
		RATE	FLOW	EQUIVALENT	ACROSS					TANK	REMOTE			
		(MLTR)	RATE		PV					LOSS	LOSS	TOTAL	IS	
		Q1	Qv-a	Qa	VALVE									
		(10)	(11)	(12)	PV			HtotI		HtotII	Htot=	Wv-a,11	PV +	Ptk <
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)		(FT)		(FT)	I+II (FT)	* Htot	Ploss	MDWP
												(PSI)	(PSI)	
OIL, MISC: Whale														
OIL, MISC: White (mineral)														
OIL, MISC: Wood														
alpha-Olefins (C13 - C18)														
Olefins (C13 and above, all isomers)														
Oleic acid														
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)														
Organic Amine 70, SEE AMINOETHYLDIETHANOLAMINE, AMINOETHYL-ETHANOLAMIN														
Palm Stearin														
n-Paraffins (C10 - C20)														
Pentadecanol, SEE SEE ALCOHOLS (C13 AND ABOVE)														
Pentaethylene Glycol														
Pentaethylenhexamine														
Pentane (all isomers)														
PENTANE (iso-)														
PENTANE (n-)														
Pentanoic acid														
Pentene (all isomers)														
PENTENE (1-)														
Petrolatum														
1-Phenyl-1-Xyllyl Ethane														
Phosphosulfurized Bicyclic Terpene														
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES														
Pinene														
Polyalkenyl Succinic Anhydride Amine														
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtur														
Polyalkylene Oxide Polyol														
Polamine, Amide mixture														
Polybutadiene, Hydroxyl terminated														
Polybutene														
Polydimethylsiloxane														
Polyethylene Glycol														
Polyethylene Glycol Dimethyl Ether														
Polyglycerol														
Polyisobutylene, SEE POLYBUTENE														
Polymerized Esters														
Poly(20)oxyethylene Sorbitan Monooleate														
Polypropylene														
Polypropylene Glycol														
Polypropylene Glycol Methyl Ether														
Polysiloxane														
Polystyrene Diakyl Maleate														

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX	VAPOR-	PIPE SECT I: LOSS				PIPE SECT II: LOSS				THRU	PRESS	IS
		LIQUID	AIR	FM REMOTE TK TO PV		FM REMOTE TK TO PV		PIP'G	@					
		TRANSF	MIX	ACROSS		TOTAL		TOTAL		TANK	REMOTE			
		RATE	FLOW	REQUIRED AIR	PRESS	LOSS	LOSS	TO P/V	PV +					
		(MLTR)	RATE	-----	PV	LOSS	LOSS	GRAND	TOTAL	Wv-a, 11	TANK	Ptk <		
		Q1	Qv-a	Qa	VALVE	HtotI	HtotII	Htot=	LOSS	* Htot	Ploss	MDWP		
		(10)	(11)	(12)	PV	(FT)	(FT)	I+II	(FT)	(PSI)	(PSI)			
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)								
Potassium Oleate	POE													
Propane	PRP													
n-Propoxypropanol	PXP													
Propyl Acetate (iso-)	IAC	5,000	5180	5861	32905	1.665	*****	86.3	*****	0.0	86.3	0.058	1.72	OK
Propyl Acetate (n-)	PAT	5,000	5185	5884	33036	1.665	*****	86.5	*****	0.0	86.5	0.059	1.72	OK
Propyl alcohol (iso-)	IPA	5,000	5300	5801	32573	1.665	*****	90.3	*****	0.0	90.3	0.057	1.72	OK
Propyl alcohol (n-)	PAL	5,000	5120	5319	29865	1.635	*****	84.8	*****	0.0	84.8	0.048	1.68	OK
Propylbenzene (n-)	PBZ	5,000	5020	5116	28727	1.635	*****	81.8	*****	0.0	81.8	0.045	1.68	OK
iso-Propylcyclohexane	IPX	5,000	5001	5006	28108	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Propylene	PPL													
Propylene-Butylene Copolymer	PBP													
Propylene Dimer	PDR													
Propylene Glycol (1,2-PROPANDIOL)	PPG	5,000	5001	5004	28093	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Propylene Glycol Monoalkyl Ether	PGE													
Propylene Glycol Ethyl Ether	PGY													
Propylene Glycol Methyl Ether	PME	5,000	5070	5296	29736	1.635	*****	83.1	*****	0.0	83.1	0.048	1.68	OK
Propylene Polymer (in liquid mixtures)														
Propylene Tetramer	PTT	5,000	5002	5002	28085	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
Propylene Trimer	PTR													
Pseudocumene, SEE TRIMETHYLBENZENES														
Rum														
Sodium Acetate, Glycol, water solutions														
Sodium Acetate solution	SAN													
Sodium Benzoate solution	SBN													
Sodium Sulfonate														
Stearic acid	SRA													
Stearyl alcohol (Octadecanol)														
Sulfolane	SFL	5,000	5001	5006	28106	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Tallow	TLO													
Tallow alcohol, SEE ALCOHOLS (C13 AND ABOVE)														
Tallow fatty acid	TFD													
Tallow Alkyl Nitrile														
Tetradecanol	TTN													
1-Tetradecene, SEE THE OLEFIN OR ALPHA-OLEFIN ENTRIES	TTD	5,000	5001	5010	28129	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Tetradecylbenzene	TBD													
Tetraethylene Glycol	TTG	5,000	5001	5010	28128	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Tetrahydronaphthalene	THN	5,000	5004	5026	28219	1.635	*****	81.4	*****	0.0	81.4	0.043	1.68	OK
Tetrapropylbenzene, SEE ALKYL(C9-C17) BENZENES														
Toluene	TOL	5,000	5150	5637	31651	1.665	*****	85.7	*****	0.0	85.7	0.054	1.72	OK
Triaryphosphate														
Tributyl Phosphate	TBP													
Tricresyl Phosphate (less than 1% of the ortho isomer)	TCP	5,000	5001	5019	28180	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO		MAX	VAPOR-					PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU		IS
		C	LIQUID	AIR				FM REMOTE	TK TO PV	FM REMOTE	TK TO PV	PIP'G	PRESS	
		H	TRANSF	MIX	REQUIRED	AIR	PRESS					REMOTE	@	
		R	RATE	FLOW	EQUIVALENT	ACROSS		TOTAL		TOTAL	GRAND	TO P/V	TANK	
		I	(MLTR)	RATE			PV	LOSS		LOSS	LOSS	* Htot	Ploss	
S	Q1	Qv-a	Qa		VALVE		HtotI		HtotII	Htot=	Ploss	Ptk	MDWP	
	(10)	(11)	(12)		PV					I+II				
	(BBL/	(BBL/	(BBL/	(FT^3/										
	HR)	HR)	HR)	HR)	(PSI)		(FT)		(FT)	(FT)	(PSI)	(PSI)		
Tridecane	TRD	5,000	5002	5019	28178	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Tridecanoic acid														
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)	TDN	5,000	5001	5010	28130	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
1-Tridecene	TDC	5,000	5001	5009	28125	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Tridecylbenzene	TRB													
Triethylbenzene	TEB	5,000	5002	5016	28164	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Triethylene Glycol	TEG	5,000	5001	5008	28115	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Triethylene Glycol Butyl Ether														
Triethylene Glycol Butyl Ether mixture														
Triethylene Glycol di-(2-ethylbutyrate)	TGD													
Triethylene Glycol Ether mixture														
Triethylene Glycol Ethyl Ether	TGE													
Triethylene Glycol Methyl Ether														
Triethyl Phosphate	TPS	5,000	5002	5018	28176	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Triisooctyl Trimellitate														
Triisopropanolamine	TIP													
Trimethylbenzenes (all isomers)	TRE	5,000	5014	5083	28539	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
TRIMETHYL BENZENE (1,2,5-)	TMB	5,000	5014	5082	28531	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
TRIMETHYL BENZENE (1,2,3-)	TMD	5,000	5014	5082	28531	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TME	5,000	5014	5082	28531	1.635	*****	81.6	*****	0.0	81.6	0.044	1.68	OK
Trimethylol Propane Polyethoxylate	TPR													
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate														
2,2,4-Trimethyl-3-pentanol-1-isobutyrate	TMP													
Tripropylene, SEE PROPYLENE TRIMER														
Tripropylene Glycol	TGC													
Tripropylene Glycol Methyl Ether	TGM													
Trixylenyl Phosphate	TRP													
Turpentine	TPT													
Turpentine substitute (White spirit), SEE WHITE SPIRIT (LOW (15-20%) A														
Undecanol														
Undecene (1-)	UDC	5,000	5005	5038	28288	1.635	*****	81.4	*****	0.0	81.4	0.044	1.68	OK
Undecyl alcohol	UND	5,000	5001	5009	28122	1.635	*****	81.3	*****	0.0	81.3	0.043	1.68	OK
Undecylbenzene	UDB													
Vinyl Acetate-fumerate Copolymer														
Waxes:	WAX													
WAXES: Candelilla														
WAXES: Carnauba	WAX,													
WAXES: Paraffin	WAX,													
WAXES: Petroleum														
White spirit, SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)														
White spirit (low (15 - 20%) aromatic)	WSL													
Wine, SEE ALCOHOLIC BEVERAGES, N.O.S.														

E-3-1

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

CARGO

Wool grease
 Xylenes (ortho-, meta-, para-)
 XYLENE (M-)
 XYLENE (O-)
 XYLENE (P-)
 XYLENOL
 Zinc Dialkyldithiophosphate

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
 "VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

	MAX	VAPOR-				PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU		
C	LIQUID	AIR				FM REMOTE	TK TO PV	FM REMOTE	TK TO PV	PIP'G	PRESS	
H	TRANSF	MIX	REQUIRED AIR	PRESS						REMOTE	@	
R	RATE	FLOW	EQUIVALENT	ACROSS						TANK	REMOTE	
I	(MLTR)	RATE	-----	PV						TO P/V	TANK	IS
S	Q1	Qv-a	Qa	VALVE						LOSS	* Htot	Ptk
	(10)	(11)	(12)	PV			HtotI		HtotII	Htot=	Ploss	MDWP
	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)		(FT)		(FT)	I+II (FT)	(PSI)	(PSI)

XLX	5,000	5051	5258	29523	1.635	*****	82.6	*****	0.0	82.6	0.047	1.68 OK
XLM	5,000	5051	5258	29523	1.635	*****	82.6	*****	0.0	82.6	0.047	1.68 OK
XLO	5,000	5040	5203	29212	1.635	*****	82.3	*****	0.0	82.3	0.046	1.68 OK
XLP	5,000	5051	5258	29523	1.635	*****	82.6	*****	0.0	82.6	0.047	1.68 OK
XYL	5,000	5010	5051	28360	1.635	*****	81.5	*****	0.0	81.5	0.044	1.68 OK

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

TABLE III: MAX PRESSURE @ REMOTE TANK FOR
"VGR" * MAX ALLOWABLE LIQUID TRANSFER RATE

CARGO	C H R I S	MAX VAPOR-		PIPE SECT I: LOSS		PIPE SECT II: LOSS		THRU		PRESS				
		LIQUID	AIR	FM REMOTE TK TO PV		FM REMOTE TK TO PV		PIP'G	PRESS					
		TRANSF	MIX	REQUIRED AIR	PRESS			REMOTE	@					
		RATE	FLOW	EQUIVALENT	ACROSS			TANK	REMOTE					
		(MLTR)	RATE		PV	TOTAL	TOTAL	GRAND	TO P/V	TANK	IS			
		Q1	Qv-a	Qa	VALVE	LOSS	LOSS	LOSS	Wv-a,11	PV +	Ptk <			
		(10)	(11)	(12)	PV	HtotI	HtotII	Htot=	* Htot	Ploss	MDWP			
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(FT^3/ HR)	(PSI)	(FT)	(FT)	I+II	Ploss	Ptk			
		***							(FT)	(PSI)	(PSI)			
		46 CFR SUBCHAPTER D, BUT NOT TABLE 30.25-1												

AROMATIC RESIN OIL 60	ARS	5,000	5015	5015	28158	1.635	*****	81.7	*****	0.0	81.7	0.043	1.68	OK
AROMATIC RESIN OIL 80	ARS	5,000	5015	5015	28158	1.635	*****	81.7	*****	0.0	81.7	0.043	1.68	OK
AROMATIC RESIN OILS														
					</									

CONOCO, INC.

SUMMARY TABLE FOR "GASOLINE"

(VGR = 1.25) (S.G.mix = 2.911)

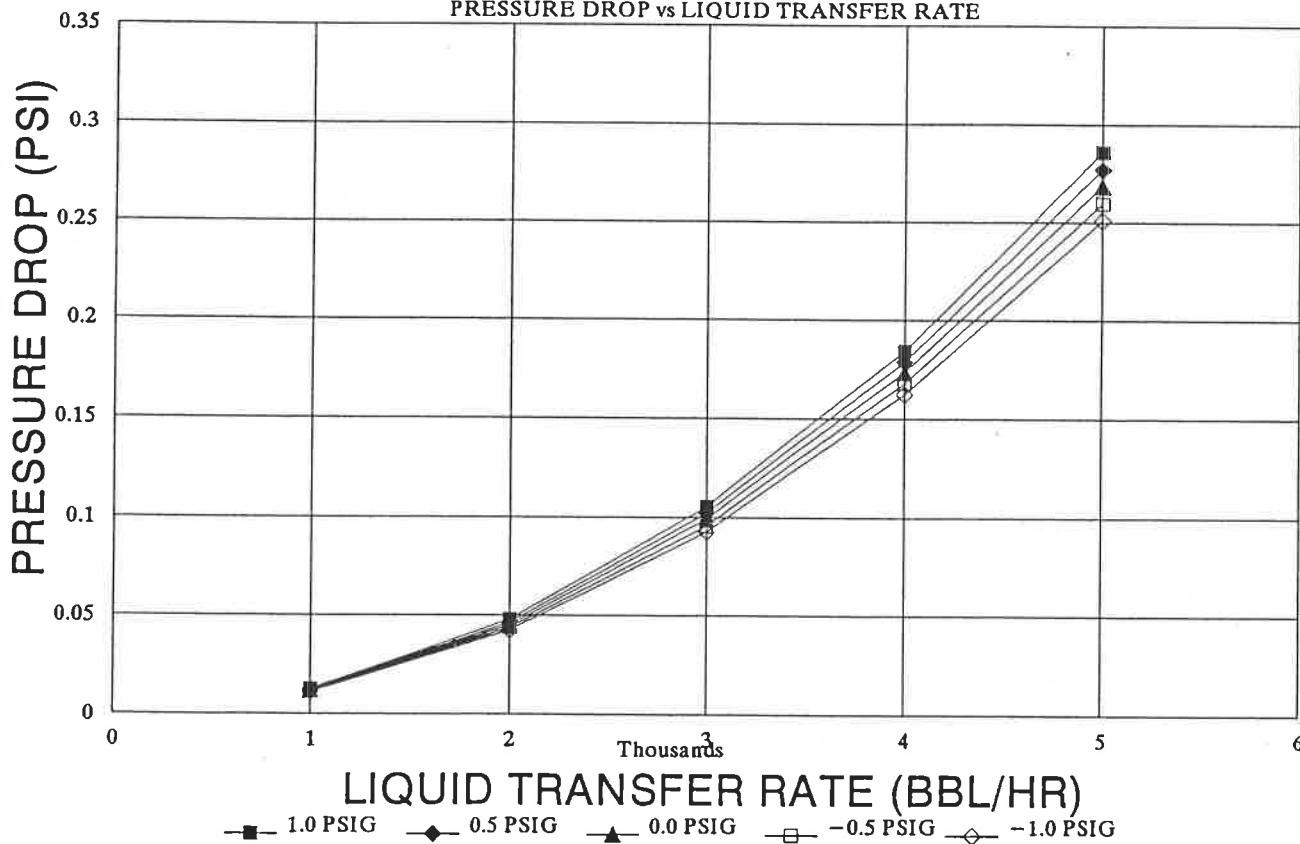
PRESSURE DROP VS LIQUID TRANSFER RATE
FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR CONNECTION
PRESSURE DROP IS BASED ON VAPOR-AIR MIX @ VGR * THE INDICATED LIQUID TRANSFER RATE
(TABULATED DATA IS FOR THE INDICATED PRESSURE AT THE SHORE CONNECTION)

LIQUID TRANSFER RATE				PRESSURE DROP (PSI)				
PERCENT MAX XFER RATE	LIQUID BBL PER HR	LIQUID GAL PER MIN	LIQUID CU FT PER MIN	1.0 PSIG PRESS. @ VAP. CONN.	0.5 PSIG PRESS. @ VAP. CONN.	0.0 PSIG PRESS. @ VAP. CONN.	-0.5 PSIG PRESS. @ VAP. CONN.	-1.0 PSIG PRESS. @ VAP. CONN.
20	1000.0	700.00	93.6	0.0126	0.0122	0.0118	0.0115	0.0111
40	2000.0	1400.00	187.2	0.0480	0.0464	0.0452	0.0436	0.0424
60	3000.0	2100.00	280.7	0.1055	0.1021	0.0991	0.0957	0.0926
80	4000.0	2800.00	374.3	0.1846	0.1790	0.1735	0.1679	0.1624
100*	5000.0	3500.00	467.9	0.2859	0.2771	0.2684	0.2596	0.2509

* MAXIMUM LIQUID TRANSFER RATE

GRAPH FOR "GASOLINE"

PRESSURE DROP vs LIQUID TRANSFER RATE



PRESSURE DROP IS BASED ON VAPOR-AIR MIX @ VGR * THE INDICATED LIQUID TRANSFER RATE
(TABULATED DATA IS FOR THE INDICATED PRESSURE AT THE SHORE CONNECTION)

(VGR = 1.25) (S.G.mix = 2.911)

DATA FOR VAPOR-AIR MIX PRESSURE DROP VS LIQUID TRANSFER RATE
FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR SHORE CONNECTION

CARGO = "GASOLINE"

VGR = 1.25

PRESSURE AT VESSEL VAPOR CONNECTION IS ASSUMED =

1.0 PSIG <--- *

	ITEM	DATA "SOURCE"	SYMBOL	UNITS	20 PERCENT VGR*MAX TRANSFER RATE	40 PERCENT VGR*MAX TRANSFER RATE	60 PERCENT VGR*MAX TRANSFER RATE	80 PERCENT VGR*MAX TRANSFER RATE	100 PERCENT VGR*MAX TRANSFER RATE
A	CARGO:								
	"GASOLINE"								
	SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
	SPEC WT VAP-AIR MIX	(SEE NOTE b)	W _s /W _{sav}	LBS/CU FT	0.215	0.215	0.215	0.215	0.215
E	ABS VISCOS. VAP-AIR MIX	INPUT (SEE NOTE c)	u	CENTIPOISE	0.0190	0.0190	0.0190	0.0190	0.0190
	"	D*2.09E-5	"	# SEC/FT^2	3.97E-07	3.97E-07	3.97E-07	3.97E-07	3.97E-07
	BARGE:								
	VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
	% OF VGR*MAX ALLOW TRANS RATE	x % * F	F _{cg}	BBL/HR	1250	2500	3750	5000	6250
I	"	G*42/60	"	GAL/MIN	875	1750	2625	3500	4375
	"	H/(7.48*60)	"	CU FT/SEC	1.950	3.899	5.849	7.799	9.748
	SHORE CONNECTION								
	PRESSURE @ REQ'D FLOW	INPUT	P2	PSIG	1.0	1.0	1.0	1.0	1.0
L	"	J +14.7	"	PSIA	15.7	15.7	15.7	15.7	15.7
	"	K*144	"	PSFA	2260.8	2260.8	2260.8	2260.8	2260.8
	VAP RECOV'Y PIPING: SECTION I								
	INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
	"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
P	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.3474	0.3474	0.3474	0.3474	0.3474
Q	ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
	LENGTH	INPUT (SEE NOTE d)	L	FEET	230	230	230	230	230
	ANALYSIS: SECTION I								
	VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
	COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE		0.5	0.5	0.5	0.5	0.5
T	COEFF.: HEAD LOSS, BENDS	INPUT (SEE NOTE e)	KB		0.972	0.972	0.972	0.972	0.972
U	NO. OF BENDS	INPUT	N		9	9	9	9	9
	COEFF.: HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
	COEFF.: HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
Y	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.245	0.978	2.201	3.912	6.113
Z	HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	4.279	17.116	38.512	68.465	106.977
	HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)	0.318	1.271	2.861	5.086	7.947
	HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
CC	REYNOLDS NO.	R*N*C/E*32.2	R		6.28E+04	1.26E+05	1.88E+05	2.51E+05	3.14E+05
DD	RELATIVE ROUGHNESS	P/N	e/D		0.00023	0.00023	0.00023	0.00023	0.00023
	MOODY DIAG FRICTION FACTOR	INPUT	f		0.02118	0.01892	0.01783	0.01711	0.01670
	HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	3.583	12.797	27.144	46.289	70.601
	HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	8.424	32.163	70.717	123.753	191.637
	VAP RECOV'Y PIPING: SECTION II								
M	INSIDE DIAMETER	INPUT	ID	INCHES	1.0E-14	1.0E-14	1.0E-14	1.0E-14	1.0E-14
N	"	M/12	"	FEET	0.0000	0.0000	0.0000	0.0000	0.0000
	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
	ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
	LENGTH	INPUT (SEE NOTE d)	L	FEET	0	0	0	0	0
	ANALYSIS: SECTION II								
R	VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	*****	*****	*****	*****	*****
	COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
	COEFF.: HEAD LOSS, PER BEND	INPUT (SEE NOTE e)	KB		0.000	0.000	0.000	0.000	0.000
U	NO. OF BENDS	INPUT	N		1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11
V	COEFF.: HEAD LOSS, VALVE	INPUT	KV		0	0	0	0	0
W	COEFF.: HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
	HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
Z	HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
A	HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
	REYNOLDS NO.	R*N*C/E*32.2	R		N/A	N/A	N/A	N/A	N/A
	RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
	MOODY DIAG FRICTION FACTOR	INPUT	f		N/A	N/A	N/A	N/A	N/A
E	HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
F	HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
	HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	8.424	32.163	70.717	123.753	191.637
	PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2262.61	2267.71	2275.99	2287.38	2301.96
	"	GG/144	"	PSIA	15.71	15.75	15.81	15.88	15.99
I	"	HH-14.7	"	PSIG	1.01	1.05	1.11	1.18	1.29
J	(P1 - P2) / P1	(HH-K) / HH			0.1%	0.3%	0.7%	1.2%	1.8%
	(P1 - P2) / P1 < 10% ??				YES	YES	YES	YES	YES
	(P1-P2)	(II-J)		PSI	0.0126	0.0480	0.1055	0.1846	0.2859

DATA FOR VAPOR-AIR MIX PRESSURE DROP VS LIQUID TRANSFER RATE
FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR SHORE CONNECTION

CARGO = "GASOLINE"

VGR = 1.25

PRESSURE AT VESSEL VAPOR CONNECTION IS ASSUMED =

0.5 PSIG <--- *

ITEM	DATA "SOURCE"	SYMBOL	UNITS	20 PERCENT VGR*MAX TRANSFER RATE	40 PERCENT VGR*MAX TRANSFER RATE	60 PERCENT VGR*MAX TRANSFER RATE	80 PERCENT VGR*MAX TRANSFER RATE	100 PERCENT VGR*MAX TRANSFER RATE
CARGO:								
"GASOLINE"								
SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT	0.208	0.208	0.208	0.208	0.208
ABS VISCOS. VAP-AIR MIX	INPUT (SEE NOTE c)	u	CENTIPOISE	0.0190	0.0190	0.0190	0.0190	0.0190
"	D*2.09E-5	"	# SEC/FT^2	3.97E-07	3.97E-07	3.97E-07	3.97E-07	3.97E-07
BARGE:								
VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR	1250	2500	3750	5000	6250
"	G*42/60	"	GAL/MIN	875	1750	2625	3500	4375
"	H/(7.48*60)	"	CU FT/SEC	1.950	3.899	5.849	7.799	9.748
SHORE CONNECTION								
SETTING	INPUT	P2	PSIG	0.5	0.5	0.5	0.5	0.5
"	J +14.7	"	PSIA	15.2	15.2	15.2	15.2	15.2
"	K*144	"	PSFA	2188.8	2188.8	2188.8	2188.8	2188.8
VAP RECOV'Y PIPING: SECTION I								
INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.3474	0.3474	0.3474	0.3474	0.3474
ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET	230	230	230	230	230
ANALYSIS: SECTION I								
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE		0.5	0.5	0.5	0.5	0.5
COEFF.: HEAD LOSS, BENDS	INPUT (SEE NOTE e)	KB		0.972	0.972	0.972	0.972	0.972
NO. OF BENDS	INPUT	N		9	9	9	9	9
COEFF.: HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
COEFF.: HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.245	0.978	2.201	3.912	6.113
HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	4.279	17.116	38.512	68.465	106.977
HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)	0.318	1.271	2.861	5.086	7.947
HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R		6.08E+04	1.22E+05	1.82E+05	2.43E+05	3.04E+05
RELATIVE ROUGHNESS	P/N	e/D		0.000226	0.000226	0.000226	0.000226	0.000226
MOODY DIAG FRICTION FACTOR	INPUT	f		0.02131	0.01892	0.01783	0.01719	0.01676
HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	3.605	12.797	27.144	46.515	70.850
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	8.446	32.163	70.717	123.978	191.887
VAP RECOV'Y PIPING: SECTION II								
INSIDE DIAMETER	INPUT	ID	INCHES	1.0E-14	1.0E-14	1.0E-14	1.0E-14	1.0E-14
"	M/12	"	FEET	0.0000	0.0000	0.0000	0.0000	0.0000
INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET	0	0	0	0	0
ANALYSIS: SECTION II								
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	*****	*****	*****	*****	*****
COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
COEFF.: HEAD LOSS, PER BEND	INPUT (SEE NOTE e)	KB		0.000	0.000	0.000	0.000	0.000
NO. OF BENDS	INPUT	N		1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11
COEFF.: HEAD LOSS, VALVE	INPUT	KV		0	0	0	0	0
COEFF.: HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R		N/A	N/A	N/A	N/A	N/A
RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
MOODY DIAG FRICTION FACTOR	INPUT	f		N/A	N/A	N/A	N/A	N/A
HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	8.446	32.163	70.717	123.978	191.887
PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2190.56	2195.49	2203.51	2214.58	2228.70
"	GG/144	"	PSIA	15.21	15.25	15.30	15.38	15.48
"	HH-14.7	"	PSIG	0.51	0.55	0.60	0.68	0.78
(P1 - P2) / P1	(HH-K) / HH			0.1%	0.3%	0.7%	1.2%	1.8%
(P1 - P2) / P1 < 10% ??				YES	YES	YES	YES	YES
(P1-P2)	(II-J)		PSI	0.0122	0.0464	0.1021	0.1790	0.2771

DATA FOR VAPOR-AIR MIX PRESSURE DROP VS LIQUID TRANSFER RATE
FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR SHORE CONNECTION

CARGO = "GASOLINE"

VGR = 1.25

PRESSURE AT VESSEL VAPOR CONNECTION IS ASSUMED = 0.0 PSIG <--- *

ITEM	DATA "SOURCE"	SYMBOL	UNITS	20 PERCENT VGR*MAX TRANSFER RATE	40 PERCENT VGR*MAX TRANSFER RATE	60 PERCENT VGR*MAX TRANSFER RATE	80 PERCENT VGR*MAX TRANSFER RATE	100 PERCENT VGR*MAX TRANSFER RATE
CARGO:								
"GASOLINE"								
SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT	0.201	0.201	0.201	0.201	0.201
ABS VISCOS. VAP-AIR MIX	INPUT (SEE NOTE c)	u	CENTIPOISE	0.0190	0.0190	0.0190	0.0190	0.0190
"	D*2.09E-5	"	# SEC/FT^2	3.97E-07	3.97E-07	3.97E-07	3.97E-07	3.97E-07
BARGE:								
VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR	1250	2500	3750	5000	6250
"	G*42/60	"	GAL/MIN	875	1750	2625	3500	4375
"	H/(7.48*60)	"	CU FT/SEC	1.950	3.899	5.849	7.799	9.748
SHORE CONNECTION								
SETTING	INPUT	P2	PSIG	0.0	0.0	0.0	0.0	0.0
"	J +14.7	"	PSIA	14.7	14.7	14.7	14.7	14.7
"	K*144	"	PSFA	2116.8	2116.8	2116.8	2116.8	2116.8
VAP RECOV'Y PIPING: SECTION I								
INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.3474	0.3474	0.3474	0.3474	0.3474
ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET	230	230	230	230	230
ANALYSIS: SECTION I								
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
COEFF.:HEAD LOSS, ENTRANCE	INPUT	KE		0.5	0.5	0.5	0.5	0.5
COEFF.:HEAD LOSS, BENDS	INPUT (SEE NOTE e)	KB		0.972	0.972	0.972	0.972	0.972
NO. OF BENDS	INPUT	N		9	9	9	9	9
COEFF.:HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
COEFF.:HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.245	0.978	2.201	3.912	6.113
HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	4.279	17.116	38.512	68.465	106.977
HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)	0.318	1.271	2.861	5.086	7.947
HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R		5.88E+04	1.18E+05	1.76E+05	2.35E+05	2.94E+05
RELATIVE ROUGHNESS	P/N	e/D		0.000226	0.000226	0.000226	0.000226	0.000226
MOODY DIAG FRICTION FACTOR	INPUT	f		0.02145	0.01918	0.01797	0.01728	0.01682
HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	3.628	12.974	27.357	46.756	71.113
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	8.469	32.340	70.930	124.219	192.150
VAP RECOV'Y PIPING: SECTION II								
INSIDE DIAMETER	INPUT	ID	INCHES	1.0E-14	1.0E-14	1.0E-14	1.0E-14	1.0E-14
"	M/12	"	FEET	0.0000	0.0000	0.0000	0.0000	0.0000
INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET	0	0	0	0	0
ANALYSIS: SECTION II								
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	*****	*****	*****	*****	*****
COEFF.:HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
COEFF.:HEAD LOSS, PER BEND	INPUT (SEE NOTE e)	KB		0.000	0.000	0.000	0.000	0.000
NO. OF BENDS	INPUT	N		1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11
COEFF.:HEAD LOSS, VALVE	INPUT	KV		0	0	0	0	0
COEFF.:HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R		N/A	N/A	N/A	N/A	N/A
RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
MOODY DIAG FRICTION FACTOR	INPUT	f		N/A	N/A	N/A	N/A	N/A
HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	8.469	32.340	70.930	124.219	192.150
PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2118.50	2123.30	2131.07	2141.78	2155.44
"	GG/144	"	PSIA	14.71	14.75	14.80	14.87	14.97
"	HH-14.7	"	PSIG	0.01	0.05	0.10	0.17	0.27
(P1 - P2) / P1	(HH-K) / HH			0.1%	0.3%	0.7%	1.2%	1.8%
(P1 - P2) / P1 < 10% ??				YES	YES	YES	YES	YES
(P1-P2)	(II-J)		PSI	0.0118	0.0452	0.0991	0.1735	0.2684

DATA FOR VAPOR-AIR MIX PRESSURE DROP VS LIQUID TRANSFER RATE
FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR SHORE CONNECTION

CARGO = "GASOLINE"

