VAPOR CONTROL SYSTEM INSTALLATION

FOR ~~BARGE~~ HULL: "E344"

CONOCO, INC.

BARGE: "7026"

APRIL 14, 1997

ENCLOSURE (1)

PREPARED BY: SHEARER & ASSOC., INC.
P. O. BOX 9576
METAIRIE, LA 70055
(504) 836-6009

II. BARGE TYPE AND DESCRIPTION:

The vessel of concern is a 297'-6" X 54'-0" X 12'-0", double side, double bottom, tank barge intended for service on rivers, lakes, bays and sounds. It is equipped with a raked end and a box end. It 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
7526 ~~B364~~	TRINITY/PLATZER	B349

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 vessels 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 DESIGN WORKING PRESSURE:

Per previous documentation the barge structure is reported to be suitable for a 3.0 PSIG MAXIMUM DESIGN WORKING PRESSURE.

(Note: This MAXIMUM DESIGN 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 max 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 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 ~~[illegible]~~ 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.

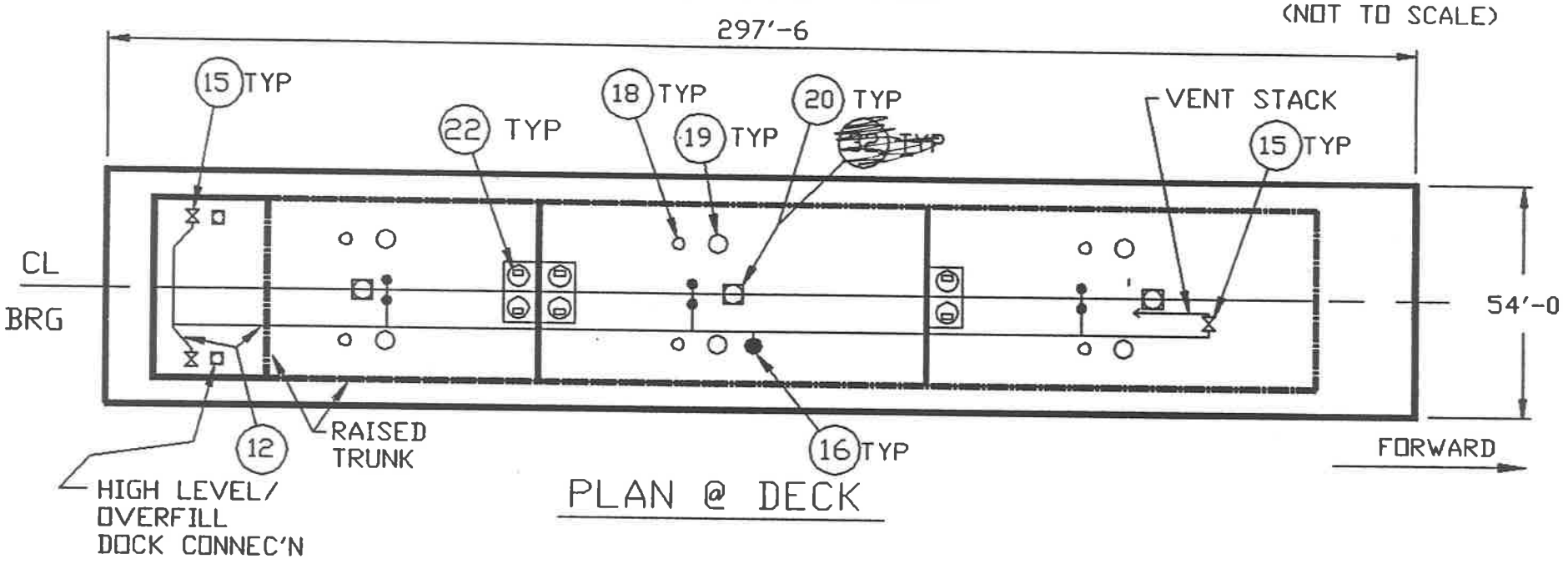
XII. OPERATIONAL REQUIREMENTS (46 CFR 39.30-1):

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.

BARGE NAME: ~~[illegible]~~ 7026



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
~~32~~	~~RUPTURE DISK~~

DIAGRAM OF VAPOR CONTROL SYSTEM

FIGURE 1

VAPOR CONTROL SYSTEM INSTALLATION

FOR BARGE: ~~E344~~ 7026

CONOCO, INC.

TABLE LM-1
LIST OF MATERIAL
FOR VAPOR CONTROL SYSTEM

PIECE MARK	ITEM	QTY	SIZE	SPECIFICATION
12	PIPING FITTINGS FLANGES		8"	SCHED 40, STEEL, ASTM A-53 OR A-106 GRADE B 2" & SMALLER: 3000# FORGED STEEL SCR'D ASTM 105; AND 2 1/2" & LARGER: BUTT WELD SCHED 40 ASTM A234 GR B, ANSI B-16.9 150# 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
[illegible]	[illegible]	[illegible]	[illegible]	

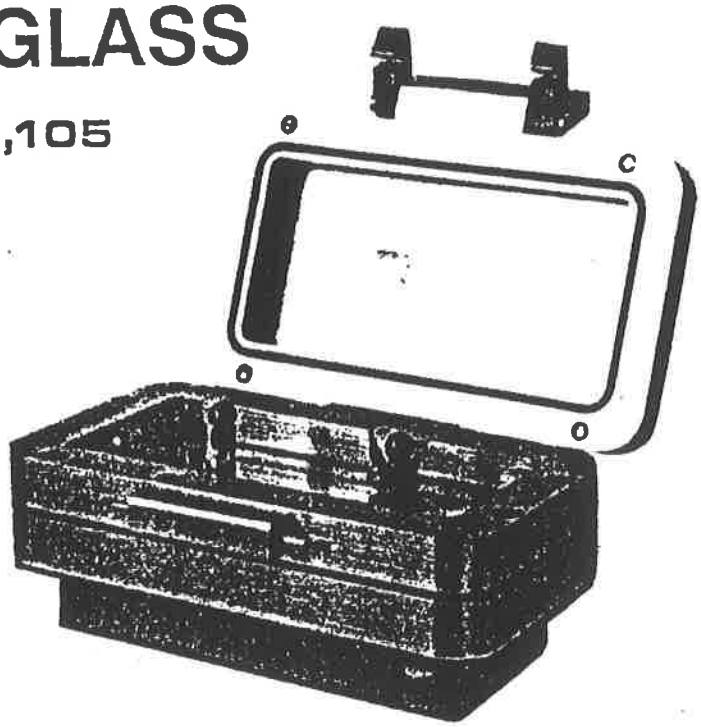
Jan '95

ERL

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.

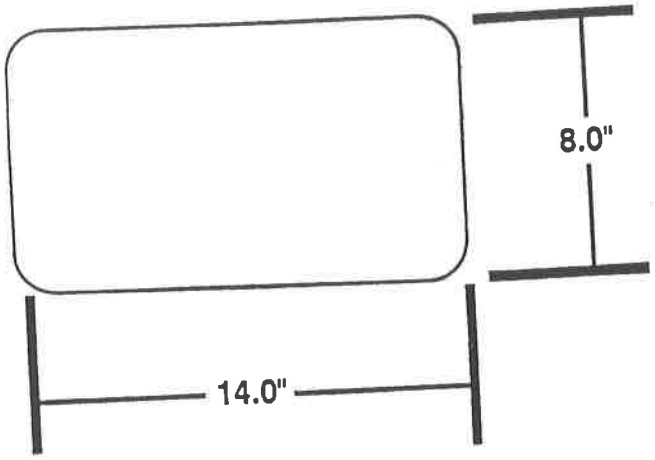
* 3/4" thick #7740 Pyrex ground and polished plate glass is stress relieved with ground edges and radiused corners.

* 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.

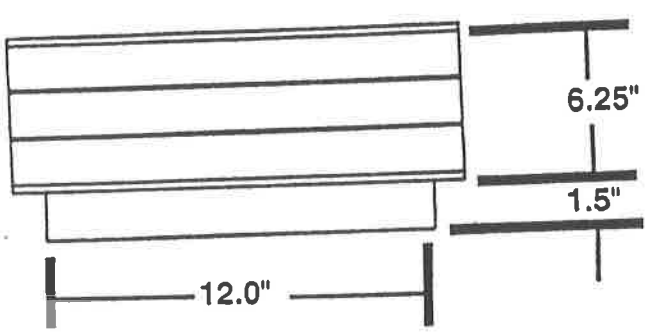
* The unique carbon-steel deck mounting flange makes shipyard installation easy and prevents damage to the sight glass, which can occur during installation of ordinary weld-in-place sight glasses.

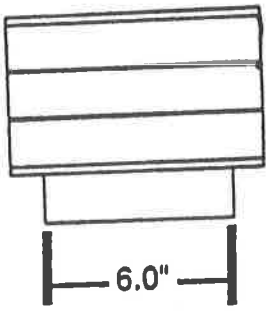
SPECIFICATIONS

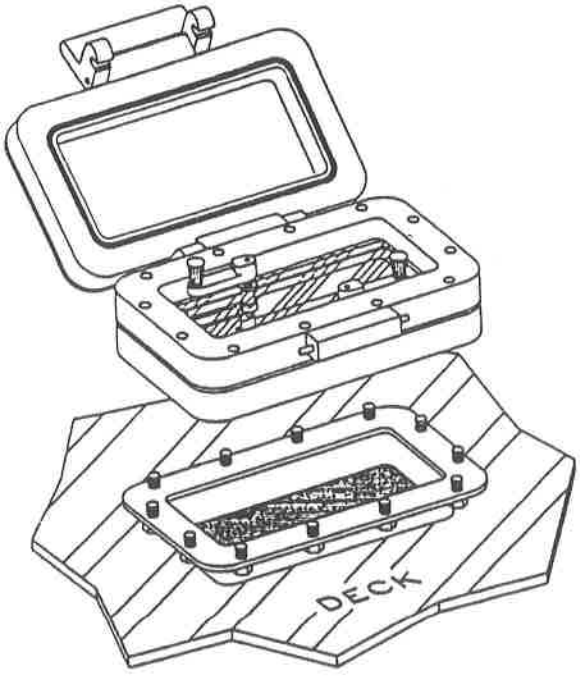


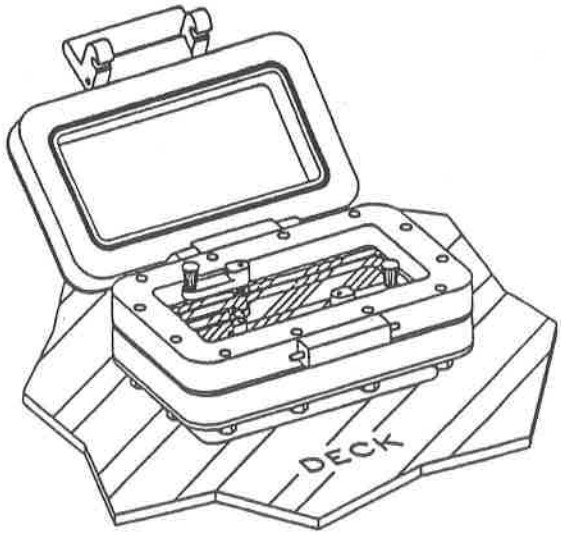
Marine Sight Glass
Model SGM-1

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



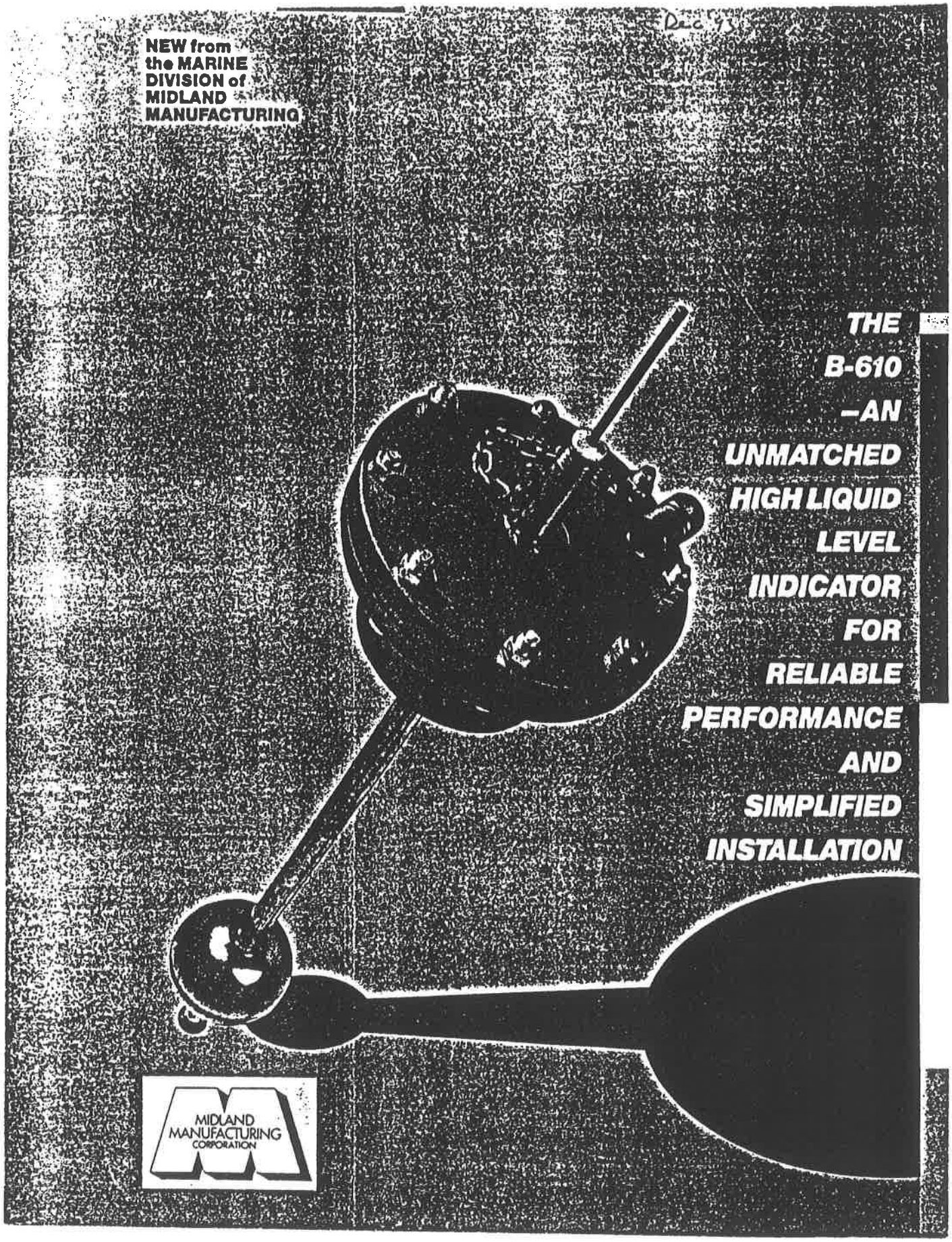






ERL MARINE PRODUCTS DIVISION
P.O. BOX 1026
NEW ALBANY, IN 47151-1026

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.

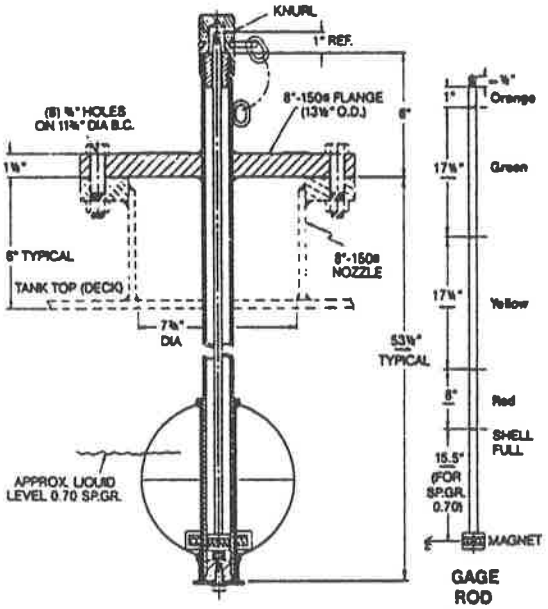
E. The extra-large 7½" diameter float remains buoyant in all services—even down to .51 specific gravity (e.g. propane).

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

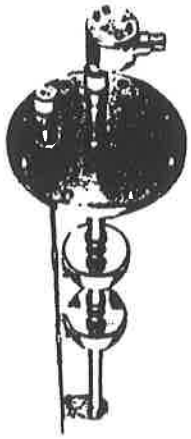
7733 Gross Point Road
Skokie, IL 60077
(708) 677-0333
Telex 28-9429
FAX # (708) 677-0138

Dec'93

FM
APPROVED

Midland
Model B-595

TANK HIGH LEVEL AND OVERFILL SENSOR

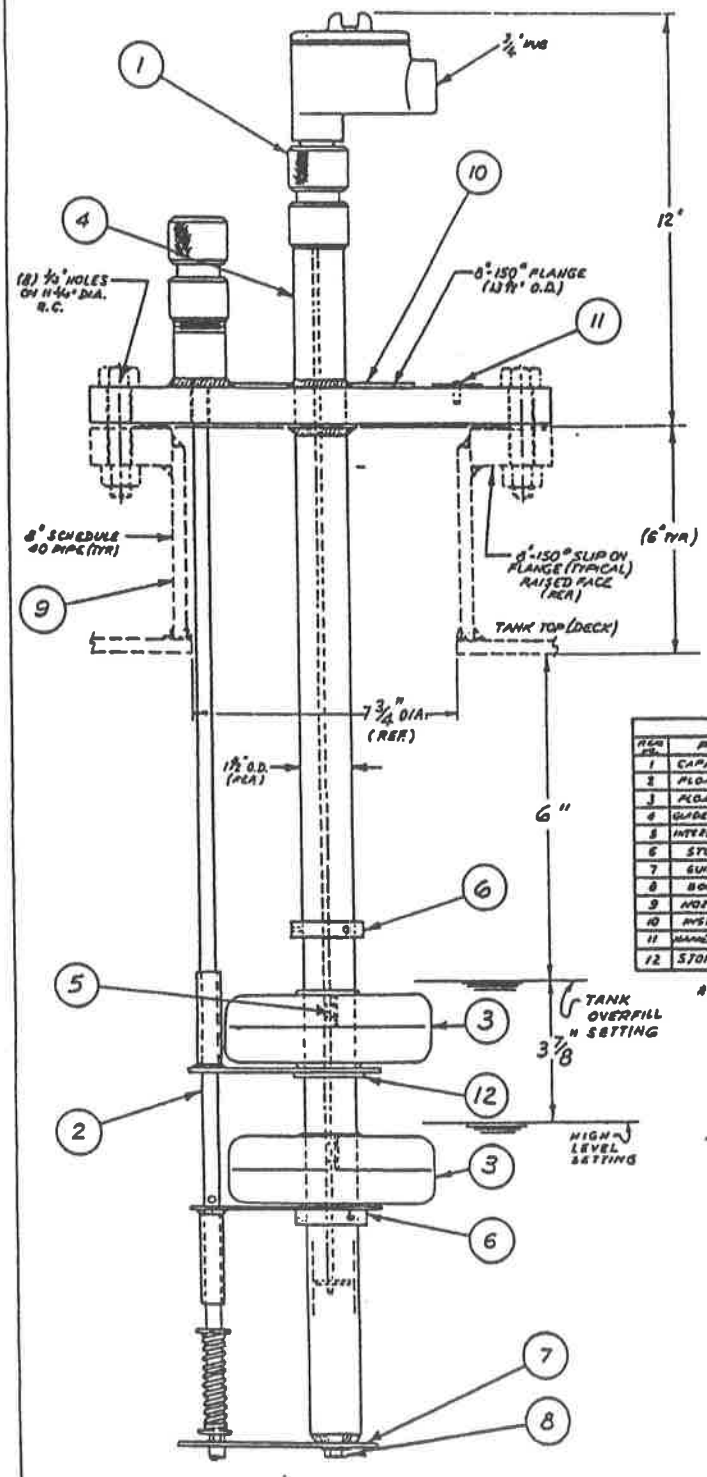


Intrinsically safe dual level alarm sensors provide independent HIGH LEVEL alarm and tank OVERFILL alarm signals to Barge Inlet connector. An 8" 150# ANSI mounting flange with integral float guide tube allows single point access for both HIGH LEVEL and OVERFILL alarm sensors. A stainless steel manual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

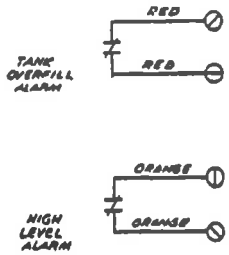
SPECIFICATIONS:

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



WIRING DIAGRAM



CONTACTS SHOWN IN NON-ALARM CONDITION

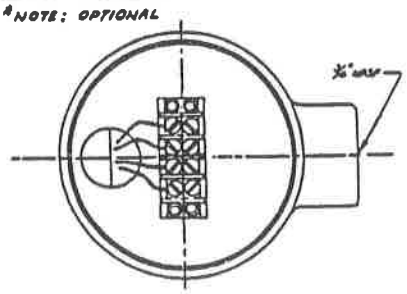
PROXIMITY SENSOR SPECIFICATIONS

CONTACT FORM C (SPDT)
CONTACT RATING 30 VDC @ 250 MA MAX.
CONTACT RESISTANCE 0.200 OHMS MAX.
SHOCK WITHOUT FALSE OPERATION 100 G'S
OPERATING TEMPERATURE -40 TO +125 °C
CYCLE LIFE 40,000,000
PER MIL. SPEC 6 C 5433 C
UL RECOGNIZED COMPONENT - FILE E 61760
CSA FILE LR 43616-2

BILL OF MATERIAL

ITEM NO.	PART NAME	MATERIAL	QTY.	MIDLAND NO.
1	CAP/OUTLET BOX	STAINLESS/ALUMINUM	1	595-11-SS
2	FLOAT WEIGHT 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	595-6-SS
7	GUIDE PLATE	STAINLESS STEEL	1	595-7-SS
8	BOLT, 1/4W	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

MIDLAND MFG. CORP. SKOKIE, ILL.	STORED ENERGY CALCULATIONS FOR COMPLIANCE WITH 46 CFR 39.20-9(b)(4)	SK 062591
MATERIAL:	REMOVE ALL BURRS. BREAK ALL EDGES & CORNERS	SCALE:
	STD. TOLERANCES: UNLESS SPECIFIED DECIMAL ± .005 FRACTIONS ± .015	DRAWN BY: GB/RHD
		DATE: 6-25-91
		REVISION:

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

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

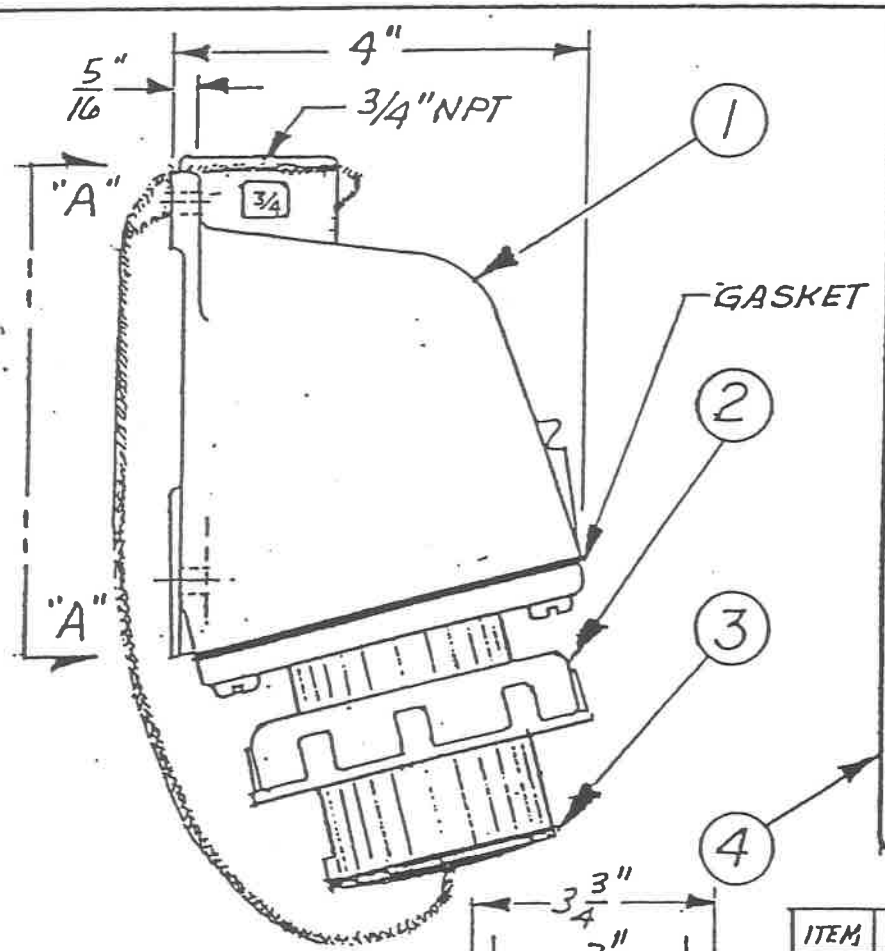
$= 401225 \times 10^{-12}$ JOULES = 0.4012 MICROJOULES

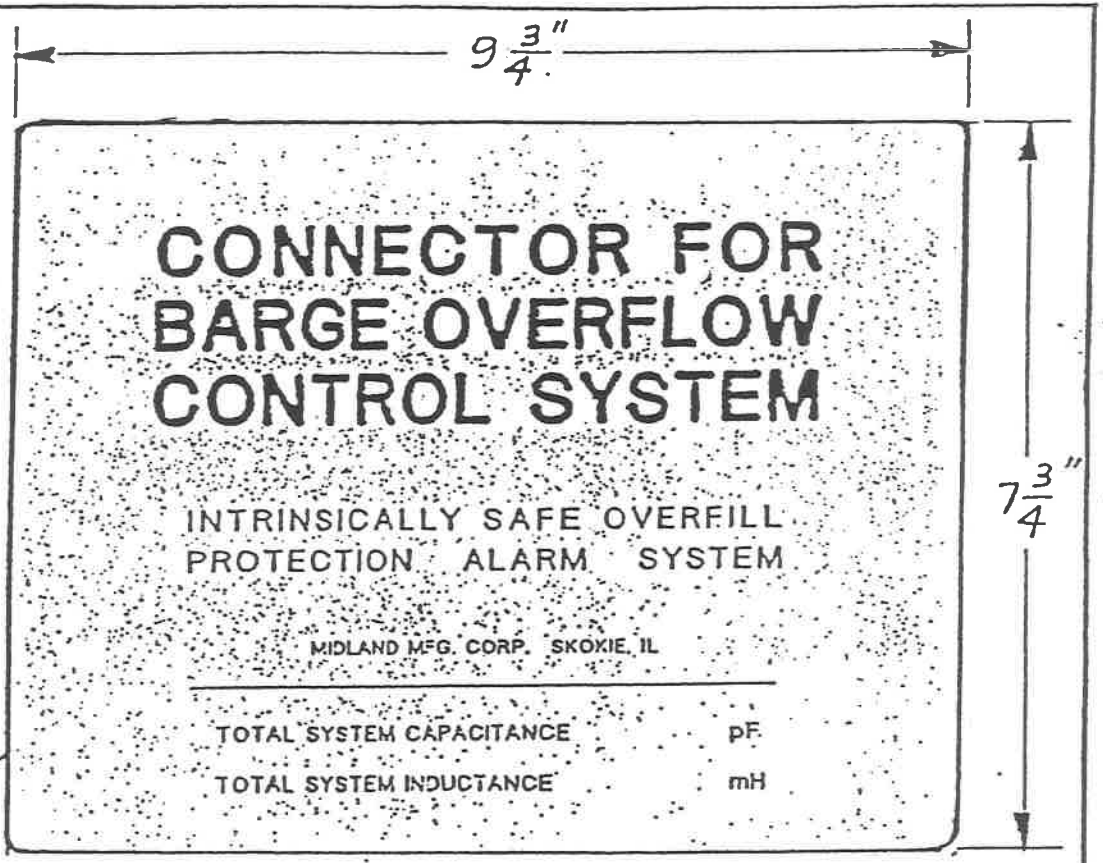
FIND: TOTAL STORED ENERGY

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.

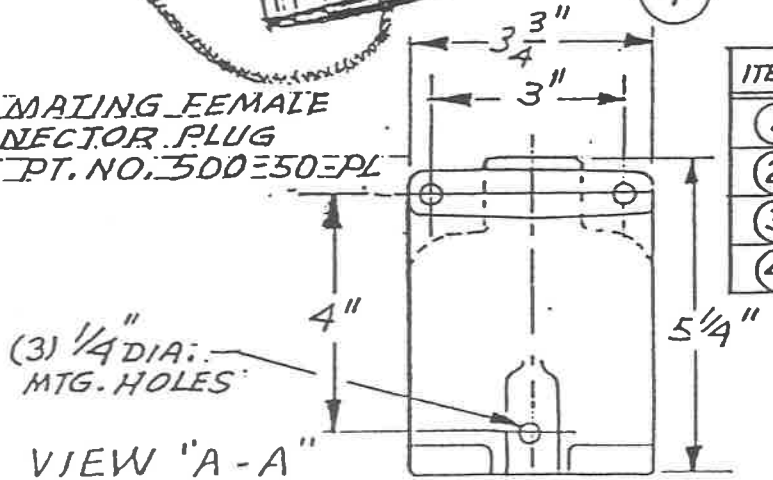
*NOTE: REFERENCE - ELECTRONIC DESIGNERS' HANDBOOK MC GRAW HILL 1957 pp 1-3





C-1-e

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



VIEW "A-A"

NO SCALE

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-BN
4	PLACARD	UV STABILIZE PLASTIC 1/16" THICK	1	500-91-PL

ADDED MATING PLUG NOTE. 5/8/91 K.M.

MATERIAL: SEE B/M

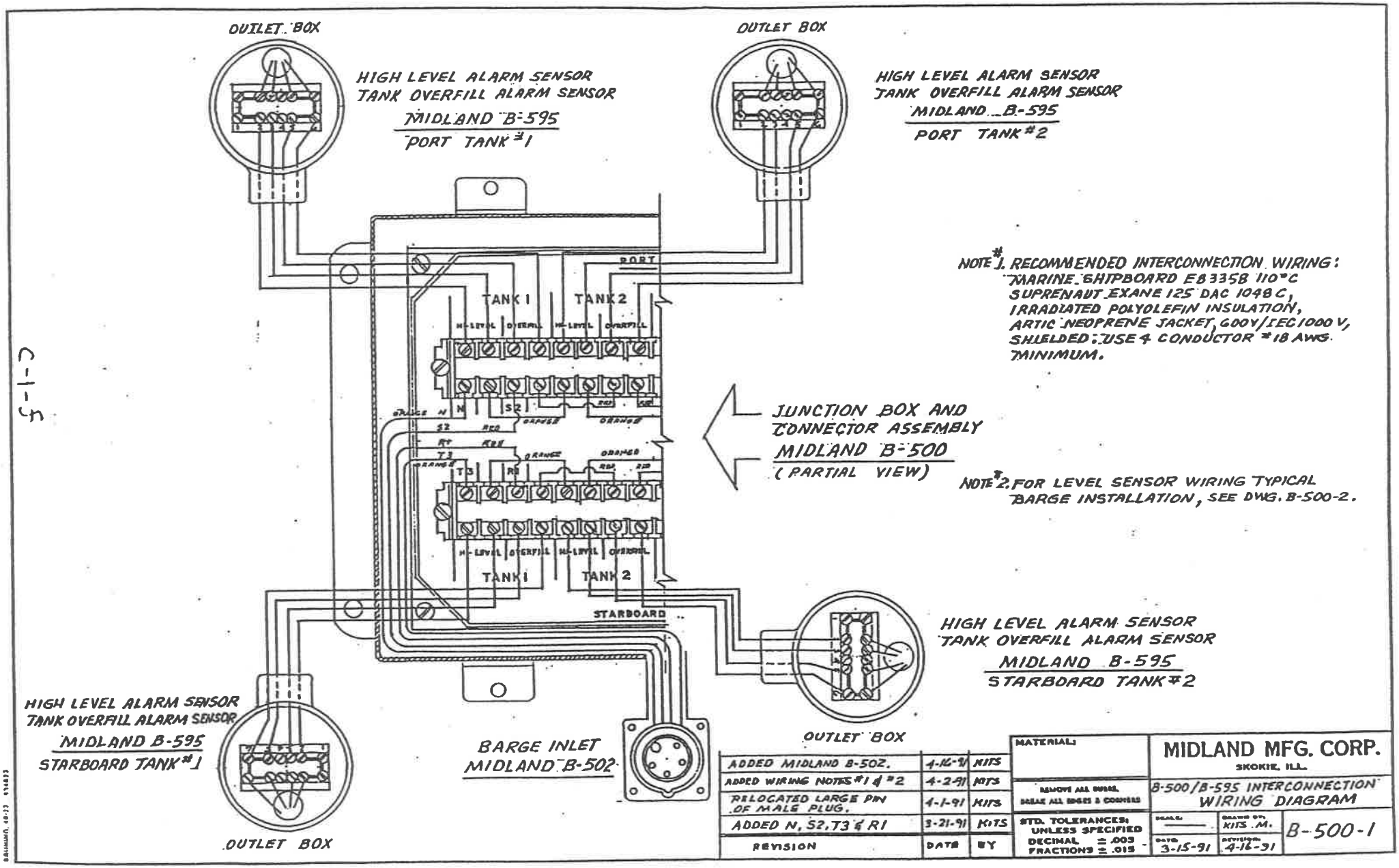
REMOVE ALL BURRS. BREAK ALL EDGES & CORNERS

STD. TOLERANCES: UNLESS SPECIFIED

MIDLAND MFG. CORP.
SKOKIE, ILL.

