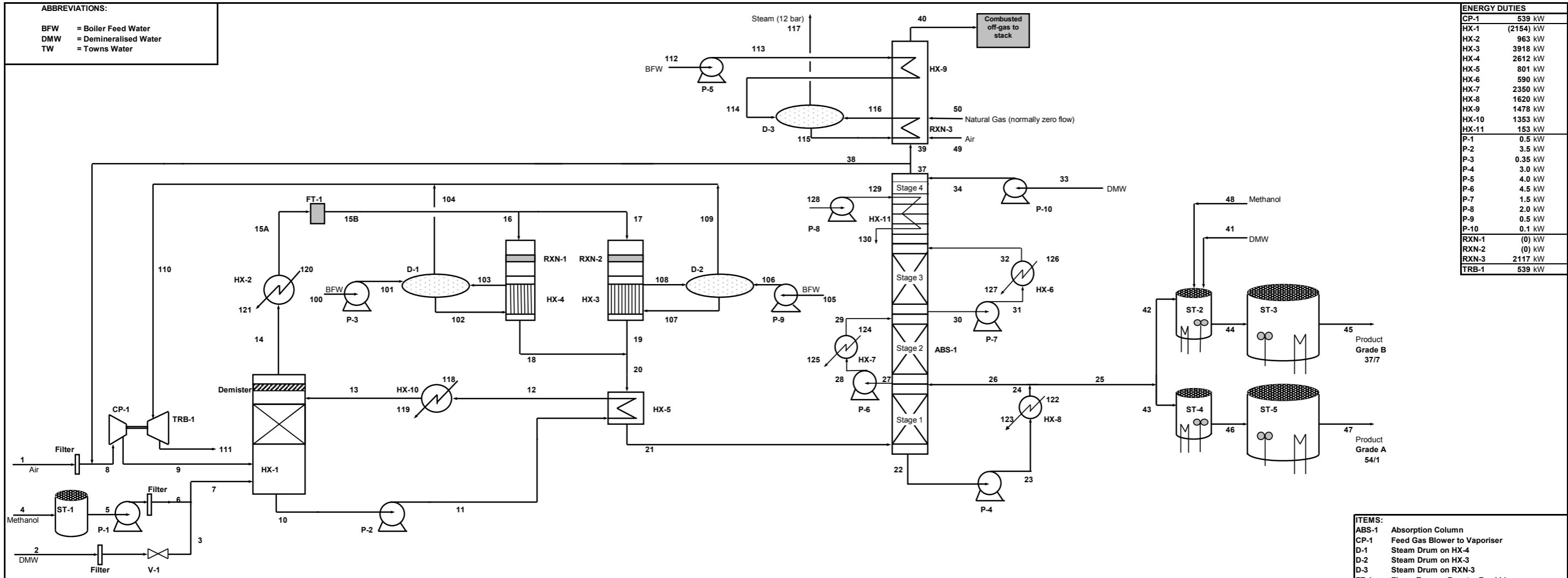




DRAWING ANNEX

1. FORMALDEHYDE PLANT PROCESS FLOW DIAGRAM
2. COMPUTER SIMULATION OUTPUT
3. DRAWING 7001: MECHANICAL DESIGN OF BUBBLE CAP
4. DRAWING 7002: MECHANICAL DESIGN OF BUBBLE CAP TRAYS – COLUMN INTERNALS
5. DRAWING 7003: MECHANICAL DESIGN OF THE BASE OF THE ABSORBER (ABS-1)
6. DRAWING 7004: MECHANICAL DESIGN OF THE ABSORBER (ABS-1) – GENERAL ARRANGEMENT
7. DRAWING 8001: PIPING AND INSTRUMENTATION DIAGRAM (P&ID) OF THE ABSORPTION SECTION OF THE PLANT
8. PIPING AND INSTRUMENTATION DIAGRAM (P&ID) OF THE VAPORISER SECTION OF THE PLANT, VERSION “A” (BEFORE HAZOP)
9. PIPING AND INSTRUMENTATION DIAGRAM (P&ID) OF THE VAPORISER SECTION OF THE PLANT, VERSION “C” (AFTER HAZOP)
10. DRAWING 1101: PLANT LAYOUT – GENERAL ARRANGEMENT DRAWING OF MAIN FORMALDEHYDE PLANT – PLAN VIEW
11. DRAWING 1102: PLANT LAYOUT – GENERAL ARRANGEMENT DRAWING OF MAIN FORMALDEHYDE PLANT – ELEVATION = LOOKING WEST

ABBREVIATIONS:
 BFW = Boiler Feed Water
 DMW = Demineralised Water
 TW = Towns Water



ENERGY DUTIES	
CP-1	539 kW
HX-1	(2154) kW
HX-2	963 kW
HX-3	3918 kW
HX-4	2612 kW
HX-5	801 kW
HX-6	590 kW
HX-7	2350 kW
HX-8	1620 kW
HX-9	1478 kW
HX-10	1353 kW
HX-11	153 kW
P-1	0.5 kW
P-2	3.5 kW
P-3	0.35 kW
P-4	3.0 kW
P-5	4.0 kW
P-6	4.5 kW
P-7	1.5 kW
P-8	2.0 kW
P-9	0.5 kW
P-10	0.1 kW
RXN-1	(0) kW
RXN-2	(0) kW
RXN-3	2117 kW
TRB-1	539 kW

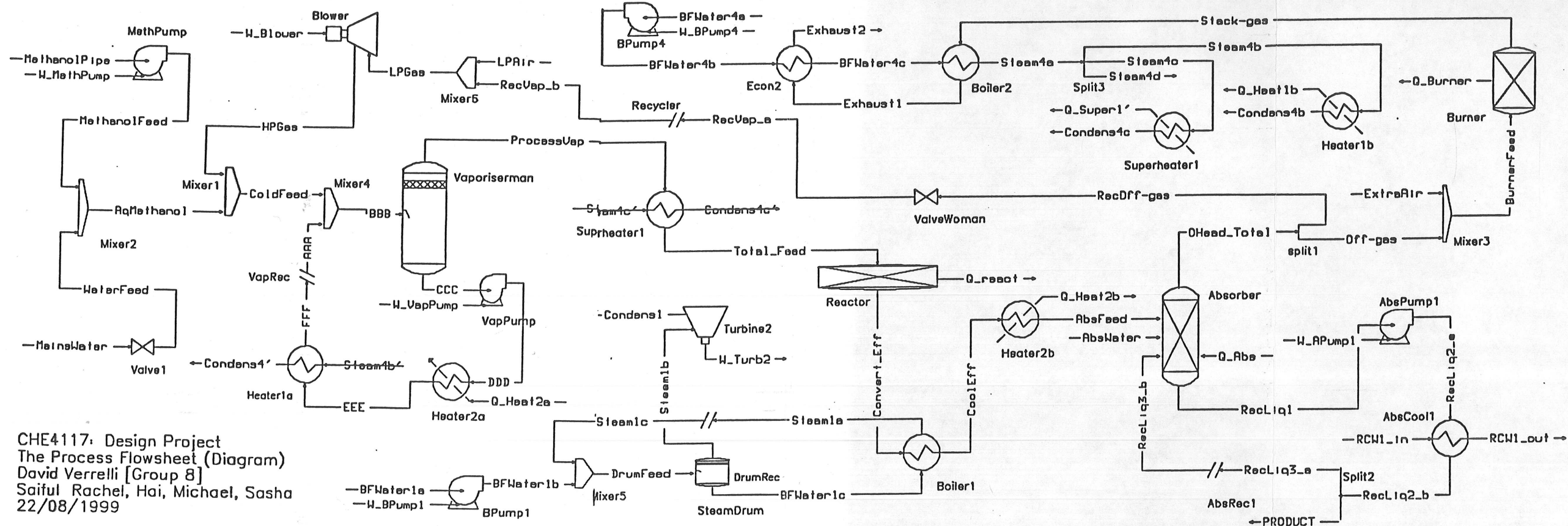
- ITEMS:**
- ABS-1 Absorption Column
 - CP-1 Feed Gas Blower to Vaporiser
 - D-1 Steam Drum on HX-4
 - D-2 Steam Drum on HX-3
 - D-3 Steam Drum on RXN-3
 - FT-1 Flame Trap on Reactor Feed Line
 - HX-1 Methanol Feed Vaporiser
 - HX-2 Methanol Superheater
 - HX-3 Waste Heat Boiler (for RXN-2)
 - HX-4 Waste Heat Boiler (for RXN-1)
 - HX-5 Reactor Effluent Cooler
 - HX-6 Stage 3 Recirculation Cooler
 - HX-7 Stage 2 Recirculation Cooler
 - HX-8 Stage 1 Recirculation Cooler
 - HX-9 Economiser
 - HX-10 Vaporiser Recycle Heater
 - HX-11 Serpentine Cooling Coils
 - P-1 Methanol Feed Pump
 - P-2 Liquid Recirculation Pump
 - P-3 Boiler Feed Water Pump
 - P-4 Stage 1 Recirculation Pump
 - P-5 Boiler Feed Water Pump
 - P-6 Stage 2 Recirculation Pump
 - P-7 Stage 3 Recirculation Pump
 - P-8 Stage 4 Coolant Pump
 - P-9 Boiler Feed Water Pump
 - P-10 Absorber Water Pump
 - RXN-1 Catalytic Reactor (40 % load)
 - RXN-2 Catalytic Reactor (40 % load)
 - RXN-3 Tail Gas Burner
 - ST-1 Methanol Storage Tank
 - ST-2 Grade B Formaldehyde Buffer Tank
 - ST-3 Grade B Formaldehyde Grading Tank
 - ST-4 Grade A Formaldehyde Buffer Tank
 - ST-5 Grade A Formaldehyde Grading Tank
 - TRB-1 Turbine to drive CP-1
 - V-1 Water Let-Down Valve

