VAPOR CONTROL SYSTEM INSTALLATION

for

DOUBLE SKIN TANK BARGES "7031" AND "7032"

for

CONOCO, INC.
DOMESTIC MARINE OPERATIONS

April 5, 2002

Prepared by: Shearer & Assoc., Inc.
P. O. Box 9576
Metairie, LA 70055-9576
(504) 836-6009

TABLE OF CONTENTS

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:

NAME	BUILDER	HULL NUMBER
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 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

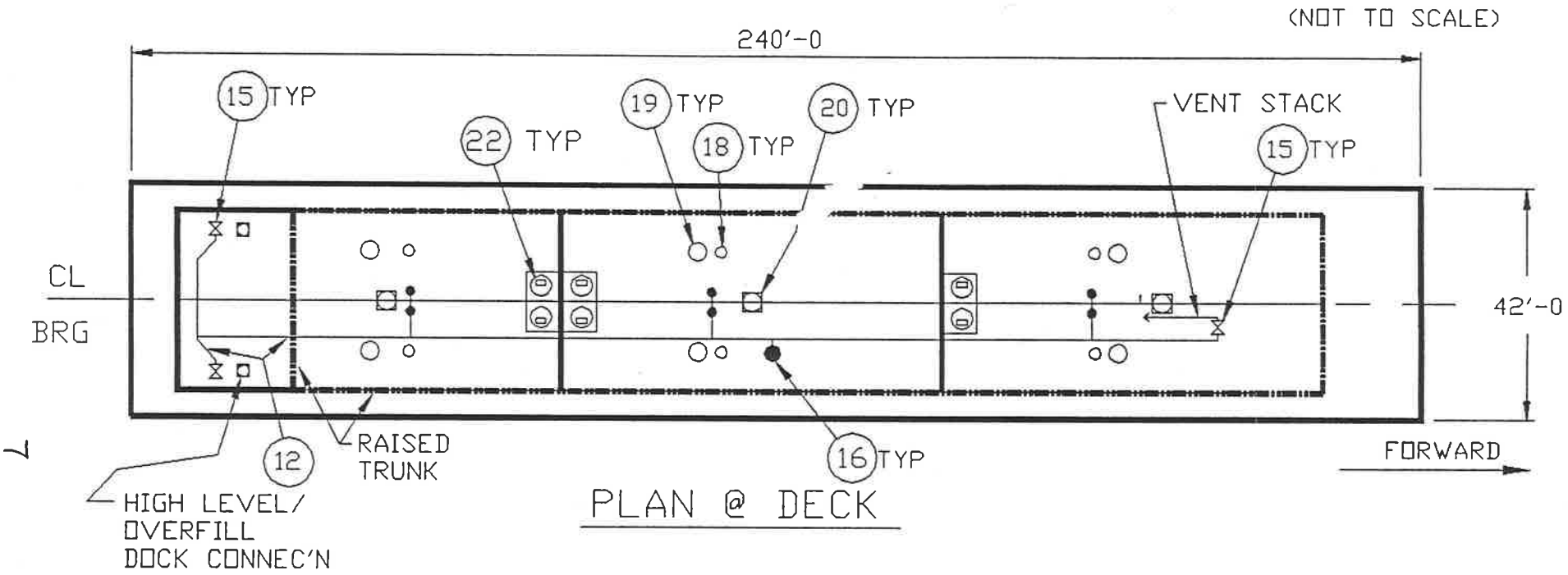
b. Not relieve at a vacuum corresponding to a vacuum in the cargo tank vapor space of less than 0.5 PSIG below atmospheric pressure.

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.



PLAN @ DECK

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

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 2 1/2" & LARGER: BUTT WELD SCHED 40 ASTM A234 GR B, ANSI B-16.9
	FLANGES			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 '95

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.

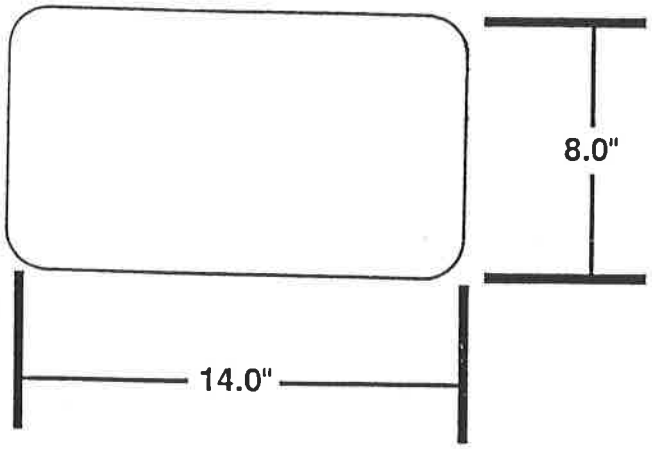
* 3/4" thick #7740 Pyrex ground and polished plate glass is stress relieved with ground edges and radiused corners.

* 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.

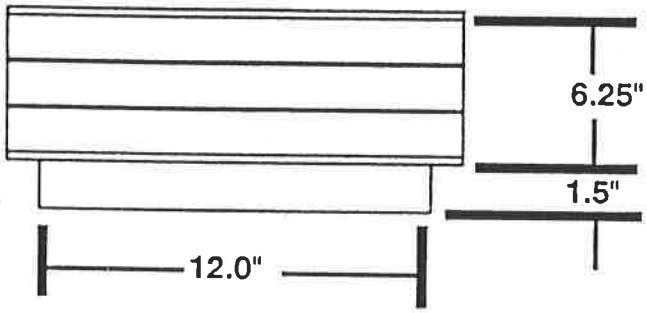
* The unique carbon-steel deck mounting flange makes shipyard installation easy and prevents damage to the sight glass, which can occur during installation of ordinary weld-in-place sight glasses.

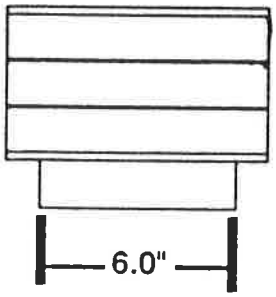
SPECIFICATIONS

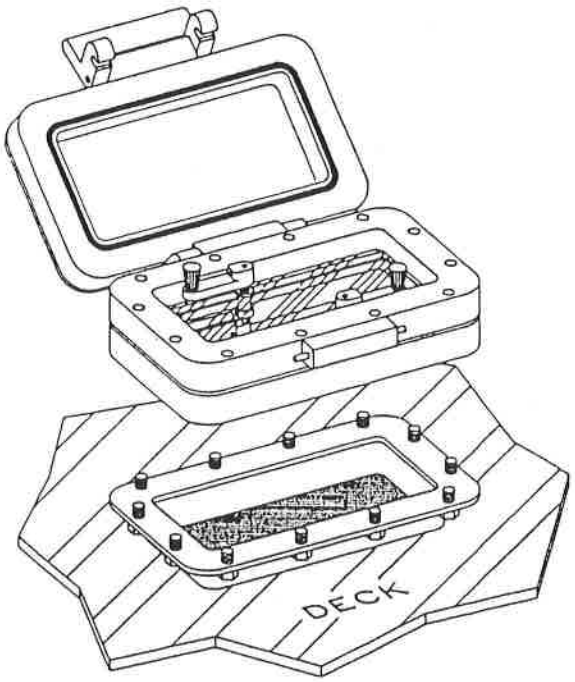


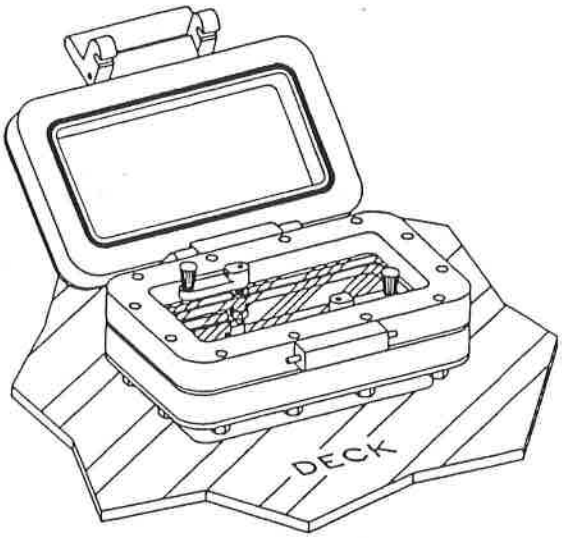
Marine Sight Glass
Model SGM-1

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





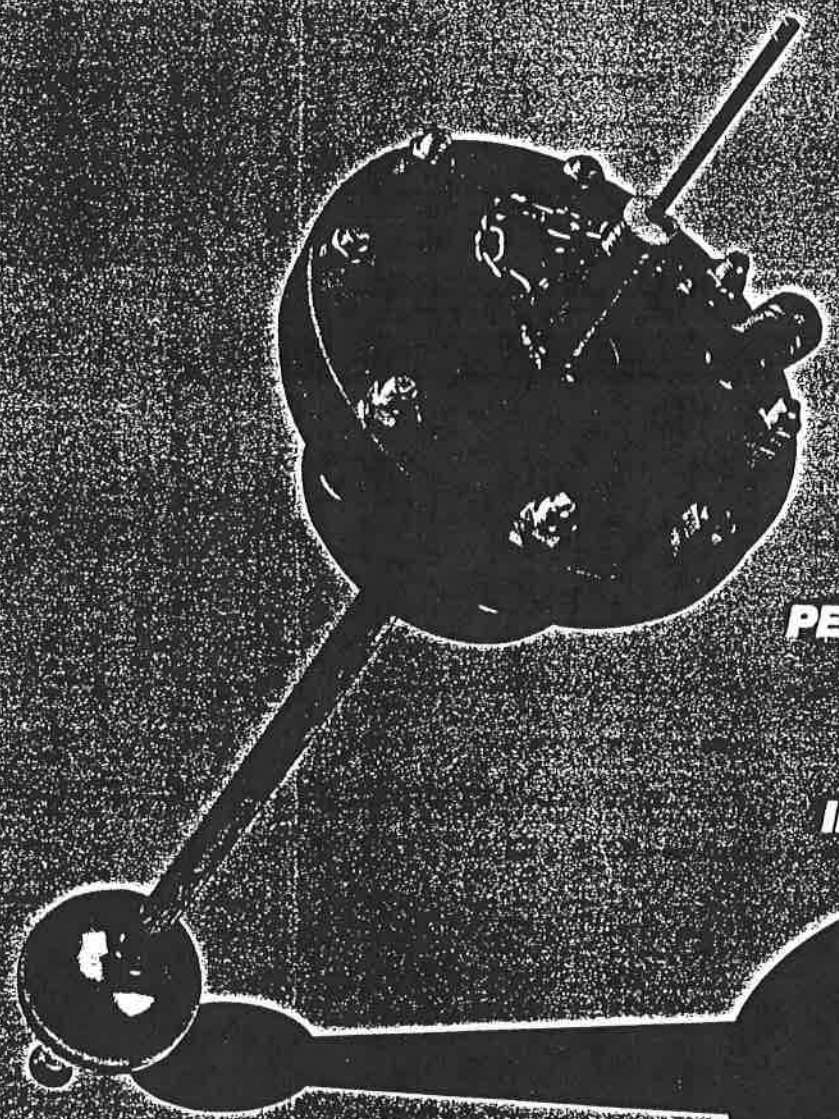




ERL MARINE PRODUCTS DIVISION
P.O. BOX 1026
NEW ALBANY, IN 47151-1026

1-800-831-9510
FAX 1-812-944-8808

NEW from the MARINE DIVISION of MIDLAND MANUFACTURING



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

MIDLAND MANUFACTURING CORPORATION

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.

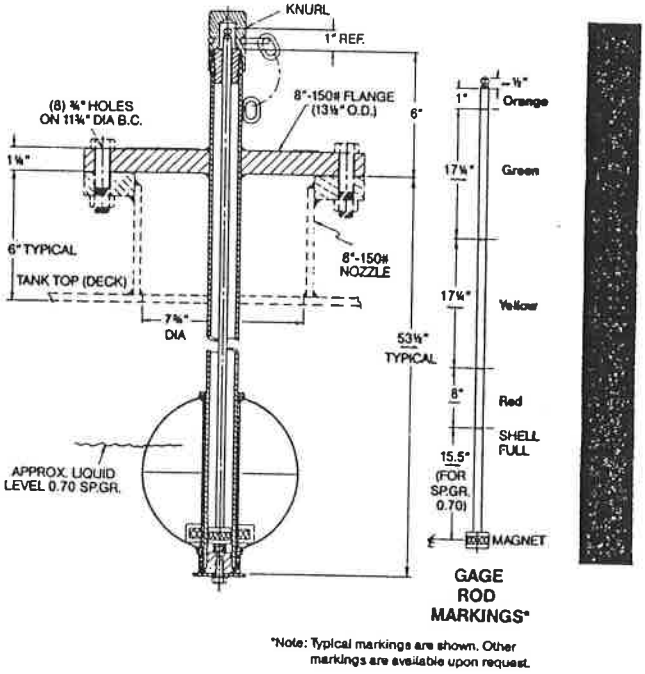
E. The extra-large 7½" diameter float remains buoyant in all services—even down to .51 specific gravity (e.g. propane).

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)



GAGE ROD MARKINGS*

*Note: Typical markings are shown. Other markings are available upon request.

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

MIDLAND MANUFACTURING CORPORATION

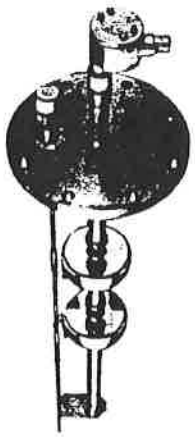
7733 Gross Point Road
Skokie, IL 60077
(708) 677-0333
Telex 28-9429
FAX # (708) 677-0138

Dec'93

FM
APPROVED

Midland
Model B-595

TANK HIGH LEVEL AND OVERFILL SENSOR

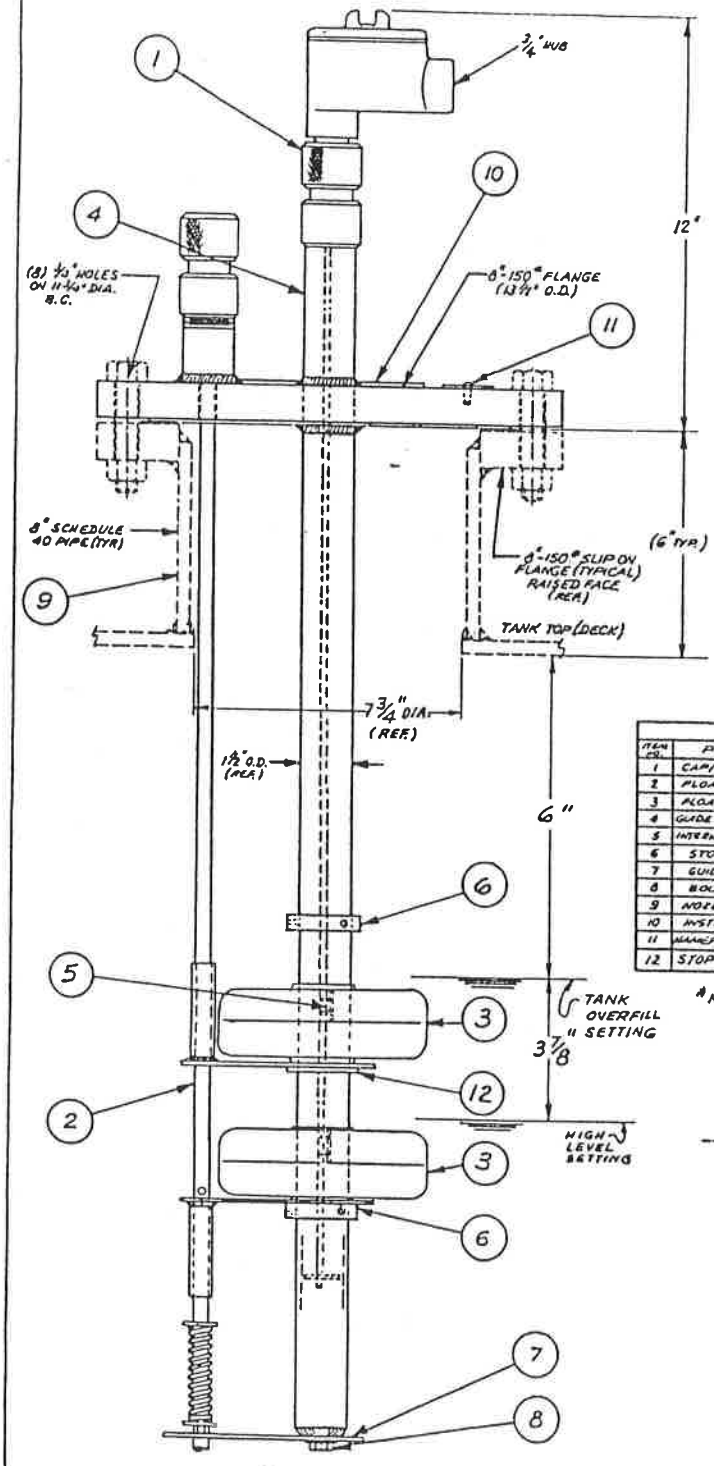


Intrinsically safe dual level alarm sensors provide independent HIGH LEVEL alarm and tank OVERFILL alarm signals to Barge Inlet connector. An 8" 150# ANSI mounting flange with integral float guide tube allows single point access for both HIGH LEVEL and OVERFILL alarm sensors. A stainless steel manual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

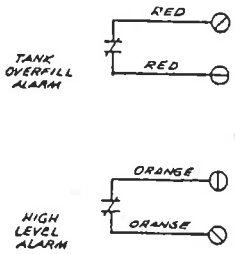
SPECIFICATIONS:

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 condulet.

MIDLAND MANUFACTURING CORPORATION
[illegible]



WIRING DIAGRAM



CONTACTS SHOWN IN NON-ALARM CONDITION

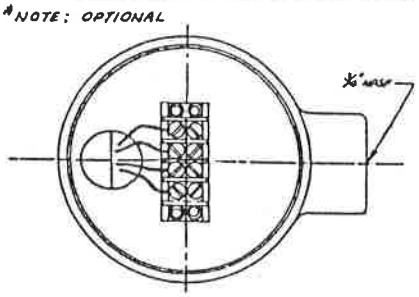
PROXIMITY SENSOR SPECIFICATIONS

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 +105 °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	595-1-AS
2	FLOAT LIFTER ASSEMBLY	STAINLESS STEEL	1	595-2-SS
3	FLOAT W/ MAGNET	STAINLESS STEEL	2	595-3-SS
4	GUIDE TUBE & FLANGE ASSY.	STAINLESS STEEL	1	595-4-SS
5	INTERNAL SENSOR ASSY.	PLASTIC & WIRE	1	595-5-PS
6	STOP COLLAR	STAINLESS STEEL	.2	595-61-SS
7	GUIDE PLATE	STAINLESS STEEL	1	595-7-SS
8	BOLT, LKW	STAINLESS STEEL	1	610-8-SS
9	NOZZLE ASSEMBLY *	STEEL	1	610-9-CS
10	INSTRUCTION PLATE	PLASTIC	1	595-10-PL
11	NAMEPLATE W/DRIVE SCREWS	STAINLESS STEEL	1	595-11-SS
12	STOP RING	STAINLESS STEEL	1	595-6-SS

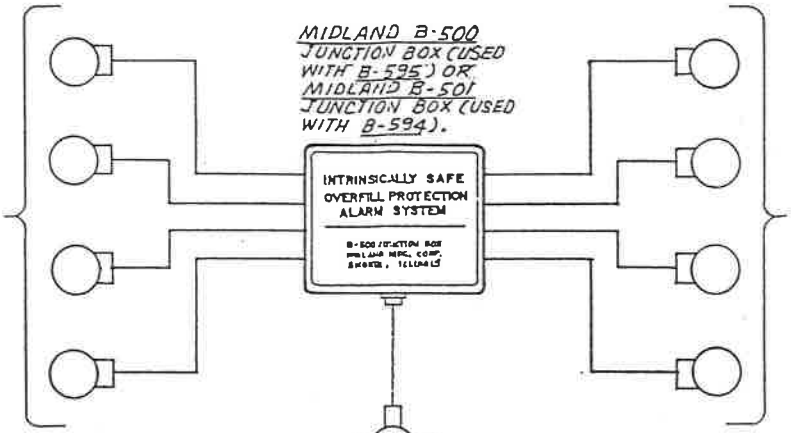
* NOTE: OPTIONAL



OUTLET BOX TOP VIEW

MEETS 46 CFR 39.20-7

MIDLAND MODEL B-595



NOTE #1.
RECOMMENDED INTERCONNECTION WIRING:
MARINE SHIPBOARD EB3358 110°C
SUPRENAUT EXANE 125 DAC 1048C,
IRRADIATED POLYOLEFIN INSULATION,
ARTIC NEOPRENE JACKET,
600V / IEC 1000 V, SHIELDED.