BARGE INLET

SCALE: HALF | DRAWN BY: KITS M. | B-502



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 BURRS. BREAK ALL EDGES & CORNERS

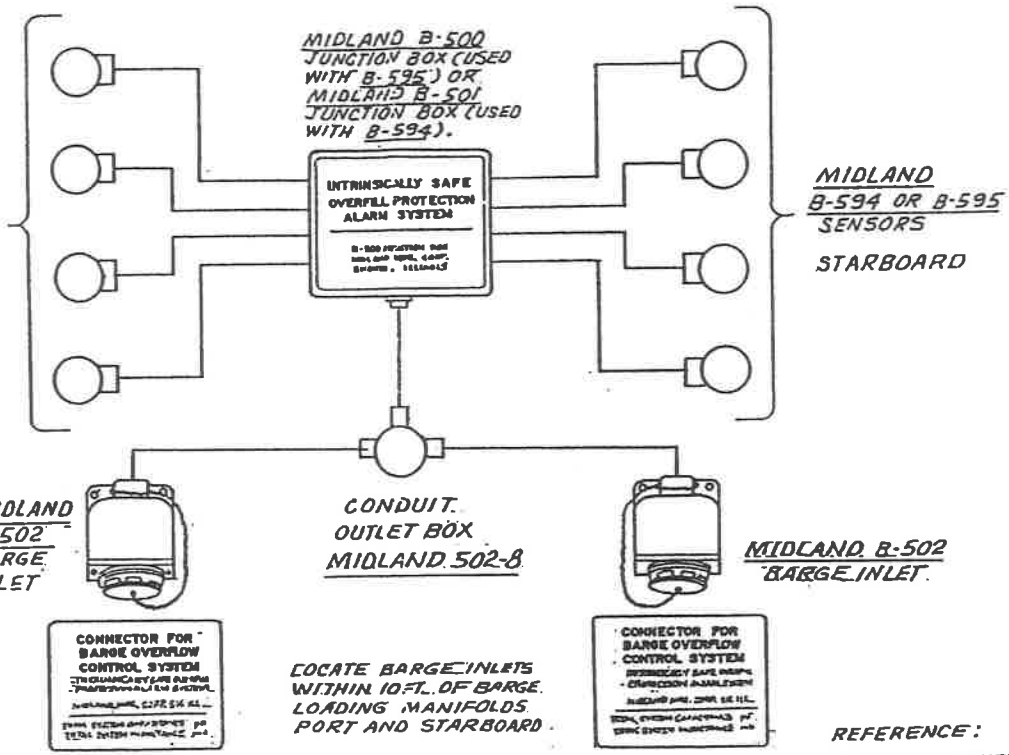
STD. TOLERANCES: UNLESS SPECIFIED DECIMAL ± .005 FRACTIONS ± .015

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



NOTE #1.
RECOMMENDED INTERCONNECTION WIRING:
MARINE SHIPBOARD EB3358 110°C
SUPRENAUT EXANE 125 DAC 104BC,
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.

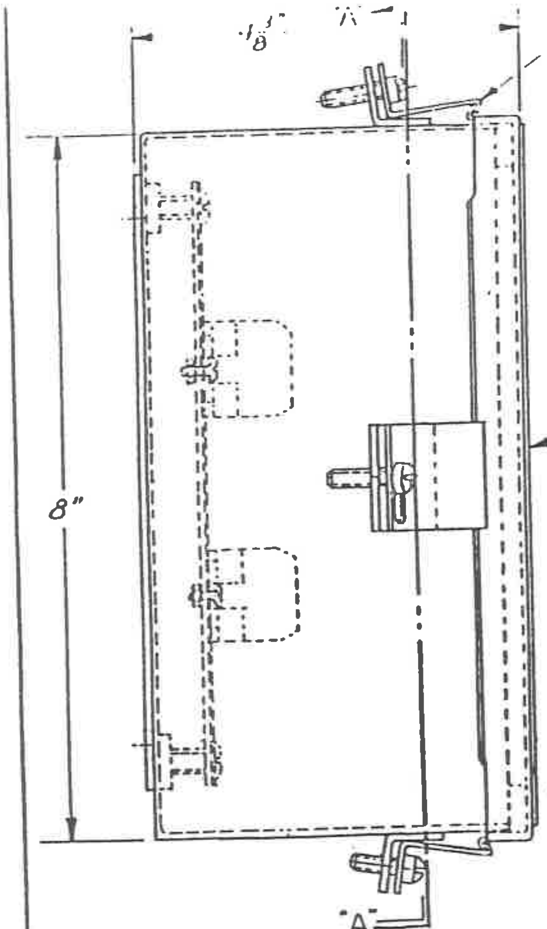
REFERENCE:
OVERFILL CONTROL SYSTEMS FOR TANK BARGES API RECOMMENDED PRACTICE 1125.

ADDED JUNCTION BOX PLACARD WORDING	1-18-91	KITE
ADDED WIRING NOTES #1, #2, & #3	1-21-91	KITE
-- REVISION --	DATE	BY

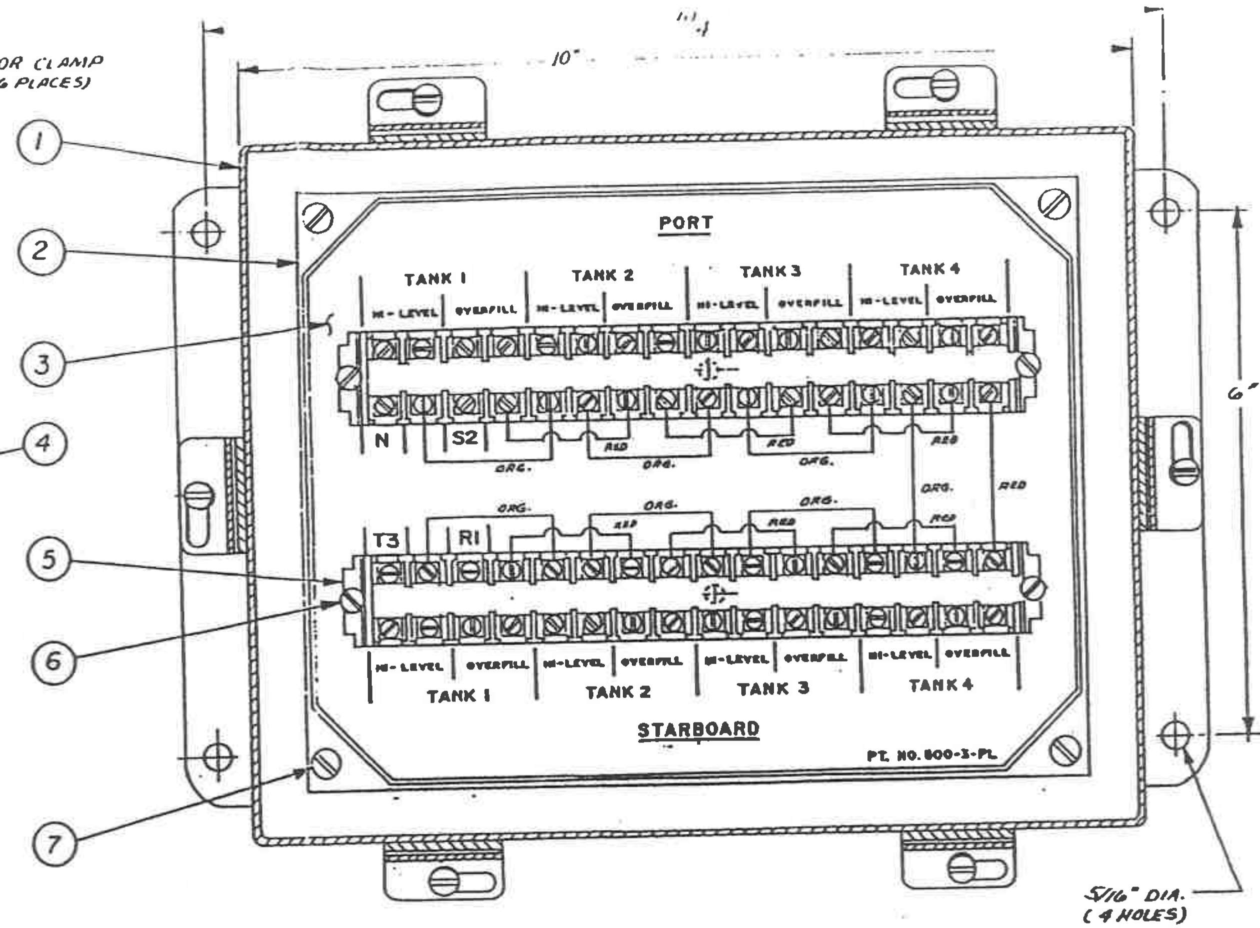
MATERIAL:	MIDLAND MFG. CORP. BROOKE, S.C.
REMOVE ALL BURRS BREAK ALL EDGES & CORNERS	LEVEL SENSOR WIRING TYPICAL BARGE INSTALLATION
STD. TOLERANCES: UNLESS SPECIFIED DECIMAL ± .005 FRACTIONS ± .015	SCALE: DRAWN BY: KITE M. B-500-2
DATE: 4-1-91	REVISED: 4-18-91

C-1-c

C-1-d



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-[illegible]	[illegible]
ADDED NOTE	3-22-9[illegible]	[illegible]
ADDED "USED WITH" NOTE	3-19-91	[illegible]
CHANGED TITLE	3/4/91	[illegible]

MATERIALS: NEMA 4X ENCLOSURE

MIDLAND MFG. CORP.

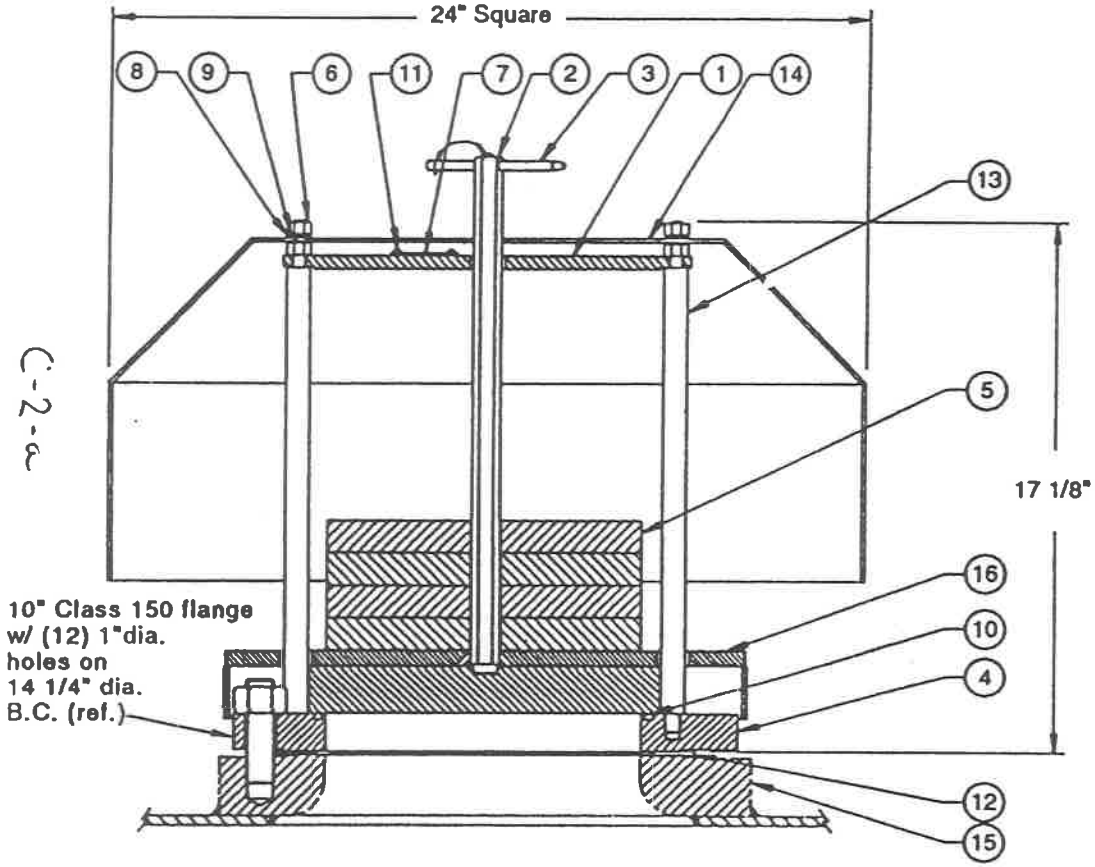
JUNCTION BOX AND CONNECTOR ASSEMBLY

FULL

A-500

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.

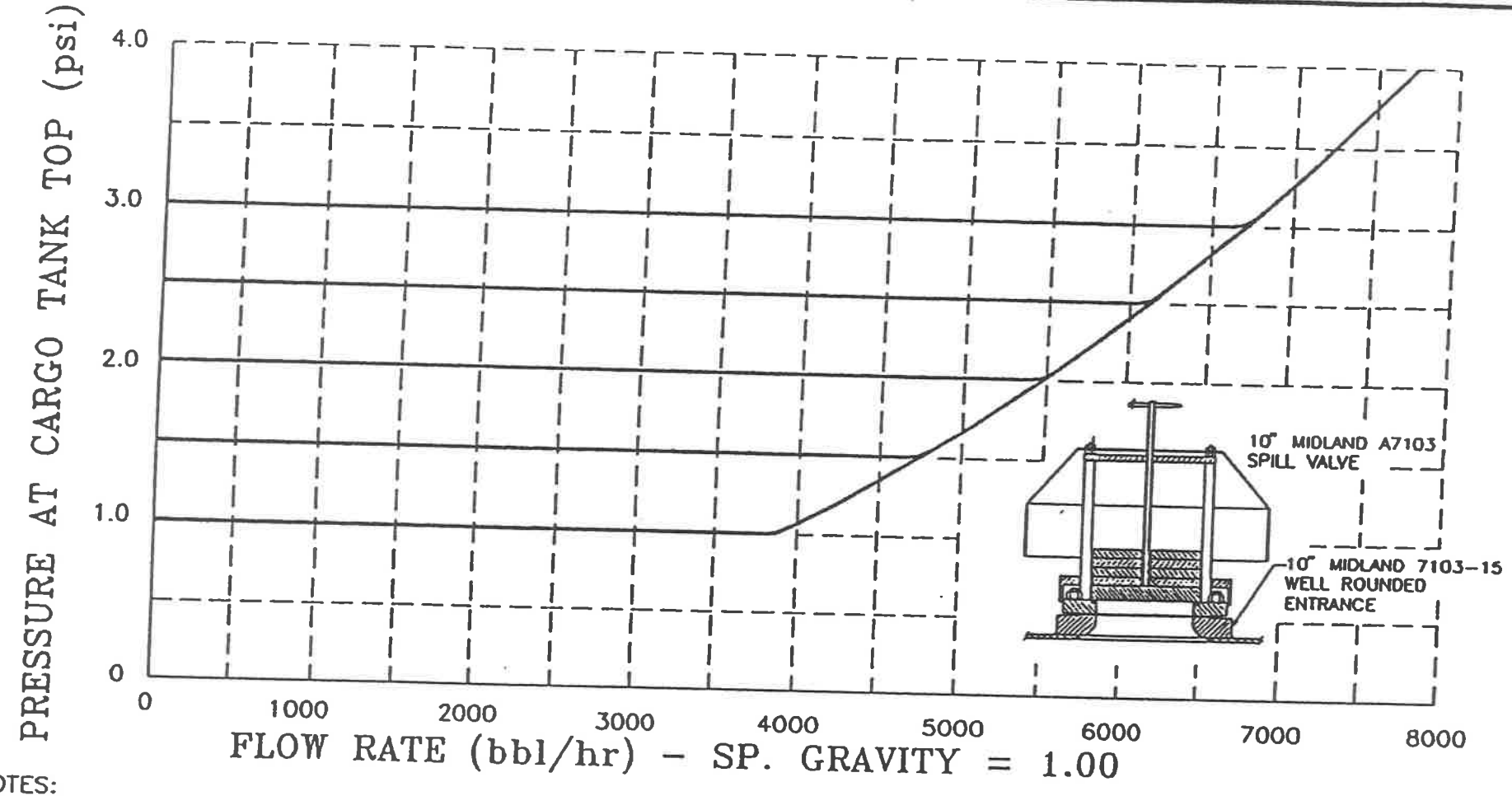
CERTIFIED AS COMPLYING WITH ASTM F 1271-90 SPECIFICATION

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.



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

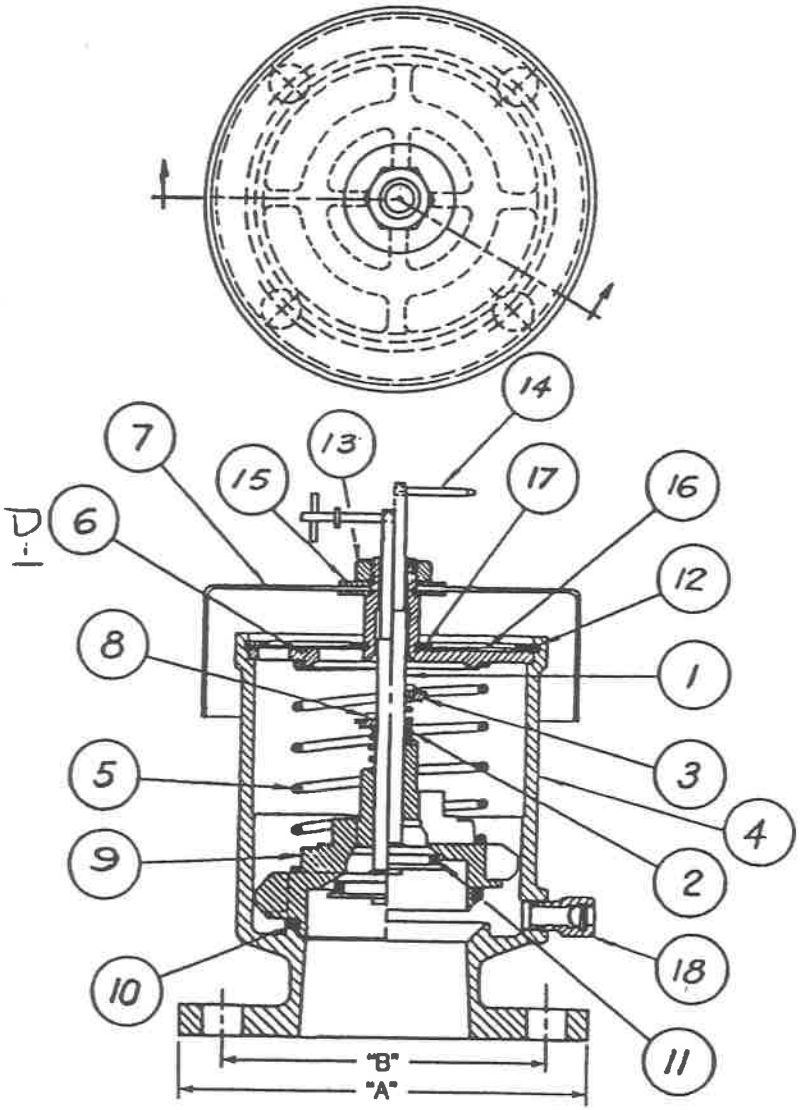
4) TO DETERMINE FLOW RATE AT A TANK PRESSURE, ENTER VERTICAL AXIS AT DESIRED PRESSURE, MOVE HORIZONTALLY TO CURVE, TURN DOWN TO READ FLOW RATE

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:	REVISION:
		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.

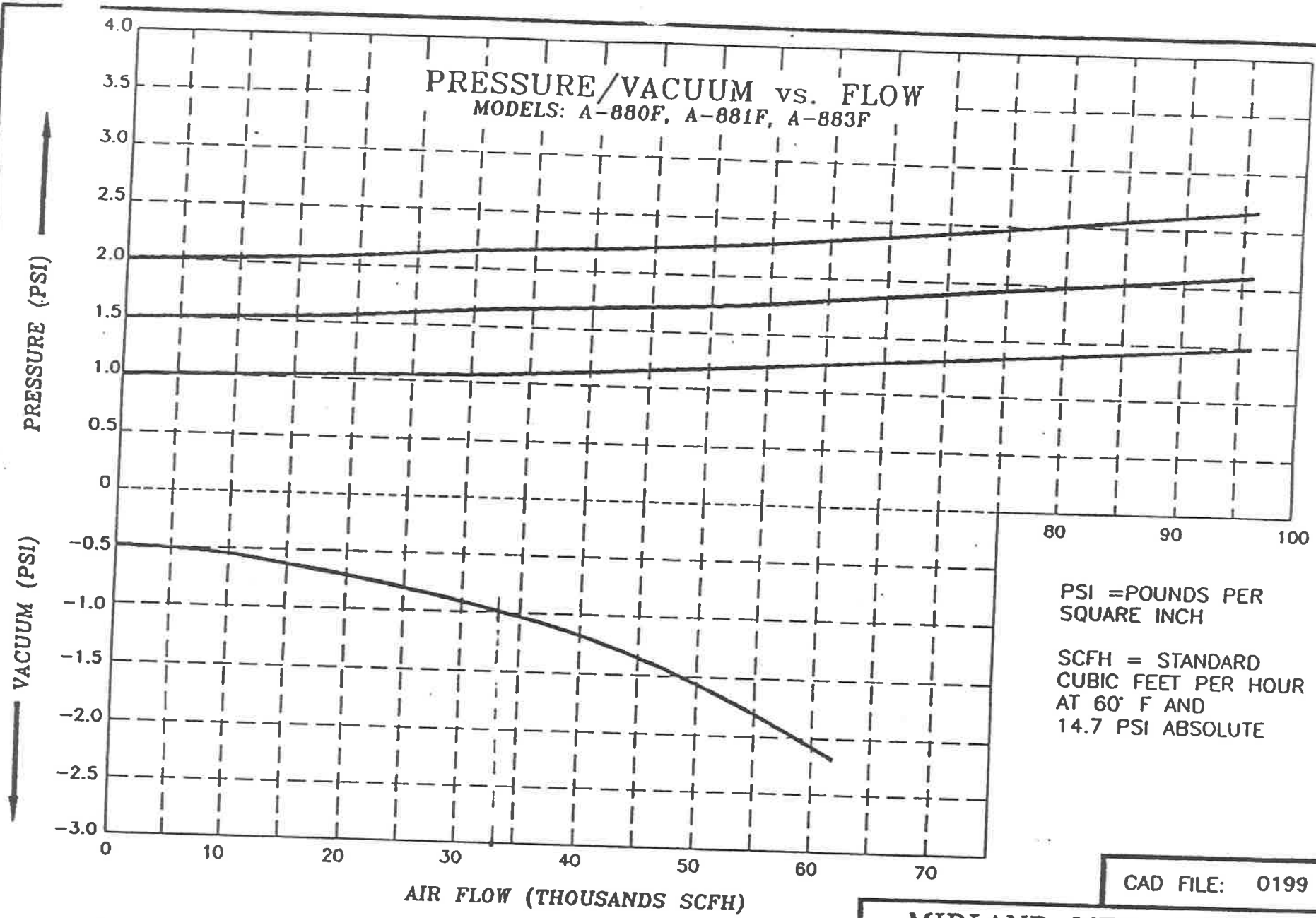
VALVE MATERIAL	MODEL SUFFIX
BRASS	-BR
STAINLESS	-SS

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
BARGES: C9706: CONOCO, INC.; E344

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

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

STDVAP1

TABLE I: INPUT DATA & NOTES

(MDWP)	> =	3.000	PSIG					
(T)		115	F					
(TMLTR)		5,000	BPH					
(Pp/v)		1.500	PSIG --->	16.2	PSIA			
NOM I.D.		8	IN -----> I.D.	7.981	IN			
ROUGHNESS		0.00015	AREA	0.347	FT^2			
		125	FT					
		0.5						
		QTY	LOSS COEF	TOTAL			COEF	TOTAL
TEE (THRU RUN)		1	0.60	0.600	90EL LR	1	0.75	0.750
TEE (THRU BRANCH)		3	1.80	5.400	45 EL	0	0.40	0.000
OTHER		0	N/A	0.000	90 EL	0	N/A	0.000
TOTAL:		5	AVG:	1.350				
		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						
NOM I.D.		N/A	IN -----> I.D.	0.000	IN			
ROUGHNESS		0.00015	AREA	0.000	FT^2			
		N/A	FT					
		0						
		QTY	LOSS COEF	TOTAL			COEF	TOTAL
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			

MIDLAND 8" PV
MODEL A883/A880

P/V VALVE DATA

FLOW RATE (SCFH/ 1000)	PRESSURE ACROSS PV (PSI)
0	1.500
5	1.505
10	1.520
15	1.540
20	1.570
25	1.605
30	1.635
35	1.665
40	1.695
45	1.725
50	1.755
55	1.785
60	1.815
65	1.850
70	1.890
75	1.930
80	1.975
85	2.015
90	2.060
95	2.100

	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

E-1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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

E-9-a

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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

BARGES: C9706: CONOCO, INC.; E344

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											

E-2-C

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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

BARGES: C9706: CONOCO, INC.; E344

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 HYDP	PGS												
PROPIONALDEHYDE	PAD	0.81	2		2.00	13.76	16.200	0.849	0.151	0.076	0.141	1.849	1.275
PROPIONIC ANHYDRIDE	PAH	1.01	1		4.50	0.11	16.200	0.007	0.993	0.076	0.078	1.024	1.002
PROPIONITRILE	PCN	0.70	1		1.90	1.17	16.200	0.072	0.928	0.076	0.081	1.065	1.023
PROPYLAMINE (n-)	PRA	0.72	1		2.04	13.55	16.200	0.836	0.164	0.076	0.142	1.870	1.271
PROPYLBENZENE			1		0.20	4.14	16.200	0.256	0.744	0.076	0.061	0.796	1.083
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	GPY	0.84	1		2.80	7.30	16.200	0.451	0.549	0.076	0.138	1.811	1.146
PYROLYSIS RESIDUAL FUELS		0.89											
SEWAGE, RAW	SWR												

E-2-5

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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

E-2-9

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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 Tributyl Citrate		1.05		402.460	13.89								
Acrylonitrile-Styrene Copolymer dispersion in Polyether Polyol	ALE												
Alcohols (C13 and above)	ALY												
Alcoholic beverages, N.O.S.													
Alcohol (C6 - C17)(secondary) Poly(3-6)ethoxylates													
Alcohol (C12 - C15) Poly(1-3)ethoxylates													
Alcohol (C12 - C15) Poly(3-11)ethoxylates													
Alkenylsuccinic acid													
Alkenylsuccinic Anhydride													
Alkyl (C9 - C17) Benzenes	AKB												
Alkylbenzenesulfonic acid (4% or less)	ABS												
Alkyl Phthalates (n-)													
Alkyl Succinate Formaldehyde Hydr- oxyamino condensate (3.2% or less)													
Aminoethyldiethanolamine, Aminoethylethanolamine solution													
Amyl Acetate (commercial, iso-, n-,sec-)	AEC	0.87	1		4.50	2.02	16.200	0.125	0.875	0.076	0.109	1.436	1.040
AMYL ACETATE (n-)	AML	0.88	1		4.48	0.33	16.200	0.020	0.980	0.076	0.082	1.071	1.007
AMYL ACETATE (iso-)	IAT	0.88	1		4.48	0.33	16.200	0.020	0.980	0.076	0.082	1.071	1.007
Amyl alcohol (iso-, n-, sec-, primary)(SEE ALSO IAA)	AAI	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amyl alcohol (n-)	AAN	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amyl alcohol (tert-)	AAI												
AMYL ALCOHOL, PRIMARY	APM	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
AMYL ALCOHOL, (sec-)	ASE	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amylene	AMZ												
AMYL ALCOHOL, (iso-)	IAA	0.82	1		3.04	0.30	16.200	0.019	0.981	0.076	0.079	1.038	1.006
Amyl Methyl Ketone	AMK												
Amyl Tallate													
Asphalt	ASP	1.04											
ASPHALT BLENDING STOCKS: Roofers flux	ARF												
ASPHALT BLENDING STOCKS: Straight run residue	ASR												
Behenyl alcohol													
Benzene Tricarboxylic acid Trioctyl Ester													
Benzyl alcohol	BAL	1.05	1	108.140	3.73	0.10	16.200	0.006	0.994	0.076	0.077	1.017	1.002
Bicyclic Terpenel Polyamide salt													
Brake fluid base mixtures (containing Poly(2-8)alkylene (C2-C3)	gBFX												
Butane	BMX	1.03											
Butene, SEE BUTYLENE													
Butene Oligomer	BOL												

E-2-y

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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												

E-2-2

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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													

E-2-82

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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-C

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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-O, 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													

E-2-3

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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										

E-2-7

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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											

III-2-9

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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													

E-2-p

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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-2-9r

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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

BARGES: C9706: CONOCO, INC.; E344

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.													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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													

III-C-4

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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										