VGR = 1.25

PRESSURE AT VESSEL VAPOR CONNECTION IS ASSUMED =

-0.5 PSIG ---- *

ITEM	DATA "SOURCE"	SYMBOL	UNITS	20 PERCENT VGR*MAX TRANSFER RATE	40 PERCENT VGR*MAX TRANSFER RATE	60 PERCENT VGR*MAX TRANSFER RATE	80 PERCENT VGR*MAX TRANSFER RATE	100 PERCENT VGR*MAX TRANSFER RATE
CARGO:								
"GASOLINE"								
SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
SPEC WT VAP-AIR MIX	(SEE NOTE b)	W _s /W _{sav}	LBS/CU FT	0.194	0.194	0.194	0.194	0.194
ABS VISCOS. VAP-AIR MIX	INPUT (SEE NOTE c)	u	CENTIPOISE	0.0190	0.0190	0.0190	0.0190	0.0190
"	D*2.09E-5	"	# SEC/FT ²	3.97E-07	3.97E-07	3.97E-07	3.97E-07	3.97E-07
BARGE:								
VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
% OF VGR*MAX ALLOW TRANS RATE	x % * F	F _{cg}	BBL/HR	1250	2500	3750	5000	6250
"	G*42/60	"	GAL/MIN	875	1750	2625	3500	4375
"	H/(7.48*60)	"	CU FT/SEC	1.950	3.899	5.849	7.799	9.748
SHORE CONNECTION								
SETTING	INPUT	P2	PSIG	-0.5	-0.5	-0.5	-0.5	-0.5
"	J +14.7	"	PSIA	14.2	14.2	14.2	14.2	14.2
"	K*144	"	PSFA	2044.8	2044.8	2044.8	2044.8	2044.8
VAP RECOV'Y PIPING: SECTION I								
INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
INSIDE AREA	3.14159*N ² /4	IA	SQ FT	0.3474	0.3474	0.3474	0.3474	0.3474
ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET	230	230	230	230	230
ANALYSIS: SECTION I								
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE		0.5	0.5	0.5	0.5	0.5
COEFF.: HEAD LOSS, BENDS	INPUT (SEE NOTE e)	KB		0.972	0.972	0.972	0.972	0.972
NO. OF BENDS	INPUT	N		9	9	9	9	9
COEFF.: HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
COEFF.: HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R ² /2*32.2)	HE	FT PROD. (GAS)	0.245	0.978	2.201	3.912	6.113
HEAD LOSS: BENDS	U*T*(R ² /2*32.2)	HB	FT PROD. (GAS)	4.279	17.116	38.512	68.465	106.977
HEAD LOSS: VALVE	V*(R ² /2*32.2)	HV	FT PROD. (GAS)	0.318	1.271	2.861	5.086	7.947
HEAD LOSS: EXIT	W*(R ² /2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R		5.68E+04	1.14E+05	1.70E+05	2.27E+05	2.84E+05
RELATIVE ROUGHNESS	P/N	e/D		0.000226	0.000226	0.000226	0.000226	0.000226
MOODY DIAG FRICTION FACTOR	INPUT	f		0.02159	0.01918	0.01797	0.01737	0.01689
HEAD LOSS: PIPE	DD*(Q/N)*(R ² /2*32.2)	HP	FT PROD. (GAS)	3.652	12.974	27.357	47.013	71.391
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	8.493	32.340	70.930	124.477	192.427
VAP RECOV'Y PIPING: SECTION II								
INSIDE DIAMETER	INPUT	ID	INCHES	1.0E-14	1.0E-14	1.0E-14	1.0E-14	1.0E-14
"	M/12	"	FEET	0.0000	0.0000	0.0000	0.0000	0.0000
INSIDE AREA	3.14159*N ² /4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET	0	0	0	0	0
ANALYSIS: SECTION II								
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC	*****	*****	*****	*****	*****
COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
COEFF.: HEAD LOSS, PER BEND	INPUT (SEE NOTE e)	KB		0.000	0.000	0.000	0.000	0.000
NO. OF BENDS	INPUT	N		1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11
COEFF.: HEAD LOSS, VALVE	INPUT	KV		0	0	0	0	0
COEFF.: HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R ² /2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: BENDS	U*T*(R ² /2*32.2)	HB	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: VALVE	V*(R ² /2*32.2)	HV	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: EXIT	W*(R ² /2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R		N/A	N/A	N/A	N/A	N/A
RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
MOODY DIAG FRICTION FACTOR	INPUT	f		N/A	N/A	N/A	N/A	N/A
HEAD LOSS: PIPE	DD*(Q/N)*(R ² /2*32.2)	HP	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HL _{tot}	FT PROD. (GAS)	8.493	32.340	70.930	124.477	192.427
PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2046.45	2051.08	2058.58	2068.98	2082.18
"	GG/144	"	PSIA	14.21	14.24	14.30	14.37	14.46
"	HH-14.7	"	PSIG	-0.49	-0.46	-0.40	-0.33	-0.24
(P1 - P2) / P1	(HH-K) / HH			0.1%	0.3%	0.7%	1.2%	1.8%
(P1 - P2) / P1 < 10% ??				YES	YES	YES	YES	YES
(P1 - P2)	(II-J)		PSI	0.0115	0.0436	0.0957	0.1679	0.2596

DATA FOR VAPOR-AIR MIX PRESSURE DROP VS LIQUID TRANSFER RATE FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR SHORE CONNECTION					20	40	60	80	100
CARGO = "GASOLINE" VGR = 1.25					PERCENT	PERCENT	PERCENT	PERCENT	PERCENT
PRESSURE AT VESSEL VAPOR CONNECTION IS ASSUMED = -1.0 PSIG <--- *					VGR*MAX	VGR*MAX	VGR*MAX	VGR*MAX	VGR*MAX
ITEM	DATA "SOURCE"	SYMBOL	UNITS		TRANSFER	TRANSFER	TRANSFER	TRANSFER	TRANSFER
					RATE	RATE	RATE	RATE	RATE
CARGO									
"GASOLINE"									
SPEC GRAV VAP-AIR MIX	INPUT	SG			2.911	2.911	2.911	2.911	2.911
SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT		0.187	0.187	0.187	0.187	0.187
ABS VISCOS. VAP-AIR MIX	INPUT (SEE NOTE c)	u	CENTIPOISE		0.0190	0.0190	0.0190	0.0190	0.0190
"	D*2.09E-5	"	# SEC/FT^2		3.97E-07	3.97E-07	3.97E-07	3.97E-07	3.97E-07
BARGE:									
VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR		6250	6250	6250	6250	6250
% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR		1250	2500	3750	5000	6250
"	G*42/60	"	GAL/MIN		875	1750	2625	3500	4375
"	H/(7.48*60)	"	CU FT/SEC		1.950	3.899	5.849	7.799	9.748
SHORE CONNECTION									
SETTING	INPUT	P2	PSIG		-1.0	-1.0	-1.0	-1.0	-1.0
"	J +14.7	"	PSIA		13.7	13.7	13.7	13.7	13.7
"	K*144	"	PSFA		1972.8	1972.8	1972.8	1972.8	1972.8
VAP RECOV'Y PIPING: SECTION I									
INSIDE DIAMETER	INPUT	ID	INCHES		7.981	7.981	7.981	7.981	7.981
"	M/12	"	FEET		0.6651	0.6651	0.6651	0.6651	0.6651
INSIDE AREA	3.14159*N^2/4	IA	SQ FT		0.3474	0.3474	0.3474	0.3474	0.3474
ROUGHNESS OF PIPE	INPUT	e	FEET		0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET		230	230	230	230	230
ANALYSIS: SECTION I									
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC		5.61	11.22	16.84	22.45	28.06
COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE			0.5	0.5	0.5	0.5	0.5
COEFF.: HEAD LOSS, BENDS	INPUT (SEE NOTE e)	KB			0.972	0.972	0.972	0.972	0.972
NO. OF BENDS	INPUT	N			9	9	9	9	9
COEFF.: HEAD LOSS, VALVE	INPUT	KV			0.65	0.65	0.65	0.65	0.65
COEFF.: HEAD LOSS, EXIT	INPUT	KX			0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)		0.245	0.978	2.201	3.912	6.113
HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)		4.279	17.116	38.512	68.465	106.977
HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)		0.318	1.271	2.861	5.086	7.947
HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)		0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R			5.48E+04	1.10E+05	1.64E+05	2.19E+05	2.74E+05
RELATIVE ROUGHNESS	P/N	e/D			0.000226	0.000226	0.000226	0.000226	0.000226
MOODY DIAG FRICTION FACTOR	INPUT	f			0.02174	0.01948	0.01813	0.01748	0.01695
HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)		3.677	13.177	27.590	47.290	71.685
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)		8.519	32.542	71.163	124.753	192.721
VAP RECOV'Y PIPING: SECTION II									
INSIDE DIAMETER	INPUT	ID	INCHES		1.0E-14	1.0E-14	1.0E-14	1.0E-14	1.0E-14
"	M/12	"	FEET		0.0000	0.0000	0.0000	0.0000	0.0000
INSIDE AREA	3.14159*N^2/4	IA	SQ FT		0.0000	0.0000	0.0000	0.0000	0.0000
ROUGHNESS OF PIPE	INPUT	e	FEET		0.00015	0.00015	0.00015	0.00015	0.00015
LENGTH	INPUT (SEE NOTE d)	L	FEET		0	0	0	0	0
ANALYSIS: SECTION II									
VELOC. THRU VAP REC PIPING	I/O	V	FT/SEC		*****	*****	*****	*****	*****
COEFF.: HEAD LOSS, ENTRANCE	INPUT	KE			0	0	0	0	0
COEFF.: HEAD LOSS, PER BEND	INPUT (SEE NOTE e)	KB			0.000	0.000	0.000	0.000	0.000
NO. OF BENDS	INPUT	N			1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11
COEFF.: HEAD LOSS, VALVE	INPUT	KV			0	0	0	0	0
COEFF.: HEAD LOSS, EXIT	INPUT	KX			0	0	0	0	0
HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)		0.000	0.000	0.000	0.000	0.000
HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)		0.000	0.000	0.000	0.000	0.000
HEAD LOSS: VALVE	V*(R^2/2*32.2)	HV	FT PROD. (GAS)		0.000	0.000	0.000	0.000	0.000
HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)		0.000	0.000	0.000	0.000	0.000
REYNOLDS NO.	R*N*C/E*32.2	R			N/A	N/A	N/A	N/A	N/A
RELATIVE ROUGHNESS	P/N	e/D			1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
MOODY DIAG FRICTION FACTOR	INPUT	f			N/A	N/A	N/A	N/A	N/A
HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)		0.000	0.000	0.000	0.000	0.000
HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)		0.000	0.000	0.000	0.000	0.000
HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)		8.519	32.542	71.163	124.753	192.721
PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA		1974.40	1978.90	1986.14	1996.18	2008.92
"	GG/144	"	PSIA		13.71	13.74	13.79	13.86	13.95
"	HH-14.7	"	PSIG		-0.99	-0.96	-0.91	-0.84	-0.75
(P1 - P2) / P1	(HH-K) / HH				0.1%	0.3%	0.7%	1.2%	1.8%
(P1 - P2) / P1 < 10% ??					YES	YES	YES	YES	YES
(P1 - P2)	(II-J)		PSI		0.0111	0.0424	0.0926	0.1624	0.2509

FOR TRANSFER RATE VS PRESSURE DROP

NOTES:

- a. 46 CFR 39.30.1 (b) REQUIRES THAT, FOR GASOLINE, CRUDE OIL, AND BENZENE, PRESSURE DROP THROUGH THE VAPOR COLLECTION SYSTEM FROM THE MOST REMOTE CARGO TANK TO THE VESSEL VAPOR CONNECTION MUST BE DETERMINED BASED ON A 50 PERCENT CARGO VAPOR AND AIR MIXTURE. PER DALTON'S LAW OF PARTIAL PRESSURES, AND ASSUMING THE MIXTURE IS 50/50 BY VOLUME, THE SPECIFIC GRAVITY OF THE MIXTURE CAN BE DETERMINED AS FOLLOWS:

$$SG_{mix} = \{ (N/2) * MW_{air} \} + \{ (N/2) * MW_{cargo} \} / (N * MW_{air}) \quad \text{WHERE}$$

N = TOTAL NO. MOLECULES PER UNIT VOLUME MW_{air} = MOLECULAR WEIGHT OF AIR
MW_{cargo} = MOLECULAR WEIGHT OF CARGO VAPOR

$$SG_{mix} = 0.5 * (MW_{air} + MW_{cargo}) / MW_{air}$$

A CORRESPONDING RELATIONSHIP IN TERMS OF SPECIFIC GRAVITY IS:

$$SG_{mix} = (SG_{air} + SG_{cargo}) / 2$$

FOR PRODUCTS OTHER THAN THOSE CITED ABOVE, THE SPECIFIC GRAVITY OF THE MIX CAN BE DETERMINED AS:

$$SG_{mix} = Wv-a,115 / Wa,115 \quad \text{WHERE}$$

Wv-a,115 = VAPOR-AIR MIX WEIGHT DENSITY, & Wa-115 = AIR WEIGHT DENSITY, BOTH AT 115 DEG F.

- b. THE SPECIFIC WEIGHT OF THE VAPOR/AIR MIXTURE IS OBTAINED BY MULTIPLYING THE SPECIFIC GRAVITY OF THE VAPOR/AIR MIXTURE BY THE WEIGHT OF AIR AS OBTAINED FROM THE FORMULA IN CRANE T.P. 410 (PAGE A-10) [I.E., $Ws = (M * P) / (10.72 * T)$ WHERE M IS THE MOLECULAR WEIGHT OF AIR (28.97), P IS PRESSURE IN PSIA (SEE BELOW), AND T IS ABSOLUTE TEMPERATURE IN RANKINE (F + 460) WITH T = 115 DEGREES FAHRENHEIT PER USCG GUIDANCE.

IF $(P1 - P2)/P1 < 10\%$ THE ASSUMPTION THAT $Ws = Ws1 = Ws2$ (WITH $Ws2$ EVALUATED @ P2) CAN BE CONSIDERED TO BE APPROPRIATE;

OTHERWISE, A SECOND ITERATION SHOULD BE PERFORMED USING

$$Ws = Ws_{av} = (Ws1 + Ws2) / 2 \quad \text{(WITH } Ws1 \text{ EVALUATED @ } P1 \text{ AND } Ws2 \text{ @ } P2).$$

- c. THE PRECISE VISCOSITY OF THE CARGO VAPOR-AIR MIXTURE IS NOT KNOWN; HOWEVER, THE VISCOSITY OF AIR @ 100 DEGREES F IS 0.019 CENTIPOISE (SEE CRANE T.P. 410 (PAGE A-5)).

FOR PURPOSES OF THESE CALCULATIONS, ASSUMPTION THAT THE VISCOSITY OF THE CARGO-AIR MIXTURE IS THAT OF AIR AT 100 DEGREES F IS CONSIDERED REASONABLE.

FOR REFERENCE AND COMPARISON, REPRESENTATIVE VALUES OF ABSOLUTE (DYNAMIC) VISCOSITY OF VARIOUS HYDROCARBON VAPOR AND NATURAL GASES MAY BE FOUND IN CRANE T.P. 410 (PAGE A-5).

"LENGTH" IS THE DISTANCE BETWEEN THE MOST REMOTE CARGO TANK VAPOR INLET AND THE VESSEL'S VAPOR CONNECTION, AND IS ESTIMATED CONSERVATIVELY HIGH.

BEND HEAD LOSS ASSUMES

SECTION I:

	QTY	LOSS COEFF.	QT	LOSS COEFF.
TEE (THRU RUN)	3	0.60 90 DEG EL L.R.1		0.75
TEE (THRU BRANCH)	3	1.80 90 DEG EL	0 N/A	
OTHER	0	0.75 45 DEG EL L.R.2		0.40
TOTAL QTY FITTINGS:	9	AVERAGE COEFF.:		0.972

SECTION II:

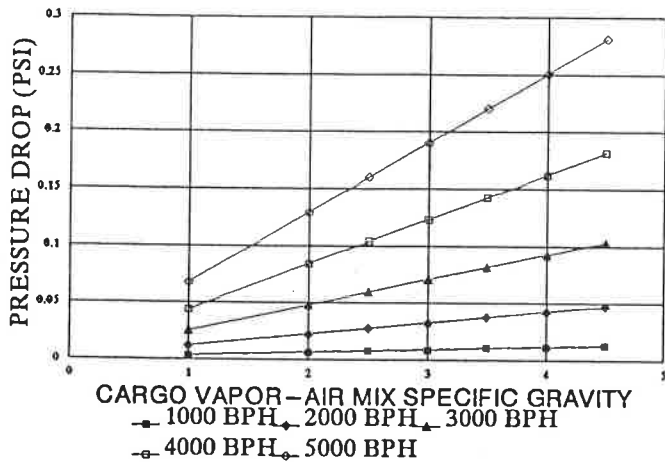
TEE (THRU RUN)	0	0.6 90 DEG EL L.R.0		0.75
TEE (THRU BRANCH)	0	1.8 90 DEG EL	0 N/A	
OTHER	0	0.75 45 DEG EL L.R.0		0.40
TOTAL QTY FITTINGS:	0	AVERAGE COEFF.:		0.000

BASED ON FROM DARCY'S EQUATION:

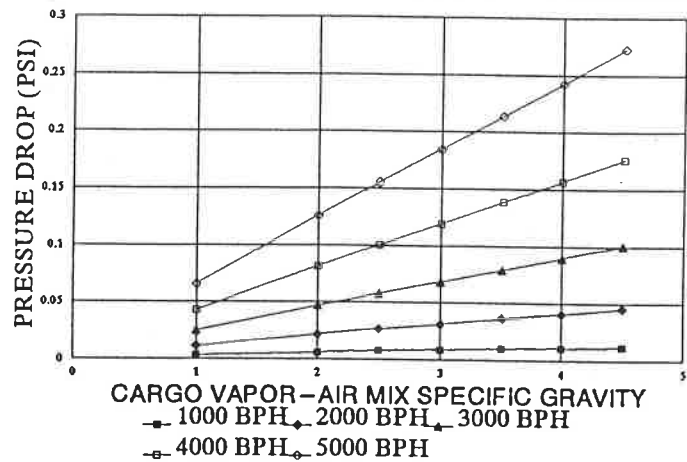
$$P1 - P2 = Ws * f * Leq * [V^2 / (2 * G)] / D \quad \text{(ADJUSTED AS REQ'D FOR UNIT COMPATIBILITY)}$$

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 100%

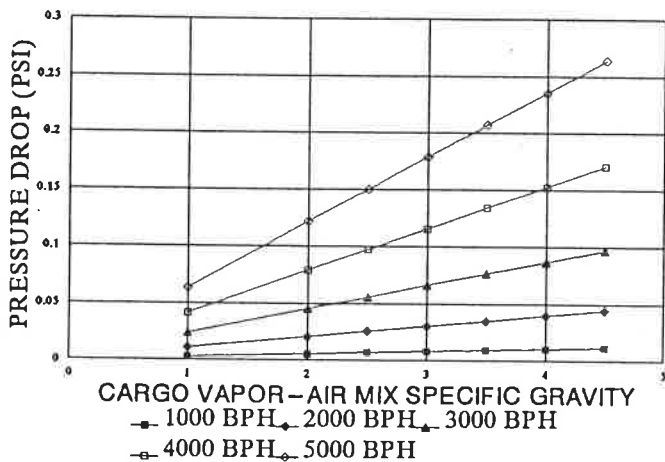
1.0 PSIG SHORE CONNECTION PRESSURE



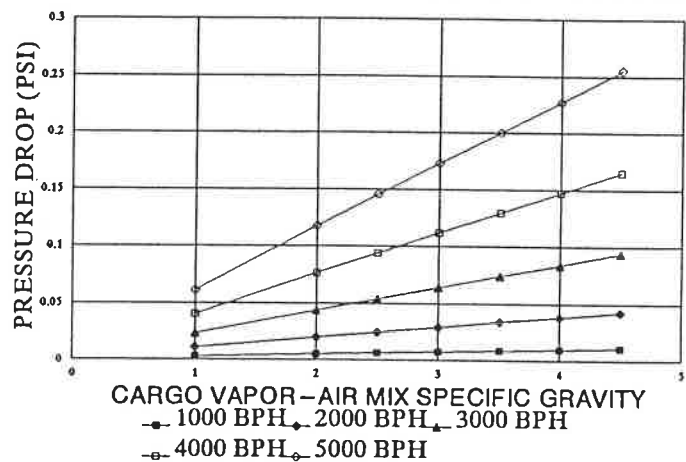
0.5 PSIG SHORE CONNECTION PRESSURE



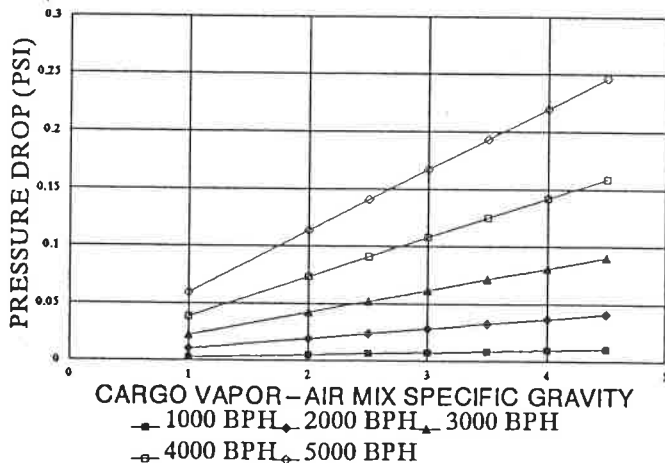
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

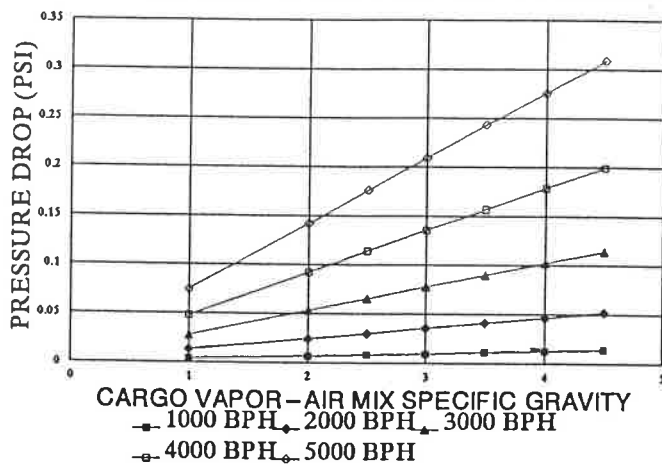
1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

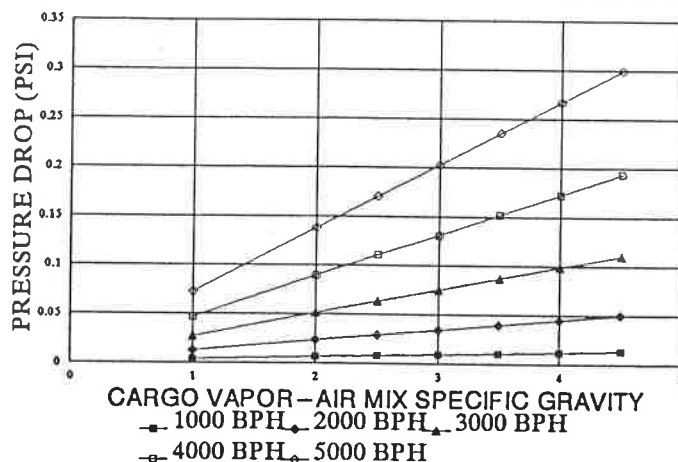
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 105%

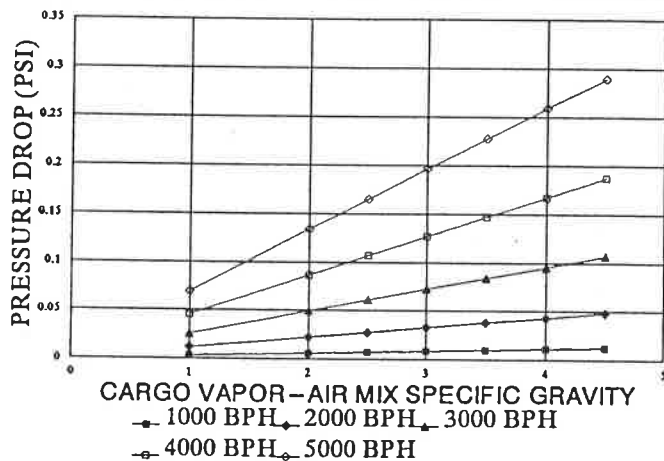
1.0 PSIG SHORE CONNECTION PRESSURE



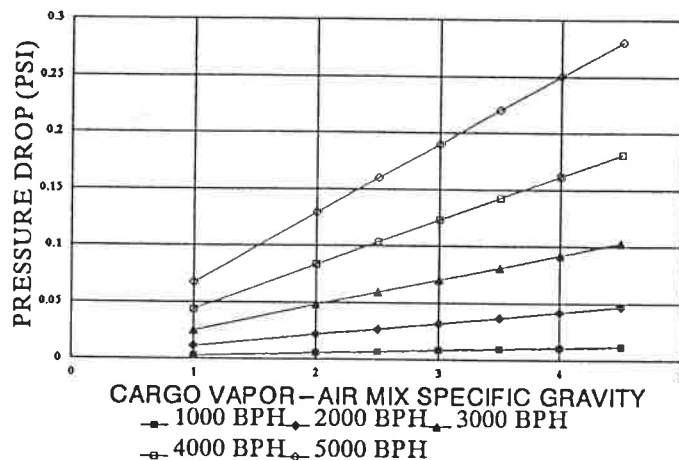
0.5 PSIG SHORE CONNECTION PRESSURE



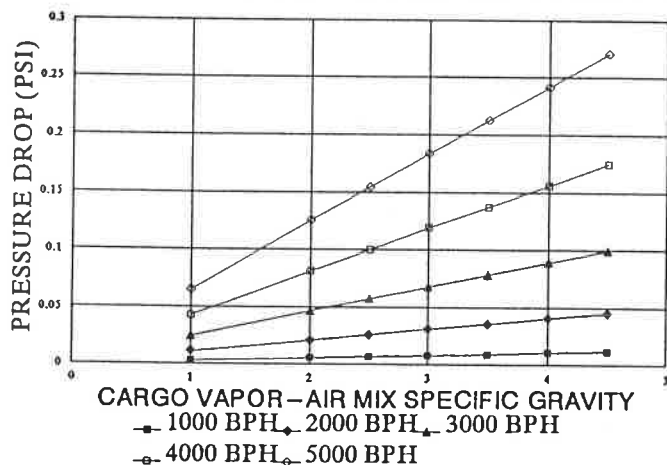
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

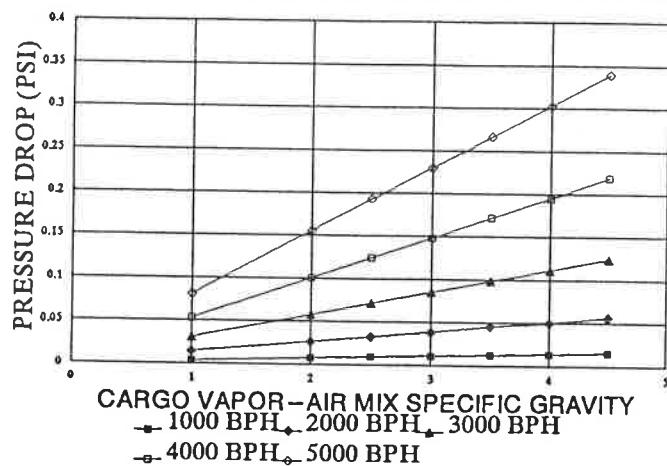
1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

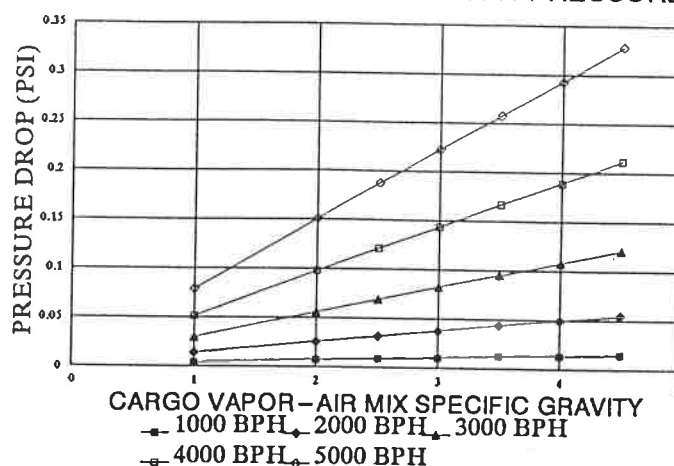
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 110%

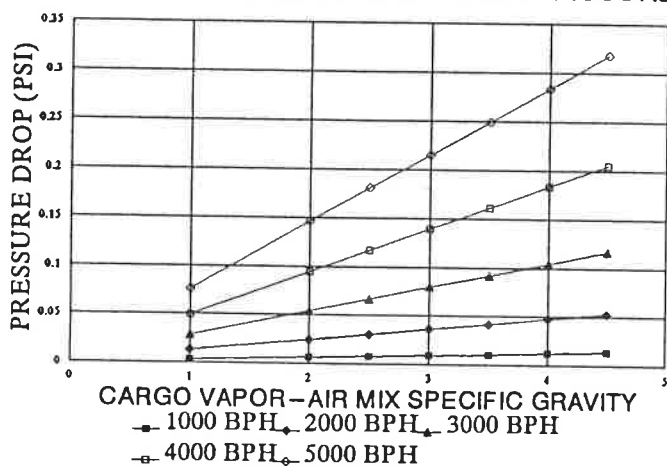
1.0 PSIG SHORE CONNECTION PRESSURE



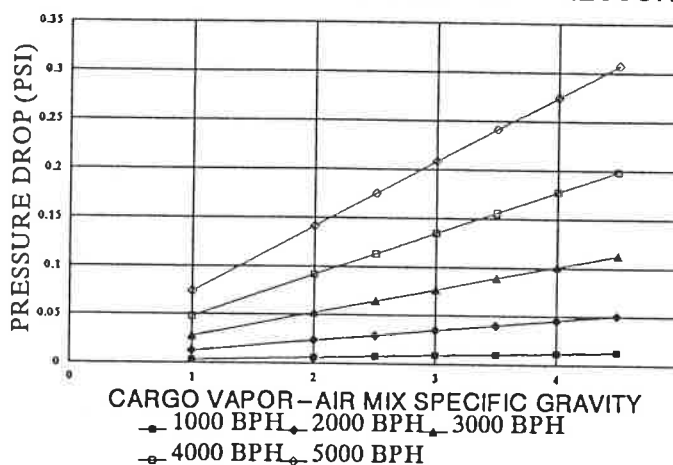
0.5 PSIG SHORE CONNECTION PRESSURE



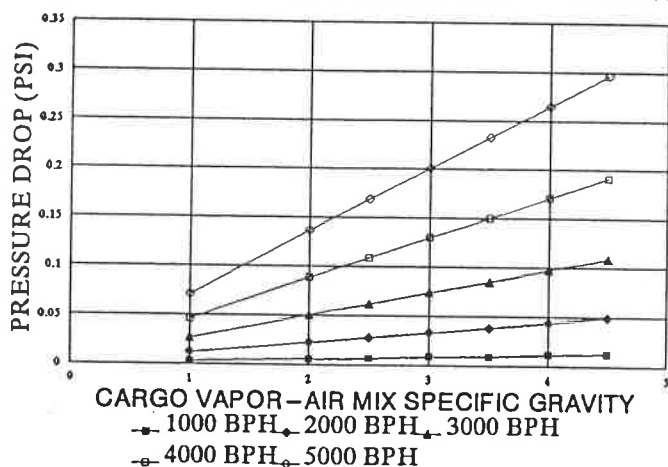
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



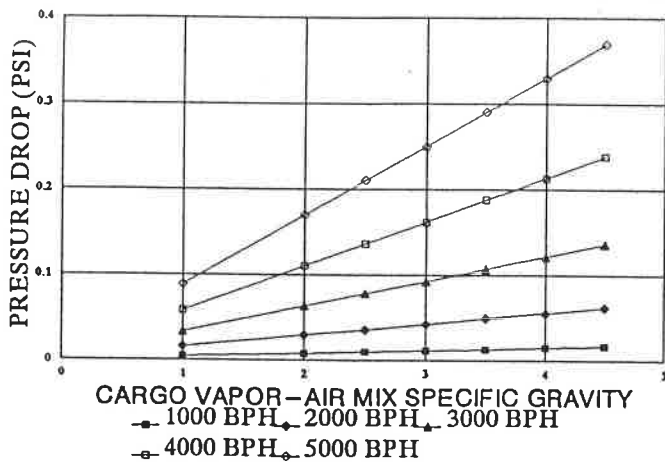
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

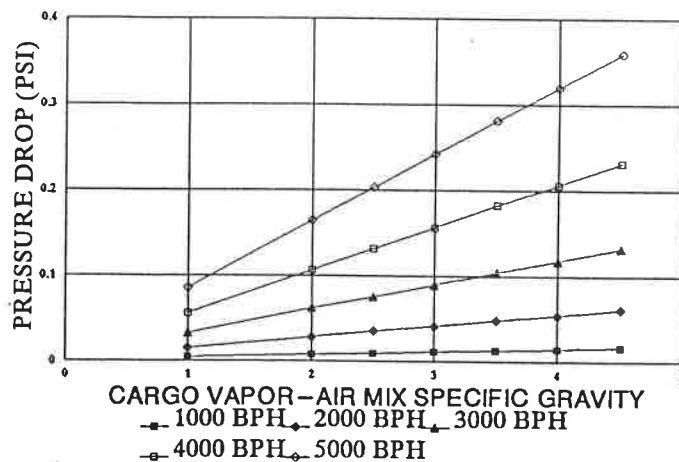
- A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 115%