FOR B-594 USE 2 CONDUCTOR #18 AWG MINIMUM.
FOR B-595 USE 4 CONDUCTOR #18 AWG MINIMUM.

NOTE #2.
FOR B-500/B-595 INTERCONNECTION WIRING DIAGRAM, SEE DRAWING B-500-1.

NOTE #3.
FOR B-501/B-594 INTERCONNECTION WIRING DIAGRAM, SEE DRAWING B-501-1.

LOCATE BARGE INLETS WITHIN 10 FT. OF BARGE LOADING MANIFOLDS PORT AND STARBOARD.

REFERENCE:
OVERFILL CONTROL SYSTEMS FOR TANK BARGES
API RECOMMENDED PRACTICE 1125.

REVISION	DATE	BY
ADDED JUNCTION BOX PLACARD WORDING	4-18-91	KITS
ADDED WIRING NOTES #1, #2, & #3	4-2-91	KITS

MATERIAL:

REMOVE ALL BURRS. BREAK ALL EDGES & CORNERS

STD. TOLERANCES: UNLESS SPECIFIED DECIMAL ± .003 FRACTIONS ± .015

MIDLAND MFG. CORP.
SKOKIE, ILL.

LEVEL SENSOR WIRING
TYPICAL BARGE INSTALLATION

SCALE:

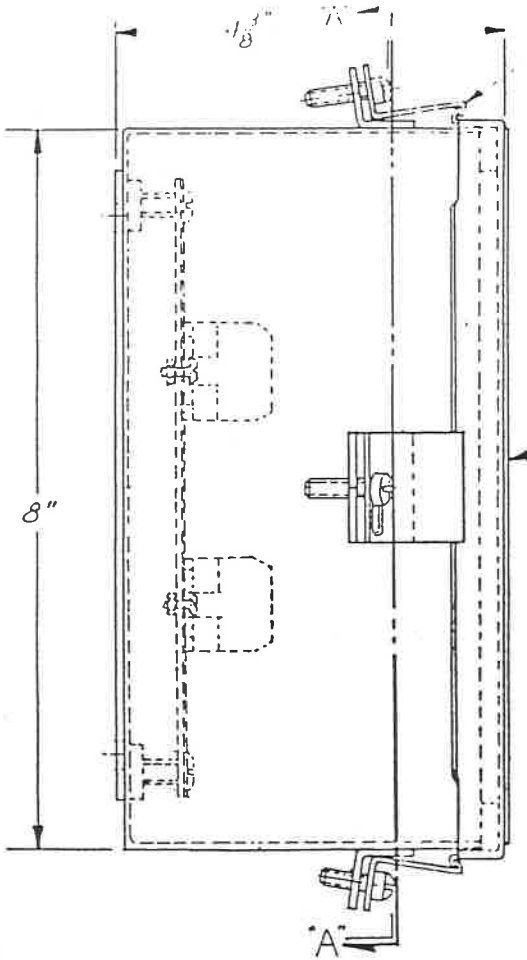
DRAWN BY: KITS M.

DATE: 4-1-91

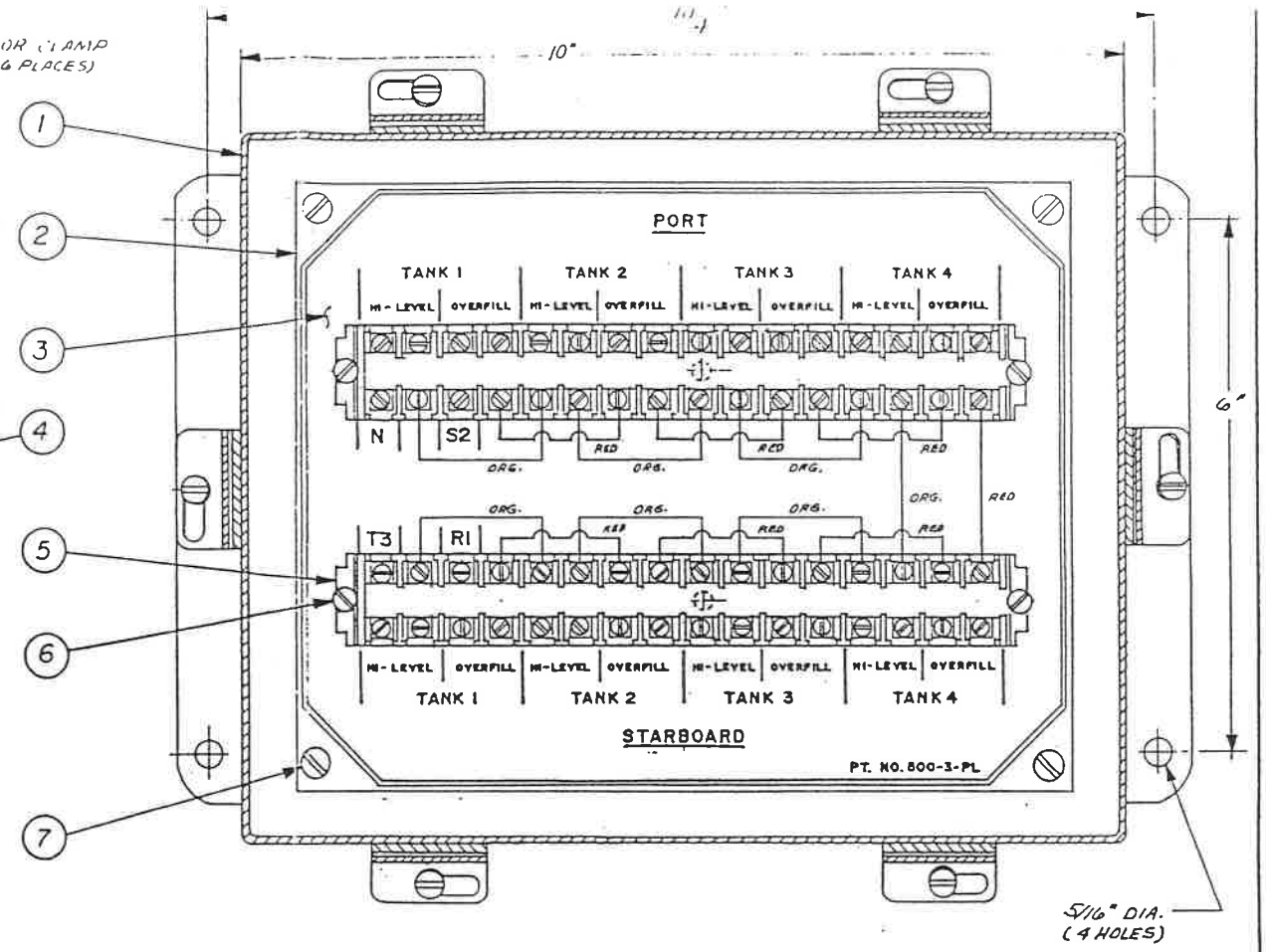
REVISIONS: 4-18-91

B-500-2

C-1-c



SIDE VIEW



SECTION "A-A"

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

INTRINSICALLY SAFE
OVERFILL PROTECTION
ALARM SYSTEM

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

COVER NAMEPLATE

USED WITH B595
DUAL LEVEL SENSORS.

REMOVED ITEM 8 THRU 13.	4-18-91	KHM
ADDED NOTE	3-27-91	KHM
ADDED "USED WITH" NOTE	3-19-91	KHM
CHANGED TITLE	3/14/91	KHM

MATERIAL: NEMA 4X ENCLOSURE

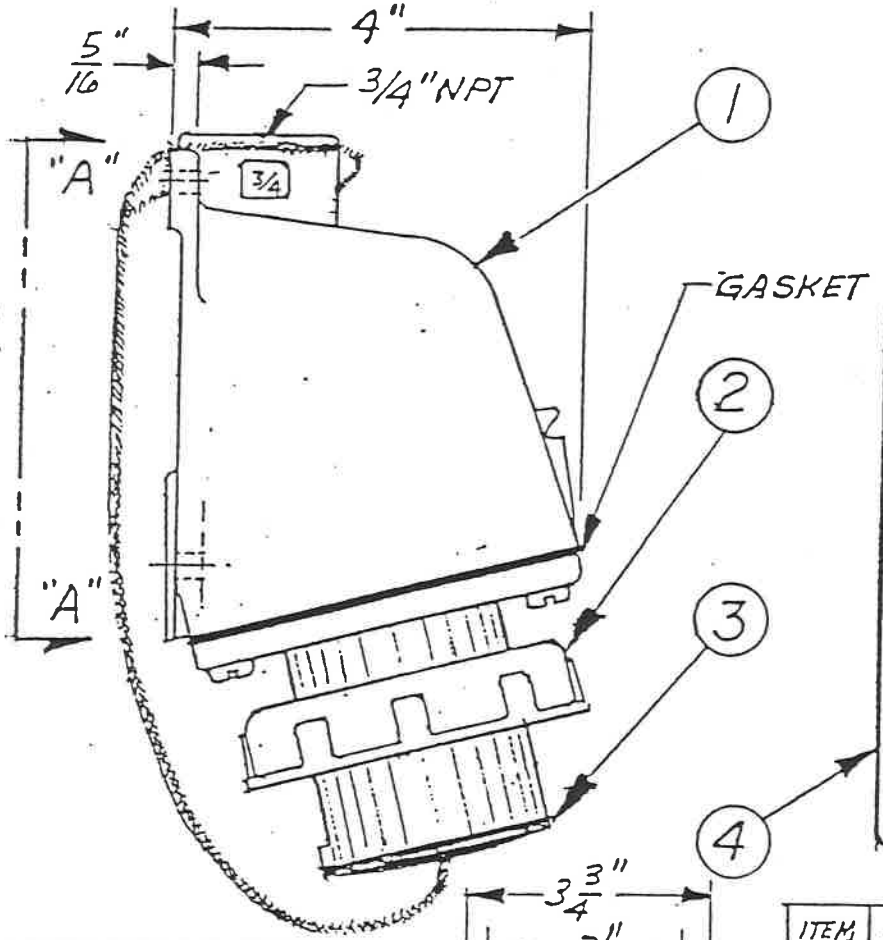
STD. TOLERANCES UNLESS SPECIFIED: FULL

MIDLAND MFG. CORP.
SKOKIE, ILL.

JUNCTION BOX AND CONNECTOR ASSEMBLY

B-500

C-1-d



C-1-e

FOR MATING FEMALE CONNECTOR PLUG USE PT. NO. 500-50-PL

VIEW "A-A"

NO SCALE

9 3/4"

7 3/4"

CONNECTOR FOR BARGE OVERFLOW CONTROL SYSTEM

INTRINSICALLY SAFE OVERFILL PROTECTION ALARM SYSTEM

MIDLAND MFG. CORP. SKOKIE, IL

TOTAL SYSTEM CAPACITANCE ____ pF.

TOTAL SYSTEM INDUCTANCE ____ mH

ITEM	PART NAME	MATERIAL	QTY.	PART NO.
1	ANGLE BACK BOX	CAST ALUMINUM	1	500-10-AL
2	FLANGED MALE INLET	PLASTIC AND METAL	1	500-11-PL
3	CLOSURE PLUG W/ CORD	RUBBER & NYLON	1	500-12-BM
4	PLACARD	UV STABILIZE PLASTIC 1/16" THICK	1	500-41-PL

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

MATERIAL: SEE B/M

REMOVE ALL BURRS, BREAK ALL EDGES & CORNERS

STD. TOLERANCES: UNLESS SPECIFIED DECIMAL = .005 FRACTIONS = .015

MIDLAND MFG. CORP.
SKOKIE, ILL.

BARGE INLET

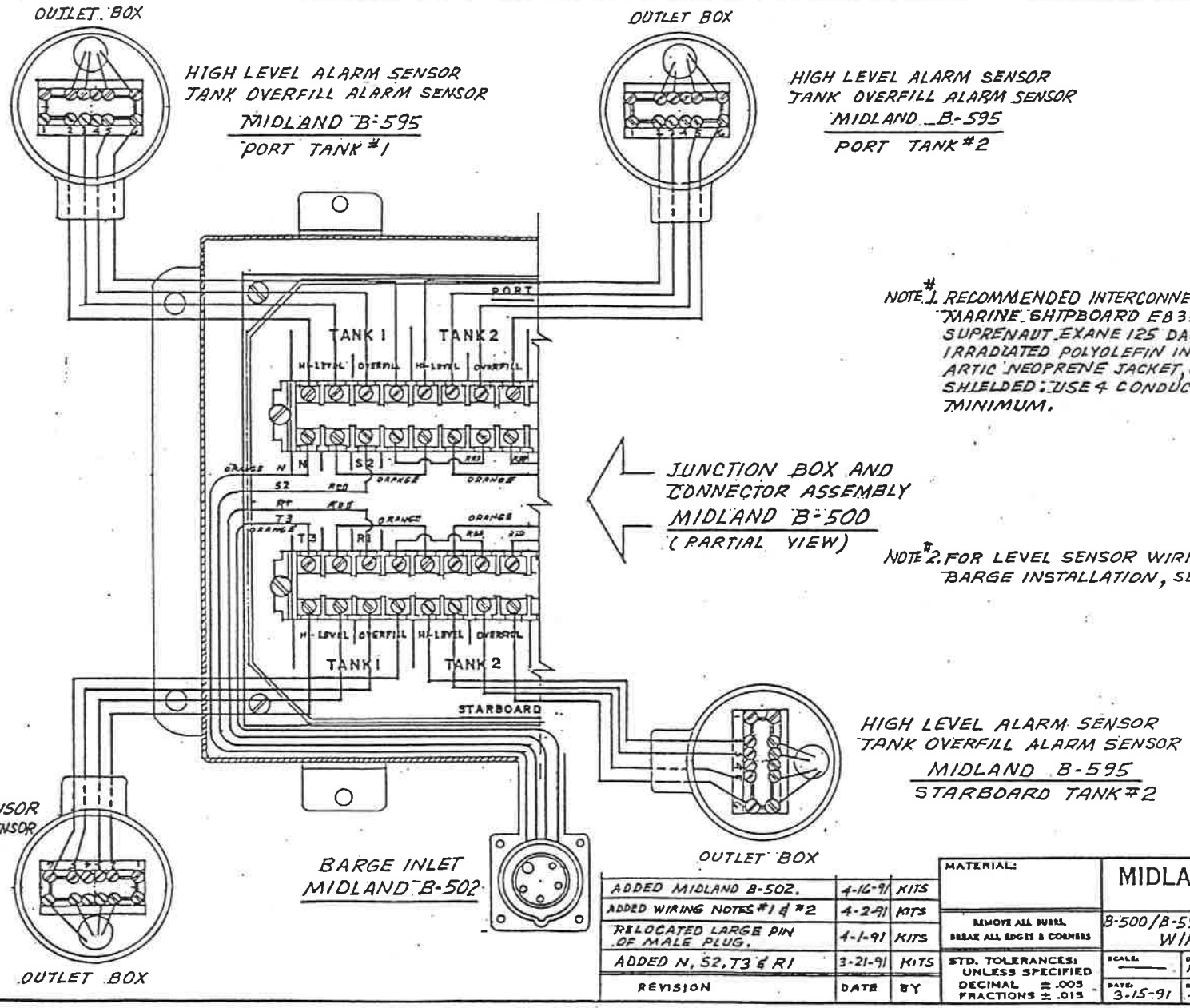
SCALE: HALF

DRAWN BY: KITS M.

DATE: 4-9-91

REVISION: 5/8/91

B-502



NOTE #1. RECOMMENDED INTERCONNECTION WIRING: MARINE SHIPBOARD EB3358 110°C SUPRENAUT EXANE 125 DAC 1048 C, IRRADIATED POLYOLEFIN INSULATION, ARTIC NEOPRENE JACKET, 600V/IEC 1000 V, SHIELDED: USE 4 CONDUCTOR #18 AWG MINIMUM.

NOTE #2. FOR LEVEL SENSOR WIRING TYPICAL BARGE INSTALLATION, SEE DWG. B-500-2.

C-1-5

REVISION	DATE	BY
ADDED MIDLAND B-502.	4-16-91	KITS
ADDED WIRING NOTES #1 & #2	4-2-91	KITS
RELOCATED LARGE PIN OF MALE PLUG.	4-1-91	KITS
ADDED N, S2, T3 & R1	3-21-91	KITS

MATERIAL:

REMOVE ALL BURR. BREAK ALL EDGES & CORNERS

STD. TOLERANCES: UNLESS SPECIFIED DECIMAL ± .005 FRACTIONS ± .015

MIDLAND MFG. CORP.
SKOKIE, ILL.

B-500/B-595 INTERCONNECTION WIRING DIAGRAM

SCALE: —— DRAWN BY: KITS M.

DATE: 3-15-91 REVISION: 4-16-91

B-500-1

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 PICOFARADS

FIND: STORED ENERGY IN SENSOR CIRCUIT.

CALCULATIONS:

INDUCTIVE ENERGY $\frac{LI^2}{2}$ JOULES $= \frac{(1.5 \times 10^{-6})(155 \times 10^{-3})^2}{2}$

$= 18.018 \times 10^{-12}$ JOULES = 0.0180 MICROJOULES

CAPACITIVE ENERGY $\frac{CV^2}{2}$ JOULES $= \frac{(18 \times 10^{-12})(20.66)^2}{2}$

$= 3841 \times 10^{-12}$ JOULES = .0038 MICROJOULES

GIVEN TEST DATA:

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

FIND: STORED ENERGY IN THE EIGHT TANK BARGE CIRCUIT.

CALCULATIONS:

INDUCTIVE ENERGY = $\frac{LI^2}{2}$ JOULES

$= \frac{(.195 \times 10^{-3})(155 \times 10^{-3})^2}{2}$

$= 2342 \times 10^{-9}$ JOULES = 2.342 MICROJOULES

CAPACITIVE ENERGY $\frac{CV^2}{2}$ JOULES

$= \frac{(1880 \times 10^{-12})(20.66)^2}{2}$

$= 401225 \times 10^{-12}$ JOULES = 0.4012 MICROJOULES

FIND: TOTAL STORED ENERGY

2.342 MICROJOULES + .401 MICROJOULES = 2.743 MICROJOULES.

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

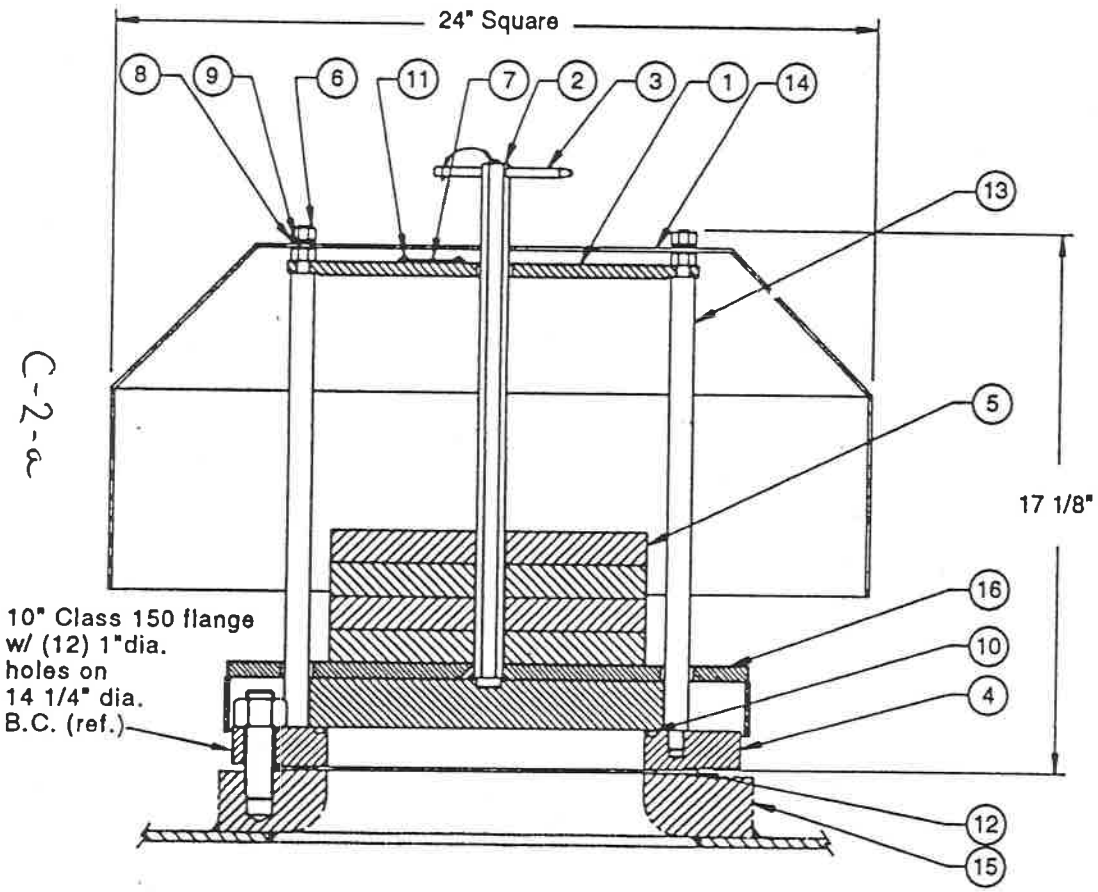
SK 062591

DRAWN BY: GB/RHD
REVISION:
SCALE:
DATE: 6-25-91

MATERIAL:
REMOVE ALL BURRS. BREAK ALL EDGES & CORNERS
STD. TOLERANCES: UNLESS SPECIFIED DECIMAL ± .005 FRACTIONS ± .015

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

9/27/93



C-2-a

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.