E-2-V

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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 SUBCHAPT O, TABLE 151												
ACETIC ACID	AAC	5,000	5092	5244	29446	1.635	*********	88.7	*********	0.0	88.7	0.050	1.68	OK
ACETIC ANHYDRIDE	ACA	5,000	5040	5193	29158	1.635	*********	87.0	*********	0.0	87.0	0.049	1.68	OK
ACETONITRILE	ATN	5,000	5003	5005	28101	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
ACRYLIC ACID	ACR	5,000	5040	5131	28810	1.635	*********	87.1	*********	0.0	87.1	0.048	1.68	OK
ACRYLONITRILE	ACN	5,000	5500	6142	34483	1.665	*********	102.3	*********	0.0	102.3	0.067	1.73	OK
ADIPONITRILE	ADN	5,000	5001	5005	28103	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
ALUMINUM SULFATE SOLUTION	ASX													
AMINOETHYLETHANOLAMINE	AEE	5,000	5001	5005	28101	1.635	*********	86.0	*********	0.0	86.0	0.046	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	*********	130.3	*********	0.0	130.3	0.103	1.83	OK
BENZENE HYDROCARBON MIXTURES (W/ACETYLENES) (W/10% BENZENE OR MOR	BHA	5,000	5730	7711	43296	1.725	*********	108.9	*********	0.0	108.9	0.104	1.83	OK
BENZENE HYDROCARBON MIXTURES (W/10% BENZENE OR MORE)	BHB	5,000	5730	7711	43296	1.725	*********	108.9	*********	0.0	108.9	0.104	1.83	OK
BENZENE, TOLUENE, XYLENE MIXTURES (HAVING 10% BENZENE OR MORE)	BTX	5,000	5730	7711	43296	1.725	*********	108.9	*********	0.0	108.9	0.104	1.83	OK
iso-BUTYL ACRYLATE	BAI	5,000	5060	5371	30156	1.665	*********	87.4	*********	0.0	87.4	0.052	1.72	OK
n-BUTYL ACRYLATE	BTC	5,000	5040	5247	29462	1.635	*********	86.9	*********	0.0	86.9	0.050	1.68	OK
BUTYL ACRYLATE (SEE ISO- & N- BUTYL ACRYLATE)	BAR	5,000	5060	5371	30156	1.665	*********	87.4	*********	0.0	87.4	0.052	1.72	OK
BUTYL METHACRYLATE	BMH	5,000	5029	5202	29205	1.635	*********	86.6	*********	0.0	86.6	0.049	1.68	OK
iso-BUTYRALDEHYDE	BAD	5,000	5780	7585	42589	1.725	*********	111.1	*********	0.0	111.1	0.101	1.83	OK
n-BUTYRALDEHYDE	BTR	5,000	5780	7585	42589	1.725	*********	111.1	*********	0.0	111.1	0.101	1.83	OK
BUTYRALDEHYDES (CRUDE)	BFA	5,000	5800	7631	42843	1.725	*********	111.9	*********	0.0	111.9	0.102	1.83	OK
BUTYRALDEHYDE (ISO-, N-)	BAE	5,000	5800	7631	42843	1.725	*********	111.9	*********	0.0	111.9	0.102	1.83	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	*********	88.1	*********	0.0	88.1	0.053	1.72	OK
CHLOROFORM	CRF													
CHLOROSULFONIC ACID	CSA													
COAL TAR NAPHTHA SOLVENT	NCT	5,000	5020	5102	28645	1.635	*********	86.4	*********	0.0	86.4	0.047	1.68	OK
CREOSOTE (COAL TAR)	CCT	5,000	5001	5005	28103	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
CREOSOTE (WOOD)	CWD	5,000	5001	5005	28103	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
CRESOLS (ALL ISOMERS)	CRS	5,000	5006	5031	28248	1.635	*********	86.1	*********	0.0	86.1	0.046	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	*********	86.1	*********	0.0	86.1	0.046	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	*********	92.3	*********	0.0	92.3	0.057	1.72	OK

STDVAP1

E-3-a

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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
CYCLOHEXANONE	CCH	5,000	5002	5009	28126	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
CYCLOHEXYLAMINE	CHA	5,000	5062	5291	29709	1.635	*********	87.6	*********	0.0	87.6	0.051	1.69	OK
DECYL ACRYLATE (iso-, n-)	DAT	5,000	5001	5011	28134	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
DICHLOROBENZENE (ALL ISOMERS)	DBX	5,000	5010	5073	28481	1.635	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
1,1-DICHLOROETHANE	DCH	5,000	5990	9419	52886	1.785	*********	117.3	*********	0.0	117.3	0.153	1.94	OK
2,2-DICHLOROETHYL ETHER	DEE	5,000	5004	5028	28231	1.635	*********	86.1	*********	0.0	86.1	0.046	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	*********	104.5	*********	0.0	104.5	0.118	1.87	OK
1,3-DICHLOROPROPENE	DPU	5,000	5550	7778	43673	1.725	*********	102.0	*********	0.0	102.0	0.106	1.83	OK
DICHLOROPROPENE, DICHLOROPROPANE MIXTURES	DMX	5,000	5630	8213	46110	1.755	*********	104.5	*********	0.0	104.5	0.118	1.87	OK
2,2-DICHLOROPROPIONIC ACID	DCN													
DIETHANOLAMINE	DEA	5,000	5001	5005	28102	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
DIETHYLAMINE	DEN	5,000	5100	5331	29931	1.635	*********	88.9	*********	0.0	88.9	0.051	1.69	OK
DIETHYLENETRIAMINE	DET	5,000	5004	5019	28182	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
DIETHYL ETHER, SEE ETHYL ETHER	DEH													
DIISOBUTYLAMINE	DBU	5,000	5046	5288	29691	1.635	*********	87.0	*********	0.0	87.0	0.051	1.69	OK
DIISOPROPANOLAMINE	DIP	5,000	5001	5007	28110	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
DIISOPROPYLAMINE	DIA	5,000	5370	6731	37791	1.695	*********	96.8	*********	0.0	96.8	0.080	1.78	OK
N,N-DIMETHYLACETAMIDE	DAC	5,000	5020	5082	28532	1.635	*********	86.5	*********	0.0	86.5	0.047	1.68	OK
DIMETHYLETHANOLAMINE	DMB	5,000	5050	5206	29229	1.635	*********	87.3	*********	0.0	87.3	0.049	1.68	OK
DIMETHYLFORMAMIDE	DMF	5,000	5030	5100	28634	1.635	*********	86.8	*********	0.0	86.8	0.047	1.68	OK
1,4-DIOXANE	DOX	5,000	5184	5751	32288	1.665	*********	91.3	*********	0.0	91.3	0.059	1.72	OK
DI-N-PROPYLAMINE	DNA	5,000	5150	5715	32088	1.665	*********	90.1	*********	0.0	90.1	0.059	1.72	OK
ETHANOLAMINE	MEA	5,000	5003	5008	28119	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
ETHYL ACRYLATE	EAC	5,000	5200	5949	33399	1.665	*********	91.4	*********	0.0	91.4	0.063	1.73	OK
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	5,000	6550	8117	45576	1.755	*********	142.7	*********	0.0	142.7	0.116	1.87	OK
N-ETHYLBUTYLAMINE	EBA	5,000	5120	5574	31296	1.665	*********	89.5	*********	0.0	89.5	0.056	1.72	OK
N-ETHYLCYCLOHEXYLAMINE	ECC	5,000	5050	5308	29805	1.635	*********	87.1	*********	0.0	87.1	0.051	1.69	OK
ETHYLENE CYANOHYDRIN	ETC	5,000	5001	5003	28092	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
ETHYLENEDIAMINE	EDA	5,000	5090	5243	29439	1.635	*********	88.7	*********	0.0	88.7	0.050	1.68	OK
ETHYLENE DIBROMIDE	EDB													
ETHYLENE DICHLORIDE	EDC	5,000	5400	6825	38322	1.695	*********	97.5	*********	0.0	97.5	0.082	1.78	OK
ETHYLENE GLYCOL PROPYL ETHER	EGP	5,000	5060	5404	30344	1.665	*********	87.4	*********	0.0	87.4	0.053	1.72	OK
2-ETHYLHEXYL ACRYLATE	EAI	5,000	5002	5019	28177	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
ETHYLIDENE NORBORNENE	ENB	5,000	5033	5190	29137	1.635	*********	86.7	*********	0.0	86.7	0.049	1.68	OK
ETHYL METHACRYLATE	ETM	5,000	5100	5544	31125	1.665	*********	88.8	*********	0.0	88.8	0.055	1.72	OK
2-ETHYL-3-PROPYLACROLEIN	EPA	5,000	5012	5074	28488	1.635	*********	86.2	*********	0.0	86.2	0.047	1.68	OK
FERRIC CHLORIDE SOLUTIONS	FCS													
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	5,000	5015	5016	28162	1.635	*********	86.4	*********	0.0	86.4	0.046	1.68	OK

III-30

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; B344

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	FMA	5,000	5210	5409	30369	1.665	*********	92.7	*********	0.0	92.7	0.053	1.72	OK
FURFURAL	FFA	5,000	5015	5068	28457	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
GLUTARALDEHYDE SOLUTION (50% OR LESS)	GTA													
HEXAMETHYLENEDIAMINE SOLUTION	HMC	5,000	5001	5006	28105	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
HEXAMETHYLENEIMINE	HMI	5,000	5050	5050	28354	1.635	*********	87.6	*********	0.0	87.6	0.046	1.68	OK
HYDROCHLORIC ACID SPENT (15% OR LESS)	HCS													
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-)														
ISOPRENE	IPR	5,000	7300	12467	69999	1.890	*********	172.3	*********	0.0	172.3	0.266	2.16	OK
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT 3% OR MORE)(INCLUDING:	KPL													
MESITYL OXIDE	MSO	5,000	5067	5323	29884	1.635	*********	87.7	*********	0.0	87.7	0.051	1.69	OK
METHYL ACRYLATE	MAM	5,000	5410	6640	37279	1.695	*********	98.2	*********	0.0	98.2	0.078	1.77	OK
METHYLCYCLOPENTADIENE DIMER	MCK	5,000	5015	5013	28148	1.635	*********	86.4	*********	0.0	86.4	0.046	1.68	OK
METHYL DIETHANOLAMINE	MDE	5,000	5010	5058	28397	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
2-METHYL-5-ETHYLPYRIDINE	MEP	5,000	5016	5094	28602	1.635	*********	86.4	*********	0.0	86.4	0.047	1.68	OK
METHYLENE CHLORIDE (SEE DICHLOROMETHANE)														
METHYL METHACRYLATE	MMM	5,000	5202	5944	33372	1.665	*********	91.5	*********	0.0	91.5	0.063	1.73	OK
2-METHYLPYRIDINE	MPR	5,000	5050	5219	29301	1.635	*********	87.3	*********	0.0	87.3	0.049	1.68	OK
alpha-METHYLSTYRENE	MSR	5,000	5040	5228	29354	1.635	*********	86.9	*********	0.0	86.9	0.049	1.68	OK
MORPHOLINE	MPL	5,000	5080	5325	29898	1.635	*********	88.2	*********	0.0	88.2	0.051	1.69	OK
NITRIC ACID (70% OR LESS)	NCD													
NITROPROPANE (-1, OR -2)	NPM	5,000	5105	5435	30516	1.665	*********	89.0	*********	0.0	89.0	0.053	1.72	OK
OCTYL NITRATES (ALL ISOMERS)	ONE	5,000	5031	5266	29568	1.635	*********	86.6	*********	0.0	86.6	0.050	1.69	OK
OLEUM	OLM	5,000	5001	5004	28094	1.635	*********	86.0	*********	0.0	86.0	0.045	1.68	OK
PENTACHLOROETHANE	PCE													
1, 3-PENTADIENE	PDE	5,000	6706	10458	58720	1.815	*********	146.7	*********	0.0	146.7	0.189	2.00	OK
PERCHLOROETHYLENE (SAME AS TETRACHLOROETHYLENE)	PER													
PHOSPHORIC ACID	PAC													
POLYETHYLENE POLYAMINES	PEB	5,000	5001	5007	28114	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
POLYMETHYLENE POLYPHENYL ISOCYANATE	PPI													
POTASSIUM HYDROXIDE SOLUTION (SEE CAUSTIC POTASH SOLUTION)														
iso-PROPANOLAMINE	MPA	5,000	5008	5028	28228	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
PROPANOLAMINE (iso-, n-)	PAX	5,000	5008	5028	28228	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
PROPIONIC ACID	PNA	5,000	5030	5102	28647	1.635	*********	86.8	*********	0.0	86.8	0.047	1.68	OK
iso-PROPYLAMINE	IPP	5,000	7342	11619	65233	1.890	*********	175.0	*********	0.0	175.0	0.232	2.12	OK
iso-PROPYL ETHER	IPE	5,000	5664	8060	45251	1.755	*********	106.0	*********	0.0	106.0	0.113	1.87	OK
PYRIDINE	PRD	5,000	5130	5473	30727	1.665	*********	89.8	*********	0.0	89.8	0.054	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													

F-3-C

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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	*********	87.0	*********	0.0	87.0	0.049	1.68	OK
SULFURIC ACID	SFA	5,000	5001	5005	28100	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
SULFURIC ACID, SPENT	SAC	5,000	5001	5000	28070	1.635	*********	86.0	*********	0.0	86.0	0.045	1.68	OK
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORIDE)	TEC											
TETRAETHYLENEPENTAMINE	TTP	5,000	5000	5001	28079	1.635	*********	86.0	*********	0.0	86.0	0.045	1.68	OK
TETRAHYDROFURAN	THF	5,000	5850	6365	35735	1.695	*********	115.7	*********	0.0	115.7	0.072	1.77	OK
1,1,2-TRICHLOROETHANE (VINYL TRICHLORIDE)	TCM	5,000	5102	5651	31727	1.665	*********	88.4	*********	0.0	88.4	0.057	1.72	OK
TRICHLOROETHANE (SEE 1,1,2-TRICHLOROETHANE)														
TRICHLOROETHYLENE	TCL	5,000	5346	7067	39679	1.695	*********	95.3	*********	0.0	95.3	0.088	1.78	OK
1,2,3-TRICHLOROPROPANE	TCN	5,000	5015	5121	28751	1.635	*********	86.3	*********	0.0	86.3	0.048	1.68	OK
TRIETHANOLAMINE	TEA	5,000	5001	5007	28115	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
TRIETHYLAMINE	TEN	5,000	5250	6177	34681	1.665	*********	93.2	*********	0.0	93.2	0.068	1.73	OK
TRIETHYLENETETRAMINE	TET	5,000	5001	5007	28114	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
UREA, AMMONIUM NITRATE SOL'N (CONTAINING MORE THAN 2% NH3)	UAS													
VALERALDEHYDE (iso-, n-)		5,000	5500	6995	39272	1.695	*********	101.2	*********	0.0	101.2	0.087	1.78	OK
VALERALDEHYDE (iso-)	IVA	5,000	5500	6995	39272	1.695	*********	101.2	*********	0.0	101.2	0.087	1.78	OK
VALERALDEHYDE (n-)	VAL	5,000	5001	5009	28122	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VBL													
VINYL ACETATE	VAM	5,000	5580	7287	40913	1.725	*********	103.8	*********	0.0	103.8	0.094	1.82	OK
VINYLTOLUENE	VNT	5,000	5012	5069	28460	1.635	*********	86.2	*********	0.0	86.2	0.047	1.68	OK

E-3-d

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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 Nv-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	*********	104.5	*********	0.0	104.5	0.118	1.87	OK
1,1,1-TRICHLOROETHANE														
1,2-DICHLOROPROPANE	DPP	5,000	5260	6227	34960	1.665	*********	93.2	*********	0.0	93.2	0.069	1.73	OK
1,3 CYCLOPENTADIENE														
1,3-DICHLOROPROPANE	DPC	5,000	5380	6974	39156	1.695	*********	96.5	*********	0.0	96.5	0.086	1.78	OK
2-METHYL-2-HYDROXY-3-BUTYNE	MHB	5,000	5114	5445	30573	1.665	*********	89.3	*********	0.0	89.3	0.054	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	*********	130.3	*********	0.0	130.3	0.103	1.83	OK
BENZENE SULFONYL CHLORIDE	BSC	5,000	5000	5001	28078	1.635	*********	86.0	*********	0.0	86.0	0.045	1.68	OK
BENZYL ACETATE	BZE	5,000	5002	5015	28157	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
BENZYL CHLORIDE (STABILIZED)	BCL	5,000	5009	5056	28385	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
BUTANOL														
BUTYL ETHER (n-)	BTE	5,000	5040	5253	29495	1.635	*********	86.9	*********	0.0	86.9	0.050	1.68	OK
BUTYLENE OXIDE (1,2-)	BTO	5,000	5918	8037	45125	1.755	*********	115.9	*********	0.0	115.9	0.113	1.87	OK
BUTYRIC ACID	BRA	5,000	5007	5029	28234	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
CARBOLIC ACID	CBO	5,000	5006	5027	28224	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
CHLOROACETIC ACID (80% OR LESS)	CHM	5,000	5001	5005	28099	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
CHLOROPROPIONIC ACID (2- OR 3-)	CPM	5,000	5002	5010	28131	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
CHLOROTOLUENE (m-)	CTM	5,000	5032	5198	29186	1.635	*********	86.7	*********	0.0	86.7	0.049	1.68	OK
CHLOROTOLUENE (o-)	CTO	5,000	5032	5198	29186	1.635	*********	86.7	*********	0.0	86.7	0.049	1.68	OK
CHLOROTOLUENE (p)	CRN	5,000	5009	5056	28385	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
CHLOROTOLUENES (MIXED ISOMERS)	CHI	5,000	5053	5327	29907	1.635	*********	87.2	*********	0.0	87.2	0.051	1.69	OK
CREOSOTE (ALL ISOMERS)	CCW	5,000	5001	5005	28103	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
CRESYLIC ACID TAR	CRX	5,000	5010	5010	28130	1.635	*********	86.3	*********	0.0	86.3	0.046	1.68	OK
CYCLOHEPTANE	CYE	5,000	5140	5646	31700	1.665	*********	89.7	*********	0.0	89.7	0.057	1.72	OK
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	CYX	5,000	5100	5462	30666	1.665	*********	88.8	*********	0.0	88.8	0.054	1.72	OK
CYCLOHEXYL ACETATE	CYC	5,000	5001	5007	28113	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
CYCLOPENTADIENE, STYRENE, BENZENE MIXTURE	CSB	5,000	5450	7681	43124	1.725	*********	98.3	*********	0.0	98.3	0.103	1.83	OK
CYCLOPENTANE	CYP	5,000	6315	9230	51825	1.785	*********	131.0	*********	0.0	131.0	0.148	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	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
DICHLOROPROPANE														
DICHLOROPROPENE														
DIETHYL SULFATE	DSU	5,000	5001	5008	28116	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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	*********	86.4	*********	0.0	86.4	0.047	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	*********	100.6	*********	0.0	100.6	0.094	1.82	OK
ETHYLAMINE	EAM	5,000	9080	14023	78736	1.975	*********	266.3	*********	0.0	266.3	0.336	2.31	OK
ETHYLENE DICHLORIDE 1,1,2-TRICHLOROETHANE MIXTURE	ETX	5,000	5370	7249	40700	1.725	*********	95.9	*********	0.0	95.9	0.092	1.82	OK
ETHYLMERCAPTAN (SAME AS ETHANETHIOL)														
ETHYLPHENOL	EPL	5,000	5002	5012	28140	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
FORMALDEHYDE SOLUTION (50% OR MORE), METHANOL MIXTURES	MTM	5,000	5663	5778	32440	1.665	*********	109.5	*********	0.0	109.5	0.060	1.73	OK
HYDROSULFIDE														
INDENES														
ISOBUTYL ACETATE	IBA	5,000	5036	5204	29218	1.635	*********	86.8	*********	0.0	86.8	0.049	1.68	OK
ISOPRENE, PENTADIENE MIXTURE	IPN													
ISO-PROPYL ALCOHOL		5,000	5300	5803	32584	1.665	*********	95.4	*********	0.0	95.4	0.060	1.73	OK
LAURIC ACID	LRA													
METHACRYLONITRILE	MET	5,000	5339	6027	33837	1.665	*********	96.4	*********	0.0	96.4	0.065	1.73	OK
METHANOL														
METHYL STYRENE														
METHYL STYRENE, INDENES, ALKYLBENZENE MIXTURES	MIA													
METHYLCYCLOHEXANE	MCY	5,000	5237	6087	34178	1.665	*********	92.7	*********	0.0	92.7	0.066	1.73	OK
METHYLHEXANE (SAME AS HEPTANE)														
MONOETHANOLAMINE	MEA	5,000	5010	5027	28226	1.635	*********	86.3	*********	0.0	86.3	0.046	1.68	OK
MONOISOPROPANOLAMINE		5,000	5020	5069	28461	1.635	*********	86.5	*********	0.0	86.5	0.047	1.68	OK
NAPHTHALENE (MOLTEN)	NTM	5,000	5001	5006	28109	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
NEODECANOIC ACID	NEA	5,000	5001	5009	28122	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
NITRILOTRIACETIC ACID	NAA													
NITROPHENOL (MOLTEN)	NTP													
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NNM	5,000	5110	5456	30632	1.665	*********	89.1	*********	0.0	89.1	0.054	1.72	OK
NITROTOLUENE (o-,p-)	NIT	5,000	5002	5014	28149	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
PARALDEHYDE	PDH	5,000	5830	9788	54958	1.785	*********	110.7	*********	0.0	110.7	0.165	1.95	OK
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDP	GS													
PROPIONALDEHYDE	PAD	5,000	6376	8671	48684	1.755	*********	134.3	*********	0.0	134.3	0.131	1.89	OK
PROPIONIC ANHYDRIDE	PAH	5,000	5011	5070	28467	1.635	*********	86.2	*********	0.0	86.2	0.047	1.68	OK
PROPIONITRILE	PCN	5,000	5117	5281	29649	1.635	*********	89.6	*********	0.0	89.6	0.050	1.69	OK
PROPYLAMINE (n-)	PRA	5,000	6355	8690	48792	1.755	*********	133.1	*********	0.0	133.1	0.132	1.89	OK
PROPYLBENZENE		5,000	5414	4829	27113	1.635	*********	101.7	*********	0.0	101.7	0.043	1.68	OK
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	GPY	5,000	5730	7711	43296	1.725	*********	108.9	*********	0.0	108.9	0.104	1.83	OK
PYROLYSIS RESIDUAL FUELS														
SEWAGE, RAW	SWR													

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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
SODIUM SULFIDE (SOLID IN WATER)	SDS											
STYRENE	STY	5,000	5040	5199	29192	1.635	*********	87.0	*********	0.0	87.0	0.049	1.68	OK
STYRENE CRUDE	STX	5,000	5040	5199	29192	1.635	*********	87.0	*********	0.0	87.0	0.049	1.68	OK
STYRENE TAR	STT													
TETRAMETHYLBENZENE (1,2,3,5-)	TTB	5,000	5014	5083	28539	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
TOLUIDINE (o-)	TLI	5,000	5001	5005	28102	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
TRICHLOROBENZENE (1,2,4-)	TCB	5,000	5003	5027	28226	1.635	*********	86.0	*********	0.0	86.0	0.046	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	*********	99.0	*********	0.0	99.0	0.086	1.78	OK

E-3-9

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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	*********	119.7	*********	0.0	119.7	0.102	1.83	OK
Acetophenone	ACP	5,000	5060	5346	30017	1.665	*********	87.4	*********	0.0	87.4	0.052	1.72	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	*********	91.1	*********	0.0	91.1	0.069	1.76	OK
AMYL ACETATE (n-)	AML	5,000	5033	5208	29243	1.635	*********	86.7	*********	0.0	86.7	0.049	1.68	OK
AMYL ACETATE (iso-)	IAT	5,000	5033	5208	29243	1.635	*********	86.7	*********	0.0	86.7	0.049	1.68	OK
Amyl alcohol (iso-, n-, sec-, primary)(SEE ALSO IAA)	AAI	5,000	5030	5124	28770	1.635	*********	86.8	*********	0.0	86.8	0.048	1.68	OK
Amyl alcohol (n-)	AAN	5,000	5030	5124	28770	1.635	*********	86.8	*********	0.0	86.8	0.048	1.68	OK
Amyl alcohol (tert-)	AAI													
AMYL ALCOHOL, PRIMARY	APM	5,000	5030	5124	28770	1.635	*********	86.8	*********	0.0	86.8	0.048	1.68	OK
AMYL ALCOHOL, (sec-)	ASE	5,000	5030	5124	28770	1.635	*********	86.8	*********	0.0	86.8	0.048	1.68	OK
Amylene	AMZ													
AMYL ALCOHOL, (iso-)	IAA	5,000	5030	5124	28770	1.635	*********	86.8	*********	0.0	86.8	0.048	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	*********	86.2	*********	0.0	86.2	0.046	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													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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
Butyl Acetate (iso-, n-)	BAX	5,000	5060	5334	29947	1.635	*********	87.5	*********	0.0	87.5	0.051	1.69	OK
BUTYL ACETATE (N-)	BCN	5,000	5080	5443	30562	1.665	*********	88.1	*********	0.0	88.1	0.053	1.72	OK
Butyl Acetate (sec-)	BTA	5,000	5150	5822	32686	1.665	*********	90.1	*********	0.0	90.1	0.061	1.73	OK
Butyl alcohol (iso-, n-, sec-, tert-)		5,000	5090	5311	29822	1.635	*********	88.6	*********	0.0	88.6	0.051	1.69	OK
BUTYL ALCOHOL (ISO-)	IAL	5,000	5090	5311	29822	1.635	*********	88.6	*********	0.0	88.6	0.051	1.69	OK
BUTYL ALCOHOL (N-)	BAN	5,000	5050	5173	29046	1.635	*********	87.4	*********	0.0	87.4	0.048	1.68	OK
BUTYL ALCOHOL (SEC-)	BAS	5,000	5130	5449	30597	1.665	*********	89.8	*********	0.0	89.8	0.054	1.72	OK
BUTYL ALCOHOL (TERT-)	BAT	5,000	5280	5966	33495	1.665	*********	94.7	*********	0.0	94.7	0.064	1.73	OK
Butyl Benzyl Phthalate	BPH	5,000	5001	5016	28164	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Butylene	BTN													
Butylene Glycol	BUG													
1,3-Butylene Glycol, SEE BUTYLENE GLYCOL														
Butylene Polyglycol, SEE BUTYLENE GLYCOL														
iso-Butyl Formate														
n-Butyl Formate														
Butyl Heptyl Ketone	BHK													
Butyl Methyl Ketone,SEE METHYL BUTYL KETONE														
Butyl Stearate														
Butyl Toluene	BUE	5,000	5010	5073	28484	1.635	*********	86.1	*********	0.0	86.1	0.047	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	*********	86.1	*********	0.0	86.1	0.046	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	*********	87.4	*********	0.0	87.4	0.052	1.72	OK
Cycloaliphatic resins														
Cyclohexane	CHX	5,000	5450	6736	37823	1.695	*********	99.7	*********	0.0	99.7	0.081	1.78	OK
Cyclohexanol	CHN	5,000	5015	5072	28475	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
1,3-Cyclopentadiene dimer (molten)	CPD	5,000	5025	5161	28976	1.635	*********	86.5	*********	0.0	86.5	0.048	1.68	OK
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)														
Cymene (para-)	CMP	5,000	5011	5072	28479	1.635	*********	86.2	*********	0.0	86.2	0.047	1.68	OK
Decahydronaphthalene	DHN	5,000	5010	5068	28454	1.635	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
Decaldehyde (iso-)	IDA	5,000	5001	5007	28114	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Decaldehyde (n-)	DAL													
Decane	DDC													
Decene	DCE	5,000	5012	5082	28534	1.635	*********	86.2	*********	0.0	86.2	0.047	1.68	OK

E-3-2

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
DECYL ALCOHOL (iso-)	ISA	5,000	5001	5008	28116	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
DECYL ALCOHOL (n-)	DAN	5,000	5001	5008	28116	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Decylbenzene (n-)	DBZ	5,000	5001	5011	28135	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Detergent Alkylate														
Diacetone alcohol	DAA	5,000	5010	5056	28389	1.635	*********	86.2	*********	0.0	86.2	0.046	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	*********	86.5	*********	0.0	86.5	0.048	1.68	OK
Diethylbenzene	DEB	5,000	5008	5053	28369	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
Diethylene Glycol	DEG	5,000	5001	5005	28102	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Diethylene Glycol Butyl Ether	DME	5,000	5001	5008	28118	1.635	*********	86.0	*********	0.0	86.0	0.046	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	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Diethylene Glycol Methyl Ether	DGM	5,000	5003	5018	28172	1.635	*********	86.0	*********	0.0	86.0	0.046	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	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
Diisobutylene	DBL	5,000	5200	6049	33962	1.665	*********	91.4	*********	0.0	91.4	0.065	1.73	OK
Diisobutyl Ketone	DIK	5,000	5016	5112	28700	1.635	*********	86.3	*********	0.0	86.3	0.047	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	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Diisopropyl Naphthalene	DII													
Dimethyl Adipate	DLA													
Dimethylbenzene														
Dimethyl Glutarate	DGT													

III-3-1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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
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	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Di(octylpheny)amine														
Dioctyl Phthalate	DOP													
Dipentene	DPN	5,000	5010	5070	28466	1.635	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
Diphenyl	DIL	5,000	5001	5008	28116	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Diphenyl, Diphenyl Ether mixture	DDO	5,000	5001	5009	28121	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Diphenyl Ether	DPE	5,000	5001	5009	28121	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Diphenyl Ether, Biphenyl Ether mixture	DOB													
Dipropylene Glycol	DPG	5,000	5007	5046	28332	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
Dipropylene Glycol Dibenzoate	DGY													
Dipropylene Glycol Methyl Ether	DPY													
DISTILLATES: Flashed feed stocks	DFF	5,000	5230	6056	34002	1.665	*********	92.5	*********	0.0	92.5	0.066	1.73	OK
DISTILLATES: Straight run	DSR	5,000	5230	6056	34002	1.665	*********	92.5	*********	0.0	92.5	0.066	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	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
DODECENE	DOD	5,000	5002	5017	28168	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Dodecylbenzene	DDB	5,000	5470	9704	54482	1.785	*********	97.4	*********	0.0	97.4	0.162	1.95	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	*********	99.3	*********	0.0	99.3	0.082	1.78	OK
Ethyl Acetoacetate	EAA	5,000	5020	5127	28785	1.635	*********	86.4	*********	0.0	86.4	0.048	1.68	OK
Ethyl alcohol (ETHANOL)	EAL	5,000	5350	5686	31926	1.665	*********	97.7	*********	0.0	97.7	0.058	1.72	OK
Ethyl Amyl Ketone	EAK													
Ethyl Benzene	ETB	5,000	5060	5295	29727	1.635	*********	87.5	*********	0.0	87.5	0.051	1.69	OK
Ethyl Butanol	EBT	5,000	5012	5059	28402	1.635	*********	86.3	*********	0.0	86.3	0.046	1.68	OK
Ethyl Butyrate	EBR	5,000	5100	5552	31174	1.665	*********	88.8	*********	0.0	88.8	0.056	1.72	OK
Ethyl Cyclohexane	ECY	5,000	5050	5269	29583	1.635	*********	87.2	*********	0.0	87.2	0.050	1.69	OK
Ethylene	ETL													
Ethylene Carbonate														

III-3-82

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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	***											
Ethylene Glycol Acetate	EGL	5,000	5001	5003	28089	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Ethylene Glycol Butyl Ether	EGO													
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EGM													
Ethylene Glycol Ether Acetate	EMA	5,000	5005	5040	28297	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Ethylene Glycol Tert-Butyl Ether														
Ethylene Glycol Diacetate														
Ethylene Glycol Dibutyl Ether	EGY	5,000	5001	5007	28114	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	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	5,000	5001	5007	28112	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Ethylene Glycol Phenyl Ether	EGT													
Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixt	EPE	5,000	5001	5007	28112	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Ethylene-Propylene Copolymer (in liquid mixtures)	EDX													
Ethyl-3-Ethoxypropionate														
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EEP													
2-Ethylhexanoic acid	EHA	5,000	5017	5106	28668	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHO													
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID	EHX	5,000	5002	5013	28145	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Ethyl Hexyl Phthalate (SEE ALSO DI 2-ETHYLHEXYL PHTHALATE)	EHE													
Ethyl Hexyl Tallate	EHT													
Ethyl Propionate	EPR	5,000	5350	5686	31926	1.665	*********	97.7	*********	0.0	97.7	0.058	1.72	OK
Ethyl Toluene	ETE	5,000	5028	5163	28989	1.635	*********	86.6	*********	0.0	86.6	0.048	1.68	OK
Fatty acid (saturated, C13 and above)														
Fatty acid Amides														
Formamide														
Furfuryl Alcohol	FAM	5,000	5010	5019	28177	1.635	*********	86.3	*********	0.0	86.3	0.046	1.68	OK
Gas oil, cracked	FAL	5,000	5005	5024	28205	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
GASOLINE BLENDING STOCKS: Alkylates	GOC													
GASOLINE BLENDING STOCKS: Reformates	GAK	5,000	6250	10555	59261	1.815	*********	127.0	*********	0.0	127.0	0.191	2.01	OK
GASOLINES: Automotive (containing not over 4.23 grams lead per ga	GRF	5,000	6250	10555	59261	1.815	*********	127.0	*********	0.0	127.0	0.191	2.01	OK
GASOLINES: Aviation (containing not over 4.86 grams lead per gall	GAT	5,000	6250	10555	59261	1.815	*********	127.0	*********	0.0	127.0	0.191	2.01	OK
GASOLINES: Casinghead (natural)	GAV	5,000	6250	10555	59261	1.815	*********	127.0	*********	0.0	127.0	0.191	2.01	OK
GASOLINES: Polymer	GCS	5,000	6250	10555	59261	1.815	*********	127.0	*********	0.0	127.0	0.191	2.01	OK
GASOLINES: Straight run	GPL	5,000	6250	10555	59261	1.815	*********	127.0	*********	0.0	127.0	0.191	2.01	OK
Glycerine	GSR	5,000	6250	10555	59261	1.815	*********	127.0	*********	0.0	127.0	0.191	2.01	OK
Glycerol, SEE GLYCERINE	GCR													
Glycerol Polyalkoxylate														
Glycerol Triacetate														