Stream Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
HYSM Identifier	LPAir	MansWater	WaterFeed	MethPipe	MethPipe	Meth.Feed	AqMethanol	LPGas	HPGas	CCC	DDD	EEE	FFF / AAA	ProcessVap	Total_Feed	-	-	-	-	CoolEff	AbsFeed	-	-	-	
Vapour fraction	-	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	
Temperature	°C	37.0	37.0	37.0	37.0	37.0	37.0	43.6	121.6	62.1	62.1	72.6	86.5	62.1	158.3	158.3	158.3	170.0	170.0	170.0	90.0	75.0	75.0	60.0	
Pressure	kPa	101	400	185	110	110	185	101	185	185.0	245.0	215.0	185	185	170	170	170	145	145	145	130	130.0	170	130	
MASS FLOW	kg.s ⁻¹	3.221	0.226	0.226	1.742	1.742	1.742	1.968	5.948	5.948	23.945	23.945	23.945	23.945	7.916	7.916	3.166	4.750	3.166	4.750	7.916	7.916	29.7	29.7	
MASS FRACTION																									
Formaldehyde	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	trace	trace	0.000	0.000	0.000	0.000	trace	trace	trace	0.181	0.181	0.181	0.181	0.540	0.540	0.540	
Methanol	-	0.000	0.000	0.000	1.000	1.000	1.000	0.885	trace	trace	0.315	0.315	0.315	0.315	0.220	trace	trace	0.003	0.003	0.003	0.003	0.010	0.010	0.010	
Oxygen	-	0.225	0.000	0.000	0.000	0.000	0.000	0.000	0.122	0.122	0.000	0.000	0.000	0.092	0.092	0.092	0.092	0.001	0.001	0.001	0.001	0.000	0.000	0.000	
Water	-	0.032	1.000	1.000	0.000	0.000	0.000	0.115	0.046	0.046	0.685	0.685	0.685	0.685	0.063	0.063	0.063	0.063	0.153	0.153	0.153	0.153	0.450	0.450	0.450
Hydrogen	-	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.006	0.000	0.000	0.000	0.000	0.005	0.005	0.005	0.005	0.010	0.010	0.010	0.010	0.000	0.000	
Carbon Dioxide	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.038	0.000	0.000	0.000	0.029	0.029	0.029	0.029	0.029	0.059	0.059	0.059	0.059	0.000	0.000	0.000
Carbon Monoxide	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.002	0.002	0.002	0.002	0.003	0.003	0.003	0.003	0.000	0.000	0.000
Formic Acid	-	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002
Nitrogen	-	0.743	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.590	0.590	0.590	0.590	0.590	0.590	0.590	0.000	0.000	0.000	0.000

Stream Number	Units	25	26	27	28	29	30	31	32	33	34	37	38	39	40	41	42	43	44	45	46	47	48	49
HYSM Identifier		PRODUCT									AbsWater	Ohead_Total	RecVap_a	Off-gas	Exhaust2									ExtraAir
Vapour fraction	-	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	1
Temperature	°C	60.0	60.0	63.0	63.0	48.0	51.0	51.0	40.0	37.0	37.0	50.0	50.0	50.0	206.4	37.0	60.0	60.0	63.0	63.0	63.0	63.0	37.0	37.0
Pressure	kPa	130	130	240	280	240	265	305	265	400	495	110	101	110	101	150	130	130	130	130	130	130	150	110
MASS FLOW	kg.s ⁻¹	2.646	27.1	41.2	41.2	41.2	13.7	13.7	13.7	0.328	0.328	5.599	2.727	2.872	4.590	0.069	0.187	2.458	0.273	0.273	2.458	0.017	1.718	
MASS FRACTION																								
Formaldehyde	-	0.540	0.540	0.289	0.289	0.289	0.199	0.199	0.199	0.000	0.000	trace	trace	trace	0.000	0.000	0.540	0.540	0.370	0.370	0.540	0.540	0.000	0.000
Methanol	-	0.010	0.010	0.005	0.005	0.005	0.003	0.003	0.003	0.000	0.000	trace	trace	trace	0.000	0.000	0.010	0.010	0.080	0.080	0.010	0.010	1.000	0.000
Oxygen	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.225
Water	-	0.450	0.450	0.706	0.706	0.706	0.798	0.798	0.798	1.000	1.000	0.063	0.063	0.063	0.129	1.000	0.450	0.450	0.550	0.550	0.450	0.450	0.000	0.032
Hydrogen	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.014	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Carbon Dioxide	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.083	0.083	0.083	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Carbon Monoxide	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Formic Acid	-	0.0002	0.0002	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0001	0.0001	0.0001	0.0002	0.0002	0.0000
Nitrogen	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.834	0.834	0.834	0.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.743

Stream Number	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130
HYSM Identifier											Steam1b	Condens1	BFWater4a	BFWater4b	BFWater4c			Steam1a	Steam1b	Condens4	Steam1c	Condens1c									
Vapour fraction	-	0	0	0	0.75	1	0	0	0	0.75	1	1	0.9417	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	
Temperature	°C	100.0	100.0	151.9	151.9	151.9	100.0	100.0	151.9	151.9	151.9	151.9	100.2	100.0	100.1	189.5	189.5	188.0	188.0	188.0	187.4	188.0	187.4	30.0	45.0	30.0	41.0	30.0	30.0	35.0	
Pressure	kPa	400	500	500	500	500	400	500	500	500	500	500	102	400	1270	1240	1240	1200	1200	1200	1185	1200	1185	400	360	400	360	400	525	485	
MASS FLOW	kg.s ⁻¹	1.086	1.086	1.086	1.599	1.086	1.628	1.628	1.628	2.398	1.628	2.714	2.720	1.720	1.720	1.720	1.720	1.720	1.720	0.569	0.569	0.484	0.484	25.9	25.9	37.5	37.5	12.8	7.32	7.32	
FRACTION WATER	-	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	

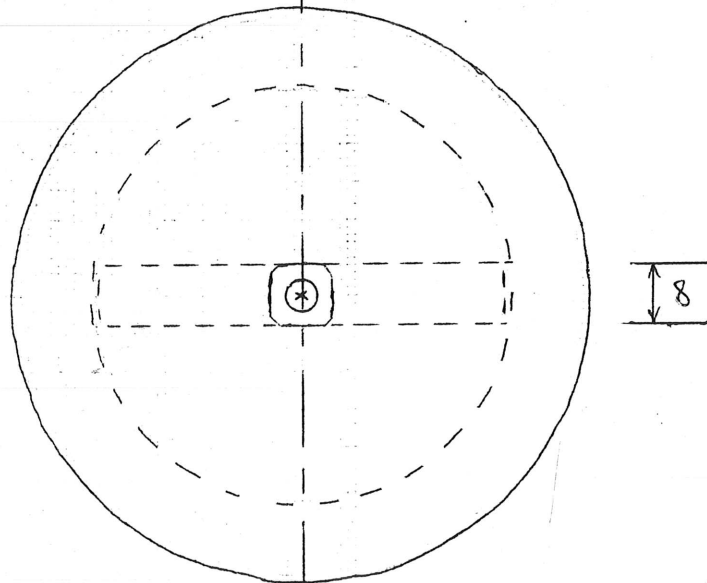
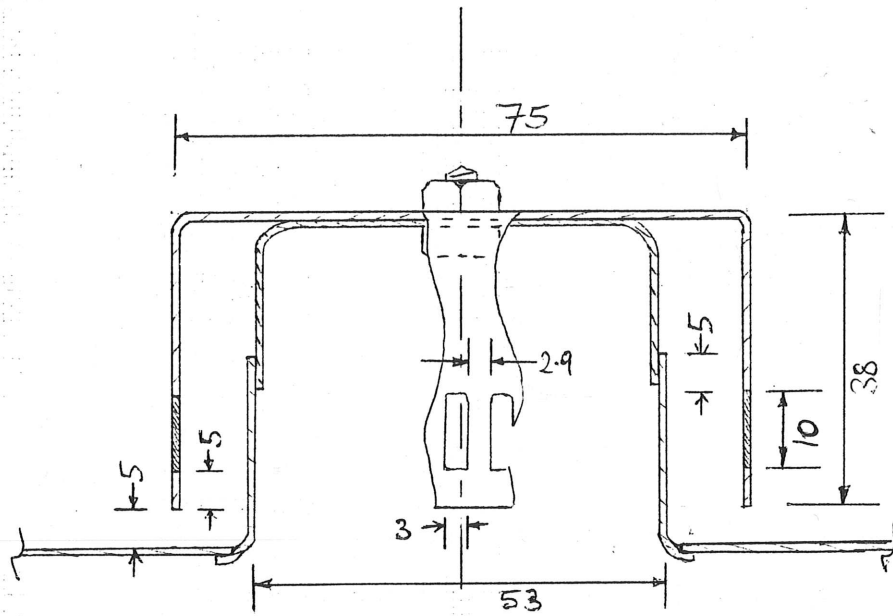
Title: Formaldehyde Plant Process Flow Diagram
Process: Non-distillative silver catalyst (off-gas recycle)
Original: Sasha Trandafilovic
Revised by: David I. Verrelli
Revision: "F"
Date: 09/10/1999



