

TABLE 1 - VAPOR CONTROL SYSTEM CALCULATIONS

	CHRIS CODE	NAME	COMP GROUP	SUB CHAP	GRADE	HULL TYPE	VCS CAT	REST.	LIQ SG	VAPOR PRESS	VAPOR SG	VAPOR AIR WEIGHT DENSITY	VAPOR GROWTH RATE	VAPOR FLOW RATE (bbbl/h)	AIR EQUIV FLOW RATE (bbbl/hr)	PRESSURE DROP TO PV VALVE IN VCS (LOADING) (psid)	PRESSURE DROP TO SHORE CONN IN VCS (LOADING)* (psid)
1	ABX	Ammonium bisulfite solution (70% or less)	43	O	NA	III	N/A	.50-73, .56-1(a), (b), (c)	0.880	0.330	4.480	0.086	1.007	3523	3642	0.017	0.024
2	ACN	Acrylonitrile	15	O	C	II	4	.50-70(a), .55-1(e)	0.810	5.000	1.800	0.100	1.100	3850	4278	0.024	0.034
3	ADN	Adiponitrile	37	O	E	II	1	No	0.950	0.010	3.730	0.081	1.000	3501	3506	0.016	0.023
4	AEE	Aminoethylethanamine	8	O	E	III	1	.55-1(b)	1.030	0.010	3.590	0.081	1.000	3501	3506	0.016	0.023
5	AHO	Anthrane oil (Coal tar fraction)	33	O	NA	II	N/A	No	1.030	0.010	3.590	0.081	1.000	3501	3506	0.016	0.023
6	AMH	Ammonium hydroxide (28% or less NH3)	6	O	NA	III	N/A	.56-1(a), (b), (c), (f), (g)	0.940	10.600	2.640	0.163	1.212	4242	6020	0.047	0.067
7	ATN	Acetonitrile	37	O	C	III	3	No	0.780	0.030	1.410	0.081	1.001	3502	3506	0.016	0.023
8	BAE	Butyraldehyde (all isomers)	19	O	C	III	1	.55-1(b)	0.790	8.000	2.480	0.136	1.160	4060	5280	0.036	0.051
9	BAR	Butyl acrylate (all isomers)	14	O	D	III	2	.50-70(a), .50-81(a), (b)	0.880	0.600	4.420	0.090	1.012	3542	3750	0.018	0.026
10	BHA	Benzene or hydrocarbon mixtures (containing Acetylene and 10% Benzene or more)	32	O	NA	III	1	.50-60, .56-1(b), (d), (f), (g)	0.880	0.800	4.000	0.092	1.250	4375	4674	0.028	0.040
11	BHB	Benzene or hydrocarbon mixtures (having 10% Benzene or more)	32	O	NA	III	1	.50-60	0.880	0.800	4.000	0.092	1.250	4375	4674	0.028	0.040
12	BMN	Butyl Methacrylate	14	O	D	III	2	.50-70(a), .50-81(a), (b)	0.880	0.290	4.900	0.086	1.006	3520	3637	0.017	0.024
13	BNZ	Benzene	32	O	C	III	1	.50-60	0.880	4.500	2.800	0.119	1.250	4375	5310	0.036	0.052
14	BTX	Benzene, Toluene, Xylene mixtures (10% Benzene or more)	32	O	B/C	III	1	.50-60	0.840	7.300	2.800	0.143	1.250	4375	5815	0.044	0.062
15	CBT	Carbon tetrachloride	36	O	NA	III	N/A	No	1.590	5.400	5.490	0.195	1.108	3878	6025	0.047	0.067
16	CCH	Cyclohexanone	18	O	D	III	1	.56-1(a), (b)	0.950	0.200	3.400	0.083	1.004	3514	3565	0.016	0.023
17	CCW	Creosote	21	O	E	III	1	No	0.950	0.200	3.400	0.083	1.004	3514	3565	0.016	0.023
18	CHA	Cyclohexylamine	7	O	D	III	1	.56-1(a), (b), (c), (g)	0.870	0.620	3.420	0.088	1.012	3543	3698	0.018	0.025
19	CSS	Caustic soda solution	5	O	NA	III		.50-73, .55-1(f)	1.540	0.029	1.330	0.081	1.001	3502	3506	0.016	0.023
20	DCM	Dichloromethane	36	O	NA	III	5	No	1.340	19.000	3.000	0.313	1.250	4375	8622	0.096	0.137
21	DEE	2,2'-Dichloroethyl ether	41	O	D	II	1	.55-1(f)	1.220	0.040	4.900	0.082	1.001	3503	3521	0.016	0.023
