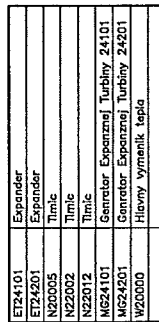


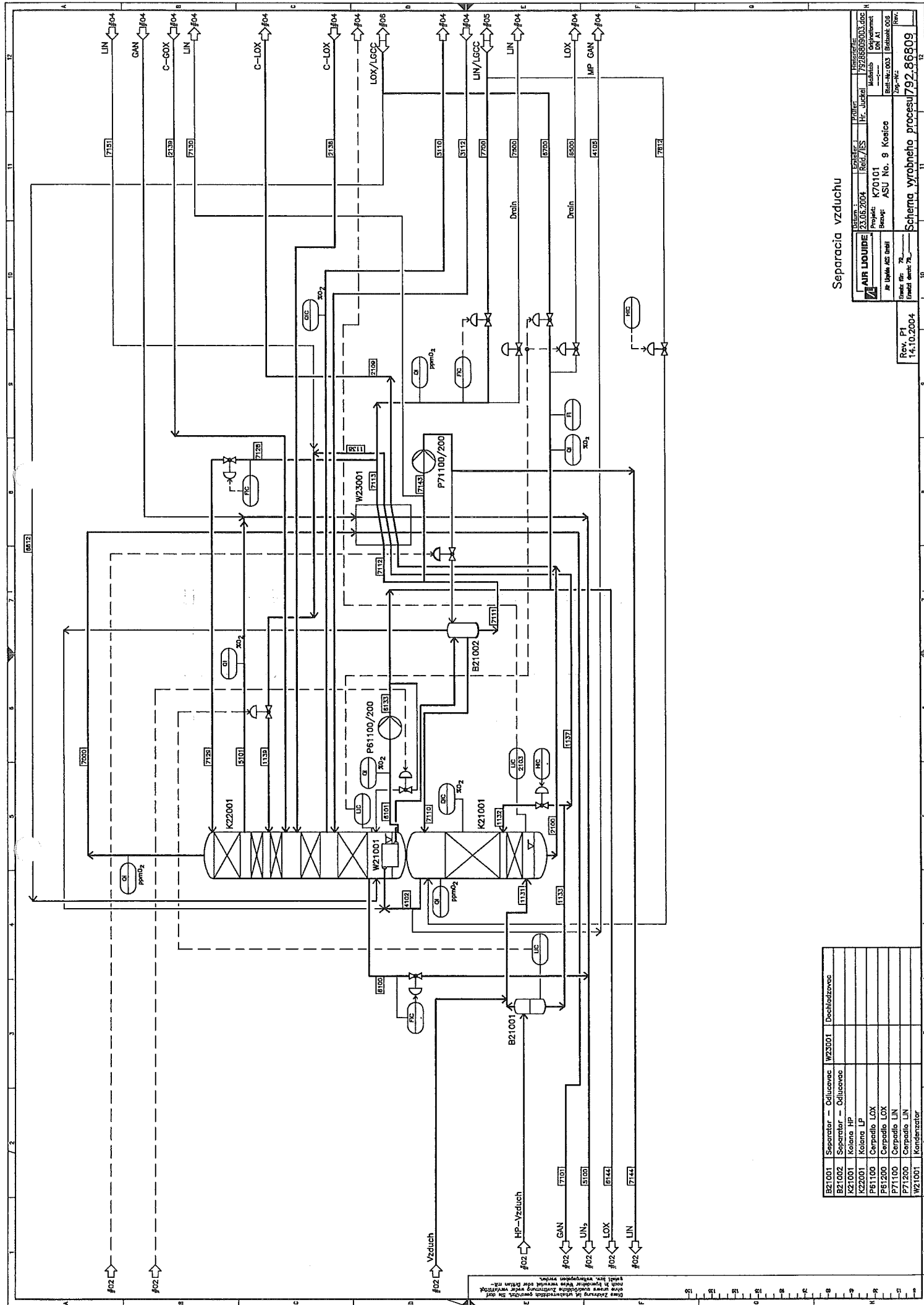
## 9. Vývojový diagram pocesu





## Hlavný výmeník tepla

[illegible]Rev. P1  
14.10.2004

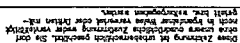


# Separacia vzduchu

Objekt:	7928809003.dwg	Projekt:	K70101	Revizie:	7928809003.dwg
Stavba:	7928809003.dwg	Stavba:	ASU No. 9 Koice	Stavba:	7928809003.dwg
Stavba:	7928809003.dwg	Stavba:	ASU No. 9 Koice	Stavba:	7928809003.dwg
Stavba:	7928809003.dwg	Stavba:	ASU No. 9 Koice	Stavba:	7928809003.dwg
Stavba:	7928809003.dwg	Stavba:	ASU No. 9 Koice	Stavba:	7928809003.dwg


Objekt	Stavba	Stavba	Stavba	Stavba	Stavba
B21001	Separacia vzduchu	W23001	Dochladzovacia		
K220001	Separacia vzduchu				
K220001	Separacia vzduchu				
P61100	Separacia vzduchu				
P61200	Separacia vzduchu				
P71100	Separacia vzduchu				
P71200	Separacia vzduchu				
W21001	Separacia vzduchu				

Príloha k projektu: 7928809003.dwg



K40001	Kolena CAR 1
K40002	Kolena CAR 2
K43001	Kolena čistilno orogaru
P40100	Cerpadlo LAR
W40001	Kondenzator
W43001	Odparivač
W43002	Kondenzator
B40001	Nadoba
B43002	Nadoba