CHE4117: Design Project
 The Process Flowsheet (Diagram)
 David Verrelli [Group 8]
 Saiful Rachel, Hai, Michael, Sasha
 22/08/1999

Stream Name	AAA	AbsFeed	AbsWater	AqMethanol	BBB	BFWater1a	BFWater1b	BFWater1c	BFWater4a	BFWater4b	BFWater4c	BurnerFeed	CCC	ColdFeed	Condens1
Vapour_Frac	0.0000	1.0000	0.0000	0.0000	0.2305	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.8305	0.9417
Temperature	86.5180	90.0000	37.0000	37.0368	62.0833	100.0000	100.0153	151.8571	100.0000	100.1359	189.4517	45.7076	62.0833	38.1968	100.1843
Pressure	185.0000	130.0000	120.0000	185.0000	185.0000	400.0000	500.0000	500.0000	400.0000	1270.0000	1240.0000	110.0000	185.0000	185.0000	102.0000
Flow	957.0421	332.7419	18.1792	66.8933	1252.9148	150.6514	150.6514	221.8490	95.4755	95.4755	95.4755	182.0192	957.0473	295.8688	150.6551
Mass_Flow	20.0000	7.9159	0.3275	1.9675	27.9159	2.7140	2.7140	3.9966	1.7200	1.7200	1.7200	4.5900	20.0000	7.9159	2.7141
LiqVol_Flow	21.6455	10.6550	-0.3282	2.4151	31.5978	2.7195	2.7195	4.0047	1.7235	1.7235	1.7235	6.0095	21.6455	9.9523	2.7195
Energy	-26970.2295	3572.8516	-613.5226	-1896.8556	-25984.1970	-4364.6093	-4364.2277	-5547.3923	-2766.0752	-2763.9706	-2103.1497	1680.7712	-28961.0290	738.1688	1402.9055
Stream Name	Condens4*	Condens4b	Condens4c	Condens4c*	Convert_Eff	CoolEff	DDD	DrumFeed	EEE	Exhaust1	Exhaust2	ExtraAir	FFF	HPGas	LP Air
Vapour_Frac	0.0000	0.0000	0.0000	0.0000	0.9689	1.0000	0.0000	0.4044	0.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
Temperature	187.3985	187.3985	187.3985	187.3985	700.0000	170.0000	62.0967	151.8571	72.6444	328.4914	206.3792	37.0000	86.5180	121.5830	37.0000
Pressure	1185.0000	1185.0000	1185.0000	1185.0000	160.0000	145.0000	245.0000	500.0000	215.0000	106.0000	101.0000	110.0000	185.0000	185.0000	101.0000
Flow	31.5819	31.5819	26.8842	26.8842	332.7419	332.7419	957.0473	372.5042	957.0473	171.9008	171.9008	60.6691	957.0473	228.9755	113.7801
Mass_Flow	0.5690	0.5690	0.4843	0.4843	7.9159	7.9159	20.0000	6.7107	20.0000	4.5900	4.5900	1.7176	20.0000	5.9484	3.2212
LiqVol_Flow	0.5701	0.5701	0.4853	0.4853	10.6550	10.6550	21.6455	6.7242	21.6455	5.5203	5.5203	1.9775	21.6455	7.5372	3.7087
Energy	-700.9128	-700.9128	-596.6548	-596.6548	10745.0928	4430.0422	-28959.2476	-3596.7701	-28102.0568	3134.5079	2473.6871	549.2388	-26970.4458	2635.0243	1030.0533
Stream Name	LP Gas	MainsWater	MethanolFeed	MethanolPipe	OHead_Total	Off-gas	PRODUCT	ProcessVap	Q_Abs	Q_Burner	Q_Heat1b	Q_Heat2a	Q_Heat2b	Q_Super1*	Q_React
Vapour_Frac	1.0000	0.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
Temperature	43.5838	37.0000	37.0355	37.0000	50.0000	50.0000	60.0000	62.0833	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pressure	101.0000	400.0000	185.0000	110.0000	110.0000	120.0000	185.0000	185.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Flow	228.9755	12.5395	54.3538	54.3538	236.5498	121.3501	114.3723	295.8674	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mass_Flow	5.9484	0.2259	1.7416	1.7416	5.5993	2.8724	2.5441	7.9159	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LiqVol_Flow	7.5372	0.2264	2.1887	2.1887	7.8596	4.0320	3.1235	9.9523	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	2104.1736	-423.1333	-1473.7222	-1473.9474	2205.7159	1131.5323	-2562.5408	2976.8316	-27.5397	0.0000	1131.6110	857.1907	857.1907	963.2883	0.0000
Stream Name	RCW1_In	RCW1_out	RecLiq1	RecLiq2_a	RecLiq2_b	RecLiq3_a	RecLiq3_b	RecOff-gas	RecVap_a	RecVap_b	Stack-gas	Steam1a	Steam1b	Steam1c	Steam4a
Vapour_Frac	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.9539	0.7500	1.0000	0.7500	1.0000
Temperature	30.0000	45.0000	75.0000	75.0145	60.0000	60.0000	60.0000	50.0000	49.9958	49.9954	907.6920	151.8557	151.8571	151.8557	187.9668
Pressure	400.0000	360.0000	130.0000	170.0000	120.0000	120.0000	120.0000	110.0000	101.0000	101.0000	110.0000	500.0000	500.0000	500.0000	1200.0000
Flow	2885.0285	2885.0285	2569.1488	2569.1488	2569.1488	2454.7765	2454.7776	115.1998	115.1998	115.1954	171.9008	221.8490	150.6551	221.8490	95.4755
Mass_Flow	51.9741	51.9741	59.3941	59.3941	59.3941	56.7500	56.7500	2.7268	2.7268	2.7272	4.5900	3.9966	2.7141	3.9967	1.7200
LiqVol_Flow	52.0790	52.0790	70.1631	70.1631	70.1631	67.0396	67.0396	3.8276	3.8276	3.8288	5.5203	4.0047	2.7195	4.0048	1.7235
Energy	-98890.0260	-95597.3417	-54273.8546	-54269.7600	-57562.4443	-54999.9036	-54999.9279	1074.1837	1074.1837	1074.1202	6539.7038	767.4445	1950.6219	767.4574	1302.0460
Stream Name	Steam4b	Steam4b*	Steam4c	Steam4c*	Steam4d	Total_Feed	W_APump1	W_BPump1	W_BPump4	W_Blower	W_MethPump	W_Turb2	W_VapPump	WaterFeed	
Vapour_Frac	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	0.0000	
Temperature	187.9668	187.9668	187.9668	187.9668	187.9668	158.2616	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	37.0456	
Pressure	1200.0000	1200.0000	1200.0000	1200.0000	1200.0000	170.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	185.0000	
Flow	31.5819	31.5819	26.8842	26.8842	37.0093	295.8674	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	12.5395	
Mass_Flow	0.5690	0.5690	0.4843	0.4843	0.6667	7.9159	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2259	
LiqVol_Flow	0.5701	0.5701	0.4853	0.4853	0.6681	9.9523	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2264	
Energy	430.6981	430.6981	366.6335	366.6335	504.7143	3940.1198	4.0946	0.3816	2.1046	530.8508	0.2252	547.7165	1.7814	-423.1333	