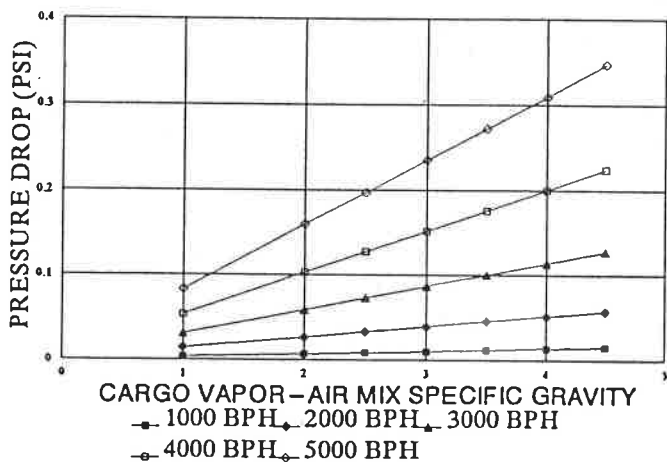
1.0 PSIG SHORE CONNECTION PRESSURE



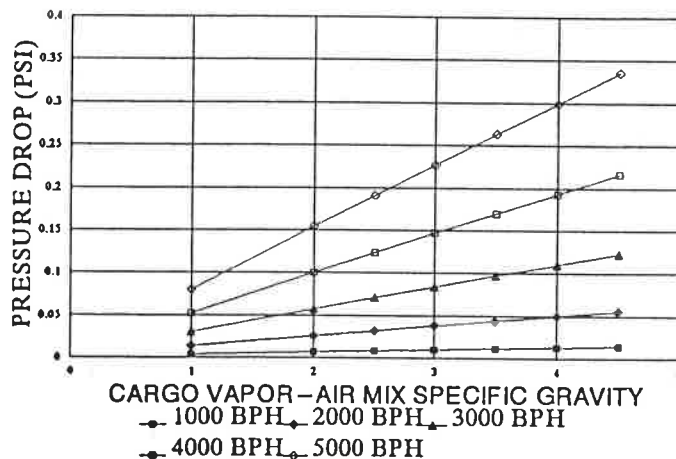
0.5 PSIG SHORE CONNECTION PRESSURE



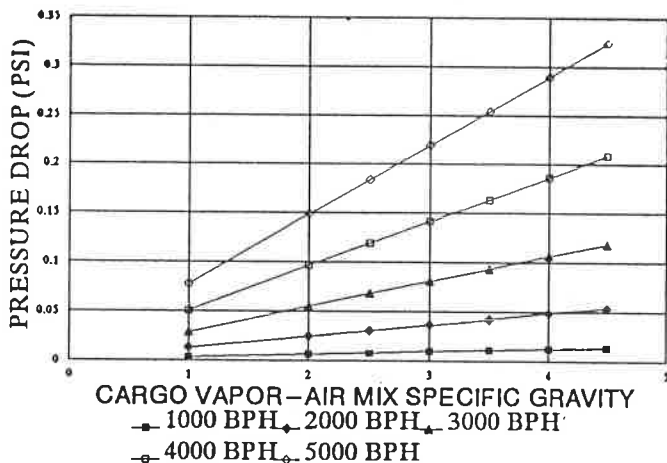
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

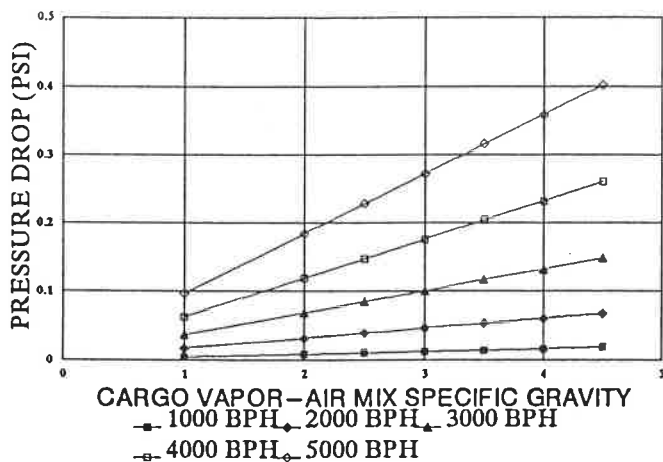
1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

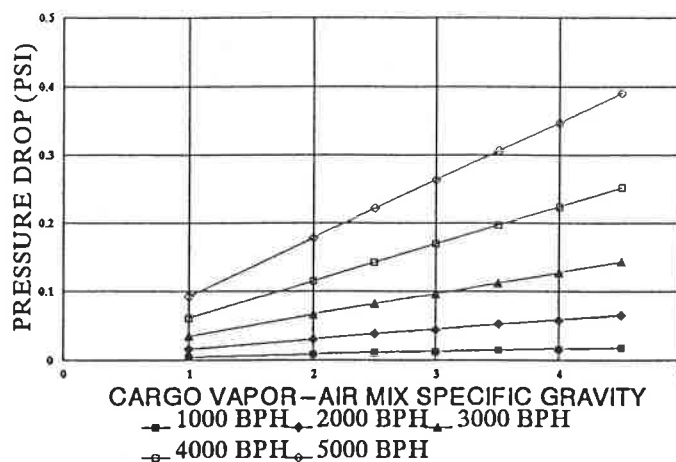
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 120%

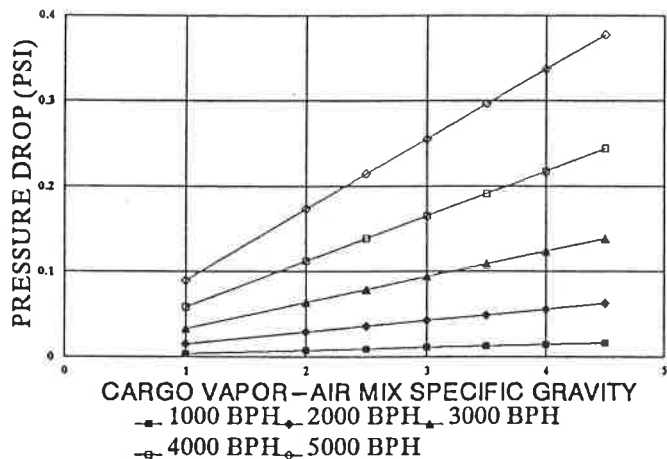
1.0 PSIG SHORE CONNECTION PRESSURE



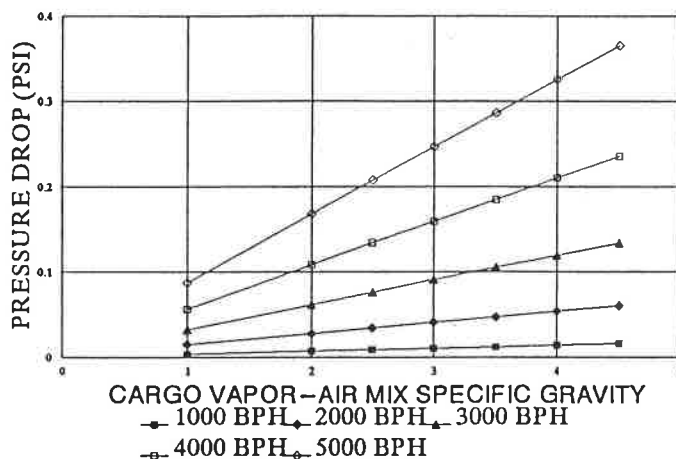
0.5 PSIG SHORE CONNECTION PRESSURE



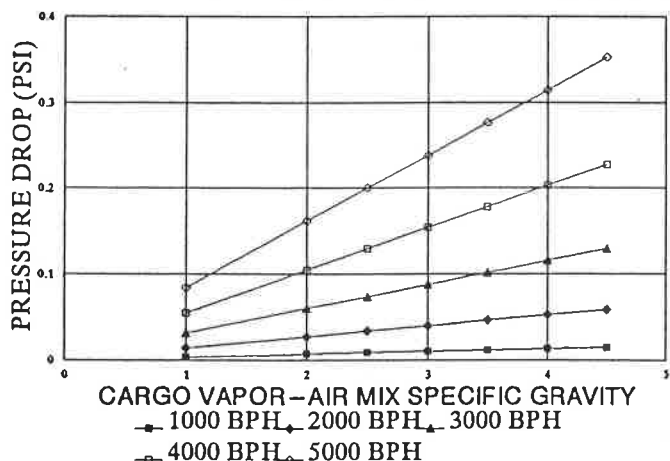
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

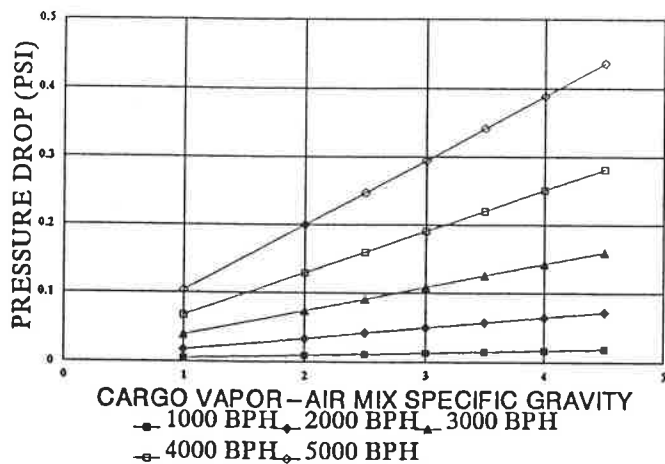
1. OBTAIN: (a) VAP. - AIR MIX GROWTH RATE (VGR), (b) VAP. - AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

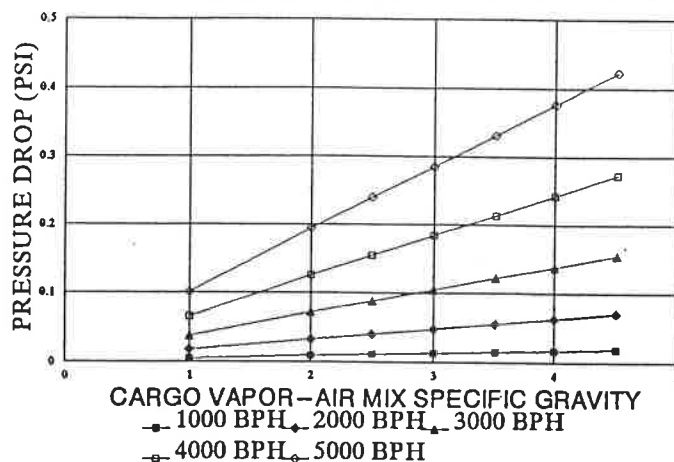
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 125%

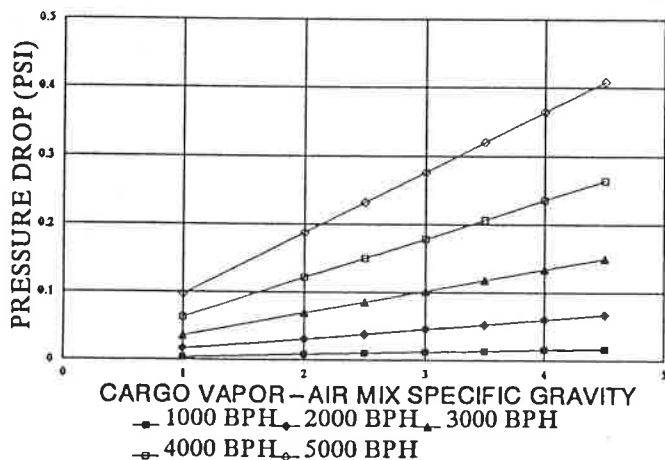
1.0 PSIG SHORE CONNECTION PRESSURE



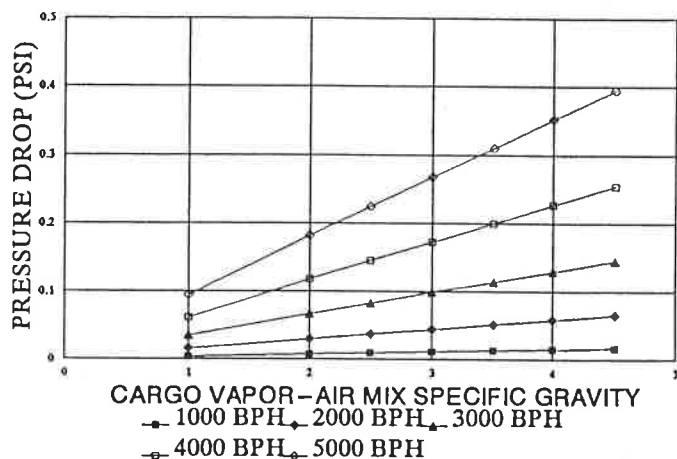
0.5 PSIG SHORE CONNECTION PRESSURE



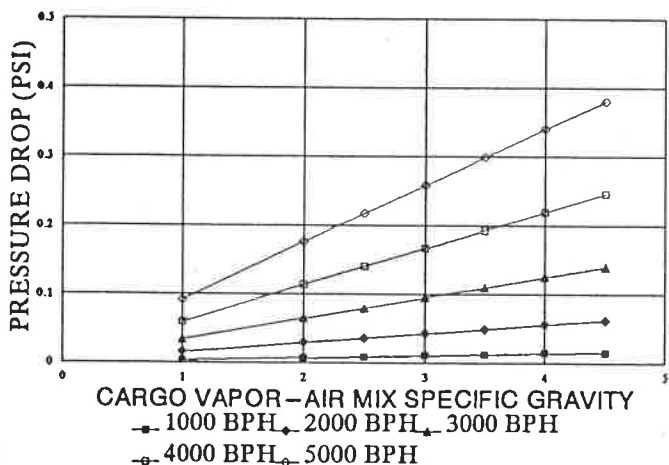
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

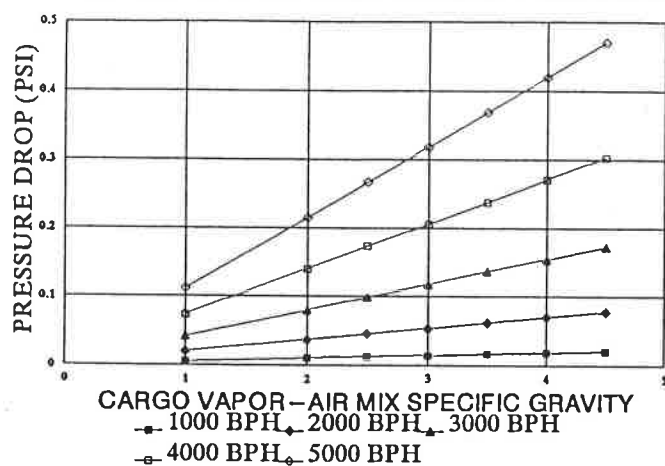
1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

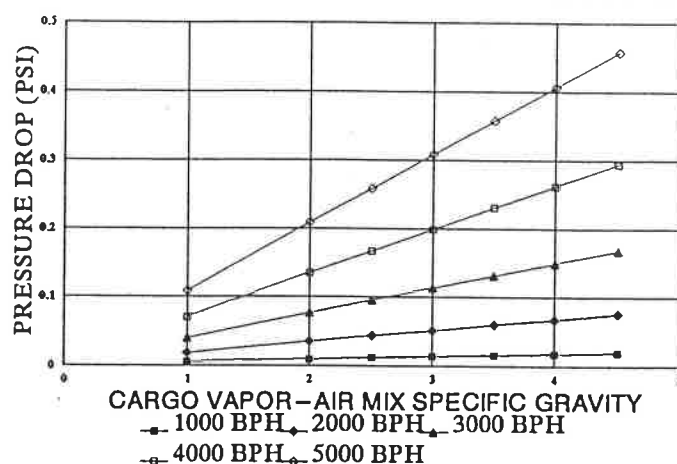
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 130%

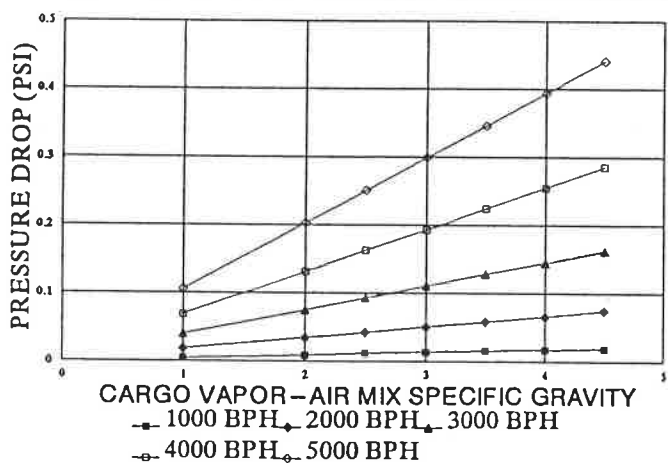
1.0 PSIG SHORE CONNECTION PRESSURE



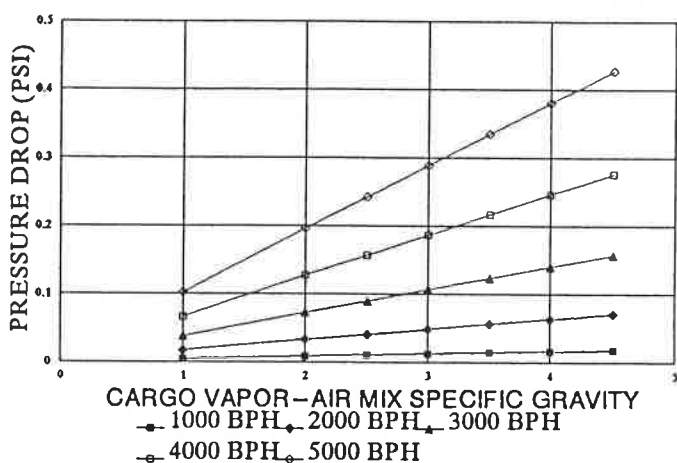
0.5 PSIG SHORE CONNECTION PRESSURE



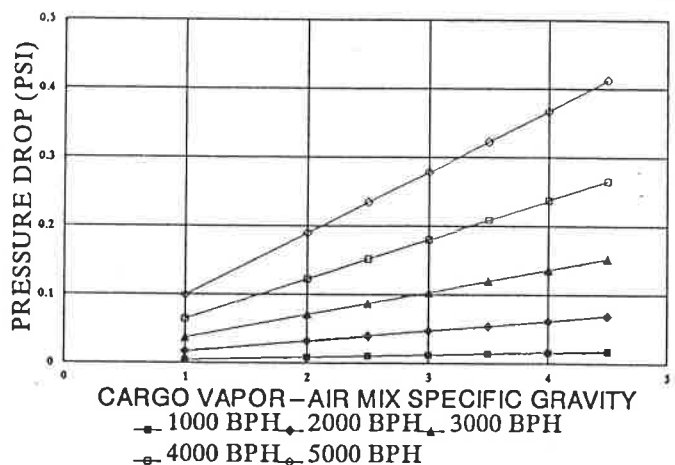
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

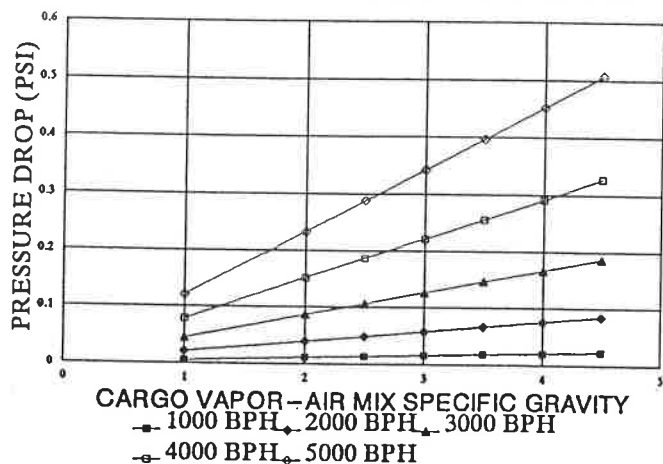
1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

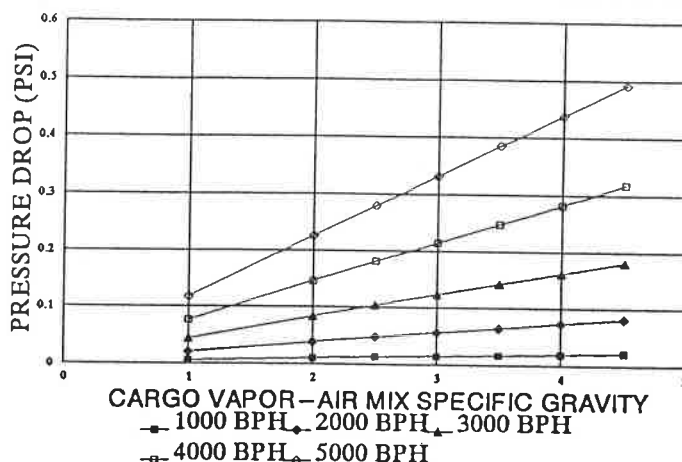
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 135%

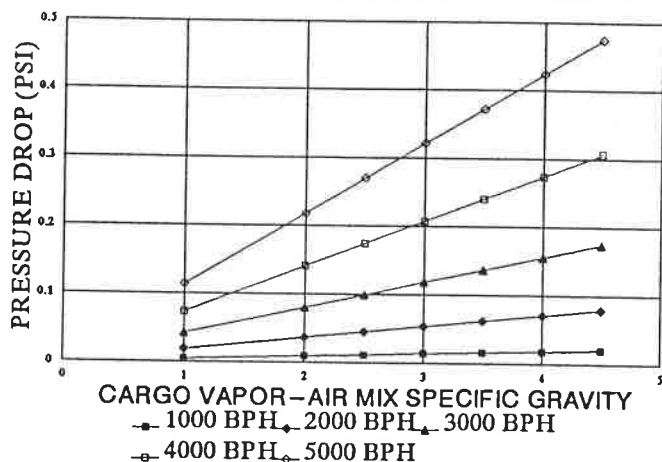
1.0 PSIG SHORE CONNECTION PRESSURE



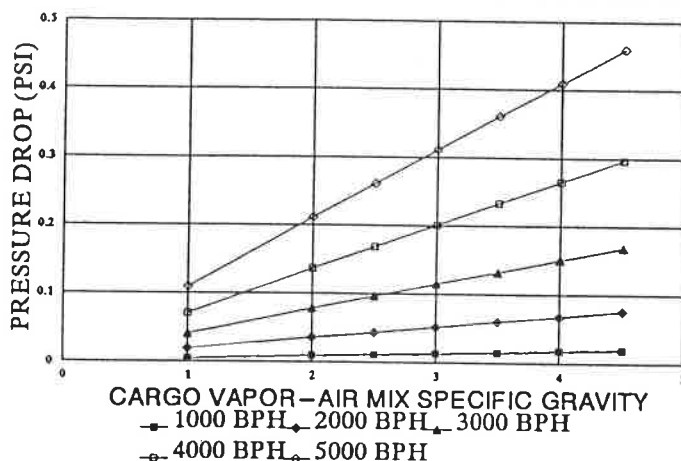
0.5 PSIG SHORE CONNECTION PRESSURE



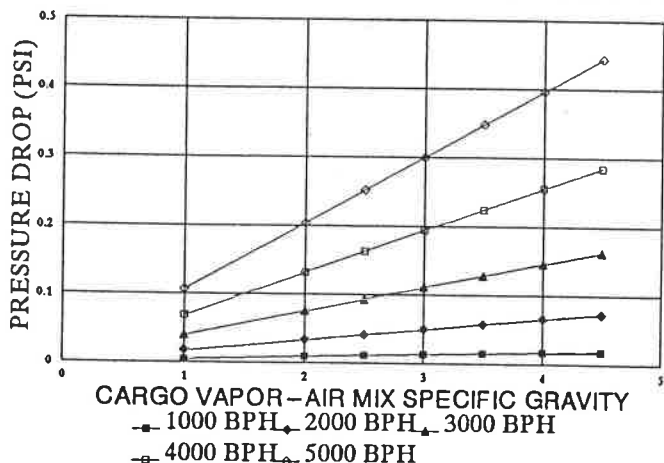
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

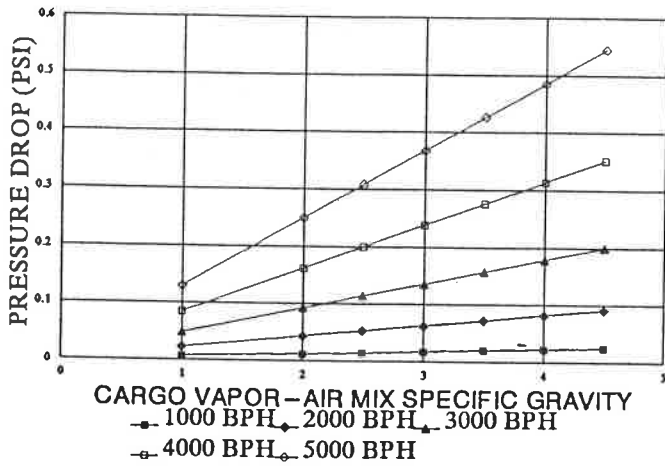
1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

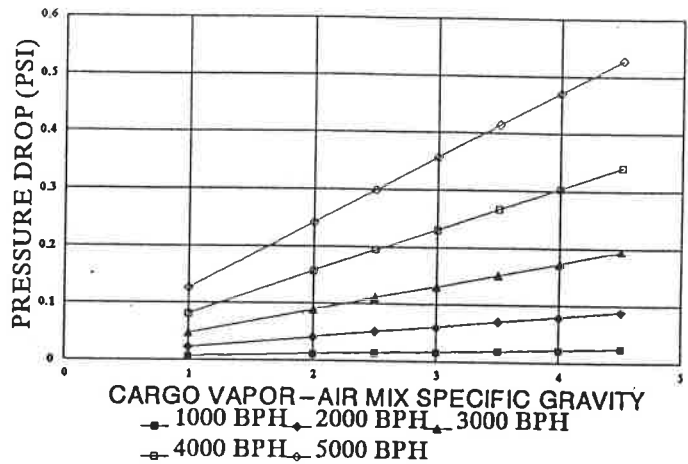
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 140%

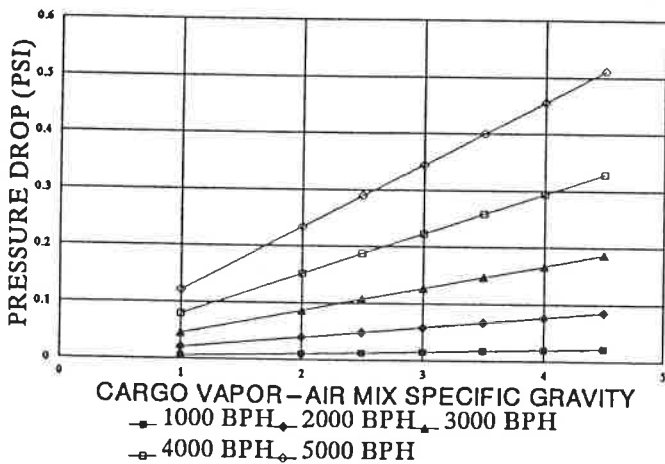
1.0 PSIG SHORE CONNECTION PRESSURE



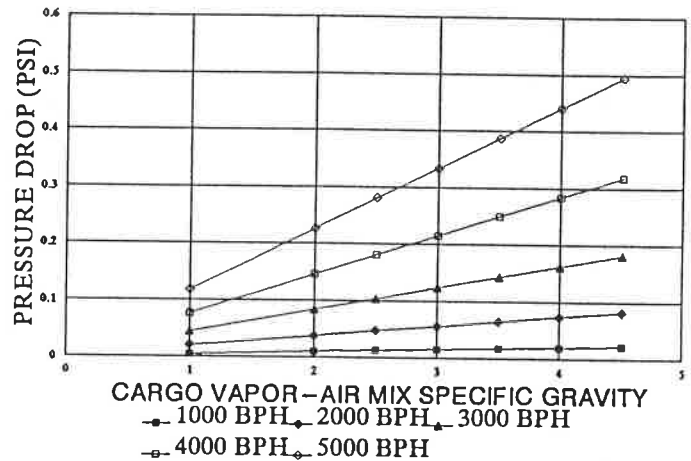
0.5 PSIG SHORE CONNECTION PRESSURE



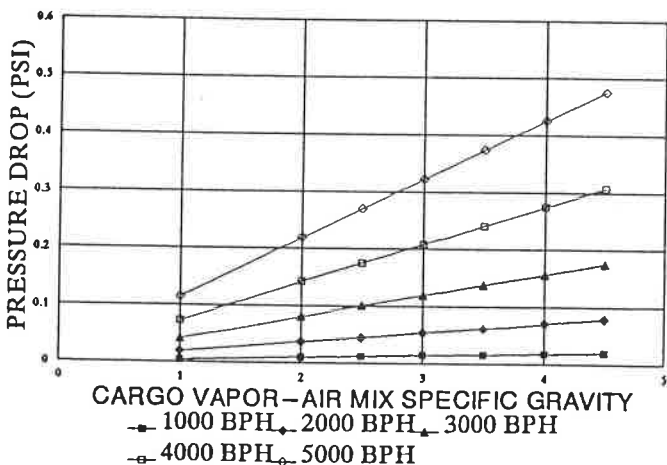
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

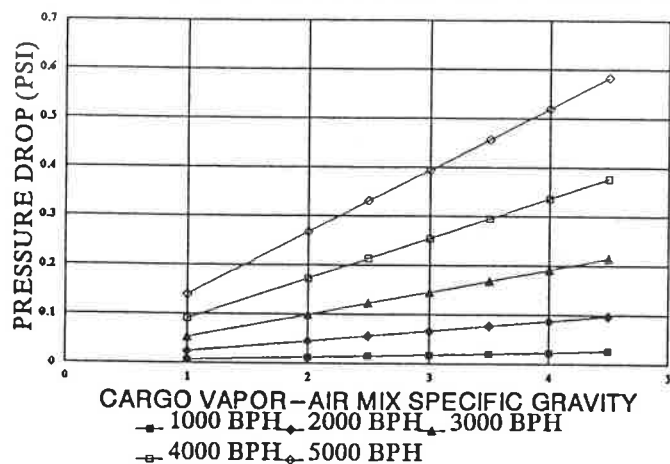
1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONNEC'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONNEC'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

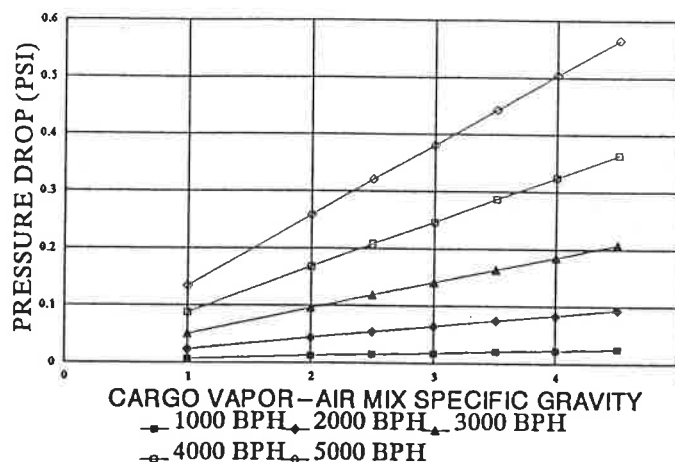
B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

GRAPH(S) FOR VAPOR GROWTH RATE (VGR) OF 145%

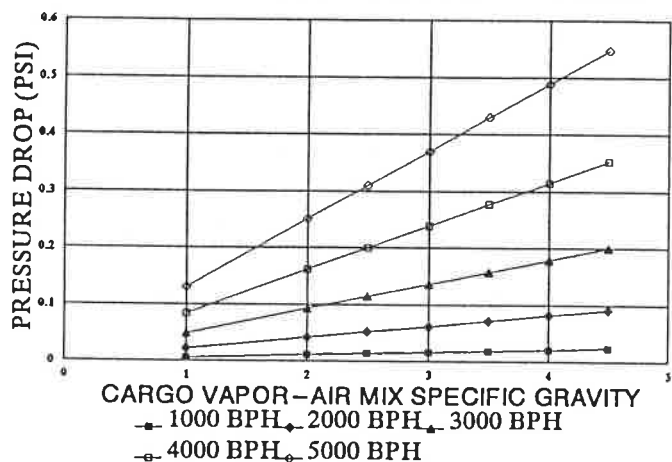
1.0 PSIG SHORE CONNECTION PRESSURE



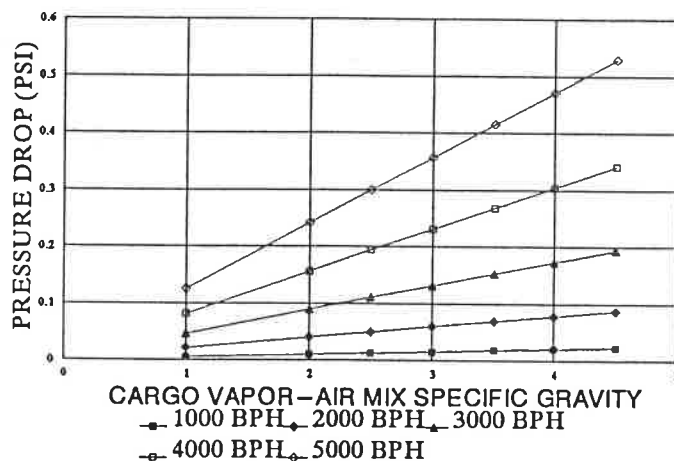
0.5 PSIG SHORE CONNECTION PRESSURE



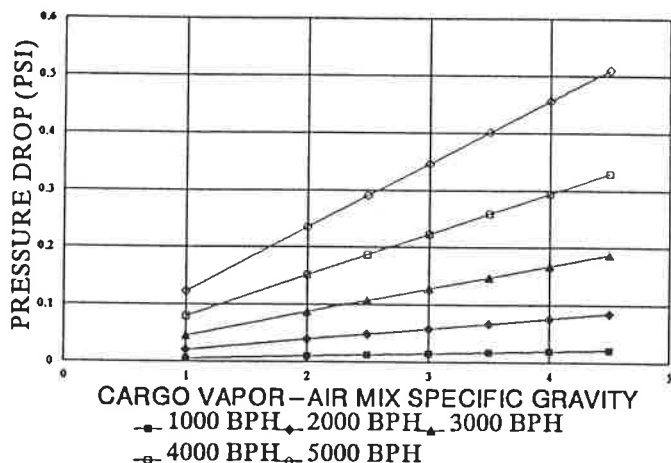
0.0 PSIG SHORE CONNECTION PRESSURE



-0.5 PSIG SHORE CONNECTION PRESSURE



-1.0 PSIG SHORE CONNECTION PRESSURE



DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

1. OBTAIN: (a) VAP.-AIR MIX GROWTH RATE (VGR), (b) VAP.-AIR MIX SPECIFIC GRAVITY, (c) MAX LIQUID TRANSFER RATE (MLTR), & (d) PRESSURE TO BE MAINTAINED @ THE SHORE CONNECTION.
2. SELECT THE GRAPH PAGE THAT APPLIES TO THE LESSER OF THE SAME OR NEXT HIGHER 'VGR'.
3. FROM THAT PAGE, SELECT THE GRAPH THAT APPLIES TO THE NEXT HIGHER 'SHORE CONNECTION PRESSURE'.
4. ENTER THAT GRAPH WITH 'SPECIFIC GRAVITY' & 'MAX LIQUID TRANSFER RATE' TO DETERMINE 'PRESSURE DROP' FROM THE MOST REMOTE CARGO TANK TO THE SHORE CONN'E'N.
5. IF THE SUM OF 'PRESS. DROP' + 'SHORE CONN'E'N PRESSURE' IS LESS THAN 80% OF THE P/V SETTING, THEN THE 'MLTR' IS OK.