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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 TRI	***											
Glycidyl Ester of Tridecyl Acetic acid												
Glycidyl Ester of Versatic acid, SEE GLYCIDYL ESTER OF TRIDECYL ACETI	GLT											
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)												
HEPTANE (N-)	HMX	5,000	5250	6163	34604	1.665	*********	93.2	*********	0.0	93.2	0.068	1.73	OK
Heptanoic acid	HPT	5,000	5250	6163	34604	1.665	*********	93.2	*********	0.0	93.2	0.068	1.73	OK
Heptanol (all isomers)	HEP	5,000	5001	5006	28109	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
HEPTANOL	HTX	5,000	5004	5023	28200	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
Heptene (all isomers)	HTN	5,000	5004	5023	28200	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
HEPTENE (1-)	HPX	5,000	5290	6325	35513	1.695	*********	94.2	*********	0.0	94.2	0.071	1.77	OK
Heptyl Acetate	HTE	5,000	5280	6280	35262	1.695	*********	93.9	*********	0.0	93.9	0.070	1.77	OK
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR	HPE	5,000	5010	5079	28518	1.635	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
Hexaethylene Glycol												
Hexamethylene Glycol												
Hexamethylenetetramine solutions												
Hexane (all isomers)	HTS											
HEXANE	HXS	5,000	5700	7783	43696	1.725	*********	107.8	*********	0.0	107.8	0.106	1.83	OK
Hexanoic acid	HXA	5,000	5700	7783	43696	1.725	*********	107.8	*********	0.0	107.8	0.106	1.83	OK
Hexanol	HXO	5,000	5001	5006	28105	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Hexene (all isomers)	HXN	5,000	5100	5482	30782	1.665	*********	88.8	*********	0.0	88.8	0.054	1.72	OK
HEXENE (1-)	HEX	5,000	5800	8075	45338	1.755	*********	111.3	*********	0.0	111.3	0.114	1.87	OK
HEXENE (2-)	HXE	5,000	5820	8152	45769	1.755	*********	111.9	*********	0.0	111.9	0.116	1.87	OK
Hexyl Acetate	HXT	5,000	5820	8152	45769	1.755	*********	111.9	*********	0.0	111.9	0.116	1.87	OK
Hexylene Glycol	HAE													
Hog Grease, SEE LARD	HXG	5,000	5001	5001	28080	1.635	*********	86.0	*********	0.0	86.0	0.045	1.68	OK
2-Hydroxy-4-(methylthio)butanoic acid												
HYDROCARBON 5-9 (MOVED TO SUB-O, NON TABLE 151, 6/24/95)	HBA											
Hydroxy terminated Polybutadiene, SEE POLYBUTADIENE, HYDROXYL TERMINA	HFN											
Isophorone												
JET FUELS: JP-1 (Kerosene)	IPH	5,000	5001	5007	28111	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
JET FUELS: JP-3	JPO	5,000	5014	5089	28575	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
JET FUELS: JP-4	JPT	5,000	5851	9858	55348	1.815	*********	111.5	*********	0.0	111.5	0.167	1.98	OK
JET FUELS: JP-5 (Kerosene, heavy)	JPF	5,000	5340	6817	38275	1.695	*********	95.4	*********	0.0	95.4	0.082	1.78	OK
JET FUELS: JP-8	JPV	5,000	5010	5056	28389	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
Kerosene	JPE													
Lactic acid	KRS	5,000	5015	5096	28610	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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
Lard	***											
Latex, liquid synthetic, including: Styrene-Butadien rubber	LLS											
Latex, liquid synthetic, including: Carboxylated Styrene-Butadien Cop												
Magnesium Nonyl Phenol Sulfide												
Magnesium Sulfonate												
Maleic Anhydride Copolymer	MSE											
2-Mercaptobenzothiazol (in liquid mixtures)												
Methane	MTH											
3-Methoxy-1-Butanol												
3-Methoxybutyl Acetate	MOA											
1-Methoxy-2-Propyl Acetate	MPO											
Methoxy Triglycol, SEE TRIETHYLENE GLYCOL METHYL ETHER	MTG											
Methyl Acetate	MTT	5,000	5610	7102	39873	1.695	*********	105.3	*********	0.0	105.3	0.089	1.78	OK
Methyl Acetoacetate	MAE													
Methyl alcohol (SEE METHANOL)	MAL	5,000	5663	5778	32440	1.665	*********	109.5	*********	0.0	109.5	0.060	1.73	OK
Methyl Amyl Acetate	MAC	5,000	5033	5233	29379	1.635	*********	86.7	*********	0.0	86.7	0.050	1.68	OK
Methyl Amyl alcohol	MAA	5,000	5043	5209	29246	1.635	*********	87.1	*********	0.0	87.1	0.049	1.68	OK
Methyl Amyl Ketone	MAK													
Methyl Butanol, SEE THE AMYL ALCOHOLS	MBL													
Methyl Butenol	MBK	5,000	5097	5465	30685	1.665	*********	88.7	*********	0.0	88.7	0.054	1.72	OK
Methyl n-Butyl Ketone	MBY													
Methyl Butynol	MBU	5,000	5126	5608	31485	1.665	*********	89.7	*********	0.0	89.7	0.057	1.72	OK
Methyl Butyrate	MEK	5,000	5450	6487	36421	1.695	*********	100.0	*********	0.0	100.0	0.075	1.77	OK
Methyl Ethyl Ketone	MTF	5,000	6542	10391	58343	1.815	*********	139.4	*********	0.0	139.4	0.186	2.00	OK
Methyl Formal (DIMETHYL FORMAL)	MHK	5,000	5006	5042	28309	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
Methyl Heptyl Ketone	MIC													
Methyl Isobutyl Carbinol, SEE METHYL AMYL ALCOHOL	MIK	5,000	5115	5542	31116	1.665	*********	89.3	*********	0.0	89.3	0.055	1.72	OK
Methyl Isobutyl Ketone	MNA	5,000	5001	5007	28113	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
3-Methyl-3-Methoxybutanol	MPN	5,000	5630	7424	41684	1.725	*********	105.4	*********	0.0	105.4	0.097	1.82	OK
3-Methyl-3-Methoxybutyl Acetate	MTN	5,000	5849	8263	46394	1.755	*********	113.0	*********	0.0	113.0	0.119	1.87	OK
1-Methyl Naphthalene	MPY													
Methyl Pentene	MBE	5,000	5004	5017	28169	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
2-METHYL-1-PENTENE	MCO													
5-METHYL-1-PENTENE	MNS	5,000	5020	5121	28754	1.635	*********	86.4	*********	0.0	86.4	0.048	1.68	OK
N-Methyl-2-Pyrrolidone	MRE	5,000	5017	5114	28710	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
Methyl Tert-Butyl Ether (MTBE)														
Metolachlor														
Mineral spirits														
Myrcene														
NAPHTHA: Aromatic (Having less than 10% Benzene)														
NAPHTHA: Cracking fraction														
NAPHTHA: Heavy														

E-3-2

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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												
NAPHTHA: Solvent	PTN											
NAPHTHA: Stoddard solvent	NSV	5,000	5020	5097	28617	1.635	*********	86.4	*********	0.0	86.4	0.047	1.68	OK
NAPHTHA: Varnish makers' and painters' (75%)	NSS	5,000	5020	5121	28754	1.635	*********	86.4	*********	0.0	86.4	0.048	1.68	OK
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt sol	NVM	5,000	5019	5115	28720	1.635	*********	86.4	*********	0.0	86.4	0.047	1.68	OK
Naphthenic acid	NFS													
Nonane (all isomers)	NTI													
NONANE	NAX	5,000	5027	5168	29014	1.635	*********	86.6	*********	0.0	86.6	0.048	1.68	OK
Nonanoic acid (all isomers)	NAN	5,000	5027	5168	29014	1.635	*********	86.6	*********	0.0	86.6	0.048	1.68	OK
Nonanoic, Tridecanoic acid mixture	NNA													
Nonene														
Nonyl alcohol (all isomers)	NON	5,000	5035	5211	29260	1.635	*********	86.8	*********	0.0	86.8	0.049	1.68	OK
NONYL ALCOHOL	NNS	5,000	5010	5072	28475	1.635	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
NONYL ALCOHOL (iso-)	NNN	5,000	5010	5072	28475	1.635	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
Nonyl Methacrylate Monomer	NNI	5,000	5010	5072	28475	1.635	*********	86.1	*********	0.0	86.1	0.047	1.68	OK
Nonyl Phenol														
Nonyl Phenol Poly(4-12)ethoxylates	NNP	5,000	5001	5011	28136	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Nonyl Phenol Sulfide (90% or less)	NPE													
Noxious liquid, N.O.S. (17) ("Trade name," contains "principal compone														
Non-Noxious liquid, N.O.S. (18) ("Trade name," contains principal com														
Octadecene														
Octadecenoamide solution (Oleamide)														
Octane (all isomers)	ODD													
OCTANE	OAX	5,000	5079	5426	30467	1.665	*********	88.1	*********	0.0	88.1	0.053	1.72	OK
Octanoic acid (all isomers)	OAN	5,000	5079	5426	30467	1.665	*********	88.1	*********	0.0	88.1	0.053	1.72	OK
Octanol (all isomers)	OAA	5,000	5001	5007	28114	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
OCTANOL	OCK	5,000	5001	5006	28109	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Octene (all isomers)	OTA	5,000	5001	5006	28109	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
OCTENE (1-)	OTX	5,000	5090	5485	30795	1.665	*********	88.5	*********	0.0	88.5	0.054	1.72	OK
Octyl Acetate	OTE	5,000	5100	5532	31060	1.665	*********	88.8	*********	0.0	88.8	0.055	1.72	OK
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	OCX	5,000	5001	5006	28109	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
OCTYL ALCOHOL	IOA	5,000	5001	5006	28109	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Octyl Aldehydes	OAL													
Octyl Decyl Adipate	ODA													
Octyl Epoxytallate	OET													
Octyl Phthalate, SEE DI-(2-ETHYLHEXYL)PHTHALATE														
OIL, EDIBLE: Babassu														
OIL, EDIBLE: Beechnut	OBB													
OIL, EDIBLE: Castor														
OIL, EDIBLE: Cocoa butter	OCA													
OIL, EDIBLE: Coconut														
	OCC													

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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, EDIBLE: Cod liver	***											
OIL, EDIBLE: Corn												
OIL, EDIBLE: Cottonseed	OCO											
OIL, EDIBLE: Fish, N.O.S.	OCS											
OIL, EDIBLE: Grapeseed	OFS											
OIL, EDIBLE: Groundnut												
OIL, EDIBLE: Hazelnut												
OIL, EDIBLE: Lard												
OIL, EDIBLE: Maize	OLD											
OIL, EDIBLE: Mustard seed												
OIL, EDIBLE: Nutmeg Butter												
OIL, EDIBLE: Olive												
OIL, EDIBLE: Palm	OOL											
OIL, EDIBLE: Palm kernel	OPM											
OIL, EDIBLE: Peanut	OPO											
OIL, EDIBLE: Poppy	OPN											
OIL, EDIBLE: Raisin seed												
OIL, EDIBLE: Rice bran												
OIL, EDIBLE: Safflower	ORP											
OIL, EDIBLE: Salad	OSF											
OIL, EDIBLE: Sesame												
OIL, EDIBLE: Soya bean												
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED	OSB											
OIL, EDIBLE: Sunflower seed												
OIL, EDIBLE: Tucum	OSN											
OIL, EDIBLE: Vegetable, N.O.S.	OTC											
OIL, EDIBLE: Walnut	OVG											
OIL, FUEL: No. 1 (Kerosene)												
OIL, FUEL: No. 1-D	OON											
OIL, FUEL: No. 2	OOD											
OIL, FUEL: No. 2-D	OTW	5,000	5056	5635	31636	1.665	*********	86.8	*********	0.0	86.8	0.057	1.72	OK
OIL, FUEL: No. 4	OTD													
OIL, FUEL: No. 5	OFR	5,000	5015	5070	28469	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
OIL, FUEL: No. 6	OFV	5,000	5015	5070	28469	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
OIL, MISC: Absorption	OSX	5,000	5015	5070	28469	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
OIL, MISC: Aliphatic	OAS													
OIL, MISC: Animal, N.O.S.														
OIL, MISC: Aromatic														
OIL, MISC: Aviation F2300														
OIL, MISC: Clarified														
OIL, MISC: Coal	OCF													
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHY														

E-3-R

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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, 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 METH														
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACIDCFY														
OIL, MISC: Croton														
OIL, MISC: Crude														
OIL, MISC: Diesel	OIL	5,000	6250	6319	35479	1.695	*********	132.7	*********	0.0	132.7	0.072	1.77	OK
OIL, MISC: Gas, low pour	ODS	5,000	5069	5322	29880	1.635	*********	87.8	*********	0.0	87.8	0.051	1.69	OK
OIL, MISC: Gas, low sulfur														
OIL, MISC: Heartcut distillate														
OIL, MISC: Lanolin														
OIL, MISC: Linseed														
OIL, MISC: Lubricating														
OIL, MISC: Mineral	OLB	5,000	5015	5015	28158	1.635	*********	86.4	*********	0.0	86.4	0.046	1.68	OK
OIL, MISC: Mineral seal														
OIL, MISC: Motor	OMS													
OIL, MISC: Neatsfoot	OMT													
OIL, MISC: Oiticica	ONF													
OIL, MISC: Palm oil, fatty acid Methyl Ester	OOI													
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID MOPE	OPE													
OIL, MISC: Penetrating														
OIL, MISC: Perilla	OPT													
OIL, MISC: Pilchard														
OIL, MISC: Pine														
OIL, MISC: Range	OPI													
OIL, MISC: Residual	ORG													
OIL, MISC: Resin														
OIL, MISC: Resinous petroleum	ORS	5,000	5015	5015	28158	1.635	*********	86.4	*********	0.0	86.4	0.046	1.68	OK
OIL, MISC: Road														
OIL, MISC: Rosin	ORD													
OIL, MISC: Seal	ORN													
OIL, MISC: Soapstock														
OIL, MISC: Soya bean (epoxidized)	OIS													
OIL, MISC: Sperm														
OIL, MISC: Spindle	OSP													
OIL, MISC: Spray	OSD													
OIL, MISC: Tall	OSY													
OIL, MISC: Tall, fatty acid	OTL													
OIL, MISC: Tanner's	TOF													
OIL, MISC: Transformer	OTN													
OIL, MISC: Tung	OTF													
OIL, MISC: Turbine	OTG													
	OTB	5,000	5030	5231	29370	1.635	*********	86.6	*********	0.0	86.6	0.050	1.68	OK

III-3-A

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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: Whale	***											
OIL, MISC: White (mineral)												
OIL, MISC: Wood												
alpha-Olefins (C13 - C18)												
Olefins (C13 and above, all isomers)	OAM											
Oleic acid												
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)	OLA											
Organic Amine 70, SEE AMINOETHYLDIETHANOLAMINE, AMINOETHYL-ETHANOLAMI												
Palm Stearin												
n-Paraffins (C10 - C20)	PMS											
Pentadecanol, SEE SEE ALCOHOLS (C13 AND ABOVE)	PFN											
Pentaethylene Glycol	PDC	5,000	5001	5012	28139	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Pentaethylenehexamine												
Pentane (all isomers)	PEP											
PENTANE (iso-)	PTY	5,000	7100	12130	68103	1.890	*********	163.1	*********	0.0	163.1	0.252	2.14	OK
PENTANE (n-)	IPT	5,000	7700	14337	80495	2.015	*********	190.5	*********	0.0	190.5	0.349	2.36	OK
Pentanoic acid	PTA	5,000	7044	11980	67265	1.890	*********	160.5	*********	0.0	160.5	0.246	2.14	OK
Pentene (all isomers)														
PENTENE (1-)	PTX	5,000	7490	13298	74660	1.930	*********	180.9	*********	0.0	180.9	0.301	2.23	OK
Petrolatum	PTE	5,000	7490	13298	74660	1.930	*********	180.9	*********	0.0	180.9	0.301	2.23	OK
1-Phenyl-1-Xylyl Ethane	PTL													
Phosphosulfurized Bicyclic Terpene	PXE													
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES														
Pinene														
Polyalkenyl Succinic Anhydride Amine	PIN	5,000	5035	5232	29378	1.635	*********	86.7	*********	0.0	86.7	0.050	1.68	OK
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtur	PPX													
Polyalkylene Oxide Polyol														
Polamine, Amide mixture	PAO													
Polybutadiene, Hydroxyl terminated														
Polybutene														
Polydimethylsiloxane	PLB	5,000	5001	5121	28750	1.635	*********	85.7	*********	0.0	85.7	0.048	1.68	OK
Polyethylene Glycol														
Polyethylene Glycol Dimethyl Ether														
Polyglycerol														
Polyisobutylene, SEE POLYBUTENE														
Polymerized Esters														
Poly(20)oxyethylene Sorbitan Monooleate														
Polypropylene	PSM													
Polypropylene Glycol	PLP													
Polypropylene Glycol Methyl Ether	PGC	5,000	5010	5010	28130	1.635	*********	86.3	*********	0.0	86.3	0.046	1.68	OK
Polysiloxane	PGM	5,000	5080	5338	29972	1.635	*********	88.2	*********	0.0	88.2	0.051	1.69	OK
Polystyrene Diakyl Maleate														

E-3-2

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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
Potassium Oleate	***											
Propane	POE											
n-Propoxypropanol	PRP											
Propyl Acetate (iso-)	PXP											
Propyl Acetate (n-)	IAC	5,000	5180	5861	32905	1.665	*********	91.1	*********	0.0	91.1	0.062	1.73	OK
Propyl alcohol (iso-)	PAT	5,000	5185	5884	33036	1.665	*********	91.3	*********	0.0	91.3	0.062	1.73	OK
Propyl alcohol (n-)	IPA	5,000	5300	5801	32573	1.665	*********	95.4	*********	0.0	95.4	0.060	1.73	OK
Propylbenzene (n-)	PAL	5,000	5120	5319	29865	1.635	*********	89.6	*********	0.0	89.6	0.051	1.69	OK
iso-Propylcyclohexane	PBZ	5,000	5020	5116	28727	1.635	*********	86.4	*********	0.0	86.4	0.047	1.68	OK
Propylene	IPX	5,000	5001	5006	28108	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Propylene-Butylene Copolymer	PPL													
Propylene Dimer	PBP													
Propylene Glycol (1,2-PROPANDIOL)	PDR													
Propylene Glycol Monoalkyl Ether	PPG	5,000	5001	5004	28093	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Propylene Glycol Ethyl Ether	PGE													
Propylene Glycol Methyl Ether	PGY													
Propylene Polymer (in liquid mixtures)	PME	5,000	5070	5296	29736	1.635	*********	87.9	*********	0.0	87.9	0.051	1.69	OK
Propylene Tetramer														
Propylene Trimer	PTT	5,000	5002	5002	28085	1.635	*********	86.0	*********	0.0	86.0	0.045	1.68	OK
Pseudocumene, SEE TRIMETHYLBENZENES	PTR													
Rum														
Sodium Acetate, Glycol, water solutions														
Sodium Acetate solution														
Sodium Benzoate solution	SAN													
Sodium Sulfonate	SBN													
Stearic acid														
Stearyl alcohol (Octadecanol)	SRA													
Sulfolane														
Tallow	SFL	5,000	5001	5006	28106	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Tallow alcohol, SEE ALCOHOLS (C13 AND ABOVE)	TLO													
Tallow fatty acid														
Tallow Alkyl Nitrile	TFD													
Tetradecanol														
1-Tetradecene, SEE THE OLEFIN OR ALPHA-OLEFIN ENTRIES	TTN													
Tetradecylbenzene	TTD	5,000	5001	5010	28129	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Tetraethylene Glycol	TBD													
Tetrahydronaphthalene	TTG	5,000	5001	5010	28128	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Tetrapropylbenzene, SEE ALKYL(C9-C17) BENZENES	THN	5,000	5004	5026	28219	1.635	*********	86.1	*********	0.0	86.1	0.046	1.68	OK
Toluene	TOL	5,000	5150	5637	31651	1.665	*********	90.6	*********	0.0	90.6	0.057	1.72	OK
Triaryphosphate														
Tributyl Phosphate	TBP													
Tricresyl Phosphate (less than 1% of the ortho isomer)	TCP	5,000	5001	5019	28180	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK

STDVAP1

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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	***													
Tridecanoic acid	TRD	5,000	5002	5019	28178	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)														
1-Tridecene	TDN	5,000	5001	5010	28130	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Tridecylbenzene	TDC	5,000	5001	5009	28125	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Triethylbenzene	TRB													
Triethylene Glycol	TEB	5,000	5002	5016	28164	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Triethylene Glycol Butyl Ether	TEG	5,000	5001	5008	28115	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
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	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Triisooctyl Trimellitate														
Triisopropanolamine	TIP													
Trimethylbenzenes (all isomers)	TRE	5,000	5014	5083	28539	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
TRIMETHYL BENZENE (1,2,5-)	TMB	5,000	5014	5082	28531	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
TRIMETHYL BENZENE (1,2,3-)	TMD	5,000	5014	5082	28531	1.635	*********	86.3	*********	0.0	86.3	0.047	1.68	OK
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TME	5,000	5014	5082	28531	1.635	*********	86.3	*********	0.0	86.3	0.047	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%)														
Undecanol														
Undecene (1-)	UDC	5,000	5005	5038	28288	1.635	*********	86.0	*********	0.0	86.0	0.046	1.68	OK
Undecyl alcohol	UND	5,000	5001	5009	28122	1.635	*********	86.0	*********	0.0	86.0	0.046	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)	WSL													
White spirit (low (15 - 20%) aromatic)														
Wine, SEE ALCOHOLIC BEVERAGES, N.O.S.														

E-13-7

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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
Wool grease	***	------	------	------	-------	------	----------	----------	------	------	------	-----
Xylenes (ortho-, meta-, para-)	XLX	5,000	5051	5258	29523	1.635	*********	87.2	*********	0.0	87.2	0.050	1.68	OK
XYLENE (M-)	XLM	5,000	5051	5258	29523	1.635	*********	87.2	*********	0.0	87.2	0.050	1.68	OK
XYLENE (O-)	XLO	5,000	5040	5203	29212	1.635	*********	87.0	*********	0.0	87.0	0.049	1.68	OK
XYLENE (P-)	XLP	5,000	5051	5258	29523	1.635	*********	87.2	*********	0.0	87.2	0.050	1.68	OK
XYLENOL	XYL	5,000	5010	5051	28360	1.635	*********	86.2	*********	0.0	86.2	0.046	1.68	OK
Zinc Dialkyldithiophosphate														

CALCULATIONS FOR CAPACITY OF CARGO TANK VENTING SYSTEM

BARGES: C9706: CONOCO, INC.; E344

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 Hv-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	*********	*********	0.0	86.4	0.046	1.68	OK
AROMATIC RESIN OIL 80	ARS	5,000	5015	5015	28158	1.635	*********	*********	0.0	86.4	0.046	1.68	OK
AROMATIC RESIN OILS		999					86.4	*********					

D-7

STDVAP1

CONOCO, INC.

E342, E343

SUMMARY TABLE FOR "GASOLINE"

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

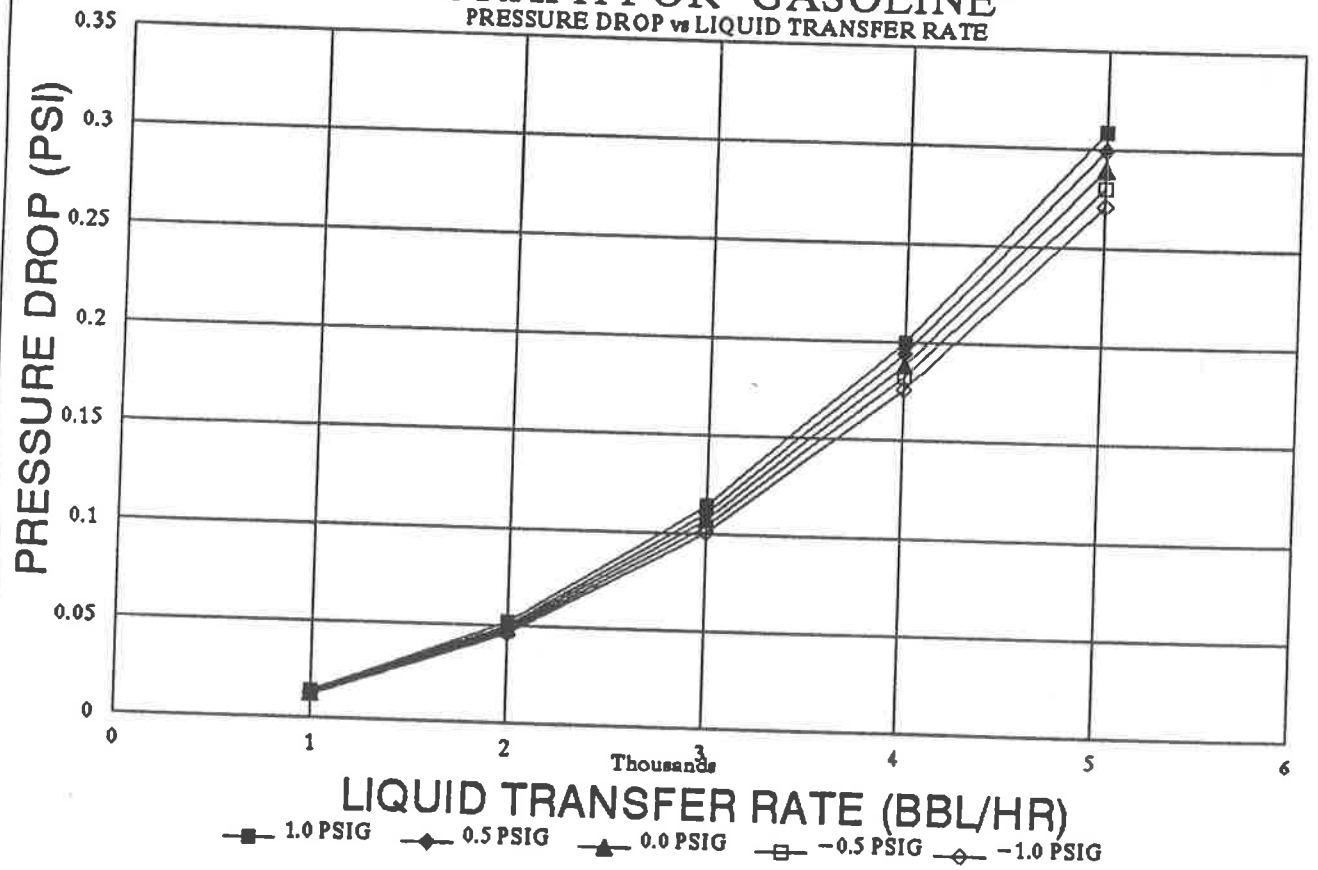
PRESSURE DROP VS LIQUID TRANSFER RATE
FROM MOST REMOTE CARGO TANK TO VESSEL VAPOR CONNECTION
PRESSURE DROP IS BASED ON VAPOR–AIR MIX @ VGR * THE INDICATED LIQUID TRANSFER RATE
(TABULATED DATA IS FOR THE INDICATED PRESSURE AT THE SHORE CONNECTION)

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	0.0137	0.0133	0.0129	0.0125	0.0121
40	2000.0	1400.00	187.2	0.0521	0.0505	0.0491	0.0474	0.0461
60	3000.0	2100.00	280.7	0.1143	0.1106	0.1074	0.1037	0.1004
80	4000.0	2800.00	374.3	0.1996	0.1936	0.1877	0.1817	0.1758
100 *	5000.0	3500.00	467.9	0.3087	0.2994	0.2900	0.2805	0.2711

* 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 <--- *

STEP	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"								
B	SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
C	SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT	0.215	0.215	0.215	0.215	0.215
D	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:								
F	VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
G	% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR	1250	2500	3750	5000	6250
H	"	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								
J	PRESSURE @ REQ'D FLOW	INPUT	P2	PSIG	1.0	1.0	1.0	1.0	1.0
K	"	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								
M	INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
N	"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
O	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	280	280	280	280	280
	ANALYSIS: SECTION I								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
S	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
V	COEFF.:HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
W	COEFF.:HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
X	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
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		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
EE	HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	4.361	15.579	33.045	56.352	85.949
FF	HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	9.203	34.945	76.618	133.816	206.985
	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
O	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
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	0	0	0	0	0
	ANALYSIS: SECTION II								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	*********	*********	*********	*********	*********
S	COEFF.:HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
T	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
X	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
Y	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
CC	RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
DD	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
FFto	HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	9.203	34.945	76.618	133.816	206.985
GG	PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2262.78	2268.31	2277.26	2289.54	2305.26
HH	"	GG/144	"	PSIA	15.71	15.75	15.81	15.90	16.01
II	"	HH-14.7	"	PSIG	1.01	1.05	1.11	1.20	1.31
JJ	(P1 - P2) / P1	(HH-K) /HH			0.1%	0.3%	0.7%	1.3%	1.9%
KK	(P1 -P2) /P1 < 10% ??				YES	YES	YES	YES	YES
PP	(P1-P2)	(II-J)		PSI	0.0137	0.0521	0.1143	0.1996	0.3087

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 <--- *

STEP	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"								
B	SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
C	SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT	0.208	0.208	0.208	0.208	0.208
D	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:								
F	VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
G	% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR	1250	2500	3750	5000	6250
H	"	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								
J	SETTING	INPUT	P2	PSIG	0.5	0.5	0.5	0.5	0.5
K	"	J +14.7	"	PSIA	15.2	15.2	15.2	15.2	15.2
L	"	K*144	"	PSFA	2188.8	2188.8	2188.8	2188.8	2188.8
	VAP RECOV'Y PIPING: SECTION I								
M	INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
N	"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
O	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	280	280	280	280	280
	ANALYSIS: SECTION I								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
S	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
V	COEFF.:HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
W	COEFF.:HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
X	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
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		6.08E+04	1.22E+05	1.82E+05	2.43E+05	3.04E+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		0.02131	0.01892	0.01783	0.01719	0.01676
EE	HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	4.388	15.579	33.045	56.627	86.252
FF	HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	9.230	34.945	76.618	134.090	207.289
	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
O	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
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	0	0	0	0	0
	ANALYSIS: SECTION II								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	*********	*********	*********	*********	*********
S	COEFF.:HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
T	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
X	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
Y	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
CC	RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
DD	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
FFtot	HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	9.230	34.945	76.618	134.090	207.289
GG	PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2190.72	2196.07	2204.73	2216.68	2231.91
HH	"	GG/144	"	PSIA	15.21	15.25	15.31	15.39	15.50
II	"	HH-14.7	"	PSIG	0.51	0.55	0.61	0.69	0.80
JJ	(P1 - P2) / P1	(HH-K) /HH			0.1%	0.3%	0.7%	1.3%	1.9%
KK	(P1 -P2) /P1 < 10% ??				YES	YES	YES	YES	YES
PP	(P1-P2)	(II-J)		PSI	0.0133	0.0505	0.1106	0.1936	0.2994