Výroba Argonu

	<b>AIR LIQUIDE</b>	Datum: 23.03.2004	Ref: JES	Priloha: 1	Priloha: 2	Priloha: 3	Priloha: 4	Priloha: 5	Priloha: 6	Priloha: 7	Priloha: 8	Priloha: 9	Priloha: 10	Priloha: 11	Priloha: 12	Priloha: 13	Priloha: 14	Priloha: 15	Priloha: 16	Priloha: 17	Priloha: 18	Priloha: 19	Priloha: 20	Priloha: 21	Priloha: 22	Priloha: 23	Priloha: 24	Priloha: 25	Priloha: 26	Priloha: 27	Priloha: 28	Priloha: 29	Priloha: 30	Priloha: 31	Priloha: 32	Priloha: 33	Priloha: 34	Priloha: 35	Priloha: 36	Priloha: 37	Priloha: 38	Priloha: 39	Priloha: 40	Priloha: 41	Priloha: 42	Priloha: 43	Priloha: 44	Priloha: 45	Priloha: 46	Priloha: 47	Priloha: 48	Priloha: 49	Priloha: 50	Priloha: 51	Priloha: 52	Priloha: 53	Priloha: 54	Priloha: 55	Priloha: 56	Priloha: 57	Priloha: 58	Priloha: 59	Priloha: 60	Priloha: 61	Priloha: 62	Priloha: 63	Priloha: 64	Priloha: 65	Priloha: 66	Priloha: 67	Priloha: 68	Priloha: 69	Priloha: 70	Priloha: 71	Priloha: 72	Priloha: 73	Priloha: 74	Priloha: 75	Priloha: 76	Priloha: 77	Priloha: 78	Priloha: 79	Priloha: 80	Priloha: 81	Priloha: 82	Priloha: 83	Priloha: 84	Priloha: 85	Priloha: 86	Priloha: 87	Priloha: 88	Priloha: 89	Priloha: 90	Priloha: 91	Priloha: 92	Priloha: 93	Priloha: 94	Priloha: 95	Priloha: 96	Priloha: 97	Priloha: 98	Priloha: 99	Priloha: 100	Priloha: 101	Priloha: 102	Priloha: 103	Priloha: 104	Priloha: 105	Priloha: 106	Priloha: 107	Priloha: 108	Priloha: 109	Priloha: 110	Priloha: 111	Priloha: 112	Priloha: 113	Priloha: 114	Priloha: 115	Priloha: 116	Priloha: 117	Priloha: 118	Priloha: 119	Priloha: 120	Priloha: 121	Priloha: 122	Priloha: 123	Priloha: 124	Priloha: 125	Priloha: 126	Priloha: 127	Priloha: 128	Priloha: 129	Priloha: 130	Priloha: 131	Priloha: 132	Priloha: 133	Priloha: 134	Priloha: 135	Priloha: 136	Priloha: 137	Priloha: 138	Priloha: 139	Priloha: 140	Priloha: 141	Priloha: 142	Priloha: 143	Priloha: 144	Priloha: 145	Priloha: 146	Priloha: 147	Priloha: 148	Priloha: 149	Priloha: 150	Priloha: 151	Priloha: 152	Priloha: 153	Priloha: 154	Priloha: 155	Priloha: 156	Priloha: 157	Priloha: 158	Priloha: 159	Priloha: 160	Priloha: 161	Priloha: 162	Priloha: 163	Priloha: 164	Priloha: 165	Priloha: 166	Priloha: 167	Priloha: 168	Priloha: 169	Priloha: 170	Priloha: 171	Priloha: 172	Priloha: 173	Priloha: 174	Priloha: 175	Priloha: 176	Priloha: 177	Priloha: 178	Priloha: 179	Priloha: 180	Priloha: 181	Priloha: 182	Priloha: 183	Priloha: 184	Priloha: 185	Priloha: 186	Priloha: 187	Priloha: 188	Priloha: 189	Priloha: 190	Priloha: 191	Priloha: 192	Priloha: 193	Priloha: 194	Priloha: 195	Priloha: 196	Priloha: 197	Priloha: 198	Priloha: 199	Priloha: 200	Priloha: 201	Priloha: 202	Priloha: 203	Priloha: 204	Priloha: 205	Priloha: 206	Priloha: 207	Priloha: 208	Priloha: 209	Priloha: 210	Priloha: 211	Priloha: 212	Priloha: 213	Priloha: 214	Priloha: 215	Priloha: 216	Priloha: 217	Priloha: 218	Priloha: 219	Priloha: 220	Priloha: 221	Priloha: 222	Priloha: 223	Priloha: 224	Priloha: 225	Priloha: 226	Priloha: 227	Priloha: 228	Priloha: 229	Priloha: 230	Priloha: 231	Priloha: 232	Priloha: 233	Priloha: 234	Priloha: 235	Priloha: 236	Priloha: 237	Priloha: 238	Priloha: 239	Priloha: 240	Priloha: 241	Priloha: 242	Priloha: 243	Priloha: 244	Priloha: 245	Priloha: 246	Priloha: 247	Priloha: 248	Priloha: 249	Priloha: 250	Priloha: 251	Priloha: 252	Priloha: 253	Priloha: 254	Priloha: 255	Priloha: 256	Priloha: 257	Priloha: 258	Priloha: 259	Priloha: 260	Priloha: 261	Priloha: 262	Priloha: 263	Priloha: 264	Priloha: 265	Priloha: 266	Priloha: 267	Priloha: 268	Priloha: 269	Priloha: 270	Priloha: 271	Priloha: 272	Priloha: 273	Priloha: 274	Priloha: 275	Priloha: 276	Priloha: 277	Priloha: 278	Priloha: 279	Priloha: 280	Priloha: 281	Priloha: 282	Priloha: 283	Priloha: 284	Priloha: 285	Priloha: 286	Priloha: 287	Priloha: 288	Priloha: 289	Priloha: 290	Priloha: 291	Priloha: 292	Priloha: 293	Priloha: 294	Pr
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Rev. P1  
14.10.2004