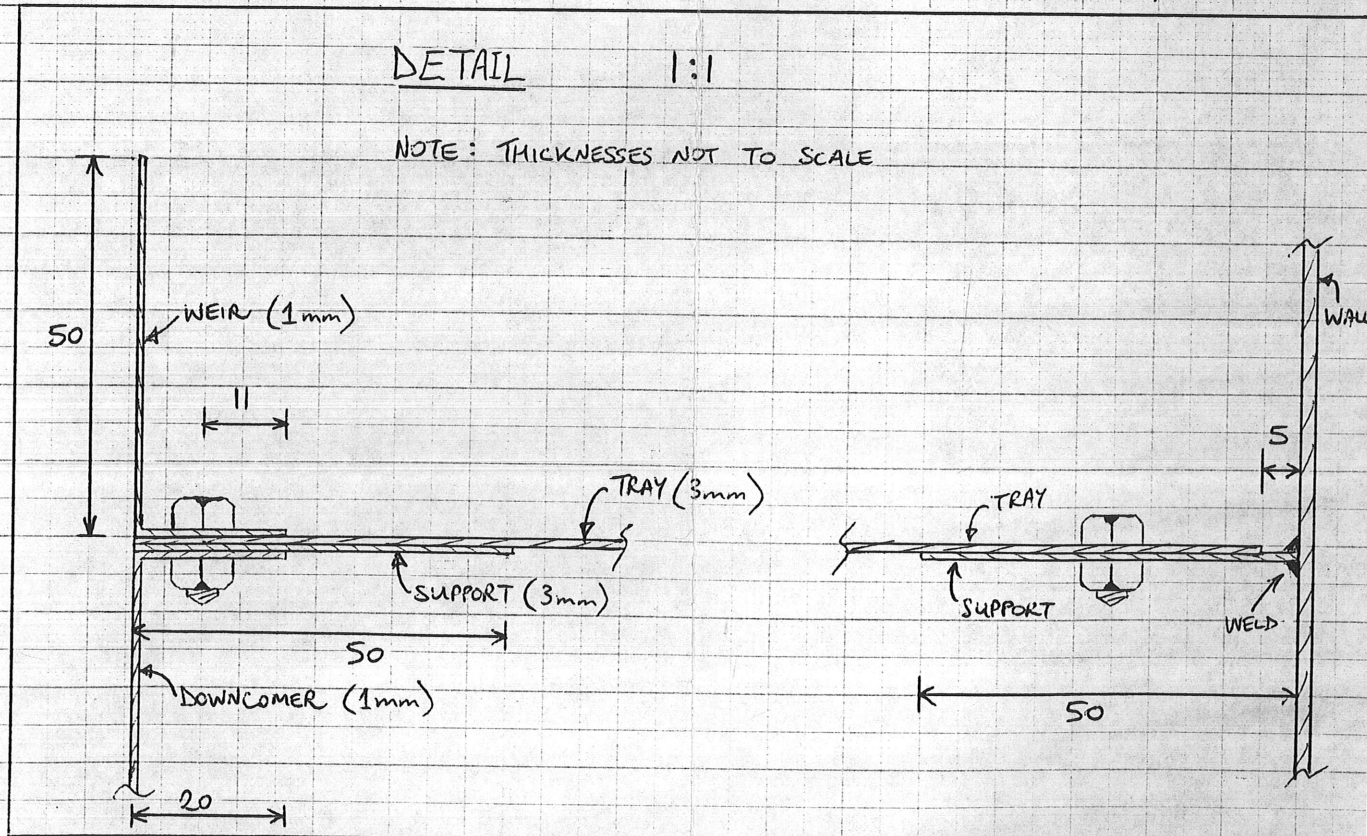
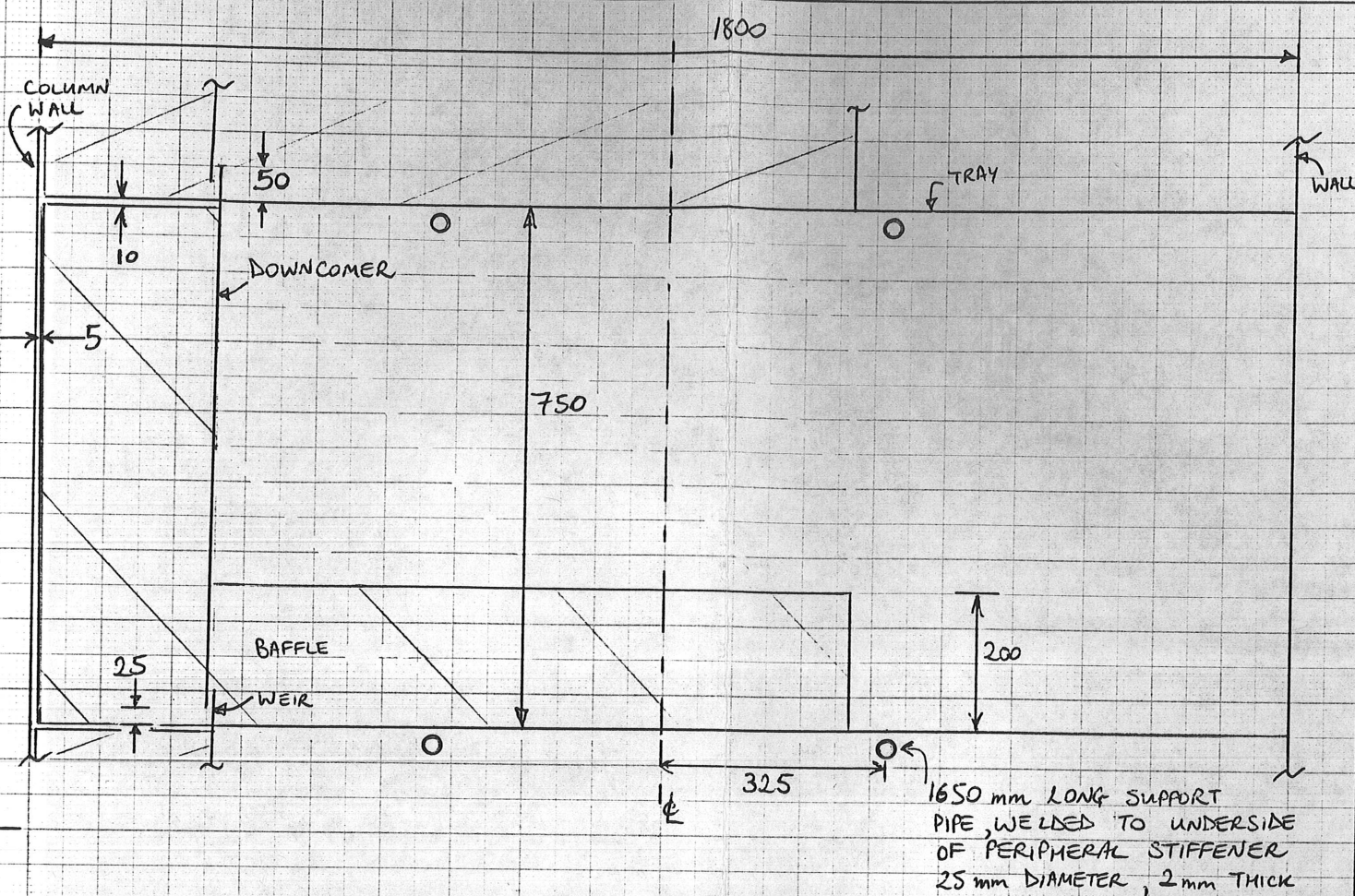
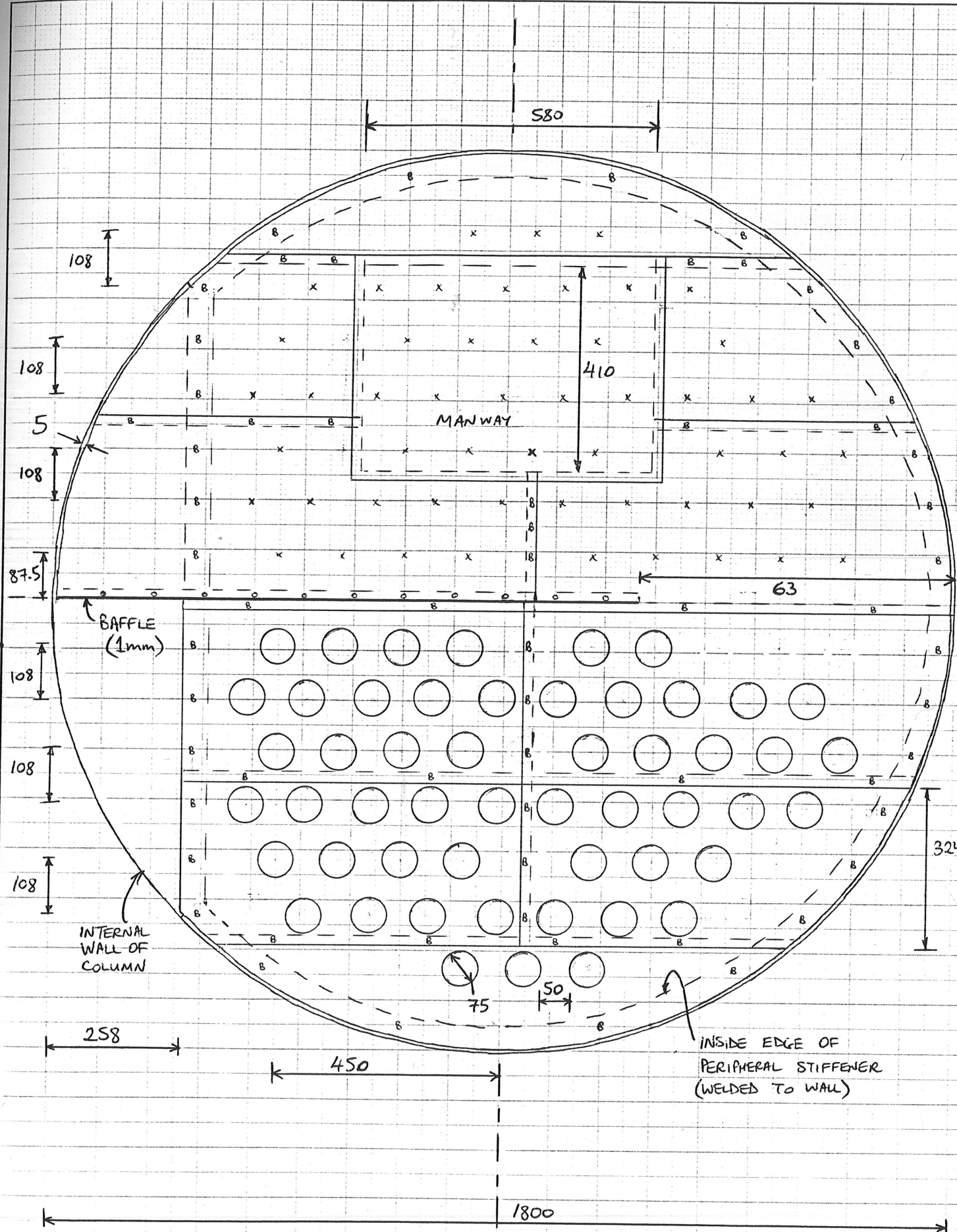
DP_D148.SIM