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 <--- *

STEP	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"								
B	SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
C	SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT	0.201	0.201	0.201	0.201	0.201
D	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:								
F	VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
G	% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR	1250	2500	3750	5000	6250
H	"	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								
J	SETTING	INPUT	P2	PSIG	0.0	0.0	0.0	0.0	0.0
K	"	J +14.7	"	PSIA	14.7	14.7	14.7	14.7	14.7
L	"	K*144	"	PSFA	2116.8	2116.8	2116.8	2116.8	2116.8
	VAP RECOV'Y PIPING: SECTION I								
M	INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
N	"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
O	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	280	280	280	280	280
	ANALYSIS: SECTION I								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
S	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
V	COEFF.:HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
W	COEFF.:HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
X	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
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		5.88E+04	1.18E+05	1.76E+05	2.35E+05	2.94E+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		0.02145	0.01918	0.01797	0.01728	0.01682
EE	HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	4.416	15.795	33.304	56.920	86.572
FF	HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	9.258	35.161	76.877	134.383	207.609
	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
O	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
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	0	0	0	0	0
	ANALYSIS: SECTION II								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	*********	*********	*********	*********	*********
S	COEFF.:HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
T	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
X	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
Y	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
CC	RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
DD	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
FFto	HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	9.258	35.161	76.877	134.383	207.609
GG	PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2118.66	2123.87	2132.26	2143.83	2158.55
HH	"	GG/144	"	PSIA	14.71	14.75	14.81	14.89	14.99
II	"	HH-14.7	"	PSIG	0.01	0.05	0.11	0.19	0.29
JJ	(P1 - P2) / P1	(HH-K) /HH			0.1%	0.3%	0.7%	1.3%	1.9%
KK	(P1 -P2) /P1 < 10% ??				YES	YES	YES	YES	YES
PP	(P1-P2)	(II-J)		PSI	0.0129	0.0491	0.1074	0.1877	0.2900

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 <--- *

STEP	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"								
B	SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
C	SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT	0.194	0.194	0.194	0.194	0.194
D	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:								
F	VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
G	% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR	1250	2500	3750	5000	6250
H	"	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								
J	SETTING	INPUT	P2	PSIG	-0.5	-0.5	-0.5	-0.5	-0.5
K	"	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
	VAP RECOV'Y PIPING: SECTION I								
M	INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
N	"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
O	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	280	280	280	280	280
	ANALYSIS: SECTION I								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
S	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
V	COEFF.:HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
W	COEFF.:HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
X	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
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		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
EE	HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	4.446	15.795	33.304	57.233	86.910
FF	HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	9.287	35.161	76.877	134.697	207.947
	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
O	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
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	0	0	0	0	0
	ANALYSIS: SECTION II								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	*********	*********	*********	*********	*********
S	COEFF.:HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
T	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
X	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
Y	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
CC	RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
DD	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
FFto	HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	9.287	35.161	76.877	134.697	207.947
GG	PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	2046.60	2051.63	2059.74	2070.97	2085.20
HH	"	GG/144	"	PSIA	14.21	14.25	14.30	14.38	14.48
II	"	HH-14.7	"	PSIG	-0.49	-0.45	-0.40	-0.32	-0.22
JJ	(P1 - P2) / P1	(HH-K) /HH			0.1%	0.3%	0.7%	1.3%	1.9%
KK	(P1 -P2) /P1 < 10% ??				YES	YES	YES	YES	YES
PP	(P1-P2)	(II-J)		PSI	0.0125	0.0474	0.1037	0.1817	0.2805

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 <--- *

STEP	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"								
B	SPEC GRAV VAP-AIR MIX	INPUT	SG		2.911	2.911	2.911	2.911	2.911
C	SPEC WT VAP-AIR MIX	(SEE NOTE b)	Ws\Wsav	LBS/CU FT	0.187	0.187	0.187	0.187	0.187
D	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:								
F	VGR*MAX ALLOW TRANS RATE	INPUT	F	BBL/HR	6250	6250	6250	6250	6250
G	% OF VGR*MAX ALLOW TRANS RATE	x % * F	Fcg	BBL/HR	1250	2500	3750	5000	6250
H	"	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								
J	SETTING	INPUT	P2	PSIG	-1.0	-1.0	-1.0	-1.0	-1.0
K	"	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
	VAP RECOV'Y PIPING: SECTION I								
M	INSIDE DIAMETER	INPUT	ID	INCHES	7.981	7.981	7.981	7.981	7.981
N	"	M/12	"	FEET	0.6651	0.6651	0.6651	0.6651	0.6651
O	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	280	280	280	280	280
	ANALYSIS: SECTION I								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	5.61	11.22	16.84	22.45	28.06
S	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
V	COEFF.:HEAD LOSS, VALVE	INPUT	KV		0.65	0.65	0.65	0.65	0.65
W	COEFF.:HEAD LOSS, EXIT	INPUT	KX		0	0	0	0	0
X	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
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		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
EE	HEAD LOSS: PIPE	DD*(Q/N)*(R^2/2*32.2)	HP	FT PROD. (GAS)	4.477	16.041	33.587	57.570	87.268
FF	HEAD LOSS: TOTAL	X+Y+Z+AA+EE	HL	FT PROD. (GAS)	9.318	35.407	77.160	135.033	208.305
	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
O	INSIDE AREA	3.14159*N^2/4	IA	SQ FT	0.0000	0.0000	0.0000	0.0000	0.0000
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	0	0	0	0	0
	ANALYSIS: SECTION II								
R	VELOC.THRU VAP REC PIPING	I/O	V	FT/SEC	*********	*********	*********	*********	*********
S	COEFF.:HEAD LOSS, ENTRANCE	INPUT	KE		0	0	0	0	0
T	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
X	HEAD LOSS: ENTRANCE	S*(R^2/2*32.2)	HE	FT PROD. (GAS)	0.000	0.000	0.000	0.000	0.000
Y	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
CC	RELATIVE ROUGHNESS	P/N	e/D		1.8E+11	1.8E+11	1.8E+11	1.8E+11	1.8E+11
DD	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
FFto	HEAD LOSS: GRAND TOTAL	FF(I) + FF(II)	HLtot	FT PROD. (GAS)	9.318	35.407	77.160	135.033	208.305
GG	PRESSURE @ TANK	(SEE NOTE f)	P1	PSFA	1974.55	1979.44	1987.26	1998.11	2011.84
HH	"	GG/144	"	PSIA	13.71	13.75	13.80	13.88	13.97
II	"	HH-14.7	"	PSIG	-0.99	-0.95	-0.90	-0.82	-0.73
JJ	(P1 - P2) / P1	(HH-K) /HH			0.1%	0.3%	0.7%	1.3%	1.9%
KK	(P1 -P2) /P1 < 10% ??				YES	YES	YES	YES	YES
PP	(P1-P2)	(II-J)		PSI	0.0121	0.0461	0.1004	0.1758	0.2711

DATA FOR TRANSFER RATE VS PRESSURE DROP

NOTES:

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

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

e. 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

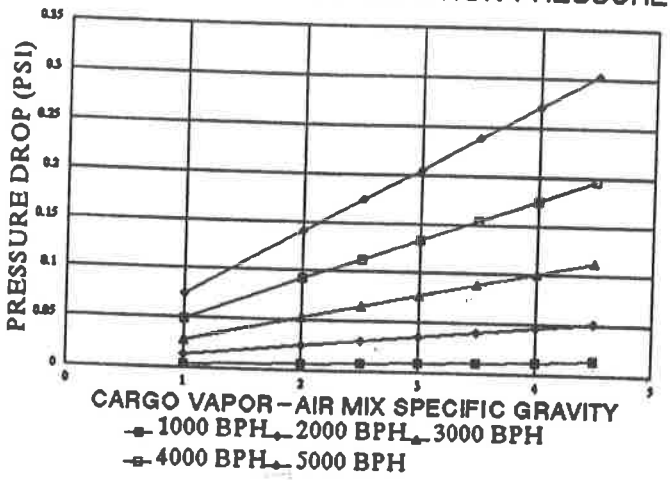
f. BASED ON FROM DARCY'S EQUATION:
P1-P2 = Ws * f * Leq * [V^2 / (2*G)] / D (ADJUSTED AS REQ'D FOR UNIT COMPATIBILITY)

CONOCO, INC.

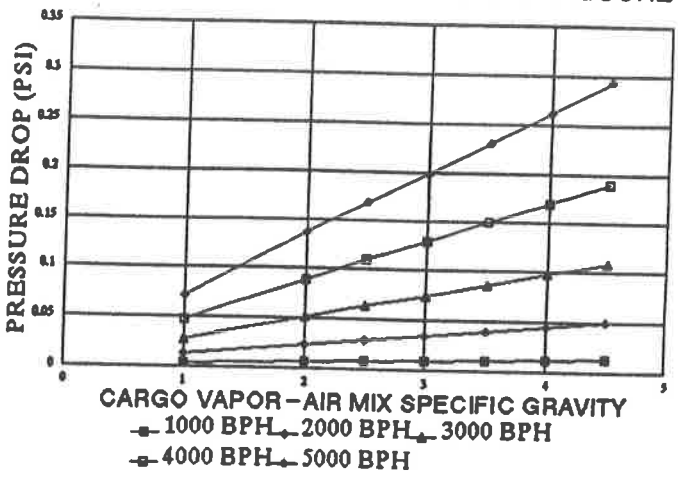
E344

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

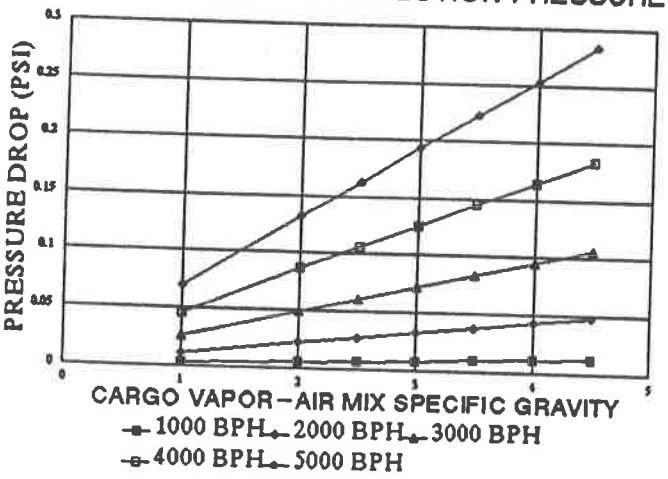
1.0 PSIG SHORE CONNECTION PRESSURE



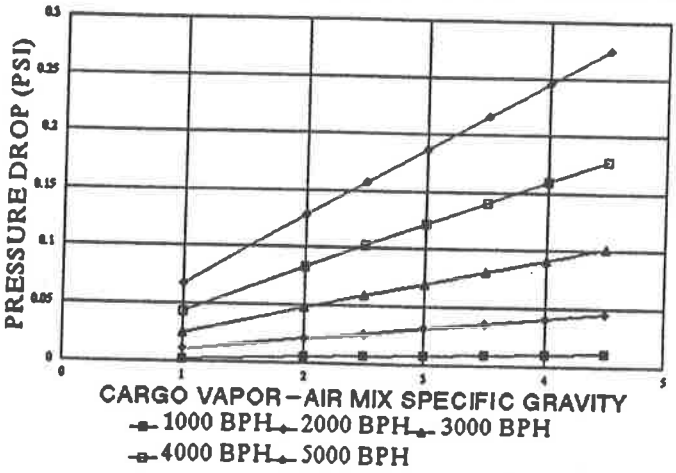
0.5 PSIG SHORE CONNECTION PRESSURE



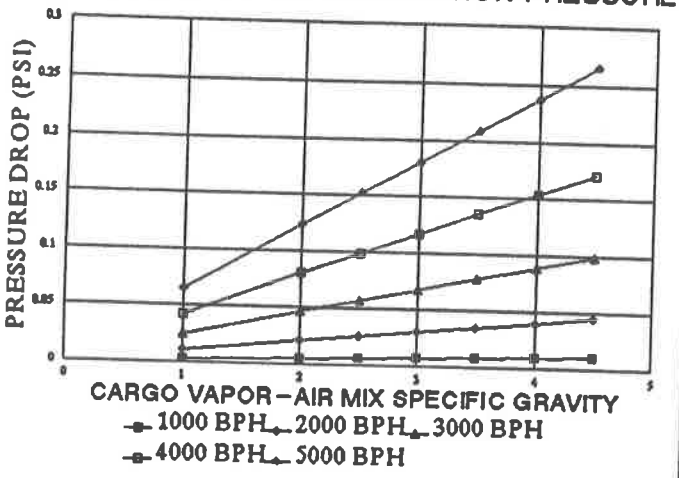
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

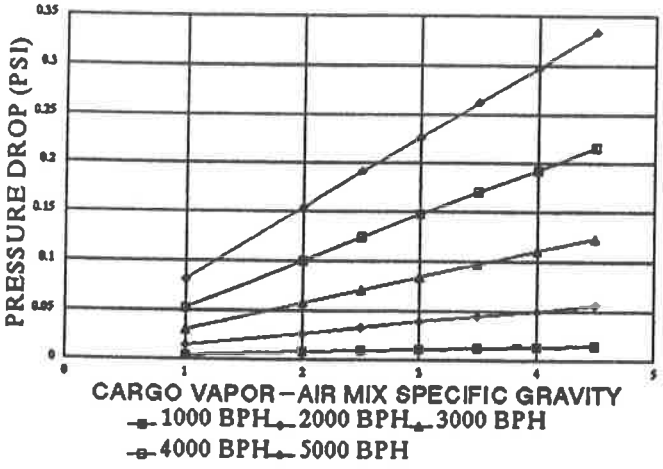
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

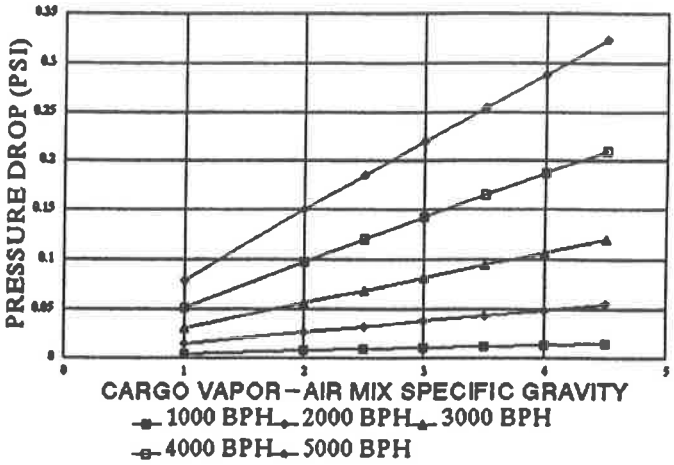
E344

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

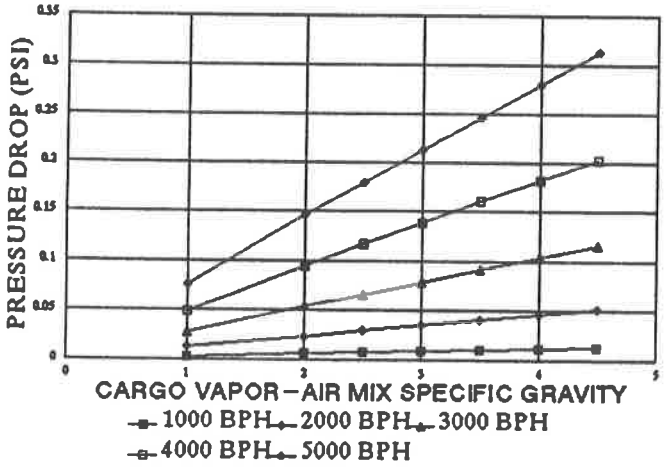
1.0 PSIG SHORE CONNECTION PRESSURE



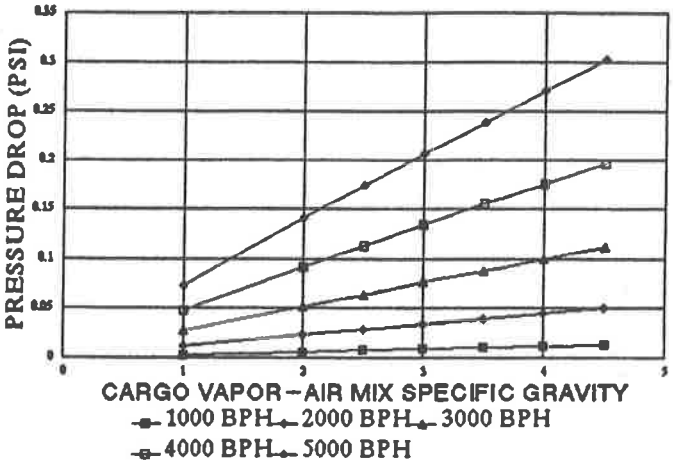
0.5 PSIG SHORE CONNECTION PRESSURE



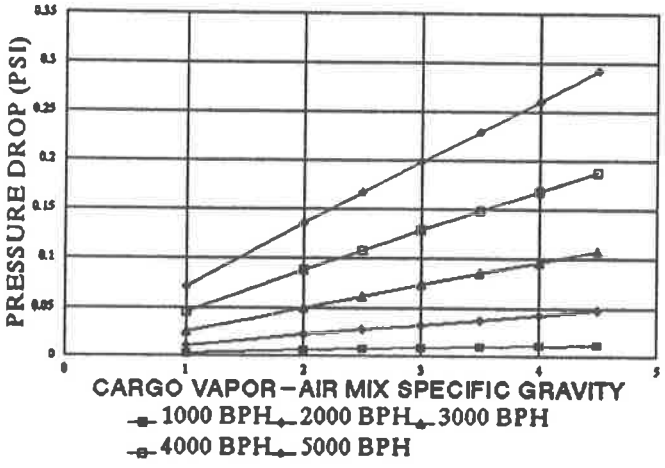
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

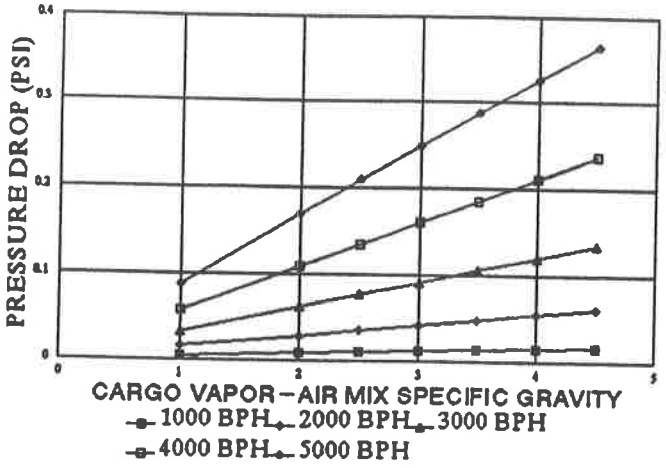
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

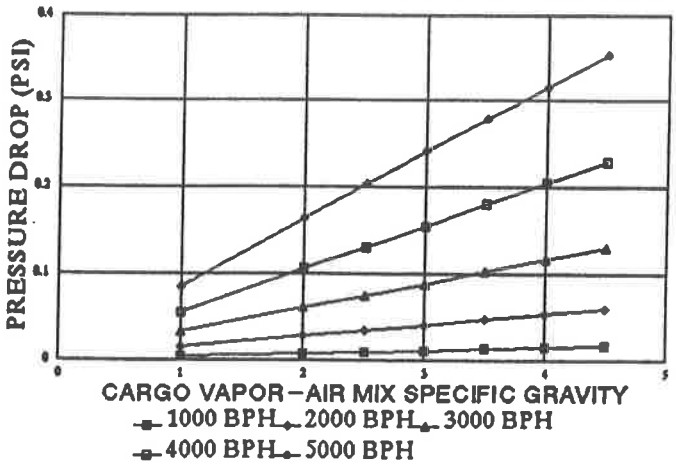
E344

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

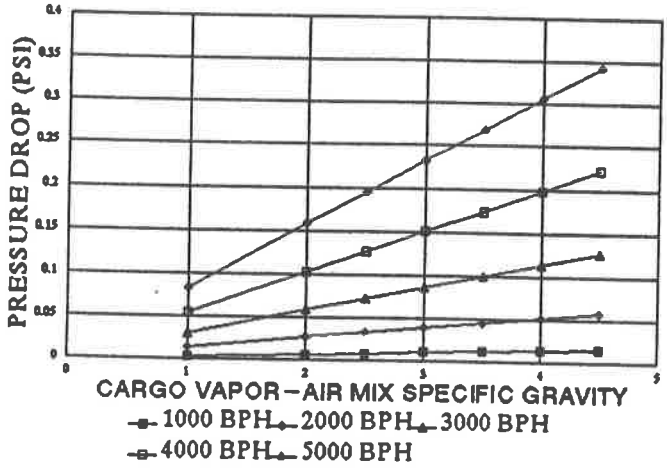
1.0 PSIG SHORE CONNECTION PRESSURE



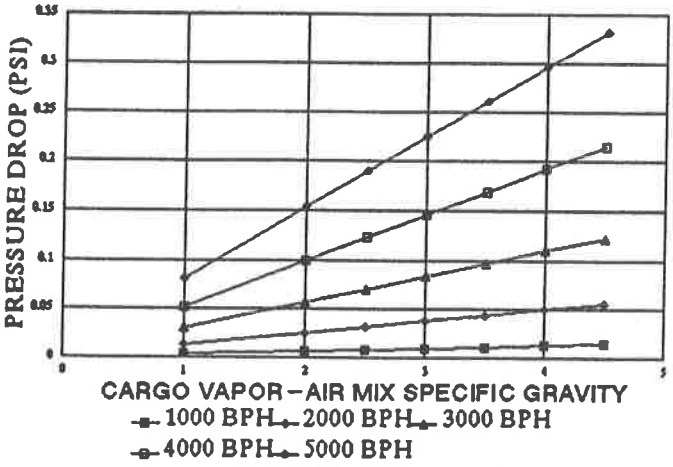
0.5 PSIG SHORE CONNECTION PRESSURE



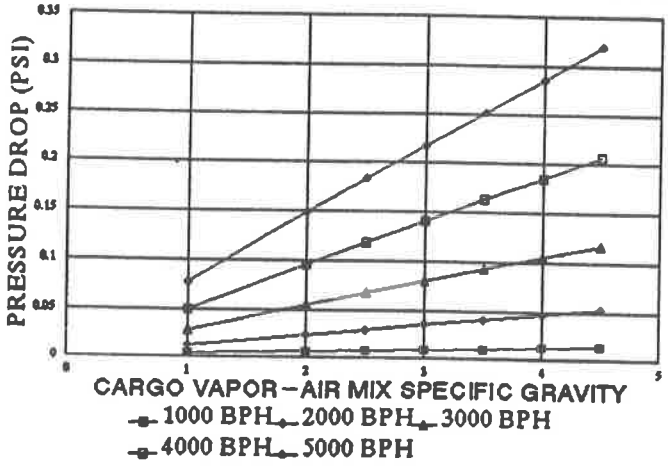
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

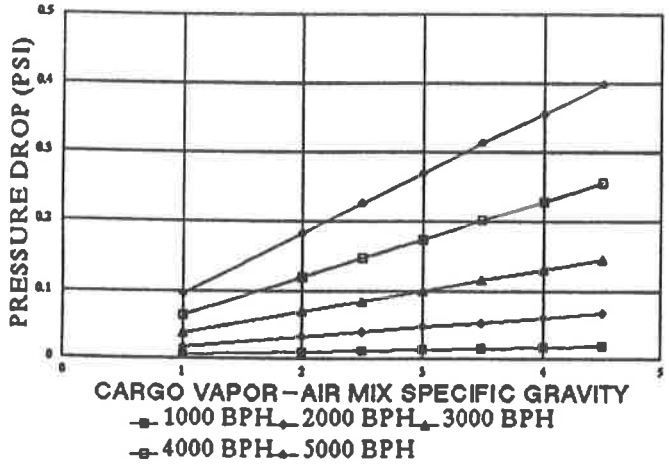
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

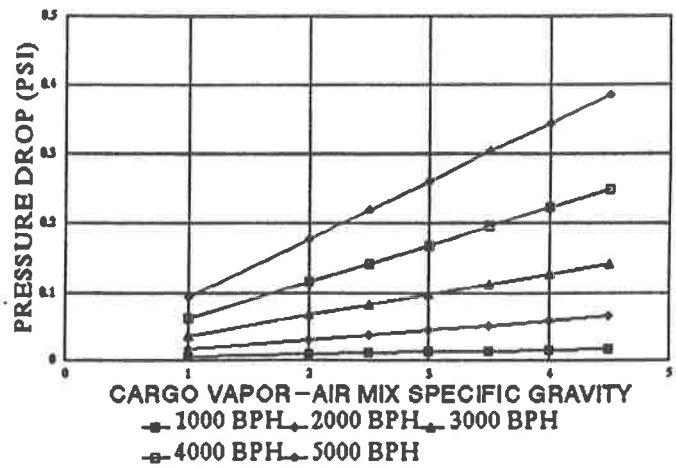
E344

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

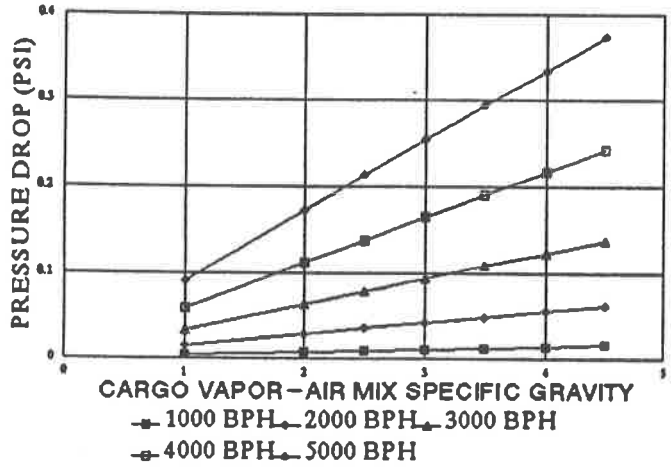
1.0 PSIG SHORE CONNECTION PRESSURE



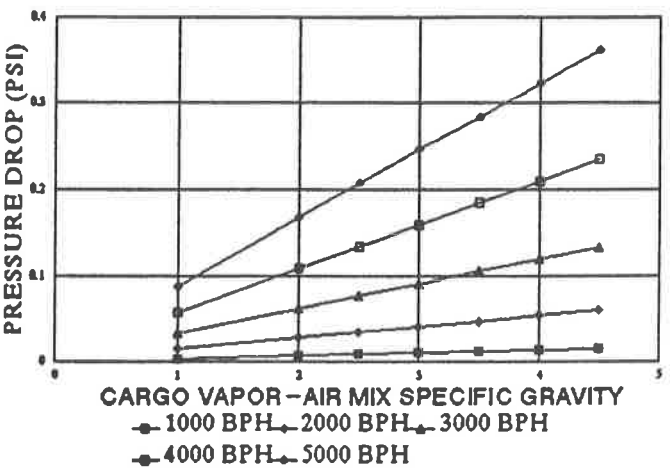
0.5 PSIG SHORE CONNECTION PRESSURE



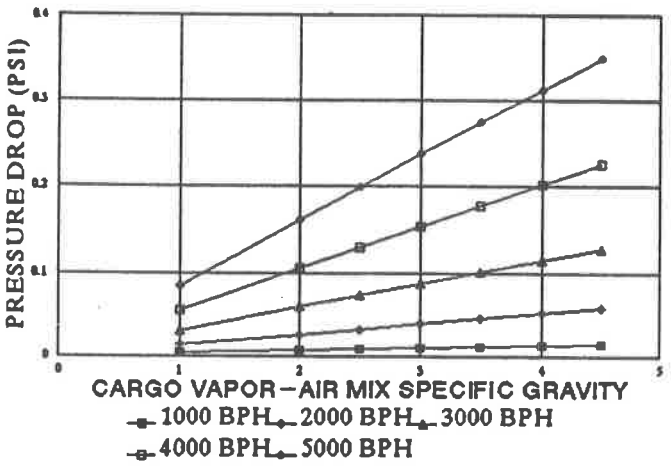
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

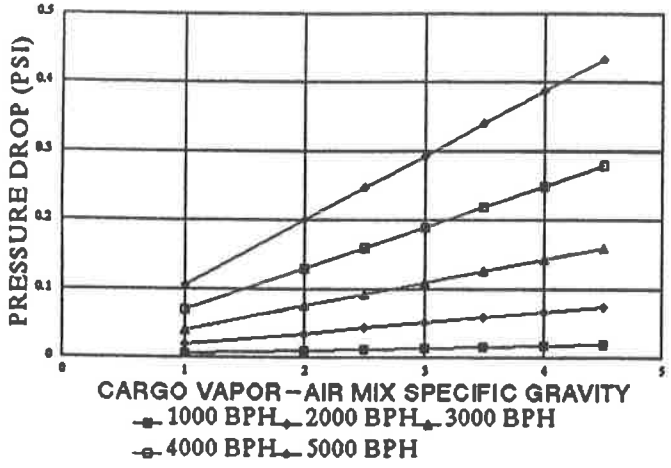
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

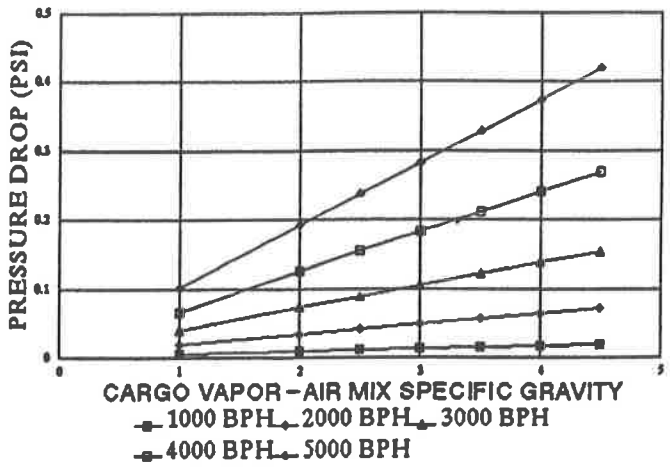
E344

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

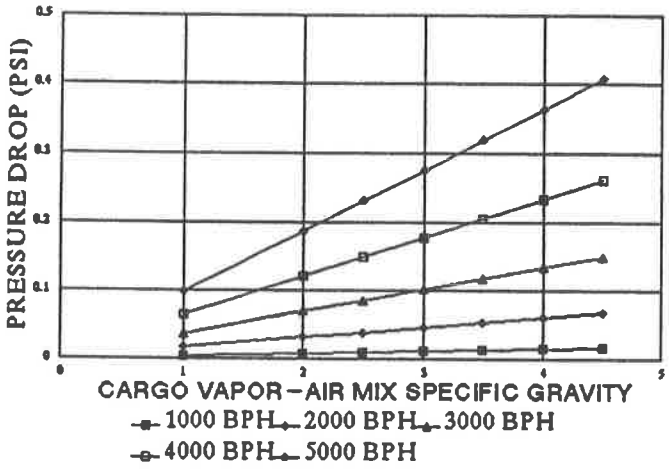
1.0 PSIG SHORE CONNECTION PRESSURE



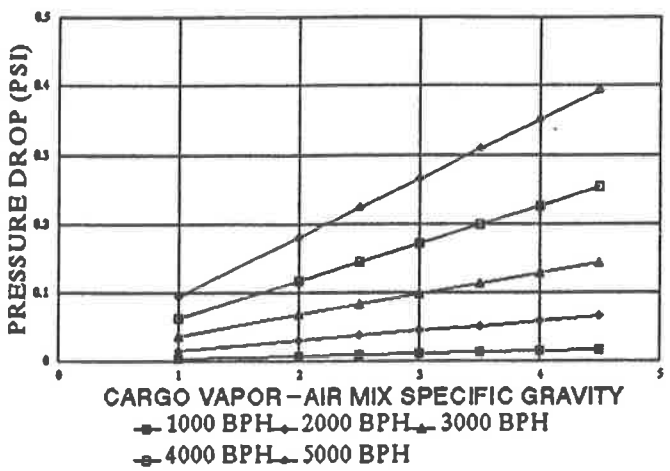
0.5 PSIG SHORE CONNECTION PRESSURE



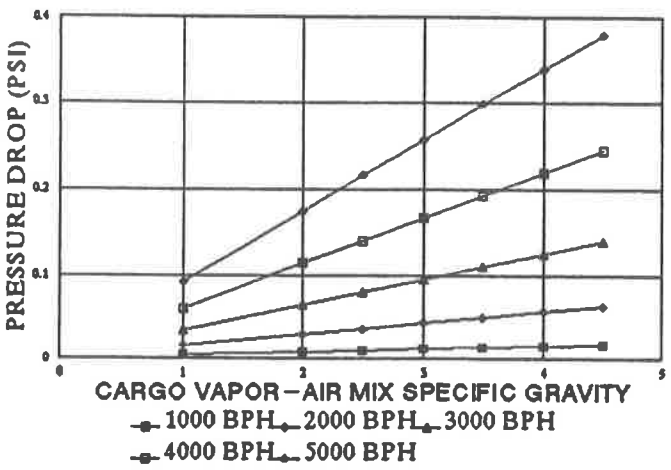
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