AIR LIQUIDE			Process Specification										Project: K70101 ASU No.9 Kosice		
Air Liquide AGS GmbH			According to PFD No: 792.86809; Rev. P1			Case:			Rev.: 2			Date: 14/10/04			
Design Conditions:			Ambient Temperature [°C]: 12			Ambient Pressure [bar a]: 1.013			Humidity: 65%			Cooling Water Temperature [°C]: 16			
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	Composition (mol/mol)				Density	Remarks		
		Nm³/h	kg/h	bar(a)	K			N₂	Ar	O₂	H₂	H₂O	kg/m3		
Normal	1	H2O	1700000	4	289	Liquid						1	999.1		
LOX	1	H2O	1700000	4	289	Liquid						1	999.1		
LIN	1	H2O	1700000	4	289	Liquid						1	999.1		
MaxGOX	1	H2O	1700000	4	289	Liquid						1	999.1		
MinGOX1	1	H2O	1700000	4	289	Liquid						1	999.1		
MinGOX2	1	H2O	1700000	4	289	Liquid						1	999.1		
Normal	9	H2O	1700000	2	299	Liquid						1	997.0		
LOX	9	H2O	1700000	2	299	Liquid						1	997.0		
LIN	9	H2O	1700000	2	299	Liquid						1	997.0		
MaxGOX	9	H2O	1700000	2	299	Liquid						1	997.0		
MinGOX1	9	H2O	1700000	2	299	Liquid						1	997.0		
MinGOX2	9	H2O	1700000	2	299	Liquid						1	997.0		
Normal	80	H2O	210000	4	289.1	Liquid						1	999.1		
LOX	80	H2O	210000	4	289.1	Liquid						1	999.1		
LIN	80	H2O	210000	4	289.1	Liquid						1	999.1		
MaxGOX	80	H2O	210000	4	289.1	Liquid						1	999.1		
MinGOX1	80	H2O	210000	4	289.1	Liquid						1	999.1		
MinGOX2	80	H2O	210000	4	289.1	Liquid						1	999.1		
Normal	81	H2O	210000	8	289.2	Liquid						1	999.2		
LOX	81	H2O	210000	8	289.2	Liquid						1	999.2		
LIN	81	H2O	210000	8	289.2	Liquid						1	999.2		
MaxGOX	81	H2O	210000	8	289.2	Liquid						1	999.2		
MinGOX1	81	H2O	210000	8	289.2	Liquid						1	999.2		
MinGOX2	81	H2O	210000	8	289.2	Liquid						1	999.2		
Normal	82	H2O	29654	9	284.8	Liquid						1	999.8		
LOX	82	H2O	29654	9	285.2	Liquid						1	999.8		
LIN	82	H2O	29689	9	285.7	Liquid						1	999.7		
MaxGOX	82	H2O	29691	9	285.3	Liquid						1	999.8		
MinGOX1	82	H2O	19920	9	288.1	Liquid						1	999.4		
MinGOX2	82	H2O	19931	9	288.1	Liquid						1	999.4		
Normal	89	H2O	240095	5.87	300	Liquid						1	996.9		
LOX	89	H2O	240091	5.83	300	Liquid						1	996.9		
LIN	89	H2O	240123	5.77	300	Liquid						1	996.9		
MaxGOX	89	H2O	240134	5.81	300.1	Liquid						1	996.8		
MinGOX1	89	H2O	230234	5.53	297.5	Liquid						1	997.5		
MinGOX2	89	H2O	230244	5.55	297.5	Liquid						1	997.5		



AIR LIQUIDE				Process Specification										Project: K70101 ASU No.9 Kosice					
Air Liquide AGS GmbH				According to PFD No: 792.86809; Rev. P1				Case:		Rev.: 2									
Design Conditions:				Ambient Temperature [°C]: 12				Ambient Pressure [bar a]: 1.013				Humidity: 65%				Cooling Water Temperature [°C]: 16			
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	Composition (mol/mol)				Density	Remarks						
		Nm³/h	kg/h	bar(a)	K			N₂	Ar	O₂	H₂	H₂O	kg/m3						
Normal	91	H2O	30000	4	289.1	Liquid						1	999.1						
LOX	91	H2O	30000	4	289.1	Liquid						1	999.1						
LIN	91	H2O	30000	4	289.1	Liquid						1	999.1						
MaxGOX	91	H2O	30000	4	289.1	Liquid						1	999.1						
MinGOX1	91	H2O	20000	4	289.1	Liquid						1	999.1						
MinGOX2	91	H2O	20000	4	289.1	Liquid						1	999.1						
Normal	98	H2O	45009	1.04	283.6	Liquid						1	999.6						
LOX	98	H2O	45009	1.04	284	Liquid						1	999.6						
LIN	98	H2O	45009	1.04	284.6	Liquid						1	999.5						
MaxGOX	98	H2O	45009	1.04	284.1	Liquid						1	999.6						
MinGOX1	98	H2O	44993	1.04	287.9	Liquid						1	999.1						
MinGOX2	98	H2O	44993	1.04	287.9	Liquid						1	999.1						
Normal	119	H2O	1900	11	553	Vapor						1	4.440						
LOX	119	H2O	1900	11	553	Vapor						1	4.440						
LIN	119	H2O	1900	11	553	Vapor						1	4.440						
MaxGOX	119	H2O	1900	11	553	Vapor						1	4.440						
MinGOX1	119	H2O	1900	11	553	Vapor						1	4.440						
MinGOX2	119	H2O	1900	11	553	Vapor						1	4.440						
Normal	601	H2O	1900	1	353	Liquid						1	971.7						
LOX	601	H2O	1900	1	353	Liquid						1	971.7						
LIN	601	H2O	1900	1	353	Liquid						1	971.7						
MaxGOX	601	H2O	1900	1	353	Liquid						1	971.7						
MinGOX1	601	H2O	1900	1	353	Liquid						1	971.7						
MinGOX2	601	H2O	1900	1	353	Liquid						1	971.7						
Normal	1000	AIR	124940	1	285.1	Vapor		0.774	0.009	0.208		0.009	1.218						
LOX	1000	AIR	124914	1	285.1	Vapor		0.774	0.009	0.208		0.009	1.218						
LIN	1000	AIR	125633	1	285.1	Vapor		0.774	0.009	0.208		0.009	1.218						
MaxGOX	1000	AIR	126848	1	285.1	Vapor		0.774	0.009	0.208		0.009	1.218						
MinGOX1	1000	AIR	94005	1	285.1	Vapor		0.774	0.009	0.208		0.009	1.218						
MinGOX2	1000	AIR	94050	1	285.1	Vapor		0.774	0.009	0.208		0.009	1.218						
Normal	1019	AIR		5.87	368.8	Vapor		0.775	0.009	0.208		0.008	5.509	max. 100000 Nm3/h					
LOX	1019	AIR		5.83	368.6	Vapor		0.775	0.009	0.208		0.008	5.484	max. 100000 Nm3/h					
LIN	1019	AIR		5.77	368.1	Vapor		0.775	0.009	0.208		0.008	5.431	max. 100000 Nm3/h					
MaxGOX	1019	AIR		5.81	368.4	Vapor		0.775	0.009	0.208		0.008	5.461	max. 100000 Nm3/h					
MinGOX1	1019	AIR		5.31	364.5	Vapor		0.774	0.009	0.208		0.009	5.048	max. 100000 Nm3/h					
MinGOX2	1019	AIR		5.34	364.7	Vapor		0.774	0.009	0.208		0.009	5.074	max. 100000 Nm3/h					