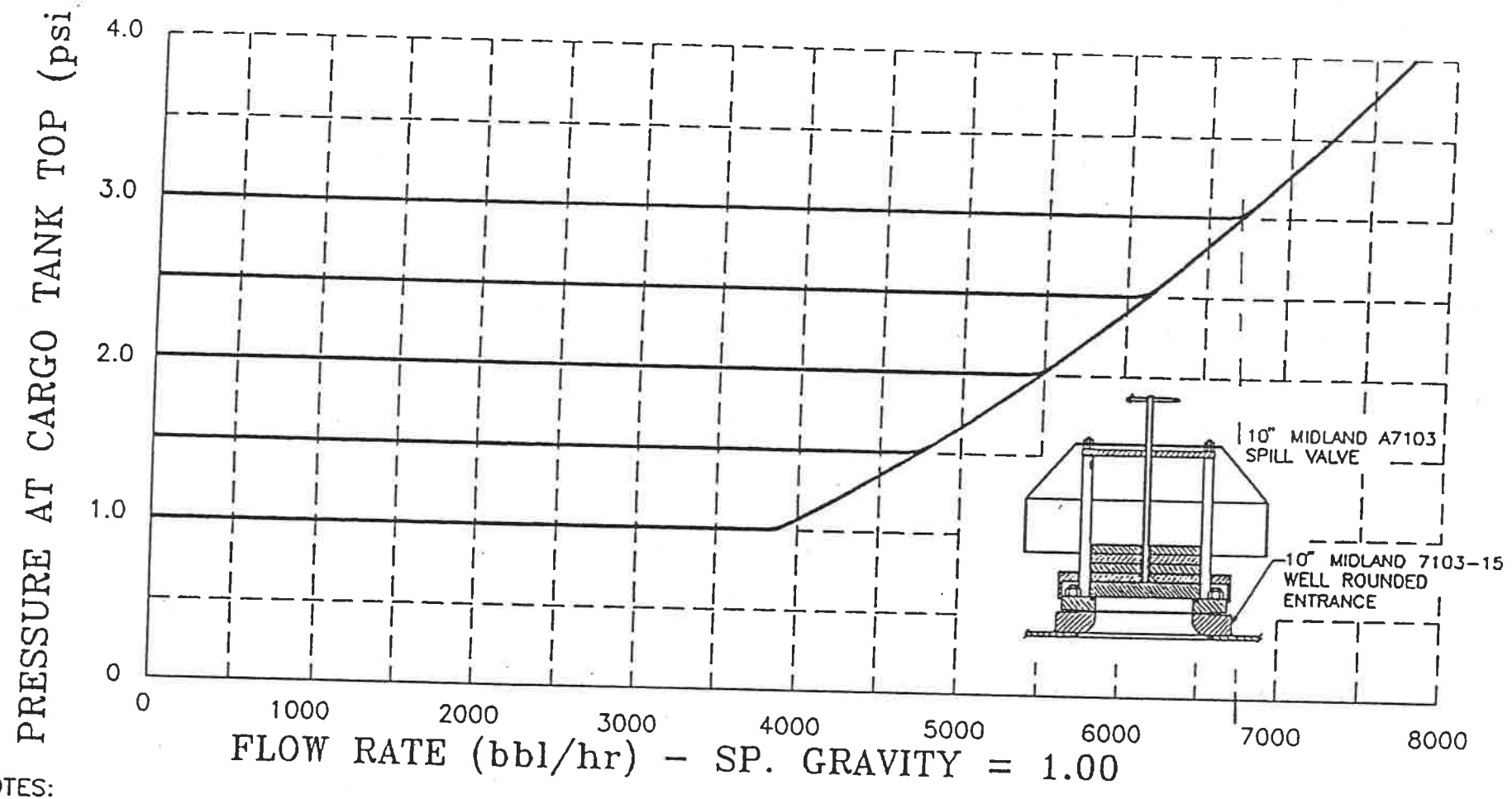
SET OPENING PRESSURE (PSI)	SPILL VALVE PART NUMBER	QUANTITY	WEIGHT PART NUMBER	RATED FLOW @ 120% OF SET OPENING PRESSURE 1.0 SP. GR. (BBL/HR.)
1.00	A-7103-16	———	———	4239
1.25	A-7103-20	1	7103-54-MO	4740
1.30	A-7103-21	1	7103-54-MO	4834
		1	7103-51-MO	
1.50	A-7103-24	2	7103-54-MO	5192
1.75	A-7103-28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

A-7103

10" SPILL VALVES



C-2-b

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

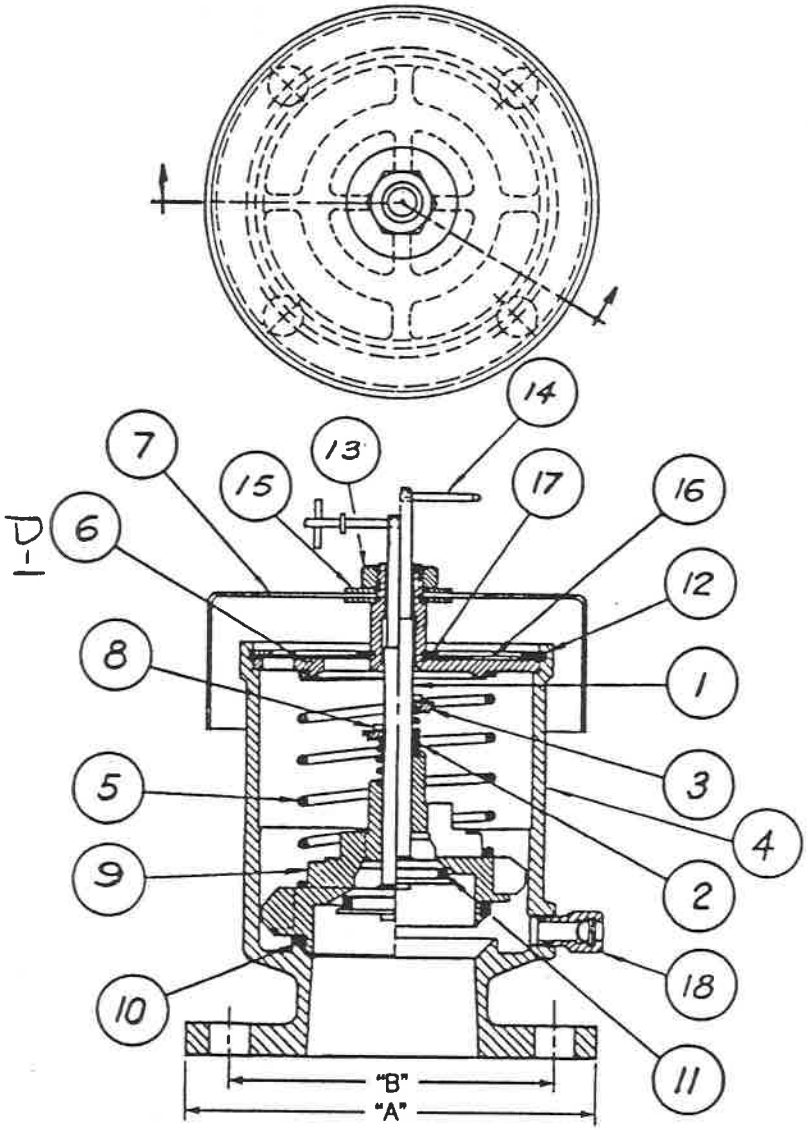
4) TO DETERMINE FLOW RATE AT A TANK PRESSURE, ENTER VERTICAL AXIS AT DESIRED PRESSURE, MOVE HORIZONTALLY TO CURVE, TURN DOWN TO READ FLOW RATE

CERTIFIED AS COMPLYING WITH ASTM F1271-90 SPECIFICATION

CAD FILE: 0058

MATERIAL: ALL 300 SERIES STAINLESS STEEL	MIDLAND MFG. CORP. *SKOKIE, IL, U.S.A.*
REMOVE ALL BURRS. BREAK ALL EDGES & CORNERS	10" SPILL VALVE CAPACITIES WITH MIDLAND ROUNDED ENTRANCE
STANDARD TOLERANCES UNLESS SPECIFIED DECIMAL: ±.005 FRACTIONS ±.015	SCALE: / DRAWN BY: Maggio / DATE: 2/7/92 / REVISION: 2/11/92 / A702-9

FLG'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.

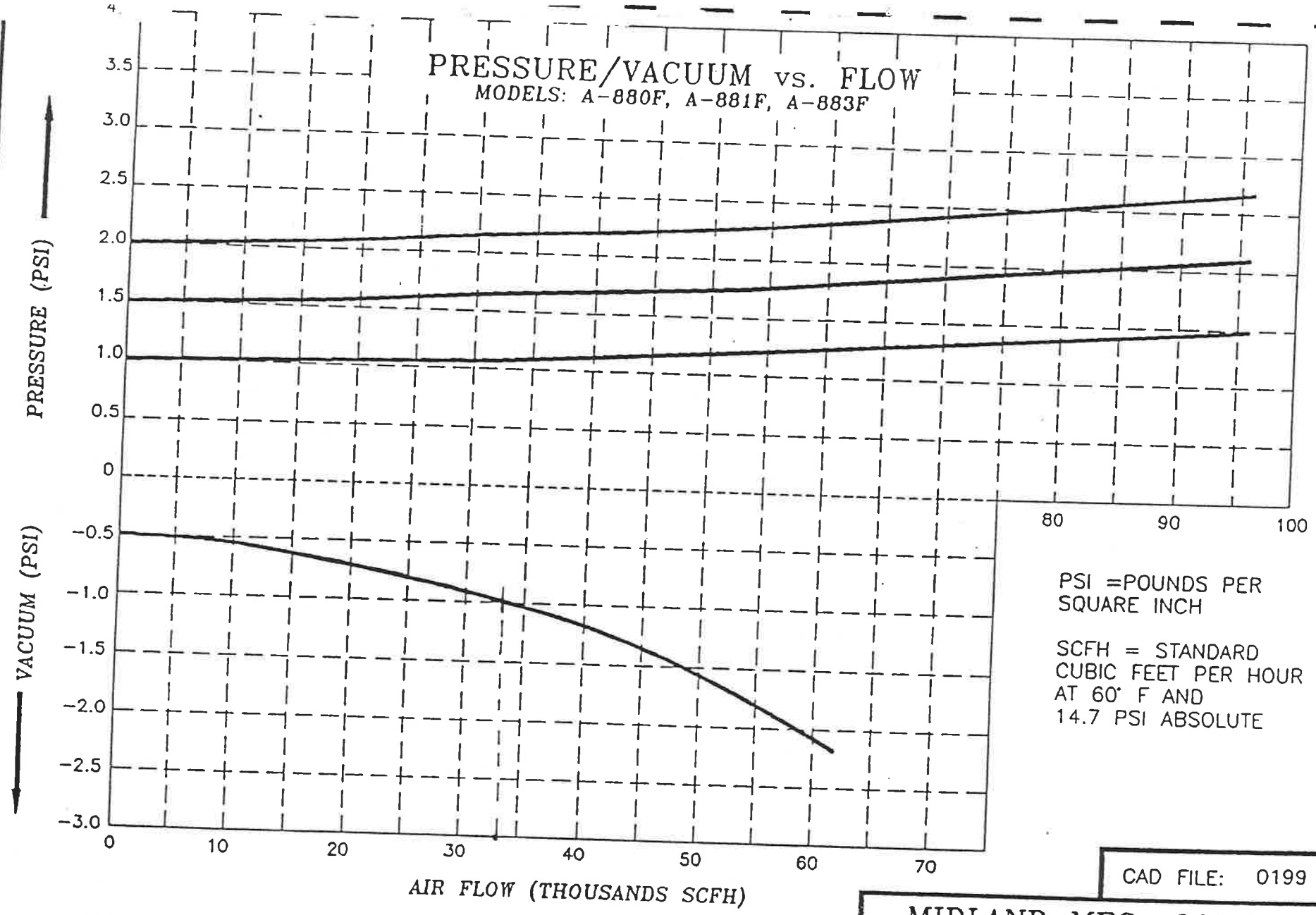
VALVE MATERIAL	MODEL SUFFIX
BRASS	-BR
STAINLESS	-SS

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

MARINE EQUIPMENT

PRESSURE-VACUUM VALVES USCG APPROVED

A-828-F, A-833-F, A-843-F, A-853-F, A-863-F, A-883-F, A-8103-F



PSI =POUNDS PER SQUARE INCH

SCFH = STANDARD CUBIC FEET PER HOUR AT 60° F AND 14.7 PSI ABSOLUTE

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	A800-19
DATE: 11/23/92	REVISION:	

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

MAX DESIGN WORKING PRESS
DESIGN TEMPERATURE
"TARGET" MAX LIQUID TRANSFER RATE
CARGO TANK P/V SETTING
PIPING SECTION I:

CARGO TANK OUTLET TO VAPOR RELIEF VALVE
DISTANCE ENROUTE TO PV
ENTRANCE LOSS (Ke)
BEND LOSS (Kb)

VALVE LOSS (Kv)

EXIT LOSS (Kex)

PIPING SECTION II:

CARGO TANK OUTLET TO VAPOR RELIEF VALVE
DISTANCE ENROUTE TO PV
ENTRANCE LOSS (Ke)
BEND LOSS (Kb)

VALVE LOSS (Kv)

EXIT LOSS (Kex)

CARGO VISCOSITY

TABLE I: INPUT DATA & NOTES

(MDWP)	> =	3.000	PSIG					MIDLAND 8" PV	
(T)		115	F					MODEL A883/A880	
(TMLTR)		5,000	BPH					P/V VALVE DATA	
(Pp/v)		1.500	PSIG --->	16.2	PSIA			FLOW RATE (SCFH/ 1000)	PRESSURE ACROSS PV (PSI)
NOM I.D.		8	IN ----->I.D.	7.981	IN			0	1.500
ROUGHNESS		0.00015	AREA	0.347	FT^2			5	1.505
		105	FT					10	1.520
		0.5						15	1.540
		QTY	LOSS COEF	TOTAL		COEF	TOTAL	20	1.570
TEE (THRU RUN)		1	0.60	0.600	90EL LR 1	0.75	0.750	25	1.605
TEE (THRU BRANCH)		3	1.80	5.400	45 EL 0	0.40	0.000	30	1.635
OTHER		0	N/A	0.000	90 EL 0	N/A	0.000	35	1.665
TOTAL:		5	AVG:	1.350				40	1.695
		QTY	LOSS COEF	TOTAL				45	1.725
GATE		0	0.19	0.000				50	1.755
BUTTERFLY		0	0.65	0.000				55	1.785
OTHER		0	N/A	0.000				60	1.815
		0	AVG:	0.000				65	1.850
		0						70	1.890
NOM I.D.		N/A	IN ----->I.D.	0.000	IN			75	1.930
ROUGHNESS		0.00015	AREA	0.000	FT^2			80	1.975
		N/A	FT					85	2.015
		0						90	2.060
		QTY	LOSS COEF	TOTAL		COEF	TOTAL	95	2.100
TEE (THRU RUN)		0	0.60	0.000	90EL LR 0	0.75	0.000		
TEE (THRU BRANCH)		0	1.80	0.000	45 EL 0	0.40	0.000		
OTHER		0	N/A	0.000	90 EL 0	N/A	0.000		
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							
		0.01900	CENTIPOISE ---->	4E-07	LB SEC/FT^2				

NOTES:
1. LIQUID SPECIFIC GRAVITY; MOLECULAR WEIGHT OF CARGO
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 & THE PRESSURE SETTING OF THE P/V
8. VAPOR-AIR WEIGHT DENSITY @ 115 F & P/V PRESS SETTING
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

	OBTAIN FROM REFERENCE SOURCE
SGv	(CARGO MW / AIR MW), OR FM REF. SOURCE
Pv,115	OBTAIN FROM REFERENCE SOURCE
Pt,115	EST'D TO BE SAME AS P/V SETTING (Pp/v)
Vv,115	Pv,115 / Pt,115
Va,115	(Pt,115 - Pv,115) / Pt,115
Wa,115	MWa * Pp/v MWa = MOLEC. WT. OF AIR ---------- = 28.97 10.72*(460+T)
Wv-a,115	[(SGv*Vv,115)+Va,115]*(0.0047*Pp/v)
VGR	ESTIMATED TO BE 1 + (0.25*Pv,115/12.5)
Ql	
Qv-a	Ql * VGR
Qa	Qv-a*(Wv-a,115/Wa,115)^.5

13. USCG VAP COLLECT'N SYS. CARGO CATEGORIES
    1. NO ADD'L VCS REQMNTS 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 REQMNTS CAN BE DETERMINED
14. VGR = 1.25 FOR GASOLINE, CRUDE OIL, AND BENZENE.
15. NF/NC = NON-FLAMMABLE/NON-COMBUSTIBLE

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	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 MOR	BHA	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
CAMPHOR 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

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	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	DTI												
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	CHRIS	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	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	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
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					NF/NC							
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			NF/NC							
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

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	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%	DDA												
3-PENTENENITRILE	PNT	(CRUDE ?)	8										
AEROTHENE TT (1,1,1-TRICHLOROETHANE)			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	CHRIS	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	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, ALKYLBENZENE 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 HYDPGS													
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	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
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	CHRIS	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	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 Tribtuyl 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												

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	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

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

CARGO	CHRIS	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	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												
Diisoocytl 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												

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

CARGO	CHRIS	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	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(octylpheny)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	CHRIS	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	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 mixt	EDX												
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 ga	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 gall	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													

E-2-l

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
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	HTS												
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	HBA												
HYDROCARBON 5-9 (MOVED TO SUB-0, NON TABLE 151, 6/24/95)	HFN												
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													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	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										

STDVAP1

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

CARGO	CHRIS	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	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	OBB												
OIL, EDIBLE: Beechnut													
OIL, EDIBLE: Castor	OCA												
OIL, EDIBLE: Cocoa butter													
OIL, EDIBLE: Coconut	OCC	0.95											

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
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													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
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											
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												
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

E-2-9

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
OIL, MISC: Whale													
OIL, MISC: White (mineral)													
OIL, MISC: Wood													
alpha-Olefins (C13 - C18)	OAM												
Olefins (C13 and above, all isomers)		0.72											
Oleic acid	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	0.83	1		7.88	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
Pentaethylene Glycol													
Pentaethylenehexamine	PEP												
Pentane (all isomers)	PTY	0.63	5	72.090	2.48	21.00	16.200	1.296	-0.296	0.076	0.222	2.919	1.420
PENTANE (iso-)	IPT	0.62	5		2.48	27.00	16.200	1.667	-0.667	0.076	0.264	3.467	1.540
PENTANE (n-)	PTA	0.63	1		2.50	20.44	16.200	1.262	-0.262	0.076	0.220	2.893	1.409
Pentanoic acid													
Pentene (all isomers)	PTX	0.64	1		2.40	24.90	16.200	1.537	-0.537	0.076	0.240	3.152	1.498
PENTENE (1-)	PTE	0.64	1		2.40	24.90	16.200	1.537	-0.537	0.076	0.240	3.152	1.498
Petrolatum	PTL												
1-Phenyl-1-Xylyl Ethane	PXE												
Phosphosulfurized Bicyclic Terpene													
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES													
Pinene	PIN	0.86	1		4.70	0.35	16.200	0.022	0.978	0.076	0.082	1.080	1.007
Polyalkenyl Succinic Anhydride Amine													
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtur	PPX												
Polyalkylene Oxide Polyol	PAO	1.04											
Polamine, Amide mixture													
Polybutadiene, Hydroxyl terminated													
Polybutene	PLB	0.91	1		79.30	0.01	16.200	0.001	0.999	0.076	0.080	1.048	1.000
Polydimethylsiloxane		1.04											
Polyethylene Glycol		1.04											
Polyethylene Glycol Dimethyl Ether													
Polyglycerol													
Polyisobutylene, SEE POLYBUTENE													
Polymerized Esters													
Poly(20)oxyethylene Sorbitan Monooleate	PSM												
Polypropylene	PLP												
Polypropylene Glycol	PGC	1.01	1		1.00	0.10	16.200	0.006	0.994	0.076	0.076	1.000	1.002
Polypropylene Glycol Methyl Ether	PGM	0.92	1		3.11	0.80	16.200	0.049	0.951	0.076	0.084	1.104	1.016
Polysiloxane													
Polystyrene Diakyl Maleate													

E-2-2

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	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
Triaryphosphate													
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

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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	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													
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)	TDN	0.85	1		6.91	0.01	16.200	0.001	0.999	0.076	0.076	1.004	1.000
1-Tridecene	TDC	0.77	1		6.29	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
Tridecylbenzene	TRB												
Triethylbenzene	TEB	0.86	1		5.60	0.02	16.200	0.001	0.999	0.076	0.077	1.006	1.000
Triethylene Glycol	TEG	1.12	1		5.17	0.01	16.200	0.001	0.999	0.076	0.076	1.003	1.000
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													
Triisopropanolamine	TIP	1.02	8	191.270	6.60								
Trimethylbenzenes (all isomers)	TRE	0.89	1		4.20	0.14	16.200	0.009	0.991	0.076	0.078	1.028	1.003
TRIMETHYL BENZENE (1,2,5-)	TMB	0.89	1		4.14	0.14	16.200	0.009	0.991	0.076	0.078	1.027	1.003
TRIMETHYL BENZENE (1,2,3-)	TMD	0.89	1		4.14	0.14	16.200	0.009	0.991	0.076	0.078	1.027	1.003
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TME	0.89	1		4.14	0.14	16.200	0.009	0.991	0.076	0.078	1.027	1.003
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	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-fumerate 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.													