22	DEN	Diethylamine	7	O	C	III	3	.55-1(c)	0.710	1.000	2.500	0.088	1.020	3570	3725	0.018	0.026
23	DET	Diethylenetriamine	7	O	E	III	1	.55-1(c)	0.950	0.040	3.480	0.081	1.001	3503	3516	0.016	0.023
24	DIA	Diisopropylamine	7	O	C	II	3	.55-1(c)	0.720	3.700	3.500	0.124	1.074	3759	4665	0.028	0.040
25	DIP	Diisopropanolamine	8	O	E	III	1	.55-1(c)	0.980	0.010	4.590	0.081	1.000	3501	3507	0.016	0.023
26	DMB	Dimethylmethanolamine	8	O	D	III	1	.56-1(b), (c)	0.890	0.516	3.030	0.086	1.010	3536	3645	0.017	0.025
27	DMF	Dimethylformamide	10	O	D	III	1	.55-1(e)	0.950	0.300	2.510	0.083	1.006	3521	3570	0.016	0.024
28	DMX	Dichloropropene, Dichloropropane mixtures.	15	O	NA	II	1	No	0.892	9.200	1.550	0.105	1.184	4144	4718	0.029	0.041
29	DNA	Di-n-propylamine	7	O	C	II	3	.55-1(c)	0.740	1.450	3.500	0.098	1.029	3602	3966	0.020	0.029
30	DOL	Dodecyl phenol	21	O	E	I		.50-73	0.930	0.000	9.040	0.081	1.000	3500	3503	0.016	0.023
31	DOT	Dodecyl(dimethyl)amine, Tetradecyl(dimethyl)amine mixture	7	O	E	III	N/A	.56-1(b)	0.990	0.010	13.450	0.081	1.000	3501	3516	0.016	0.023
32	DPB	1,1-Dichloropropane	36	O	C	III	3	No	1.040	1.800	3.000	0.098	1.036	3626	3991	0.021	0.029
33	DPC	1,3-Dichloropropane	36	O	C	III	3	No	1.040	1.800	3.000	0.098	1.036	3626	3991	0.021	0.029
34	DPP	1,2-Dichloropropane	36	O	C	III	3	No	1.160	2.500	3.890	0.115	1.050	3675	4383	0.025	0.035
35	DPU	1,3-Dichloropropene	15	O	D	II	4	No	1.230	5.500	3.840	0.154	1.110	3885	5371	0.037	0.053
36	DTI	2,4-Dichlorophenoxyacetic acid, trisopropanolamine salt solution.	43	O	NA	III	N/A	.56-1(a), (b), (c), (g)	1.180	0.010	5.300	0.081	1.000	3501	3508	0.016	0.023
37	EAC	Ethyl acrylate	14	O	C	III	2	.50-70(a), .50-81(a), (b)	0.930	2.000	3.500	0.104	1.040	3640	4139	0.022	0.032
38	EAI	2-Ethylhexyl acrylate	14	O	E	III	2	.50-70(a), .50-81(a), (b)	0.890	0.015	6.350	0.081	1.000	3512	3516	0.016	0.023
39	EAN	Ethylamine solution (72% or less)	7	O	A	II	6	.55-1(b)	0.800	15.500	1.560	0.133	1.250	4375	5616	0.041	0.058
40	EBA	N-Ethylbutylamine	7	O	D	III	3	.55-1(b)	0.719	1.598	0.286	0.075	1.032	3612	3493	0.016	0.023
41	ECC	N-Ethylcyclohexylamine	7	O	D	III	1	.55-1(b)	0.850	0.585	4.400	0.090	1.012	3541	3743	0.018	0.026
42	EDA	Ethylenediamine	7	O	D	III	1	.55-1(c)	0.910	0.900	2.100	0.085	1.018	3563	3667	0.017	0.025
43	EDC	Ethylene dichloride	36	O	C	III	1	No	1.260	4.000	3.420	0.126	1.080	3780	4729	0.029	0.041
44	EGC	Ethylene glycol monoalkyl ethers	40	O	D/E	III	1	No	0.970	0.200	4.720	0.084	1.004	3514	3592	0.017	0.024
45	EGH	Ethylene glycol hexyl ether	40	O	E	III	N/A	No	0.930	0.170	3.100	0.083	1.003	3512	3551	0.016	0.023
46	EGP	Ethylene glycol propyl ether	40	O	E	III	1	No	0.908	0.025	3.600	0.081	1.001	3502	3511	0.016	0.023
47	EPA	2-Ethyl-3-propylacrolein	19	O	E	III	1	No	0.850	0.120	4.350	0.083	1.002	3508	3552	0.016	0.023