A. FLOW RATES SHOWN HEREON (I.E., 'BPH') ARE LIQUID TRANSFER RATES.

B. PRESSURE DROP IS FOR CARGO VAPOR-AIR MIX FLOW RATE OF 'VGR' TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

MAX DESIGN WORKING PRESS
DESIGN TEMPERATURE
"TARGET" MAX LIQUID TRANSFER RATE
PRESSURE AT VESSEL VAPOR SHORE CONNECTION
PIPING SECTION I:

VALVE LOSS (Kv)

MOST REMOTE CARGO TANK OUTLET TO SHORE CONN
DISTANCE ENROUTE TO PV
ENTRANCE LOSS (K_e)
BEND LOSS (K_b)

VALVE LOSS (Kv)

EXIT LOSS (Kex)
CARGO VISCOSITY

2. SPECIFIC GRAVITY OF CARGO VAPOR
3. SATURATED VAPOR PRESSURE @ 115 F
4. TOTAL VAPOR-AIR PRESSURE @ 115 F
5. PARTIAL VOLUME OF VAPOR @ 115 F
6. PARTIAL VOLUME OF AIR @ 115 F
7. AIR WEIGHT DENSITY @ 115 F & SHORE CONN. PRESS.
8. VAPOR-AIR WEIGHT DENSITY @ 115 F & SHORE CONN. PRESS.
9. VAPOR GROWTH RATE (SEE ALSO NOTE NO. 14)
10. LIQUID TRANSFER RATE
11. VAPOR-AIR MIXTURE FLOW RATE
12. REQUIRED AIR EQUIVALENT FLOW RATE

(MDWP)	> -	N/A	PSIG			INCREMENTS FOR PERCENT OF MLTR:	
(T)			115 F			1.	20.0% *
(TMLTR)			5000 BPH			2.	40.0% *
(Ps/c)			1.00 PSIG ---->	15.7 PSIA		3.	60.0% *
NOM I.D.			8 IN ----->	I.D.	7.981 IN	4.	80.0% *
ROUGHNESS		0.00015	AREA		0.347 FT^2	5.	100.0% *
						6.	100.0% *
			230 FT			7.	100.0% *
			0.5				
		QTY	LOSS COEF	TOTAL		QTY	LOSS COEFF
TEE (THRU RUN)		3	0.60	1.800	90 DEG EL L.R.	1	0.75
TEE (THRU BRANCH)		3	1.80	5.400	90 DEG EL	0	N/A
OTHER		0	0.75	0.000	45 DEG EL L.R.	2	0.40
TOTAL:		9	AVG:	0.972			
		QTY	LOSS COEF	TOTAL			
GATE	*	0	0.19	0.000			
BUTTERFLY	*	1	0.65	0.650			
OTHER	*	0	N/A	0.000			
		1	AVG:	0.650			
		0					
NOM I.D.		N/A	IN ----->	I.D.	0.000 IN		
ROUGHNESS		0.00015	AREA		0.000 FT^2		
			0 FT				
			0				
		QTY	LOSS COEF	TOTAL		QTY	LOSS COEFF
TEE (THRU RUN)		0	0.60	0.000	90 DEG EL L.R.	0	0.75
TEE (THRU BRANCH)		0	1.80	0.000	90 DEG EL	0	N/A
OTHER		0	0.75	0.000	45 DEG EL L.R.	0	0.40
TOTAL:		0	AVG:	0.000			
		QTY	LOSS COEF	TOTAL			
GATE	*	0	0.19	0.000			
BUTTERFLY	*	0	0.65	0.000			
OTHER	*	0	N/A	0.000			
		0	AVG:	0.000			
		0					
			0.019 CP ---->	3.97E-07	LB SEC/FT^2		

SGv	OBTAIN FROM REFERENCE SOURCE	13.	USCG VAP COLLECT'N SYS. CARGO CAT
Pv,115	(CARGO MW / AIR MW), OR FM REF. SOURCE	1.	NO ADD'L VCS REQMENTS ABOVE TH
Pt,115	OBTAIN FROM REFERENCE SOURCE		FOR BENZENE, GASOLINE & CRUDE
Vv,115	EST'D TO BE SAME SHORE PRESS (Ps/c)	2.	POLYMERIZES
Va,115	Pv,115 / Pt,115	3.	HGHLY TOXIC
Wa,115	(Pt,115 - Pv,115) / Pt,115	4.	POLYMERIZES & HIGHLY TOXIC
	MWa * Ps/c MWa = MOLEC. WT. OF AIR	5.	HIGH VAPOR GROWTH RATE
	-----	6.	HIGH VAP GROWTH RATE & HIGHLY
	10.72*(460+T)	7.	HIGH VAP GROWTH RATE & POLYME
Wv-a,115	[(SGv*Vv,115)+Va,115]*(0.0047*Ps/c)	8.	MORE INFO NEEDED BEFORE REQMN
VGR	ESTIMATED TO BE 1 + (0.25*Pv,115/12.5)		CAN BE DETERMINED
Q1		14.	VGR = 1.25 FOR GASOLINE, CRUDE OIL
Qv-a	Q1 * VGR		BENZENE.
Qa	Qv-a*(Wv-a,115/Wa,115)^.5	15.	NE/NC = NON-FLAMMABLE/NON-COMBUST

13. USCG VAP COLLECT'N SYS. CARGO CATEGORIES
 1. NO ADD'L VCS REQMTS ABOVE THOSE FOR BENZENE, GASOLINE & CRUDE OIL
 2. POLYMERIZES
 3. HGHLY TOXIC
 4. POLYMERIZES & HIGHLY TOXIC
 5. HIGH VAPOR GROWTH RATE
 6. HIGH VAP GROWTH RATE & HIGHLY TOXIC
 7. HIGH VAP GROWTH RATE & POLYMERIZES
 8. MORE INFO NEEDED BEFORE REQMTS CAN BE DETERMINED
14. VGR = 1.25 FOR GASOLINE, CRUDE OIL, AND BENZENE.
15. NF/NC = NON-FLAMMABLE/NON-COMBUSTIBLE

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

CARGO	C H R I S	20.0%	40.0%	60.0%	80.0%	100.0
		MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	MAX LIQUID TRANSF RATE (MLTR) 5,000 (BBL/ HR)
46 CFR SUBCHAPT O, TABLE 151						
ACETIC ACID	AAC	0.003	0.013	0.028	0.048	0.074
ACETIC ANHYDRIDE	ACA	0.003	0.013	0.027	0.047	0.072
ACETONITRILE	ATN	0.003	0.012	0.025	0.044	0.068
ACRYLIC ACID	ACR	0.003	0.012	0.027	0.046	0.071
ACRYLONITRILE	ACN	0.005	0.017	0.037	0.065	0.101
ADIPONITRILE	ADN	0.003	0.012	0.025	0.044	0.068
ALUMINUM SULFATE SOLUTION	ASX					
AMINOETHYLETHANOLAMINE	AEE	0.003	0.012	0.025	0.044	0.068
AMMONIUM BISULFITE SOLN (70% OR LESS)	ABX					
AMMONIUM HYDROXIDE (28% OR LESS NH3)	AMH					
ANTHRACENE OIL (COAL TAR FRACTION)	AHO					
BENZENE	BNZ	0.007	0.026	0.057	0.099	0.154
BENZENE HYDROCARBON MIXTURES (W/ACETYLENES) (W/10% BENZENE OR MORE)	BHA	0.007	0.026	0.058	0.101	0.155
BENZENE HYDROCARBON MIXTURES (W/10% BENZENE OR MORE)	BHB	0.007	0.026	0.058	0.101	0.155
BENZENE, TOLUENE, XYLENE MIXTURES (HAVING 10% BENZENE OR MORE)	BTX	0.007	0.026	0.058	0.101	0.155
iso-BUTYL ACRYLATE	BAI	0.004	0.013	0.029	0.050	0.077
n-BUTYL ACRYLATE	BTC	0.003	0.013	0.028	0.048	0.074
BUTYL ACRYLATE (SEE ISO- & N- BUTYL ACRYLATE)	BAR	0.004	0.013	0.029	0.050	0.077
BUTYL METHACRYLATE	BMH	0.003	0.013	0.027	0.047	0.073
iso-BUTYRALDEHYDE	BAD	0.007	0.026	0.056	0.098	0.151
n-BUTYRALDEHYDE	BTR	0.007	0.026	0.056	0.098	0.151
BUTYRALDEHYDES (CRUDE)	BFA	0.007	0.026	0.057	0.099	0.152
BUTYRALDEHYDE (ISO-, N-)	BAE	0.007	0.026	0.057	0.099	0.152
CAMPOR OIL (LIGHT)	CPO					
CARBON TETRACHLORIDE	CBT					
CAUSTIC POTASH SOLUTION	CPS					
CAUSTIC SODA SOLUTION	CSS					
CHLOROBENZENE	CRB	0.004	0.014	0.030	0.051	0.079
CHLOROFORM	CRF					
CHLOROSULFONIC ACID	CSA					
COAL TAR NAPHTHA SOLVENT	NCT	0.003	0.012	0.026	0.046	0.070
CREOSOTE (COAL TAR)	CCT	0.003	0.012	0.025	0.044	0.068
CREOSOTE (WOOD)	CWD	0.003	0.012	0.025	0.044	0.068
CRESOLS (ALL ISOMERS)	CRS	0.003	0.012	0.026	0.044	0.068
CRESOLS WITH LESS THAN 5% PHENOL (SEE CRESOLS (ALL ISOMERS))	CRS					
CRESOLS WITH 5% OR MORE PHENOL (SEE PHENOL)	CFP	0.003	0.012	0.025	0.044	0.068
CRESYLATE SPENT CAUSTIC	CSC					
CRESYLIC ACID, SODIUM SALT SOLUTION, SEE CRESYLATE SPENT CAUSTIC	CAX					
CROTONALDEHYDE	CTA	0.004	0.015	0.032	0.055	0.085
CYCLOHEXANONE	CCH	0.003	0.012	0.025	0.044	0.068
CYCLOHEXYLAMINE	CHA	0.003	0.013	0.028	0.049	0.075
DECYL ACRYLATE (iso-, n-)	DAT	0.003	0.012	0.025	0.044	0.068
DICHLOROBENZENE (ALL ISOMERS)	DBX	0.003	0.012	0.026	0.045	0.069
1,1-DICHLOROETHANE	DCH	0.010	0.039	0.085	0.148	0.229
2,2-DICHLOROETHYL ETHER	DEE	0.003	0.012	0.026	0.044	0.068
DICHLOROMETHANE (ALSO KNOWN AS METHYLENE CHLORIDE)	DCM					
2,4-DICHLOROPHENOXYACETIC ACID DIETHANOLAMINE SALT SOLUTION	DDE					
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION	DAD					
2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	DTI					
1,1-,1,2- OR 1,3- DICHLOROPROPANE	DPX	0.008	0.030	0.065	0.114	0.176
1,3-DICHLOROPROPENE	DPU	0.007	0.027	0.059	0.102	0.158
DICHLOROPROPENE, DICHLOROPROPANE MIXTURES	DMX	0.008	0.030	0.065	0.114	0.176
2,2-DICHLOROPROPIONIC ACID	DCN					
DIETHANOLAMINE	DEA	0.003	0.012	0.025	0.044	0.068
DIETHYLAMINE	DEN	0.004	0.013	0.029	0.050	0.076
DIETHYLENETRIAMINE	DET	0.003	0.012	0.025	0.044	0.068
DIETHYL ETHER, SEE ETHYL ETHER	DEH					
DIISOBUTYLAMINE	DBU	0.003	0.013	0.028	0.049	0.075
DIISOPROPANOLAMINE	DIP	0.003	0.012	0.025	0.044	0.068

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

CARGO	C H R I S	20.0%	40.0%	60.0%	80.0%	100.0
		MAX	MAX	MAX	MAX	MAX
		LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
		TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
		RATE	RATE	RATE	RATE	RATE
		(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
		1,000	2,000	3,000	4,000	5,000
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)
DIISOPROPYLAMINE	DIA	0.005	0.020	0.044	0.078	0.120
N,N-DIMETHYLACETAMIDE	DAC	0.003	0.012	0.026	0.045	0.070
DIMETHYLETHANOLAMINE	DMB	0.003	0.013	0.027	0.047	0.073
DIMETHYLFORMAMIDE	DMF	0.003	0.012	0.026	0.046	0.070
1,4-DIOXANE	DOX	0.004	0.015	0.033	0.057	0.088
DI-N-PROPYLAMINE	DNA	0.004	0.015	0.033	0.057	0.088
ETHANOLAMINE	MEA	0.003	0.012	0.025	0.044	0.068
ETHYL ACRYLATE	EAC	0.004	0.016	0.035	0.061	0.095
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	0.008	0.029	0.064	0.111	0.172
N-ETHYLBUTYLAMINE	EBA	0.004	0.014	0.031	0.054	0.083
N-ETHYLCYCLOHEXYLAMINE	ECC	0.003	0.013	0.028	0.049	0.076
ETHYLENE CYANOHYDRIN	ETC	0.003	0.012	0.025	0.044	0.067
ETHYLENEDIAMINE	EDA	0.003	0.013	0.028	0.048	0.074
ETHYLENE DIBROMIDE	EDB					
ETHYLENE DICHLORIDE	EDC	0.006	0.021	0.046	0.080	0.123
ETHYLENE GLYCOL PROPYL ETHER	EGP	0.004	0.013	0.029	0.051	0.078
2-ETHYLHEXYL ACRYLATE	EAI	0.003	0.012	0.025	0.044	0.068
ETHYLIDENE NORBORNENE	ENB	0.003	0.012	0.027	0.047	0.072
ETHYL METHACRYLATE	ETM	0.004	0.014	0.031	0.053	0.082
2-ETHYL-3-PROPYLACROLEIN	EPA	0.003	0.012	0.026	0.045	0.069
FERRIC CHLORIDE SOLUTIONS	FCS					
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	0.003	0.012	0.025	0.044	0.068
FORMIC ACID	FMA	0.004	0.014	0.029	0.051	0.078
FURFURAL	FFA	0.003	0.012	0.026	0.045	0.069
GLUTARALDEHYDE SOLUTION (50% OR LESS)	GTA					
HEXAMETHYLENEDIAMINE SOLUTION	HMC	0.003	0.012	0.025	0.044	0.068
HEXAMETHYLENEIMINE	HMI	0.003	0.012	0.026	0.045	0.069
HYDROCHLORIC ACID SPENT (15% OR LESS)	HCS					
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-))						
ISOPRENE	IPR	0.017	0.066	0.146	0.256	0.396
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT >= 3%) (INCL'G: BLACK, GREEN OR WHITE)	KPL					
MESITYL OXIDE	MSO	0.004	0.013	0.028	0.049	0.076
METHYL ACRYLATE	MAM	0.005	0.020	0.043	0.076	0.116
METHYLCYCLOPENTADIENE DIMER	MCK	0.003	0.012	0.025	0.044	0.068
METHYL DIETHANOLAMINE	MDE	0.003	0.012	0.026	0.045	0.069
2-METHYL-5-ETHYLPYRIDINE	MEP	0.003	0.012	0.026	0.045	0.070
METHYLENE CHLORIDE (SEE DICHLOROMETHANE)						
METHYL METHACRYLATE	MMM	0.004	0.016	0.035	0.061	0.094
2-METHYLPYRIDINE	MPR	0.003	0.013	0.027	0.048	0.073
alpha-METHYLSTYRENE	MSR	0.003	0.013	0.027	0.048	0.073
MORPHOLINE	MPL	0.004	0.013	0.028	0.049	0.076
NITRIC ACID (70% OR LESS)	NCD					
NITROPROPANE (-1, OR -2)	NPM	0.004	0.014	0.030	0.051	0.079
OCTYL NITRATES (ALL ISOMERS)	ONE	0.003	0.013	0.028	0.048	0.074
OLEUM	OLM	0.003	0.012	0.025	0.044	0.067
PENTACHLOROETHANE	PCE					
1, 3-PENTADIENE	PDE	0.012	0.047	0.104	0.182	0.281
PERCHLOROETHYLENE (SAME AS TETRACHLOROETHYLENE)	PER					
PHOSPHORIC ACID	PAC					
POLYETHYLENE POLYAMINES	PEB	0.003	0.012	0.025	0.044	0.068
POLYMETHYLENE POLYPHENYL ISOCYANATE	PPI	0.003	0.012	0.025	0.044	0.067
POTASSIUM HYDROXIDE SOLUTION (SEE CAUSTIC POTASH SOLUTION)						
iso-PROPANOLAMINE	MPA	0.003	0.012	0.026	0.044	0.068
PROPANOLAMINE (iso-, n-)	PAX	0.003	0.012	0.026	0.044	0.068
PROPIONIC ACID	PNA	0.003	0.012	0.026	0.046	0.070
iso-PROPYLAMINE	IPP	0.015	0.058	0.127	0.223	0.345
iso-PROPYL ETHER	IPE	0.008	0.029	0.063	0.110	0.169
PYRIDINE	PRD	0.004	0.014	0.030	0.052	0.080
SODIUM ALUMINATE SOLUTION	SAU					
SODIUM CHLORATE SOLUTION (50% OR LESS)	SDD					
SODIUM DICHROMATE SOL'N (70% OR LESS)	SDL					
SODIUM HYDROXIDE SOLUTION (SEE CAUSTIC SODA SOLUTION)						

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

RESDRP1

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

CARGO	C H R I S	20.0%	40.0%	60.0%	80.0%	100.0%
		MAX	MAX	MAX	MAX	MAX
		LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
		TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
		RATE	RATE	RATE	RATE	RATE
		(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
		1,000	2,000	3,000	4,000	5,000
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)

46 CFR SUBCHAPT O BUT NOT TABLE 151		***				

1,1-DICHLOROPROPANE	DPB	0.008	0.030	0.065	0.114	0.176
1,1,1-TRICHLOROETHANE						
1,2-DICHLOROPROPANE	DPP	0.005	0.018	0.038	0.067	0.103
1,3 CYCLOPENTADIENE						
1,3-DICHLOROPROPANE	DPC	0.006	0.022	0.048	0.083	0.128
2-METHYL-2-HYDROXY-3-BUTYNE	MHB	0.004	0.014	0.030	0.052	0.079
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION (70% OR LESS)	DDA					
3-PENTENENITRILE	PNT					
AEROTHENE TT (1,1,1-TRICHLOROETHANE)						
ALKYLBENZENE						
AMINOETHYLPIPERAZINE	AEP					
BENZENE RAFFINATE (ASSUME VAPOR PROPERTIES SIMILAR TO BENZENE)		0.007	0.026	0.057	0.099	0.154
BENZENE SULFONYL CHLORIDE	BSC	0.003	0.012	0.025	0.044	0.067
BENZYL ACETATE	BZE	0.003	0.012	0.025	0.044	0.068
BENZYL CHLORIDE (STABILIZED)	BCL	0.003	0.012	0.026	0.045	0.069
BUTANOL						
BUTYL ETHER (n-)	BTE	0.003	0.013	0.028	0.048	0.074
BUTYLENE OXIDE (1,2-)	BTO	0.008	0.029	0.063	0.109	0.168
BUTYRIC ACID	BRA	0.003	0.012	0.026	0.044	0.068
CARBOLIC ACID	CBO	0.003	0.012	0.025	0.044	0.068
CHLOROACETIC ACID (80% OR LESS)	CHM	0.003	0.012	0.025	0.044	0.068
CHLOROPROPIONIC ACID (2- OR 3-)	CPM	0.003	0.012	0.025	0.044	0.068
CHLOROTOLUENE (m-)	CTM	0.003	0.013	0.027	0.047	0.073
CHLOROTOLUENE (o-)	CTO	0.003	0.013	0.027	0.047	0.073
CHLOROTOLUENE (p)	CRN	0.003	0.012	0.026	0.045	0.069
CHLOROTOLUENES (MIXED ISOMERS)	CHI	0.004	0.013	0.028	0.049	0.076
CREOSOTE (ALL ISOMERS)	CCW	0.003	0.012	0.025	0.044	0.068
CRESYLIC ACID TAR	CRX	0.003	0.012	0.025	0.044	0.068
CYCLOHEPTANE	CYE	0.004	0.015	0.032	0.055	0.085
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	CYX	0.004	0.014	0.030	0.052	0.080
CYCLOHEXYL ACETATE	CYC	0.003	0.012	0.025	0.044	0.068
CYCLOPENTADIENE, STYRENE, BENZENE MIXTURE	CSB	0.007	0.026	0.057	0.100	0.154
CYCLOPENTANE	CYP	0.010	0.037	0.081	0.143	0.221
DECANOIC ACID	DCO	0.003	0.012	0.025	0.044	0.067
DI 2 ETHYLHEXYL PHTHALATE (SEE ALSO ETHYLHEXYL PHTHALATE)						
DICHLOROISOPROPYL ETHER (2,2'-)	DCI	0.003	0.012	0.026	0.045	0.069
DICHLOROPROPANE						
DICHLOROPROPENE						
DIETHYL SULFATE	DSU	0.003	0.012	0.025	0.044	0.068
DIETHYLETHANOLAMINE	DAE	0.003	0.012	0.026	0.046	0.070
DODECYL BENZENE						
DODECYLDIMETHYLAMINE TETRADECYLDIMETHYLAMINE MIXTURE	DOT					
DRIPOLENE						
ETHANOL (see ethyl alcohol)						
ETHYL BROMIDE						
ETHYL TERT-BUTYL ETHER	EBE	0.006	0.024	0.052	0.091	0.140
ETHYLAMINE	EAM	0.022	0.083	0.184	0.323	0.500
ETHYLENE DICHLORIDE 1,1,2-TRICHLOROETHANE MIXTURE	ETX	0.006	0.023	0.051	0.089	0.138
ETHYLMERCAPTAN (SAME AS ETHANETHIOL)						
ETHYLPHENOL	EPL	0.003	0.012	0.025	0.044	0.068
FORMALDEHYDE SOLUTION (50% OR MORE), METHANOL MIXTURES	MTM	0.004	0.015	0.033	0.058	0.089
HYDROSULFIDE						
INDENES						
ISOBUTYL ACETATE	IBA	0.003	0.013	0.027	0.047	0.073
ISOPRENE, PENTADIENE MIXTURE	IPN					
ISO-PROPYL ALCOHOL		0.004	0.015	0.034	0.058	0.090
LAURIC ACID	LRA					
METHACRYLONITRILE	MET	0.004	0.017	0.036	0.063	0.097
METHANOL						

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

TABLE V; SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

	C H R I S	20.0%	40.0%	60.0%	80.0%	100.0
		MAX	MAX	MAX	MAX	MAX
		LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
		TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
		RATE	RATE	RATE	RATE	RATE
		(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
CARGO		1,000	2,000	3,000	4,000	5,000
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)

METHYL STYRENE	MIA					
METHYL STYRENE, INDENES, ALKYL BENZENE MIXTURES	MCY	0.005	0.017	0.037	0.064	0.099
METHYLCYCLOHEXANE						
METHYLHEXANE (SAME AS HEPTANE)						
MONOETHANOLAMINE	MEA	0.003	0.012	0.025	0.044	0.068
MONOISOPROPANOLAMINE		0.003	0.012	0.026	0.045	0.069
NAPHTHALENE (MOLTEN)	NTM	0.003	0.012	0.025	0.044	0.068
NEODECANOIC ACID	NEA	0.003	0.012	0.025	0.044	0.068
NITRILOTRIACETIC ACID	NAA					
NITROPHENOL (MOLTEN)	NTP					
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NNM	0.004	0.014	0.030	0.052	0.080
NITROTOLUENE (o-,p-)	NIT	0.003	0.012	0.025	0.044	0.068
PARALDEHYDE	PDH	0.011	0.041	0.091	0.159	0.247
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXIE)	PGS					
PROPIONALDEHYDE	PAD	0.009	0.033	0.072	0.127	0.195
PROPIONIC ANHYDRIDE	PAH	0.003	0.012	0.026	0.045	0.069
PROPIONITRILE	PCN	0.003	0.013	0.028	0.049	0.075
PROPYLAMINE (n-)	PRA	0.009	0.033	0.073	0.127	0.196
PROPYLBENZENE		0.003	0.011	0.024	0.041	0.063
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	GPY	0.007	0.026	0.058	0.101	0.155
PYROLYSIS RESIDUAL FUELS						
SEWAGE, RAW	SWR					
SODIUM SULFIDE (SOLID IN WATER)	SDS					
STYRENE	STY	0.003	0.013	0.027	0.047	0.073
STYRENE CRUDE	STX	0.003	0.013	0.027	0.047	0.073
STYRENE TAR	STT					
TETRAMETHYLBENZENE (1,2,3,5-)	TTB	0.003	0.012	0.026	0.045	0.070
TOLUIDINE (o-)	TLI	0.003	0.012	0.025	0.044	0.068
TRICHLOROBENZENE (1,2,4-)	TCB	0.003	0.012	0.026	0.044	0.068
TRIIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N						
TRIPHENYLBORANE	TPE					
UNDECANOIC ACID	UDA	0.003	0.012	0.025	0.044	0.067
HYDROCARBON 5-9	HFN	0.006	0.022	0.048	0.084	0.129

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO

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Acetone	ACT	0.007	0.026	0.057	0.099	0.153
Acetophenone	ACP	0.004	0.013	0.029	0.050	0.077
Acetyl Tributyl Citrate						
Acrylonitrile-Styrene Copolymer dispersion in Polyether Polyol	ALE					
Alcohols (C13 and above)	ALY					
Alcoholic beverages, N.O.S.						
Alcohol (C6 - C17) (secondary) Poly(3-6)ethoxylates						
Alcohol (C12 - C15) Poly(1-3)ethoxylates						
Alcohol (C12 - C15) Poly(3-11)ethoxylates						
Alkenylsuccinic acid						
Alkenylsuccinic Anhydride						
Alkyl (C9 - C17) Benzenes	AKB					
Alkylbenzenesulfonic acid (4% or less)	ABS					
Alkyl Phthalates (n-)						
Alkyl Succinate Formaldehyde Hydr- oxyamino condensate (3.2% or less)						
Aminoethyldiethanolamine, Aminoethylethanolamine solution						
Amyl Acetate (commercial, iso-, n-, sec-)	AEC	0.005	0.018	0.038	0.067	0.103
AMYL ACETATE (n-)	AML	0.003	0.013	0.027	0.047	0.073
AMYL ACETATE (iso-)	IAT	0.003	0.013	0.027	0.047	0.073
Amyl alcohol (iso-, n-, sec-, primary) (SEE ALSO IAA)	AAI	0.003	0.012	0.026	0.046	0.071
Amyl alcohol (n-)	AAN	0.003	0.012	0.026	0.046	0.071
Amyl alcohol (tert-)	AAI					
AMYL ALCOHOL, PRIMARY	APM	0.003	0.012	0.026	0.046	0.071
AMYL ALCOHOL, (sec-)	ASE	0.003	0.012	0.026	0.046	0.071
Amylene	AMZ					
AMYL ALCOHOL, (iso-)	IAA	0.003	0.012	0.026	0.046	0.071
Amyl Methyl Ketone	AMK					
Amyl Tallate						
Asphalt	ASP					
ASPHALT BLENDING STOCKS: Roofers flux	ARF					
ASPHALT BLENDING STOCKS: Straight run residue	ASR					
Behenyl alcohol						
Benzene Tricarboxylic acid Trioctyl Ester						
Benzyl alcohol	BAL	0.003	0.012	0.026	0.045	0.069
Bicyclic Terpenel Polyamide salt						
Brake fluid base mixtures (containing Poly(2-8)alkylene (C2-C3) glycols, Polyalkyl	BFX					
Butane	BMX					
Butene, SEE BUTYLENE						
Butene Oligomer	BOL					
Butyl Acetate (iso-, n-)	BAX	0.004	0.013	0.029	0.050	0.076
BUTYL ACETATE (N-)	BCN	0.004	0.014	0.030	0.052	0.079
Butyl Acetate (sec-)	BTA	0.004	0.015	0.034	0.059	0.090
Butyl alcohol (iso-, n-, sec-, tert-)		0.003	0.013	0.028	0.049	0.076
BUTYL ALCOHOL (ISO-)	IAL	0.003	0.013	0.028	0.049	0.076
BUTYL ALCOHOL (N-)	BAN	0.003	0.012	0.027	0.047	0.072
BUTYL ALCOHOL (SEC-)	BAS	0.004	0.014	0.030	0.052	0.080
BUTYL ALCOHOL (TERT-)	BAT	0.004	0.016	0.035	0.061	0.095
Butyl Benzyl Phthalate	BPH	0.003	0.012	0.025	0.044	0.068
Butylene	BTN					
Butylene Glycol	BUG					
1,3-Butylene Glycol, SEE BUTYLENE GLYCOL						
Butylene Polyglycol, SEE BUTYLENE GLYCOL						
iso-Butyl Formate						
n-Butyl Formate						
Butyl Heptyl Ketone	BHK					
Butyl Methyl Ketone,SEE METHYL BUTYL KETONE						
Butyl Stearate						
Butyl Toluene	BUE	0.003	0.012	0.026	0.045	0.069
Butyrolactone (gamma)	BLA					