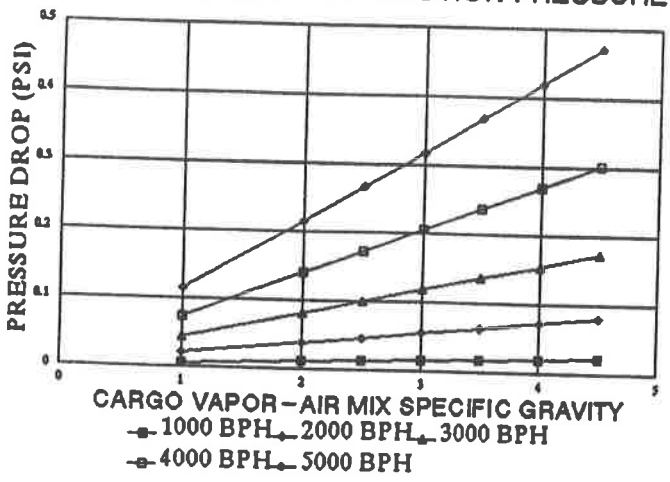
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

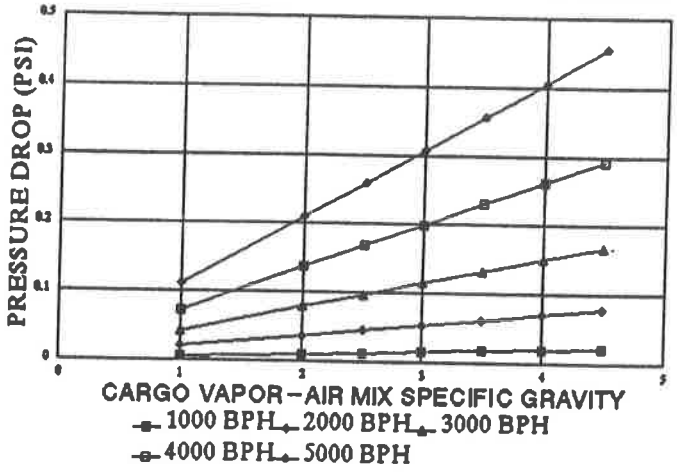
E344

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

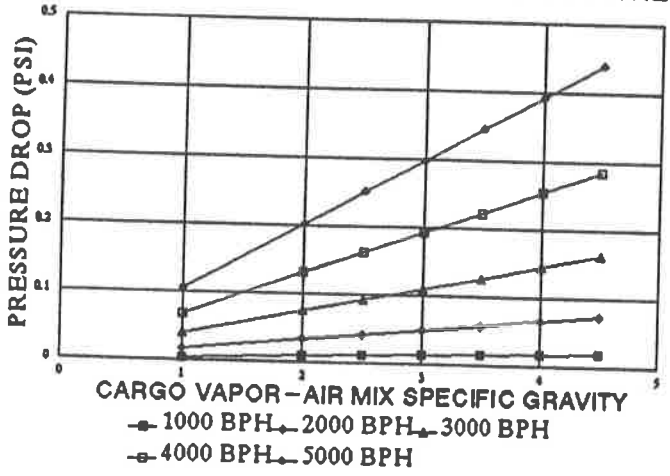
1.0 PSIG SHORE CONNECTION PRESSURE



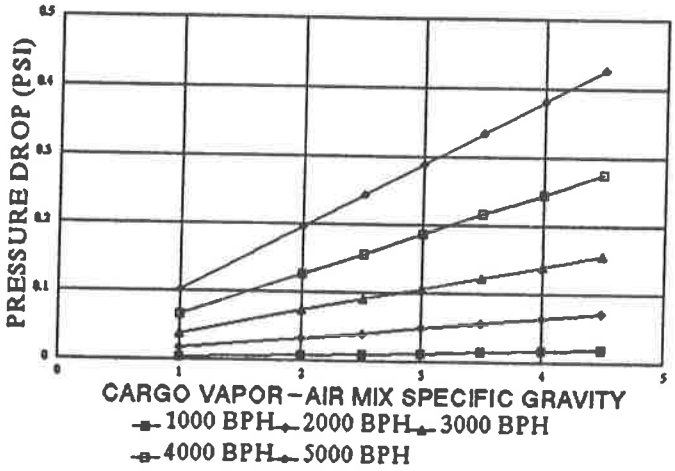
0.5 PSIG SHORE CONNECTION PRESSURE



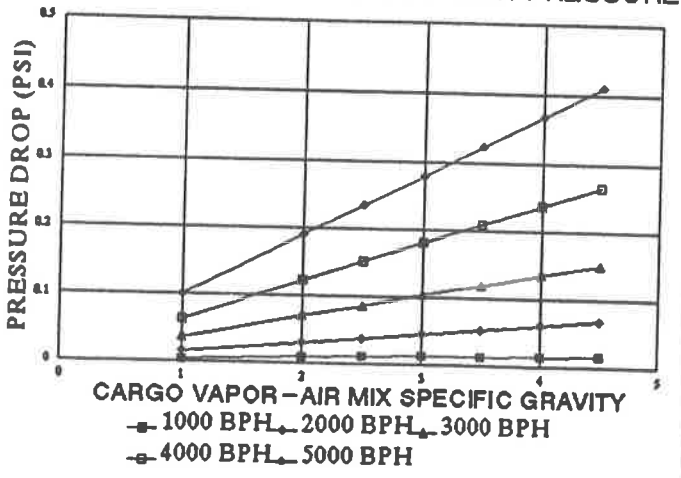
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

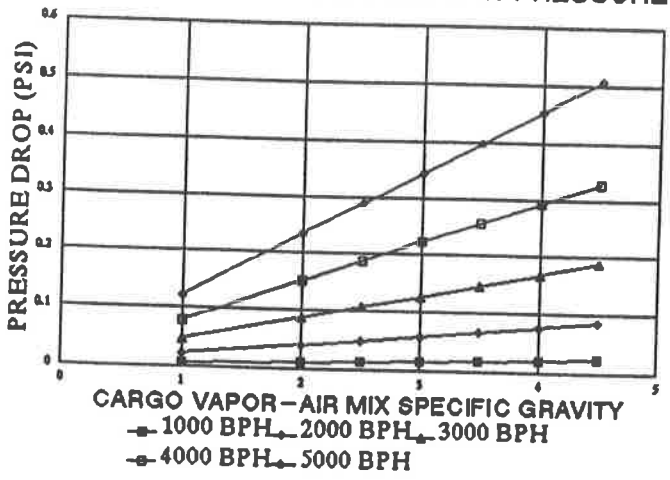
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

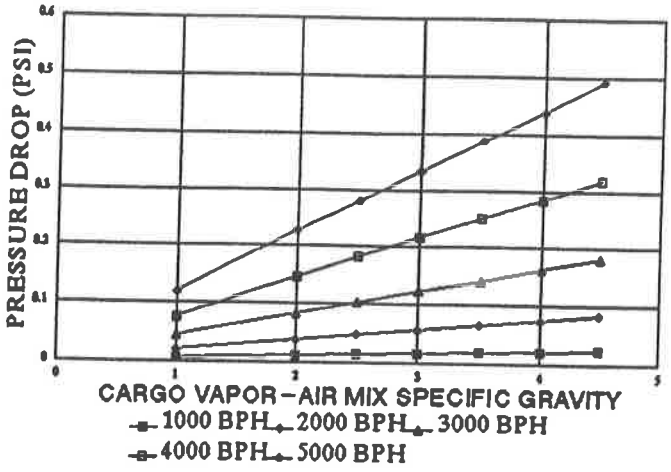
E344

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

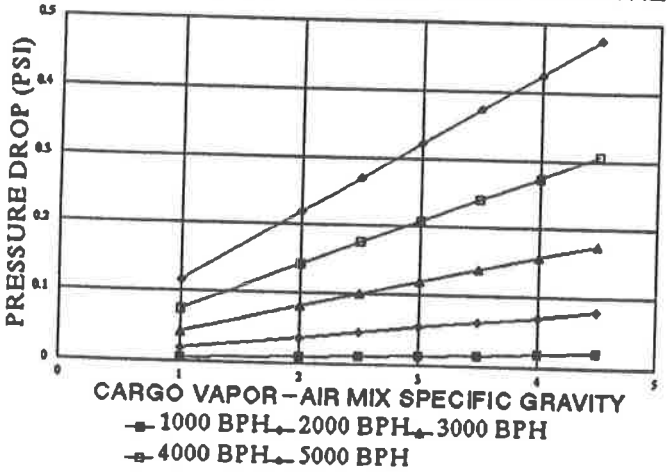
1.0 PSIG SHORE CONNECTION PRESSURE



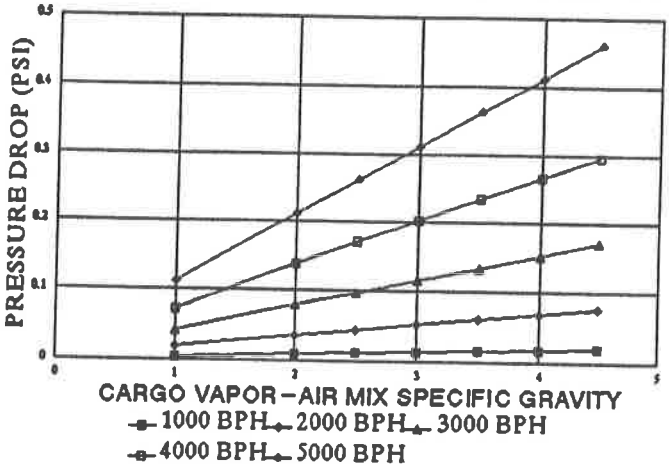
0.5 PSIG SHORE CONNECTION PRESSURE



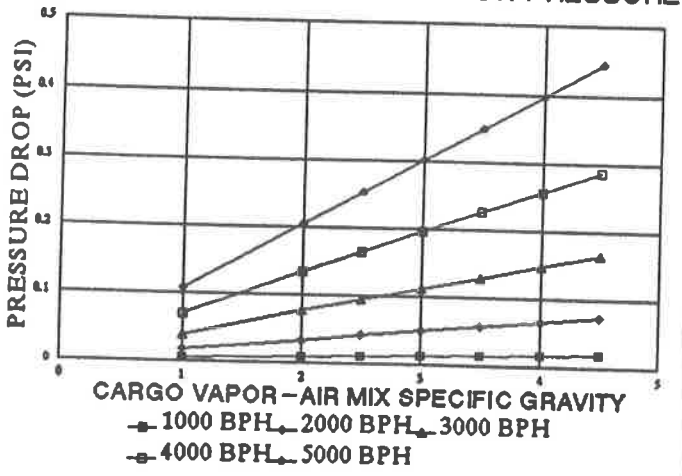
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

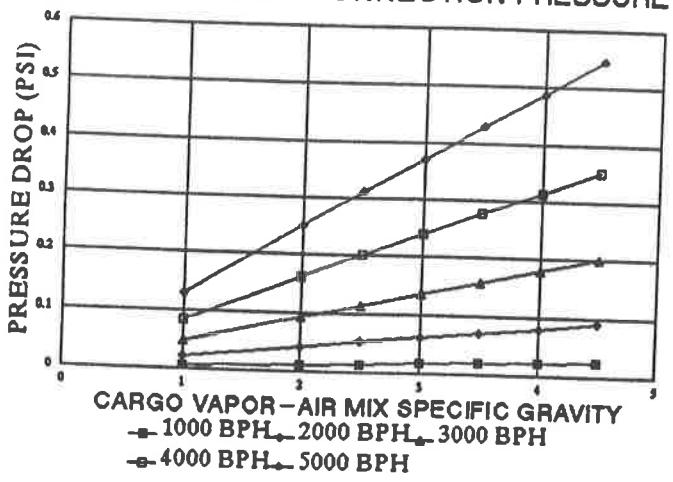
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

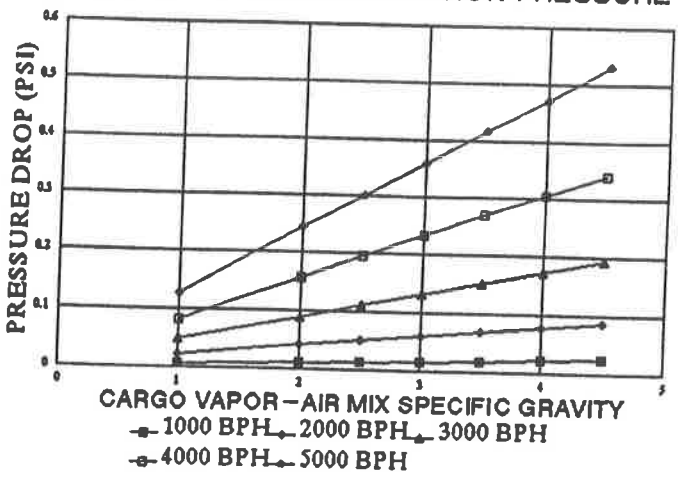
E344

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

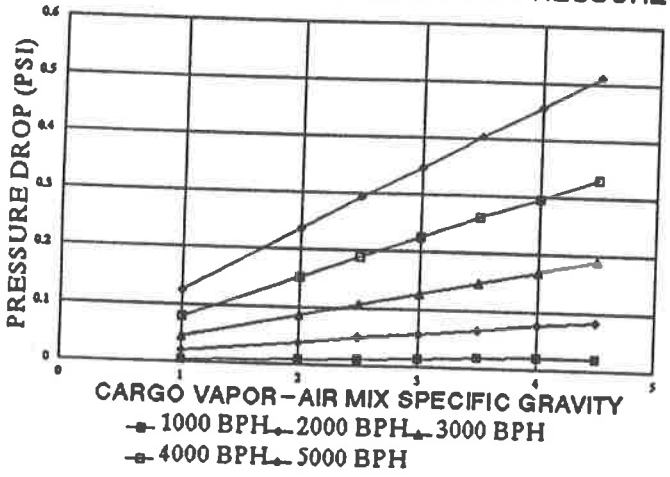
1.0 PSIG SHORE CONNECTION PRESSURE



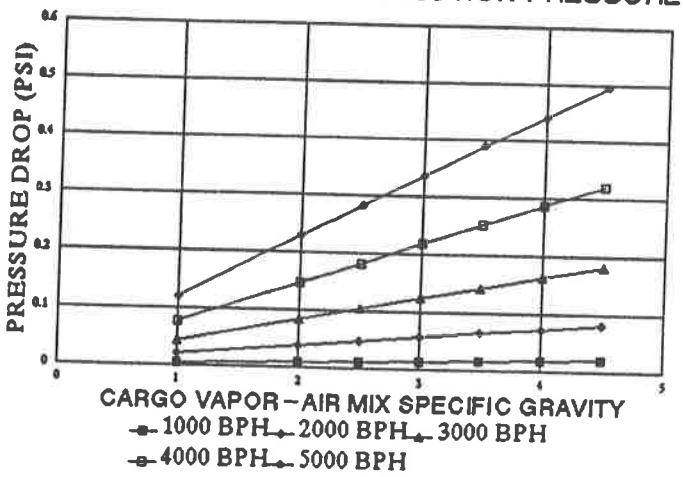
0.5 PSIG SHORE CONNECTION PRESSURE



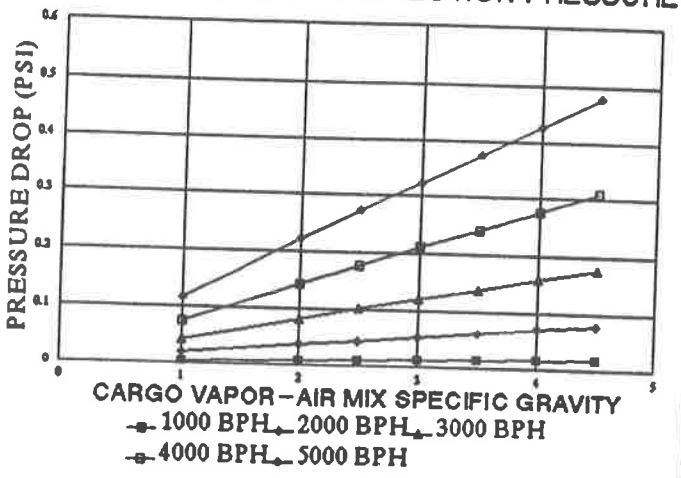
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

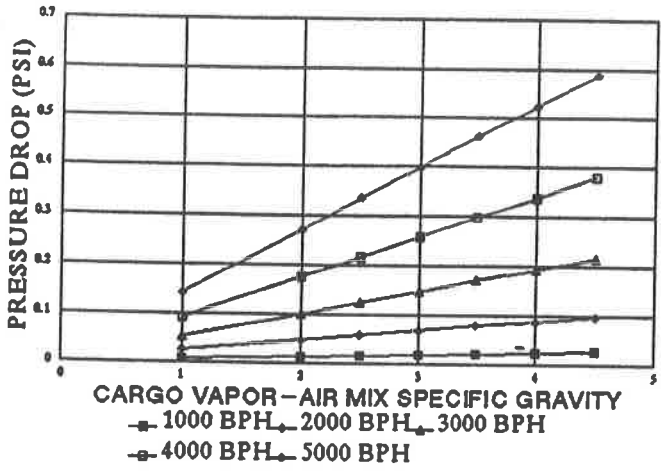
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

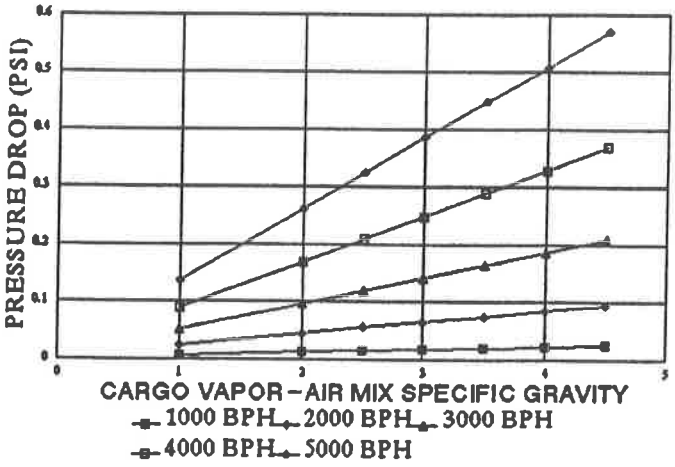
E344

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

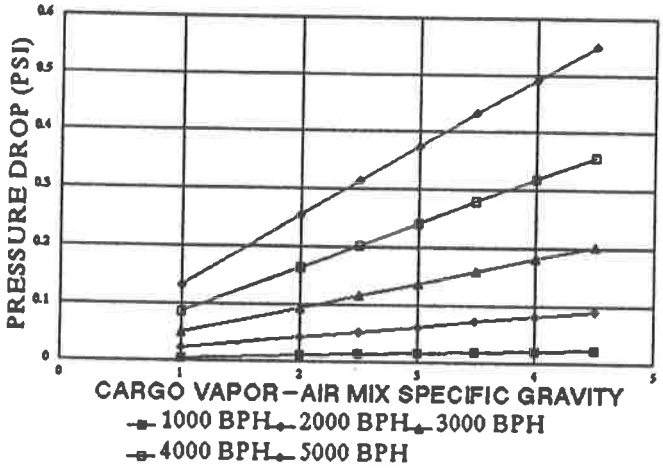
1.0 PSIG SHORE CONNECTION PRESSURE



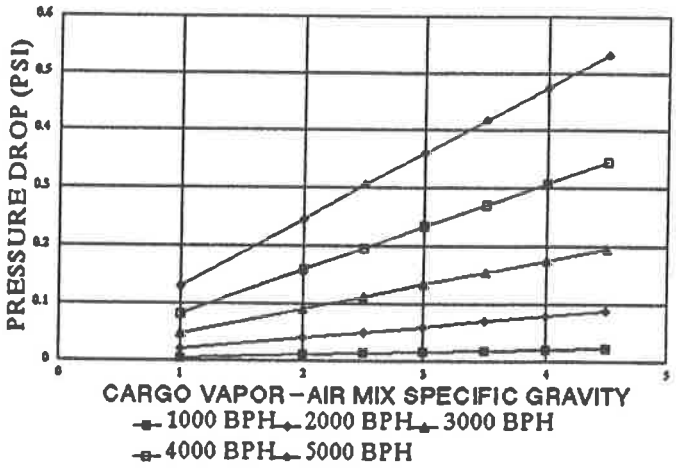
0.5 PSIG SHORE CONNECTION PRESSURE



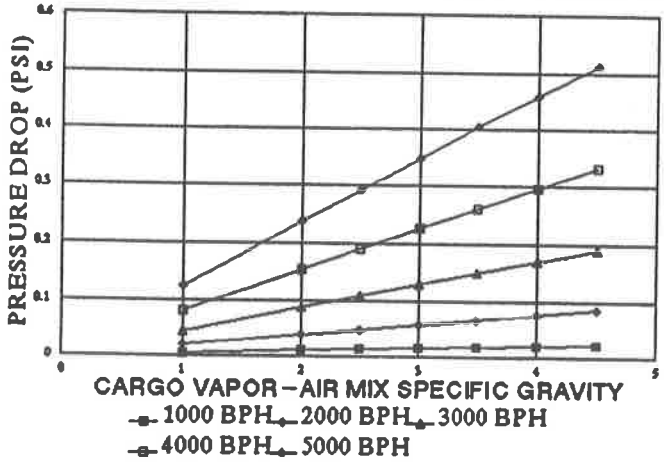
0.0 PSIG SHORE CONNECTION PRESSURE



–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.

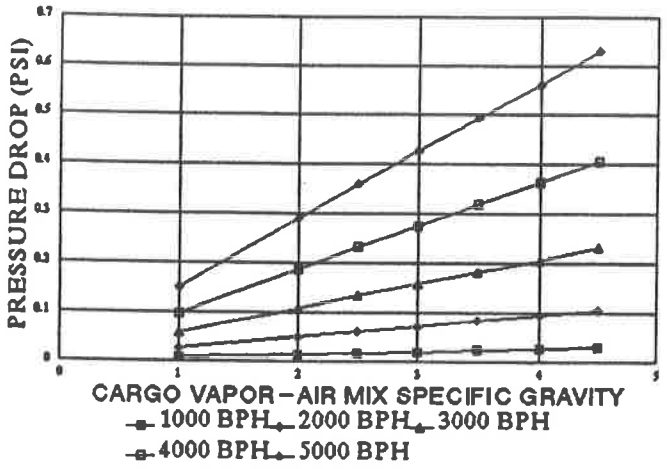
A. FLOW RATES SHOWN HEREON (I.E., "BPH") ARE LIQUID TRANSFER RATES.
B. PRESSURE DROP IS FOR CARGO VAPOR–AIR MIX FLOW RATE OF "VGR" TIMES THE LIQUID TRANSFER RATE, AND IS FROM MOST REMOTE TANK TO SHORE CONNECTION.

CONOCO, INC.

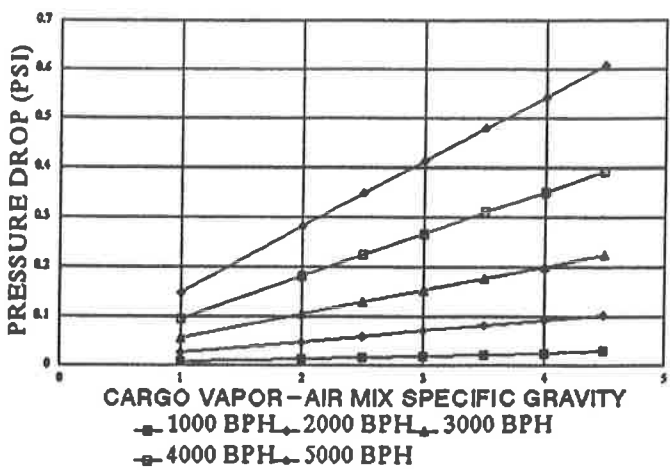
E344

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

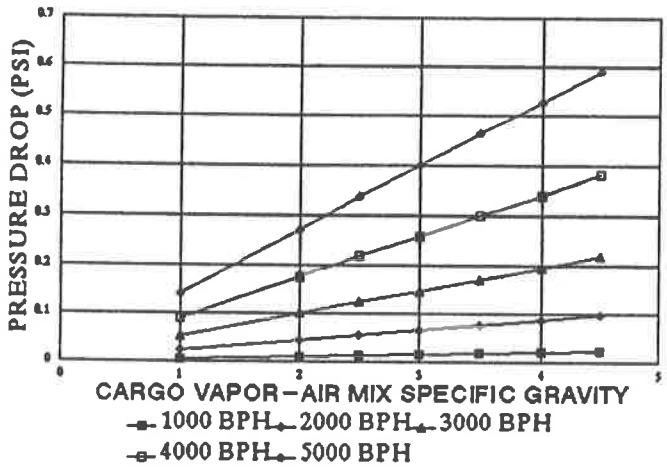
1.0 PSIG SHORE CONNECTION PRESSURE



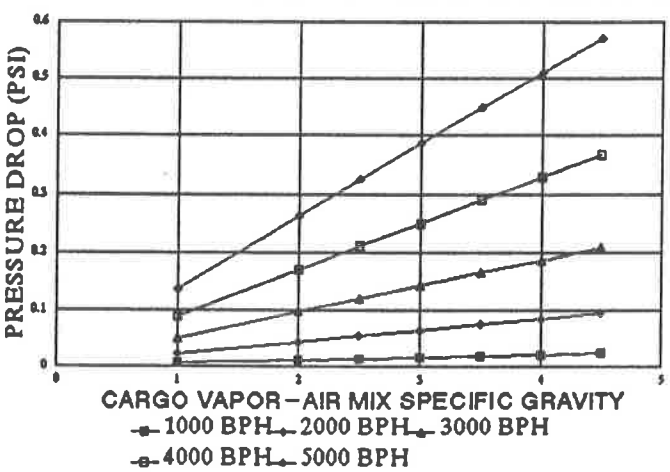
0.5 PSIG SHORE CONNECTION PRESSURE



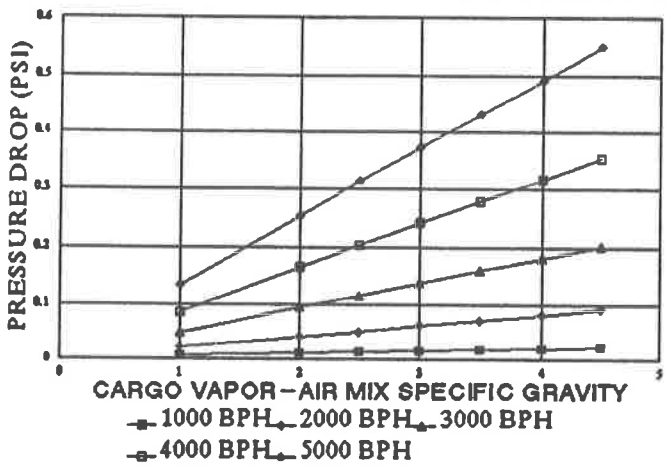
0.0 PSIG SHORE CONNECTION PRESSURE



–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
BARGE: C9706: CONOCO, INC.; E344

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: 280 FT
DISTANCE ENROUTE TO PV: 0.5

		QTY	LOSS COEF	TOTAL	
ENTRANCE LOSS (Ke)	TEE (THRU RUN)	3	0.60	1.800	90 DEG EL L.R.
BEND LOSS (Kb)	TEE (THRU BRANCH)	3	1.80	5.400	90 DEG EL
	OTHER	0	0.75	0.000	45 DEG EL L.R.
	TOTAL:	9	AVG:	0.972	

		QTY	LOSS COEF	TOTAL
VALVE LOSS (Kv)	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

		QTY	LOSS COEF	TOTAL	
ENTRANCE LOSS (Ke)	TEE (THRU RUN)	0	0.60	0.000	90 DEG EL L.R.
BEND LOSS (Kb)	TEE (THRU BRANCH)	0	1.80	0.000	90 DEG EL
	OTHER	0	0.75	0.000	45 DEG EL L.R.
	TOTAL:	0	AVG:	0.000	

		QTY	LOSS COEF	TOTAL
VALVE LOSS (Kv)	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:

		QTY	LOSS COEFF	TOTAL
1.	20.0% *	1	0.75	0.750
2.	40.0% *	0	N/A	0.000
3.	60.0% *	2	0.40	0.800
4.	80.0% *			
5.	100.0% *			
6.	100.0% *			
7.	100.0% *			

		QTY	LOSS COEFF	TOTAL
		0	0.75	0.000
		0	N/A	0.000
		0	0.40	0.000

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

SGv	OBTAIN FROM REFERENCE SOURCE (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	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

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	0.004	0.014	0.030	0.052	0.080
ACETIC ANHYDRIDE	ACA	0.004	0.014	0.030	0.051	0.079
ACETONITRILE	ATN	0.003	0.013	0.028	0.048	0.074
ACRYLIC ACID	ACR	0.004	0.013	0.029	0.050	0.077
ACRYLONITRILE	ACN	0.005	0.019	0.041	0.071	0.109
ADIPONITRILE	ADN	0.003	0.013	0.028	0.048	0.074
ALUMINUM SULFATE SOLUTION	ASX					
AMINOETHYLETHANOLAMINE	AEE	0.003	0.013	0.028	0.048	0.074
AMMONIUM BISULFITE SOLN (70% OR LESS)	ABX					
AMMONIUM HYDROXIDE (28% OR LESS NH3)	AMH					
ANTHRACENE OIL (COAL TAR FRACTION)	AHO					
BENZENE	BNZ	0.006	0.022	0.048	0.083	0.128
BENZENE HYDROCARBON MIXTURES (W/ACETYLENES) (W/10% BENZENE OR MORE)	BHA	0.008	0.029	0.063	0.109	0.168
BENZENE HYDROCARBON MIXTURES (W/10% BENZENE OR MORE)	BHB	0.008	0.029	0.063	0.109	0.168
BENZENE, TOLUENE, XYLENE MIXTURES (HAVING 10% BENZENE OR MORE)	BTX	0.008	0.029	0.063	0.109	0.168
iso-BUTYL ACRYLATE	BAI	0.004	0.015	0.032	0.055	0.084
n-BUTYL ACRYLATE	BTC	0.004	0.014	0.030	0.052	0.080
BUTYL ACRYLATE (SEE ISO- & N- BUTYL ACRYLATE)	BAR	0.004	0.015	0.032	0.055	0.084
BUTYL METHACRYLATE	BMH	0.004	0.014	0.030	0.052	0.079
iso-BUTYRALDEHYDE	BAD	0.007	0.028	0.061	0.106	0.163
n-BUTYRALDEHYDE	BTR	0.007	0.028	0.061	0.106	0.163
BUTYRALDEHYDES (CRUDE)	BFA	0.008	0.028	0.062	0.107	0.165
BUTYRALDEHYDE (ISO-, N-)	BAE	0.008	0.028	0.062	0.107	0.165
CAMPHOR OIL (LIGHT)	CPO					
CARBON TETRACHLORIDE	CBT					
CAUSTIC POTASH SOLUTION	CPS					
CAUSTIC SODA SOLUTION	CSS					
CHLOROBENZENE	CRB	0.004	0.015	0.032	0.056	0.086
CHLOROFORM	CRF					
CHLOROSULFONIC ACID	CSA					
COAL TAR NAPHTHA SOLVENT	NCT	0.004	0.013	0.029	0.050	0.076
CREOSOTE (COAL TAR)	CCT	0.003	0.013	0.028	0.048	0.074
CREOSOTE (WOOD)	CWD	0.003	0.013	0.028	0.048	0.074
CRESOLS (ALL ISOMERS)	CRS	0.004	0.013	0.028	0.048	0.074
CRESOLS WITH LESS THAN 5% PHENOL (SEE CRESOLS (ALL ISOMERS)	CRS					
CRESOLS WITH 5% OR MORE PHENOL (SEE PHENOL)	CFP	0.004	0.013	0.028	0.048	0.074
CRESYLATE SPENT CAUSTIC	CSC					
CRESYLIC ACID, SODIUM SALT SOLUTION, SEE CRESYLATE SPENT CAUSTIC	CAX					
CROTONALDEHYDE	CTA	0.004	0.016	0.035	0.060	0.093
CYCLOHEXANONE	CCH	0.003	0.013	0.028	0.048	0.074
CYCLOHEXYLAMINE	CHA	0.004	0.014	0.031	0.053	0.082
DECYL ACRYLATE (iso-, n-)	DAT	0.003	0.013	0.028	0.048	0.074
DICHLOROBENZENE (ALL ISOMERS)	DBX	0.004	0.013	0.028	0.049	0.075
1,1-DICHLOROETHANE	DCH	0.011	0.042	0.092	0.161	0.247
2,2-DICHLOROETHYL ETHER	DEE	0.004	0.013	0.028	0.048	0.074
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	0.009	0.032	0.071	0.123	0.190
1,3-DICHLOROPROPENE	DPU	0.008	0.029	0.064	0.111	0.171
DICHLOROPROPENE, DICHLOROPROPANE MIXTURES	DMX	0.009	0.032	0.071	0.123	0.190
2,2-DICHLOROPROPIONIC ACID	DCN					
DIETHANOLAMINE	DEA	0.003	0.013	0.028	0.048	0.074
DIETHYLAMINE	DEN	0.004	0.014	0.031	0.054	0.083
DIETHYLENETRIAMINE	DET	0.003	0.013	0.028	0.048	0.074
DIETHYL ETHER, SEE ETHYL ETHER	DEH					
DIISOBUTYLAMINE	DBU	0.004	0.014	0.031	0.053	0.082
DIISOPROPANOLAMINE	DIP	0.003	0.013	0.028	0.048	0.074