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48	ETC	Ethylene cyanohydrin	20	O	E	III	1	No	1.040	0.010	2.450	0.081	1.000	3501	3505	0.016	0.023
49	ETM	Ethyl methacrylate	14	O	D/E	III	2	.50-70(a)	0.920	1.000	3.940	0.095	1.020	3570	3866	0.019	0.028
50	FFA	Furfural	19	O	E	III	1	.55-1(b)	1.200	0.150	3.310	0.082	1.003	3511	3548	0.016	0.023
51	FMS	Formaldehyde solution (37% to 50%)	19	O	D/E	III	1	.55-1(b)	1.130	0.150	1.030	0.081	1.003	3511	3514	0.016	0.023
52	GTA	Glutaraldehyde solution (50% or less)	19	O	NA	III	N/A	No	1.124	0.010	3.400	0.081	1.000	3501	3506	0.016	0.023
53	HMC	Hexamethylenediamine solution	7	O	E	III	1	.55-1(c)	1.210	10.500	1.260	0.094	1.210	4235	4562	0.027	0.038
54	HMI	Hexamethylenimine	7	O	C	II	1	.56-1(b), (c)	0.880	5.600	0.104	0.057	1.112	3892	3278	0.014	0.020
55	IAI	iso-Decyl acrylate	14	O	E	III	2	.50-70(a), .50-81(a), (b), .55-1(c)	0.890	0.010	7.300	0.081	1.000	3501	3510	0.016	0.023
56	IPP	iso-Propylamine	7	O	A	II	5	.55-1(c)	0.690	23.100	2.030	0.258	1.250	4375	7820	0.079	0.113
57	IPR	Isoprene	30	O	A	III	7	.50-70(a), .50-81(a), (b)	0.672	11.300	1.772	0.122	1.226	4291	5272	0.036	0.051
58	KPL	Kraft pulping liquors (free alkali content 3% or more) (including: Black, Green, or White liquor)	5	O	NA	III	N/A	.50-73, .56-1(a), (c), (g)	0.800	10.060	2.960	0.174	1.201	4204	6164	0.049	0.070
59	MAM	Methyl acrylate	14	O	C	III	2	.50-70(a), .50-81(a), (b)	0.950	4.100	3.000	0.119	1.082	3787	4606	0.027	0.039
60	MCK	Methylcyclopentadiene dimer	30	O	C	III	1	No	0.941	0.040	0.930	0.081	1.001	3503	3505	0.016	0.023
61	MDE	Methyl diethanolamine	8	O	E	III	1	.56-1(b), (c)	1.043	0.000	4.120	0.081	1.000	3500	3503	0.016	0.023
62	MEA	Ethanolamine	8	O	E	III	1	.55-1(c)	1.020	0.030	2.100	0.081	1.001	3502	3508	0.016	0.023
63	MEP	2-Methyl-5-ethylpyridine	9	O	E	III	1	.55-1(e)	0.920	0.160	4.180	0.083	1.003	3511	3566	0.016	0.023
64	MMM	Methyl methacrylate	14	O	C	III	2	.50-70(a), .50-81(a), (b)	0.940	2.020	3.450	0.104	1.040	3641	4135	0.022	0.032
65	MPA	iso-Propanolamine	8	O	E	III	1	.55-1(c)	0.960	0.080	2.590	0.081	1.002	3506	3521	0.016	0.023
66	MPL	Morpholine	7	O	D	III	1	.55-1(c)	1.000	0.800	3.000	0.088	1.016	3556	3721	0.018	0.026
67	MPR	2-Methylpyridine	9	O	D	III	3	.55-1(c)	0.940	2.065	3.200	0.102	1.041	3645	4101	0.022	0.031
68	MSO	Mesityl oxide	18	O	D	III	1	No	0.860	0.670	3.500	0.089	1.013	3547	3719	0.018	0.026
69	MSR	alpha-Methylstyrene	30	O	D	III	2	.50-70(a), .50-81(a), (b)	0.890	0.400	4.080	0.087	1.008	3528	3655	0.017	0.025
70	NCT	Coal tar naphtha solvent	33	O	D	III	1	.50-73	1.410	3.600	2.170	0.101	1.072	3752	4190	0.023	0.032
71	NPM	1- or 2-Nitropropane	42	O	D	III	1	.50-81	0.990	1.050	3.060	0.091	1.021	3574	3795	0.019	0.027
72	PAX	Propanolamine (iso-, n-)	8	O	E	III	1	.56-1(b), (c)	0.870	1.900	3.520	0.103	1.038	3633	4111	0.022	0.031
73	PDE	1,3-Pentadiene	30	O	A	III	7	.50-70(a), .50-81	0.680	17.060	2.360	0.221	1.250	4375	7246	0.068	0.097
74	PEB	Polyethylene polyamines	7	O	E	III	1	.55-1(e)	0.994	8.300	4.550	0.219	1.166	4081	6727	0.058	0.083
75	PER	Perchloroethylene	36	O	NA	III	N/A	No	1.620	1.230	5.830	0.109	1.025	3586	4163	0.022	0.032
76	PRD	Pyridine	9	O	C	III	1	.55-1(e)	0.980	1.300	2.720	0.091	1.026	3591	3820	0.019	0.027
77	SAU	Sodium aluminate solution (45% or less)	5	O	NA	III	N/A	.50-73, .56-1(a), (b), (c)	0.850	0.010	0.010	0.081	1.000	3502	3502	0.016	0.023
78	SDD	Sodium chlorate solution (50% or less)	0	O	NA	III	N/A	.50-73	0.850	0.010	0.010	0.081	1.000	3501	3502	0.016	0.023
79	SSH	Sodium sulfide, hydrosulfide solution (H2S 15 ppm or less)	0	O	NA	III	1	.50-73, .55-1(b)	1.280	1.510	1.170	0.082	1.030	3606	3635	0.017	0.024
80	SSI	Sodium sulfide, hydrosulfide solution (H2S greater than 15 ppm but less than 200 ppm)	0	O	NA	III	N/A	.50-73, .55-1(b)	1.280	1.510	1.170	0.082	1.030	3606	3635	0.017	0.024
81	SSJ	Sodium sulfide, hydrosulfidesolutions (H2S greater than200ppm)	0	O	NA	II	N/A	.50-73, .55-1(b)	1.280	1.510	1.170	0.082	1.030	3606	3635	0.017	0.024
82	STY	Styrene monomer	30	O	D	III	2	.50-70(a), .50-81(a), (b)	0.920	0.400	3.600	0.086	1.008	3528	3636	0.017	0.024
83	TCB	1,2,4-Trichlorobenzene	36	O	E	III	1	No	1.450	0.010	6.260	0.081	1.000	3501	3509	0.016	0.023
84	TCL	Trichloroethylene	36	O	NA	III	1	No	1.470	3.500	4.540	0.139	1.070	3745	4916	0.031	0.045
85	TCM	1,1,2-Trichloroethane	36	O	NA	III	1	.50-73, .56-1(a)	1.430	0.010	4.550	0.081	1.000	3501	3507	0.016	0.023
86	TCN	1,2,3-Trichloropropane	36	O	E	II	3	.50-73, .56-1(a)	1.390	0.150	5.600	0.084	1.003	3511	3583	0.017	0.024
87	TEA	Triethanolamine	8	O	E	III	1	.55-1(b)	1.130	0.010	5.140	0.081	1.000	3501	3508	0.016	0.023
88	TEC	1,1,2,2-Tetrachloroethane	36	O	NA	III	N/A	No	1.600	1.000	5.800	0.103	1.020	3570	4041	0.021	0.030
89	TEN	Triethylamine	7	O	C	II	3	.55-1(e)	0.730	2.500	3.490	0.110	1.050	3675	4292	0.024	0.034
90	TET	Triethylenetetramine	7	O	E	III	1	.55-1(b)	0.980	0.010	5.040	0.081	1.000	3501	3508	0.016	0.023
91	THF	Tetrahydrofuran	41	O	C	III	1	.50-70(b)	0.890	8.500	1.350	0.095	1.170	4095	4439	0.025	0.036
92	TPB	Triphenylborane (10% or less), caustic soda solution	5	O	NA	III	N/A	.56-1(a), (b), (c)	0.870	1.500	3.140	0.096	1.030	3605	3930	0.020	0.028
93	TTP	Urea, Ammonium nitrate solution (containing more than 2% NH3)	1	O	E	III	N/A	.55-1(c)	0.998	0.000	6.530	0.081	1.000	3500	3503	0.016	0.023
94	UAS	Tetraethylenepentamine solution	6	O	NA	III	N/A	.56-1(b)	1.000	0.010	6.800	0.081	1.000	3501	3509	0.016	0.023