NOTES

ALL DIMENSIONS IN mm.
 40 SLOTS PER CAP
 ALL TOLERANCES ± 0.5 mm
 EXCEPT SLOTS: ± 0.1 mm
 ALL 1.5mm THICK, TYPE 316 STAINLESS

B	DIV	20/09/1999	FOR APPROVAL
REV.	BY	DATE	DESCRIPTION
		12/09/1999	BUBBLE-CAP
		SCALE	1:1
		NUMBER	7001
		DRAWN BY	DIV
		PROJECT	CHE417 - FORMALDEHYDE ABSORBER



NOTES

ALL DIMENSIONS IN mm

x DENOTES CENTRE OF BELL CAP
(NOT SHOWN IN TOP HALF FOR CLARITY)
DOWNCOMER ALTERNATES TOP AND BOTTOM HALF

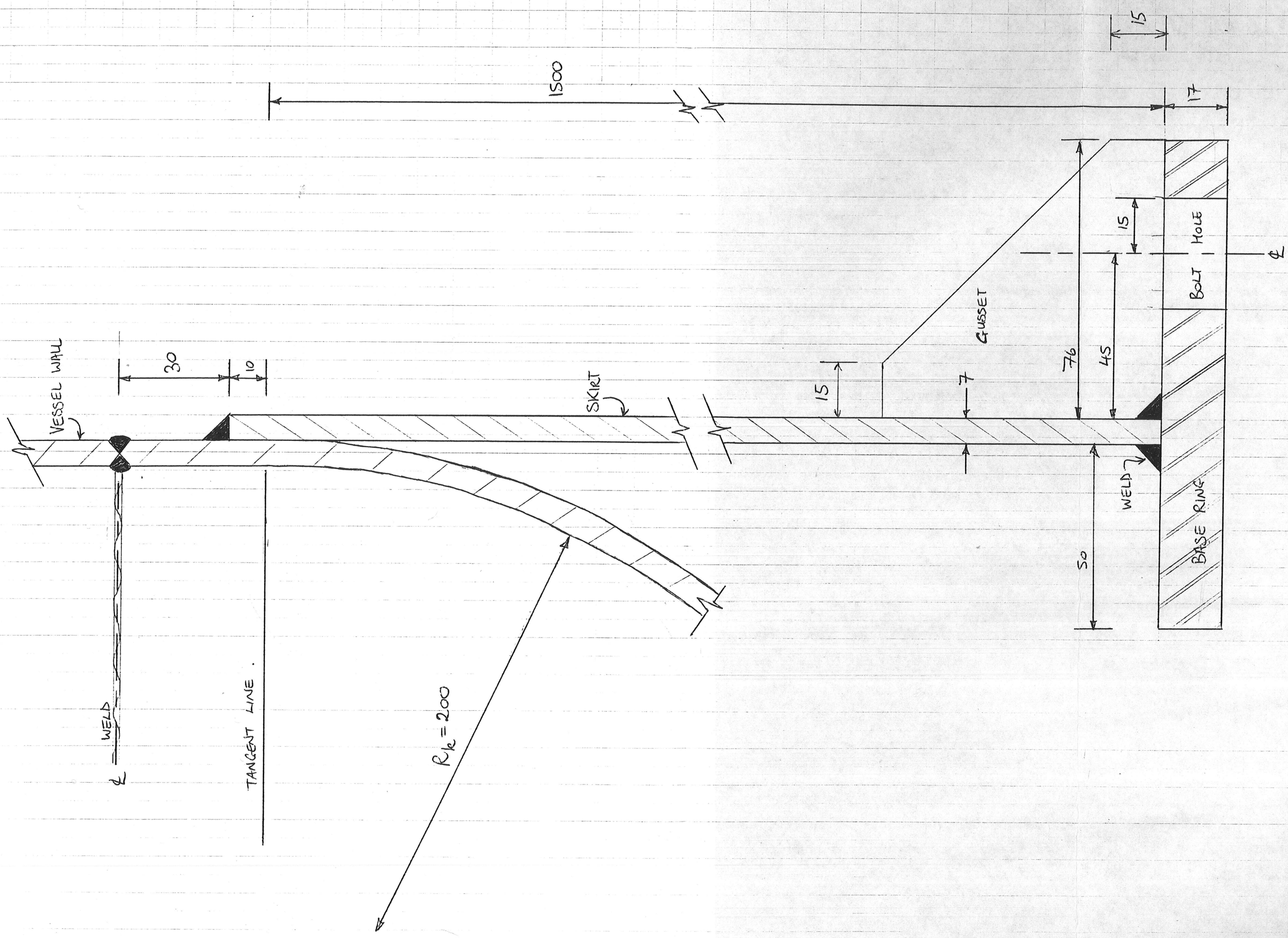
--- DENOTES OVERLAPPING JOIN
(ALL 20 mm, EXCEPT PERIPHERAL STIFFENER)

o DENOTES SCREW (HEAD)
B DENOTES BOLT (HEAD)

ALL DIMENSIONS ± 2 mm, EXCEPT THICKNESSES
ALL TYPE 316 STAINLESS

DOWNCOMER IS VERTICAL
(ANGLE ON DRAWING IS FOR CLARITY)