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

C H R I S	CARGO		20.0%	40.0%	60.0%	80.0%	100.0
			MAX	MAX	MAX	MAX	MAX
			LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
			TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
			RATE	RATE	RATE	RATE	RATE
			(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
			1,000	2,000	3,000	4,000	5,000
			(BBL/	(BBL/	(BBL/	(BBL/	(BBL/
			HR)	HR)	HR)	HR)	HR)
	Dimethylbenzene	***					
	Dimethyl Glutarate	DGT					
	Dimethyl Phthalate	DTL	0.003	0.012	0.025	0.044	0.067
	Dimethyl Polysiloxane	DMP					
	2,2-Dimethylpropane-1,3-diol	DDI					
	Dimethyl Succinate	DSE					
	Dinonyl Phthalate	DIF	0.003	0.012	0.025	0.044	0.068
	Di(octylphenyl)amine						
	Dioctyl Phthalate	DOP	0.003	0.012	0.025	0.044	0.067
	Dipentene	DPN	0.003	0.012	0.026	0.045	0.069
	Diphenyl	DIL	0.003	0.012	0.025	0.044	0.068
	Diphenyl, Diphenyl Ether mixture	DDO	0.003	0.012	0.025	0.044	0.068
	Diphenyl Ether	DPE	0.003	0.012	0.025	0.044	0.068
	Diphenyl Ether, Biphenyl Ether mixture	DOB					
	Dipropylene Glycol	DPG	0.003	0.012	0.026	0.045	0.069
	Dipropylene Glycol Dibenzoate	DGY					
	Dipropylene Glycol Methyl Ether	DPY					
	DISTILLATES: Flashed feed stocks	DFF	0.004	0.017	0.036	0.063	0.097
	DISTILLATES: Straight run	DSR	0.004	0.017	0.036	0.063	0.097
	Ditridecyl Phthalate	DTP					
	Diundecyl Phthalate	DUP					
	Dodecane (all isomers)	DOC					
	Dodecanol	DDN					
	Dodecene (all isomers)	DOZ	0.003	0.012	0.025	0.044	0.068
	DODECENE	DOD	0.003	0.012	0.025	0.044	0.068
	Dodecylbenzene	DDB	0.011	0.041	0.089	0.156	0.242
	Dodecyl Phenol	DOL					
	Drilling mud (low toxicity) (if flammable or combustible)/						
	Epoxylated linear alcohols, C11-C15						
	Ethane	ETH					
	2-Ethoxyethanol	EEO					
	2-Ethoxyethyl Acetate	EEA					
	3thoxyalated alcohols, C11-C15,SEE THE ALCOHOL POLYETHOXYLATES						
	3thoxy Triglycol (crude)	ETG	0.003	0.012	0.025	0.044	0.067
	3thyl Acetate	ETA	0.006	0.021	0.046	0.080	0.123
	Ethyl Acetoacetate	EAA	0.003	0.012	0.026	0.046	0.071
	Ethyl alcohol (ETHANOL)	EAL	0.004	0.015	0.032	0.056	0.087
	3thyl Amyl Ketone	EAK					
	3thyl Benzene	ETB	0.003	0.013	0.028	0.049	0.075
	3thyl Butanol	EBT	0.003	0.012	0.026	0.045	0.069
	Ethyl Butyrate	EBR	0.004	0.014	0.031	0.054	0.083
	Ethyl Cyclohexane	ECY	0.003	0.013	0.028	0.048	0.075
	3thylene	ETL					
	3thylene Carbonate						
	Ethylene Glycol	EGL	0.003	0.012	0.025	0.044	0.067
	Ethylene Glycol Acetate	EGO					
	3thylene Glycol Butyl Ether	EGM					
	3THYLENE GLYCOL BUTYL ETHER ACETATE	EMA	0.003	0.012	0.026	0.045	0.068
	3thylene Glycol Ether Acetate						
	Ethylene Glycol Tert-Butyl Ether						
	Ethylene Glycol Diacetate	EGY	0.003	0.012	0.025	0.044	0.068
	3thylene Glycol Dibutyl Ether	EGB					
	3thylene Glycol Ethyl Ether, SEE 2-ETHOXYETHANOL	EGF					
	3thylene Glycol Ethyl Ether Acetate, SEE 2-ETHOXYETHYL ACETATE	EGA					
	Ethylene Glycol Isopropyl Ether	EGI					
	Ethylene Glycol Methyl Butyl Ether						
	3thylene Glycol Methyl Ether	EME	0.003	0.012	0.025	0.044	0.068
	3thylene Glycol Methyl Ether Acetate	EGT					
	Ethylene Glycol Phenyl Ether	EPE	0.003	0.012	0.025	0.044	0.068
	Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixture	EDX					
	Ethylene-Propylene Copolymer (in liquid mixtures)						
	3thyl-3-Ethoxypropionate	EEP					

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

CARGO		20.0%	40.0%	60.0%	80.0%	100.0
		MAX	MAX	MAX	MAX	MAX
	C	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
	H	TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
	R	RATE	RATE	RATE	RATE	RATE
	I	(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
	S					
		1,000	2,000	3,000	4,000	5,000
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	***					
2-Ethylhexanoic acid	EHA	0.003	0.012	0.026	0.046	0.070
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHO					
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID	EHX	0.003	0.012	0.025	0.044	0.068
Ethyl Hexyl Phthalate (SEE ALSO DI 2-ETHYLHEXYL PHTHALATE)	EHE					
Ethyl Hexyl Tallate	EHT					
Ethyl Propionate	EPR	0.004	0.015	0.032	0.056	0.087
Ethyl Toluene	ETE	0.003	0.012	0.027	0.047	0.072
Fatty acid (saturated, C13 and above)						
Fatty acid Amides						
Formamide						
Furfuryl Alcohol	FAM	0.003	0.012	0.025	0.044	0.068
Gas oil, cracked	FAL	0.003	0.012	0.025	0.044	0.068
GASOLINE BLENDING STOCKS: Alkylates	GOC					
GASOLINE BLENDING STOCKS: Reformates	GAK	0.013	0.048	0.105	0.185	0.286
GASOLINES: Automotive (containing not over 4.23 grams lead per gallon)	GRF	0.013	0.048	0.105	0.185	0.286
GASOLINES: Aviation (containing not over 4.86 grams lead per gallon) Aviation	GAT	0.013	0.048	0.105	0.185	0.286
GASOLINES: Casinghead (natural)	GAV	0.013	0.048	0.105	0.185	0.286
GASOLINES: Polymer	GCS	0.013	0.048	0.105	0.185	0.286
GASOLINES: Straight run	GPL	0.013	0.048	0.105	0.185	0.286
Glycerine	GSR	0.013	0.048	0.105	0.185	0.286
Glycerol, SEE GLYCERINE	GCR	0.003	0.012	0.025	0.044	0.067
Glycerol Polyalkoxylate						
Glycerol Triacetate						
Glycidyl Ester of Tertiary Carboxylic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACID						
Glycidyl Ester of Tridecyl Acetic acid	GLT					
Glycidyl Ester of Versatic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACID						
Glycol Diacetate, SEE ETHYLENE GLYCOL DIACETATE						
Glycols, Resins and Solvents mixtures						
Gylcol Triacetate, SEE GLYCERYL TRIACETATE						
Glyoxal solution (40% or less)						
Grease						
Heptadecane						
Heptane (all isomers) (METHYHEXANE)	HMX	0.005	0.017	0.038	0.065	0.101
HEPTANE (N-)	HPT	0.005	0.017	0.038	0.065	0.101
Heptanoic acid	HEP	0.003	0.012	0.025	0.044	0.068
Heptanol (all isomers)	HTX	0.003	0.012	0.025	0.044	0.068
HEPTANOL	HTN	0.003	0.012	0.025	0.044	0.068
Heptene (all isomers)	HPX	0.005	0.018	0.039	0.069	0.106
HEPTENE (1-)	HTE	0.005	0.018	0.039	0.068	0.105
Heptyl Acetate	HPE	0.003	0.012	0.026	0.045	0.069
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR						
Hexaethylene Glycol						
Hexamethylene Glycol						
Hexamethylenetetramine solutions	HTS					
Hexane (all isomers)	HXS	0.007	0.027	0.059	0.103	0.158
HEXANE	HXA	0.007	0.027	0.059	0.103	0.158
Hexanoic acid	HXO	0.003	0.012	0.025	0.044	0.068
Hexanol	HXN	0.004	0.014	0.030	0.052	0.081
Hexene (all isomers)	HEX	0.008	0.029	0.063	0.110	0.170
HEXENE (1-)	HXE	0.008	0.029	0.064	0.112	0.173
HEXENE (2-)	HXT	0.008	0.029	0.064	0.112	0.173
Hexyl Acetate	HAE					
Hexylene Glycol	HXG	0.003	0.012	0.025	0.044	0.067
Hog Grease, SEE LARD						
2-Hydroxy-4-(methylthio)butanoic acid	HBA					
HYDROCARBON 5-9 (MOVED TO SUB-O, NON TABLE 151, 6/24/95)	HFN					
Hydroxy terminated Polybutadiene, SEE POLYBUTADIENE, HYDROXYL TERMINATED/						
Isophorone	IPH	0.003	0.012	0.025	0.044	0.068
JET FUELS: JP-1 (Kerosene)	JPO	0.003	0.012	0.026	0.045	0.070
JET FUELS: JP-3	JPT	0.011	0.042	0.092	0.162	0.250
JET FUELS: JP-4	JPF	0.006	0.021	0.045	0.079	0.122

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

CARGO	C H R I S	20.0%	40.0%	60.0%	80.0%	100.0
		MAX LIQUID TRANSF RATE (MLTR)	MAX LIQUID TRANSF RATE (MLTR)	MAX LIQUID TRANSF RATE (MLTR)	MAX LIQUID TRANSF RATE (MLTR)	MAX LIQUID TRANSF RATE (MLTR)
		1,000 (BBL/ HR)	2,000 (BBL/ HR)	3,000 (BBL/ HR)	4,000 (BBL/ HR)	5,000 (BBL/ HR)

JET FUELS: JP-5 (Kerosene, heavy)	JPV	0.003	0.012	0.026	0.045	0.069
JET FUELS: JP-8	JPE					
Kerosene	KRS	0.003	0.012	0.026	0.045	0.070
Lactic acid						
Lard						
Latex, liquid synthetic, including: Styrene-Butadien rubber	LLS					
Latex, liquid synthetic, including: Carboxylated Styrene-Butadien Copolymer						
Magnesium Nonyl Phenol Sulfide						
Magnesium Sulfonate	MSE					
Maleic Anhydride Copolymer						
2-Mercaptobenzothiazol (in liquid mixtures)						
Methane	MTH					
3-Methoxy-1-Butanol						
3-Methoxybutyl Acetate	MOA					
1-Methoxy-2-Propyl Acetate	MPO					
Methoxy Trigylcol, SEE TRIETHYLENE GLYCOL METHYL ETHER	MTG					
Methyl Acetate	MIT	0.006	0.023	0.049	0.086	0.133
Methyl Acetoacetate	MAE					
Methyl alcohol (SEE METHANOL)	MAL	0.004	0.015	0.033	0.058	0.089
Methyl Amyl Acetate	MAC	0.003	0.013	0.028	0.048	0.074
Methyl Amyl alcohol	MAA	0.003	0.013	0.027	0.047	0.073
Methyl Amyl Ketone	MAK					
Methyl Butanol, SEE THE AMYL ALCOHOLS						
Methyl Butenol	MBL					
Methyl n-Butyl Ketone	MBK	0.004	0.014	0.030	0.052	0.080
Methyl Butynol	MBY					
Methyl Butyrate	MBU	0.004	0.014	0.031	0.055	0.084
Methyl Ethyl Ketone	MEK	0.005	0.019	0.041	0.073	0.111
Methyl Formal (DIMETHYL FORMAL)	MTF	0.012	0.047	0.102	0.179	0.278
Methyl Heptyl Ketone	MHK	0.003	0.012	0.026	0.045	0.068
Methyl Isobutyl Carbinol, SEE METHYL AMYL ALCOHOL	MIC					
Methyl Isobutyl Ketone	MIK	0.004	0.014	0.031	0.053	0.082
3-Methyl-3-Methoxybutanol						
3-Methyl-3-Methoxybutyl Acetate						
1-Methyl Naphthalene	MNA	0.003	0.012	0.025	0.044	0.068
Methyl Pentene						
2-METHYL-1-PENTENE	MPN	0.007	0.025	0.054	0.094	0.144
5-METHYL-1-PENTENE	MTN	0.008	0.030	0.066	0.115	0.178
N-Methyl-2-Pyrrolidone	MPY					
Methyl Tert-Butyl Ether (MTBE)	MBE	0.003	0.012	0.025	0.044	0.068
Metolachlor	MCO					
Mineral spirits	MNS	0.003	0.012	0.026	0.046	0.071
Myrcene	MRE	0.003	0.012	0.026	0.046	0.070
NAPHTHA: Aromatic (Having less than 10% Benzene)						
NAPHTHA: Cracking fraction						
NAPHTHA: Heavy						
NAPHTHA: Paraffinic						
NAPHTHA: Petroleum	PTN					
NAPHTHA: Solvent	NSV	0.003	0.012	0.026	0.045	0.070
NAPHTHA: Stoddard solvent	NSS	0.003	0.012	0.026	0.046	0.071
NAPHTHA: Varnish makers' and painters' (75%)	NVM	0.003	0.012	0.026	0.046	0.070
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt solution	NFS					
Naphthenic acid	NTI					
Nonane (all isomers)	NAX	0.003	0.012	0.027	0.047	0.072
NONANE	NAN	0.003	0.012	0.027	0.047	0.072
Nonanoic acid (all isomers)	NNA					
Nonanoic, Tridecanoic acid mixture						
Nonene	NON	0.003	0.013	0.027	0.047	0.073
Nonyl alcohol (all isomers)	NNS	0.003	0.012	0.026	0.045	0.069
NONYL ALCOHOL	NNN	0.003	0.012	0.026	0.045	0.069
NONYL ALCOHOL (iso-)	NNI	0.003	0.012	0.026	0.045	0.069
Nonyl Methacrylate Monomer						

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

C H R I S	CARGO		20.0%	40.0%	60.0%	80.0%	100.0
			MAX	MAX	MAX	MAX	MAX
			LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
			TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
			RATE	RATE	RATE	RATE	RATE
			(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
			1,000	2,000	3,000	4,000	5,000
			(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)
	Nonyl Phenol	***					
	Nonyl Phenol Poly(4-12)ethoxylates	NNP	0.003	0.012	0.025	0.044	0.068
	Nonyl Phenol Sulfide (90% or less)	NPE					
	Noxious liquid, N.O.S. (17) ("Trade name," contains "principal components"), Category						
	Non-Noxious liquid, N.O.S. (18) ("Trade name," contains principal components"), Appen						
	Octadecene						
	Octadecenoamide solution (Oleamide)						
	Octane (all isomers)	ODD					
	OCTANE	OAX	0.004	0.014	0.029	0.051	0.079
	Octanoic acid (all isomers)	OAN	0.004	0.014	0.029	0.051	0.079
	Octanol (all isomers)	OAA	0.003	0.012	0.025	0.044	0.068
	OCTANOL	OCX	0.003	0.012	0.025	0.044	0.068
	Octene (all isomers)	OTA	0.003	0.012	0.025	0.044	0.068
	OCTENE (1-)	OTX	0.004	0.014	0.030	0.052	0.081
	Octyl Acetate	OTE	0.004	0.014	0.031	0.053	0.082
	Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)						
	OCTYL ALCOHOL	OCX	0.003	0.012	0.025	0.044	0.068
	Octyl Aldehydes	IOA	0.003	0.012	0.025	0.044	0.068
	Octyl Decyl Adipate	OAL					
	Octyl Epoxystallate	ODA					
	Octyl Phthalate. SEE DI-(2-ETHYLHEXYL) PHTHALATE	OET					
	OIL, EDIBLE: Babassu						
	OIL, EDIBLE: Beechnut	OB					
	OIL, EDIBLE: Castor						
	OIL, EDIBLE: Cocoa butter	OCA					
	OIL, EDIBLE: Coconut						
	OIL, EDIBLE: Cod liver	OCC					
	OIL, EDIBLE: Corn						
	OIL, EDIBLE: Cottonseed	OCO					
	OIL, EDIBLE: Fish, N.O.S.	OCS					
	OIL, EDIBLE: Grapeseed	OFS					
	OIL, EDIBLE: Groundnut						
	OIL, EDIBLE: Hazelnut						
	OIL, EDIBLE: Lard						
	OIL, EDIBLE: Maize	OLD					
	OIL, EDIBLE: Mustard seed						
	OIL, EDIBLE: Nutmeg Butter						
	OIL, EDIBLE: Olive						
	OIL, EDIBLE: Palm	OOL					
	OIL, EDIBLE: Palm kernel	OPM					
	OIL, EDIBLE: Peanut	OPO					
	OIL, EDIBLE: Poppy	OPN					
	OIL, EDIBLE: Raisin seed						
	OIL, EDIBLE: Rice bran						
	OIL, EDIBLE: Safflower	ORP					
	OIL, EDIBLE: Salad	OSF					
	OIL, EDIBLE: Sesame						
	OIL, EDIBLE: Soya bean						
	OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED	OSB					
	OIL, EDIBLE: Sunflower seed						
	OIL, EDIBLE: Tucum	OSN					
	OIL, EDIBLE: Vegetable, N.O.S.	OTC					
	OIL, EDIBLE: Walnut	OVG					
	OIL, FUEL: No. 1 (Kerosene)						
	OIL, FUEL: No. 1-D	OON					
	OIL, FUEL: No. 2	OOD					
	OIL, FUEL: No. 2-D	OTW	0.004	0.015	0.032	0.055	0.085
	OIL, FUEL: No. 4	OTD					
	OIL, FUEL: No. 5	OFR	0.003	0.012	0.026	0.045	0.069
	OIL, FUEL: No. 6	OFV	0.003	0.012	0.026	0.045	0.069
	OIL, MISC: Absorption	OSX	0.003	0.012	0.026	0.045	0.069
	OIL, MISC: Aliphatic	OAS					

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO		20.0%	40.0%	60.0%	80.0%	100.0
		MAX	MAX	MAX	MAX	MAX
C	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
H	TRANSF	TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
R	RATE	RATE	RATE	RATE	RATE	RATE
I	(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
S						
		1,000	2,000	3,000	4,000	5,000
		(BBL/	(BBL/	(BBL/	(BBL/	(BBL/
		HR)	HR)	HR)	HR)	HR)

OIL, MISC: Animal, N.O.S.						
OIL, MISC: Aromatic						
OIL, MISC: Aviation F2300						
OIL, MISC: Clarified						
OIL, MISC: Coal	OCF					
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHYL ESTER						
OIL, MISC: Coconut oil, fatty acid						
OIL, MISC: Coconut oil, fatty acid Methyl Ester	OCM					
OIL, MISC: Coconut oil, Methyl Ester, SEE COCONUT OIL FATTY ACID METHYL ESTER						
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACID	CFY					
OIL, MISC: Croton						
OIL, MISC: Crude	OIL	0.005	0.018	0.040	0.069	0.106
OIL, MISC: Diesel	ODS	0.004	0.013	0.028	0.049	0.076
OIL, MISC: Gas, low pour						
OIL, MISC: Gas, low sulfur						
OIL, MISC: Heartcut distillate						
OIL, MISC: Lanolin						
OIL, MISC: Linseed						
OIL, MISC: Lubricating	OLB	0.003	0.012	0.025	0.044	0.068
OIL, MISC: Mineral						
OIL, MISC: Mineral seal	OMS					
OIL, MISC: Motor	OMT					
OIL, MISC: Neatsfoot	ONF					
OIL, MISC: Oiticica	OOI					
OIL, MISC: Palm oil, fatty acid Methyl Ester	OPE					
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID METHYL ESTER	OPE					
OIL, MISC: Penetrating	OPT					
OIL, MISC: Perilla						
OIL, MISC: Pilchard						
OIL, MISC: Pine	OPI					
OIL, MISC: Range	ORG					
OIL, MISC: Residual						
OIL, MISC: Resin	ORS	0.003	0.012	0.025	0.044	0.068
OIL, MISC: Resinous petroleum						
OIL, MISC: Road	ORD					
OIL, MISC: Rosin	ORN					
OIL, MISC: Seal						
OIL, MISC: Soapstock	OIS					
OIL, MISC: Soya bean (epoxidized)						
OIL, MISC: Sperm	OSP					
OIL, MISC: Spindle	OSD					
OIL, MISC: Spray	OSY					
OIL, MISC: Tall	OTL					
OIL, MISC: Tall, fatty acid	TOF					
OIL, MISC: Tanner's	OTN					
OIL, MISC: Transformer	OTF					
OIL, MISC: Tung	OTG					
OIL, MISC: Turbine	OTB	0.003	0.013	0.027	0.048	0.074
OIL, MISC: Whale						
OIL, MISC: White (mineral)						
OIL, MISC: Wood						
alpha-Olefins (C13 - C18)	OAM					
Olefins (C13 and above, all isomers)	OLA					
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)						
Organic Amine 70, SEE AMINOETHYLDIETHANOLAMINE, AMINOETHYL-ETHANOLAMINE SOLUTION						
Palm Stearin	PMS					
n-Paraffins (C10 - C20)	PFN					
Pentadecanol, SEE SEE ALCOHOLS (C13 AND ABOVE)	PDC	0.003	0.012	0.025	0.044	0.068
Pentaethylene Glycol						
Pentaethylenehexamine	PEP					
Pentane (all isomers)	PTY	0.016	0.063	0.138	0.242	0.375

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

C H R I S		20.0%	40.0%	60.0%	80.0%	100.0
		MAX	MAX	MAX	MAX	MAX
		LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
		TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
		RATE	RATE	RATE	RATE	RATE
		(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
		1,000	2,000	3,000	4,000	5,000
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)

PENTANE (iso-)	IPT	0.023	0.087	0.191	0.336	0.521
PENTANE (n-)	PTA	0.016	0.061	0.135	0.237	0.367
Pentanoic acid						
Pentene (all isomers)	PTX	0.020	0.075	0.165	0.290	0.449
PENTENE (1-)	PTE	0.020	0.075	0.165	0.290	0.449
Petrolatum	PTL					
1-Phenyl-1-Xylyl Ethane	PXE					
Phosphosulfurized Bicyclic Terpene						
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES						
Pinene	PIN	0.003	0.013	0.028	0.048	0.074
Polyalkenyl Succinic Anhydride Amine						
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtures	PPX					
Polyalkylene Oxide Polyol	PAO					
Polamine, Amide mixture						
Polybutadiene, Hydroxyl terminated						
Polybutene	PLB	0.003	0.012	0.026	0.046	0.071
Polydimethylsiloxane						
Polyethylene Glycol						
Polyethylene Glycol Dimethyl Ether						
Polyglycerol						
Polyisobutylene, SEE POLYBUTENE						
Polymerized Esters						
Poly(20)oxyethylene Sorbitan Monooleate	PSM					
Polypropylene	PLP					
Polypropylene Glycol	PGC	0.003	0.012	0.025	0.044	0.068
Polypropylene Glycol Methyl Ether	PGM	0.004	0.013	0.029	0.050	0.076
Polysiloxane						
Polystyrene Diakyl Maleate						
Potassium Oleate	POE					
Propane	PRP					
n-Propoxypropanol	PKP					
Propyl Acetate (iso-)	IAC	0.004	0.016	0.034	0.059	0.092
Propyl Acetate (n-)	PAT	0.004	0.016	0.034	0.060	0.092
Propyl alcohol (iso-)	IPA	0.004	0.015	0.034	0.058	0.090
Propyl alcohol (n-)	PAL	0.004	0.013	0.028	0.049	0.076
Propylbenzene (n-)	PBZ	0.003	0.012	0.026	0.046	0.070
iso-Propylcyclohexane	IPX	0.003	0.012	0.025	0.044	0.068
Propylene	PPL					
Propylene-Butylene Copolymer	PBP					
Propylene Dimer	PDR					
Propylene Glycol (1,2-PROPANDIOL)	PPG	0.003	0.012	0.025	0.044	0.067
Propylene Glycol Monoalkyl Ether	PGE					
Propylene Glycol Ethyl Ether	PGY					
Propylene Glycol Methyl Ether	PME	0.003	0.013	0.028	0.049	0.075
Propylene Polymer (in liquid mixtures)						
Propylene Tetramer	PTT	0.003	0.012	0.025	0.044	0.067
Propylene Trimer	PTR					
Pseudocumene, SEE TRIMETHYLBENZENES						
Rum						
Sodium Acetate, Glycol, water solutions						
Sodium Acetate solution	SAN					
Sodium Benzoate solution	SBN					
Sodium Sulfonate						
Stearic acid	SRA					
Stearyl alcohol (Octadecanol)						
Sulfolane	SFL	0.003	0.012	0.025	0.044	0.068
Tallow	TLO					
Tallow alcohol, SEE ALCOHOLS (C13 AND ABOVE)						
Tallow fatty acid	TFD					
Tallow Alkyl Nitrile						
Tetradecanol	TTN					
1-Tetradecene, SEE THE OLEFIN OR ALPHA-OLEFIN ENTRIES	TTD	0.003	0.012	0.025	0.044	0.068

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO		20.0%	40.0%	60.0%	80.0%	100.0
		MAX	MAX	MAX	MAX	MAX
C	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
H	TRANSF	TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
R	RATE	RATE	RATE	RATE	RATE	RATE
I	(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
S						
		1,000	2,000	3,000	4,000	5,000
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)
Tetradecylbenzene	TBD					
Tetraethylene Glycol	TTG	0.003	0.012	0.025	0.044	0.068
Tetrahydronaphthalene	THN	0.003	0.012	0.025	0.044	0.068
Tetrapropylbenzene, SEE ALKYL(C9-C17) BENZENES						
Toluene	TOL	0.004	0.015	0.032	0.055	0.085
Triaryphosphate						
Tributyl Phosphate	TBP					
Tricresyl Phosphate (less than 1% of the ortho isomer)	TCP	0.003	0.012	0.025	0.044	0.068
Tridecane	TRD	0.003	0.012	0.025	0.044	0.068
Tridecanoic acid						
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)	TDN	0.003	0.012	0.025	0.044	0.068
1-Tridecene	TDC	0.003	0.012	0.025	0.044	0.068
Tridecylbenzene	TRB					
Triethylbenzene	TEB	0.003	0.012	0.025	0.044	0.068
Triethylene Glycol	TEG	0.003	0.012	0.025	0.044	0.068
Triethylene Glycol Butyl Ether						
Triethylene Glycol Butyl Ether mixture						
Triethylene Glycol di-(2-ethylbutyrate)	TGD					
Triethylene Glycol Ether mixture						
Triethylene Glycol Ethyl Ether	TGE					
Triethylene Glycol Methyl Ether						
Triethyl Phosphate						
Triisooctyl Trimellitate	TPS	0.003	0.012	0.025	0.044	0.068
Triisopropanolamine	TIP					
Trimethylbenzenes (all isomers)	TRE	0.003	0.012	0.026	0.045	0.070
TRIMETHYL BENZENE (1,2,5-)	TMB	0.003	0.012	0.026	0.045	0.070
TRIMETHYL BENZENE (1,2,3-)	TMD	0.003	0.012	0.026	0.045	0.070
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TME	0.003	0.012	0.026	0.045	0.070
Trimethylol Propane Polyethoxylate	TPR					
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate						
2,2,4-Trimethyl-3-pentanol-1-isobutyrate	TMP					
Tripropylene, SEE PROPYLENE TRIMER						
Tripropylene Glycol	TGC					
Tripropylene Glycol Methyl Ether	TGM					
Trixylenyl Phosphate	TRP					
Turpentine	TPT					
Turpentine substitute (White spirit), SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)						
Undecanol						
Undecene (1-)	UDC	0.003	0.012	0.026	0.045	0.068
Undecyl alcohol	UND	0.003	0.012	0.025	0.044	0.068
Undecylbenzene	UDB					
Vinyl Acetate-fumurate Copolymer						
Waxes:	WAX					
WAXES: Candelilla						
WAXES: Carnauba	WAX,					
WAXES: Paraffin	WAX,					
WAXES: Petroleum						
White spirit, SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)						
White spirit (low (15 - 20%) aromatic)	WSL					
Wine, SEE ALCOHOLIC BEVERAGES, N.O.S.						
Wool grease						
Xylenes (ortho-, meta-, para-)	XLX	0.003	0.013	0.028	0.048	0.074
XYLENE (M-)	XLN	0.003	0.013	0.028	0.048	0.074
XYLENE (O-)	XLO	0.003	0.013	0.027	0.047	0.073
XYLENE (P-)	XLN	0.003	0.013	0.028	0.048	0.074
XYLENOL	XYL	0.003	0.012	0.026	0.045	0.069
Zinc Dialkyldithiophosphate						

TABLE V: SUMMARY OF PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VAPOR SHORE CONNECTION

		20.0%	40.0%	60.0%	80.0%	100.0
		MAX	MAX	MAX	MAX	MAX
(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)	C	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
	H	TRANSF	TRANSF	TRANSF	TRANSF	TRANSF
	R	RATE	RATE	RATE	RATE	RATE
	I	(MLTR)	(MLTR)	(MLTR)	(MLTR)	(MLTR)
	S					
CARGO		1,000	2,000	3,000	4,000	5,000
		(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)	(BBL/ HR)
----- *** -----						
46 CFR SUBCHAPTER D, BUT NOT TABLE 30.25-1						
=====						
AROMATIC RESIN OIL 60	ARS	0.003	0.012	0.025	0.044	0.068
AROMATIC RESIN OIL 80	ARS	0.003	0.012	0.025	0.044	0.068
AROMATIC RESIN OILS						
=====						

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw) max 6,750 BPH

CARGO	C	LIQUID	CARGO	EQUIVALENT	Qw<= (Qw) max
	H	SPECIFIC	MAX	WATER	
	R	GRAVITY	LIQUID	LIQUID	
	I		TRANSFER	TRANSFER	
	S		RATE	RATE	
		(1)	(Q1)	Qw= (Q1)*SG1 ^{.5}	
			(BPH)	(BPH)	