OWNER: E-Squared Marine Service

DESCRIPTION: Double Skin Tank Barge, Rivers, Lakes, Bays and Sounds

SIZE: 200'-0"x35'-0"x12'-6"

HULL/NAME: 5271/E2MS 101

CONTRACT: 96273

BY: MEC

DATE: 22-Feb-2017

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	CHRIS CODE	NAME	COMP GROUP	SUB CHAP	GRADE	HULL TYPE	VCS CAT	REST.	LIQ SG	VAPOR PRESS	VAPOR SG	VAPOR AIR WEIGHT DENSITY	VAPOR GROWTH RATE	VAPOR FLOW RATE (bb/h)	AIR EQUIV FLOW RATE (bb/hr)	PRESSURE DROP TO PV VALVE IN VCS (LOADING) (psid)	PRESSURE DROP TO SHORE CONN IN VCS (LOADING)* (psid)
95	VAM	Vinyl acetate	13	O	C	III	2	.50-70(a), .50-81(a), (b) (c), (g)	0.940	5.800	2.970	0.135	1.116	3906	5043	0.033	0.047
96	VNT	Vinyltoluene	13	O	D	III	2	.50-70(a), .50-81, .56-1(a), (b), (c), (g)	0.900	0.120	4.080	0.083	1.002	3508	3549	0.016	0.023
97	ACP	Acetophenone	18	D	E	NA	1	NA	1.030	0.600	4.140	0.090	1.012	3542	3734	0.018	0.026
98	ACT	Acetone	18	D	C	NA	1	NA	0.790	10.000	2.000	0.128	1.200	4200	5286	0.036	0.052
99	BAL	Benzyl alcohol	21	D	E	NA	1	NA	1.050	0.100	3.730	0.082	1.002	3507	3538	0.016	0.023
100	BAN	Butyl alcohol (n-)	0	D	D	NA	1	NA	0.810	0.085	2.600	0.085	1.010	3535	3619	0.017	0.024
101	BAS	Butyl alcohol (sec-)	0	D	C	NA	1	NA	0.810	1.300	2.600	0.091	1.026	3591	3805	0.019	0.027
102	BAT	Butyl alcohol (tert-)	0	D	C	NA	1	NA	0.780	2.800	2.600	0.102	1.056	3696	4153	0.022	0.032
103	BAX	Butyl acetate (all isomers)	34	D	D	NA	1	NA	0.870	0.600	4.000	0.089	1.012	3542	3726	0.018	0.026
104	BPH	Butyl benzyl phthalate	34	D	E	NA	1	NA	1.120	0.010	10.800	0.081	1.000	3501	3513	0.016	0.023
105	BUE	Butyl toluene	32	D	D	NA	1	NA	0.850	0.100	5.110	0.083	1.002	3507	3551	0.016	0.023
106	CHN	Cyclohexanol	20	D	E	NA	1	NA	0.940	0.200	3.500	0.083	1.004	3514	3568	0.016	0.023
107	CHX	Cyclohexane	31	D	C	NA	1	NA	0.780	4.500	2.900	0.121	1.090	3815	4672	0.028	0.040
108	CLS	Caprolactam solutions	22	D	E	NA	1	NA	1.060	0.700	3.900	0.090	1.014	3549	3756	0.018	0.026
109	CMP	p-Cymene	32	D	D	NA	1	NA	0.860	0.460	4.620	0.089	1.009	3532	3702	0.018	0.025
110	CPD	1,3-Cyclopentadiene dimer (molten)	30	D	D/E	NA	2	NA	0.690	0.250	4.550	0.085	1.005	3518	3610	0.017	0.024
111	DAA	Diacetone alcohol	20	D	E	NA	1	NA	0.940	0.100	4.000	0.082	1.002	3507	3540	0.016	0.023
112	DAX	Decyl alcohol (all isomers)	20	D	E	NA	1	NA	0.830	5.800	2.970	0.135	1.116	3906	5043	0.033	0.047
113	DBL	Diisobutylene	30	D	C	NA	1	NA	0.720	2.200	3.970	0.112	1.044	3654	4296	0.024	0.034
114	DCE	Decene	30	D	D	NA	1	NA	0.740	0.120	5.300	0.083	1.002	3508	3563	0.016	0.023
115	DDB	Dodecylbenzene, see Alkyl(C9+)benzenes	32	D	E	NA	1	NA	0.860	4.700	8.400	0.244	1.094	3829	6662	0.057	0.082
116	DDO	Diphenyl, Diphenyl ether mixtures	33	D	E	NA	1	NA	1.070	0.010	5.870	0.081	1.000	3501	3508	0.016	0.023