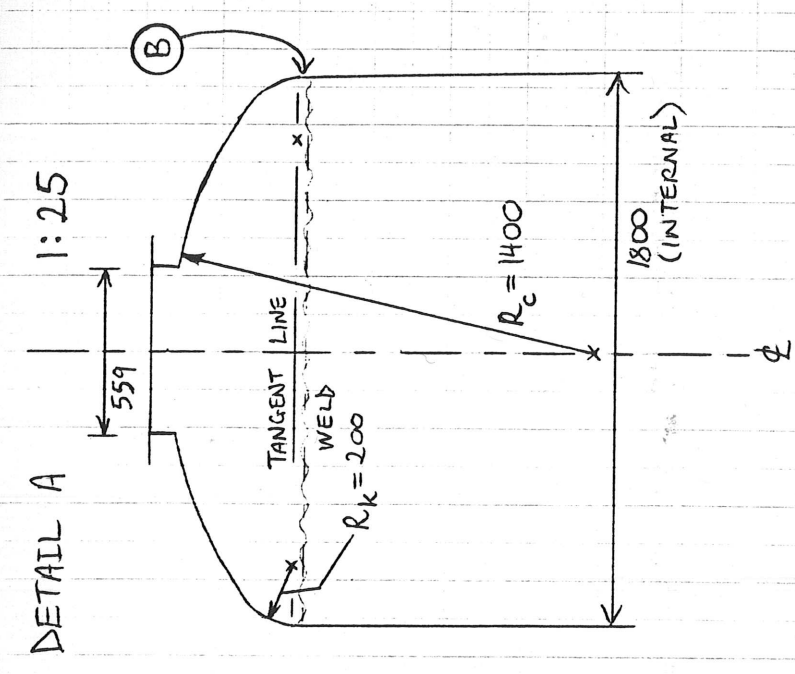
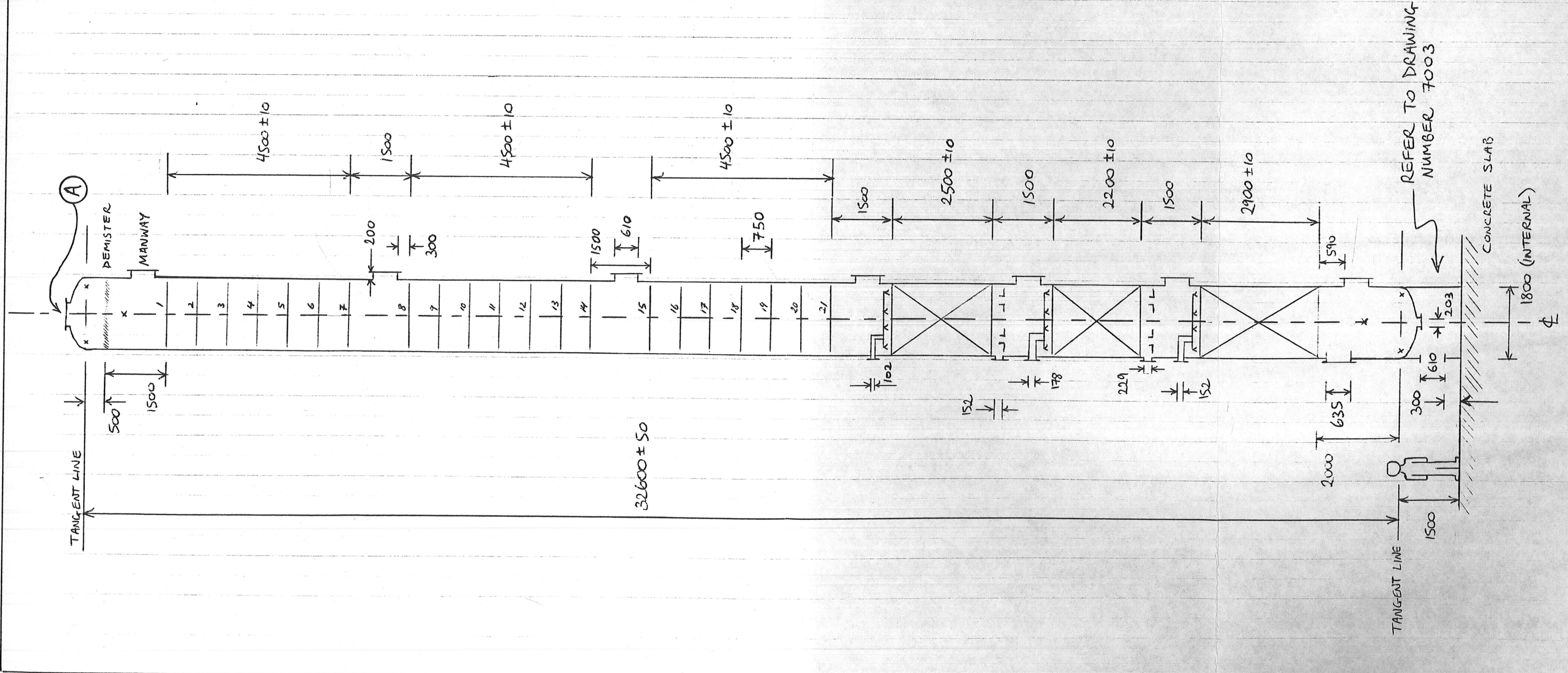
REV.	BY	DATE	DESCRIPTION
B	DIV	19/09/1999	FOR APPROVAL
		12/09/1999	BUBBLE CAP TRAYS
		1:10	- COLUMN INTERNALS
		7002	
		DIV	
PROJECT	CHE4117 - FORMALDEHYDE ABSORBER		



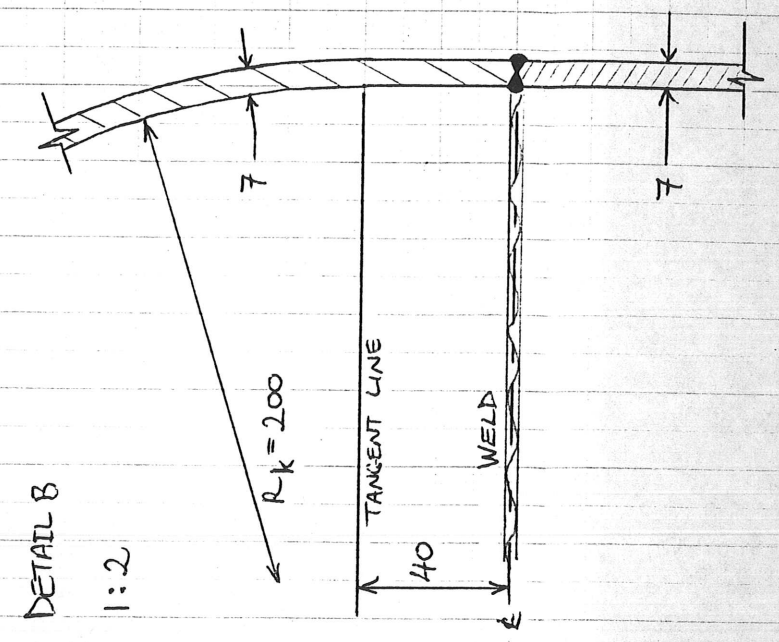
B	DIV	DATE	FOR APPROVAL
REV.	BY	DATE	DESCRIPTION
DATE	SCALE	NUMBER	PROJECT
1:1	7003	CHE117	FORMALDEHYDE ABSORBER
DRAWN BY	DIV		

NOTES
 ALL DIMENSIONS IN MILLIMETRES
 ALL TYPE 316SS
 FULL RADIOGRAPHIC OR ULTRASONIC EXAMINATION OF ALL JOINTS REQUIRED
 EIGHT (8) EQUI-DISTANT BOLT-HOLES IN BASE RING

BASE OF
 ABSORBER (ABS-1)