STDVAP1

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

CARGO	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
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-)	XLM	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	CHRIS	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	VAPOR-AIR MIX GROWTH RATE VGR (9)
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										

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS ***	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)	(FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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 MOR	BHA	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

E-3-a

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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	DTI											
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

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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													

E-3-c

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS ***	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	(FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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%	DDA													
3-PENTENENITRILE	PNT	(												
AEROTHENE TT (1,1,1-TRICHLOROETHANE)														
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

E-3-e

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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, ALKYLBENZENE 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 HYDPGS												
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											

III-3-5

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
SODIUM SULFIDE (SOLID IN WATER)	SDS											
STYRENE	STY	5,000	5040	5199	29192	1.635	*********	82.3	*********	0.0	82.3	0.046	1.68	OK
STYRENE CRUDE	STX	5,000	5040	5199	29192	1.635	*********	82.3	*********	0.0	82.3	0.046	1.68	OK
STYRENE TAR	STT													
TETRAMETHYLBENZENE (1,2,3,5-)	TTB	5,000	5014	5083	28539	1.635	*********	81.6	*********	0.0	81.6	0.044	1.68	OK
TOLUIDINE (o-)	TLI	5,000	5001	5005	28102	1.635	*********	81.3	*********	0.0	81.3	0.043	1.68	OK
TRICHLOROBENZENE (1,2,4-)	TCB	5,000	5003	5027	28226	1.635	*********	81.3	*********	0.0	81.3	0.043	1.68	OK
TRIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N														
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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
46 CFR SUBCHAPTER D, TABLE 30.25-1	***											
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 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	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													

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	(FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
Butyl Acetate (iso-, n-)	***											
BUTYL ACETATE (N-)	BAX	5,000	5060	5334	29947	1.635	*********	82.8	*********	0.0	82.8	0.049	1.68	OK
Butyl Acetate (sec-)	BCN	5,000	5080	5443	30562	1.665	*********	83.4	*********	0.0	83.4	0.051	1.72	OK
Butyl alcohol (iso-, n-, sec-, tert-)	BTA	5,000	5150	5822	32686	1.665	*********	85.3	*********	0.0	85.3	0.058	1.72	OK
BUTYL ALCOHOL (ISO-)		5,000	5090	5311	29822	1.635	*********	83.8	*********	0.0	83.8	0.048	1.68	OK
BUTYL ALCOHOL (N-)	IAL	5,000	5090	5311	29822	1.635	*********	83.8	*********	0.0	83.8	0.048	1.68	OK
BUTYL ALCOHOL (SEC-)	BAN	5,000	5050	5173	29046	1.635	*********	82.6	*********	0.0	82.6	0.046	1.68	OK
BUTYL ALCOHOL (TERT-)	BAS	5,000	5130	5449	30597	1.665	*********	85.0	*********	0.0	85.0	0.051	1.72	OK
Butyl Benzyl Phthalate	BAT	5,000	5280	5966	33495	1.665	*********	89.7	*********	0.0	89.7	0.061	1.73	OK
Butylene	BPH	5,000	5001	5016	28164	1.635	*********	81.3	*********	0.0	81.3	0.043	1.68	OK
Butylene Glycol	BTN													
1,3-Butylene Glycol, SEE BUTYLENE GLYCOL	BUG													
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	5010	5073	28484	1.635	*********	81.5	*********	0.0	81.5	0.044	1.68	OK
Butyrolactone (gamma)	BLA													
Calcium Alkylphenate														
Calcium Alkyl Salicylate														
Calcium Amino Nonyl Phenolate														
Calcium Carboxylate														
Caprolactam solutions	CLS	5,000	5005	5027	28227	1.635	*********	81.4	*********	0.0	81.4	0.043	1.68	OK
Carbon black base														
Cetyl alcohol (HEXADECANOL) SEE ALCOHOLS (C13 AND ABOVE)														
Cetyl-Stearal alcohol														
Cleaning spirit (unleaded)														
Coal tar	COR													
Cumene	CUM	5,000	5060	5352	30047	1.665	*********	82.7	*********	0.0	82.7	0.049	1.71	OK
Cycloaliphatic resins														
Cyclohexane	CHX	5,000	5450	6736	37823	1.695	*********	94.5	*********	0.0	94.5	0.076	1.77	OK
Cyclohexanol	CHN	5,000	5015	5072	28475	1.635	*********	81.6	*********	0.0	81.6	0.044	1.68	OK
1,3-Cyclopentadiene dimer (molten)	CPD	5,000	5025	5161	28976	1.635	*********	81.8	*********	0.0	81.8	0.046	1.68	OK
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)														
Cymene (para-)	CMP	5,000	5011	5072	28479	1.635	*********	81.5	*********	0.0	81.5	0.044	1.68	OK
Decahydronaphthalene	DHN	5,000	5010	5068	28454	1.635	*********	81.5	*********	0.0	81.5	0.044	1.68	OK
Decaldehyde (iso-)	IDA	5,000	5001	5007	28114	1.635	*********	81.3	*********	0.0	81.3	0.043	1.68	OK
Decaldehyde (n-)	DAL													
Decane	DDC													
Decene	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	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
Decyl alcohol (all isomers) (DECANOL)	DAX	5,000	5001	5008	28116	1.635	*********	*********	0.0	81.3	0.043	1.68	OK
DECYL ALCOHOL (iso-)	ISA	5,000	5001	5008	28116	1.635	*********	*********	0.0	81.3	0.043	1.68	OK
DECYL ALCOHOL (n-)	DAN	5,000	5001	5008	28116	1.635	*********	*********	0.0	81.3	0.043	1.68	OK
Decylbenzene (n-)	DBZ	5,000	5001	5011	28135	1.635	*********	*********	0.0	81.3	0.043	1.68	OK
Detergent Alkylate													
Diacetone alcohol	DAA	5,000	5010	5056	28389	1.635	*********	*********	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	*********	*********	0.0	81.8	0.046	1.68	OK
Diethylbenzene	DEB	5,000	5008	5053	28369	1.635	*********	*********	0.0	81.5	0.044	1.68	OK
Diethylene Glycol	DEG	5,000	5001	5005	28102	1.635	*********	*********	0.0	81.3	0.043	1.68	OK
Diethylene Glycol Butyl Ether	DME	5,000	5001	5008	28118	1.635	*********	*********	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	*********	*********	0.0	81.3	0.043	1.68	OK
Diethylene Glycol Methyl Ether	DGM	5,000	5003	5018	28172	1.635	*********	*********	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	*********	*********	0.0	81.4	0.044	1.68	OK
Diisobutylene	DBL	5,000	5200	6049	33962	1.665	*********	*********	0.0	86.6	0.062	1.73	OK
Diisobutyl Ketone	DIK	5,000	5016	5112	28700	1.635	*********	*********	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	*********	*********	0.0	81.3	0.043	1.68	OK
Diisopropyl Naphthalene	DII												
Dimethyl Adipate	DLA												
Dimethylbenzene													
Dimethyl Glutarate	DGT												

E-2-7

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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(octylpheny)amine														
Dioctyl 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)/														
Epoxylated 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														

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
Ethylene Glycol	EGL	5,000	5001	5003	28089	1.635	*********	81.3	*********	0.0	81.3	0.043	1.68	OK
Ethylene Glycol Acetate	EGO													
Ethylene Glycol Butyl Ether	EGM													
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EMA	5,000	5005	5040	28297	1.635	*********	81.4	*********	0.0	81.4	0.044	1.68	OK
Ethylene Glycol Ether Acetate														
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 mixt	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 ga	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 gall	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	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)		PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)		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
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														

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	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)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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	MTT	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												

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
NAPHTHA: Paraffinic	***											
NAPHTHA: Petroleum	PTN											
NAPHTHA: Solvent	NSV	5,000	5020	5097	28617	1.635	*********	81.8	*********	0.0	81.8	0.045	1.68	OK
NAPHTHA: Stoddard solvent	NSS	5,000	5020	5121	28754	1.635	*********	81.8	*********	0.0	81.8	0.045	1.68	OK
NAPHTHA: Varnish makers' and painters' (75%)	NVM	5,000	5019	5115	28720	1.635	*********	81.7	*********	0.0	81.7	0.045	1.68	OK
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt sol	NFS													
Naphthenic acid	NTI													
Nonane (all isomers)	NAX	5,000	5027	5168	29014	1.635	*********	81.9	*********	0.0	81.9	0.046	1.68	OK
NONANE	NAN	5,000	5027	5168	29014	1.635	*********	81.9	*********	0.0	81.9	0.046	1.68	OK
Nonanoic acid (all isomers)	NNA													
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	OBB													
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	CHRIS	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)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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 ACID	CFY											
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

E-3-4

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	(FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
OIL, MISC: Whale	***											
OIL, MISC: White (mineral)												
OIL, MISC: Wood												
alpha-Olefins (C13 - C18)	OAM											
Olefins (C13 and above, all isomers)												
Oleic acid	OLA											
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)												
Organic Amine 70, SEE AMINOETHYLDIETHANOLAMINE, AMINOETHYL-ETHANOLAMIN												
Palm Stearin	PMS											
n-Paraffins (C10 - C20)	PFN											
Pentadecanol, SEE SEE ALCOHOLS (C13 AND ABOVE)	PDC	5,000	5001	5012	28139	1.635	*********	81.3	*********	0.0	81.3	0.043	1.68	OK
Pentaethylene Glycol														
Pentaethylenehexamine	PEP													
Pentane (all isomers)	PTY	5,000	7100	12130	68103	1.890	*********	155.3	*********	0.0	155.3	0.240	2.13	OK
PENTANE (iso-)	IPT	5,000	7700	14337	80495	2.015	*********	181.5	*********	0.0	181.5	0.333	2.35	OK
PENTANE (n-)	PTA	5,000	7044	11980	67265	1.890	*********	152.9	*********	0.0	152.9	0.234	2.12	OK
Pentanoic acid														
Pentene (all isomers)	PTX	5,000	7490	13298	74660	1.930	*********	172.3	*********	0.0	172.3	0.287	2.22	OK
PENTENE (1-)	PTE	5,000	7490	13298	74660	1.930	*********	172.3	*********	0.0	172.3	0.287	2.22	OK
Petrolatum	PTL													
1-Phenyl-1-Xylyl Ethane	PXE													
Phosphosulfurized Bicyclic Terpene														
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES														
Pinene	PIN	5,000	5035	5232	29378	1.635	*********	82.1	*********	0.0	82.1	0.047	1.68	OK
Polyalkenyl Succinic Anhydride Amine														
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtur	PPX													
Polyalkylene Oxide Polyol	PAO													
Polamine, Amide mixture														
Polybutadiene, Hydroxyl terminated														
Polybutene	PLB	5,000	5001	5121	28750	1.635	*********	81.1	*********	0.0	81.1	0.045	1.68	OK
Polydimethylsiloxane														
Polyethylene Glycol														
Polyethylene Glycol Dimethyl Ether														
Polyglycerol														
Polyisobutylene, SEE POLYBUTENE														
Polymerized Esters														
Poly(20)oxyethylene Sorbitan Monooleate	PSM													
Polypropylene	PLP													
Polypropylene Glycol	PGC	5,000	5010	5010	28130	1.635	*********	81.6	*********	0.0	81.6	0.043	1.68	OK
Polypropylene Glycol Methyl Ether	PGM	5,000	5080	5338	29972	1.635	*********	83.4	*********	0.0	83.4	0.049	1.68	OK
Polysiloxane														
Polystyrene Diakyl Maleate														

E-3-2

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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-X

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	REQUIRED AIR EQUIVALENT (FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
Wool grease												
Xylenes (ortho-, meta-, para-)	XLX	5,000	5051	5258	29523	1.635	*********	82.6	*********	0.0	82.6	0.047	1.68	OK
XYLENE (M-)	XLM	5,000	5051	5258	29523	1.635	*********	82.6	*********	0.0	82.6	0.047	1.68	OK
XYLENE (O-)	XLO	5,000	5040	5203	29212	1.635	*********	82.3	*********	0.0	82.3	0.046	1.68	OK
XYLENE (P-)	XLP	5,000	5051	5258	29523	1.635	*********	82.6	*********	0.0	82.6	0.047	1.68	OK
XYLENOL	XYL	5,000	5010	5051	28360	1.635	*********	81.5	*********	0.0	81.5	0.044	1.68	OK
Zinc Dialkyldithiophosphate												

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

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

CARGO	CHRIS	MAX LIQUID TRANSF RATE (MLTR) Ql (10) (BBL/HR)	VAPOR-AIR MIX FLOW RATE Qv-a (11) (BBL/HR)	REQUIRED AIR EQUIVALENT Qa (12) (BBL/HR)	(FT^3/HR)	PRESS ACROSS PV VALVE PV (PSI)	PIPE SECT I: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotI (FT)	PIPE SECT II: LOSS FM REMOTE TK TO PV TOTAL LOSS HtotII (FT)	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
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	999											

STDVAP1

CONOCO, INC.

SUMMARY TABLE FOR "GASOLINE"

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

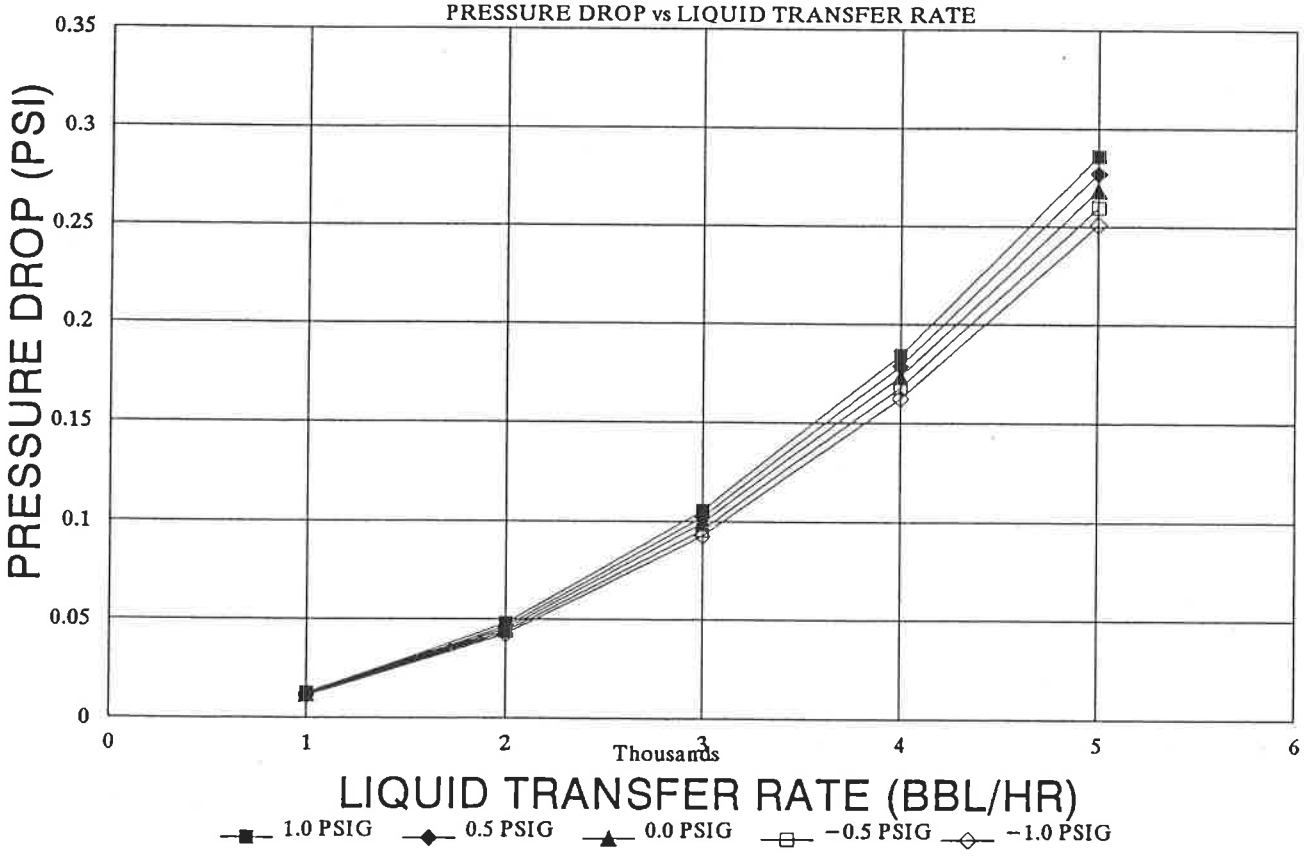
PRESSURE DROP VS LIQUID TRANSFER RATE
FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR CONNECTION
PRESSURE DROP IS BASED ON VAPOR–AIR MIX @ VGR * THE INDICATED LIQUID TRANSFER RATE
(TABULATED DATA IS FOR THE INDICATED PRESSURE AT THE SHORE CONNECTION)

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 <--- *

P	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:								
A	"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	0.215	0.215	0.215	0.215	0.215
	ABS VISCOS. VAP-AIR MIX	INPUT (SEE NOTE c)	u	CENTIPOISE	0.0190	0.0190	0.0190	0.0190	0.0190
E	"	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
I	"	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
	"	J +14.7	"	PSIA	15.7	15.7	15.7	15.7	15.7
L	"	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
	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.3474	0.3474	0.3474	0.3474	0.3474
P	ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
Q	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
^	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.245	0.978	2.201	3.912	6.113
Y	HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	4.279	17.116	38.512	68.465	106.977
Z	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		6.28E+04	1.26E+05	1.88E+05	2.51E+05	3.14E+05
CC	RELATIVE ROUGHNESS	P/N	e/D		0.00023	0.00023	0.00023	0.00023	0.00023
DD	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 <--- *