AIR LIQUIDE			Process Specification										Project: K70101 ASU No.9 Kosice Rev.: 2 Date: 14/10/04 By: TV / JJ				
Air Liquide AGS GmbH			According to PFD No: 792.86809; Rev. P1		Case:		Ambient Pressure [bar a]: 1.013		Humidity: 65%		Cooling Water Temperature [°C]: 16						
Design Conditions:			Ambient Temperature [°C]: 12		Temp.		Phase		Vapor Fraction		Composition (mol/mol)			Density		Remarks	
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.						N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	kg/m3	
Normal	1020	AIR	96937	5.87	368.8	Vapor					0.775	0.009	0.208		0.008	5.509	
LOX	1020	AIR	96920	5.83	368.6	Vapor					0.775	0.009	0.208		0.008	5.484	
LIN	1020	AIR	97484	5.77	368.1	Vapor					0.775	0.009	0.208		0.008	5.431	
MaxGOX	1020	AIR	98423	5.81	368.4	Vapor					0.775	0.009	0.208		0.008	5.461	
MinGOX1	1020	AIR	72959	5.53	366.2	Vapor					0.774	0.009	0.208		0.008	5.232	
MinGOX2	1020	AIR	72992	5.55	366.4	Vapor					0.775	0.009	0.208		0.008	5.249	
Normal	1030	AIR	96400	5.82	287	Vapor					0.779	0.009	0.209		0.003	7.077	
LOX	1030	AIR	96388	5.78	287.3	Vapor					0.779	0.009	0.209		0.003	7.021	
LIN	1030	AIR	96954	5.72	287.7	Vapor					0.779	0.009	0.209		0.003	6.938	
MaxGOX	1030	AIR	97884	5.75	287.4	Vapor					0.779	0.009	0.209		0.003	6.982	
MinGOX1	1030	AIR	72579	5.5	288.6	Vapor					0.778	0.009	0.209		0.004	6.650	
MinGOX2	1030	AIR	72613	5.52	288.6	Vapor					0.778	0.009	0.209		0.004	6.674	
Normal	1041	AIR	18000	5.87	296.1	Vapor					0.781	0.009	0.21			6.915	only for start-up
LOX	1041	AIR	18000	5.83	296.1	Vapor					0.781	0.009	0.21			6.868	only for start-up
LIN	1041	AIR	18000	5.77	296.1	Vapor					0.781	0.009	0.21			6.797	only for start-up
MaxGOX	1041	AIR	18000	5.81	296.1	Vapor					0.781	0.009	0.21			6.845	only for start-up
MinGOX1	1041	AIR	18000	5.31	296.1	Vapor					0.781	0.009	0.21			6.255	only for start-up
MinGOX2	1041	AIR	18000	5.34	296.1	Vapor					0.781	0.009	0.21			6.290	only for start-up
Normal	1100	AIR	95378	5.62	296.1	Vapor					0.781	0.009	0.210			6.62	
LOX	1100	AIR	95358	5.58	296.1	Vapor					0.781	0.009	0.210			6.57	
LIN	1100	AIR	95911	5.51	296.1	Vapor					0.781	0.009	0.210			6.49	
MaxGOX	1100	AIR	96851	5.54	296.1	Vapor					0.781	0.009	0.210			6.53	
MinGOX1	1100	AIR	71574	5.36	296.1	Vapor					0.781	0.009	0.210			6.31	
MinGOX2	1100	AIR	71608	5.38	296.1	Vapor					0.781	0.009	0.210			6.34	
Normal	1102	AIR	51468	5.62	296.1	Vapor					0.781	0.009	0.210			6.62	
LOX	1102	AIR	39325	5.58	296.1	Vapor					0.781	0.009	0.210			6.57	
LIN	1102	AIR	36837	5.51	296.1	Vapor					0.781	0.009	0.210			6.49	
MaxGOX	1102	AIR	51874	5.54	296.1	Vapor					0.781	0.009	0.210			6.53	
MinGOX1	1102	AIR	22686	5.36	296.1	Vapor					0.781	0.009	0.210			6.31	
MinGOX2	1102	AIR	36445	5.38	296.1	Vapor					0.781	0.009	0.210			6.34	
Normal	1103	AIR	51468	5.47	106	Vapor					0.781	0.009	0.210			20.06	
LOX	1103	AIR	39325	5.49	100.1	Vapor					0.781	0.009	0.210			21.89	
LIN	1103	AIR	36837	5.43	102.2	Vapor					0.781	0.009	0.210			20.96	
MaxGOX	1103	AIR	51874	5.39	110.4	Vapor					0.781	0.009	0.210			18.67	
MinGOX1	1103	AIR	22686	5.32	99.5	Vapor					0.781	0.009	0.210			21.30	
MinGOX2	1103	AIR	36445	5.29	106.2	Vapor					0.781	0.009	0.210			19.27	