46 CFR SUBCHAPT O, TABLE 151

ACETIC ACID	AAC	1.05	5,000	5,123	OK
ACETIC ANHYDRIDE	ACA	1.08	5,000	5,203	OK
ACETONITRILE	ATN	0.78	5,000	4,416	OK
ACRYLIC ACID	ACR	1.05	5,000	5,123	OK
ACRYLONITRILE	ACN	0.81	5,000	4,500	OK
ADIPONITRILE	ADN	0.95	5,000	4,873	OK
ALUMINUM SULFATE SOLUTION	ASX	1.76	5,000	6,633	OK
AMINOETHYLETHANOLAMINE	AEE	1.03	5,000	5,070	OK
AMMONIUM BISULFITE SOLN (70% OR LESS)	ABX	1.44	5,000	6,000	OK
AMMONIUM HYDROXIDE (28% OR LESS NH3)	AMH				
ANTHRACENE OIL (COAL TAR FRACTION)	AHO				
BENZENE	BNZ	0.88	5,000	4,688	OK
BENZENE HYDROCARBON MIXTURES (W/ACETYLENES) (W/10% BENZENE OR MORE)	BHA	0.84	5,000	4,583	OK
BENZENE HYDROCARBON MIXTURES (W/10% BENZENE OR MORE)	BHB	0.84	5,000	4,583	OK
BENZENE, TOLUENE, XYLENE MIXTURES (HAVING 10% BENZENE OR MORE)	BTX	0.84	5,000	4,583	OK
iso-BUTYL ACRYLATE	BAI	0.88	5,000	4,690	OK
n-BUTYL ACRYLATE	BTC	0.90	5,000	4,741	OK
BUTYL ACRYLATE (SEE ISO- & N- BUTYL ACRYLATE)	BAR	0.90	5,000	4,743	OK
BUTYL METHACRYLATE	BMH	0.88	5,000	4,690	OK
iso-BUTYRALDEHYDE	BAD	0.80	5,000	4,481	OK
n-BUTYRALDEHYDE	BTR	0.80	5,000	4,472	OK
BUTYRALDEHYDES (CRUDE)	BFA	0.82	5,000	4,528	OK
BUTYRALDEHYDE (ISO-, N-)	BAE	0.82	5,000	4,528	OK
CAMPOR OIL (LIGHT)	CPO	0.92	5,000	4,804	OK
CARBON TETRACHLORIDE	CBT	1.59	5,000	6,305	OK
CAUSTIC POTASH SOLUTION	CPS	1.50	5,000	6,124	OK
CAUSTIC SODA SOLUTION	CSS	1.50	5,000	6,124	OK
CHLOROBENZENE	CRB	1.11	5,000	5,268	OK
CHLOROFORM	CRF	1.48	5,000	6,083	OK
CHLOROSULFONIC ACID	CSA	1.79	5,000	6,690	OK
COAL TAR NAPHTHA SOLVENT	NCT	0.88	5,000	4,690	OK
CREOSOTE (COAL TAR)	CCT	1.07	5,000	5,172	OK
CREOSOTE (WOOD)	CWD	1.07	5,000	5,172	OK
CRESOLS (ALL ISOMERS)	CRS	1.05	5,000	5,123	OK
CRESOLS WITH LESS THAN 5% PHENOL (SEE CRESOLS (ALL ISOMERS)	CRS	1.05	5,000	5,123	OK
CRESOLS WITH 5% OR MORE PHENOL (SEE PHENOL)	CFP	1.07	5,000	5,172	OK
CRESYLATE SPENT CAUSTIC	CSC	1.55	5,000	6,225	OK
CRESYLIC ACID, SODIUM SALT SOLUTION, SEE CRESYLATE SPENT CAUSTIC	CAX (TAR ?)				
CROTONALDEHYDE	CTA	0.85	5,000	4,610	OK
CYCLOHEXANONE	CCH	0.95	5,000	4,873	OK
CYCLOHEXYLAMINE	CHA	0.87	5,000	4,664	OK
DECYL ACRYLATE (iso-, n-)	DAT	0.89	5,000	4,717	OK
DICHLOROBENZENE (ALL ISOMERS)	DBX	1.30	5,000	5,701	OK
1,1-DICHLOROETHANE	DCH	1.18	5,000	5,431	OK
2,2-DICHLOROETHYL ETHER	DEE	1.22	5,000	5,523	OK
DICHLOROMETHANE (ALSO KNOWN AS METHYLENE CHLORIDE)	DCM	1.32	5,000	5,745	OK
2,4-DICHLOROPHENOXYACETIC ACID DIETHANOLAMINE SALT SOLUTION	DDE				
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION	DAD				
2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	DTI				
1,1-,1,2- OR 1,3- DICHLOROPROPANE	DPX	1.16	5,000	5,385	OK
1,3-DICHLOROPROPENE	DFU	1.23	5,000	5,545	OK
DICHLOROPROPENE, DICHLOROPROPANE MIXTURES	DMX	1.21	5,000	5,500	OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw) max 6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE $Q_w = (Q_1) \cdot SG^{1.5}$ (BPH)	$Q_w \leq (Q_w)_{max}$
*** *****					
2,2-DICHLOROPROPIONIC ACID	DCN				
DIETHANOLAMINE	DEA	1.09	5,000	5,220	OK
DIETHYLAMINE	DEN	0.71	5,000	4,213	OK
DIETHYLENETRIAMINE	DET	0.96	5,000	4,899	OK
DIETHYL ETHER, SEE ETHYL ETHER	DEH				
DIISOBUTYLAMINE	DBU	0.75	5,000	4,330	OK
DIISOPROPANOLAMINE	DIP	0.98	5,000	4,950	OK
DIISOPROPYLAMINE	DIA	0.72	5,000	4,243	OK
N,N-DIMETHYLACETAMIDE	DAC	0.95	5,000	4,873	OK
DIMETHYLETHANOLAMINE	DMB	0.89	5,000	4,717	OK
DIMETHYLFORMAMIDE	DMF	0.95	5,000	4,873	OK
1,4-DIOXANE	DOX	1.04	5,000	5,099	OK
DI-N-PROPYLAMINE	DNA	0.74	5,000	4,301	OK
ETHANOLAMINE	MEA	1.02	5,000	5,050	OK
ETHYL ACRYLATE	EAC	0.93	5,000	4,822	OK
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	0.80	5,000	4,472	OK
N-ETHYLBUTYLAMINE	EBA	0.74	5,000	4,301	OK
N-ETHYLCYCLOHEXYLAMINE	ECC	0.86	5,000	4,637	OK
ETHYLENE CYANOHYDRIN	ETC	1.04	5,000	5,099	OK
ETHYLENEDIAMINE	EDA	0.91	5,000	4,770	OK
ETHYLENE DIBROMIDE	EDB	2.17	4,582	6,750	OK
ETHYLENE DICHLORIDE	EDC	1.26	5,000	5,612	OK
ETHYLENE GLYCOL PROPYL ETHER	EGP	0.91	5,000	4,770	OK
2-ETHYLHEXYL ACRYLATE	EAI	0.89	5,000	4,717	OK
ETHYLIDENE NORBORNENE	ENB	0.90	5,000	4,743	OK
ETHYL METHACRYLATE	ETM	0.92	5,000	4,796	OK
2-ETHYL-3-PROPYLACROLEIN	EPA	0.85	5,000	4,610	OK
FERRIC CHLORIDE SOLUTIONS	FCS				
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	1.13	5,000	5,315	OK
FORMIC ACID	FMA	1.22	5,000	5,523	OK
FURFURAL	FFA	1.20	5,000	5,477	OK
GLUTARALDEHYDE SOLUTION (50% OR LESS)	GTA				
HEXAMETHYLENEDIAMINE SOLUTION	HMC	0.93	5,000	4,822	OK
HEXAMETHYLENEIMINE	HMI	0.88	5,000	4,690	OK
HYDROCHLORIC ACID SPENT (15% OR LESS)	HCS	1.21	5,000	5,500	OK
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-))					
ISOPRENE	IPR	0.69	5,000	4,153	OK
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT 3% OR MORE) (INCLUDING: BLACK, GREY, KPL)	MSO	0.86	5,000	4,637	OK
MESITYL OXIDE	MAM	0.95	5,000	4,873	OK
METHYL ACRYLATE	MCK	0.94	5,000	4,848	OK
METHYLCYCLOPENTADIENE DIMER	MDE	1.04	5,000	5,099	OK
METHYL DIETHANOLAMINE	MEP	0.92	5,000	4,796	OK
2-METHYL-5-ETHYLPYRIDINE					
METHYLENE CHLORIDE (SEE DICHLOROMETHANE)					
METHYL METHACRYLATE	MMM	0.94	5,000	4,848	OK
2-METHYLPYRIDINE	MPR	0.95	5,000	4,873	OK
alpha-METHYLSTYRENE	MSR	0.89	5,000	4,717	OK
MORPHOLINE	MPL	1.00	5,000	5,000	OK
NITRIC ACID (70% OR LESS)	NCD				
NITROPROPANE (-1, OR -2)	NPM	0.99	5,000	4,975	OK
OCTYL NITRATES (ALL ISOMERS)	ONE	1.00	5,000	5,000	OK
OLEUM	OLM	1.98	4,797	6,750	OK
PENTACHLOROETHANE	PCE	1.67	5,000	6,461	OK
1, 3-PENTADIENE	PDE	0.68	5,000	4,123	OK
PERCHLOROETHYLENE (SAME AS TETRACHLOROETHYLENE)	PER	1.62	5,000	6,364	OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS	(MDWP)	3.000 PSIG
SPILL VALVE SET PRESSURE	(Ps/v)	1.750 PSIG
CARGO TANK P/V SETTING	(Pp/v)	1.500 PSIG
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000 BPH
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw) max	6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE $Q_w = (Q_1) * SG^{1.5}$ (BPH)	$Q_w \leq (Q_w)_{max}$
PHOSPHORIC ACID	PAC	1.83	4,990	6,750	OK
POLYETHYLENE POLYAMINES	PEB	0.99	5,000	4,975	OK
POLYMETHYLENE POLYPHENYL ISOCYANATE	PPI	1.20	5,000	5,477	OK
POTASSIUM HYDROXIDE SOLUTION (SEE CAUSTIC POTASH SOLUTION)					
iso-PROPANOLAMINE	MPA	0.96	5,000	4,899	OK
PROPANOLAMINE (iso-, n-)	PAX	0.96	5,000	4,899	OK
PROPIONIC ACID	PNA	1.00	5,000	5,000	OK
iso-PROPYLAMINE	IPP	0.69	5,000	4,153	OK
iso-PROPYL ETHER	IPE	0.72	5,000	4,243	OK
PYRIDINE	PRD	0.98	5,000	4,950	OK
SODIUM ALUMINATE SOLUTION	SAU				
SODIUM CHLORATE SOLUTION (50% OR LESS)	SDD	1.63	5,000	6,384	OK
SODIUM DICHROMATE SOL'N (70% OR LESS)	SDL				
SODIUM HYDROXIDE SOLUTION (SEE CAUSTIC SODA SOLUTION)					
SODIUM HYPOCHLORITE SOL'N (15% OR LESS)	SHP	1.10	5,000	5,244	OK
SODIUM SULFIDE, HYDROSULFIDE SOLUTIONS (H2S 15 PPM OR LESS)	SSH	1.32	5,000	5,745	OK
SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (15 PPM<H2S<200 PPM)	SSI	1.32	5,000	5,745	OK
SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (H2S GREATER THAN 200 PPM)	SSJ	1.32	5,000	5,745	OK
SODIUM THIOCYANATE SOLUTION (56% OR LESS)	STS				
STYRENE MONOMER	STY	0.92	5,000	4,796	OK
SULFURIC ACID	SFA	1.84	4,976	6,750	OK
SULFURIC ACID, SPENT	SAC	1.39	5,000	5,895	OK
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORIDE)	TEC	1.59	5,000	6,311	OK
TETRAETHYLENEPENTAMINE	TTP	1.00	5,000	5,000	OK
TETRAHYDROFURAN	THF	0.89	5,000	4,717	OK
1,1,2-TRICHLOROETHANE (VINYL TRICHLORIDE)	TCM	1.44	5,000	6,000	OK
TRICHLOROETHANE (SEE 1,1,2-TRICHLOROETHANE)					
TRICHLOROETHYLENE	TCL	1.46	5,000	6,042	OK
1,2,3-TRICHLOROPROPANE	TCN	1.39	5,000	5,895	OK
TRIETHANOLAMINE	TEA	1.13	5,000	5,315	OK
TRIETHYLAMINE	TEN	0.73	5,000	4,272	OK
TRIETHYLENETETRAMINE	TET	0.98	5,000	4,950	OK
UREA, AMMONIUM NITRATE SOL'N (CONTAINING MORE THAN 2% NH3)	UAS				
VALERALDEHYDE (iso-, n-)		0.79	5,000	4,444	OK
VALERALDEHYDE (iso-)	IVA	0.79	5,000	4,444	OK
VALERALDEHYDE (n-)	VAL	0.84	5,000	4,583	OK
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VBL				
VINYL ACETATE	VAM	0.94	5,000	4,848	OK
VINYLTOLUENE	VNT	0.90	5,000	4,743	OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw) max 6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE Qw=(Q1)*SG1 ^{.5} (BPH)	Qw<= (Qw) max
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1,1-DICHLOROPROPANE	DPB	1.16	5,000	5,385	OK
1,1,1-TRICHLOROETHANE		1.51	5,000	6,144	OK
1,2-DICHLOROPROPANE	DPP	1.16	5,000	5,385	OK
1,3 CYCLOPENTADIENE					
1,3-DICHLOROPROPANE	DPC	1.16	5,000	5,385	OK
2-METHYL-2-HYDROXY-3-BUTYNE	MHB	0.86	5,000	4,637	OK
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION (70% OR LESS)	DDA				
3-PENTENENITRILE	PNT (CRUDE ?)				
AEROTHENE TT (1,1,1-TRICHLOROETHANE)					
ALKYLBENZENE					
AMINOETHYLPIPERAZINE	AEP				
BENZENE RAFFINATE (ASSUME VAPOR PROPERTIES SIMILAR TO BENZENE)		0.70	5,000	4,183	OK
BENZENE SULFONYL CHLORIDE	BSC	1.38	5,000	5,874	OK
BENZYL ACETATE	BZE	1.04	5,000	5,099	OK
BENZYL CHLORIDE (STABILIZED)	BCL	1.10	5,000	5,244	OK
BUTANOL					
BUTYL ETHER (n-)	BTE	0.77	5,000	4,387	OK
BUTYLENE OXIDE (1,2-)	BTO	0.83	5,000	4,555	OK
BUTYRIC ACID	BRA	0.96	5,000	4,899	OK
CARBOLIC ACID	CBO	1.04	5,000	5,099	OK
CHLOROACETIC ACID (80% OR LESS)	CHM	1.58	5,000	6,285	OK
CHLOROPROPIONIC ACID (2- OR 3-)	CPM	1.26	5,000	5,612	OK
CHLOROTOLUENE (m-)	CTM	1.07	5,000	5,172	OK
CHLOROTOLUENE (o-)	CTO	1.08	5,000	5,196	OK
CHLOROTOLUENE (p)	CRN	1.07	5,000	5,172	OK
CHLOROTOLUENES (MIXED ISOMERS)	CHI	1.08	5,000	5,196	OK
CREOSOTE (ALL ISOMERS)	CCW	1.07	5,000	5,172	OK
CRESYLIC ACID TAR	CRX	1.05	5,000	5,123	OK
CYCLOHEPTANE	CYE	0.81	5,000	4,500	OK
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	CYC	0.95	5,000	4,873	OK
CYCLOHEXYL ACETATE	CSB	0.97	5,000	4,924	OK
CYCLOPENTADIENE, STYRENE, BENZENE MIXTURE	CSB	1.50	5,000	6,124	OK
CYCLOPENTANE	CYP	0.74	5,000	4,301	OK
DECAHOIC ACID	DCO	5.94	2,770	6,750	OK
DI 2 ETHYLHEXYL PHTHALATE (SEE ALSO ETHYLHEXYL PHTHALATE)		0.98	5,000	4,955	OK
DICHLOROISOPROPYL ETHER (2,2'-)	DCI	1.11	5,000	5,268	OK
DICHLOROPROPANE		1.16	5,000	5,385	OK
DICHLOROPROPENE		1.23	5,000	5,545	OK
DIETHYL SULFATE	DSU	1.18	5,000	5,431	OK
DIETHYLETHANOLAMINE	DAE	0.89	5,000	4,717	OK
DODECYL BENZENE					
DODECYLDIMETHYLAMINE TETRADECYLDIMETHYLAMINE MIXTURE	DOT				
DRIPOLENE					
ETHANOL (see ethyl alcohol)					
ETHYL BROMIDE					
ETHYL TERT-BUTYL ETHER	EBE	0.73	5,000	4,272	OK
ETHYLAMINE	EAM	0.80	5,000	4,472	OK
ETHYLENE DICHLORIDE 1,1,2-TRICHLOROETHANE MIXTURE	ETX	1.44	5,000	6,000	OK
ETHYLMERCAPTAN (SAME AS ETHANETHIOL)					
ETHYLPHENOL	EPL	1.04	5,000	5,099	OK
FORMALDEHYDE SOLUTION (50% OR MORE), METHANOL MIXTURES	MTM	0.79	5,000	4,444	OK
HYDROSULFIDE					

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw) max 6,750 BPH

C	LIQUID	CARGO	EQUIVALENT	
H	SPECIFIC	MAX	WATER	
R	GRAVITY	LIQUID	LIQUID	Qw <= (Qw) max
I		TRANSFER	TRANSFER	
S		RATE	RATE	
	(1)	(Q1)	Qw = (Q1) * SG1 ^{.5}	
		(BPH)	(BPH)	
*** *****				
INDENES				
ISOBUTYL ACETATE	IBA			
ISOPRENE, PENTADIENE MIXTURE	IPN			
ISO-PROPYL ALCOHOL		0.79	5,000	4,444 OK
LAURIC ACID	LRA	0.88	5,000	4,690 OK
METHACRYLONITRILE	MET	0.80	5,000	4,472 OK
METHANOL		0.79	5,000	4,447 OK
METHYL STYRENE				
METHYL STYRENE, INDENES, ALKYL BENZENE MIXTURES	MIA			
METHYLCYCLOHEXANE	MCY	0.77	5,000	4,387 OK
METHYLHEXANE (SAME AS HEPTANE)				
MONOETHANOLAMINE	MEA	1.02	5,000	5,050 OK
MONOISOPROPANOLAMINE		0.96	5,000	4,899 OK
NAPHTHALENE (MOLTEN)	NTM	1.15	5,000	5,362 OK
NEODECANOIC ACID	NEA	0.92	5,000	4,796 OK
NITRILOTRIACETIC ACID	NAA (&SALTS ?)			
NITROPHENOL (MOLTEN)	NTP	1.49	5,000	6,103 OK
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NNM	1.05	5,000	5,123 OK
NITROTOLUENE (o-,p-)	NIT	1.16	5,000	5,385 OK
PARALDEHYDE	PDH	0.99	5,000	4,975 OK
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXIE)	PGS			
PROPIONALDEHYDE	PAD	0.81	5,000	4,500 OK
PROPIONIC ANHYDRIDE	PAH	1.01	5,000	5,025 OK
PROPIONITRILE	PCN	0.70	5,000	4,183 OK
PROPYLAMINE (n-)	PRA	0.72	5,000	4,243 OK
PROPYLBENZENE				
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	GPY	0.84	5,000	4,583 OK
PYROLYSIS RESIDUAL FUELS		0.89	5,000	4,717 OK
SEWAGE, RAW	SWR			
SODIUM SULFIDE (SOLID IN WATER)	SDS	1.53	5,000	6,185 OK
STYRENE	STY	0.92	5,000	4,796 OK
STYRENE CRUDE	STX	0.92	5,000	4,796 OK
STYRENE TAR	STT			
TETRAMETHYLBENZENE (1,2,3,5-)	TTB	0.89	5,000	4,717 OK
TOLUIDINE (o-)	TLI	1.00	5,000	5,000 OK
TRICHLOROBENZENE (1,2,4-)	TCB	1.45	5,000	6,021 OK
TRIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N				
TRIPHENYLBORANE	TPE			
UNDECANOIC ACID	UDA	0.89	5,000	4,717 OK
HYDROCARBON 5-9	HFN	0.85	5,000	4,610 OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw) max 6,750 BPH

C	LIQUID	CARGO	EQUIVALENT	
H	SPECIFIC	MAX	WATER	
R	GRAVITY	LIQUID	LIQUID	Qw <= (Qw) max
I		TRANSFER	TRANSFER	
S		RATE	RATE	
	(1)	(Q1)	Qw = (Q1) * SG1 ^{.5}	
		(BPH)	(BPH)	

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Acetone	ACT	0.79	5,000	4,450	OK
Acetophenone	ACP	1.03	5,000	5,065	OK
Acetyl Tributyl Citrate		1.05	5,000	5,114	OK
Acrylonitrile-Styrene Copolymer dispersion in Polyether Polyol	ALE				
Alcohols (C13 and above)	ALY				
Alcoholic beverages, N.O.S.					
Alcohol (C6 - C17) (secondary) Poly(3-6)ethoxylates					
Alcohol (C12 - C15) Poly(1-3)ethoxylates					
Alcohol (C12 - C15) Poly(3-11)ethoxylates					
Alkenylsuccinic acid					
Alkenylsuccinic Anhydride					
Alkyl (C9 - C17) Benzenes	AKB				
Alkylbenzenesulfonic acid (4% or less)	ABS				
Alkyl Phthalates (n-)					
Alkyl Succinate Formaldehyde Hydr- oxyamino condensate (3.2% or less)					
Aminoethyldiethanolamine, Aminoethylethanolamine solution					
Amyl Acetate (commercial, iso-, n-, sec-)	AEC	0.87	5,000	4,664	OK
AMYL ACETATE (n-)	AML	0.88	5,000	4,690	OK
AMYL ACETATE (iso-)	IAT	0.88	5,000	4,690	OK
Amyl alcohol (iso-, n-, sec-, primary) (SEE ALSO IAA)	AAI	0.82	5,000	4,528	OK
Amyl alcohol (n-)	AAN	0.82	5,000	4,528	OK
Amyl alcohol (tert-)	AAI				
AMYL ALCOHOL, PRIMARY	APM	0.82	5,000	4,528	OK
AMYL ALCOHOL, (sec-)	ASE	0.82	5,000	4,528	OK
Amylene	AMZ				
AMYL ALCOHOL, (iso-)	IAA	0.82	5,000	4,528	OK
Amyl Methyl Ketone	AMK				
Amyl Tallate					
Asphalt	ASP	1.04	5,000	5,087	OK
ASPHALT BLENDING STOCKS: Roofers flux	ARF				
ASPHALT BLENDING STOCKS: Straight run residue	ASR				
Behenyl alcohol					
Benzene Tricarboxylic acid Trioctyl Ester					
Benzyl alcohol	BAL	1.05	5,000	5,123	OK
Bicyclic Terpenel Polyamide salt					
Brake fluid base mixtures (containing Poly(2-8)alkylene (C2-C3) glycols, PolBFX	BMX	1.03	5,000	5,074	OK
Butane					
Butene, SEE BUTYLENE					
Butene Oligomer	BOL				
Butyl Acetate (iso-, n-)	BAX	0.87	5,000	4,664	OK
BUTYL ACETATE (N-)	BCN	0.88	5,000	4,690	OK
Butyl Acetate (sec-)	BTA	0.89	5,000	4,717	OK
Butyl alcohol (iso-, n-, sec-, tert-)					
BUTYL ALCOHOL (ISO-)	IAL	0.81	5,000	4,500	OK
BUTYL ALCOHOL (N-)	BAN	0.81	5,000	4,500	OK
BUTYL ALCOHOL (SEC-)	BAS	0.81	5,000	4,500	OK
BUTYL ALCOHOL (TERT-)	BAT	0.78	5,000	4,416	OK
Butyl Benzyl Phthalate	BPH	1.12	5,000	5,292	OK
Butylene	BTN				
Butylene Glycol	BUG				
1,3-Butylene Glycol, SEE BUTYLENE GLYCOL					
Butylene Polyglycol, SEE BUTYLENE GLYCOL					

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw) max 6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE $Q_w = (Q_1) \cdot SG^{1.5}$ (BPH)	$Q_w \leq (Q_w)_{max}$
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iso-Butyl Formate					
n-Butyl Formate					
Butyl Heptyl Ketone	BHK				
Butyl Methyl Ketone, SEE METHYL BUTYL KETONE					
Butyl Stearate					
Butyl Toluene					
Butyrolactone (gamma)	BUE	0.85	5,000	4,610	OK
Calcium Alkylphenate	BLA				
Calcium Alkyl Salicylate					
Calcium Amino Nonyl Phenolate					
Calcium Carboxylate					
Caprolactam solutions					
Carbon black base	CLS	1.02	5,000	5,050	OK
Cetyl alcohol (HEXADECANOL) SEE ALCOHOLS (C13 AND ABOVE)		0.90	5,000	4,743	OK
Cetyl-Stearal alcohol					
Cleaning spirit (unleaded)					
Coal tar					
Cumene	COR	1.11	5,000	5,268	OK
Cycloaliphatic resins	CUM	0.86	5,000	4,640	OK
Cyclohexane					
Cyclohexanol	CHX	0.78	5,000	4,413	OK
1,3-Cyclopentadiene dimer (molten)	CHN	0.95	5,000	4,873	OK
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	CPD	0.69	5,000	4,153	OK
Cymene (para-)					
Decahydronaphthalene	CMP	0.86	5,000	4,637	OK
Decaldehyde (iso-)	DHN	0.89	5,000	4,717	OK
Decaldehyde (n-)	IDA	0.83	5,000	4,555	OK
Decane	DAL	0.83	5,000	4,555	OK
Decene	DDC				
Decyl alcohol (all isomers) (DECANOL)	DCE	0.74	5,000	4,301	OK
DECYL ALCOHOL (iso-)	DAX	0.83	5,000	4,555	OK
DECYL ALCOHOL (n-)	ISA	0.83	5,000	4,555	OK
Decylbenzene (n-)	DAN	0.83	5,000	4,555	OK
Detergent Alkylate	DBZ	0.86	5,000	4,637	OK
Diacetone alcohol					
Dialkyl (C10-C14) Benzenes	DAA	0.97	5,000	4,933	OK
Dialkyl (C7-C13) Phthalates	DAB				
Dibutyl Carbinol	DAH				
Dibutyl Phthalate (ortho-)					
Dicyclopentadiene, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	DPA	1.05	5,000	5,123	OK
Diethylbenzene	DPT	0.98	5,000	4,950	OK
Diethylene Glycol	DEB	0.87	5,000	4,664	OK
Diethylene Glycol Butyl Ether	DEG	1.12	5,000	5,292	OK
Diethylene Glycol Butyl Ether Acetate	DME	0.95	5,000	4,873	OK
Diethylene Glycol Dibutyl Ether	DEM				
Diethylene Glycol Diethyl Ether	DIG				
Diethylene Glycol Ethyl Ether					
Diethylene Glycol Ethyl Ether Acetate	DGE				
Diethylene Glycol Methyl Ether	DGA	0.99	5,000	4,975	OK
Diethylene Glycol Methyl Ether Acetate	DGM	1.03	5,000	5,074	OK
Diethylene Glycol Phenyl Ether	DGR				
Diethylene Glycol Phthalate	DGP				
Di-(2-ethylhexyl)adipate	DGL				
Di-(2-ethylhexyl)phthalate	DEH				
Diethyl Phthalate	DIE				
	DPH				

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw) max 6,750 BPH

CARGO	C H I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE $Q_w = (Q1) \cdot SG1^{.5}$ (BPH)	$Q_w \leq (Q_w)_{max}$
*** *****					
Diglycidyl Ether of Bisphenol A	BDE				
Diheptyl Phthalate	DHP				
Dihexyl Phthalate	DHA				
Diisobutylcarbinol	DBC	0.81	5,000	4,500	OK
Diisobutylene	DBL	0.72	5,000	4,243	OK
Diisobutyl Ketone	DIK	0.81	5,000	4,500	OK
Diisobutyl Phthalate	DIT				
Diisodecyl Phthalate	DID				
Diisononyl Adipate	DNY				
Diisononyl Phthalate	DIN				
Diisooctyl Phthalate	DIO				
Diisopropylbenzene (all isomers)	DIX	0.86	5,000	4,637	OK
Diisopropyl Naphthalene	DII				
Dimethyl Adipate	DLA				
Dimethylbenzene					
Dimethyl Glutarate	DGT				
Dimethyl Phthalate	DTL	1.19	5,000	5,454	OK
Dimethyl Polysiloxane	DMP				
2,2-Dimethylpropane-1,3-diol	DDI				
Dimethyl Succinate	DSE				
Dinonyl Phthalate	DIF	0.97	5,000	4,924	OK
Di(octylphenyl)amine					
Diocetyl Phthalate	DOP	0.98	5,000	4,950	OK
Dipentene	DPN	0.84	5,000	4,583	OK
Diphenyl	DIL	0.99	5,000	4,975	OK
Diphenyl, Diphenyl Ether mixture	DDO	1.07	5,000	5,172	OK
Diphenyl Ether	DPE	1.07	5,000	5,172	OK
Diphenyl Ether, Biphenyl Ether mixture	DOB				
Dipropylene Glycol	DPG	1.03	5,000	5,074	OK
Dipropylene Glycol Dibenzoate	DGY				
Dipropylene Glycol Methyl Ether	DPY				
DISTILLATES: Flashed feed stocks	DDF	0.75	5,000	4,330	OK
DISTILLATES: Straight run	DSR	0.73	5,000	4,272	OK
Ditridecyl Phthalate	DTP				
Diundecyl Phthalate	DUP				
Dodecane (all isomers)	DOC				
Dodecanol	DDN				
Dodecene (all isomers)	DOZ	0.76	5,000	4,359	OK
DODECENE	DOD	0.76	5,000	4,359	OK
Dodecylbenzene	DDB	0.86	5,000	4,637	OK
Dodecyl Phenol	DOL				
Drilling mud (low toxicity) (if flammable or combustible)/					
Epoxylated linear alcohols, C11-C15					
Ethane	ETH	0.47	5,000	3,410	OK
2-Ethoxyethanol	EEO	1.04	5,000	5,099	OK
2-Ethoxyethyl Acetate	EEA	1.04	5,000	5,099	OK
Ethoxylated alcohols, C11-C15, SEE THE ALCOHOL POLYETHOXYLATES					
Ethoxy Triglycol (crude)	ETG	1.02	5,000	5,050	OK
Ethyl Acetate	ETA	0.90	5,000	4,743	OK
Ethyl Acetoacetate	EAA	1.03	5,000	5,074	OK
Ethyl alcohol (ETHANOL)	EAL	0.79	5,000	4,441	OK
Ethyl Amyl Ketone	EAK				
Ethyl Benzene	ETB	0.87	5,000	4,664	OK
Ethyl Butanol	EBT	0.83	5,000	4,555	OK
Ethyl Butyrate	EBR	0.88	5,000	4,690	OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS	(MDWP)	3.000	PSIG	
SPILL VALVE SET PRESSURE	(Ps/v)	1.750	PSIG	
CARGO TANK P/V SETTING	(Pp/v)	1.500	PSIG	
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000	BPH	
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw) max	6,750	BPH	
	C	LIQUID	CARGO	EQUIVALENT
	H	SPECIFIC	MAX	WATER
	R	GRAVITY	LIQUID	LIQUID
	I		TRANSFER	TRANSFER
	S		RATE	RATE
CARGO		(1)	(Q1)	$Qw = (Q1) * SG1^{.5}$
			(BPH)	(BPH)
Ethyl Cyclohexane	ECY	0.79	5,000	4,444 OK
Ethylene	ETL			
Ethylene Carbonate				
Ethylene Glycol	EGL	1.13	5,000	5,315 OK
Ethylene Glycol Acetate	EGO			
Ethylene Glycol Butyl Ether	EGM			
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EMA	0.94	5,000	4,848 OK
Ethylene Glycol Ether Acetate				
Ethylene Glycol Tert-Butyl Ether				
Ethylene Glycol Diacetate	EGY	1.10	5,000	5,244 OK
Ethylene Glycol Dibutyl Ether	EGB			
Ethylene Glycol Ethyl Ether, SEE 2-ETHOXYETHANOL	EGF			
Ethylene Glycol Ethyl Ether Acetate, SEE 2-ETHOXYETHYL ACETATE	EGA			
Ethylene Glycol Isopropyl Ether	EGI			
Ethylene Glycol Methyl Butyl Ether				
Ethylene Glycol Methyl Ether	EME	1.10	5,000	5,244 OK
Ethylene Glycol Methyl Ether Acetate	EGT			
Ethylene Glycol Phenyl Ether	EPE	1.10	5,000	5,244 OK
Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixture	EDX			
Ethylene-Propylene Copolymer (in liquid mixtures)				
Ethyl-3-Ethoxypropionate	EEP			
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EHA	0.82	5,000	4,528 OK
2-Ethylhexanoic acid	EHO			
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHX	0.84	5,000	4,583 OK
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID				
Ethyl Hexyl Phthalate (SEE ALSO DI 2-ETHYLHEXYL PHTHALATE)	EHE			
Ethyl Hexyl Tallate	EHT			
Ethyl Propionate	EPR	0.89	5,000	4,717 OK
Ethyl Toluene	ETE	0.88	5,000	4,690 OK
Fatty acid (saturated, C13 and above)				
Fatty acid Amides				
Formamide	FAM	1.13	5,000	5,315 OK
Furfuryl Alcohol	FAL	1.13	5,000	5,315 OK
Gas oil, cracked	GOC			
GASOLINE BLENDING STOCKS: Alkylates	GAK	0.75	5,000	4,330 OK
GASOLINE BLENDING STOCKS: Reformates	GRF	0.80	5,000	4,472 OK
GASOLINES: Automotive (containing not over 4.23 grams lead per gallon)	GAT	0.74	5,000	4,301 OK
GASOLINES: Aviation (containing not over 4.86 grams lead per gallon) Aviation	GAV	0.71	5,000	4,213 OK
GASOLINES: Casinghead (natural)	GCS	0.67	5,000	4,093 OK
GASOLINES: Polymer	GPL	0.75	5,000	4,330 OK
GASOLINES: Straight run	GSR	0.75	5,000	4,330 OK
Glycerine	GCR	1.26	5,000	5,612 OK
Glycerol, SEE GLYCERINE				
Glycerol Polyalkoxylate				
Glycerol Triacetate				
Glycidyl Ester of Tertiary Carboxylic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACID	GLT			
Glycidyl Ester of Tridecyl Acetic acid				
Glycidyl Ester of Versatic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACID				
Glycol Diacetate, SEE ETHYLENE GLYCOL DIACETATE				
Glycols, Resins and Solvents mixtures				
Gylcol Triacetate, SEE GLYCERYL TRIACETATE				
Glyoxal solution (40% or less)				
Grease				
Heptadecane				
Heptane (all isomers) (METHYHEXANE)	HMX	0.68	5,000	4,135 OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw)max 6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE $Q_w = (Q_1) \cdot SG^{1.5}$ (BPH)	$Q_w \leq (Q_w)_{max}$
HEPTANE (N-)	HPT	0.68	5,000	4,123	OK
Heptanoic acid	HEP	0.92	5,000	4,796	OK
Heptanol (all isomers)	HTX	0.82	5,000	4,528	OK
HEPTANOL	HTN	0.82	5,000	4,528	OK
Heptene (all isomers)	HPX	0.70	5,000	4,183	OK
HEPTENE (1-)	HTE	0.70	5,000	4,183	OK
Heptyl Acetate	HPE	0.88	5,000	4,690	OK
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR					
Hexaethylene Glycol					
Hexamethylene Glycol					
Hexamethylenetetramine solutions	HTS				
Hexane (all isomers)	HXS	0.66	5,000	4,062	OK
HEXANE	HXA	0.66	5,000	4,062	OK
Hexanoic acid	HKO	0.93	5,000	4,822	OK
Hexanol	HKN	0.82	5,000	4,528	OK
Hexene (all isomers)	HEX	0.67	5,000	4,093	OK
HEXENE (1-)	HXE	0.67	5,000	4,093	OK
HEXENE (2-)	HXT	0.67	5,000	4,093	OK
Hexyl Acetate	HAE				
Hexylene Glycol	HXG	0.92	5,000	4,796	OK
Hog Grease, SEE LARD					
2-Hydroxy-4-(methylthio)butanoic acid	HBA				
HYDROCARBON 5-9 (MOVED TO SUB-O, NON TABLE 151, 6/24/95)	HFN				
Hydroxy terminated Polybutadiene, SEE POLYBUTADIENE, HYDROXYL TERMINATED/ Isophorone	IPH	0.93	5,000	4,822	OK
JET FUELS: JP-1 (Kerosene)	JPO	0.80	5,000	4,472	OK
JET FUELS: JP-3	JPT	0.80	5,000	4,472	OK
JET FUELS: JP-4	JPF	0.81	5,000	4,500	OK
JET FUELS: JP-5 (Kerosene, heavy)	JPV	0.82	5,000	4,528	OK
JET FUELS: JP-8	JPE				
Kerosene	KRS	0.81	5,000	4,500	OK
Lactic acid					
Lard					
Latex, liquid synthetic, including: Styrene-Butadien rubber	LLS				
Latex, liquid synthetic, including: Carboxylated Styrene-Butadien Copolymer					
Magnesium Nonyl Phenol Sulfide					
Magnesium Sulfonate	MSE				
Maleic Anhydride Copolymer					
2-Mercaptobenzothiazol (in liquid mixtures)					
Methane	MTH				
3-Methoxy-1-Butanol					
3-Methoxybutyl Acetate	MOA				
1-Methoxy-2-Propyl Acetate	MPO				
Methoxy Triglycol, SEE TRIETHYLENE GLYCOL METHYL ETHER	MTG				
Methyl Acetate	MTT	0.92	5,000	4,796	OK
Methyl Acetoacetate	MAE				
Methyl alcohol (SEE METHANOL)	MAL	0.79	5,000	4,444	OK
Methyl Amyl Acetate	MAC	0.86	5,000	4,637	OK
Methyl Amyl alcohol	MAA	0.81	5,000	4,500	OK
Methyl Amyl Ketone	MAK				
Methyl Butanol, SEE THE AMYL ALCOHOLS					
Methyl Butenol	MBL				
Methyl n-Butyl Ketone	MBK	0.81	5,000	4,500	OK
Methyl Butynol	MBY				
Methyl Butyrate	MBU	0.90	5,000	4,743	OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw)max 6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE Qw=(Q1)*SG1 ^{.5} (BPH)	Qw<= (Qw) max
*** *****					
Methyl Ethyl Ketone	MEK	0.80	5,000	4,472	OK
Methyl Formal (DIMETHYL FORMAL)	MTF	0.86	5,000	4,637	OK
Methyl Heptyl Ketone	MHK	0.83	5,000	4,555	OK
Methyl Isobutyl Carbinol, SEE METHYL AMYL ALCOHOL	MIC	0.84	5,000	4,583	OK
Methyl Isobutyl Ketone	MIK	0.80	5,000	4,472	OK
3-Methyl-3-Methoxybutanol					
3-Methyl-3-Methoxybutyl Acetate					
1-Methyl Naphthalene	MNA	1.02	5,000	5,050	OK
Methyl Pentene					
2-METHYL-1-PENTENE	MPN	0.69	5,000	4,153	OK
5-METHYL-1-PENTENE	MTN	0.67	5,000	4,093	OK
N-Methyl-2-Pyrrolidone	MPY				
Methyl Tert-Butyl Ether (MTBE)	MBE	0.74	5,000	4,301	OK
Metolachlor	MCO				
Mineral spirits	MNS	0.75	5,000	4,330	OK
Myrcene	MRE	0.80	5,000	4,472	OK
NAPHTHA: Aromatic (Having less than 10% Benzene)		.6 -.85			
NAPHTHA: Cracking fraction		.6 -.85			
NAPHTHA: Heavy		.6 -.85			
NAPHTHA: Paraffinic		.6 -.85			
NAPHTHA: Petroleum	PTN	.6 -.85			
NAPHTHA: Solvent	NSV	0.87	5,000	4,664	OK
NAPHTHA: Stoddard solvent	NSS	0.78	5,000	4,416	OK
NAPHTHA: Varnish makers' and painters' (75%)	NVM	0.77	5,000	4,387	OK
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt solution	NFS				
Naphthenic acid	NTI	1.02	5,000	5,050	OK
Nonane (all isomers)	NAX	0.72	5,000	4,243	OK
NONANE	NAN	0.72	5,000	4,243	OK
Nonanoic acid (all isomers)	NNA				
Nonanoic, Tridecanoic acid mixture					
Nonene	NON	0.73	5,000	4,272	OK
Nonyl alcohol (all isomers)	NNS	0.94	5,000	4,848	OK
NONYL ALCOHOL	NNN	0.94	5,000	4,848	OK
NONYL ALCOHOL (iso-)	NNI	0.94	5,000	4,848	OK
Nonyl Methacrylate Monomer					
Nonyl Phenol	NNP	0.95	5,000	4,873	OK
Nonyl Phenol Poly(4-12)ethoxylates	NPE				
Nonyl Phenol Sulfide (90% or less)					
Noxious liquid, N.O.S. (17) ("Trade name," contains "principal components"), Category D (i					
Non-Noxious liquid, N.O.S. (18) ("Trade name," contains principal components"), Appendix					
Octadecene					
Octadecenoamide solution (Oleamide)	ODD				
Octane (all isomers)	OAX	0.70	5,000	4,183	OK
OCTANE	OAN	0.70	5,000	4,183	OK
Octanoic acid (all isomers)	OAA	0.91	5,000	4,770	OK
Octanol (all isomers)	OCK	0.83	5,000	4,555	OK
OCTANOL	OTA	0.83	5,000	4,555	OK
Octene (all isomers)	OTX	0.72	5,000	4,243	OK
OCTENE (1-)	OTE	0.72	5,000	4,243	OK
Octyl Acetate					
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	OCK	0.83	5,000	4,555	OK
OCTYL ALCOHOL	IOA	0.83	5,000	4,555	OK
Octyl Aldehydes	OAL				
Octyl Decyl Adipate	ODA				
Octyl Epoxytallate	OET				