:P	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:								
A	"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	0.194	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
E	"	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
I	"	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
L	"	K*144	"	PSFA	2044.8	2044.8	2044.8	2044.8	2044.8
M	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
P	ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
Q	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
..	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.245	0.978	2.201	3.912	6.113
Y	HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	4.279	17.116	38.512	68.465	106.977
Z	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
CC	RELATIVE ROUGHNESS	P/N	e/D		0.000226	0.000226	0.000226	0.000226	0.000226
DD	MOODY DIAG FRICTION FACTOR	INPUT	f		0.02159	0.01918	0.01797	0.01737	0.01689
PP	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								
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
AA	HEAD LOSS: EXIT	W*(R^2/2*32.2)	HX	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
BB	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
EE	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
FF	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)	8.493	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
II	"	HH-14.7	"	PSIG	-0.49	-0.46	-0.40	-0.33	-0.24
JJ	(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
CARGO = "GASOLINE" VGR = 1.25
PRESSURE AT VESSEL VAPOR CONNECTION IS ASSUMED = -1.0 PSIG <--- *

P	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								
A	"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
E	"	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
I	"	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
L	"	K*144	"	PSFA	1972.8	1972.8	1972.8	1972.8	1972.8
M	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
P	ROUGHNESS OF PIPE	INPUT	e	FEET	0.00015	0.00015	0.00015	0.00015	0.00015
Q	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
--	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.245	0.978	2.201	3.912	6.113
Y	HEAD LOSS: BENDS	U*T*(R^2/2*32.2)	HB	FT PROD. (GAS)	4.279	17.116	38.512	68.465	106.977
Z	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
CC	RELATIVE ROUGHNESS	P/N	e/D		0.000226	0.000226	0.000226	0.000226	0.000226
DD	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								
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
V	NO. OF BENDS	INPUT	N		1.0E-11	1.0E-11	1.0E-11	1.0E-11	1.0E-11
W	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
A	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
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)	8.519	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
I	"	HH-14.7	"	PSIG	-0.99	-0.96	-0.91	-0.84	-0.75
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	0.0111	0.0424	0.0926	0.1624	0.2509

FOR TRANSFER RATE VS PRESSURE DROP

OTES:

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:
SGmix = { (N/2) * MWair } + { (N/2) * MWcargo} / (N * MWair) WHERE
N = TOTAL NO. MOLECULES PER UNIT VOLUME
MWair = MOLECULAR WEIGHT OF AIR
MWcargo = MOLECULAR WEIGHT OF CARGO VAPOR
SGmix = 0.5 * (MWair + MWcargo) / MWair
A CORRESPONDING RELATIONSHIP IN TERMS OF SPECIFIC GRAVITY IS:
SGmix = (SGair + SGcargo) / 2
FOR PRODUCTS OTHER THAN THOSE CITED ABOVE, THE SPECIFIC GRAVITY OF THE MIX CAN BE DETERMINED AS:
SGmix = Wv-a,115 / Wa,115 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 = Wsav = (Ws1 +Ws2)/2 (WITH Ws1 EVALUATED @ P1 AND Ws2 @ 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).

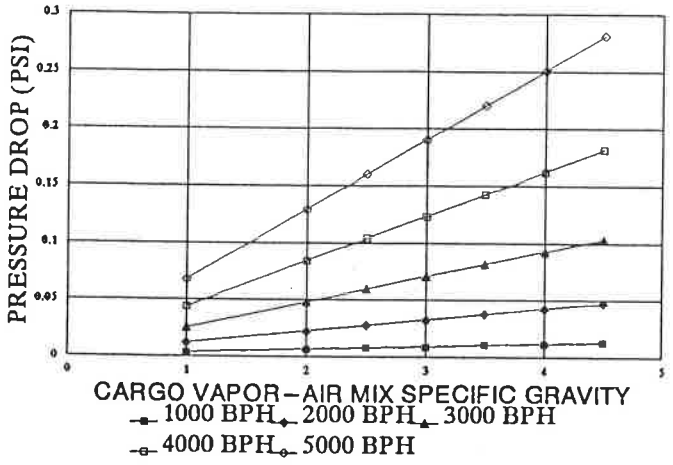
— "LENGTH" IS THE DISTANCE BETWEEN THE MOST REMOTE CARGO TANK VAPOR INLET AND THE VESSEL'S VAPOR CONNECTION, AND IS ESTIMATED CONSERVATIVELY HIGH.

BEND HEAD LOSS ASSUMES	QTY	LOSS COEFF.		QT	LOSS COEFF.
SECTION I:					
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

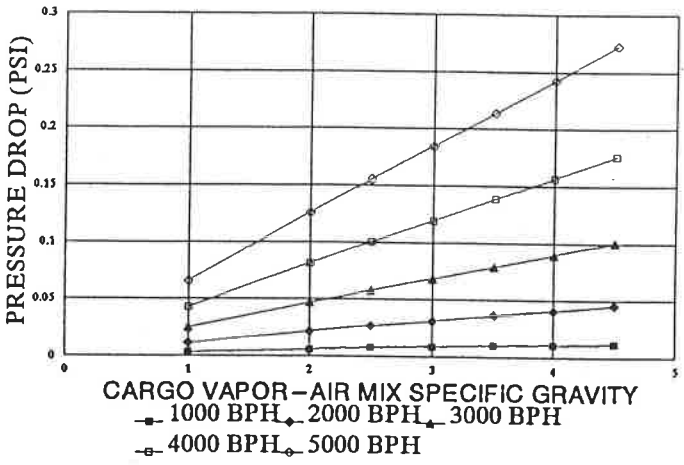
BASED ON FROM DARCY'S EQUATION:
P1-P2 = Ws * f * Leq * [V^2 / (2*G)] / D (ADJUSTED AS REQ'D FOR UNIT COMPATIBILITY)

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

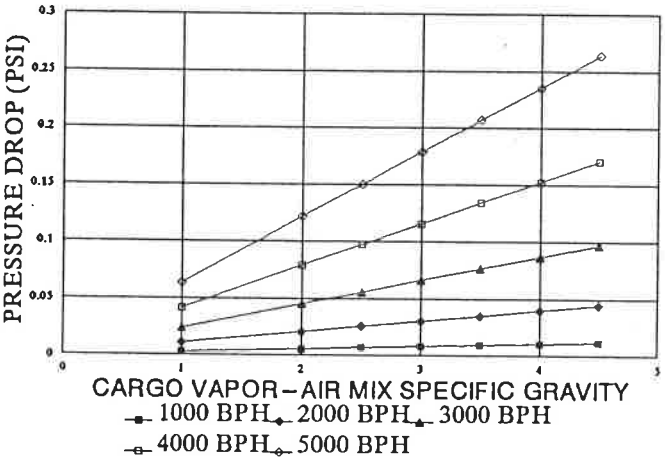
1.0 PSIG SHORE CONNECTION PRESSURE



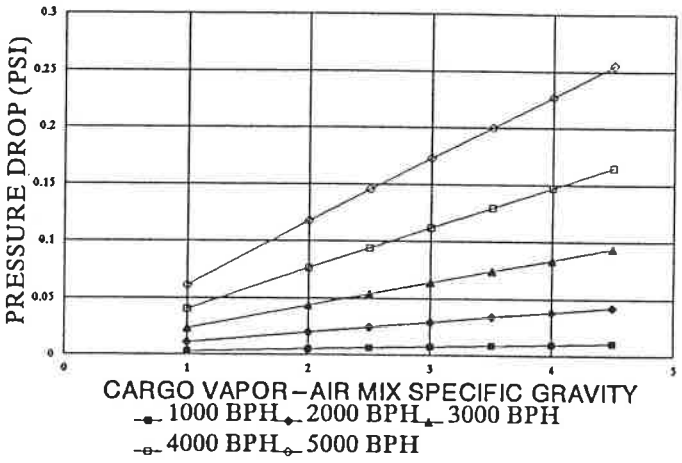
0.5 PSIG SHORE CONNECTION PRESSURE



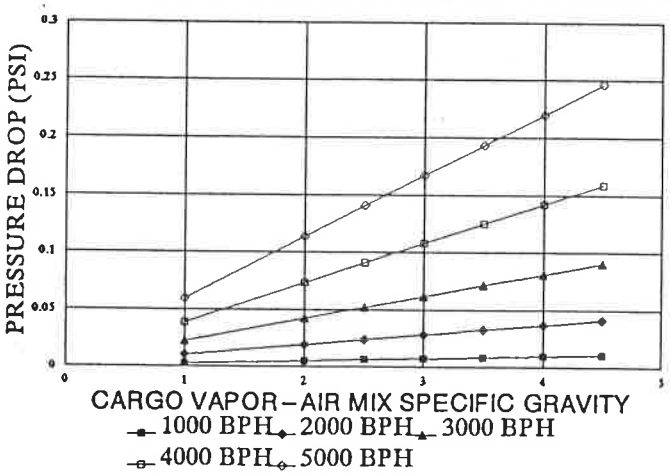
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



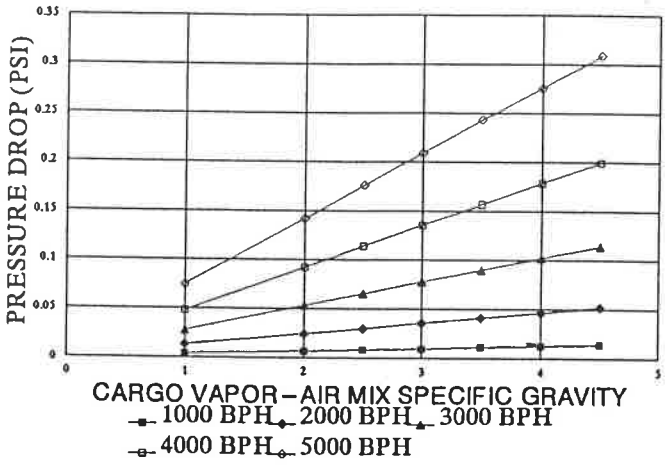
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

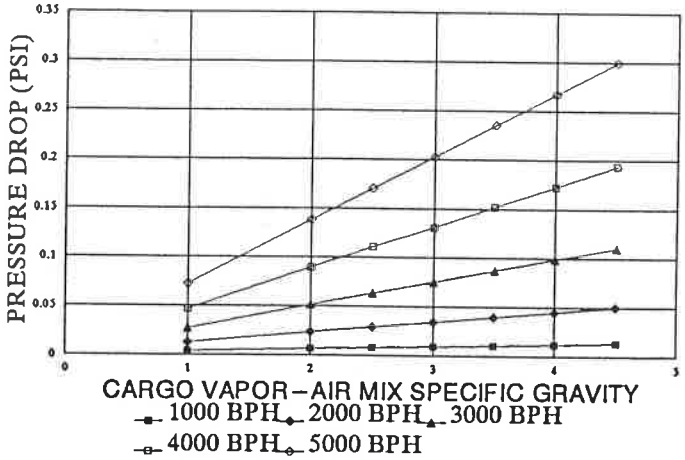
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

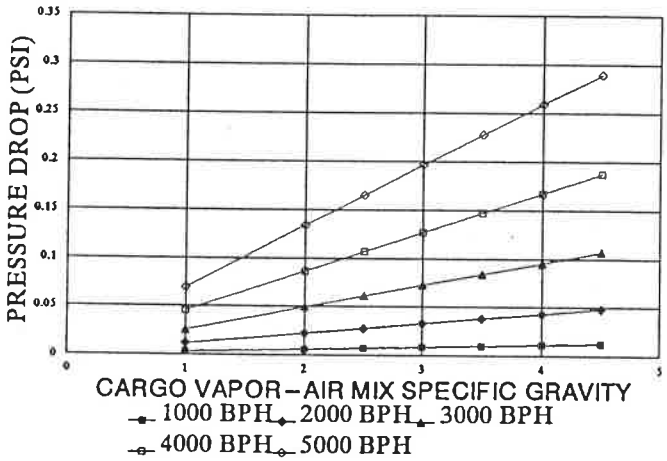
1.0 PSIG SHORE CONNECTION PRESSURE



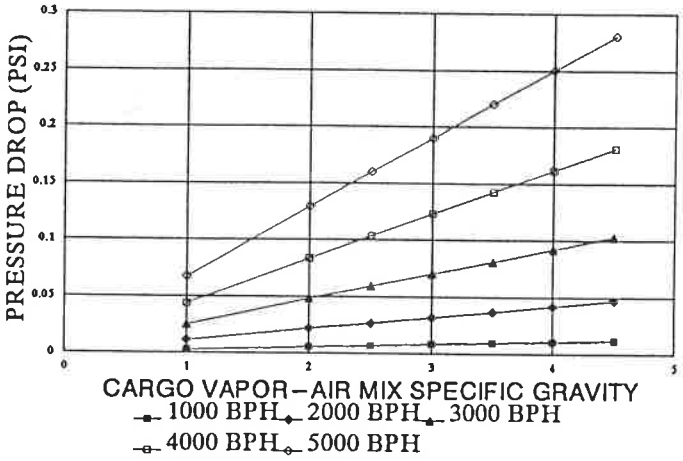
0.5 PSIG SHORE CONNECTION PRESSURE



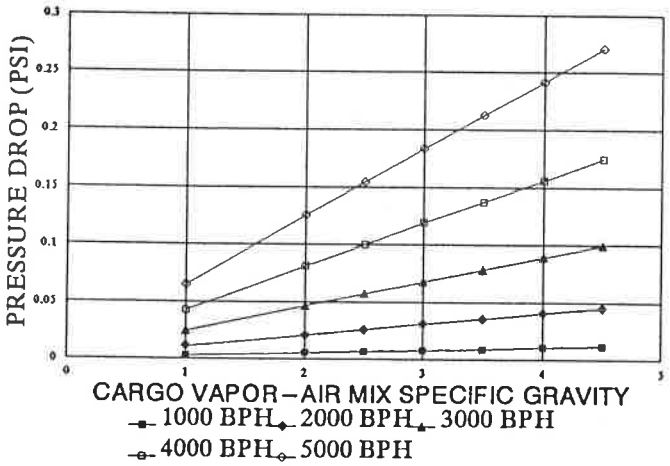
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



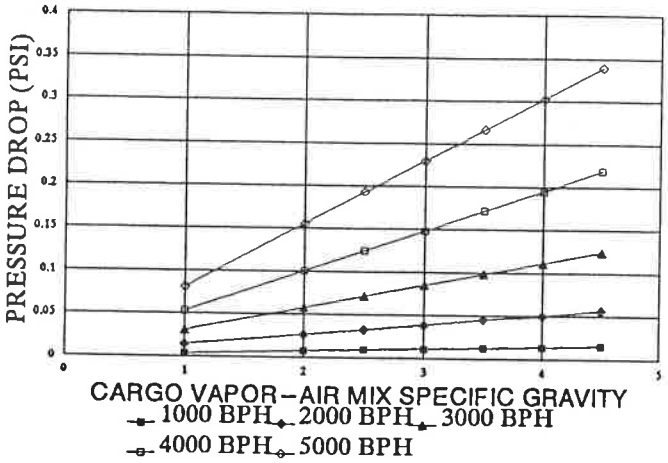
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

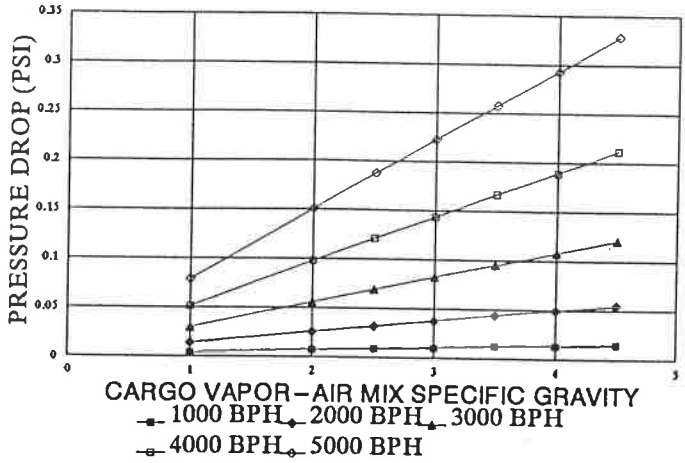
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

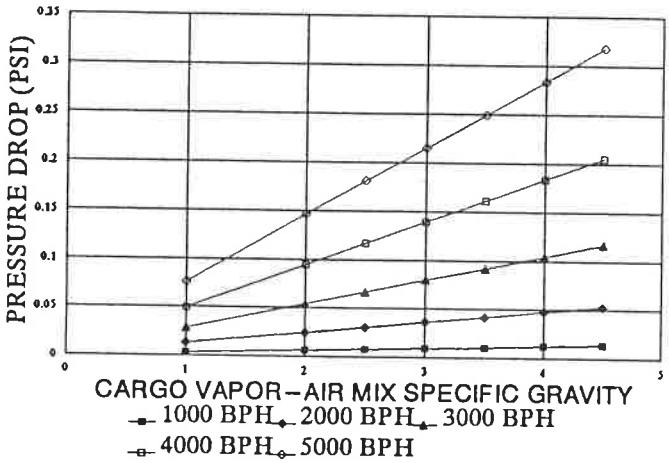
1.0 PSIG SHORE CONNECTION PRESSURE



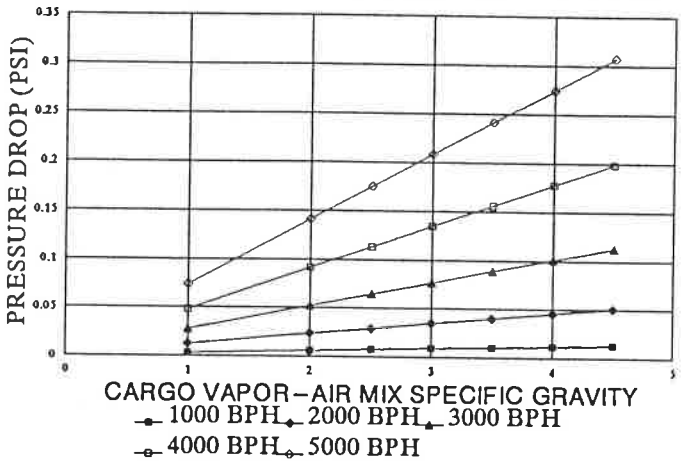
0.5 PSIG SHORE CONNECTION PRESSURE



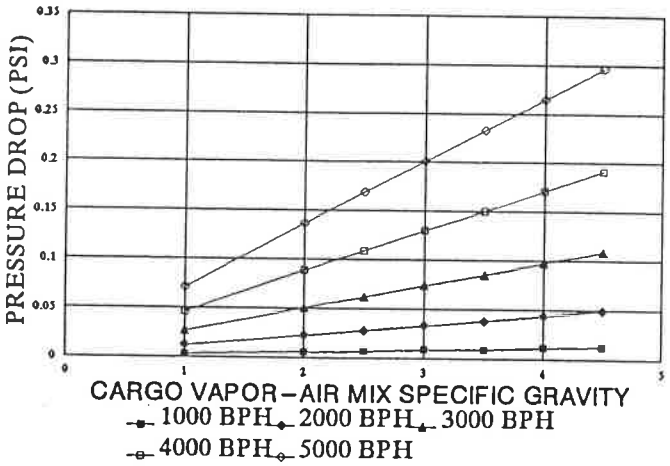
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



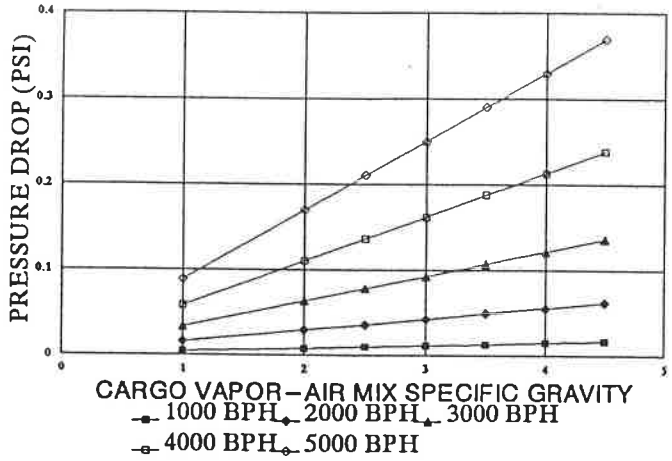
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