<div>AIR LIQUIDE</div> <div>Air Liquide AGS GmbH</div>				Process Specification										Project: K70101 ASU No.9 Kosice			
Design Conditions:				According to PFD No: 792.86809; Rev. P1				Case:				Rev.: 2					
Ambient Temperature [°C]: 12				Ambient Pressure [bar a]: 1.013				Humidity: 65%				Date: 14/10/04					
												By: TV / JJ					
												Cooling Water Temperature [°C]: 16					
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	Composition (mol/mol)				Density	Remarks				
		Nm³/h	kg/h	bar(a)	K			N₂	Ar	O₂	H₂	H₂O					
Normal	1104	LAIR	35140	56.83	106	Liquid		0.781	0.009	0.210			752				
LOX	1104	LAIR	38998	56.77	100.1	Liquid		0.781	0.009	0.210			783				
LIN	1104	LAIR	35204	56.74	102.2	Liquid		0.781	0.009	0.210			772				
MaxGOX	1104	LAIR	44608	56.8	110.4	Liquid		0.781	0.009	0.210			728				
MinGOX1	1104	LAIR	24118	54.82	99.5	Liquid		0.781	0.009	0.210			785				
MinGOX2	1104	LAIR	27793	54.88	106.2	Liquid		0.781	0.009	0.210			750				
Normal	1110	AIR	43910	5.62	296.1	Vapor		0.781	0.009	0.210			6.62				
LOX	1110	AIR	56033	5.58	296.1	Vapor		0.781	0.009	0.210			6.57				
LIN	1110	AIR	59074	5.51	296.1	Vapor		0.781	0.009	0.210			6.49				
MaxGOX	1110	AIR	44978	5.54	296.1	Vapor		0.781	0.009	0.210			6.53				
MinGOX1	1110	AIR	48888	5.36	296.1	Vapor		0.781	0.009	0.210			6.31				
MinGOX2	1110	AIR	35163	5.38	296.1	Vapor		0.781	0.009	0.210			6.34				
Normal	1119	AIR	43910	57	298.1	Vapor		0.781	0.009	0.210			67.21				
LOX	1119	AIR	56033	57	298.1	Vapor		0.781	0.009	0.210			67.21				
LIN	1119	AIR	59074	57	298.1	Vapor		0.781	0.009	0.210			67.21				
MaxGOX	1119	AIR	44978	57	298.1	Vapor		0.781	0.009	0.210			67.21				
MinGOX1	1119	AIR	48888	55	298.1	Vapor		0.781	0.009	0.210			64.84				
MinGOX2	1119	AIR	35163	55	298.1	Vapor		0.781	0.009	0.210			64.84				
Normal	1131	AIR	63930	82522	5.47	105	Vapor	0.788	0.009	0.203			20.30				
LOX	1131	AIR	66195	85503	5.49	99.4	Vapor	0.783	0.009	0.208			22.12				
LIN	1131	AIR	62851	81159	5.43	100.8	Vapor	0.785	0.009	0.206			21.37				
MaxGOX	1131	AIR	59496	76725	5.39	109.3	Vapor	0.794	0.009	0.197			18.88				
MinGOX1	1131	AIR	48187	62242	5.32	102.7	Vapor	0.783	0.009	0.208			20.32				
MinGOX2	1131	AIR	46902	60533	5.29	105.2	Vapor	0.789	0.009	0.202			19.50				
Normal	1132	LAIR	15644	20253	5.47	97.4	Liquid	0.768	0.010	0.222			780				
LOX	1132	LAIR	14501	18749	5.49	97.4	Liquid	0.777	0.009	0.214			777				
LIN	1132	LAIR	13160	17023	5.43	97.3	Liquid	0.773	0.010	0.217			779				
MaxGOX	1132	LAIR	14878	19283	5.4	97.3	Liquid	0.760	0.010	0.230			783				
MinGOX1	1132	LAIR	11613	15015	5.32	97	Liquid	0.777	0.009	0.214			779				
MinGOX2	1132	LAIR	9819	12713	5.3	97	Liquid	0.767	0.010	0.223			782				
Normal	1133	LAIR	31288	40505	5.47	97.4	Liquid	0.768	0.01	0.222			780				
LOX	1133	LAIR	29003	37499	5.49	97.4	Liquid	0.777	0.009	0.214			777				
LIN	1133	LAIR	32900	42558	5.43	97.3	Liquid	0.773	0.01	0.217			779				
MaxGOX	1133	LAIR	37196	48206	5.4	97.3	Liquid	0.76	0.01	0.23			783				
MinGOX1	1133	LAIR	23227	30029	5.32	97	Liquid	0.777	0.009	0.214			779				
MinGOX2	1133	LAIR	24547	31783	5.3	97	Liquid	0.767	0.010	0.223			782				

AIR LIQUIDE		Process Specification										Project: K70101 ASU No.9 Kosice Rev.: 2 Date: 14/10/04 By: TV / JJ			
Air Liquide AGS GmbH		According to PFD No.: 792.86809; Rev. P1			Case:		Humidity: 65%			Cooling Water Temperature [°C]: 16					
Design Conditions:		Ambient Temperature [°C]: 12			Ambient Pressure [bar a]: 1.013			Composition (mol/mol)			Density		Remarks		
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	Density	Remarks	
		Nm <sup>3</sup> /h	kg/h	bar(a)	K			N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	kg/m3		
Normal	1137 LAIR	15644	20253	5.47	97.4	Liquid		0.768	0.010	0.222			780		
LOX	1137 LAIR	14501	18749	5.49	97.4	Liquid		0.777	0.009	0.214			777		
LIN	1137 LAIR	19740	25535	5.43	97.3	Liquid		0.773	0.010	0.217			779		
MaxGOX	1137 LAIR	22317	28924	5.4	97.3	Liquid		0.760	0.010	0.230			783		
MinGOX1	1137 LAIR	11613	15015	5.32	97	Liquid		0.777	0.009	0.214			779		
MinGOX2	1137 LAIR	14728	19070	5.3	97	Liquid		0.767	0.010	0.223			782		
Normal	1138 LAIR	15644	20253	5.47	88.1	Liquid		0.768	0.010	0.222			829		
LOX	1138 LAIR	14501	18749	5.49	87.9	Liquid		0.777	0.009	0.214			827		
LIN	1138 LAIR	19740	25535	5.43	89.1	Liquid		0.773	0.010	0.217			823		
MaxGOX	1138 LAIR	22317	28924	5.4	89.6	Liquid		0.760	0.010	0.230			824		
MinGOX1	1138 LAIR	11613	15015	5.32	89	Liquid		0.777	0.009	0.214			821		
MinGOX2	1138 LAIR	14728	19070	5.3	89	Liquid		0.767	0.010	0.223			825		
Normal	1139 LAIR	15654	20265	1.32	81.5	Mixed	6.7%	0.768	0.010	0.222			81.11		
LOX	1139 LAIR	14511	18761	1.32	81.4	Mixed	6.5%	0.777	0.009	0.214			83.31		
LIN	1139 LAIR	19749	25546	1.31	81.4	Mixed	7.8%	0.773	0.010	0.217			70.13		
MaxGOX	1139 LAIR	22326	28935	1.31	81.5	Mixed	8.2%	0.760	0.010	0.230			67.00		
MinGOX1	1139 LAIR	11621	15025	1.31	81.4	Mixed	7.7%	0.777	0.009	0.214			70.93		
MinGOX2	1139 LAIR	14736	19080	1.31	81.4	Mixed	7.7%	0.767	0.010	0.223			70.98		
Normal	1160 AIR	8400	10853	56.85	182	Vapor		0.781	0.009	0.210			133		
LOX	1160 AIR	25480	32922	56.65	182	Vapor		0.781	0.009	0.210			132		
LIN	1160 AIR	23500	30363	56.65	182	Vapor		0.781	0.009	0.210			132		
MaxGOX	1160 AIR			56.87	182	Vapor		0.781	0.009	0.210			133		
MinGOX1	1160 AIR	24400	31526	54.69	190	Vapor		0.781	0.009	0.210			117		
MinGOX2	1160 AIR	7000	9044	54.9	180	Vapor		0.781	0.009	0.210			130		
Normal	1161 AIR	8400	10853	5.5	99.5	Mixed	99.5%	0.781	0.009	0.210			22.17		
LOX	1161 AIR	25480	32922	5.56	99.6	Mixed	98.9%	0.781	0.009	0.210			22.54		
LIN	1161 AIR	23500	30363	5.49	99.4	Mixed	98.8%	0.781	0.009	0.210			22.29		
MaxGOX	1161 AIR			5.39	109.9	Vapor		0.781	0.009	0.210			18.78		
MinGOX1	1161 AIR	24400	31526	5.38	104.6	Vapor		0.781	0.009	0.210			20.06		
MinGOX2	1161 AIR	7000	9044	5.32	99.1	Vapor		0.781	0.009	0.210			21.43		
Normal	1162 AIR	8400	10853	56.85	182	Vapor		0.781	0.009	0.210			133		
LOX	1162 AIR	12740	16461	56.65	182	Vapor		0.781	0.009	0.210			132		
LIN	1162 AIR	11750	15182	56.65	182	Vapor		0.781	0.009	0.210			132		
MaxGOX	1162 AIR			56.87	182	Vapor		0.781	0.009	0.210			133		
MinGOX1	1162 AIR	12200	15763	54.69	190	Vapor		0.781	0.009	0.210			117		
MinGOX2	1162 AIR	7000	9044	54.9	180	Vapor		0.781	0.009	0.210			130		