117	DEB	Diethylbenzene	32	D	D	NA	1	NA	0.870	0.080	4.620	0.082	1.002	3506	3538	0.016	0.023
118	DEG	Diethylene glycol	40	D	E	NA	1	NA	1.120	0.010	3.660	0.081	1.000	3501	3506	0.016	0.023
119	DIK	Diisobutyl ketone	18	D	D	NA	1	NA	0.810	0.480	4.900	0.090	1.010	3534	3724	0.018	0.026
120	DOP	Diocetyl phthalate	34	D	E	NA	1	NA	0.990	0.010	13.450	0.081	1.000	3501	3516	0.016	0.023
121	DPG	Dipropylene glycol	40	D	E	NA	1	NA	1.030	0.070	4.630	0.082	1.001	3505	3533	0.016	0.023
122	EAL	Ethyl alcohol	20	D	C	NA	1	NA	0.790	3.500	1.600	0.091	1.070	3745	3970	0.020	0.029
123	EBT	Ethyl butanol	20	D	D	NA	1	NA	0.830	0.140	3.400	0.082	1.003	3510	3547	0.016	0.023
124	EGL	Ethylene glycol	20	D	E	NA	1	NA	1.130	0.010	2.210	0.081	1.000	3501	3505	0.016	0.023
125	EGY	Ethylene glycol diacetate	34	D	E	NA	1	NA	1.130	0.010	1.000	0.081	1.000	3501	3503	0.016	0.023
126	EHX	2-Ethylhexanol	20	D	E	NA	1	NA	0.830	0.015	4.500	0.081	1.000	3501	3509	0.016	0.023
127	ETA	Ethyl acetate	34	D	C	NA	1	NA	0.900	4.500	3.040	0.124	1.090	3815	4728	0.029	0.041
128	ETB	Ethylbenzene	32	D	C	NA	1	NA	0.870	0.600	3.660	0.088	1.012	3542	3706	0.018	0.025
129	ETG	Ethoxy triglycol (crude)	40	D	E	NA	1	NA	1.020	0.010	6.140	0.081	1.000	3501	3509	0.016	0.023
130	FAL	Furfuryl alcohol	20	D	E	NA	1	NA	1.290	0.100	3.370	0.082	1.002	3507	3534	0.016	0.023
131	GAT	Gasolines: Automotive (containing not over 4.23 grams lead per gallon)	33	D	C	NA	1	NA	0.760	12.500	3.400	0.222	1.250	4375	7253	0.068	0.097
132	GCR	Glycerine	20	D	E	NA	1	NA	1.260	0.010	3.170	0.081	1.000	3501	3506	0.016	0.023
133	HMX	Heptane (all isomers), see Alkanes (C6-C9) (all isomers)	31	D	C	NA	1	NA	0.680	2.500	3.450	0.110	1.050	3675	4283	0.024	0.034
134	HPX	Heptene (all isomers)	30	D	C	NA	2	NA	0.700	2.900	3.400	0.114	1.058	3703	4392	0.025	0.036
135	HXG	Hexylene glycol	20	D	E	NA	1	NA	0.920	0.010	4.000	0.081	1.000	3501	3507	0.016	0.023
136	HXN	Hexanol	20	D	D	NA	1	NA	0.820	1.000	3.520	0.093	1.020	3570	3826	0.019	0.027
137	IAC	iso-Propyl acetate	34	D	C	NA	1	NA	0.880	3.100	3.520	0.118	1.062	3717	4486	0.026	0.037
138	IAL	Butyl alcohol (iso-)	20	D	D	NA	1	NA	0.810	0.900	2.600	0.088	1.018	3563	3712	0.018	0.025
139	IDA	iso-Decaldehyde	19	D	E	NA	1	NA	0.830	0.060	5.380	0.092	1.001	3504	3534	0.016	0.023
140	IPA	iso-Propyl alcohol	20	D	C	NA	1	NA	0.790	3.000	2.070	0.086	1.060	3710	4045	0.021	0.030
141	IPH	Isophorone	18	D	E	NA	1	NA	0.930	0.010	4.750	0.081	1.000	3501	3507	0.016	0.023
142	KRS	Kerosene	33	D	D	NA	1	NA	0.810	0.150	4.500	0.083	1.003	3511	3566	0.016	0.023
143	MAC	Methylamyl acetate	34	D	D	NA	1	NA	0.860	0.340	5.000	0.087	1.007	3524	3663	0.017	0.025
144	MAL	Methyl alcohol	20	D	C	NA	1	NA	0.790	7.000	1.100	0.084	1.140	3990	4074	0.021	0.031
145	MBE	Methyl tert-butyl ether	41	D	C	NA	1	NA	0.740	0.040	3.100	0.081	1.001	3503	3514	0.016	0.023