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS	(MDWP)	3,000 PSIG
SPILL VALVE SET PRESSURE	(Ps/v)	1,750 PSIG
CARGO TANK P/V SETTING	(Pp/v)	1,500 PSIG
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000 BPH
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw)max	6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE (BPH)	Qw<= (Qw) max
				Qw= (Q1) *SG1^ .5	
	***	*****			
Octyl Phthalate. SEE DI-(2-ETHYLHEXYL) PHTHALATE					
OIL, EDIBLE: Babassu	OB				
OIL, EDIBLE: Beechnut					
OIL, EDIBLE: Castor	O				
OIL, EDIBLE: Cocoa butter					
OIL, EDIBLE: Coconut	OCC	0.95	5,000	4,884	OK
OIL, EDIBLE: Cod liver					
OIL, EDIBLE: Corn	OCO	0.96	5,000	4,886	OK
OIL, EDIBLE: Cottonseed	OCS				
OIL, EDIBLE: Fish, N.O.S.	OFS	0.96	5,000	4,899	OK
OIL, EDIBLE: Grapeseed					
OIL, EDIBLE: Groundnut					
OIL, EDIBLE: Hazelnut					
OIL, EDIBLE: Lard					
OIL, EDIBLE: Maize	OLD				
OIL, EDIBLE: Mustard seed					
OIL, EDIBLE: Nutmeg Butter					
OIL, EDIBLE: Olive					
OIL, EDIBLE: Palm	OOL				
OIL, EDIBLE: Palm kernel	OPM				
OIL, EDIBLE: Peanut	OPO				
OIL, EDIBLE: Poppy	OPN				
OIL, EDIBLE: Raisin seed					
OIL, EDIBLE: Rice bran					
OIL, EDIBLE: Safflower	ORP				
OIL, EDIBLE: Salad	OSF				
OIL, EDIBLE: Sesame					
OIL, EDIBLE: Soya bean					
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED	OSB	0.96	5,000	4,899	OK
OIL, EDIBLE: Sunflower seed		0.95	5,000	4,873	OK
OIL, EDIBLE: Tucum	OSN				
OIL, EDIBLE: Vegetable, N.O.S.	OTC				
OIL, EDIBLE: Walnut	OVG	0.96	5,000	4,899	OK
OIL, FUEL: No. 1 (Kerosene)	OON				
OIL, FUEL: No. 1-D	OOD				
OIL, FUEL: No. 2	OTW	0.88	5,000	4,690	OK
OIL, FUEL: No. 2-D	OTD				
OIL, FUEL: No. 4	OFR	0.90	5,000	4,743	OK
OIL, FUEL: No. 5	OFV	0.94	5,000	4,848	OK
OIL, FUEL: No. 6	OSX	0.95	5,000	4,873	OK
OIL, MISC: Absorption	OAS				
OIL, MISC: Aliphatic					
OIL, MISC: Animal, N.O.S.					
OIL, MISC: Aromatic					
OIL, MISC: Aviation F2300					
OIL, MISC: Clarified	OCF				
OIL, MISC: Coal					
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHYL ESTER					
OIL, MISC: Coconut oil, fatty acid					
OIL, MISC: Coconut oil, fatty acid Methyl Ester	OCM				
OIL, MISC: Coconut oil, Methyl Ester, SEE COCONUT OIL FATTY ACID METHYL ESTER					
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACID	CFY	0.95	5,000	4,873	OK
OIL, MISC: Croton					
OIL, MISC: Crude	OIL	0.95	5,000	4,873	OK
OIL, MISC: Diesel	ODS	0.90	5,000	4,743	OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS	(MDWP)	3.000 PSIG
SPILL VALVE SET PRESSURE	(Ps/v)	1.750 PSIG
CARGO TANK P/V SETTING	(Pp/v)	1.500 PSIG
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000 BPH
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw)max	6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY	CARGO MAX LIQUID TRANSFER RATE (Q1)	EQUIVALENT WATER LIQUID TRANSFER RATE $Q_w = (Q_1) * SG^{1.5}$	Qw <= (Qw)max
		(1)	(Q1)	(BPH)	(BPH)
*** *****					
OIL, MISC: Gas, low pour					
OIL, MISC: Gas, low sulfur					
OIL, MISC: Heartcut distillate					
OIL, MISC: Lanolin					
OIL, MISC: Linseed					
OIL, MISC: Lubricating	OLB	0.90	5,000	4,743	OK
OIL, MISC: Mineral					
OIL, MISC: Mineral seal	OMS				
OIL, MISC: Motor	OMT				
OIL, MISC: Neatsfoot	ONF				
OIL, MISC: Oiticica	OOI				
OIL, MISC: Palm oil, fatty acid Methyl Ester	OPE	0.95	5,000	4,873	OK
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID METHYL ESTER	OPT				
OIL, MISC: Penetrating					
OIL, MISC: Perilla					
OIL, MISC: Pilchard					
OIL, MISC: Pine	OPI				
OIL, MISC: Range	ORG				
OIL, MISC: Residual					
OIL, MISC: Resin	ORS	1.02	5,000	5,050	OK
OIL, MISC: Resinous petroleum					
OIL, MISC: Road	ORD				
OIL, MISC: Rosin	ORN				
OIL, MISC: Seal					
OIL, MISC: Soapstock	OIS				
OIL, MISC: Soya bean (epoxidized)					
OIL, MISC: Sperm	OSP				
OIL, MISC: Spindle	OSD				
OIL, MISC: Spray	OSY				
OIL, MISC: Tall	OTL				
OIL, MISC: Tall, fatty acid	TOF				
OIL, MISC: Tanner's	OTN				
OIL, MISC: Transformer	OTF				
OIL, MISC: Tung	OTG				
OIL, MISC: Turbine	OTB	0.87	5,000	4,664	OK
OIL, MISC: Whale					
OIL, MISC: White (mineral)					
OIL, MISC: Wood					
alpha-Olefins (C13 - C18)	OAM				
Olefins (C13 and above, all isomers)	OLA	0.72	5,000	4,243	OK
Oleic acid					
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)					
Organic Amine 70, SEE AMINOETHYLDIETHANOLAMINE, AMINOETHYL-ETHANOLAMINE SOLUTION					
Palm Stearin	PMS				
n-Paraffins (C10 - C20)	PFN				
Pentadecanol, SEE SEE ALCOHOLS (C13 AND ABOVE)	PDC	0.83	5,000	4,555	OK
Pentaethylene Glycol					
Pentaethylenehexamine	PEP				
Pentane (all isomers)	PTY	0.63	5,000	3,957	OK
PENTANE (iso-)	IPT	0.62	5,000	3,937	OK
PENTANE (n-)	PTA	0.63	5,000	3,969	OK
Pentanoic acid					
Pentene (all isomers)	PTX	0.64	5,000	4,000	OK
PENTENE (1-)	PTE	0.64	5,000	4,000	OK
Petrolatum	PTL				

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS	(MDWP)	3.000	PSIG		
SPILL VALVE SET PRESSURE	(Ps/v)	1.750	PSIG		
CARGO TANK P/V SETTING	(Pp/v)	1.500	PSIG		
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000	BPH		
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw) max	6,750	BPH		
	C	LIQUID	CARGO	EQUIVALENT	
	H	SPECIFIC	MAX	WATER	
	R	GRAVITY	LIQUID	LIQUID	Qw <= (Qw) max
	I		TRANSFER	TRANSFER	
	S		RATE	RATE	
CARGO		(1)	(Q1)	Qw = (Q1) * SG1 ^{.5}	
			(BPH)	(BPH)	
1-Phenyl-1-Xylol Ethane	PXE				
Phosphosulfurized Bicyclic Terpene					
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES					
Pinene	PIN	0.86	5,000	4,637	OK
Polyalkenyl Succinic Anhydride Amine					
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtures	PPX				
Polyalkylene Oxide Polyol	PAO	1.04	5,000	5,099	OK
Polamine, Amide mixture					
Polybutadiene, Hydroxyl terminated					
Polybutene	PLB	0.91	5,000	4,770	OK
Polydimethylsiloxane		1.04	5,000	5,099	OK
Polyethylene Glycol		1.04	5,000	5,099	OK
Polyethylene Glycol Dimethyl Ether					
Polyglycerol					
Polyisobutylene, SEE POLYBUTENE					
Polymerized Esters					
Poly(20)oxyethylene Sorbitan Monooleate	PSM				
Polypropylene	PLP				
Polypropylene Glycol	PGC	1.01	5,000	5,025	OK
Polypropylene Glycol Methyl Ether	PGM	0.92	5,000	4,796	OK
Polysiloxane					
Polystyrene Diakyl Maleate					
Potassium Oleate	POE				
Propane	PRP	1.04	5,000	5,099	OK
n-Propoxypropanol	PXP				
Propyl Acetate (iso-)	IAC	0.89	5,000	4,717	OK
Propyl Acetate (n-)	PAT	0.00			
Propyl alcohol (iso-)	IPA	0.79	5,000	4,444	OK
Propyl alcohol (n-)	PAL	0.80	5,000	4,472	OK
Propylbenzene (n-)	PBZ	0.86	5,000	4,637	OK
iso-Propylcyclohexane	IPX	0.80	5,000	4,472	OK
Propylene	PPL	1.04	5,000	5,099	OK
Propylene-Butylene Copolymer	PBP				
Propylene Dimer	PDR				
Propylene Glycol (1,2-PROPANDIOL)	PPG	1.04	5,000	5,099	OK
Propylene Glycol Monoalkyl Ether	PGE				
Propylene Glycol Ethyl Ether	PGY				
Propylene Glycol Methyl Ether	PME	0.92	5,000	4,796	OK
Propylene Polymer (in liquid mixtures)					
Propylene Tetramer	PTT	0.29	5,000	2,693	OK
Propylene Trimer	PTR				
Pseudocumene, SEE TRIMETHYLBENZENES					
Rum					
Sodium Acetate, Glycol, water solutions					
Sodium Acetate solution	SAN				
Sodium Benzoate solution	SBN				
Sodium Sulfonate					
Stearic acid	SRA				
Stearyl alcohol (Octadecanol)					
Sulfolane	SFL	1.26	5,000	5,612	OK
Tallow	TLO				
Tallow alcohol, SEE ALCOHOLS (C13 AND ABOVE)					
Tallow fatty acid	TFD				
Tallow Alkyl Nitrile					
Tetradecanol	TTN	0.82	5,000	4,528	OK

SPILLVLV

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS	(MDWP)	3,000	PSIG	
SPILL VALVE SET PRESSURE	(Ps/v)	1,750	PSIG	
CARGO TANK P/V SETTING	(Pp/v)	1,500	PSIG	
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000	BPH	
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw) max	6,750	BPH	
CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE $Q_w = (Q_1) \cdot SG_1^{.5}$ (BPH)
				$Q_w \leq (Q_w)_{max}$
1-Tetradecene, SEE THE OLEFIN OR ALPHA-OLEFIN ENTRIES	TTD	0.77	5,000	4,387 OK
Tetradecylbenzene	TBD			
Tetraethylene Glycol	TTG	1.12	5,000	5,292 OK
Tetrahydronaphthalene	THN	0.97	5,000	4,924 OK
Tetrapropylbenzene, SEE ALKYL(C9-C17) BENZENES				
Toluene	TOL	0.87	5,000	4,664 OK
Triaryphosphate				
Tributyl Phosphate	TBP			
Tricresyl Phosphate (less than 1% of the ortho isomer)	TCP	1.16	5,000	5,385 OK
Tridecane	TRD	0.76	5,000	4,359 OK
Tridecanoic acid				
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)	TDN	0.85	5,000	4,610 OK
1-Tridecene	TDC	0.77	5,000	4,387 OK
Tridecylbenzene	TRB			
Triethylbenzene	TEB	0.86	5,000	4,637 OK
Triethylene Glycol	TEG	1.12	5,000	5,292 OK
Triethylene Glycol Butyl Ether				
Triethylene Glycol Butyl Ether mixture				
Triethylene Glycol di-(2-ethylbutyrate)	TGD	1.04	5,000	5,099 OK
Triethylene Glycol Ether mixture				
Triethylene Glycol Ethyl Ether	TGE			
Triethylene Glycol Methyl Ether				
Triethyl Phosphate	TPS	1.07	5,000	5,172 OK
Triisooctyl Trimellitate				
Triisopropanolamine	TIP	1.02	5,000	5,050 OK
Trimethylbenzenes (all isomers)	TRE	0.89	5,000	4,717 OK
TRIMETHYL BENZENE (1,2,5-)	TMB	0.89	5,000	4,717 OK
TRIMETHYL BENZENE (1,2,3-)	TMD	0.89	5,000	4,717 OK
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TME	0.89	5,000	4,717 OK
Trimethylol Propane Polyethoxylate	TPR			
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate				
2,2,4-Trimethyl-3-pentanol-1-isobutyrate	TMP			
Tripropylene, SEE PROPYLENE TRIMER				
Tripropylene Glycol	TGC			
Tripropylene Glycol Methyl Ether	TGM			
Trixylenyl Phosphate	TRP	1.16	5,000	5,385 OK
Turpentine	TPT			
Turpentine substitute (White spirit), SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)				
Undecanol				
Undecene (1-)	UDC	0.75	5,000	4,330 OK
Undecyl alcohol	UND	0.84	5,000	4,583 OK
Undecylbenzene	UDB			
Vinyl Acetate-fumurate Copolymer				
Waxes:	WAX			
WAXES: Candelilla				
WAXES: Carnauba	WAX, WCA			
WAXES: Paraffin	WAX, WPF			
WAXES: Petroleum				
White spirit, SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)				
White spirit (low (15 - 20%) aromatic)	WSL			
Wine, SEE ALCOHOLIC BEVERAGES, N.O.S.				
Wool grease				
Xylenes (ortho-, meta-, para-)	XLX	0.89	5,000	4,717 OK
XYLENE (M-)	XLIM	0.87	5,000	4,664 OK
XYLENE (O-)	XLO	0.89	5,000	4,717 OK

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS
 SPILL VALVE SET PRESSURE
 CARGO TANK P/V SETTING
 "TARGET" MAX LIQUID TRANSFER RATE
 SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE

(MDWP) 3.000 PSIG
 (Ps/v) 1.750 PSIG
 (Pp/v) 1.500 PSIG
 (TMLTR) 5,000 BPH
 (Qw)max 6,750 BPH

CARGO	C H R I S	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALENT WATER LIQUID TRANSFER RATE (BPH)	Qw<= (Qw) max
				$Q_w = (Q_1) * SG^{1.5}$	
			*** *****		
XYLENE (P-)	XLP	0.86	5,000	4,637	OK
XYLENOL	XYL	1.01	5,000	5,025	OK
Zinc Dialkyldithiophosphate					

CALCULATIONS FOR CAPACITY OF SPILL VALVE

MAX DESIGN WORKING PRESS	(MDWP)	3.000 PSIG
SPILL VALVE SET PRESSURE	(Ps/v)	1.750 PSIG
CARGO TANK P/V SETTING	(Pp/v)	1.500 PSIG
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000 BPH
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw) max	6,750 BPH

	C	LIQUID	CARGO	EQUIVALENT	
	H	SPECIFIC	MAX	WATER	
	R	GRAVITY	LIQUID	LIQUID	Qw<= (Qw) max
	I		TRANSFER	TRANSFER	
	S		RATE	RATE	
CARGO	(1)		(Q1)	Qw= (Q1) *SG1^ .5	
			(BPH)	(BPH)	

46 CFR SUBCHAPTER D, BUT NOT TABLE 30.25-1

AROMATIC RESIN OIL 60	ARS	1.02	5,000	5,050	OK
AROMATIC RESIN OIL 80	ARS	1.02	5,000	5,050	OK
AROMATIC RESIN OILS			999		

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/	(BBL/
		HR)	HR)

46 CFR SUBCHAPT 0, TABLE 151			

ACETIC ACID	AAC	5,000	5,000
ACETIC ANHYDRIDE	ACA	5,000	5,000
ACETONITRILE	ATN	5,000	5,000
ACRYLIC ACID	ACR	5,000	5,000
ACRYLONITRILE	ACN	5,000	5,000
ADIPONITRILE	ADN	5,000	5,000
ALUMINUM SULFATE SOLUTION	ASX	5,000	
AMINOETHYLETHANOLAMINE	AEE	5,000	5,000
AMMONIUM BISULFITE SOLN (70% OR LESS)	ABX	5,000	
AMMONIUM HYDROXIDE (28% OR LESS NH3)	AMH		
ANTHRACENE OIL (COAL TAR FRACTION)	AHO		
BENZENE	BNZ	5,000	5,000
BENZENE HYDROCARBON MIXTURES (W/ACETYLENES) (W/10% BENZENE OR MORE)	BHA	5,000	5,000
BENZENE HYDROCARBON MIXTURES (W/10% BENZENE OR MORE)	BHB	5,000	5,000
BENZENE, TOLUENE, XYLENE MIXTURES (HAVING 10% BENZENE OR MORE)	BTX	5,000	5,000
iso-BUTYL ACRYLATE	BAI	5,000	5,000
n-BUTYL ACRYLATE	BTC	5,000	5,000
BUTYL ACRYLATE (SEE ISO- & N- BUTYL ACRYLATE)	BAR	5,000	5,000
BUTYL METHACRYLATE	BMH	5,000	5,000
iso-BUTYRALDEHYDE	BAD	5,000	5,000
n-BUTYRALDEHYDE	BTR	5,000	5,000
BUTYRALDEHYDES (CRUDE)	BFA	5,000	5,000
BUTYRALDEHYDE (ISO-, N-)	BAE	5,000	5,000
CAMPOR OIL (LIGHT)	CPO	5,000	
CARBON TETRACHLORIDE	CBT	5,000	
CAUSTIC POTASH SOLUTION	CPS	5,000	
CAUSTIC SODA SOLUTION	CSS	5,000	
CHLOROBENZENE	CRB	5,000	5,000
CHLOROFORM	CRF	5,000	
CHLOROSULFONIC ACID	CSA	5,000	
COAL TAR NAPHTHA SOLVENT	NCT	5,000	5,000
CREOSOTE (COAL TAR)	CCT	5,000	5,000
CREOSOTE (WOOD)	CWD	5,000	5,000
CRESOLS (ALL ISOMERS)	CRS	5,000	5,000
CRESOLS WITH LESS THAN 5% PHENOL (SEE CRESOLS (ALL ISOMERS))	CRS	5,000	
CRESOLS WITH 5% OR MORE PHENOL (SEE PHENOL)	CFP	5,000	5,000
CRESYLATE SPENT CAUSTIC	CSC	5,000	
CRESYLIC ACID, SODIUM SALT SOLUTION, SEE CRESYLATE SPENT CAUSTIC	CAX		
CROTONALDEHYDE	CTA	5,000	5,000
CYCLOHEXANONE	CCH	5,000	5,000
CYCLOHEXYLAMINE	CHA	5,000	5,000
DECYL ACRYLATE (iso-, n-)	DAT	5,000	5,000
DICHLOROBENZENE (ALL ISOMERS)	DBX	5,000	5,000
1,1-DICHLOROETHANE	DCH	5,000	5,000
2,2-DICHLOROETHYL ETHER	DEE	5,000	5,000
DICHLOROMETHANE (ALSO KNOWN AS METHYLENE CHLORIDE)	DCM	5,000	
2,4-DICHLOROPHENOXYACETIC ACID DIETHANOLAMINE SALT SOLUTION	DDE		
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION	DAD		
2,4-DICHLOROPHENOXYACETIC ACID, TRIISOPROPANOLAMINE SALT SOLUTION	DTI		
1,1-,1,2- OR 1,3- DICHLOROPROPANE	DPX	5,000	5,000
1,3-DICHLOROPROPENE	DPU	5,000	5,000
DICHLOROPROPENE, DICHLOROPROPANE MIXTURES	DMX	5,000	5,000
2,2-DICHLOROPROPIONIC ACID	DCN		
DIETHANOLAMINE	DEA	5,000	5,000
DIETHYLAMINE	DEN	5,000	5,000
DIETHYLENETRIAMINE	DET	5,000	5,000
DIETHYL ETHER, SEE ETHYL ETHER	DEH		

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/ HR)	(BBL/ HR)

DIISOBUTYLAMINE	DBU	5,000	5,000
DIISOPROPANOLAMINE	DIP	5,000	5,000
DIISOPROPYLAMINE	DIA	5,000	5,000
N,N-DIMETHYLACETAMIDE	DAC	5,000	5,000
DIMETHYLETHANOLAMINE	DMB	5,000	5,000
DIMETHYLFORMAMIDE	DMF	5,000	5,000
1,4-DIOXANE	DOX	5,000	5,000
DI-N-PROPYLAMINE	DNA	5,000	5,000
ETHANOLAMINE	MEA	5,000	5,000
ETHYL ACRYLATE	EAC	5,000	5,000
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	5,000	5,000
N-ETHYLBUTYLAMINE	EBA	5,000	5,000
N-ETHYLCYCLOHEXYLAMINE	ECC	5,000	5,000
ETHYLENE CYANOHYDRIN	ETC	5,000	5,000
ETHYLENEDIAMINE	EDA	5,000	5,000
ETHYLENE DIBROMIDE	EDB	4,582	
ETHYLENE DICHLORIDE	EDC	5,000	5,000
ETHYLENE GLYCOL PROPYL ETHER	EGP	5,000	5,000
2-ETHYLHEXYL ACRYLATE	EAI	5,000	5,000
ETHYLIDENE NORBORNENE	ENB	5,000	5,000
ETHYL METHACRYLATE	ETM	5,000	5,000
2-ETHYL-3-PROPYLACROLEIN	EPA	5,000	5,000
FERRIC CHLORIDE SOLUTIONS	FCS		
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	5,000	5,000
FORMIC ACID	FMA	5,000	5,000
FURFURAL	FFA	5,000	5,000
GLUTARALDEHYDE SOLUTION (50% OR LESS)	GTA		
HEXAMETHYLENEDIAMINE SOLUTION	HMC	5,000	5,000
HEXAMETHYLENEIMINE	HMI	5,000	5,000
HYDROCHLORIC ACID SPENT (15% OR LESS)	HCS	5,000	
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-))			
ISOPRENE	IPR	5,000	5,000
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT 3% OR MORE) (INCLUDING: BLACK, KPL	KPL		
MESITYL OXIDE	MSO	5,000	5,000
METHYL ACRYLATE	MAM	5,000	5,000
METHYLCYCLOPENTADIENE DIMER	MCK	5,000	5,000
METHYL DIETHANOLAMINE	MDE	5,000	5,000
2-METHYL-5-ETHYLPYRIDINE	MEP	5,000	5,000
METHYLENE CHLORIDE (SEE DICHLOROMETHANE)			
METHYL METHACRYLATE	MMM	5,000	5,000
2-METHYLPYRIDINE	MPR	5,000	5,000
alpha-METHYLSTYRENE	MSR	5,000	5,000
MORPHOLINE	MPL	5,000	5,000
NITRIC ACID (70% OR LESS)	NCD		
NITROPROPANE (-1, OR -2)	NPM	5,000	5,000
OCTYL NITRATES (ALL ISOMERS)	ONE	5,000	5,000
OLEUM	OLM	4,797	5,000
PENTACHLOROETHANE	PCE	5,000	
1, 3-PENTADIENE	PDE	5,000	5,000
PERCHLOROETHYLENE (SAME AS TETRACHLOROETHYLENE)	PER	5,000	
PHOSPHORIC ACID	PAC	4,990	
POLYETHYLENE POLYAMINES	PEB	5,000	5,000
POLYMETHYLENE POLYPHENYL ISOCYANATE	PPI	5,000	
POTASSIUM HYDROXIDE SOLUTION (SEE CAUSTIC POTASH SOLUTION)			
iso-PROPANOLAMINE	MPA	5,000	5,000
PROPANOLAMINE (iso-, n-)	PAX	5,000	5,000
PROPIONIC ACID	PNA	5,000	5,000
iso-PROPYLAMINE	IPP	5,000	5,000
iso-PROPYL ETHER	IPE	5,000	5,000
PYRIDINE	PRD	5,000	5,000
SODIUM ALUMINATE SOLUTION	SAU		

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		P/V	P/V
		SPILL	SPILL
		VALVE	VALVE
		(BBL/ HR)	(BBL/ HR)
----- *** -----			
SODIUM CHLORATE SOLUTION (50% OR LESS)	SDD	5,000	
SODIUM DICHROMATE SOL'N (70% OR LESS)	SDL		
SODIUM HYDROXIDE SOLUTION (SEE CAUSTIC SODA SOLUTION)			
SODIUM HYPOCHLORITE SOL'N (15% OR LESS)	SHP	5,000	
SODIUM SULFIDE, HYDROSULFIDE SOLUTIONS (H2S 15 PPM OR LESS)	SSH	5,000	
SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (15 PPM<H2S<200 PPM)	SSI	5,000	
SODIUM SULFIDE HYDROSULFIDE SOLUTIONS (H2S GREATER THAN 200 PPM)	SSJ	5,000	
SODIUM THIOCYANATE SOLUTION (56% OR LESS)	STS		
STYRENE MONOMER	STY	5,000	5,000
SULFURIC ACID	SFA	4,976	5,000
SULFURIC ACID, SPENT	SAC	5,000	5,000
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORIDE)	TEC	5,000	
TETRAETHYLENEPENTAMINE	TTP	5,000	5,000
TETRAHYDROFURAN	THF	5,000	5,000
1,1,2-TRICHLOROETHANE (VINYL TRICHLORIDE)	TCM	5,000	5,000
TRICHLOROETHANE (SEE 1,1,2-TRICHLOROETHANE)			
TRICHLOROETHYLENE	TCL	5,000	5,000
1,2,3-TRICHLOROPROPANE	TCN	5,000	5,000
TRIETHANOLAMINE	TEA	5,000	5,000
TRIETHYLAMINE	TEN	5,000	5,000
TRIETHYLENETETRAMINE	TET	5,000	5,000
UREA, AMMONIUM NITRATE SOL'N (CONTAINING MORE THAN 2% NH3)	UAS		
VALERALDEHYDE (iso-, n-)		5,000	5,000
VALERALDEHYDE (iso-)	IVA	5,000	5,000
VALERALDEHYDE (n-)	VAL	5,000	5,000
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VBL		
VINYL ACETATE	VAM	5,000	5,000
VINYLTOLUENE	VNT	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO		MAX	MAX
	C	LIQUID	LIQUID
	H	TRANSFER	TRANSFER
	R	RATE	RATE
	I	PER	PER
S	SPILL	P/V	
	VALVE	VALVE	
	(BBL/ HR)	(BBL/ HR)	
-----		***	-----
46 CFR SUBCHAPT O BUT NOT TABLE 151			
=====			
1,1-DICHLOROPROPANE	DPB	5,000	5,000
1,1,1-TRICHLOROETHANE		5,000	
1,2-DICHLOROPROPANE	DPP	5,000	5,000
1,3 CYCLOPENTADIENE			
1,3-DICHLOROPROPANE	DPC	5,000	5,000
2-METHYL-2-HYDROXY-3-BUTYNE	MHB	5,000	5,000
2,4-DICHLOROPHENOXYACETIC ACID, DIMETHYLAMINE SALT SOLUTION (70% OR LESS)	DDA		
3-PENTENENITRILE	PNT		
AEROTHENE TT (1,1,1-TRICHLOROETHANE)			
ALKYLBENZENE			
AMINOETHYLPIPERAZINE	AEP		
BENZENE RAFFINATE (ASSUME VAPOR PROPERTIES SIMILAR TO BENZENE)		5,000	5,000
BENZENE SULFONYL CHLORIDE	BSC	5,000	5,000
BENZYL ACETATE	BZE	5,000	5,000
BENZYL CHLORIDE (STABILIZED)	BCL	5,000	5,000
BUTANOL			
BUTYL ETHER (n-)	BTE	5,000	5,000
BUTYLENE OXIDE (1,2-)	BTO	5,000	5,000
BUTYRIC ACID	BRA	5,000	5,000
CARBOLIC ACID	CBO	5,000	5,000
CHLOROACETIC ACID (80% OR LESS)	CHM	5,000	5,000
CHLOROPROPIONIC ACID (2- OR 3-)	CPM	5,000	5,000
CHLOROTOLUENE (m-)	CTM	5,000	5,000
CHLOROTOLUENE (o-)	CTO	5,000	5,000
CHLOROTOLUENE (p)	CRN	5,000	5,000
CHLOROTOLUENES (MIXED ISOMERS)	CHI	5,000	5,000
CREOSOTE (ALL ISOMERS)	CCW	5,000	5,000
CRESYLIC ACID TAR	CRX	5,000	5,000
CYCLOHEPTANE	CYE	5,000	5,000
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	CYX	5,000	5,000
CYCLOHEXYL ACETATE	CYC	5,000	5,000
CYCLOPENTADIENE, STYRENE, BENZENE MIXTURE	CSB	5,000	5,000
CYCLOPENTANE	CYP	5,000	5,000
DECANOIC ACID	DCO	2,770	
DI 2 ETHYLHEXYL PHTHALATE (SEE ALSO ETHYLHEXYL PHTHALATE)		5,000	
DICHLOROISOPROPYL ETHER (2,2'-)	DCI	5,000	5,000
DICHLOROPROPANE		5,000	
DICHLOROPROPENE		5,000	
DIETHYL SULFATE	DSU	5,000	5,000
DIETHYLETHANOLAMINE	DAE	5,000	5,000
DODECYL BENZENE			
DODECYLDIMETHYLAMINE TETRADECYLDIMETHYLAMINE MIXTURE	DOT		
DRIPOLENE			
ETHANOL (see ethyl alcohol)			
ETHYL BROMIDE			
ETHYL TERT-BUTYL ETHER	EBE	5,000	5,000
ETHYLAMINE	EAM	5,000	5,000
ETHYLENE DICHLORIDE 1,1,2-TRICHLOROETHANE MIXTURE	ETX	5,000	5,000
ETHYLMERCAPTAN (SAME AS ETHANETHIOL)			
ETHYLPHENOL	EPL	5,000	5,000
FORMALDEHYDE SOLUTION (50% OR MORE), METHANOL MIXTURES	MTM	5,000	5,000
HYDROSULFIDE			
INDENES			
ISOBUTYL ACETATE	IBA		5,000
ISOPRENE, PENTADIENE MIXTURE	IPN		
ISO-PROPYL ALCOHOL		5,000	5,000
LAURIC ACID	LRA	5,000	
METHACRYLONITRILE	MET	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/	(BBL/
		HR)	HR)