NOTE: DEMISTER NOT SHOWN, FOR CLARITY



NOTES

ALL DIMENSIONS IN MILLIMETRES,
MEASURED AT AMBIENT TEMPERATURE

ALL DIMENSIONS ± 5 EXCEPT

- AS MARKED
- FLANGES ARE NOMINAL
- THICKNESSES + 0.2 / - 0.1

FLANGES ARE STANDARD SOCKET WELDING,
150 POUNDS OR 6 BAR CLASS, AS AVAILABLE

ALL COMPONENTS ARE TYPE 316SS

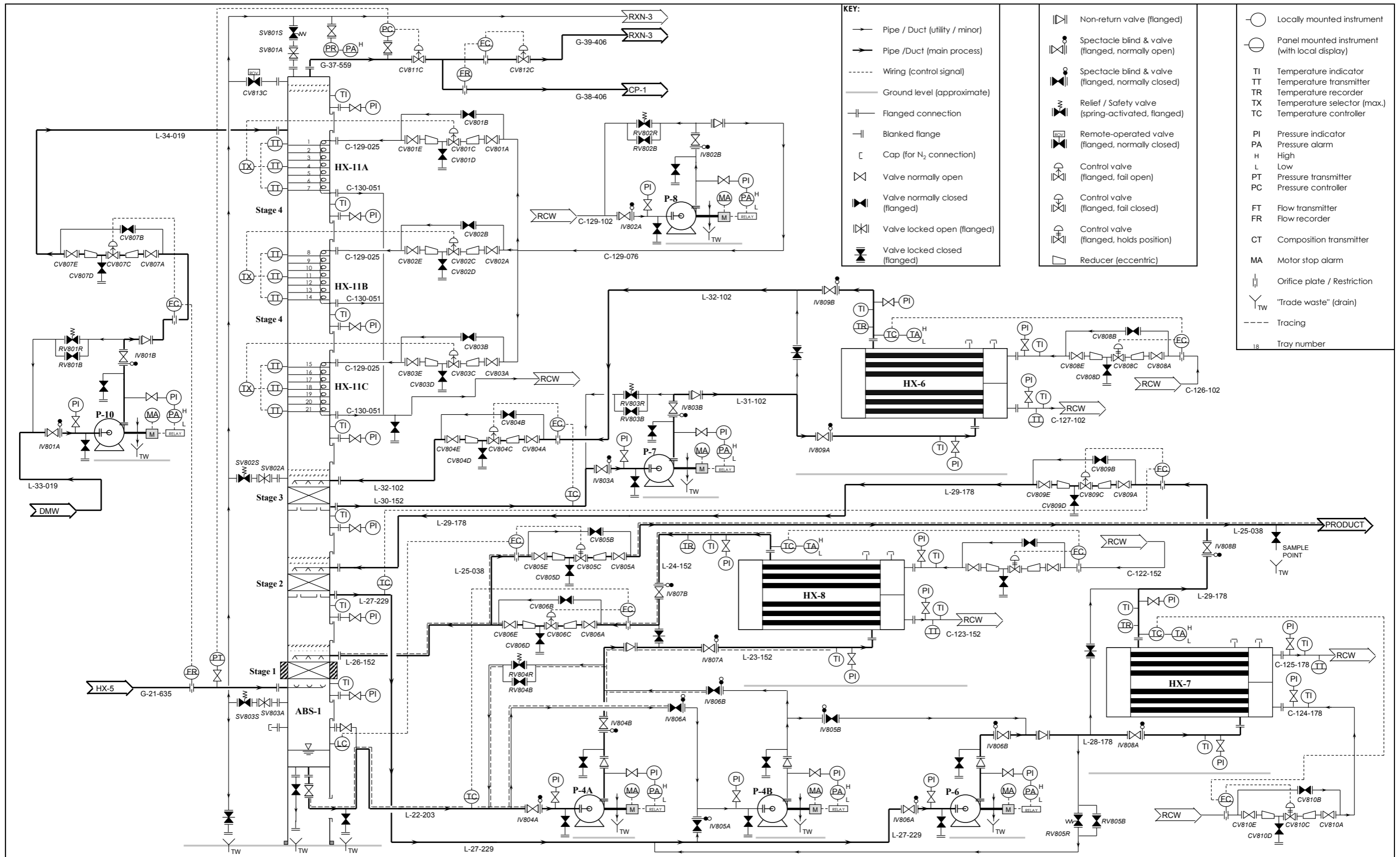
ADDITIONAL MINOR CONNECTIONS
(E.G. FOR INSTRUMENTATION)
NOT SHOWN HERE

FULL RADIOGRAPHIC OR ULTRASONIC
EXAMINATION REQUIRED - ALL JOINTS

ALL FLANGES REINFORCED BY WELDED PAD

REV. BY	DATE	DESCRIPTION	FOR APPROVAL
B	06/10/1999		
DATE	01/10/1999		
SCALE	1:100		
NUMBER	7004		
DRAWN BY	DIV		

PROJECT CHEM17 - FORMALDEHYDE ABSORBER



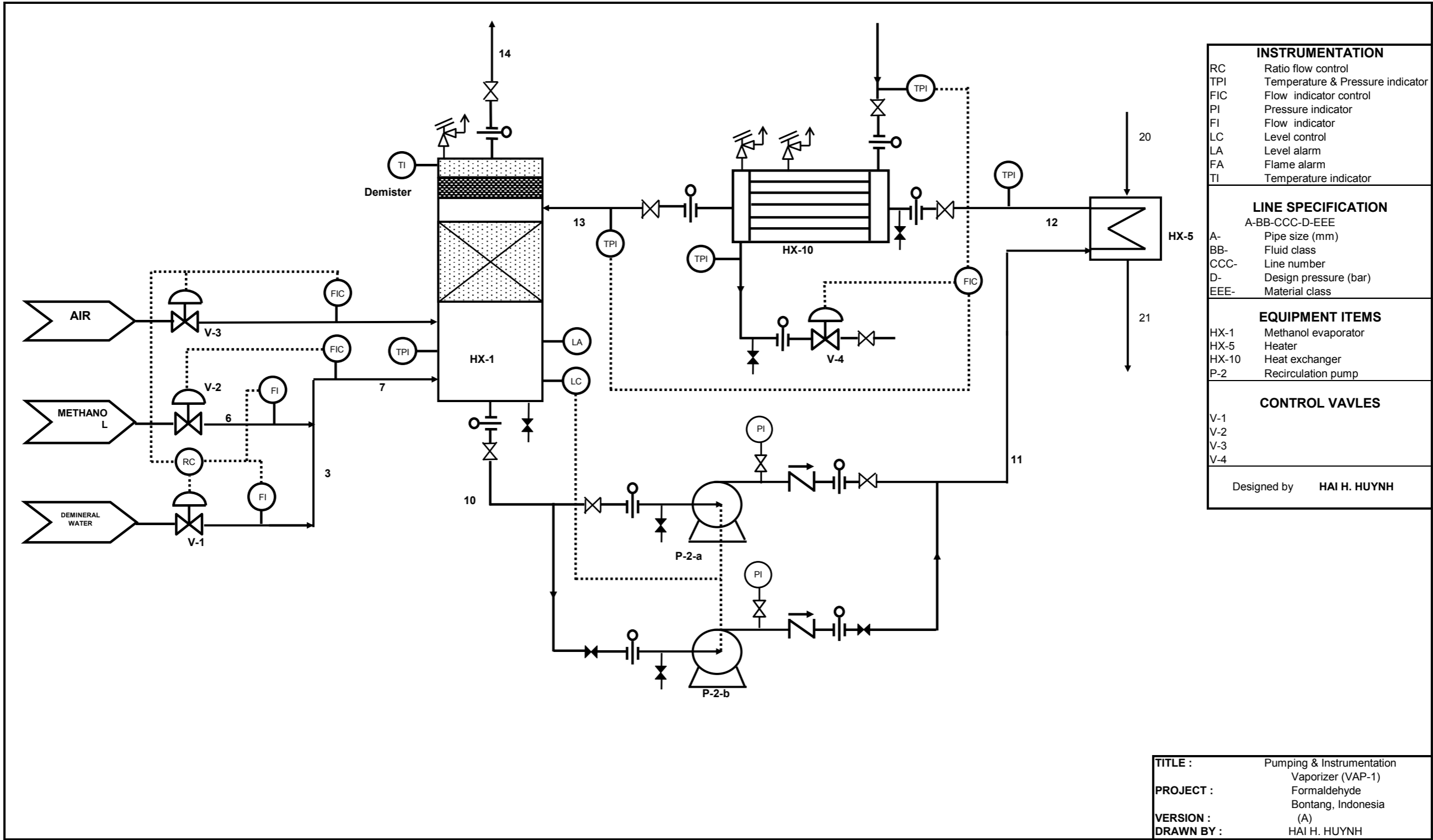
ABBREVIATIONS:

DMW	Demineralised water	P-4A	Stage 1 recirculation pump	ABS-1	Absorption column	CV	Control valve (station)
RCW	Recirculated cooling water	P-4B	Spare for P-4A / P-6	HX-6	Stage 3 recirculation cooler	RV	Relief valve (unit)
RXN-3	Off-gas burner	P-6	Stage 2 recirculation pump	HX-7	Stage 2 recirculation cooler	SV	Safety valve (unit)
HX-5	Reactor effluent cooler	P-7	Stage 3 recirculation pump	HX-8	Stage 1 recirculation cooler	IV	Isolation valve (spectacle)
CP-1	Blower	P-8	Stage 4 coolant pump	HX-11	Serpentine cooling coils		
		P-10	Absorber water pump				

LINE IDENTIFICATION: X-YY-ZZZ

X	= Fluid class:	G = Process gas
YY	= Line number	L = Process liquid
ZZZ	= Nominal line size [mm]	C = RCW
NOTE: All Schedule 80, Type 316SS		

"Z"	D.I.V.	2/10/1999	FOR APPROVAL
REVISION	BY	DATE	DESCRIPTION
		13/9/1999	PROCESS AND INSTRUMENTATION DIAGRAM
SCALE	N.T.S.		
NUMBER	8001		
DRAWN BY	D.I.V.		
PROJECT	CHE4117 - FORMALDEHYDE ABSORBER		



INSTRUMENTATION	
RC	Ratio flow control
TPI	Temperature & Pressure indicator
FIC	Flow indicator control
PI	Pressure indicator
FI	Flow indicator
LC	Level control
LA	Level alarm
FA	Flame alarm
TI	Temperature indicator