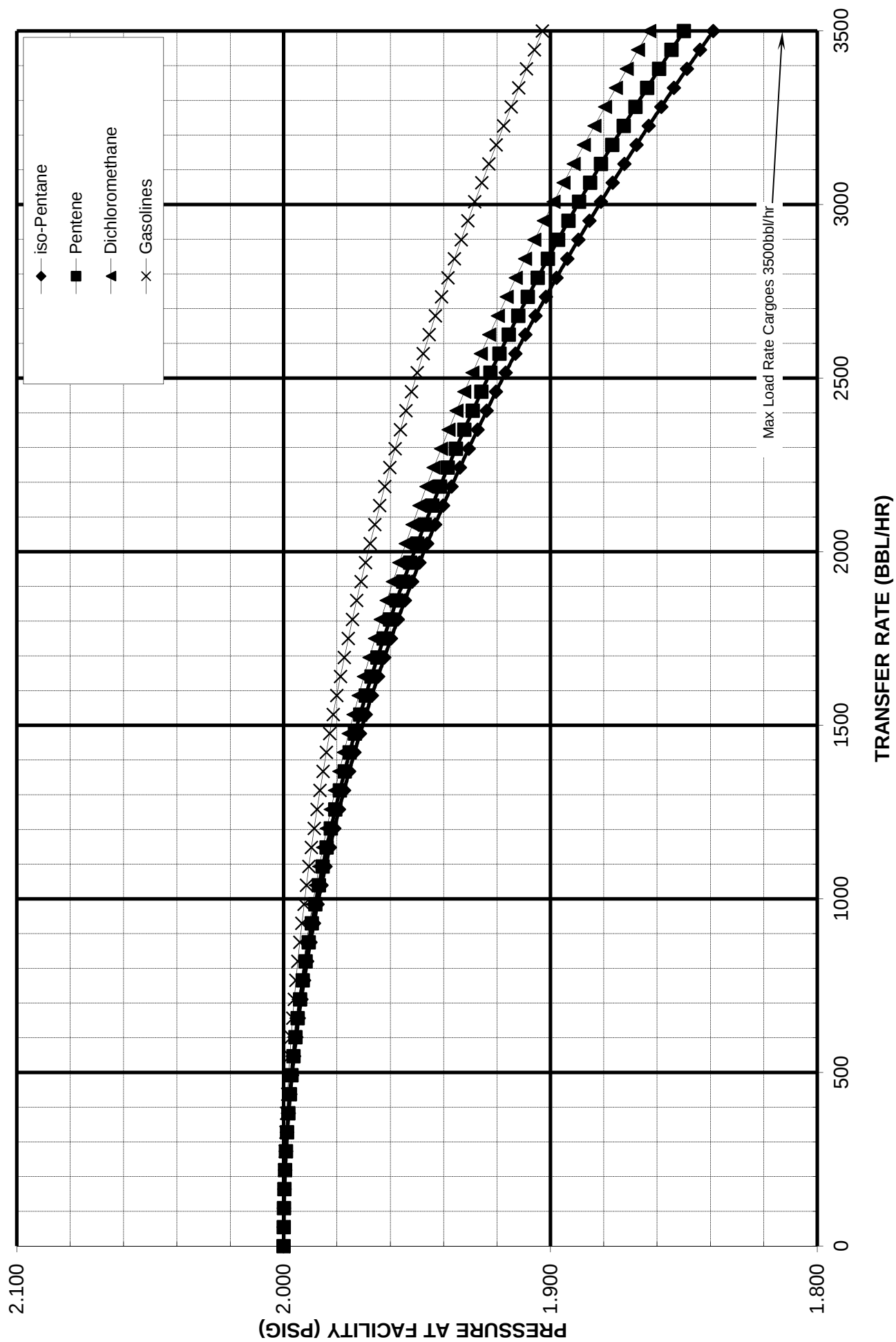
OWNER: E-Squared Marine Service
DESCRIPTION: Double Skin Tank Barge, Rivers, Lakes, Bays and Sounds
SIZE: 200'-0"x35'-0"x12'-6"
HULL/NAME: 5271/E2MS 101

CONTRACT: 96273
BY: MEC
DATE: 22-Feb-2017

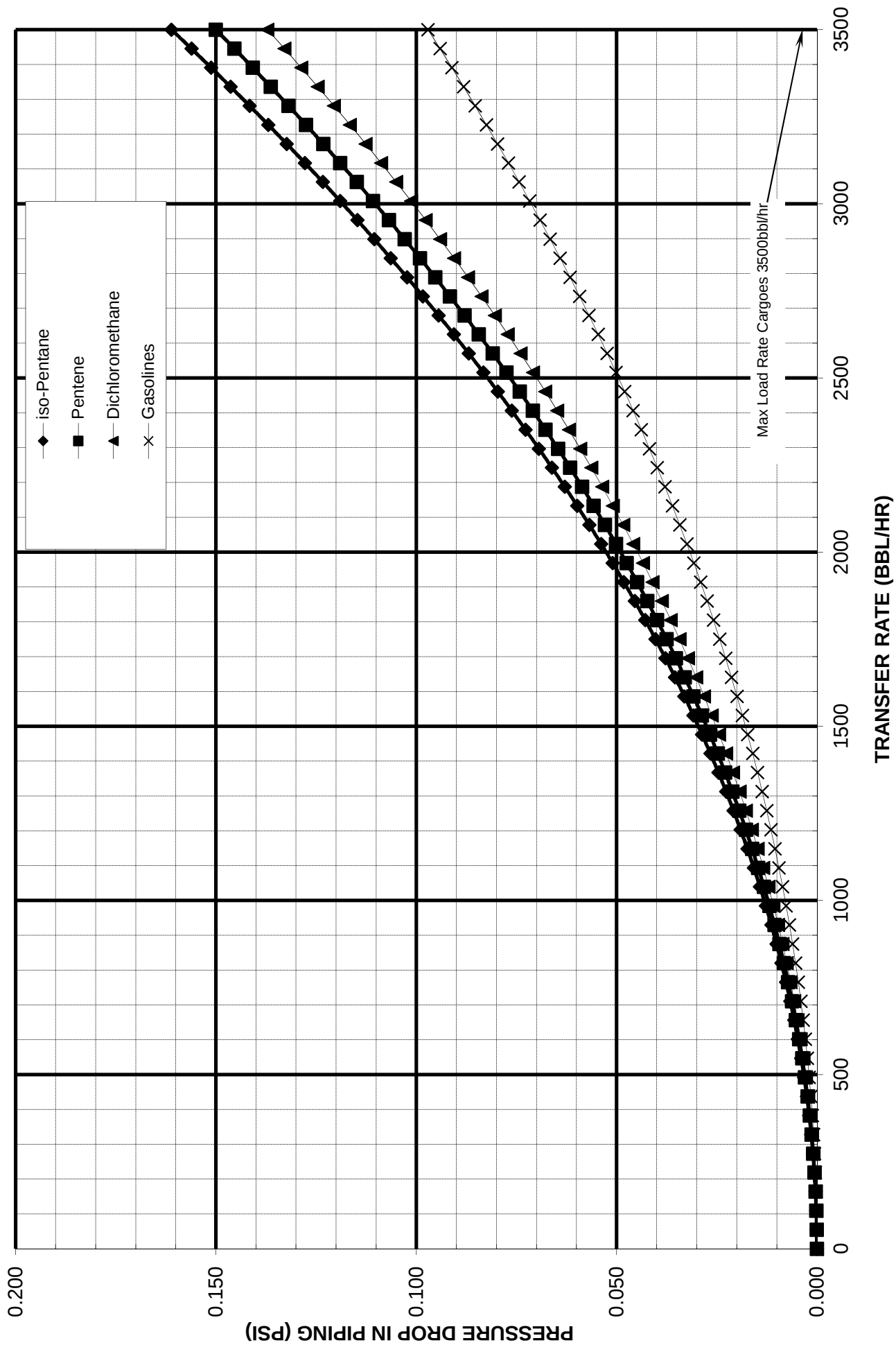
TABLE 1 - VAPOR CONTROL SYSTEM CALCULATIONS