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	0.006	0.022	0.048	0.085	0.130
N,N-DIMETHYLACETAMIDE	DAC	0.004	0.013	0.028	0.049	0.076
DIMETHYLETHANOLAMINE	DMB	0.004	0.014	0.030	0.052	0.079
DIMETHYLFORMAMIDE	DMF	0.004	0.013	0.029	0.050	0.076
1,4-DIOXANE	DOX	0.004	0.017	0.036	0.062	0.096
DI-N-PROPYLAMINE	DNA	0.004	0.016	0.036	0.062	0.095
ETHANOLAMINE	MEA	0.003	0.013	0.028	0.048	0.074
ETHYL ACRYLATE	EAC	0.005	0.018	0.038	0.067	0.103
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	0.008	0.032	0.070	0.121	0.187
N-ETHYLBUTYLAMINE	EBA	0.004	0.016	0.034	0.059	0.091
N-ETHYLCYCLOHEXYLAMINE	ECC	0.004	0.014	0.031	0.054	0.082
ETHYLENE CYANOHYDRIN	ETC	0.003	0.013	0.028	0.048	0.073
ETHYLENEDIAMINE	EDA	0.004	0.014	0.030	0.052	0.080
ETHYLENE DIBROMIDE	EDB					
ETHYLENE DICHLORIDE	EDC	0.006	0.023	0.050	0.086	0.133
ETHYLENE GLYCOL PROPYL ETHER	EGP	0.004	0.015	0.032	0.055	0.085
2-ETHYLHEXYL ACRYLATE	EAI	0.003	0.013	0.028	0.048	0.074
ETHYLIDENE NORBORNENE	ENB	0.004	0.014	0.030	0.051	0.079
ETHYL METHACRYLATE	ETM	0.004	0.016	0.034	0.058	0.090
2-ETHYL-3-PROPYLACROLEIN	EPA	0.004	0.013	0.028	0.049	0.076
FERRIC CHLORIDE SOLUTIONS	FCS					
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	0.003	0.013	0.028	0.048	0.074
FORMIC ACID	FMA	0.004	0.015	0.032	0.056	0.085
FURFURAL	FFA	0.004	0.013	0.028	0.049	0.075
GLUTARALDEHYDE SOLUTION (50% OR LESS)	GTA					
HEXAMETHYLENEDIAMINE SOLUTION	HMC	0.003	0.013	0.028	0.048	0.074
HEXAMETHYLENEIMINE	HMI	0.004	0.013	0.028	0.049	0.075
HYDROCHLORIC ACID SPENT (15% OR LESS)	HCS					
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-)						
ISOPRENE	IPR	0.019	0.072	0.158	0.277	0.428
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT >= 3%)(INCL'G: BLACK, GREEN OR WHITE)	KPL					
MESITYL OXIDE	MSO	0.004	0.014	0.031	0.054	0.083
METHYL ACRYLATE	MAM	0.006	0.022	0.047	0.082	0.126
METHYLCYCLOPENTADIENE DIMER	MCK	0.003	0.013	0.028	0.048	0.074
METHYL DIETHANOLAMINE	MDE	0.004	0.013	0.028	0.049	0.075
2-METHYL-5-ETHYLPYRIDINE	MEP	0.004	0.013	0.029	0.050	0.076
METHYLENE CHLORIDE (SEE DICHLOROMETHANE)						
METHYL METHACRYLATE	MMM	0.005	0.018	0.038	0.066	0.103
2-METHYLPYRIDINE	MPR	0.004	0.014	0.030	0.052	0.080
alpha-METHYLSTYRENE	MSR	0.004	0.014	0.030	0.052	0.080
MORPHOLINE	MPL	0.004	0.014	0.031	0.054	0.083
NITRIC ACID (70% OR LESS)	NCD					
NITROPROPANE (-1, OR -2)	NPM	0.004	0.015	0.032	0.056	0.086
OCTYL NITRATES (ALL ISOMERS)	ONE	0.004	0.014	0.030	0.053	0.081
OLEUM	OLM	0.003	0.013	0.028	0.048	0.074
PENTACHLOROETHANE	PCE					
1, 3-PENTADIENE	PDE	0.014	0.051	0.112	0.197	0.304
PERCHLOROETHYLENE (SAME AS TETRACHLOROETHYLENE)	PER					
PHOSPHORIC ACID	PAC					
POLYETHYLENE POLYAMINES	PEB	0.003	0.013	0.028	0.048	0.074
POLYMETHYLENE POLYPHENYL ISOCYANATE	PPI	0.003	0.013	0.028	0.048	0.073
POTASSIUM HYDROXIDE SOLUTION (SEE CAUSTIC POTASH SOLUTION)						
iso-PROPANOLAMINE	MPA	0.004	0.013	0.028	0.048	0.074
PROPANOLAMINE (iso-, n-)	PAX	0.004	0.013	0.028	0.048	0.074
PROPIONIC ACID	PNA	0.004	0.013	0.029	0.050	0.076
iso-PROPYLAMINE	IPP	0.017	0.063	0.138	0.241	0.373
iso-PROPYL ETHER	IPE	0.008	0.031	0.068	0.119	0.183
PYRIDINE	PRD	0.004	0.015	0.033	0.057	0.087
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)						

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

CARGO	CHRIS	20.0% MAX LIQUID TRANSF RATE (MLTR)	40.0% MAX LIQUID TRANSF RATE (MLTR)	60.0% MAX LIQUID TRANSF RATE (MLTR)	80.0% MAX LIQUID TRANSF RATE (MLTR)	100.0 MAX LIQUID TRANSF RATE (MLTR)
	***	1,000 (BBL/ HR)	2,000 (BBL/ HR)	3,000 (BBL/ HR)	4,000 (BBL/ HR)	5,000 (BBL/ HR)
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	0.004	0.014	0.030	0.052	0.079
SULFURIC ACID	SFA	0.003	0.013	0.028	0.048	0.074
SULFURIC ACID, SPENT	SAC	0.003	0.013	0.028	0.048	0.073
1,1,2,2-TETRACHLOROETHANE (ACETYLENE TETRACHLORIDE)	TEC					
TETRAETHYLENEPENTAMINE	TTP	0.003	0.013	0.028	0.048	0.073
TETRAHYDROFURAN	THF	0.005	0.020	0.044	0.076	0.117
1,1,2-TRICHLOROETHANE (VINYL TRICHLORIDE)	TCM	0.004	0.016	0.035	0.060	0.093
TRICHLOROETHANE (SEE 1,1,2-TRICHLOROETHANE)						
TRICHLOROETHYLENE	TCL	0.007	0.024	0.053	0.092	0.142
1,2,3-TRICHLOROPROPANE	TCN	0.004	0.013	0.029	0.050	0.077
TRIETHANOLAMINE	TEA	0.003	0.013	0.028	0.048	0.074
TRIETHYLAMINE	TEN	0.005	0.019	0.041	0.071	0.110
TRIETHYLENETETRAMINE	TET	0.003	0.013	0.028	0.048	0.074
UREA, AMMONIUM NITRATE SOL'N (CONTAINING MORE THAN 2% NH3)	UAS					
VALERALDEHYDE (iso-, n-)		0.006	0.024	0.052	0.091	0.140
VALERALDEHYDE (iso-)	IVA	0.006	0.024	0.052	0.091	0.140
VALERALDEHYDE (n-)	VAL	0.003	0.013	0.028	0.048	0.074
VANILLAN BLACK LIQUOR (FREE ALKALI CONTENT 3% OR MORE)	VBL					
VINYL ACETATE	VAM	0.007	0.026	0.056	0.098	0.151
VINYLTOLUENE	VNT	0.004	0.013	0.028	0.049	0.075

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	0.018	0.040	0.070	0.107
METHYLCYCLOHEXANE						
METHYLHEXANE (SAME AS HEPTANE)	MEA	0.004	0.013	0.028	0.048	0.074
MONOETHANOLAMINE		0.004	0.013	0.028	0.049	0.075
MONOISOPROPANOLAMINE	NTM	0.003	0.013	0.028	0.048	0.074
NAPHTHALENE (MOLTEN)	NEA	0.003	0.013	0.028	0.048	0.074
NEODECANOIC ACID	NAA					
NITRILOTRIACETIC ACID	NTP					
NITROPHENOL (MOLTEN)	NNM	0.004	0.015	0.033	0.056	0.087
NITROPROPANE (60%), NITROETHANE (40%) MIXTURE	NIT	0.003	0.013	0.028	0.048	0.074
NITROTOLUENE (o-,p-)	PDH	0.012	0.045	0.099	0.172	0.267
PARALDEHYDE	PGS					
POLYGLYCERINE, SODIUM SALT SOLN (CONTAINING 3% OR MORE SODIUM HYDROXIE)	PAD	0.010	0.036	0.079	0.137	0.212
PROPIONALDEHYDE	PAH	0.004	0.013	0.028	0.049	0.075
PROPIONIC ANHYDRIDE	PCN	0.004	0.014	0.031	0.053	0.081
PROPIONITRILE	PRA	0.010	0.036	0.079	0.138	0.213
PROPYLAMINE (n-)		0.003	0.012	0.026	0.045	0.069
PROPYLBENZENE	GPY	0.008	0.029	0.063	0.109	0.168
PYROLYSIS GASOLINE (GREATER THAN 5% BENZENE)	SWR					
PYROLYSIS RESIDUAL FUELS	SDS					
SEWAGE, RAW	STY	0.004	0.014	0.030	0.052	0.079
SODIUM SULFIDE (SOLID IN WATER)	STX	0.004	0.014	0.030	0.052	0.079
STYRENE	STT					
STYRENE CRUDE	TTB	0.004	0.013	0.028	0.049	0.076
STYRENE TAR	TLI	0.003	0.013	0.028	0.048	0.074
TETRAMETHYLBENZENE (1,2,3,5-)	TCB	0.004	0.013	0.028	0.048	0.074
TOLUIDINE (o-)	TPE					
TRICHLOROBENZENE (1,2,4-)	UDA	0.003	0.013	0.028	0.048	0.073
TRIISOPROPANOLAMINE SALT OF 2,4-DICHLOROPHENOXY ACETIC ACID SOL'N	HFN	0.006	0.024	0.052	0.091	0.140
TRIPHENYLBORANE						
UNDECANOIC ACID						
HYDROCARBON 5-9						

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	0.008	0.028	0.062	0.107	0.166
Acetophenone	ACP	0.004	0.014	0.031	0.054	0.083
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						
Alkylbenzenesulfonic acid (4% or less)	AKB					
Alkyl Phthalates (n-)	ABS					
Alkyl Succinate Formaldehyde Hydr- oxyamino condensate (3.2% or less)						
Aminoethyldiethanolamine, Aminoethylethanolamine solution						
Amyl Acetate (commercial, iso-, n-,sec-)	AEC	0.005	0.019	0.042	0.073	0.112
AMYL ACETATE (n-)	AML	0.004	0.014	0.030	0.052	0.079
AMYL ACETATE (iso-)	IAT	0.004	0.014	0.030	0.052	0.079
Amyl alcohol (iso-, n-, sec-, primary)(SEE ALSO IAA)	AAI	0.004	0.013	0.029	0.050	0.077
Amyl alcohol (n-)	AAN	0.004	0.013	0.029	0.050	0.077
Amyl alcohol (tert-)	AAI					
AMYL ALCOHOL, PRIMARY	APM	0.004	0.013	0.029	0.050	0.077
AMYL ALCOHOL, (sec-)	ASE	0.004	0.013	0.029	0.050	0.077
Amylene	AMZ					
AMYL ALCOHOL, (iso-)	IAA	0.004	0.013	0.029	0.050	0.077
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	0.004	0.013	0.028	0.049	0.075
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	0.014	0.031	0.054	0.083
BUTYL ACETATE (N-)	BCN	0.004	0.015	0.032	0.056	0.086
Butyl Acetate (sec-)	BTA	0.005	0.017	0.037	0.064	0.098
Butyl alcohol (iso-, n-, sec-, tert-)		0.004	0.014	0.031	0.054	0.082
BUTYL ALCOHOL (ISO-)	IAL	0.004	0.014	0.031	0.054	0.082
BUTYL ALCOHOL (N-)	BAN	0.004	0.014	0.029	0.051	0.078
BUTYL ALCOHOL (SEC-)	BAS	0.004	0.015	0.032	0.056	0.086
BUTYL ALCOHOL (TERT-)	BAT	0.005	0.018	0.039	0.067	0.103
Butyl Benzyl Phthalate	BPH	0.003	0.013	0.028	0.048	0.074
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						
Butyrolactone (gamma)	BUE	0.004	0.013	0.028	0.049	0.075
	BLA					

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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)
Calcium Alkylphenate						
Calcium Alkyl Salicylate						
Calcium Amino Nonyl Phenolate						
Calcium Carboxylate						
Caprolactam solutions	CLS	0.004	0.013	0.028	0.048	0.074
Carbon black base						
Cetyl alcohol (HEXADECANOL) SEE ALCOHOLS (C13 AND ABOVE)						
Cetyl-Stearal alcohol						
Cleaning spirit (unleaded)						
Coal tar	COR					
Cumene	CUM	0.004	0.014	0.031	0.054	0.084
Cycloaliphatic resins						
Cyclohexane	CHX	0.006	0.022	0.048	0.085	0.130
Cyclohexanol	CHN	0.004	0.013	0.028	0.049	0.075
1,3-Cyclopentadiene dimer (molten)	CPD	0.004	0.014	0.029	0.051	0.078
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)						
Cymene (para-)	CMP	0.004	0.013	0.028	0.049	0.075
Decahydronaphthalene	DHN	0.004	0.013	0.028	0.049	0.075
Decaldehyde (iso-)	IDA	0.003	0.013	0.028	0.048	0.074
Decaldehyde (n-)	DAL	0.003	0.013	0.028	0.048	0.073
Decane	DDC					
Decene	DCE	0.004	0.013	0.028	0.049	0.076
Decyl alcohol (all isomers) (DECANOL)	DAX	0.003	0.013	0.028	0.048	0.074
DECYL ALCOHOL (iso-)	ISA	0.003	0.013	0.028	0.048	0.074
DECYL ALCOHOL (n-)	DAN	0.003	0.013	0.028	0.048	0.074
Decylbenzene (n-)	DBZ	0.003	0.013	0.028	0.048	0.074
Detergent Alkylate						
Diacetone alcohol	DAA	0.004	0.013	0.028	0.049	0.075
Dialkyl (C10-C14) Benzenes	DAB					
Dialkyl (C7-C13) Phthalates	DAH					
Dibutyl Carbinol						
Dibutyl Phthalate (ortho-)	DPA					
Dicyclopentadiene, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	DPT	0.004	0.014	0.029	0.051	0.078
Diethylbenzene	DEB	0.004	0.013	0.028	0.049	0.075
Diethylene Glycol	DEG	0.003	0.013	0.028	0.048	0.074
Diethylene Glycol Butyl Ether	DME	0.003	0.013	0.028	0.048	0.074
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	0.003	0.013	0.028	0.048	0.074
Diethylene Glycol Methyl Ether	DGM	0.003	0.013	0.028	0.048	0.074
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	0.004	0.013	0.028	0.049	0.075
Diisobutylene	DBL	0.005	0.018	0.040	0.069	0.106
Diisobutyl Ketone	DIK	0.004	0.013	0.029	0.050	0.077
Diisobutyl Phthalate	DIT					
Diisodecyl Phthalate	DID					
Diisononyl Adipate	DNY					
Diisononyl Phthalate	DIN					
Diisoocytl Phthalate	DIO					
Diisopropylbenzene (all isomers)	DIX	0.004	0.013	0.028	0.048	0.074
Diisopropyl Naphthalene	DII					
Dimethyl Adipate	DLA					

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	DMB	0.003	0.013	0.028	0.048	0.073
Dimethyl Glutarate	DGT					
Dimethyl Phthalate	DTL	0.003	0.013	0.028	0.048	0.073
Dimethyl Polysiloxane	DMP					
2,2-Dimethylpropane-1,3-diol	DDI					
Dimethyl Succinate	DSE					
Dinonyl Phthalate	DIF	0.004	0.013	0.028	0.048	0.074
Di(octylpheny)amine						
Dioctyl Phthalate	DOP	0.003	0.013	0.028	0.048	0.073
Dipentene	DPN	0.004	0.013	0.028	0.049	0.075
Diphenyl	DIL	0.003	0.013	0.028	0.048	0.074
Diphenyl, Diphenyl Ether mixture	DDO	0.003	0.013	0.028	0.048	0.074
Diphenyl Ether	DPE	0.003	0.013	0.028	0.048	0.074
Diphenyl Ether, Biphenyl Ether mixture	DOB					
Dipropylene Glycol	DPG	0.004	0.013	0.028	0.049	0.075
Dipropylene Glycol Dibenzoate	DGY					
Dipropylene Glycol Methyl Ether	DPY					
DISTILLATES: Flashed feed stocks	DFF	0.005	0.018	0.040	0.069	0.106
DISTILLATES: Straight run	DSR	0.005	0.018	0.040	0.069	0.106
Ditridecyl Phthalate	DTP					
Diundecyl Phthalate	DUP					
Dodecane (all isomers)	DOC					
Dodecanol	DDN					
Dodecene (all isomers)	DOZ	0.003	0.013	0.028	0.048	0.074
DODECENE	DOD	0.003	0.013	0.028	0.048	0.074
Dodecylbenzene	DDB	0.012	0.044	0.097	0.169	0.262
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	0.003	0.013	0.028	0.048	0.073
Ethyl Acetate	ETA	0.006	0.023	0.050	0.087	0.133
Ethyl Acetoacetate	EAA	0.004	0.013	0.029	0.050	0.077
Ethyl alcohol (ETHANOL)	EAL	0.004	0.016	0.035	0.061	0.094
Ethyl Amyl Ketone	EAK					
Ethyl Benzene	ETB	0.004	0.014	0.031	0.053	0.082
Ethyl Butanol	EBT	0.004	0.013	0.028	0.049	0.075
Ethyl Butyrate	EBR	0.004	0.016	0.034	0.058	0.090
Ethyl Cyclohexane	ECY	0.004	0.014	0.031	0.053	0.081
Ethylene	ETL					
Ethylene Carbonate						
Ethylene Glycol	EGL	0.003	0.013	0.028	0.048	0.073
Ethylene Glycol Acetate	EGO					
Ethylene Glycol Butyl Ether	EGM					
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EMA	0.004	0.013	0.028	0.049	0.075
Ethylene Glycol Ether Acetate						
Ethylene Glycol Tert-Butyl Ether						
Ethylene Glycol Diacetate	EGY	0.003	0.013	0.028	0.048	0.074
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	0.013	0.028	0.048	0.074
Ethylene Glycol Methyl Ether Acetate	EGT					
Ethylene Glycol Phenyl Ether	EPE	0.003	0.013	0.028	0.048	0.074
Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixture	EDX					
Ethylene-Propylene Copolymer (in liquid mixtures)						
Ethyl-3-Ethoxypropionate	EEP					

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	0.004	0.013	0.029	0.050	0.076
2-Ethylhexanoic acid	EHO					
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHX	0.003	0.013	0.028	0.048	0.074
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	0.016	0.035	0.061	0.094
Ethyl Toluene	ETE	0.004	0.014	0.029	0.051	0.078
Fatty acid (saturated, C13 and above)						
Fatty acid Amides						
Formamide	FAM	0.003	0.013	0.028	0.048	0.074
Furfuryl Alcohol	FAL	0.004	0.013	0.028	0.048	0.074
Gas oil, cracked	GOC					
GASOLINE BLENDING STOCKS: Alkylates	GAK	0.014	0.052	0.114	0.200	0.309
GASOLINE BLENDING STOCKS: Reformates	GRF	0.014	0.052	0.114	0.200	0.309
GASOLINES: Automotive (containing not over 4.23 grams lead per gallon)	GAT	0.014	0.052	0.114	0.200	0.309
GASOLINES: Aviation (containing not over 4.86 grams lead per gallon) Aviation	GAV	0.014	0.052	0.114	0.200	0.309
GASOLINES: Casinghead (natural)	GCS	0.014	0.052	0.114	0.200	0.309
GASOLINES: Polymer	GPL	0.014	0.052	0.114	0.200	0.309
GASOLINES: Straight run	GSR	0.014	0.052	0.114	0.200	0.309
Glycerine	GCR	0.003	0.013	0.028	0.048	0.073
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	0.019	0.041	0.071	0.110
HEPTANE (N-)	HPT	0.005	0.019	0.041	0.071	0.110
Heptanoic acid	HEP	0.003	0.013	0.028	0.048	0.074
Heptanol (all isomers)	HTX	0.004	0.013	0.028	0.048	0.074
HEPTANOL	HTN	0.004	0.013	0.028	0.048	0.074
Heptene (all isomers)	HPX	0.005	0.020	0.043	0.075	0.115
HEPTENE (1-)	HTE	0.005	0.020	0.042	0.074	0.114
Heptyl Acetate	HPE	0.004	0.013	0.028	0.049	0.076
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR						
Hexaethylene Glycol						
Hexamethylene Glycol						
Hexamethylenetetramine solutions	HTS					
Hexane (all isomers)	HXS	0.008	0.029	0.064	0.112	0.172
HEXANE	HXA	0.008	0.029	0.064	0.112	0.172
Hexanoic acid	HXO	0.003	0.013	0.028	0.048	0.074
Hexanol	HXN	0.004	0.015	0.033	0.057	0.088
Hexene (all isomers)	HEX	0.008	0.031	0.069	0.120	0.184
HEXENE (1-)	HXE	0.009	0.032	0.070	0.122	0.188
HEXENE (2-)	HXT	0.009	0.032	0.070	0.122	0.188
Hexyl Acetate	HAE					
Hexylene Glycol	HXG	0.003	0.013	0.028	0.048	0.073
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	0.013	0.028	0.048	0.074
JET FUELS: JP-1 (Kerosene)	JPO	0.004	0.013	0.029	0.049	0.076
JET FUELS: JP-3	JPT	0.012	0.046	0.100	0.175	0.270
JET FUELS: JP-4	JPF	0.006	0.023	0.050	0.086	0.133

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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)
JET FUELS: JP-5 (Kerosene, heavy)	JPV	0.004	0.013	0.028	0.049	0.075
JET FUELS: JP-8	JPE					
Kerosene	KRS	0.004	0.013	0.029	0.050	0.076
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	0.007	0.025	0.054	0.094	0.144
Methyl Acetoacetate	MAE					
Methyl alcohol (SEE METHANOL)	MAL	0.005	0.017	0.036	0.063	0.097
Methyl Amyl Acetate	MAC	0.004	0.014	0.030	0.052	0.080
Methyl Amyl alcohol	MAA	0.004	0.014	0.030	0.052	0.079
Methyl Amyl Ketone	MAK					
Methyl Butanol, SEE THE AMYL ALCOHOLS						
Methyl Butenol	MBL					
Methyl n-Butyl Ketone	MBK	0.004	0.015	0.033	0.057	0.087
Methyl Butynol	MBY					
Methyl Butyrate	MBU	0.004	0.016	0.034	0.059	0.092
Methyl Ethyl Ketone	MEK	0.006	0.021	0.045	0.079	0.121
Methyl Formal (DIMETHYL FORMAL)	MTF	0.013	0.051	0.111	0.194	0.300
Methyl Heptyl Ketone	MHK	0.004	0.013	0.028	0.049	0.075
Methyl Isobutyl Carbinol, SEE METHYL AMYL ALCOHOL	MIC					
Methyl Isobutyl Ketone	MIK	0.004	0.015	0.034	0.058	0.090
3-Methyl-3-Methoxybutanol						
3-Methyl-3-Methoxybutyl Acetate						
1-Methyl Naphthalene	MNA	0.003	0.013	0.028	0.048	0.074
Methyl Pentene						
2-METHYL-1-PENTENE	MPN	0.007	0.027	0.058	0.102	0.156
5-METHYL-1-PENTENE	MTN	0.009	0.033	0.072	0.125	0.192
N-Methyl-2-Pyrrolidone	MPY					
Methyl Tert-Butyl Ether (MTBE)	MBE	0.003	0.013	0.028	0.048	0.074
Metolachlor	MCO					
Mineral spirits	MNS	0.004	0.013	0.029	0.050	0.077
Myrcene	MRE	0.004	0.013	0.029	0.050	0.077
NAPHTHA: Aromatic (Having less than 10% Benzene)						
NAPHTHA: Cracking fraction						
NAPHTHA: Heavy						
NAPHTHA: Paraffinic						
NAPHTHA: Petroleum	PTN					
NAPHTHA: Solvent	NSV	0.004	0.013	0.029	0.050	0.076
NAPHTHA: Stoddard solvent	NSS	0.004	0.013	0.029	0.050	0.077
NAPHTHA: Varnish makers' and painters' (75%)	NVM	0.004	0.013	0.029	0.050	0.077
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt solution	NFS					
Naphthenic acid	NTI					
Nonane (all isomers)	NAX	0.004	0.014	0.029	0.051	0.078
NONANE	NAN	0.004	0.014	0.029	0.051	0.078
Nonanoic acid (all isomers)	NNA					
Nonanoic, Tridecanoic acid mixture						
Nonene	NON	0.004	0.014	0.030	0.052	0.079
Nonyl alcohol (all isomers)	NNS	0.004	0.013	0.028	0.049	0.075
NONYL ALCOHOL	NNN	0.004	0.013	0.028	0.049	0.075
NONYL ALCOHOL (iso-)	NNI	0.004	0.013	0.028	0.049	0.075
Nonyl Methacrylate Monomer						

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	NNP	0.003	0.013	0.028	0.048	0.074
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						
Non-Noxious liquid, N.O.S. (18) ("Trade name," contains principal components"), Appen						
Octadecene	ODD					
Octadecenoamide solution (Oleamide)	OAX	0.004	0.015	0.032	0.056	0.086
Octane (all isomers)	OAN	0.004	0.015	0.032	0.056	0.086
OCTANE	OAA	0.003	0.013	0.028	0.048	0.074
Octanoic acid (all isomers)	OCX	0.003	0.013	0.028	0.048	0.074
Octanol (all isomers)	OTA	0.003	0.013	0.028	0.048	0.074
OCTANOL	OTX	0.004	0.015	0.033	0.057	0.088
Octene (all isomers)	OTE	0.004	0.015	0.033	0.058	0.089
OCTENE (1-)						
Octyl Acetate	OCX	0.003	0.013	0.028	0.048	0.074
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	IOA	0.003	0.013	0.028	0.048	0.074
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					
OIL, EDIBLE: Coconut						
OIL, EDIBLE: Cod liver	OCO					
OIL, EDIBLE: Corn	OCS					
OIL, EDIBLE: Cottonseed	OFS					
OIL, EDIBLE: Fish, N.O.S.						
OIL, EDIBLE: Grapeseed						
OIL, EDIBLE: Groundnut						
OIL, EDIBLE: Hazelnut	OLD					
OIL, EDIBLE: Lard						
OIL, EDIBLE: Maize						
OIL, EDIBLE: Mustard seed						
OIL, EDIBLE: Nutmeg Butter	OOL					
OIL, EDIBLE: Olive	OPM					
OIL, EDIBLE: Palm	OPO					
OIL, EDIBLE: Palm kernel	OPN					
OIL, EDIBLE: Peanut						
OIL, EDIBLE: Poppy						
OIL, EDIBLE: Raisin seed	ORP					
OIL, EDIBLE: Rice bran	OSF					
OIL, EDIBLE: Safflower						
OIL, EDIBLE: Salad						
OIL, EDIBLE: Sesame	OSB					
OIL, EDIBLE: Soya bean						
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED	OSN					
OIL, EDIBLE: Sunflower seed	OTC					
OIL, EDIBLE: Tucum	OVG					
OIL, EDIBLE: Vegetable, N.O.S.						
OIL, EDIBLE: Walnut	OON					
OIL, FUEL: No. 1 (Kerosene)	OOD					
OIL, FUEL: No. 1-D	OTW	0.004	0.016	0.035	0.060	0.093
OIL, FUEL: No. 2	OTD					
OIL, FUEL: No. 2-D	OFR	0.004	0.013	0.028	0.049	0.075
OIL, FUEL: No. 4	OFV	0.004	0.013	0.028	0.049	0.075
OIL, FUEL: No. 5	OSX	0.004	0.013	0.028	0.049	0.075
OIL, FUEL: No. 6	OAS					
OIL, MISC: Absorption						
OIL, MISC: Aliphatic						

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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						
OIL, MISC: Coal	OCF					
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHYL ESTER						
OIL, MISC: Coconut oil, fatty acid						
OIL, MISC: Coconut oil, fatty acid Methyl Ester	OCM					
OIL, MISC: Coconut oil, Methyl Ester, SEE COCONUT OIL FATTY ACID METHYL ESTER						
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACID	CFY					
OIL, MISC: Crude						
OIL, MISC: Diesel	OIL	0.004	0.013	0.028	0.049	0.075
OIL, MISC: Gas, low pour	ODS	0.004	0.014	0.031	0.054	0.083
OIL, MISC: Gas, low sulfur						
OIL, MISC: Heartcut distillate						
OIL, MISC: Lanolin						
OIL, MISC: Linseed						
OIL, MISC: Lubricating						
OIL, MISC: Mineral	OLB	0.003	0.013	0.028	0.048	0.074
OIL, MISC: Mineral seal						
OIL, MISC: Motor	OMS					
OIL, MISC: Neatsfoot	OMT					
OIL, MISC: Oiticica	ONF					
OIL, MISC: Palm oil, fatty acid Methyl Ester	OOI					
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID METHYL ESTER	OPE					
OIL, MISC: Penetrating	OPE					
OIL, MISC: Perilla	OPT					
OIL, MISC: Pilchard						
OIL, MISC: Pine						
OIL, MISC: Range	OPI					
OIL, MISC: Residual	ORG					
OIL, MISC: Resin						
OIL, MISC: Resinous petroleum	ORS	0.003	0.013	0.028	0.048	0.074
OIL, MISC: Road						
OIL, MISC: Rosin	ORD					
OIL, MISC: Seal	ORN					
OIL, MISC: Soapstock						
OIL, MISC: Soya bean (epoxidized)	OIS					
OIL, MISC: Sperm						
OIL, MISC: Spindle	OSP					
OIL, MISC: Spray	OSD					
OIL, MISC: Tall	OSY					
OIL, MISC: Tall, fatty acid	OTL					
OIL, MISC: Tanner's	TOF					
OIL, MISC: Transformer	OTN					
OIL, MISC: Tung	OTF					
OIL, MISC: Turbine	OTG					
OIL, MISC: Whale	OTB	0.004	0.014	0.030	0.052	0.080
OIL, MISC: White (mineral)						
OIL, MISC: Wood						
alpha-Olefins (C13 - C18)						
Olefins (C13 and above, all isomers)	OAM					
Oleic acid						
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)	OLA					
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	0.013	0.028	0.048	0.074
Pentaethylene Glycol						
Pentaethylenehexamine	PEP					
Pentane (all isomers)	PTY	0.018	0.068	0.150	0.262	0.405