<div><div><div></div><div>AIR LIQUIDE</div></div><div>Air Liquide AGS GmbH</div></div>				<div>Process Specification</div>										<div>Project: K70101 ASU No.9 Kosice Rev.: 2 Date: 14/10/04 By: TV / JJ</div>			
Design Conditions:				According to PFD No.: 792.86809; Rev. P1		Case:		Ambient Pressure [bar a]: 1.013		Humidity: 65%		Cooling Water Temperature [°C]: 16					
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	Composition (mol/mol)				Density	Remarks				
		Nm³/h	kg/h	bar(a)	K			N₂	Ar	O₂	H₂	H₂O	kg/m3				
Normal	1163	AIR	10853	5.5	99.5	Mixed	99.5%	0.781	0.009	0.210			22.17				
LOX	1163	AIR	16461	5.56	99.6	Mixed	98.9%	0.781	0.009	0.210			22.54				
LIN	1163	AIR	15182	5.49	99.4	Mixed	98.8%	0.781	0.009	0.210			22.29				
MaxGOX	1163	AIR		5.39	109.9	Vapor		0.781	0.009	0.210			18.78				
MinGOX1	1163	AIR	15763	5.38	104.6	Vapor		0.781	0.009	0.210			20.06				
MinGOX2	1163	AIR	9044	5.32	99.1	Vapor		0.781	0.009	0.210			21.43				
Normal	1164	AIR		56.85	182	Vapor		0.781	0.009	0.210			133				
LOX	1164	AIR	16461	56.65	182	Vapor		0.781	0.009	0.210			132				
LIN	1164	AIR	15182	56.65	182	Vapor		0.781	0.009	0.210			132				
MaxGOX	1164	AIR		56.87	182	Vapor		0.781	0.009	0.210			133				
MinGOX1	1164	AIR	15763	54.69	190	Vapor		0.781	0.009	0.210			117				
MinGOX2	1164	AIR		54.9	180	Vapor		0.781	0.009	0.210			130				
Normal	1165	AIR		5.5	99.3	Mixed	94.5%	0.781	0.009	0.210			23.36				
LOX	1165	AIR	16461	5.56	99.6	Mixed	98.9%	0.781	0.009	0.210			22.54				
LIN	1165	AIR	15182	5.49	99.4	Mixed	98.8%	0.781	0.009	0.210			22.29				
MaxGOX	1165	AIR		5.39	109.9	Vapor		0.781	0.009	0.210			18.78				
MinGOX1	1165	AIR	15763	5.38	104.6	Vapor		0.781	0.009	0.210			20.06				
MinGOX2	1165	AIR		5.32	98.9	Mixed	95.6%	0.781	0.009	0.210			22.36				
Normal	2100	CLOX	60992	5.46	98.9	Liquid		0.628	0.015	0.357			822				
LOX	2100	CLOX	62434	5.48	99	Liquid		0.628	0.015	0.357			821				
LIN	2100	CLOX	58060	5.42	98.8	Liquid		0.625	0.016	0.359			823				
MaxGOX	2100	CLOX	56053	5.39	98.7	Liquid		0.628	0.015	0.357			823				
MinGOX1	2100	CLOX	45802	5.31	98.6	Liquid		0.624	0.016	0.360			825				
MinGOX2	2100	CLOX	42322	5.29	98.6	Liquid		0.619	0.016	0.365			827				
Normal	2109	CLOX	60992	5.46	96.7	Liquid		0.628	0.015	0.357			834				
LOX	2109	CLOX	62434	5.48	96.7	Liquid		0.628	0.015	0.357			834				
LIN	2109	CLOX	58060	5.42	97.1	Liquid		0.625	0.016	0.359			833				
MaxGOX	2109	CLOX	56053	5.39	97.2	Liquid		0.628	0.015	0.357			831				
MinGOX1	2109	CLOX	45802	5.31	95.9	Liquid		0.624	0.016	0.360			840				
MinGOX2	2109	CLOX	42322	5.29	96.2	Liquid		0.619	0.016	0.365			840				
Normal	2138	CLOX	9950	1.38	85.6	Liquid		0.381	0.020	0.599			985				
LOX	2138	CLOX	10894	1.38	85.6	Liquid		0.387	0.020	0.593			983				
LIN	2138	CLOX	11222	1.37	85.4	Liquid		0.392	0.020	0.588			982				
MaxGOX	2138	CLOX	9871	1.37	85.5	Liquid		0.387	0.020	0.593			983				
MinGOX1	2138	CLOX	8462	1.37	85.5	Liquid		0.387	0.020	0.593			983				
MinGOX2	2138	CLOX	5812	1.37	85.8	Liquid		0.359	0.020	0.620			993				