	CHRIS CODE	NAME	COMP GROUP	SUB CHAP	GRADE	HULL TYPE	VCS CAT	REST.	LIQ SG	VAPOR PRESS	VAPOR SG	VAPOR AIR WEIGHT DENSITY	VAPOR GROWTH RATE	VAPOR FLOW RATE (bb/h)	AIR EQUIV FLOW RATE (bb/hr)	PRESSURE DROP TO PV VALVE IN VCS (LOADING) (psig)	PRESSURE DROP TO SHORE CONN IN VCS (LOADING)* (psig)
146	MEK	Methyl ethyl ketone	18	D	C	NA	1	NA	0.800	4.500	2.500	0.113	1.090	3815	4505	0.026	0.037
147	MIK	Methyl isobutyl ketone	18	D	C	NA	1	NA	0.800	1.200	3.450	0.095	1.024	3584	3881	0.019	0.028
148	MNS	Mineral spirits	33	D	D	NA	1	NA	0.750	0.200	4.300	0.084	1.004	3514	3584	0.017	0.024
149	MTT	Methyl acetate	34	D	D	NA	1	NA	0.920	6.100	2.600	0.127	1.122	3927	4920	0.031	0.045
150	NNP	Nonyl phenol	21	D	E	NA	1	NA	0.940	0.010	7.590	0.081	1.000	3501	3510	0.016	0.023
151	NSS	Naphtha: Stoddard solvent	33	D	D	NA	1	NA	0.780	0.200	0.010	0.080	1.004	3514	3496	0.016	0.023
152	NSV	Naphtha: Solvent	33	D	D	NA	1	NA	0.870	0.200	3.500	0.083	1.004	3514	3568	0.016	0.023
153	NVM	Naphtha: Varnish makers and painters (75%)	33	D	C	NA	1	NA	0.770	0.190	0.010	0.080	1.004	3513	3497	0.016	0.023
154	ODS	Oil, misc: Diesel	33	D	D/E	NA	1	NA	0.900	5.800	2.970	0.135	1.116	3906	5043	0.033	0.047
155	OIL	Oil, misc: Crude	33	D	C/D	NA	1	NA	0.950	5.800	2.970	0.135	1.116	3906	5043	0.033	0.047
156	OSX	Oil, fuel: No. 6	33	D	E	NA	1	NA	0.950	0.149	2.970	0.082	1.003	3510	3543	0.016	0.023
157	OTW	Oil, fuel: No. 2	33	D	D/E	NA	1	NA	0.880	0.560	8.000	0.099	1.011	3539	3925	0.020	0.028
158	PAL	n-Propyl alcohol	20	D	C	NA	1	NA	0.800	1.200	2.070	0.087	1.024	3584	3718	0.018	0.026
159	PAT	n-Propyl acetate	34	D	C	NA	1	NA	0.870	1.900	3.520	0.103	1.038	3633	4111	0.022	0.031
160	PBY	Propylbenzene (all isomers)	32	D	D	NA	1	NA	0.860	0.600	4.200	0.090	1.012	3542	3737	0.018	0.026
161	PLB	Polybutene	30	D	E	NA	1	NA	0.910	0.010	0.010	0.081	1.000	3501	3502	0.016	0.023
163	PTE	Pentene (all isomers)	31	D	A	III	5	NA	0.637	24.945	2.500	0.343	1.250	4375	9018	0.105	0.150
162	PTY	iso-Pentane	30	D	A	III	5	NA	0.620	27.000	2.480	0.368	1.250	4375	9345	0.113	0.161
164	TCP	Tricresyl phosphate (less than 1% of the ortho isomer)	34	D	E	NA	1	NA	1.170	0.010	12.700	0.081	1.000	3501	3515	0.016	0.023
165	TEB	Triethylbenzene	32	D	E	NA	1	NA	0.860	0.050	5.600	0.082	1.001	3504	3530	0.016	0.023
166	TEG	Triethylene glycol	40	D	E	NA	1	NA	1.120	0.010	5.170	0.081	1.000	3501	3508	0.016	0.023
167	THN	Tetrahydronaphthalene	32	D	E	NA	1	NA	0.980	0.040	4.550	0.082	1.001	3503	3520	0.016	0.023
168	TOL	Toluene	32	D	C	NA	1	NA	0.870	1.500	3.140	0.096	1.030	3605	3930	0.020	0.028
169	TTG	Tetraethylene glycol	40	D	E	NA	1	NA	1.130	0.010	6.700	0.081	1.000	3501	3509	0.016	0.023
Max Vapor Density Cargo		PTY Iso-Pentane	30	D	A	III	5	NA	0.620	27.000	2.480	0.368	1.250	4375	9345	0.113	0.161
Max Pressure Drop Cargo		PTY Iso-Pentane	30	D	A	III	5	NA	0.620	27.000	2.480	0.368	1.250	4375	9345	0.113	0.161