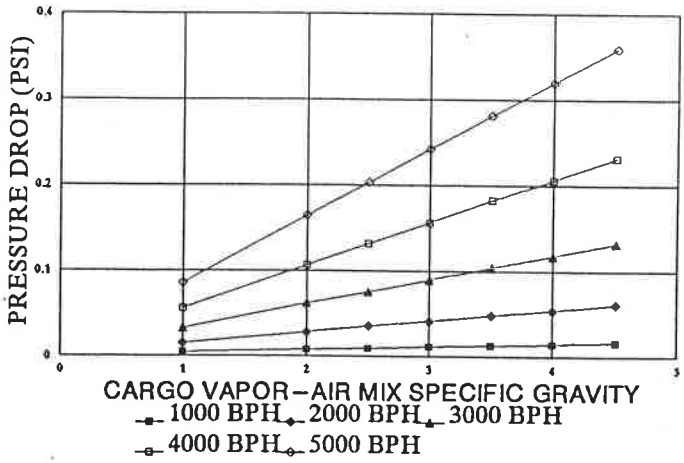
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

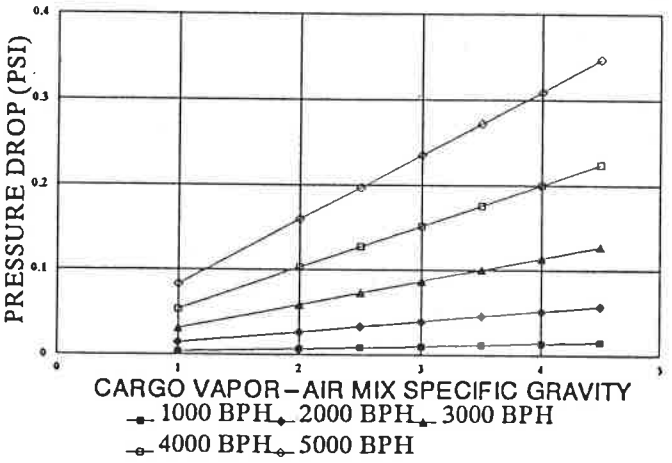
1.0 PSIG SHORE CONNECTION PRESSURE



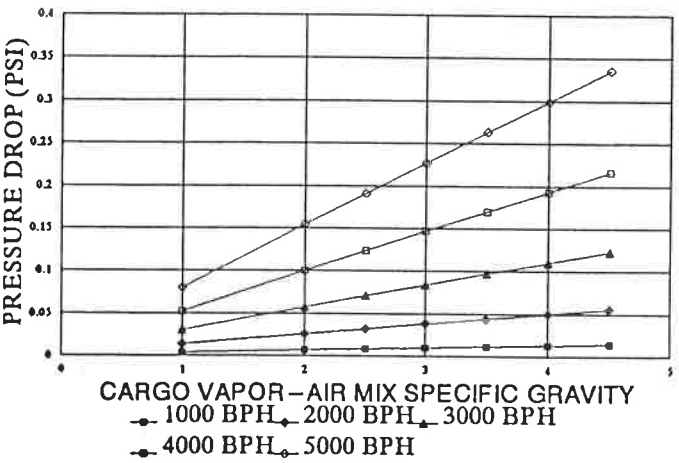
0.5 PSIG SHORE CONNECTION PRESSURE



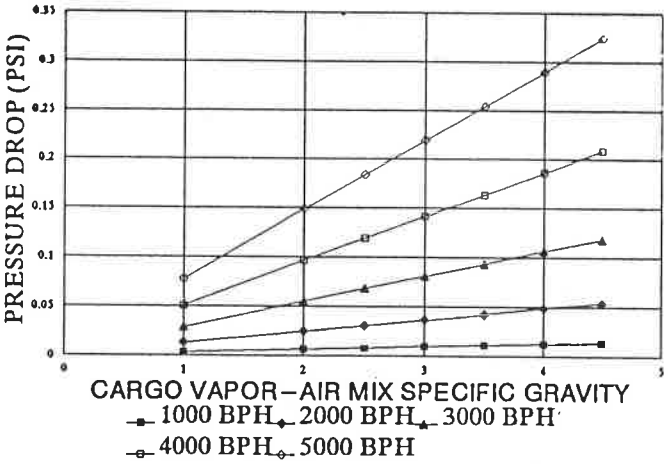
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



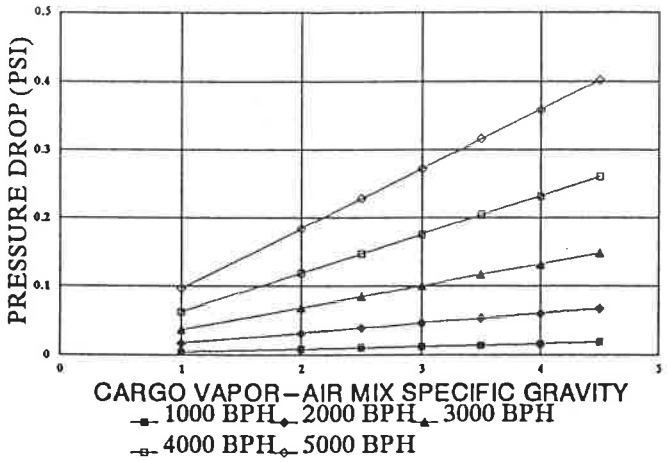
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

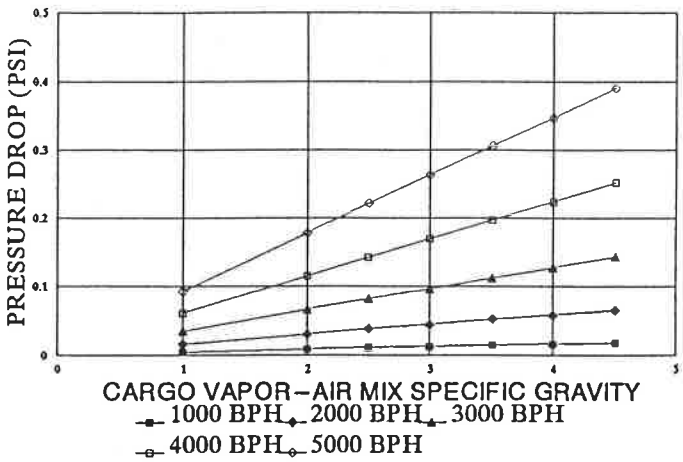
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

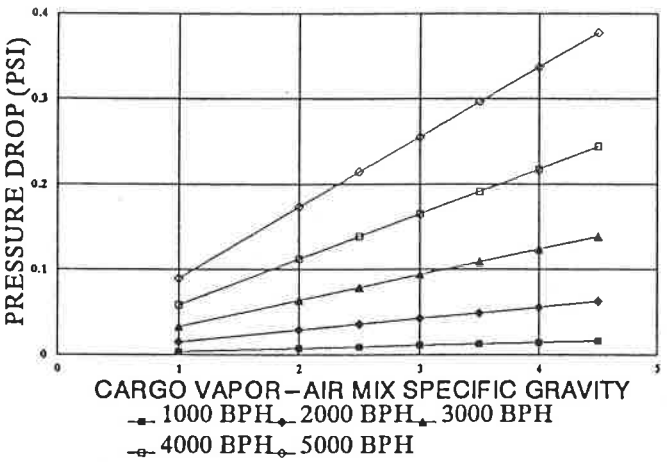
1.0 PSIG SHORE CONNECTION PRESSURE



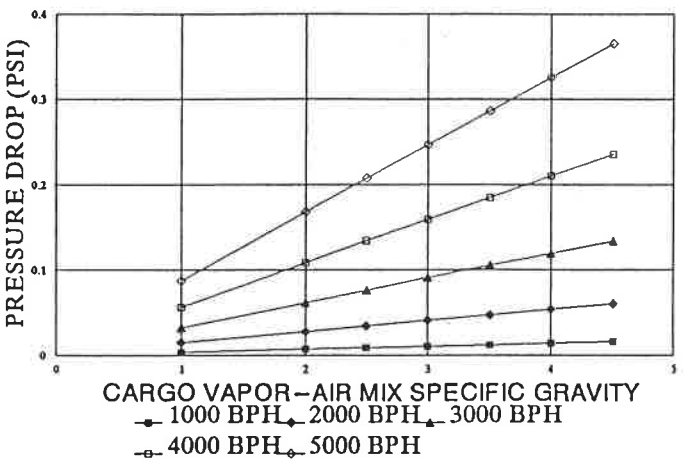
0.5 PSIG SHORE CONNECTION PRESSURE



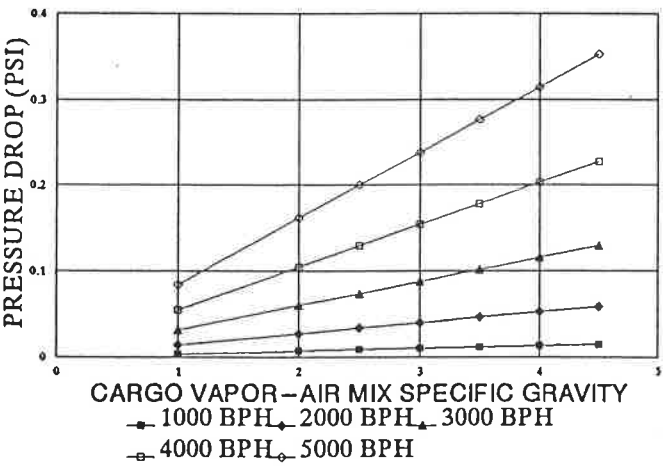
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



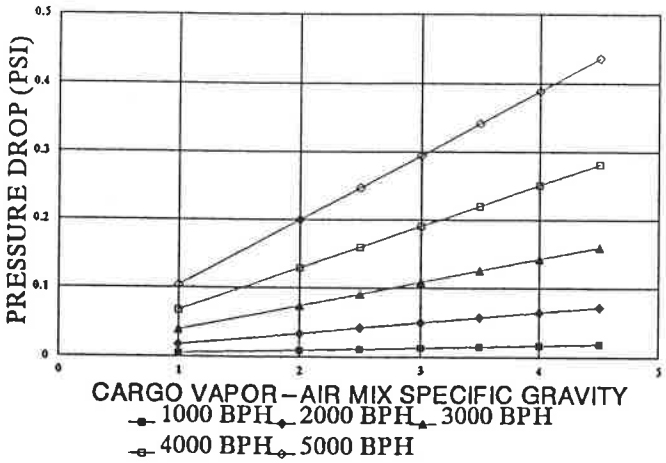
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

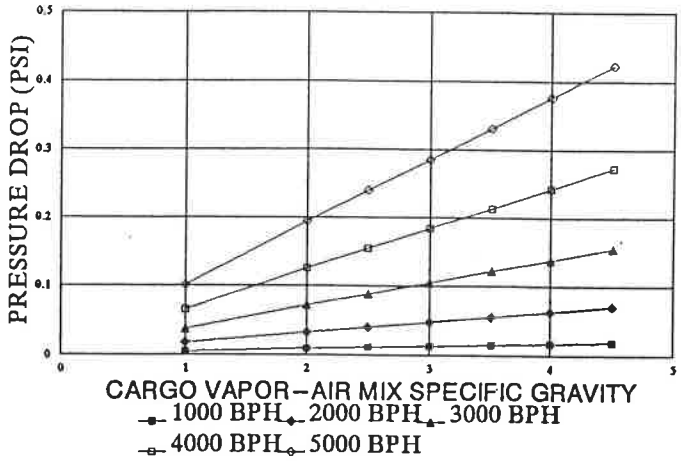
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

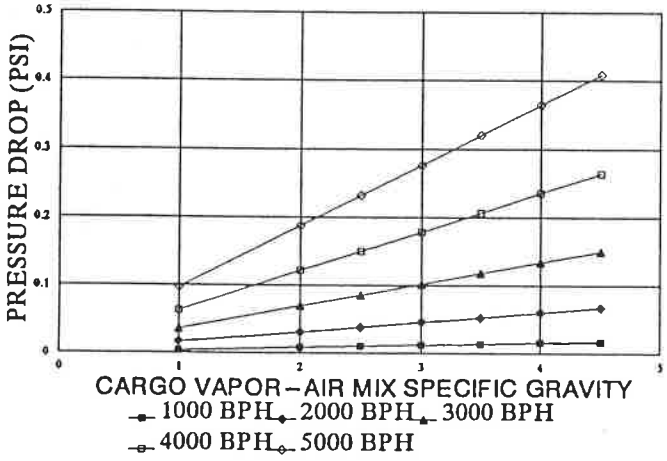
1.0 PSIG SHORE CONNECTION PRESSURE



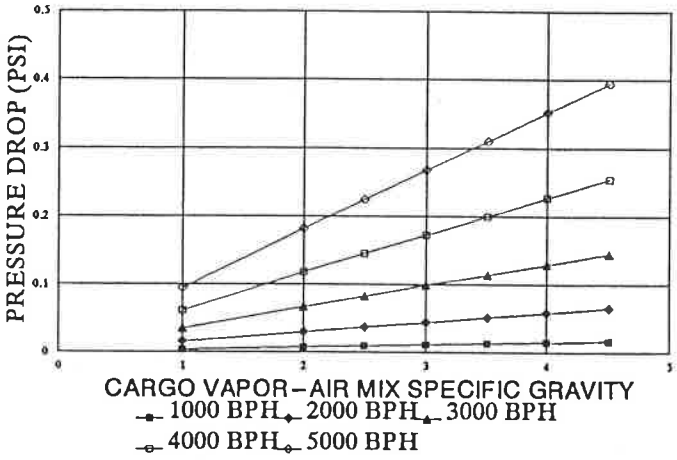
0.5 PSIG SHORE CONNECTION PRESSURE



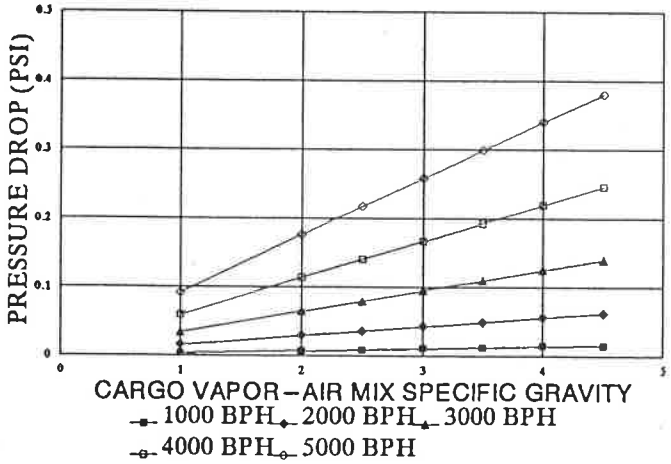
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



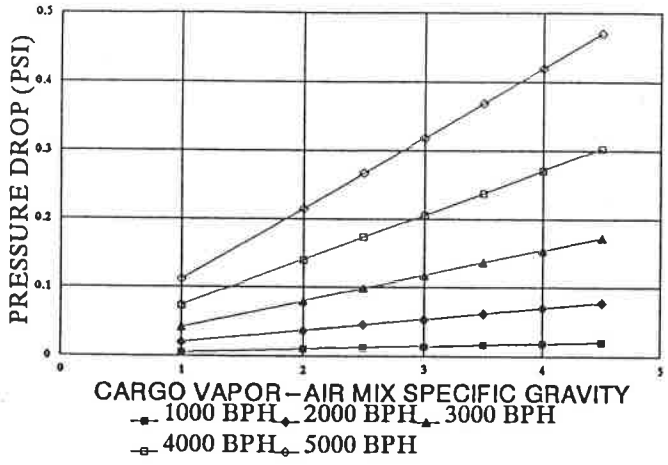
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

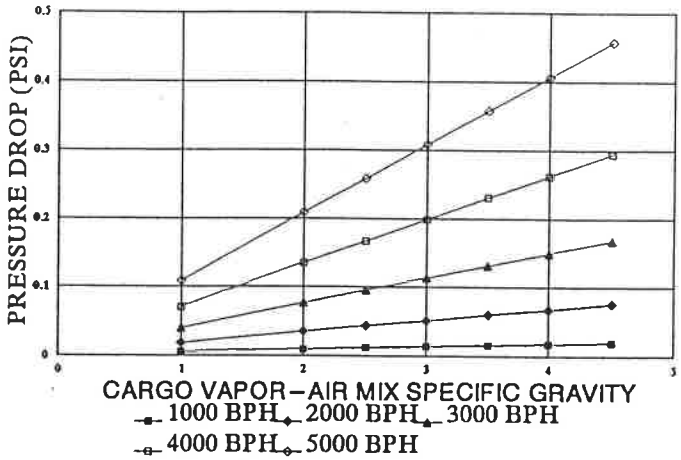
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

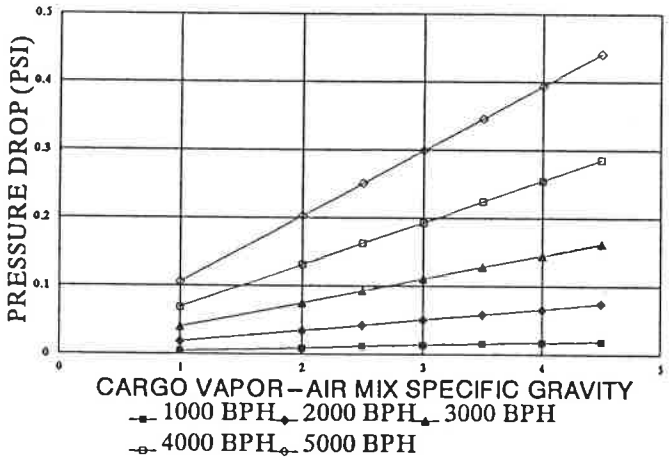
1.0 PSIG SHORE CONNECTION PRESSURE



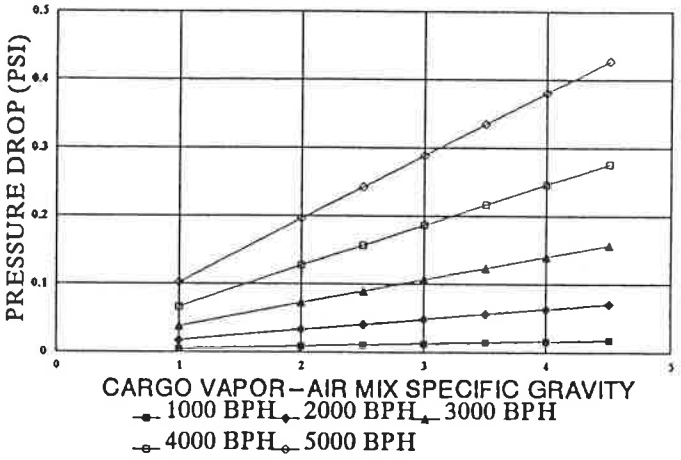
0.5 PSIG SHORE CONNECTION PRESSURE



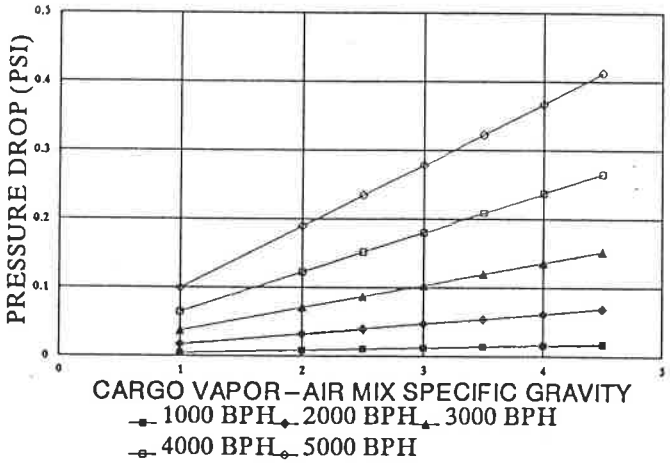
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



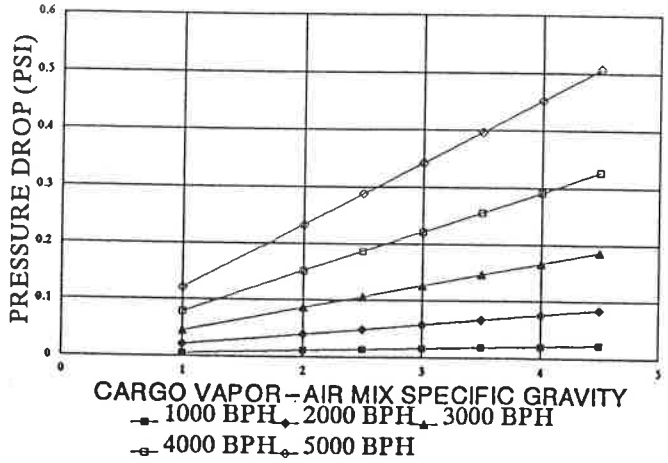
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