<div><div><div>AIR LIQUIDE</div><div>AIR LIQUIDE AGS GmbH</div></div></div>				Process Specification				Project: K70101 ASU No.9 Kosice Rev.: 2 Date: 14/10/04 By: TV / JJ					
Design Conditions:				According to PFD No: 792.86809; Rev. P1		Case:		Humidity: 65% Cooling Water Temperature [°C]: 16					
Ambient Temperature [°C]: 12				Ambient Pressure [bar a]: 1.013									
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	Composition (mol/mol)				Density	Remarks
		Nm³/h	kg/h	bar(a)	K			N₂	Ar	O₂	H₂	H₂O	
Normal	2139	CGOX	36202	1.38	85.6	Vapor		0.695	0.014	0.290			5.98
LOX	2139	CGOX	36353	1.38	85.6	Vapor		0.700	0.014	0.286			5.98
LIN	2139	CGOX	32697	1.37	85.4	Vapor		0.705	0.014	0.281			5.94
MaxGOX	2139	CGOX	32545	1.37	85.5	Vapor		0.701	0.014	0.285			5.94
MinGOX1	2139	CGOX	26179	1.37	85.5	Vapor		0.701	0.014	0.285			5.94
MinGOX2	2139	CGOX	26174	1.37	85.8	Vapor		0.677	0.015	0.309			5.94
Normal	3110	GOX	26820	1.35	92.5	Vapor			0.105	0.895			6.02
LOX	3110	GOX	26820	1.35	92.5	Vapor			0.107	0.893			6.02
LIN	3110	GOX	23760	1.34	92.4	Vapor			0.100	0.900			5.97
MaxGOX	3110	GOX	23760	1.34	92.4	Vapor			0.098	0.902			5.97
MinGOX1	3110	GOX	19440	1.34	92.4	Vapor			0.107	0.893			5.98
MinGOX2	3110	GOX	19800	1.33	92.4	Vapor			0.104	0.896			5.93
Normal	3111	LOX	26075	1.25	91.7	Liquid			0.080	0.920			1154
LOX	3111	LOX	26075	1.25	91.7	Liquid			0.082	0.918			1154
LIN	3111	LOX	23100	1.25	91.7	Liquid			0.074	0.926			1152
MaxGOX	3111	LOX	23100	1.25	91.7	Liquid			0.073	0.927			1152
MinGOX1	3111	LOX	18900	1.23	91.5	Liquid			0.082	0.918			1155
MinGOX2	3111	LOX	19250	1.23	91.5	Liquid			0.078	0.922			1154
Normal	3112	LOX	26075	8	92.2	Liquid			0.080	0.920			1153
LOX	3112	LOX	26075	8	92.2	Liquid			0.082	0.918			1153
LIN	3112	LOX	23100	8	92.2	Liquid			0.074	0.926			1151
MaxGOX	3112	LOX	23100	8	92.2	Liquid			0.073	0.927			1151
MinGOX1	3112	LOX	18900	8	92	Liquid			0.082	0.918			1154
MinGOX2	3112	LOX	19250	8	92	Liquid			0.078	0.922			1153
Normal	3118	GAR	28224	1.15	88.3	Vapor			1.000				6.50
LOX	3118	GAR	28222	1.15	88.3	Vapor			1.000				6.50
LIN	3118	GAR	25006	1.15	88.3	Vapor			1.000				6.50
MaxGOX	3118	GAR	25006	1.15	88.3	Vapor			1.000				6.50
MinGOX1	3118	GAR	20472	1.15	88.3	Vapor			1.000				6.50
MinGOX2	3118	GAR	20854	1.15	88.3	Vapor			1.000				6.50
Normal	3119	LAR	745	1.15	88.3	Liquid			1.000				1386
LOX	3119	LAR	745	1.15	88.3	Liquid			1.000				1386
LIN	3119	LAR	660	1.15	88.3	Liquid			1.000				1386
MaxGOX	3119	LAR	660	1.15	88.3	Liquid			1.000				1386
MinGOX1	3119	LAR	540	1.15	88.3	Liquid			1.000				1386
MinGOX2	3119	LAR	550	1.15	88.3	Liquid			1.000				1386