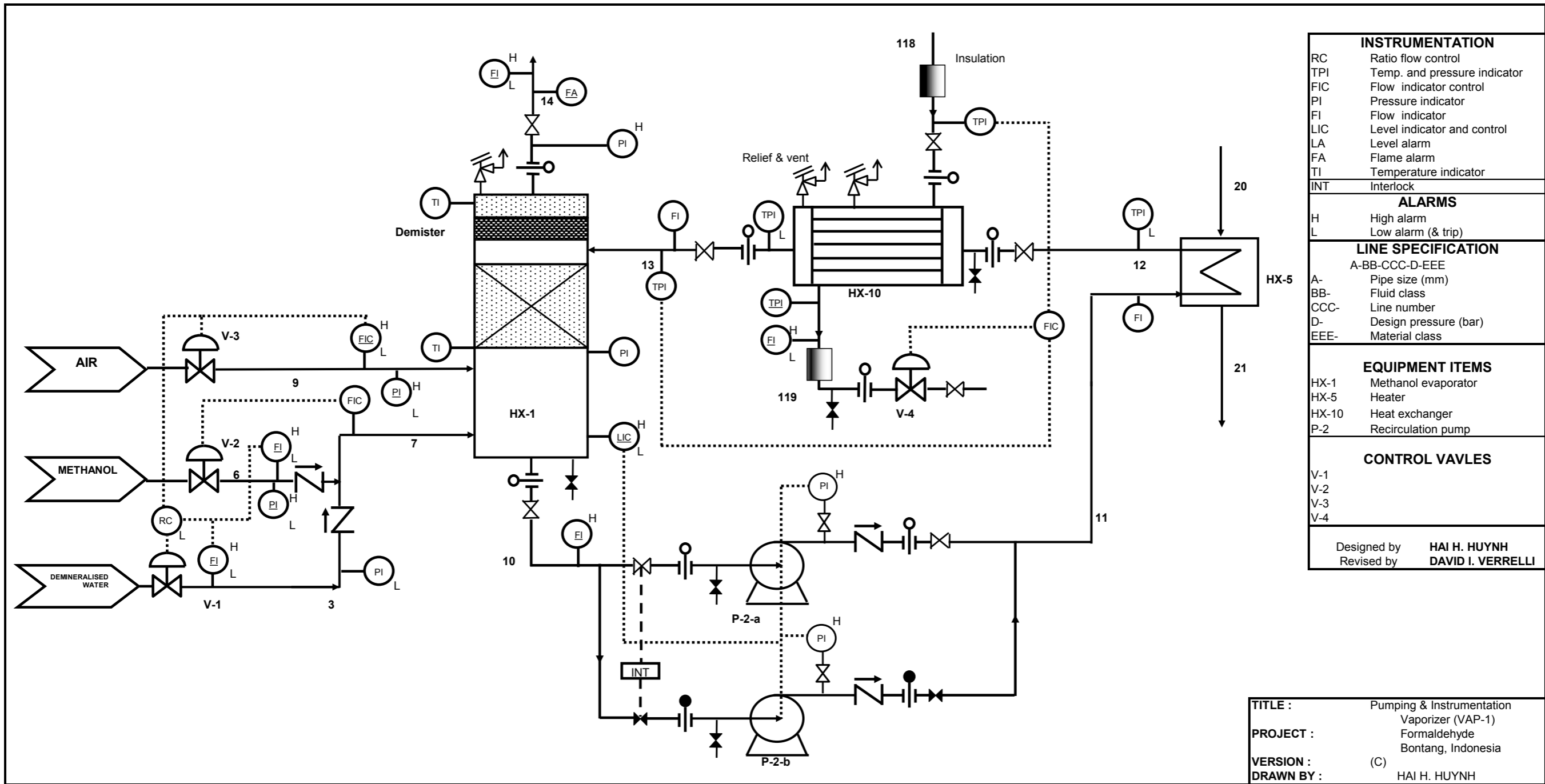
LINE SPECIFICATION	
A-BB-CCC-D-EEE	
A-	Pipe size (mm)
BB-	Fluid class
CCC-	Line number
D-	Design pressure (bar)
EEE-	Material class

EQUIPMENT ITEMS	
HX-1	Methanol evaporator
HX-5	Heater
HX-10	Heat exchanger
P-2	Recirculation pump

CONTROL VAVLES	
V-1	
V-2	
V-3	
V-4	

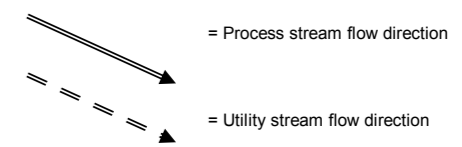
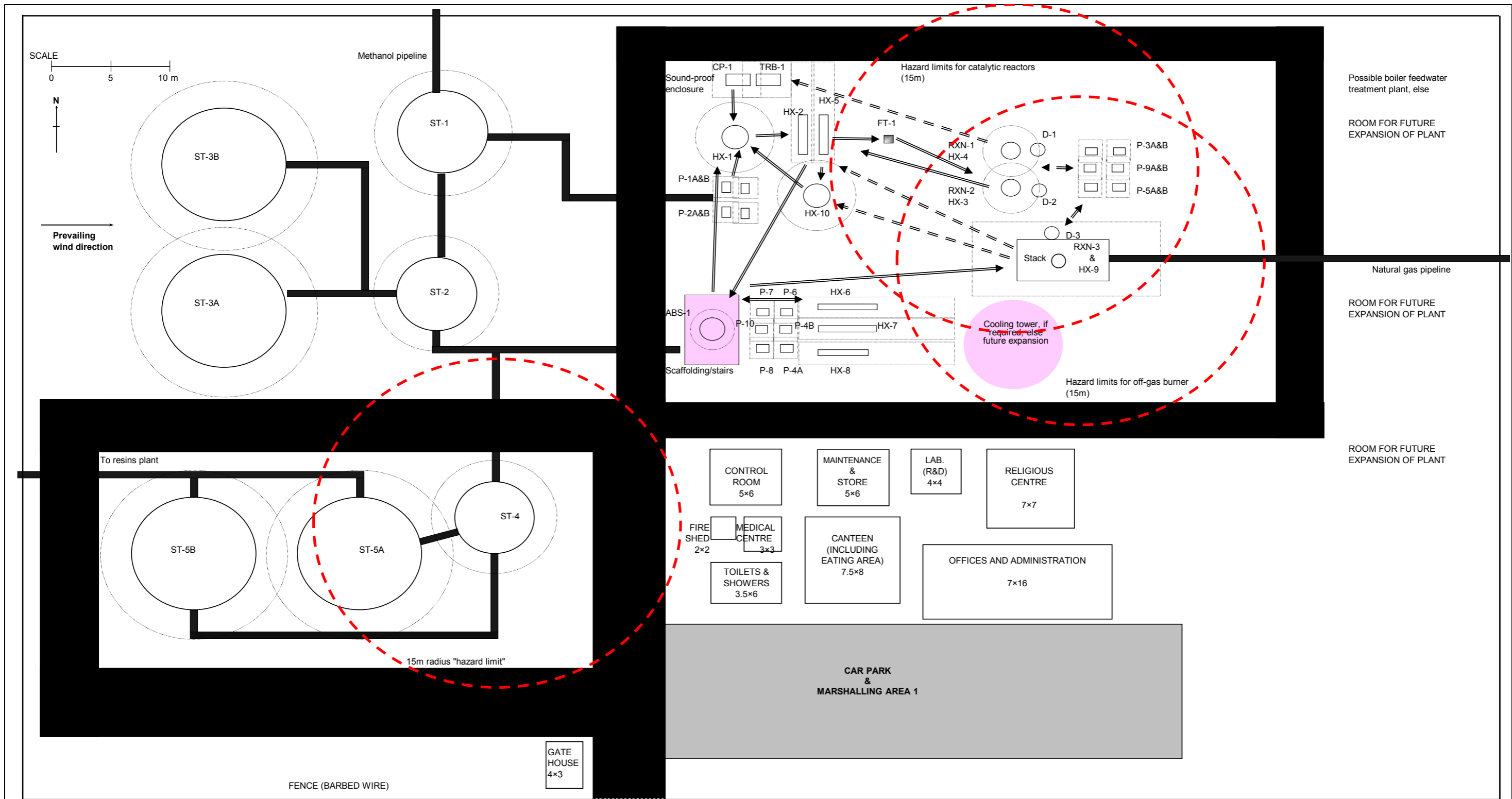
Designed by **HAI H. HUYNH**

TITLE : Pumping & Instrumentation Vaporizer (VAP-1)
PROJECT : Formaldehyde Bontang, Indonesia
VERSION : (A)
DRAWN BY : HAI H. HUYNH



INSTRUMENTATION	
RC	Ratio flow control
TPI	Temp. and pressure indicator
FIC	Flow indicator control
PI	Pressure indicator
FI	Flow indicator
LIC	Level indicator and control
LA	Level alarm
FA	Flame alarm
TI	Temperature indicator
INT	Interlock
ALARMS	
H	High alarm
L	Low alarm (& trip)
LINE SPECIFICATION	
A-BB-CCC-D-EEE	
A-	Pipe size (mm)
BB-	Fluid class
CCC-	Line number
D-	Design pressure (bar)
EEE-	Material class
EQUIPMENT ITEMS	
HX-1	Methanol evaporator
HX-5	Heater
HX-10	Heat exchanger
P-2	Recirculation pump
CONTROL VAVLES	
V-1	
V-2	
V-3	
V-4	
Designed by	HAI H. HUYNH
Revised by	DAVID I. VERRELLI

TITLE : Pumping & Instrumentation Vaporizer (VAP-1)
PROJECT : Formaldehyde Bontang, Indonesia
VERSION : (C)
DRAWN BY : HAI H. HUYNH



DESCRIPTION	FINAL	PLANT LAYOUT		
DATE	09/10/1999	GENERAL ARRANGEMENT DRAWING		
SCALE	<i>see legend</i>	OF MAIN FORMALDEHYDE PLANT		
NUMBER	1101	PLAN VIEW		
DRAWN BY	DV & ST	BY	DV,ST&MW	DATE
REVISION	"C"			11/10/1999
PROJECT	CHE4117 - FORMALDEHYDE PLANT LAYOUT			