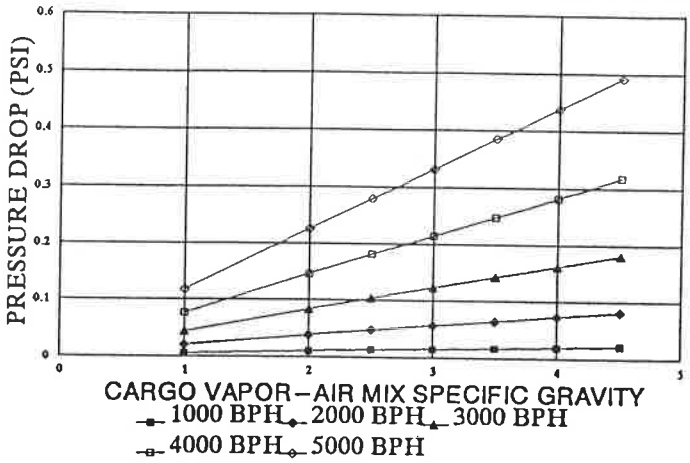
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

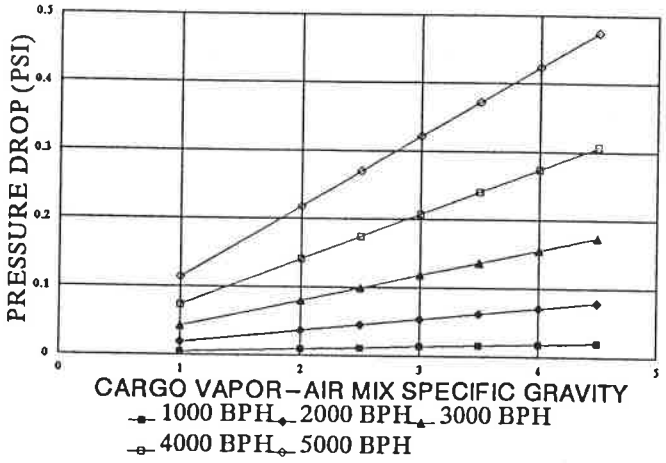
1.0 PSIG SHORE CONNECTION PRESSURE



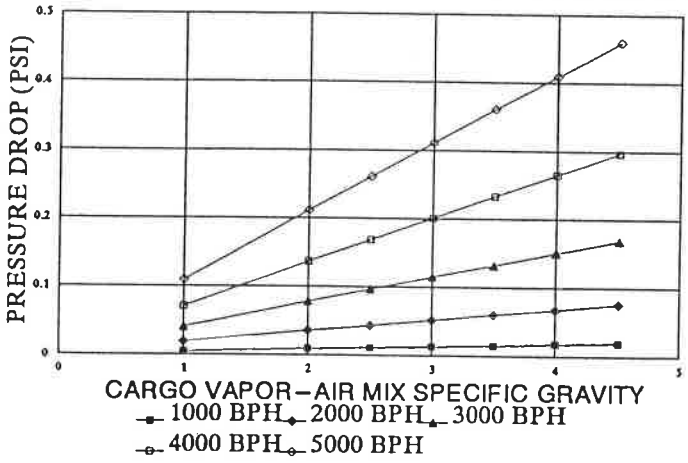
0.5 PSIG SHORE CONNECTION PRESSURE



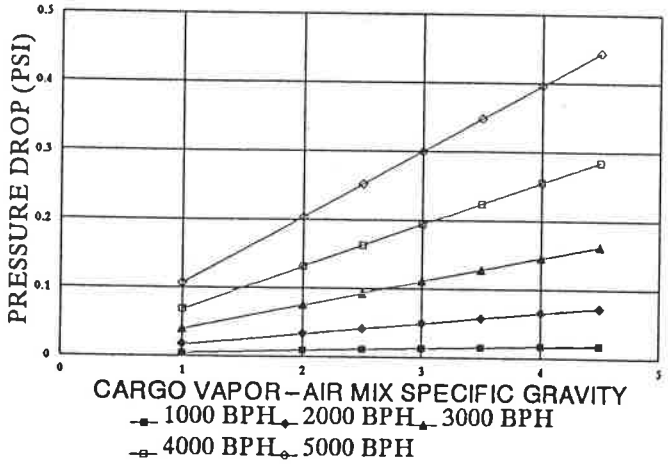
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



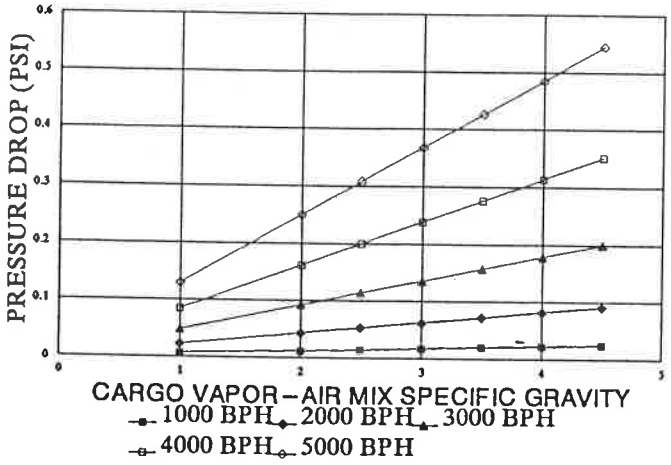
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

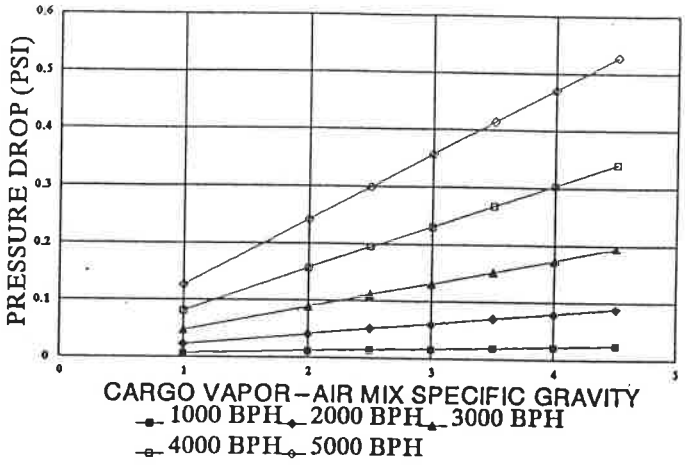
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

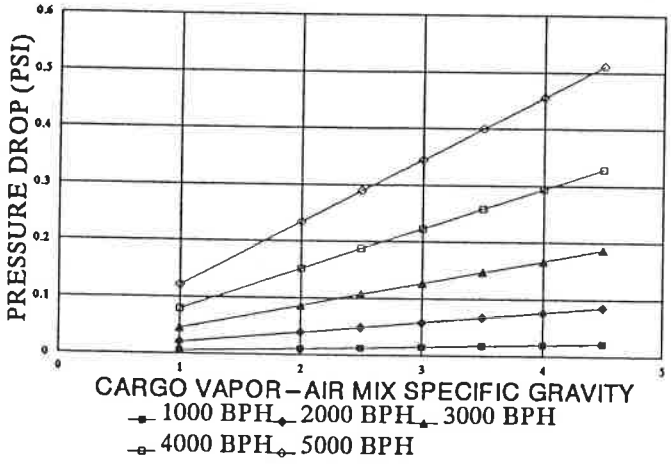
1.0 PSIG SHORE CONNECTION PRESSURE



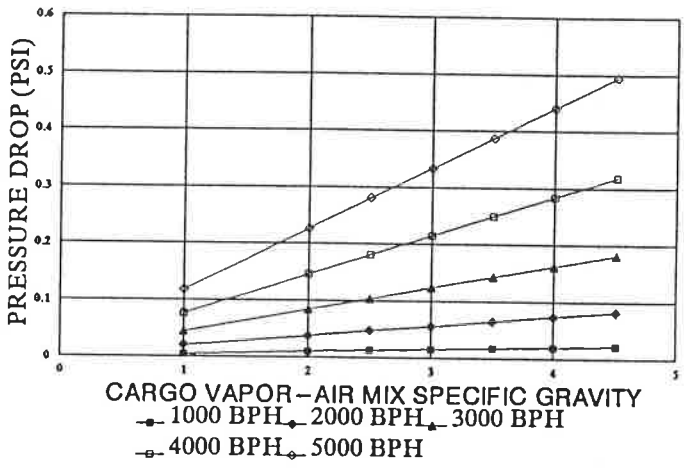
0.5 PSIG SHORE CONNECTION PRESSURE



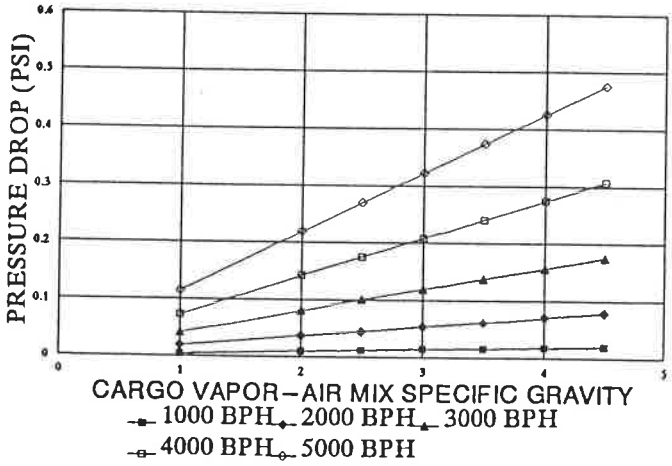
0.0 PSIG SHORE CONNECTION PRESSURE



–0.5 PSIG SHORE CONNECTION PRESSURE



–1.0 PSIG SHORE CONNECTION PRESSURE



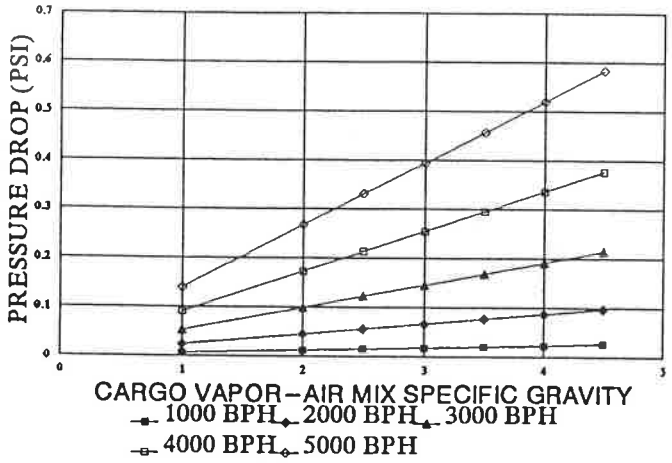
DIRECTIONS: FOR THE CARGO TO BE TRANSFER'D:

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.

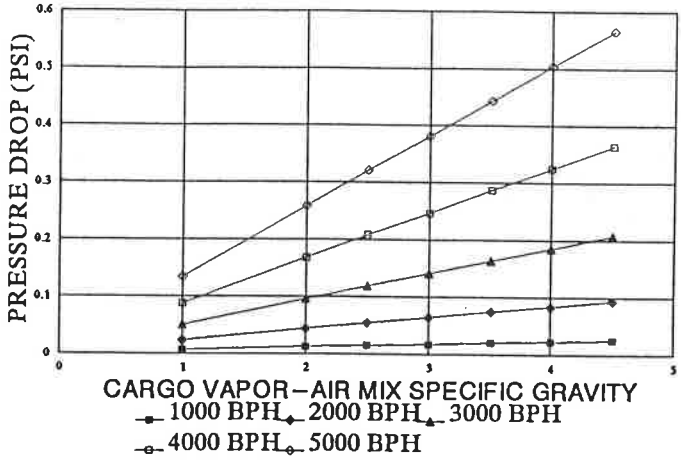
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

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

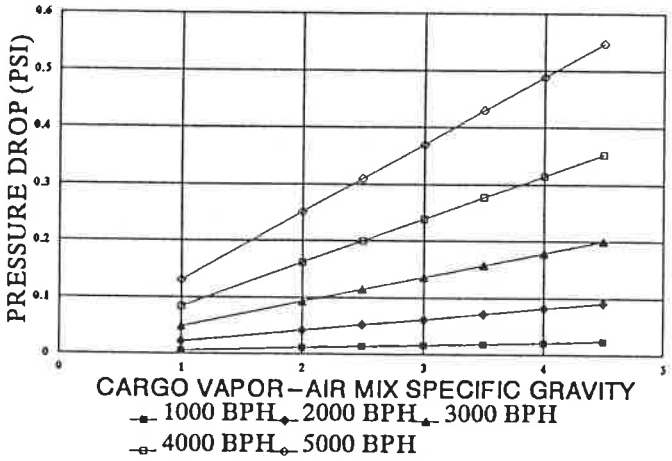
1.0 PSIG SHORE CONNECTION PRESSURE



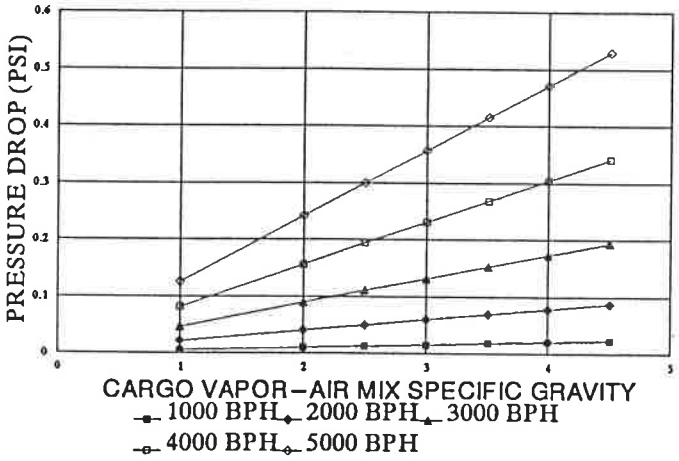
0.5 PSIG SHORE CONNECTION PRESSURE



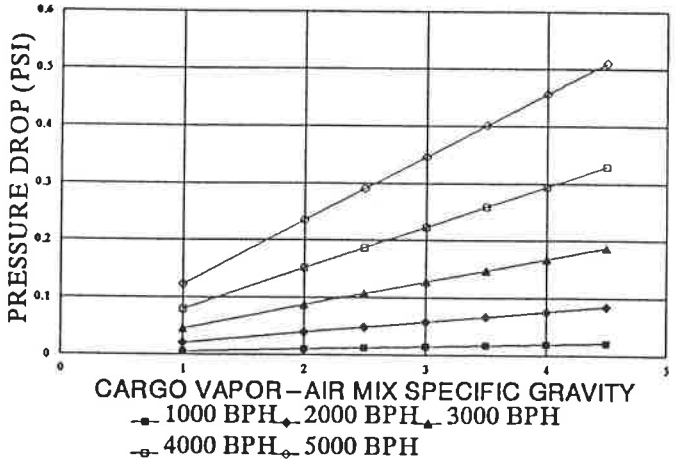
0.0 PSIG SHORE CONNECTION PRESSURE



–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 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.

CALCULATIONS FOR PRESSURE DROP FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR SHORE CONNECTION

TABLE IV: INPUT DATA & NOTES

MAX DESIGN WORKING PRESS	(MDWP)	> =	N/A	PSIG			
DESIGN TEMPERATURE	(T)		115	F			
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)		5000	BPH			
PRESSURE AT VESSEL VAPOR SHORE CONNECTION	(Ps/c)		1.00	PSIG --->	15.7	PSIA	
PIPING SECTION I:	NOM I.D.		8	IN ----->I.D.	7.981	IN	
	ROUGHNESS		0.00015	AREA	0.347	FT^2	

MOST REMOTE CARGO TANK OUTLET TO SHORE CONN: 230 FT

DISTANCE ENROUTE TO PV: 0.5

ENTRANCE LOSS (Ke)

		QTY	LOSS COEF	TOTAL
TEE (THRU RUN)		3	0.60	1.800
TEE (THRU BRANCH)		3	1.80	5.400
OTHER		0	0.75	0.000
TOTAL:		9	AVG:	0.972

BEND LOSS (Kb)

		QTY	LOSS COEFF	TOTAL
90 DEG EL L.R.		1	0.75	0.750
90 DEG EL		0	N/A	0.000
45 DEG EL L.R.		2	0.40	0.800

VALVE LOSS (Kv)

		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

EXIT LOSS (Kex): 0

PIPING SECTION II:

	NOM I.D.		N/A	IN ----->I.D.	0.000	IN	
	ROUGHNESS		0.00015	AREA	0.000	FT^2	

MOST REMOTE CARGO TANK OUTLET TO SHORE CONN: 0 FT

DISTANCE ENROUTE TO PV: 0

ENTRANCE LOSS (Ke)

		QTY	LOSS COEF	TOTAL
TEE (THRU RUN)		0	0.60	0.000
TEE (THRU BRANCH)		0	1.80	0.000
OTHER		0	0.75	0.000
TOTAL:		0	AVG:	0.000

BEND LOSS (Kb)

		QTY	LOSS COEFF	TOTAL
90 DEG EL L.R.		0	0.75	0.000
90 DEG EL		0	N/A	0.000
45 DEG EL L.R.		0	0.40	0.000

VALVE LOSS (Kv)

		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

EXIT LOSS (Kex): 0

CARGO VISCOSITY: 0.019 CP ----> 3.97E-07 LB SEC/FT^2

INCREMENTS FOR PERCENT OF MLTR:

1. 20.0% *
2. 40.0% *
3. 60.0% *
4. 80.0% *
5. 100.0% *
6. 100.0% *
7. 100.0% *

NOTES:

1. LIQUID SPECIFIC GRAVITY; MOLECULAR WEIGHT OF CARGO
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

	OBTAIN FROM REFERENCE SOURCE
SGv	(CARGO MW / AIR MW), OR FM REF. SOURCE
Pv,115	OBTAIN FROM REFERENCE SOURCE
Pt,115	EST'D TO BE SAME SHORE PRESS (Ps/c)
Vv,115	Pv,115 / Pt,115
Va,115	(Pt,115 - Pv,115) / Pt,115
Wa,115	$\frac{MWa * Ps/c}{10.72*(460+T)}$ MWa = MOLEC. WT. OF AIR = 28.97
Wv-a,115	[(SGv*Vv,115)+Va,115]*(0.0047*Ps/c)
VGR	ESTIMATED TO BE 1 + (0.25*Pv,115/12.5)
Ql	
Qv-a	Ql * VGR
Qa	Qv-a*(Wv-a,115/Wa,115)^.5

13. USCG VAP COLLECT'N SYS. CARGO CATEGORIES
    1. NO ADD'L VCS REQMNTS 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 REQMNTS CAN BE DETERMINED
14. VGR = 1.25 FOR GASOLINE, CRUDE OIL, AND BENZENE.
15. NF/NC = NON-FLAMMABLE/NON-COMBUSTIBLE

PRESDRP1

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/HR)	100.0 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
CAMPHOR 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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (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)						

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (BBL/ HR)
SODIUM HYPOCHLORITE SOL'N (15% OR LESS)	SHP					
SODIUM SULFIDE, HYDROSULFIDE SOLUTIONS (H2S 15 PPM OR LESS)	SSH					
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	0.003	0.013	0.027	0.047	0.073
SULFURIC ACID	SFA	0.003	0.012	0.025	0.044	0.068
SULFURIC ACID, SPENT	SAC	0.003	0.012	0.025	0.044	0.067
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORIDE)	TEC					
TETRAETHYLENEPENTAMINE	TTP	0.003	0.012	0.025	0.044	0.067
TETRAHYDROFURAN	THF	0.005	0.018	0.040	0.070	0.108
1,1,2-TRICHLOROETHANE (VINYL TRICHLORIDE)	TCM	0.004	0.015	0.032	0.055	0.086
TRICHLOROETHANE (SEE 1,1,2-TRICHLOROETHANE)						
TRICHLOROETHYLENE	TCL	0.006	0.022	0.049	0.085	0.131
1,2,3-TRICHLOROPROPANE	TCN	0.003	0.012	0.026	0.046	0.071
TRIETHANOLAMINE	TEA	0.003	0.012	0.025	0.044	0.068
TRIETHYLAMINE	TEN	0.005	0.017	0.038	0.066	0.101
TRIETHYLENETETRAMINE	TET	0.003	0.012	0.025	0.044	0.068
UREA, AMMONIUM NITRATE SOL'N (CONTAINING MORE THAN 2% NH3)	UAS					
VALERALDEHYDE (iso-, n-)		0.006	0.022	0.048	0.084	0.129
VALERALDEHYDE (iso-)	IVA	0.006	0.022	0.048	0.084	0.129
VALERALDEHYDE (n-)	VAL	0.003	0.012	0.025	0.044	0.068
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VBL					
VINYL ACETATE	VAM	0.006	0.024	0.052	0.090	0.139
VINYLTOLUENE	VNT	0.003	0.012	0.026	0.045	0.069