LIQUID TRANSFER RATE VS FACILITY PRESSURE FOR TANDEM LOADING BASED ON PRESSURE DROP FROM CARGO TANK #3 TO FACILITY CONNECTION

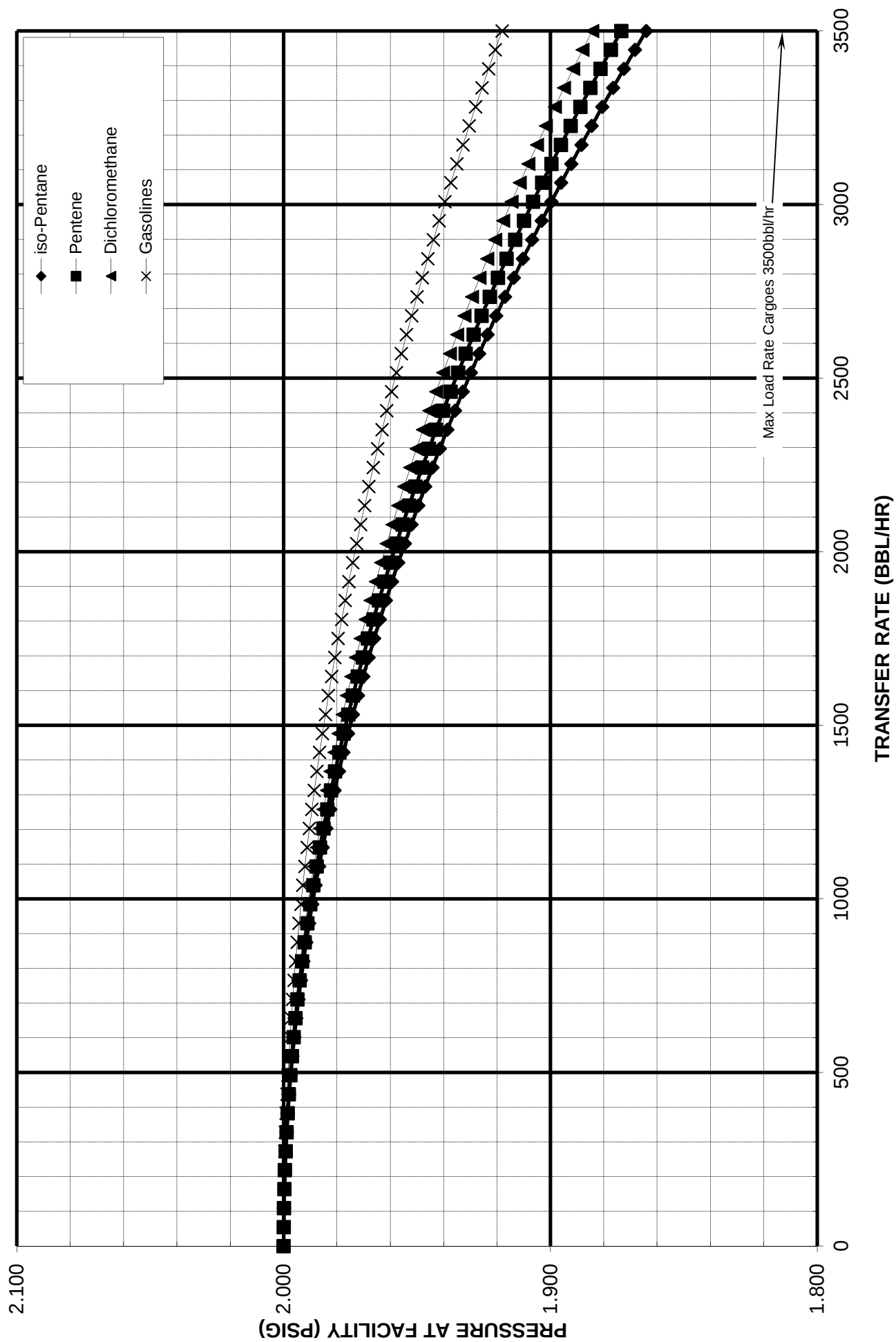


LIQUID TRANSFER RATE VS PIPING PRESSURE DROP CARGO TANK #3 TO FACILITY CONNECTION TANDEM LOADING



LIQUID TRANSFER RATE VS FACILITY PRESSURE FOR SINGLE LOADING

BASED ON PRESSURE DROP FROM CARGO TANK #3 TO FACILITY CONNECTION



LIQUID TRANSFER RATE VS PIPING PRESSURE DROP CARGO TANK #3 TO FACILITY CONNECTION SINGLE LOADING