METHANOL		5,000	
METHYL STYRENE			
METHYL STYRENE, INDENES, ALKYL BENZENE MIXTURES	MIA		
METHYLCYCLOHEXANE	MCY	5,000	5,000
METHYLHEXANE (SAME AS HEPTANE)			
MONOETHANOLAMINE	MEA	5,000	5,000
MONOISOPROPANOLAMINE		5,000	5,000
NAPHTHALENE (MOLTEN)	NTM	5,000	5,000
NEODECANOIC ACID	NEA	5,000	5,000
NITRILOTRIACETIC ACID	NAA		
NITROPHENOL (MOLTEN)	NTP	5,000	
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NNM	5,000	5,000
NITROTOLUENE (o-,p-)	NIT	5,000	5,000
PARALDEHYDE	PDH	5,000	5,000
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXIE)	PGS		
PROPIONALDEHYDE	PAD	5,000	5,000
PROPIONIC ANHYDRIDE	PAH	5,000	5,000
PROPIONITRILE	PCN	5,000	5,000
PROPYLAMINE (n-)	PRA	5,000	5,000
PROPYLBENZENE			5,000
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	GPY	5,000	5,000
PYROLYSIS RESIDUAL FUELS		5,000	
SEWAGE, RAW	SWR		
SODIUM SULFIDE (SOLID IN WATER)	SDS	5,000	
STYRENE	STY	5,000	5,000
STYRENE CRUDE	STX	5,000	5,000
STYRENE TAR	STT		
TETRAMETHYLBENZENE (1,2,3,5-)	TTB	5,000	5,000
TOLUIDINE (o-)	TLI	5,000	5,000
TRICHLOROBENZENE (1,2,4-)	TCB	5,000	5,000
TRIIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N			
TRIPHENYLBORANE	TPE		
UNDECANOIC ACID	UDA	5,000	
HYDROCARBON 5-9	HFN	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/ HR)	(BBL/ HR)
----- *** -----			
46 CFR SUBCHAPTER D, TABLE 30.25-1			

Acetone	ACT	5,000	5,000
Acetophenone	ACP	5,000	5,000
Acetyl Tributyl Citrate		5,000	
Acrylonitrile-Styrene Copolymer dispersion in Polyether Polyol	ALE		
Alcohols (C13 and above)	ALY		
Alcoholic beverages, N.O.S.			
Alcohol (C6 - C17) (secondary) Poly(3-6)ethoxylates			
Alcohol (C12 - C15) Poly(1-3)ethoxylates			
Alcohol (C12 - C15) Poly(3-11)ethoxylates			
Alkenylsuccinic acid			
Alkenylsuccinic Anhydride			
Alkyl (C9 - C17) Benzenes	AKB		
Alkylbenzenesulfonic acid (4% or less)	ABS		
Alkyl Phthalates (n-)			
Alkyl Succinate Formaldehyde Hydr- oxyamino condensate (3.2% or less)			
Aminoethyldiethanolamine, Aminoethylethanolamine solution			
Amyl Acetate (commercial, iso-, n-, sec-)	AEC	5,000	5,000
AMYL ACETATE (n-)	AML	5,000	5,000
AMYL ACETATE (iso-)	IAT	5,000	5,000
Amyl alcohol (iso-, n-, sec-, primary) (SEE ALSO IAA)	AAI	5,000	5,000
Amyl alcohol (n-)	AAN	5,000	5,000
Amyl alcohol (tert-)	AAI		
AMYL ALCOHOL, PRIMARY	APM	5,000	5,000
AMYL ALCOHOL, (sec-)	ASE	5,000	5,000
Amylene	AMZ		
AMYL ALCOHOL, (iso-)	IAA	5,000	5,000
Amyl Methyl Ketone	AMK		
Amyl Tallate			
Asphalt	ASP	5,000	
ASPHALT BLENDING STOCKS: Roofers flux	ARF		
ASPHALT BLENDING STOCKS: Straight run residue	ASR		
Behenyl alcohol			
Benzene Tricarboxylic acid Trioctyl Ester			
Benzyl alcohol	BAL	5,000	5,000
Bicyclic Terpenel Polyamide salt			
Brake fluid base mixtures (containing Poly(2-8)alkylene (C2-C3) glycols,	BFX		
Butane	BMX	5,000	
Butene, SEE BUTYLENE			
Butene Oligomer	BOL		
Butyl Acetate (iso-, n-)	BAX	5,000	5,000
BUTYL ACETATE (N-)	BCN	5,000	5,000
Butyl Acetate (sec-)	BTA	5,000	5,000
Butyl alcohol (iso-, n-, sec-, tert-)			5,000
BUTYL ALCOHOL (ISO-)	IAL	5,000	5,000
BUTYL ALCOHOL (N-)	BAN	5,000	5,000
BUTYL ALCOHOL (SEC-)	BAS	5,000	5,000
BUTYL ALCOHOL (TERT-)	BAT	5,000	5,000
Butyl Benzyl Phthalate	BPH	5,000	5,000
Butylene	BTN		
Butylene Glycol	BUG		
1,3-Butylene Glycol, SEE BUTYLENE GLYCOL			
Butylene Polyglycol, SEE BUTYLENE GLYCOL			
iso-Butyl Formate			
n-Butyl Formate			
Butyl Heptyl Ketone	BHK		
Butyl Methyl Ketone, SEE METHYL BUTYL KETONE			
Butyl Stearate			
Butyl Toluene	BUE	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/ HR)	(BBL/ HR)
----- *** -----			
Butyrolactone (gamma)	BLA		
Calcium Alkylphenate			
Calcium Alkyl Salicylate			
Calcium Amino Nonyl Phenolate			
Calcium Carboxylate			
Caprolactam solutions	CLS	5,000	5,000
Carbon black base		5,000	
Cetyl alcohol (HEXADECANOL) SEE ALCOHOLS (C13 AND ABOVE)			
Cetyl-Stearal alcohol			
Cleaning spirit (unleaded)			
Coal tar	COR	5,000	
Cumene	CUM	5,000	5,000
Cycloaliphatic resins			
Cyclohexane	CHX	5,000	5,000
Cyclohexanol	CHN	5,000	5,000
1,3-Cyclopentadiene dimer (molten)	CPD	5,000	5,000
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)			
Cymene (para-)	CMP	5,000	5,000
Decahydronaphthalene	DHN	5,000	5,000
Decaldehyde (iso-)	IDA	5,000	5,000
Decaldehyde (n-)	DAL	5,000	
Decane	DDC		
Decene	DCE	5,000	5,000
Decyl alcohol (all isomers) (DECANOL)	DAX	5,000	5,000
DECYL ALCOHOL (iso-)	ISA	5,000	5,000
DECYL ALCOHOL (n-)	DAN	5,000	5,000
Decylbenzene (n-)	DBZ	5,000	5,000
Detergent Alkylate			
Diacetone alcohol	DAA	5,000	5,000
Dialkyl (C10-C14) Benzenes	DAB		
Dialkyl (C7-C13) Phthalates	DAH		
Dibutyl Carbinol			
Dibutyl Phthalate (ortho-)	DPA	5,000	
Dicyclopentadiene, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	DPT	5,000	5,000
Diethylbenzene	DEB	5,000	5,000
Diethylene Glycol	DEG	5,000	5,000
Diethylene Glycol Butyl Ether	DME	5,000	5,000
Diethylene Glycol Butyl Ether Acetate	DEM		
Diethylene Glycol Dibutyl Ether	DIG		
Diethylene Glycol Diethyl Ether			
Diethylene Glycol Ethyl Ether	DGE		
Diethylene Glycol Ethyl Ether Acetate	DGA	5,000	5,000
Diethylene Glycol Methyl Ether	DGM	5,000	5,000
Diethylene Glycol Methyl Ether Acetate	DGR		
Diethylene Glycol Phenyl Ether	DGP		
Diethylene Glycol Phthalate	DGL		
Di-(2-ethylhexyl)adipate	DEH		
Di-(2-ethylhexyl)phthalate	DIE		
Diethyl Phthalate	DPH		
Diglycidyl Ether of Bisphenol A	BDE		
Diheptyl Phthalate	DHP		
Dihexyl Phthalate	DHA		
Diisobutylcarbinol	DBC	5,000	5,000
Diisobutylene	DBL	5,000	5,000
Diisobutyl Ketone	DIK	5,000	5,000
Diisobutyl Phthalate	DIT		
Diisodecyl Phthalate	DID		
Diisononyl Adipate	DNY		
Diisononyl Phthalate	DIN		
Diisooctyl Phthalate	DIO		
Diisopropylbenzene (all isomers)	DIX	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
	SPILL	P/V	
	VALVE	VALVE	
	(BBL/	(BBL/	
	HR)	HR)	

Diisopropyl Naphthalene	DII		
Dimethyl Adipate	DLA		
Dimethylbenzene			
Dimethyl Glutarate	DGT		
Dimethyl Phthalate	DTL	5,000	
Dimethyl Polysiloxane	DMP		
2,2-Dimethylpropane-1,3-diol	DDI		
Dimethyl Succinate	DSE		
Dinonyl Phthalate	DIF	5,000	5,000
Di(octylphenyl)amine			
Diocetyl Phthalate			
Dipentene	DOP	5,000	
Diphenyl	DPN	5,000	5,000
Diphenyl, Diphenyl Ether mixture	DIL	5,000	5,000
Diphenyl Ether	DDO	5,000	5,000
Diphenyl Ether, Biphenyl Ether mixture	DPE	5,000	5,000
Dipropylene Glycol	DOB		
Dipropylene Glycol Dibenzoate	DPG	5,000	5,000
Dipropylene Glycol Methyl Ether	DGY		
DISTILLATES: Flashed feed stocks	DPY		
DISTILLATES: Straight run	DFF	5,000	5,000
Ditridecyl Phthalate	DSR	5,000	5,000
Diundecyl Phthalate	DTP		
Dodecane (all isomers)	DUP		
Dodecanol	DOC		
Dodecene (all isomers)	DDN		
DODECENE	DOZ	5,000	5,000
Dodecylbenzene	DOD	5,000	5,000
Dodecyl Phenol	DDB	5,000	5,000
Drilling mud (low toxicity) (if flammable or combustible)/	DOL		
Epoxyated linear alcohols, C11-C15			
Ethane	ETH	5,000	
2-Ethoxyethanol	EEO	5,000	
2-Ethoxyethyl Acetate	EEA	5,000	
Ethoxylated alcohols, C11-C15,SEE THE ALCOHOL POLYETHOXYLATES			
Ethoxy Triglycol (crude)	ETG	5,000	
Ethyl Acetate	ETA	5,000	5,000
Ethyl Acetoacetate	EAA	5,000	5,000
Ethyl alcohol (ETHANOL)	EAL	5,000	5,000
Ethyl Amyl Ketone	EAK		
Ethyl Benzene	ETB	5,000	5,000
Ethyl Butanol	EBT	5,000	5,000
Ethyl Butyrate	EBR	5,000	5,000
Ethyl Cyclohexane	ECY	5,000	5,000
Ethylene	ETL		
Ethylene Carbonate			
Ethylene Glycol	EGL	5,000	5,000
Ethylene Glycol Acetate	EGO		
Ethylene Glycol Butyl Ether	EGM		
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EMA	5,000	5,000
Ethylene Glycol Ether Acetate			
Ethylene Glycol Tert-Butyl Ether			
Ethylene Glycol Diacetate	EGY	5,000	5,000
Ethylene Glycol Dibutyl Ether	EGB		
Ethylene Glycol Ethyl Ether, SEE 2-ETHOXYETHANOL	EGF		
Ethylene Glycol Ethyl Ether Acetate, SEE 2-ETHOXYETHYL ACETATE	EGA		
Ethylene Glycol Isopropyl Ether	EGI		
Ethylene Glycol Methyl Butyl Ether			
Ethylene Glycol Methyl Ether	EME	5,000	5,000
Ethylene Glycol Methyl Ether Acetate	EGT		
Ethylene Glycol Phenyl Ether	EPE	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/ HR)	(BBL/ HR)

Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixture	EDX		
Ethylene-Propylene Copolymer (in liquid mixtures)			
Ethyl-3-Ethoxypropionate	EEP		
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EHA	5,000	5,000
2-Ethylhexanoic acid	EHO		
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHX	5,000	5,000
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID			
Ethyl Hexyl Phthalate (SEE ALSO DI 2-ETHYLHEXYL PHTHALATE)	EHE		
Ethyl Hexyl Tallate	EHT		
Ethyl Propionate	EPR	5,000	5,000
Ethyl Toluene	ETE	5,000	5,000
Fatty acid (saturated, C13 and above)			
Fatty acid Amides			
Formamide	FAM	5,000	5,000
Furfuryl Alcohol	FAL	5,000	5,000
Gas oil, cracked	GOC		
GASOLINE BLENDING STOCKS: Alkylates	GAK	5,000	5,000
GASOLINE BLENDING STOCKS: Reformates	GRF	5,000	5,000
GASOLINES: Automotive (containing not over 4.23 grams lead per gallon)	GAT	5,000	5,000
GASOLINES: Aviation (containing not over 4.86 grams lead per gallon) AviGAV		5,000	5,000
GASOLINES: Casinghead (natural)	GCS	5,000	5,000
GASOLINES: Polymer	GPL	5,000	5,000
GASOLINES: Straight run	GSR	5,000	5,000
Glycerine	GCR	5,000	
Glycerol, SEE GLYCERINE			
Glycerol Polyalkoxylate			
Glycerol Triacetate			
Glycidyl Ester of Tertiary Carboxylic acid, SEE GLYCIDYL ESTER OF TRIDECYL A			
Glycidyl Ester of Tridecyl Acetic acid	GLT		
Glycidyl Ester of Versatic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACID			
Glycol Diacetate, SEE ETHYLENE GLYCOL DIACETATE			
Glycols, Resins and Solvents mixtures			
Gylcol Triacetate, SEE GLYCERYL TRIACETATE			
Glyoxal solution (40% or less)			
Grease			
Heptadecane			
Heptane (all isomers) (METHYHEXANE)	HMX	5,000	5,000
HEPTANE (N-)	HPT	5,000	5,000
Heptanoic acid	HEP	5,000	5,000
Heptanol (all isomers)	HTX	5,000	5,000
HEPTANOL	HTN	5,000	5,000
Heptene (all isomers)	HPX	5,000	5,000
HEPTENE (1-)	HTE	5,000	5,000
Heptyl Acetate	HPE	5,000	5,000
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR			
Hexaethylene Glycol			
Hexamethylene Glycol			
Hexamethylenetetramine solutions	HTS		
Hexane (all isomers)	HXS	5,000	5,000
HEXANE	HXA	5,000	5,000
Hexanoic acid	HXO	5,000	5,000
Hexanol	HXN	5,000	5,000
Hexene (all isomers)	HEX	5,000	5,000
HEXENE (1-)	HXE	5,000	5,000
HEXENE (2-)	HXT	5,000	5,000
Hexyl Acetate	HAE		
Hexylene Glycol	HXG	5,000	5,000
Hog Grease, SEE LARD			
2-Hydroxy-4-(methylthio)butanoic acid	HBA		
HYDROCARBON 5-9(MOVED TO SUB-O, NON TABLE 151, 6/24/95)	HFN		
Hydroxy terminated Polybutadiene, SEE POLYBUTADIENE, HYDROXYL TERMINATED/			

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C H R I S	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/ HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (BBL/ HR)
Isophorone	IPH	5,000	5,000
JET FUELS: JP-1 (Kerosene)	JPO	5,000	5,000
JET FUELS: JP-3	JPT	5,000	5,000
JET FUELS: JP-4	JPF	5,000	5,000
JET FUELS: JP-5 (Kerosene, heavy)	JPV	5,000	5,000
JET FUELS: JP-8	JPE		
Kerosene	KRS	5,000	5,000
Lactic acid			
Lard			
Latex, liquid synthetic, including: Styrene-Butadien rubber	LLS		
Latex, liquid synthetic, including: Carboxylated Styrene-Butadien Copolymer			
Magnesium Nonyl Phenol Sulfide			
Magnesium Sulfonate	MSE		
Maleic Anhydride Copolymer			
2-Mercaptobenzothiazol (in liquid mixtures)			
Methane	MTH		
3-Methoxy-1-Butanol			
3-Methoxybutyl Acetate	MOA		
1-Methoxy-2-Propyl Acetate	MPO		
Methoxy Triglycol, SEE TRIETHYLENE GLYCOL METHYL ETHER	MTG		
Methyl Acetate	MTT	5,000	5,000
Methyl Acetoacetate	MAE		
Methyl alcohol (SEE METHANOL)	MAL	5,000	5,000
Methyl Amyl Acetate	MAC	5,000	5,000
Methyl Amyl alcohol	MAA	5,000	5,000
Methyl Amyl Ketone	MAK		
Methyl Butanol, SEE THE AMYL ALCOHOLS			
Methyl Butenol	MBL		
Methyl n-Butyl Ketone	MBK	5,000	5,000
Methyl Butynol	MBY		
Methyl Butyrate	MBU	5,000	5,000
Methyl Ethyl Ketone	MEK	5,000	5,000
Methyl Formal (DIMETHYL FORMAL)	MTF	5,000	5,000
Methyl Heptyl Ketone	MHK	5,000	5,000
Methyl Isobutyl Carbinol, SEE METHYL AMYL ALCOHOL	MIC	5,000	
Methyl Isobutyl Ketone	MIK	5,000	5,000
3-Methyl-3-Methoxybutanol			
3-Methyl-3-Methoxybutyl Acetate			
1-Methyl Naphthalene	MNA	5,000	5,000
Methyl Pentene			
2-METHYL-1-PENTENE	MPN	5,000	5,000
5-METHYL-1-PENTENE	MTN	5,000	5,000
N-Methyl-2-Pyrrolidone	MPY		
Methyl Tert-Butyl Ether (MTBE)	MBE	5,000	5,000
Metolachlor	MCO		
Mineral spirits	MNS	5,000	5,000
Myrcene	MRE	5,000	5,000
NAPHTHA: Aromatic (Having less than 10% Benzene)			
NAPHTHA: Cracking fraction			
NAPHTHA: Heavy			
NAPHTHA: Paraffinic			
NAPHTHA: Petroleum			
NAPHTHA: Solvent	PTN		
NAPHTHA: Stoddard solvent	NSV	5,000	5,000
NAPHTHA: Varnish makers' and painters' (75%)	NSS	5,000	5,000
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt solution	NVM	5,000	5,000
Naphthenic acid	NFS		
Nonane (all isomers)	NTI	5,000	
NONANE	NAX	5,000	5,000
Nonanoic acid (all isomers)	NAN	5,000	5,000
Nonanoic, Tridecanoic acid mixture	NNA		

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		P/V	P/V
		SPILL	SPILL
		VALVE	VALVE
		(BBL/	(BBL/
		HR)	HR)

Nonene	NON	5,000	5,000
Nonyl alcohol (all isomers)	NNS	5,000	5,000
NONYL ALCOHOL	NNN	5,000	5,000
NONYL ALCOHOL (iso-)	NNI	5,000	5,000
Nonyl Methacrylate Monomer			
Nonyl Phenol	NNP	5,000	5,000
Nonyl Phenol Poly(4-12)ethoxylates	NPE		
Nonyl Phenol Sulfide (90% or less)			
Noxious liquid, N.O.S. (17) ("Trade name," contains "principal components"),			
Non-Noxious liquid, N.O.S. (18) ("Trade name," contains principal components)			
Octadecene			
Octadecenoamide solution (Oleamide)	ODD		
Octane (all isomers)	OAX	5,000	5,000
OCTANE	OAN	5,000	5,000
Octanoic acid (all isomers)	OAA	5,000	5,000
Octanol (all isomers)	OCX	5,000	5,000
OCTANOL	OTA	5,000	5,000
Octene (all isomers)	OTX	5,000	5,000
OCTENE (1-)	OTE	5,000	5,000
Octyl Acetate			
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	OCX	5,000	5,000
OCTYL ALCOHOL	IOA	5,000	5,000
Octyl Aldehydes	OAL		
Octyl Decyl Adipate	ODA		
Octyl Epoxytallate	OET		
Octyl Phthalate. SEE DI-(2-ETHYLHEXYL) PHTHALATE			
OIL, EDIBLE: Babassu	OBB		
OIL, EDIBLE: Beechnut			
OIL, EDIBLE: Castor	OCA		
OIL, EDIBLE: Cocoa butter			
OIL, EDIBLE: Coconut	OCC	5,000	
OIL, EDIBLE: Cod liver			
OIL, EDIBLE: Corn	OCO	5,000	
OIL, EDIBLE: Cottonseed	OCS		
OIL, EDIBLE: Fish, N.O.S.	OFS	5,000	
OIL, EDIBLE: Grapeseed			
OIL, EDIBLE: Groundnut			
OIL, EDIBLE: Hazelnut			
OIL, EDIBLE: Lard	OLD		
OIL, EDIBLE: Maize			
OIL, EDIBLE: Mustard seed			
OIL, EDIBLE: Nutmeg Butter			
OIL, EDIBLE: Olive	OOL		
OIL, EDIBLE: Palm	OPM		
OIL, EDIBLE: Palm kernel	OPO		
OIL, EDIBLE: Peanut	OPN		
OIL, EDIBLE: Poppy			
OIL, EDIBLE: Raisin seed			
OIL, EDIBLE: Rice bran	ORP		
OIL, EDIBLE: Safflower	OSF		
OIL, EDIBLE: Salad			
OIL, EDIBLE: Sesame			
OIL, EDIBLE: Soya bean	OSB	5,000	
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED		5,000	
OIL, EDIBLE: Sunflower seed	OSN		
OIL, EDIBLE: Tucum	OTC		
OIL, EDIBLE: Vegetable, N.O.S.	OVG	5,000	
OIL, EDIBLE: Walnut			
OIL, FUEL: No. 1 (Kerosene)	OON		
OIL, FUEL: No. 1-D	OOD		
OIL, FUEL: No. 2	OTW	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		P/V	
		VALVE	VALVE
		(BBL/	(BBL/
		HR)	HR)

OIL, FUEL: No. 2-D	OTD		
OIL, FUEL: No. 4	OFR	5,000	5,000
OIL, FUEL: No. 5	OFV	5,000	5,000
OIL, FUEL: No. 6	OSX	5,000	5,000
OIL, MISC: Absorption	OAS		
OIL, MISC: Aliphatic			
OIL, MISC: Animal, N.O.S.			
OIL, MISC: Aromatic			
OIL, MISC: Aviation F2300			
OIL, MISC: Clarified	OCF		
OIL, MISC: Coal			
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHYL ESTER			
OIL, MISC: Coconut oil, fatty acid			
OIL, MISC: Coconut oil, fatty acid Methyl Ester	OCM		
OIL, MISC: Coconut oil, Methyl Ester, SEE COCONUT OIL FATTY ACID METHYL ESTE			
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACID	CFY	5,000	
OIL, MISC: Croton			
OIL, MISC: Crude	OIL	5,000	5,000
OIL, MISC: Diesel	ODS	5,000	5,000
OIL, MISC: Gas, low pour			
OIL, MISC: Gas, low sulfur			
OIL, MISC: Heartcut distillate			
OIL, MISC: Lanolin			
OIL, MISC: Linseed			
OIL, MISC: Lubricating	OLB	5,000	5,000
OIL, MISC: Mineral			
OIL, MISC: Mineral seal	OMS		
OIL, MISC: Motor	OMT		
OIL, MISC: Neatsfoot	ONF		
OIL, MISC: Oiticica	OOI		
OIL, MISC: Palm oil, fatty acid Methyl Ester	OPE	5,000	
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID METHYL EOPE			
OIL, MISC: Penetrating	OPT		
OIL, MISC: Perilla			
OIL, MISC: Pilchard			
OIL, MISC: Pine	OPI		
OIL, MISC: Range	ORG		
OIL, MISC: Residual			
OIL, MISC: Resin	ORS	5,000	5,000
OIL, MISC: Resinous petroleum			
OIL, MISC: Road	ORD		
OIL, MISC: Rosin	ORN		
OIL, MISC: Seal			
OIL, MISC: Soapstock	OIS		
OIL, MISC: Soya bean (epoxidized)			
OIL, MISC: Sperm	OSP		
OIL, MISC: Spindle	OSD		
OIL, MISC: Spray	OSY		
OIL, MISC: Tall	OTL		
OIL, MISC: Tall, fatty acid	TOF		
OIL, MISC: Tanner's	OTN		
OIL, MISC: Transformer	OTF		
OIL, MISC: Tung	OTG		
OIL, MISC: Turbine	OTB	5,000	5,000
OIL, MISC: Whale			
OIL, MISC: White (mineral)			
OIL, MISC: Wood			
alpha-Olefins (C13 - C18)	OAM		
Olefins (C13 and above, all isomers)		5,000	
Oleic acid	OLA		
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)			

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/ HR)	(BBL/ HR)

Organic Amine 70, SEE AMINOETHYLDIETHANOLAMINE, AMINOETHYL-ETHANOLAMINE	SOLU		
Palm Stearin	PMS		
n-Paraffins (C10 - C20)	PFN		
Pentadecanol, SEE SEE ALCOHOLS (C13 AND ABOVE)	PDC	5,000	5,000
Pentaethylene Glycol			
Pentaethylenhexamine	PEP		
Pentane (all isomers)	PTY	5,000	5,000
PENTANE (iso-)	IPT	5,000	5,000
PENTANE (n-)	PTA	5,000	5,000
Pentanoic acid			
Pentene (all isomers)	PTX	5,000	5,000
PENTENE (1-)	PTE	5,000	5,000
Petrolatum	PTL		
1-Phenyl-1-Xyllyl Ethane	PXE		
Phosphosulfurized Bicyclic Terpene			
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES			
Pinene	PIN	5,000	5,000
Polyalkenyl Succinic Anhydride Amine			
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtures	PPX		
Polyalkylene Oxide Polyol	PAO	5,000	
Polamine, Amide mixture			
Polybutadiene, Hydroxyl terminated			
Polybutene	PLB	5,000	5,000
Polydimethylsiloxane		5,000	
Polyethylene Glycol		5,000	
Polyethylene Glycol Dimethyl Ether			
Polyglycerol			
Polyisobutylene, SEE POLYBUTENE			
Polymerized Esters			
Poly(20)oxyethylene Sorbitan Monooleate	PSM		
Polypropylene	PLP		
Polypropylene Glycol	PGC	5,000	5,000
Polypropylene Glycol Methyl Ether	PGM	5,000	5,000
Polysiloxane			
Polystyrene Diakyl Maleate			
Potassium Oleate	POE		
Propane	PRP	5,000	
n-Propoxypropanol	PXP		
Propyl Acetate (iso-)	IAC	5,000	5,000
Propyl Acetate (n-)	PAT		5,000
Propyl alcohol (iso-)	IPA	5,000	5,000
Propyl alcohol (n-)	PAL	5,000	5,000
Propylbenzene (n-)	PBZ	5,000	5,000
iso-Propylcyclohexane	IPX	5,000	5,000
Propylene	PPL	5,000	
Propylene-Butylene Copolymer	PBP		
Propylene Dimer	PDR		
Propylene Glycol (1,2-PROPANDIOL)	PPG	5,000	5,000
Propylene Glycol Monoalkyl Ether	PGE		
Propylene Glycol Ethyl Ether	PGY		
Propylene Glycol Methyl Ether	PME	5,000	5,000
Propylene Polymer (in liquid mixtures)			
Propylene Tetramer	PTT	5,000	5,000
Propylene Trimer	PTR		
Pseudocumene, SEE TRIMETHYLBENZENES			
Rum			
Sodium Acetate, Glycol, water solutions			
Sodium Acetate solution	SAN		
Sodium Benzoate solution	SBN		
Sodium Sulfonate			
Stearic acid	SRA		

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C	MAX	MAX
	H	LIQUID	LIQUID
	R	TRANSFER	TRANSFER
	I	RATE	RATE
	S	PER	PER
		SPILL	P/V
		VALVE	VALVE
		(BBL/ HR)	(BBL/ HR)
----- *** -----			
Stearyl alcohol (Octadecanol)			
Sulfolane	SFL	5,000	5,000
Tallow	TLO		
Tallow alcohol, SEE ALCOHOLS (C13 AND ABOVE)			
Tallow fatty acid	TFD		
Tallow Alkyl Nitrile			
Tetradecanol	TTN	5,000	
1-Tetradecene, SEE THE OLEFIN OR ALPHA-OLEFIN ENTRIES	TTD	5,000	5,000
Tetradecylbenzene	TBD		
Tetraethylene Glycol	TTG	5,000	5,000
Tetrahydronaphthalene	THN	5,000	5,000
Tetrapropylbenzene, SEE ALKYL(C9-C17) BENZENES			
Toluene	TOL	5,000	5,000
Triaryphosphate			
Tributyl Phosphate	TBP		
Tricresyl Phosphate (less than 1% of the ortho isomer)	TCP	5,000	5,000
Tridecane	TRD	5,000	5,000
Tridecanoic acid			
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)	TDN	5,000	5,000
1-Tridecene	TDC	5,000	5,000
Tridecylbenzene	TRB		
Triethylbenzene	TEB	5,000	5,000
Triethylene Glycol	TEG	5,000	5,000
Triethylene Glycol Butyl Ether			
Triethylene Glycol Butyl Ether mixture		5,000	
Triethylene Glycol di-(2-ethylbutyrate)	TGD		
Triethylene Glycol Ether mixture			
Triethylene Glycol Ethyl Ether	TGE		
Triethylene Glycol Methyl Ether			
Triethyl Phosphate	TPS	5,000	5,000
Triisooctyl Trimellitate			
Triisopropanolamine	TIP	5,000	
Trimethylbenzenes (all isomers)	TRE	5,000	5,000
TRIMETHYL BENZENE (1,2,5-)	TMB	5,000	5,000
TRIMETHYL BENZENE (1,2,3-)	TMD	5,000	5,000
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TME	5,000	5,000
Trimethylol Propane Polyethoxylate	TPR		
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate			
2,2,4-Trimethyl-3-pentanol-1-isobutyrate	TMP		
Tripropylene, SEE PROPYLENE TRIMER			
Tripropylene Glycol	TGC		
Tripropylene Glycol Methyl Ether	TGM		
Trixylenyl Phosphate	TRP	5,000	
Turpentine	TPT		
Turpentine substitute (White spirit), SEE WHITE SPIRIT (LOW (15-20%) AROMATI			
Undecanol			
Undecene (1-)	UDC	5,000	5,000
Undecyl alcohol	UND	5,000	5,000
Undecylbenzene	UDB		
Vinyl Acetate-fumerate Copolymer			
Waxes:	WAX		
WAXES: Candelilla			
WAXES: Carnauba	WAX,		
WAXES: Paraffin	WAX,		
WAXES: Petroleum			
White spirit, SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)			
White spirit (low (15 - 20%) aromatic)	WSL		
Wine, SEE ALCOHOLIC BEVERAGES, N.O.S.			
Wool grease			
Xylenes (ortho-,meta-, para-)	XLX	5,000	5,000
XYLENE (M-)	XLM	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES

CARGO	C H R I S	MAX	MAX
		LIQUID TRANSFER RATE PER SPILL VALVE (BBL/ HR)	LIQUID TRANSFER RATE PER P/V VALVE (BBL/ HR)

46 CFR SUBCHAPTER D, BUT NOT TABLE 30.25-1

AROMATIC RESIN OIL 60	ARS	5,000	5,000
AROMATIC RESIN OIL 80	ARS	5,000	5,000
AROMATIC RESIN OILS			