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (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						

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (BBL/ HR)
METHYL STYRENE	MIA					
METHYL STYRENE, INDENES, ALKYLBENZENE MIXTURES	MCY	0.005	0.017	0.037	0.064	0.099
METHYLCYCLOHEXANE						
METHYLHEXANE (SAME AS HEPTANE)	MEA	0.003	0.012	0.025	0.044	0.068
MONOETHANOLAMINE		0.003	0.012	0.026	0.045	0.069
MONOISOPROPANOLAMINE	NTM	0.003	0.012	0.025	0.044	0.068
NAPHTHALENE (MOLTEN)	NEA	0.003	0.012	0.025	0.044	0.068
NEODECANOIC ACID	NAA					
NITRILOTRIACETIC ACID	NTP					
NITROPHENOL (MOLTEN)	NNM	0.004	0.014	0.030	0.052	0.080
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NIT	0.003	0.012	0.025	0.044	0.068
NITROTOLUENE (o-,p-)	PDH	0.011	0.041	0.091	0.159	0.247
PARALDEHYDE	PGS					
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXIE)	PAD	0.009	0.033	0.072	0.127	0.195
PROPIONALDEHYDE	PAH	0.003	0.012	0.026	0.045	0.069
PROPIONIC ANHYDRIDE	PCN	0.003	0.013	0.028	0.049	0.075
PROPIONITRILE	PRA	0.009	0.033	0.073	0.127	0.196
PROPYLAMINE (n-)		0.003	0.011	0.024	0.041	0.063
PROPYLBENZENE	GPY	0.007	0.026	0.058	0.101	0.155
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	SWR					
PYROLYSIS RESIDUAL FUELS	SDS					
SEWAGE, RAW	STY	0.003	0.013	0.027	0.047	0.073
SODIUM SULFIDE (SOLID IN WATER)	STX	0.003	0.013	0.027	0.047	0.073
STYRENE	STT					
STYRENE CRUDE	TTB	0.003	0.012	0.026	0.045	0.070
STYRENE TAR	TLI	0.003	0.012	0.025	0.044	0.068
TETRAMETHYLBENZENE (1,2,3,5-)	TCB	0.003	0.012	0.026	0.044	0.068
TOLUIDINE (o-)	TPE					
TRICHLOROBENZENE (1,2,4-)	UDA	0.003	0.012	0.025	0.044	0.067
TRIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N	HFN	0.006	0.022	0.048	0.084	0.129
TRIPHENYLBORANE						
UNDECANOIC ACID						
HYDROCARBON 5-9						

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (BBL/ HR)
46 CFR SUBCHAPTER D, TABLE 30.25-1						
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, Polyalky	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					

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (BBL/ HR)
Dimethylbenzene	DGT					
Dimethyl Glutarate	DTL	0.003	0.012	0.025	0.044	0.067
Dimethyl Phthalate	DMP					
Dimethyl Polysiloxane	DDI					
2,2-Dimethylpropane-1,3-diol	DSE					
Dimethyl Succinate	DIF	0.003	0.012	0.025	0.044	0.068
Dinonyl Phthalate	DOP	0.003	0.012	0.025	0.044	0.067
Di(octylpheny)amine	DPN	0.003	0.012	0.026	0.045	0.069
Dioctyl Phthalate	DIL	0.003	0.012	0.025	0.044	0.068
Dipentene	DDO	0.003	0.012	0.025	0.044	0.068
Diphenyl	DPE	0.003	0.012	0.025	0.044	0.068
Diphenyl, Diphenyl Ether mixture	DOB					
Diphenyl Ether	DPG	0.003	0.012	0.026	0.045	0.069
Diphenyl Ether, Biphenyl Ether mixture	DGY					
Dipropylene Glycol	DPY					
Dipropylene Glycol Dibenzoate	DFF	0.004	0.017	0.036	0.063	0.097
Dipropylene Glycol Methyl Ether	DSR	0.004	0.017	0.036	0.063	0.097
DISTILLATES: Flashed feed stocks	DTP					
DISTILLATES: Straight run	DUP					
Ditridecyl Phthalate	DOC					
Diundecyl Phthalate	DDN					
Dodecane (all isomers)	DOZ	0.003	0.012	0.025	0.044	0.068
Dodecanol	DOD	0.003	0.012	0.025	0.044	0.068
Dodecene (all isomers)	DDB	0.011	0.041	0.089	0.156	0.242
DODECENE	DOL					
Dodecylbenzene						
Dodecyl Phenol						
Drilling mud (low toxicity) (if flammable or combustible)/						
Epoxylated 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	0.003	0.012	0.025	0.044	0.067
Ethyl 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
Ethyl Amyl Ketone	EAK					
Ethyl Benzene	ETB	0.003	0.013	0.028	0.049	0.075
Ethyl 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
Ethylene	ETL					
Ethylene Carbonate						
Ethylene Glycol	EGL	0.003	0.012	0.025	0.044	0.067
Ethylene Glycol Acetate	EGO					
Ethylene Glycol Butyl Ether	EGM					
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EMA	0.003	0.012	0.026	0.045	0.068
Ethylene Glycol Ether Acetate						
Ethylene Glycol Tert-Butyl Ether						
Ethylene Glycol Diacetate	EGY	0.003	0.012	0.025	0.044	0.068
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	0.003	0.012	0.025	0.044	0.068
Ethylene 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)						
Ethyl-3-Ethoxypropionate	EEP					

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (BBL/ HR)
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EHA	0.003	0.012	0.026	0.046	0.070
2-Ethylhexanoic acid	EHO					
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHX	0.003	0.012	0.025	0.044	0.068
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID						
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	FAM	0.003	0.012	0.025	0.044	0.068
Furfuryl Alcohol	FAL	0.003	0.012	0.025	0.044	0.068
Gas oil, cracked	GOC					
GASOLINE BLENDING STOCKS: Alkylates	GAK	0.013	0.048	0.105	0.185	0.286
GASOLINE BLENDING STOCKS: Reformates	GRF	0.013	0.048	0.105	0.185	0.286
GASOLINES: Automotive (containing not over 4.23 grams lead per gallon)	GAT	0.013	0.048	0.105	0.185	0.286
GASOLINES: Aviation (containing not over 4.86 grams lead per gallon) Aviation	GAV	0.013	0.048	0.105	0.185	0.286
GASOLINES: Casinghead (natural)	GCS	0.013	0.048	0.105	0.185	0.286
GASOLINES: Polymer	GPL	0.013	0.048	0.105	0.185	0.286
GASOLINES: Straight run	GSR	0.013	0.048	0.105	0.185	0.286
Glycerine	GCR	0.003	0.012	0.025	0.044	0.067
Glycerol, SEE GLYCERINE						
Glycerol Polyalkoxylate						
Glycerol Triacetate						
Glycidyl Ester of Tertiary Carboxylic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETIC ACI						
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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHARIS	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 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	MTT	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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (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)	ODD					
Octane (all isomers)	OAX	0.004	0.014	0.029	0.051	0.079
OCTANE	OAN	0.004	0.014	0.029	0.051	0.079
Octanoic acid (all isomers)	OAA	0.003	0.012	0.025	0.044	0.068
Octanol (all isomers)	OCX	0.003	0.012	0.025	0.044	0.068
OCTANOL	OTA	0.003	0.012	0.025	0.044	0.068
Octene (all isomers)	OTX	0.004	0.014	0.030	0.052	0.081
OCTENE (1-)	OTE	0.004	0.014	0.031	0.053	0.082
Octyl Acetate						
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	OCX	0.003	0.012	0.025	0.044	0.068
OCTYL ALCOHOL	IOA	0.003	0.012	0.025	0.044	0.068
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					
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						
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	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	0.004	0.015	0.032	0.055	0.085
OIL, FUEL: No. 2-D	OTD					
OIL, FUEL: No. 4	OFR	0.003	0.012	0.026	0.045	0.069
OIL, FUEL: No. 5	OFV	0.003	0.012	0.026	0.045	0.069
OIL, FUEL: No. 6	OSX	0.003	0.012	0.026	0.045	0.069
OIL, MISC: Absorption	OAS					
OIL, MISC: Aliphatic						

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS ***	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (BBL/ HR)
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					
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)						
Oleic acid	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

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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (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	PXP					
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	CHRIS	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (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	TPS	0.003	0.012	0.025	0.044	0.068
Triisooctyl Trimellitate						
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-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	0.003	0.013	0.028	0.048	0.074
XYLENE (M-)	XLM	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-)	XLP	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

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

CARGO	CHRIS	20.0% MAX LIQUID TRANSF RATE (MLTR) 1,000 (BBL/ HR)	40.0% MAX LIQUID TRANSF RATE (MLTR) 2,000 (BBL/ HR)	60.0% MAX LIQUID TRANSF RATE (MLTR) 3,000 (BBL/ HR)	80.0% MAX LIQUID TRANSF RATE (MLTR) 4,000 (BBL/ HR)	100.0 MAX LIQUID TRANSF RATE (MLTR) 5,000 (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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
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
CAMPHOR 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	DPU	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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)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, GREEN	KPL				
MESITYL OXIDE	MSO	0.86	5,000	4,637	OK
METHYL ACRYLATE	MAM	0.95	5,000	4,873	OK
METHYLCYCLOPENTADIENE DIMER	MCK	0.94	5,000	4,848	OK
METHYL DIETHANOLAMINE	MDE	1.04	5,000	5,099	OK
2-METHYL-5-ETHYLPYRIDINE	MEP	0.92	5,000	4,796	OK
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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
46 CFR SUBCHAPT O BUT NOT TABLE 151					
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	CYX	0.95	5,000	4,873	OK
CYCLOHEXYL ACETATE	CYC	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
DECANOIC 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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
INDENES	IBA				
ISOBUTYL ACETATE	IPN				
ISOPRENE, PENTADIENE MIXTURE		0.79	5,000	4,444	OK
ISO-PROPYL ALCOHOL	LRA	0.88	5,000	4,690	OK
LAURIC ACID	MET	0.80	5,000	4,472	OK
METHACRYLONITRILE		0.79	5,000	4,447	OK
METHANOL	MIA				
METHYL STYRENE	MCY	0.77	5,000	4,387	OK
METHYL STYRENE, INDENES, ALKYLBENZENE MIXTURES	MEA	1.02	5,000	5,050	OK
METHYLCYCLOHEXANE		0.96	5,000	4,899	OK
METHYLHEXANE (SAME AS HEPTANE)	NTM	1.15	5,000	5,362	OK
MONOETHANOLAMINE	NEA	0.92	5,000	4,796	OK
MONOISOPROPANOLAMINE	NAA	(&SALTS ?			
NAPHTHALENE (MOLTEN)	NTP	1.49	5,000	6,103	OK
NEODECANOIC ACID	NNM	1.05	5,000	5,123	OK
NITRILOTRIACETIC ACID	NIT	1.16	5,000	5,385	OK
NITROPHENOL (MOLTEN)	PDH	0.99	5,000	4,975	OK
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	PGS				
NITROTOLUENE (o-,p-)	PAD	0.81	5,000	4,500	OK
PARALDEHYDE	PAH	1.01	5,000	5,025	OK
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXIE)	PCN	0.70	5,000	4,183	OK
PROPIONALDEHYDE	PRA	0.72	5,000	4,243	OK
PROPIONIC ANHYDRIDE	GPY	0.84	5,000	4,583	OK
PROPIONITRILE		0.89	5,000	4,717	OK
PROPYLAMINE (n-)	SWR				
PROPYLBENZENE	SDS	1.53	5,000	6,185	OK
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	STY	0.92	5,000	4,796	OK
PYROLYSIS RESIDUAL FUELS	STX	0.92	5,000	4,796	OK
SEWAGE, RAW	STT				
SODIUM SULFIDE (SOLID IN WATER)	TTB	0.89	5,000	4,717	OK
STYRENE	TLI	1.00	5,000	5,000	OK
STYRENE CRUDE	TCB	1.45	5,000	6,021	OK
STYRENE TAR	TPE				
TETRAMETHYLBENZENE (1,2,3,5-)	UDA	0.89	5,000	4,717	OK
TOLUIDINE (o-)	HFN	0.85	5,000	4,610	OK
TRICHLOROBENZENE (1,2,4-)					
TRIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N					
TRIPHENYLBORANE					
UNDECANOIC ACID					
HYDROCARBON 5-9					

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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
46 CFR SUBCHAPTER D, TABLE 30.25-1					
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, Pol	BFX				
Butane	BMX	1.03	5,000	5,074	OK
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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
iso-Butyl Formate					
n-Butyl Formate					
Butyl Heptyl Ketone					
Butyl Methyl Ketone,SEE METHYL BUTYL KETONE	BHK				
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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)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				
Diisoocytl 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(octylpheny)amine					
Dioctyl 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	DFF	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

CARGO	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Q1)*SG1^.5 (BPH)	Qw<=(Qw)max
Ethyl Cyclohexane	ECY	0.79	5,000	4,444	OK
Ethylene	ETL				
Ethylene Carbonate					
Ethylene Glycol					
Ethylene Glycol Acetate	EGL	1.13	5,000	5,315	OK
Ethylene Glycol Butyl Ether	EGO				
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EGM				
Ethylene Glycol Ether Acetate	EMA	0.94	5,000	4,848	OK
Ethylene Glycol Tert-Butyl Ether					
Ethylene Glycol Diacetate					
Ethylene Glycol Dibutyl Ether	EGY	1.10	5,000	5,244	OK
Ethylene Glycol Ethyl Ether, SEE 2-ETHOXYETHANOL	EGB				
Ethylene Glycol Ethyl Ether Acetate, SEE 2-ETHOXYETHYL ACETATE	EGF				
Ethylene Glycol Isopropyl Ether	EGA				
Ethylene Glycol Methyl Butyl Ether	EGI				
Ethylene Glycol Methyl Ether					
Ethylene Glycol Methyl Ether Acetate	EME	1.10	5,000	5,244	OK
Ethylene Glycol Phenyl Ether	EGT				
Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixture	EPE	1.10	5,000	5,244	OK
Ethylene-Propylene Copolymer (in liquid mixtures)	EDX				
Ethyl-3-Ethoxypropionate					
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EEP				
2-Ethylhexanoic acid	EHA	0.82	5,000	4,528	OK
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHO				
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID	EHX	0.84	5,000	4,583	OK
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) Aviatio	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					
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	5,000	4,135	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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)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	HXO	0.93	5,000	4,822	OK
Hexanol	HXN	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 Trigylcol, 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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.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)	OCX	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)	OCX	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 BPH
"TARGET" MAX LIQUID TRANSFER RATE	(TMLTR)	5,000 BPH
SPILL VALVE CAPACITY (WATER) @ MAX DESIGN WORKING PRESSURE	(Qw)max	6,750 BPH

CARGO	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
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	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	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	5,000	4,899	OK
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED		0.95	5,000	4,873	OK
OIL, EDIBLE: Sunflower seed	OSN				
OIL, EDIBLE: Tucum	OTC				
OIL, EDIBLE: Vegetable, N.O.S.	OVG	0.96	5,000	4,899	OK
OIL, EDIBLE: Walnut					
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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
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	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	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)		0.72	5,000	4,243	OK
Oleic acid	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	0.83	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

CARGO	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
1-Phenyl-1-Xylyl 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

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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)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		1.04	5,000	5,099	OK
Triethylene Glycol di-(2-ethylbutyrate)	TGD				
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-fumerate 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-)	XLM	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	(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	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Q1) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Q1)*SG1^.5 (BPH)	Qw<=(Qw)max
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

CARGO	CHRIS	LIQUID SPECIFIC GRAVITY (1)	CARGO MAX LIQUID TRANSFER RATE (Ql) (BPH)	EQUIVALVENT WATER LIQUID TRANSFER RATE Qw=(Ql)*SGl^.5 (BPH)	Qw<=(Qw)max
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	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (BBL/HR)
46 CFR SUBCHAPT O, 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
CAMPHOR 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	CHRIS ***	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (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	DMP	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		
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	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (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	5,000	5,000
VALERALDEHYDE (iso-, n-)	IVA	5,000	5,000
VALERALDEHYDE (iso-)	VAL	5,000	5,000
VALERALDEHYDE (n-)	VBL		
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VAM	5,000	5,000
VINYL ACETATE	VNT	5,000	5,000
VINYLTOLUENE			

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

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

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

CARGO	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (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	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (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		
Diisoocytl Phthalate	DIO		
Diisopropylbenzene (all isomers)	DIX	5,000	5,000

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

CARGO	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (BBL/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(octylpheny)amine			
Dioctyl Phthalate	DOP	5,000	
Dipentene	DPN	5,000	5,000
Diphenyl	DIL	5,000	5,000
Diphenyl, Diphenyl Ether mixture	DDO	5,000	5,000
Diphenyl Ether	DPE	5,000	5,000
Diphenyl Ether, Biphenyl Ether mixture	DOB		
Dipropylene Glycol	DPG	5,000	5,000
Dipropylene Glycol Dibenzoate	DGY		
Dipropylene Glycol Methyl Ether	DPY		
DISTILLATES: Flashed feed stocks	DFF	5,000	5,000
DISTILLATES: Straight run	DSR	5,000	5,000
Ditridecyl Phthalate	DTP		
Diundecyl Phthalate	DUP		
Dodecane (all isomers)	DOC		
Dodecanol	DDN		
Dodecene (all isomers)	DOZ	5,000	5,000
DODECENE	DOD	5,000	5,000
Dodecylbenzene	DDB	5,000	5,000
Dodecyl Phenol	DOL		
Drilling mud (low toxicity) (if flammable or combustible)/			
Epoxylated 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	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (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) Avi	GAV	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	CHRIS	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 Trigylcol, 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	PTN		
NAPHTHA: Solvent	NSV	5,000	5,000
NAPHTHA: Stoddard solvent	NSS	5,000	5,000
NAPHTHA: Varnish makers' and painters' (75%)	NVM	5,000	5,000
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt solution	NFS		
Naphthenic acid	NTI	5,000	
Nonane (all isomers)	NAX	5,000	5,000
NONANE	NAN	5,000	5,000
Nonanoic acid (all isomers)	NNA		
Nonanoic, Tridecanoic acid mixture			

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

CARGO	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (BBL/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	ODD		
Octadecenoamide solution (Oleamide)	OAX	5,000	5,000
Octane (all isomers)	OAN	5,000	5,000
OCTANE	OAA	5,000	5,000
Octanoic acid (all isomers)	OCX	5,000	5,000
Octanol (all isomers)	OTA	5,000	5,000
OCTANOL	OTX	5,000	5,000
Octene (all isomers)	OTE	5,000	5,000
OCTENE (1-)			
Octyl Acetate	OCX	5,000	5,000
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	IOA	5,000	5,000
OCTYL ALCOHOL	OAL		
Octyl Aldehydes	ODA		
Octyl Decyl Adipate	OET		
Octyl Epoxytallate			
Octyl Phthalate. SEE DI-(2-ETHYLHEXYL)PHTHALATE	OBB		
OIL, EDIBLE: Babassu			
OIL, EDIBLE: Beechnut	OCA		
OIL, EDIBLE: Castor			
OIL, EDIBLE: Cocoa butter	OCC	5,000	
OIL, EDIBLE: Coconut			
OIL, EDIBLE: Cod liver	OCO	5,000	
OIL, EDIBLE: Corn	OCS		
OIL, EDIBLE: Cottonseed	OFS	5,000	
OIL, EDIBLE: Fish, N.O.S.			
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	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (BBL/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	CHRIS ***	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (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			
Pentaethylenehexamine	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-Xylyl 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	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (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	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX 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			