BARGE: C9706: CONOCO, INC./ E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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-)	***					
PENTANE (n-)	IPT	0.025	0.094	0.206	0.362	0.561
Pentanoic acid	PTA	0.017	0.066	0.146	0.256	0.396
Pentene (all isomers)						
PENTENE (1-)	PTX	0.021	0.081	0.179	0.313	0.485
Petrolatum	PTE	0.021	0.081	0.179	0.313	0.485
1-Phenyl-1-Xylyl Ethane	PTL					
Phosphosulfurized Bicyclic Terpene	PXE					
Phthalate plasticizers, SEE INDIVIDUAL PHTHALATES						
Pinene						
Polyalkenyl Succinic Anhydride Amine	PIN	0.004	0.014	0.030	0.052	0.080
Polyalkylene Glycols, Polyalkylene Glycol Monoalkyl Ethers mixtures						
Polyalkylene Oxide Polyol	PPX					
Polamine, Amide mixture	PAO					
Polybutadiene, Hydroxyl terminated						
Polybutene						
Polydimethylsiloxane	PLB	0.004	0.013	0.029	0.050	0.077
Polyethylene Glycol						
Polyethylene Glycol Dimethyl Ether						
Polyglycerol						
Polyisobutylene, SEE POLYBUTENE						
Polymerized Esters						
Poly(20)oxyethylene Sorbitan Monooleate						
Polypropylene	PSM					
Polypropylene Glycol	PLP					
Polypropylene Glycol Methyl Ether	PGC	0.003	0.013	0.028	0.048	0.074
Polysiloxane	PGM	0.004	0.014	0.031	0.054	0.083
Polystyrene Diakyl Maleate						
Potassium Oleate						
Propane	POE					
n-Propoxypropanol	PRP					
Propyl Acetate (iso-)	PXP					
Propyl Acetate (n-)	IAC	0.005	0.017	0.037	0.065	0.100
Propyl alcohol (iso-)	PAT	0.005	0.017	0.038	0.065	0.100
Propyl alcohol (n-)	IPA	0.005	0.017	0.037	0.064	0.098
Propylbenzene (n-)	PAL	0.004	0.014	0.031	0.054	0.083
iso-Propylcyclohexane	PBZ	0.004	0.013	0.029	0.050	0.077
Propylene	IPX	0.003	0.013	0.028	0.048	0.074
Propylene-Butylene Copolymer	PPL					
Propylene Dimer	PBP					
Propylene Glycol (1,2-PROPANDIOL)	PDR					
Propylene Glycol Monoalkyl Ether	PPG	0.003	0.013	0.028	0.048	0.074
Propylene Glycol Ethyl Ether	PGE					
Propylene Glycol Methyl Ether	PGY					
Propylene Polymer (in liquid mixtures)	PME	0.004	0.014	0.031	0.053	0.082
Propylene Tetramer						
Propylene Trimer	PTT	0.003	0.013	0.028	0.048	0.073
Pseudocumene, SEE TRIMETHYLBENZENES	PTR					
Rum						
Sodium Acetate, Glycol, water solutions						
Sodium Acetate solution						
Sodium Benzoate solution	SAN					
Sodium Sulfonate	SBN					
Stearic acid						
Stearyl alcohol (Octadecanol)	SRA					
Sulfolane						
Tallow	SPL	0.003	0.013	0.028	0.048	0.074
Tallow alcohol, SEE ALCOHOLS (C13 AND ABOVE)	TLO					
Tallow fatty acid						
Tallow Alkyl Nitrile	TFD					
Tetradecanol						
1-Tetradecene, SEE THE OLEFIN OR ALPHA-OLEFIN ENTRIES	TTN					
	TTD	0.003	0.013	0.028	0.048	0.074

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	0.013	0.028	0.048	0.074
Tetrahydronaphthalene	THN	0.004	0.013	0.028	0.048	0.074
Tetrapropylbenzene, SEE ALKYL(C9-C17) BENZENES						
Toluene	TOL	0.004	0.016	0.035	0.060	0.093
Triaryphosphate						
Tributyl Phosphate	TBP					
Tricresyl Phosphate (less than 1% of the ortho isomer)	TCP	0.003	0.013	0.028	0.048	0.074
Tridecane	TRD	0.003	0.013	0.028	0.048	0.074
Tridecanoic acid						
Tridecanol, SEE ALCOHOLS (C13 AND ABOVE)						
1-Tridecene	TDN	0.003	0.013	0.028	0.048	0.074
Tridecylbenzene	TDC	0.003	0.013	0.028	0.048	0.074
Triethylbenzene	TRB					
Triethylene Glycol	TEB	0.003	0.013	0.028	0.048	0.074
Triethylene Glycol Butyl Ether	TEG	0.003	0.013	0.028	0.048	0.074
Triethylene Glycol Butyl Ether mixture						
Triethylene Glycol di-(2-ethylbutyrate)						
Triethylene Glycol Ether mixture	TGD					
Triethylene Glycol Ethyl Ether						
Triethylene Glycol Methyl Ether	TGE					
Triethyl Phosphate						
Triisooctyl Trimellitate	TPS	0.003	0.013	0.028	0.048	0.074
Triisopropanolamine						
Trimethylbenzenes (all isomers)	TIP					
TRIMETHYL BENZENE (1,2,5-)	TRE	0.004	0.013	0.028	0.049	0.076
TRIMETHYL BENZENE (1,2,3-)	TMB	0.004	0.013	0.028	0.049	0.076
TRIMETHYL BENZENE (1,2,4-) (PSEUDOCUMENE)	TMD	0.004	0.013	0.028	0.049	0.076
Trimethylol Propane Polyethoxylate	TME	0.004	0.013	0.028	0.049	0.076
2,2,4-Trimethyl pentanediol-1,3-diisobutyrate	TPR					
2,2,4-Trimethyl-3-pentanol-1-isobutyrate						
Tripropylene, SEE PROPYLENE TRIMER	TMP					
Tripropylene Glycol						
Tripropylene Glycol Methyl Ether	TGC					
Trixylenyl Phosphate	TGM					
Turpentine	TRP					
Turpentine substitute (White spirit), SEE WHITE SPIRIT (LOW (15-20%) AROMATIC)	TPT					
Undecanol						
Undecene (1-)						
Undecyl alcohol	UDC	0.004	0.013	0.028	0.049	0.074
Undecylbenzene	UND	0.003	0.013	0.028	0.048	0.074
Vinyl Acetate-fumerate Copolymer	UDB					
Waxes:						
WAXES: Candelilla	WAX					
WAXES: Carnauba						
WAXES: Paraffin	WAX,					
WAXES: Petroleum	WAX,					
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	0.004	0.014	0.030	0.053	0.081
XYLENE (M-)	XLM	0.004	0.014	0.030	0.053	0.081
XYLENE (O-)	XLO	0.004	0.014	0.030	0.052	0.079
XYLENE (P-)	XLP	0.004	0.014	0.030	0.053	0.081
XYLENOL	XYL	0.004	0.013	0.028	0.049	0.075
Zinc Dialkyldithiophosphate						

BARGE: C9706: CONOCO, INC.; E344

(SEE "TABLE IV" FOR APPLICABLE CONDITIONS)

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

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	0.013	0.028	0.048	0.074
AROMATIC RESIN OIL 80	ARS	0.003	0.013	0.028	0.048	0.074
AROMATIC RESIN OILS						

CALCULATIONS FOR CAPACITY OF SPILL VALVE
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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, GREK	PL				
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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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	AEP				
AMINOETHYLPIPERAZINE		0.70	5,000	4,183	OK
BENZENE RAFFINATE (ASSUME VAPOR PROPERTIES SIMILAR TO BENZENE)	BSC	1.38	5,000	5,874	OK
BENZENE SULFONYL CHLORIDE	BZE	1.04	5,000	5,099	OK
BENZYL ACETATE	BCL	1.10	5,000	5,244	OK
BENZYL CHLORIDE (STABILIZED)					
BUTANOL	BTE	0.77	5,000	4,387	OK
BUTYL ETHER (n-)	BTO	0.83	5,000	4,555	OK
BUTYLENE OXIDE (1,2-)	BRA	0.96	5,000	4,899	OK
BUTYRIC ACID	CBO	1.04	5,000	5,099	OK
CARBOLIC ACID	CHM	1.58	5,000	6,285	OK
CHLOROACETIC ACID (80% OR LESS)	CPM	1.26	5,000	5,612	OK
CHLOROPROPIONIC ACID (2- OR 3-)	CTM	1.07	5,000	5,172	OK
CHLOROTOLUENE (m-)	CTO	1.08	5,000	5,196	OK
CHLOROTOLUENE (o-)	CRN	1.07	5,000	5,172	OK
CHLOROTOLUENE (p)	CHI	1.08	5,000	5,196	OK
CHLOROTOLUENES (MIXED ISOMERS)	CCW	1.07	5,000	5,172	OK
CREOSOTE (ALL ISOMERS)	CRX	1.05	5,000	5,123	OK
CRESYLIC ACID TAR	CYE	0.81	5,000	4,500	OK
CYCLOHEPTANE	CYX	0.95	5,000	4,873	OK
CYCLOHEXANONE, CYCLOHEXANOL MIXTURE	CYC	0.97	5,000	4,924	OK
CYCLOHEXYL ACETATE	CSB	1.50	5,000	6,124	OK
CYCLOPENTADIENE, STYRENE, BENZENE MIXTURE	CYP	0.74	5,000	4,301	OK
CYCLOPENTANE	DCO	5.94	2,770	6,750	OK
DECANOIC ACID		0.98	5,000	4,955	OK
DI 2 ETHYLHEXYL PHTHALATE (SEE ALSO ETHYLHEXYL PHTHALATE)	DCI	1.11	5,000	5,268	OK
DICHLOROISOPROPYL ETHER (2,2'-)		1.16	5,000	5,385	OK
DICHLOROPROPANE		1.23	5,000	5,545	OK
DICHLOROPROPENE	DSU	1.18	5,000	5,431	OK
DIETHYL SULFATE	DAE	0.89	5,000	4,717	OK
DIETHYLETHANOLAMINE					
DODECYL BENZENE	DOT				
DODECYLDIMETHYLAMINE TETRADECYLDIMETHYLAMINE MIXTURE					
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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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	BHK				
Butyl Methyl Ketone,SEE METHYL BUTYL KETONE					
Butyl Stearate					
Butyl Toluene	BUE	0.85	5,000	4,610	OK
Butyrolactone (gamma)	BLA				
Calcium Alkylphenate					
Calcium Alkyl Salicylate					
Calcium Amino Nonyl Phenolate					
Calcium Carboxylate					
Caprolactam solutions	CLS	1.02	5,000	5,050	OK
Carbon black base		0.90	5,000	4,743	OK
Cetyl alcohol (HEXADECANOL) SEE ALCOHOLS (C13 AND ABOVE)					
Cetyl-Stearal alcohol					
Cleaning spirit (unleaded)					
Coal tar	COR	1.11	5,000	5,268	OK
Cumene	CUM	0.86	5,000	4,640	OK
Cycloaliphatic resins					
Cyclohexane	CHX	0.78	5,000	4,413	OK
Cyclohexanol	CHN	0.95	5,000	4,873	OK
1,3-Cyclopentadiene dimer (molten)	CPD	0.69	5,000	4,153	OK
Cyclopentadiene polymers, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)					
Cymene (para-)	CMP	0.86	5,000	4,637	OK
Decahydronaphthalene	DHN	0.89	5,000	4,717	OK
Decaldehyde (iso-)	IDA	0.83	5,000	4,555	OK
Decaldehyde (n-)	DAL	0.83	5,000	4,555	OK
Decane	DDC				
Decene	DCE	0.74	5,000	4,301	OK
Decyl alcohol (all isomers) (DECANOL)	DAX	0.83	5,000	4,555	OK
DECYL ALCOHOL (iso-)	ISA	0.83	5,000	4,555	OK
DECYL ALCOHOL (n-)	DAN	0.83	5,000	4,555	OK
Decylbenzene (n-)	DBZ	0.86	5,000	4,637	OK
Detergent Alkylate					
Diacetone alcohol	DAA	0.97	5,000	4,933	OK
Dialkyl (C10-C14) Benzenes	DAB				
Dialkyl (C7-C13) Phthalates	DAH				
Dibutyl Carbinol					
Dibutyl Phthalate (ortho-)	DPA	1.05	5,000	5,123	OK
Dicyclopentadiene, SEE 1,3-CYCLOPENTADIENE DIMER (MOLTEN)	DPT	0.98	5,000	4,950	OK
Diethylbenzene	DEB	0.87	5,000	4,664	OK
Diethylene Glycol	DEG	1.12	5,000	5,292	OK
Diethylene Glycol Butyl Ether	DME	0.95	5,000	4,873	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	0.99	5,000	4,975	OK
Diethylene Glycol Methyl Ether	DGM	1.03	5,000	5,074	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				

CALCULATIONS FOR CAPACITY OF SPILL VALVE
BARGE: C9706: CONOCO, INC.; E344

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				
Diisooctyl Phthalate	DIO				
Diisopropylbenzene (all isomers)	DIX	0.86	5,000	4,637	OK
Diisopropyl Naphthalene	DII				
Dimethyl Adipate	DLA				
Dimethylbenzene					
Dimethyl Glutarate	DGT				
Dimethyl Phthalate	DTL	1.19	5,000	5,454	OK
Dimethyl Polysiloxane	DMP				
2,2-Dimethylpropane-1,3-diol	DDI				
Dimethyl Succinate	DSE				
Dinonyl Phthalate	DIF	0.97	5,000	4,924	OK
Di(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
BARGE: C9706: CONOCO, INC.; E344

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
Ethyl Cyclohexane	ECY	0.79	5,000	4,444	OK
Ethylene	ETL				
Ethylene Carbonate					
Ethylene Glycol	EGL	1.13	5,000	5,315	OK
Ethylene Glycol Acetate	EGO				
Ethylene Glycol Butyl Ether	EGM				
ETHYLENE GLYCOL BUTYL ETHER ACETATE	EMA	0.94	5,000	4,848	OK
Ethylene Glycol Ether Acetate					
Ethylene Glycol Tert-Butyl Ether					
Ethylene Glycol Diacetate	EGY	1.10	5,000	5,244	OK
Ethylene Glycol Dibutyl Ether	EGB				
Ethylene Glycol Ethyl Ether, SEE 2-ETHOXYETHANOL	EGF				
Ethylene Glycol Ethyl Ether Acetate, SEE 2-ETHOXYETHYL ACETATE	EGA				
Ethylene Glycol Isopropyl Ether	EGI				
Ethylene Glycol Methyl Butyl Ether					
Ethylene Glycol Methyl Ether	EME	1.10	5,000	5,244	OK
Ethylene Glycol Methyl Ether Acetate	EGT				
Ethylene Glycol Phenyl Ether	EPE	1.10	5,000	5,244	OK
Ethylene Glycol Phenyl Ether, Diethylene Glycol Phenyl Ether mixture	EDX				
Ethylene-Propylene Copolymer (in liquid mixtures)					
Ethyl-3-Ethoxypropionate	EEP				
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EHA	0.82	5,000	4,528	OK
2-Ethylhexanoic acid	EHO				
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)	EHX	0.84	5,000	4,583	OK
Ethylhexoic acid, SEE 2-ETHYLHEXANOIC ACID					
Ethyl Hexyl Phthalate (SEE ALSO DI 2-ETHYLHEXYL PHTHALATE)	EHE				
Ethyl Hexyl Tallate	EHT				
Ethyl Propionate	EPR	0.89	5,000	4,717	OK
Ethyl Toluene	ETE	0.88	5,000	4,690	OK
Fatty acid (saturated, C13 and above)					
Fatty acid Amides					
Formamide	FAM	1.13	5,000	5,315	OK
Furfuryl Alcohol	FAL	1.13	5,000	5,315	OK
Gas oil, cracked	GOC				
GASOLINE BLENDING STOCKS: Alkylates	GAK	0.75	5,000	4,330	OK
GASOLINE BLENDING STOCKS: Reformates	GRF	0.80	5,000	4,472	OK
GASOLINES: Automotive (containing not over 4.23 grams lead per gallon)	GAT	0.74	5,000	4,301	OK
GASOLINES: Aviation (containing not over 4.86 grams lead per gallon) 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
BARGE: C9706: CONOCO, INC.; E344

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	MIT	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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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
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 P2300					
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
BARGE: C9706: CONOCO, INC.; E344

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
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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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
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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC./ E344

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)	CPP	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
BARGE: C9706: CONOCO, INC.; E344

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	DMF	5,000	5,000
1,4-DIOXANE	DOX	5,000	5,000
DI-N-PROPYLAMINE	DNA	5,000	5,000
ETHANOLAMINE	MEA	5,000	5,000
ETHYL ACRYLATE	EAC	5,000	5,000
ETHYLAMINE SOLUTION (72% OR LESS)	EAN	5,000	5,000
N-ETHYLBUTYLAMINE	EBA	5,000	5,000
N-ETHYLCYCLOHEXYLAMINE	ECC	5,000	5,000
ETHYLENE CYANOHYDRIN	ETC	5,000	5,000
ETHYLENEDIAMINE	EDA	5,000	5,000
ETHYLENE DIBROMIDE	EDB	4,582	
ETHYLENE DICHLORIDE	EDC	5,000	5,000
ETHYLENE GLYCOL PROPYL ETHER	EGP	5,000	5,000
2-ETHYLHEXYL ACRYLATE	EAI	5,000	5,000
ETHYLIDENE NORBORNENE	ENB	5,000	5,000
ETHYL METHACRYLATE	ETM	5,000	5,000
2-ETHYL-3-PROPYLACROLEIN	EPA	5,000	5,000
FERRIC CHLORIDE SOLUTIONS	FCS		
FORMALDEHYDE SOLUTION (37% TO 50%)	FMS	5,000	5,000
FORMIC ACID	FMA	5,000	5,000
FURFURAL	FFA	5,000	5,000
GLUTARALDEHYDE SOLUTION (50% OR LESS)	GTA		
HEXAMETHYLENEDIAMINE SOLUTION	HMC	5,000	5,000
HEXAMETHYLENEIMINE	HMI	5,000	5,000
HYDROCHLORIC ACID SPENT (15% OR LESS)	HCS	5,000	
ISOPENTALDEHYDE (MIXED ISOMERS) (SEE VALERALDEHYDE (ISO-, N-)			
ISOPRENE	IPR	5,000	5,000
KRAFT PULPING LIQUORS (FREE ALKALI CONTENT 3% OR MORE)(INCLUDING: BLACK,	KPL		
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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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	EBE	5,000	5,000
ETHYL TERT-BUTYL ETHER	EAM	5,000	5,000
ETHYLAMINE	ETX	5,000	5,000
ETHYLENE DICHLORIDE 1,1,2-TRICHLOROETHANE MIXTURE			
ETHYLMERCAPTAN (SAME AS ETHANETHIOL)	EPL	5,000	5,000
ETHYLPHENOL	MTM	5,000	5,000
FORMALDEHYDE SOLUTION (50% OR MORE), METHANOL MIXTURES			
HYDROSULFIDE			
INDENES	IBA		5,000
ISOBUTYL ACETATE	IPN		
ISOPRENE, PENTADIENE MIXTURE		5,000	5,000
ISO-PROPYL ALCOHOL	LRA	5,000	
LAURIC ACID	MET	5,000	5,000
METHACRYLONITRILE			

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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
BARGE: C9706: CONOCO, INC.; E344

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	EGP		
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
BARGE: C9706: CONOCO, INC.; E344

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)	EEP		
Ethyl-3-Ethoxypropionate	EHA	5,000	5,000
2-Ethylhexaldehyde, SEE OCTYL ALDEHYDES	EHO		
2-Ethylhexanoic acid	EHX	5,000	5,000
2-Ethylhexanol, SEE OCTANOL (ALL ISOMERS)			
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	FAM	5,000	5,000
Formamide	FAL	5,000	5,000
Furfuryl Alcohol	GOC		
Gas oil, cracked	GAK	5,000	5,000
GASOLINE BLENDING STOCKS: Alkylates	GRF	5,000	5,000
GASOLINE BLENDING STOCKS: Reformates	GAT	5,000	5,000
GASOLINES: Automotive (containing not over 4.23 grams lead per gallon)	AviGAV	5,000	5,000
GASOLINES: Aviation (containing not over 4.86 grams lead per gallon)	GCS	5,000	5,000
GASOLINES: Casinghead (natural)	GPL	5,000	5,000
GASOLINES: Polymer	GSR	5,000	5,000
GASOLINES: Straight run	GCR	5,000	
Glycerine			
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	HMX	5,000	5,000
Heptane (all isomers) (METHYHEXANE)	HPT	5,000	5,000
HEPTANE (N-)	HEP	5,000	5,000
Heptanoic acid	HTX	5,000	5,000
Heptanol (all isomers)	HTN	5,000	5,000
HEPTANOL	HPX	5,000	5,000
Heptene (all isomers)	HTE	5,000	5,000
HEPTENE (1-)	HPE	5,000	5,000
Heptyl Acetate			
Herbicide (C15 -H22 -NO2 -CI), SEE METOLACHLOR			
Hexaethylene Glycol			
Hexamethylene Glycol	HTS		
Hexamethylenetetramine solutions	HXS	5,000	5,000
Hexane (all isomers)	HXA	5,000	5,000
HEXANE	HXO	5,000	5,000
Hexanoic acid	HXN	5,000	5,000
Hexanol	HEX	5,000	5,000
Hexene (all isomers)	HXE	5,000	5,000
HEXENE (1-)	HXT	5,000	5,000
HEXENE (2-)	HAE		
Hexyl Acetate	HXG	5,000	5,000
Hexylene Glycol			
Hog Grease, SEE LARD	HBA		
2-Hydroxy-4-(methylthio)butanoic acid	HFN		
HYDROCARBON 5-9 (MOVED TO SUB-O, NON TABLE 151, 6/24/95)			
Hydroxy terminated Polybutadiene, SEE POLYBUTADIENE, HYDROXYL TERMINATED/			

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES
BARGE: C9706: CONOCO, INC.; E344

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	MPN	5,000	5,000
2-METHYL-1-PENTENE	MTN	5,000	5,000
5-METHYL-1-PENTENE	MPY		
N-Methyl-2-Pyrrolidone	MBE	5,000	5,000
Methyl Tert-Butyl Ether (MTBE)	MCO		
Metolachlor	MNS	5,000	5,000
Mineral spirits	MRE	5,000	5,000
Myrcene			
NAPHTHA: Aromatic (Having less than 10% Benzene)			
NAPHTHA: Cracking fraction			
NAPHTHA: Heavy			
NAPHTHA: Paraffinic	PTN		
NAPHTHA: Petroleum	NSV	5,000	5,000
NAPHTHA: Solvent	NSS	5,000	5,000
NAPHTHA: Stoddard solvent	NVM	5,000	5,000
NAPHTHA: Varnish makers' and painters' (75%)	NFS		
Naphthalene Sulfonic acid-Formaldehyde Copolymer, Sodium salt solution	NTI	5,000	
Naphthenic acid	NAX	5,000	5,000
Nonane (all isomers)	NAN	5,000	5,000
NONANE	NNA		
Nonanoic acid (all isomers)			
Nonanoic, Tridecanoic acid mixture			

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES
BARGE: C9706: CONOCO, INC.; E344

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			
Octadecenoamide solution (Oleamide)	ODD		
Octane (all isomers)	OAX	5,000	5,000
OCTANE	OAN	5,000	5,000
Octanoic acid (all isomers)	OAA	5,000	5,000
Octanol (all isomers)	OCX	5,000	5,000
OCTANOL	OTA	5,000	5,000
Octene (all isomers)	OTX	5,000	5,000
OCTENE (1-)	OTE	5,000	5,000
Octyl Acetate			
Octyl alcohol (iso-, n-) (all isomers), SEE OCTANOL (ALL ISOMERS)	OCX	5,000	5,000
OCTYL ALCOHOL	IQA	5,000	5,000
Octyl Aldehydes	OAL		
Octyl Decyl Adipate	ODA		
Octyl Epoxytallate	OET		
Octyl Phthalate. SEE DI-(2-ETHYLHEXYL)PHTHALATE			
OIL, EDIBLE: Babassu	OBB		
OIL, EDIBLE: Beechnut			
OIL, EDIBLE: Castor	OCA		
OIL, EDIBLE: Cocoa butter			
OIL, EDIBLE: Coconut	OCC	5,000	
OIL, EDIBLE: Cod liver			
OIL, EDIBLE: Corn	OCO	5,000	
OIL, EDIBLE: Cottonseed	OCS		
OIL, EDIBLE: Fish, N.O.S.	OFS	5,000	
OIL, EDIBLE: Grapeseed			
OIL, EDIBLE: Groundnut			
OIL, EDIBLE: Hazelnut			
OIL, EDIBLE: Lard	OLD		
OIL, EDIBLE: Maize			
OIL, EDIBLE: Mustard seed			
OIL, EDIBLE: Nutmeg Butter			
OIL, EDIBLE: Olive	OOL		
OIL, EDIBLE: Palm	OPM		
OIL, EDIBLE: Palm kernel	OPO		
OIL, EDIBLE: Peanut	OPN		
OIL, EDIBLE: Poppy			
OIL, EDIBLE: Raisin seed			
OIL, EDIBLE: Rice bran	ORP		
OIL, EDIBLE: Safflower	OSF		
OIL, EDIBLE: Salad			
OIL, EDIBLE: Sesame			
OIL, EDIBLE: Soya bean	OSB	5,000	
OIL, EDIBLE: Sunflower, SEE SUNFLOWER SEED		5,000	
OIL, EDIBLE: Sunflower seed	OSN		
OIL, EDIBLE: Tucum	OTC		
OIL, EDIBLE: Vegetable, N.O.S.	OVG	5,000	
OIL, EDIBLE: Walnut			
OIL, FUEL: No. 1 (Kerosene)	OON		
OIL, FUEL: No. 1-D	OOD		
OIL, FUEL: No. 2	OTW	5,000	5,000

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES
BARGE: C9706: CONOCO, INC.; E344

CARGO	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (BBL/HR)
	***		
	OTD		
OIL, FUEL: No. 2-D	OFR	5,000	5,000
OIL, FUEL: No. 4	OFV	5,000	5,000
OIL, FUEL: No. 5	OSX	5,000	5,000
OIL, FUEL: No. 6	OAS		
OIL, MISC: Absorption			
OIL, MISC: Aliphatic			
OIL, MISC: Animal, N.O.S.			
OIL, MISC: Aromatic			
OIL, MISC: Aviation P2300	OCF		
OIL, MISC: Clarified			
OIL, MISC: Coal			
OIL, MISC: Coconut oil, esterified, SEE COCONUT OIL, FATTY ACID METHYL ESTER			
OIL, MISC: Coconut oil, fatty acid	OCM		
OIL, MISC: Coconut oil, fatty acid Methyl Ester	ESTE		
OIL, MISC: Coconut oil, Methyl Ester, SEE COCONUT OIL FATTY ACID METHYL	CFY	5,000	
OIL, MISC: Cottonseed, fatty acid, SEE COTTONSEED OIL, FATTY ACID			
OIL, MISC: Croton	OIL	5,000	5,000
OIL, MISC: Crude	ODS	5,000	5,000
OIL, MISC: Diesel			
OIL, MISC: Gas, low pour			
OIL, MISC: Gas, low sulfur			
OIL, MISC: Heartcut distillate			
OIL, MISC: Lanolin			
OIL, MISC: Linseed	OLB	5,000	5,000
OIL, MISC: Lubricating			
OIL, MISC: Mineral	OMS		
OIL, MISC: Mineral seal	OMT		
OIL, MISC: Motor	ONF		
OIL, MISC: Neatsfoot	OOI		
OIL, MISC: Oiticica	OPE	5,000	
OIL, MISC: Palm oil, fatty acid Methyl Ester	EOPE		
OIL, MISC: Palm oil, Methyl Ester, SEE SEE PALM OIL, FATTY ACID METHYL	OPT		
OIL, MISC: Penetrating			
OIL, MISC: Perilla			
OIL, MISC: Pilchard	OPI		
OIL, MISC: Pine	ORG		
OIL, MISC: Range			
OIL, MISC: Residual	ORS	5,000	5,000
OIL, MISC: Resin			
OIL, MISC: Resinous petroleum	ORD		
OIL, MISC: Road	ORN		
OIL, MISC: Rosin			
OIL, MISC: Seal	OIS		
OIL, MISC: Soapstock			
OIL, MISC: Soya bean (epoxidized)	OSP		
OIL, MISC: Sperm	OSD		
OIL, MISC: Spindle	OSY		
OIL, MISC: Spray	OTL		
OIL, MISC: Tall	TOF		
OIL, MISC: Tall, fatty acid	OTN		
OIL, MISC: Tanner's	OTP		
OIL, MISC: Transformer	OTG		
OIL, MISC: Tung	OTB	5,000	5,000
OIL, MISC: Turbine			
OIL, MISC: Whale			
OIL, MISC: White (mineral)			
OIL, MISC: Wood	OAM		
alpha-Olefins (C13 - C18)		5,000	
Olefins (C13 and above, all isomers)	OLA		
Oleic acid			
Oleyl alcohol (OCTADECENOL), SEE ALCOHOLS (C13 AND ABOVE)			

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES
BARGE: C9706: CONOCO, INC.; E344

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	PEP		
Pentaethylenehexamine	PTY	5,000	5,000
Pentane (all isomers)	IPT	5,000	5,000
PENTANE (iso-)	PTA	5,000	5,000
PENTANE (n-)			
Pentanoic acid	PTX	5,000	5,000
Pentene (all isomers)	PTE	5,000	5,000
PENTENE (1-)	PTL		
Petrolatum	PXE		
1-Phenyl-1-Xylyl Ethane			
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	PLB	5,000	5,000
Polybutene		5,000	
Polydimethylsiloxane		5,000	
Polyethylene Glycol			
Polyethylene Glycol Dimethyl Ether			
Polyglycerol			
Polyisobutylene, SEE POLYBUTENE			
Polymerized Esters	PSM		
Poly(20)oxyethylene Sorbitan Monooleate	PLP		
Polypropylene	PGC	5,000	5,000
Polypropylene Glycol	PGM	5,000	5,000
Polypropylene Glycol Methyl Ether			
Polysiloxane			
Polystyrene Diakyl Maleate	POE		
Potassium Oleate	PRP	5,000	
Propane	PXP		
n-Propoxypropanol	IAC	5,000	5,000
Propyl Acetate (iso-)	PAT		5,000
Propyl Acetate (n-)	IPA	5,000	5,000
Propyl alcohol (iso-)	PAL	5,000	5,000
Propyl alcohol (n-)	PBZ	5,000	5,000
Propylbenzene (n-)	IPX	5,000	5,000
iso-Propylcyclohexane	PPL	5,000	
Propylene	PBP		
Propylene-Butylene Copolymer	PDR		
Propylene Dimer	PPG	5,000	5,000
Propylene Glycol (1,2-PROPANDIOL)	PGE		
Propylene Glycol Monoalkyl Ether	PGY		
Propylene Glycol Ethyl Ether	PME	5,000	5,000
Propylene Glycol Methyl Ether			
Propylene Polymer (in liquid mixtures)	PTT	5,000	5,000
Propylene Tetramer	PTR		
Propylene Trimer			
Pseudocumene, SEE TRIMETHYLBENZENES			
Rum			
Sodium Acetate, Glycol, water solutions	SAN		
Sodium Acetate solution	SBN		
Sodium Benzoate solution			
Sodium Sulfonate	SRA		
Stearic acid			

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES
BARGE: C9706: CONOCO, INC.; E344

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

SUMMARY COMPARISON OF "SPILL VALVE" vs "P/V" MAX LIQUID TRANSFER RATES
BARGE: C9706: CONOCO, INC.; E344

CARGO	CHRIS	MAX LIQUID TRANSFER RATE PER SPILL VALVE (BBL/HR)	MAX LIQUID TRANSFER RATE PER P/V VALVE (BBL/HR)
XYLENE (O-)	XLO	5,000	5,000
XYLENE (P-)	XLP	5,000	5,000
XYLENOL	XYL	5,000	5,000
Zinc Dialkyldithiophosphate			