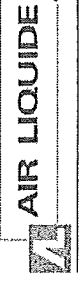
AIR LIQUIDE		Process Specification										Project: K70101 ASU No.9 Kosice Rev.: 2 Date: 14/10/04 By: TV / JJ						
Air Liquide AGS GmbH		According to PFD No.: 792.86809; Rev. P1		Case:		Ambient Pressure [bar a]: 1.013		Humidity: 65%		Cooling Water Temperature [°C]: 16								
Design Conditions:		Ambient Temperature [°C]: 12		Pres.		Temp.		Phase		Vapor Fraction		Composition (mol/mol)		Density		Remarks		
Case	Stream	Normal Flow	Mass Flow	kg/h	bar(a)	K						N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	kg/m3	
Normal	3138 CGAR	610	1083	1.5	90.9	Vapor						0.014	0.986				8.26	
LOX	3138 CGAR	611	1080	1.5	90.9	Vapor						0.025	0.975				8.23	
LIN	3138 CGAR	541	963	1.5	91	Vapor						0.005	0.995				8.27	
MaxGOX	3138 CGAR	541	963	1.5	91	Vapor						0.005	0.995				8.27	
MinGOX1	3138 CGAR	443	790	1.5	91	Vapor						0.004	0.996				8.28	
MinGOX2	3138 CGAR	452	805	1.5	91	Vapor						0.004	0.996				8.28	
Normal	3139 CLAR	608	1080	1.5	90.7	Liquid						0.013	0.987				1360	
LOX	3139 CLAR	609	1077	1.5	90.5	Liquid						0.025	0.975				1350	
LIN	3139 CLAR	539	959	1.5	90.9	Liquid						0.005	0.995				1366	
MaxGOX	3139 CLAR	539	960	1.5	90.9	Liquid						0.005	0.995				1366	
MinGOX1	3139 CLAR	441	786	1.5	90.9	Liquid						0.004	0.996				1367	
MinGOX2	3139 CLAR	450	801	1.5	90.9	Liquid						0.004	0.996				1367	
Normal	3156 CGAR	2	3.5	1.5	90.7	Vapor						0.038	0.962				8.22	
LOX	3156 CGAR	2	3.5	1.5	90.5	Vapor						0.069	0.931				8.17	
LIN	3156 CGAR	2	3.5	1.5	90.9	Vapor						0.014	0.986				8.26	
MaxGOX	3156 CGAR	2	3.5	1.5	90.9	Vapor						0.014	0.986				8.26	
MinGOX1	3156 CGAR	2	3.6	1.5	90.9	Vapor						0.010	0.990				8.27	
MinGOX2	3156 CGAR	2	3.6	1.5	90.9	Vapor						0.011	0.989				8.27	
Normal	3500 LAR			1.74	92.6	Liquid							1				1359.7	max. 750 Nm3/h
LOX	3500 LAR			1.74	92.6	Liquid							1				1359.7	max. 750 Nm3/h
LIN	3500 LAR			1.74	92.6	Liquid							1				1359.7	max. 750 Nm3/h
MaxGOX	3500 LAR			1.74	92.6	Liquid							1				1359.7	max. 750 Nm3/h
MinGOX1	3500 LAR			1.74	92.6	Liquid							1				1359.7	max. 750 Nm3/h
MinGOX2	3500 LAR			1.74	92.6	Liquid							1				1359.7	max. 750 Nm3/h
Normal	3700 LAR	743	1324	1.74	92.6	Liquid							1.000				1360	
LOX	3700 LAR	743	1324	1.74	92.6	Liquid							1.000				1360	
LIN	3700 LAR	658	1173	1.74	92.6	Liquid							1.000				1360	
MaxGOX	3700 LAR	658	1173	1.74	92.6	Liquid							1.000				1360	
MinGOX1	3700 LAR	538	959	1.74	92.6	Liquid							1.000				1360	
MinGOX2	3700 LAR	548	977	1.74	92.6	Liquid							1.000				1360	
Backup	3720 LAR	400	713	1.63	91	Liquid							1				1369.8	maximum flow; design flow: 240 Nm3/h; pump capacity is 200 l/min
Backup	3721 LAR	400	713	23	93	Liquid							1				1364.6	maximum flow; design flow: 240 Nm3/h; pump capacity is 200 l/min
Backup	3820 LAR	400	713	22	131.6	Liquid							1				1049.6	maximum flow; design flow: 240 Nm3/h
Backup	3830 GAR	400	713	21	275	Vapor							1				37.378	maximum flow; design flow: 240 Nm3/h





AIR LIQUIDE			Process Specification										Project: K70101 ASU No.9 Kosice							
Air Liquide AGS GmbH			According to PFD No.: 792.86809; Rev. P1			Case:		Ambient Pressure [bar a]: 1.013			Humidity: 65%		Cooling Water Temperature [°C]: 16		Rev.: 2		Date: 14/10/04		By: TV / JJ	
Design Conditions:			Ambient Temperature [°C]: 12		Pres.		Temp.		Phase		Vapor Fraction		Composition (mol/mol)			Density		Remarks		
Case	Stream	Normal Flow	Mass Flow	kg/h	bar(a)	K						N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	kg/m3			
Normal	5020	UN2	23223	29048	1.17	292.9	Vapor					0.998	0.002				1.347			
LOX	5020	UN2	23203	29022	1.17	294.8	Vapor					0.998	0.002				1.339			
LIN	5020	UN2	20841	26104	1.17	294.8	Vapor					0.993	0.004	0.003			1.340			
MaxGOX	5020	UN2	20676	25918	1.17	292.3	Vapor					0.987	0.004	0.009			1.353			
MinGOX1	5020	UN2	5324	6663	1.25	296.1	Vapor					0.997	0.003				1.424			
MinGOX2	5020	UN2	4648	5817	1.25	293.3	Vapor					0.997	0.003	0.001			1.438			
Normal	5029	UN2	23653	29394	1.01	289.1	Vapor					0.98	0.002		0.018		1.175			
LOX	5029	UN2	23633	29368	1.01	289.1	Vapor					0.98	0.002		0.018		1.175			
LIN	5029	UN2	21228	26415	1.01	289.2	Vapor					0.975	0.004	0.003	0.018		1.177			
MaxGOX	5029	UN2	21060	26227	1.01	289.2	Vapor					0.969	0.004	0.008	0.018		1.177			
MinGOX1	5029	UN2	5423	6742	1.01	289.2	Vapor					0.978	0.003		0.018		1.175			
MinGOX2	5029	UN2	4735	5886	1.01	289.2	Vapor					0.978	0.003	0.001	0.018		1.175			
Normal	5100	UN2	41223	51563	1.27	96.9	Vapor					0.998	0.002				4.55			
LOX	5100	UN2	41203	51536	1.27	97	Vapor					0.998	0.002				4.54			
LIN	5100	UN2	38841	48649	1.27	96.8	Vapor					0.993	0.004	0.003			4.56			
MaxGOX	5100	UN2	38681	48488	1.26	96.7	Vapor					0.987	0.004	0.009			4.53			
MinGOX1	5100	UN2	23324	29191	1.29	97	Vapor					0.997	0.003				4.62			
MinGOX2	5100	UN2	22648	28341	1.29	97	Vapor					0.997	0.003	0.001			4.62			
Normal	5101	UN2	40413	50550	1.32	79.7	Vapor					0.998	0.002				5.91			
LOX	5101	UN2	40393	50524	1.32	79.7	Vapor					0.998	0.002				5.91			
LIN	5101	UN2	38124	47752	1.31	79.7	Vapor					0.993	0.004	0.004			5.87			
MaxGOX	5101	UN2	37964	47592	1.31	79.8	Vapor					0.987	0.004	0.009			5.87			
MinGOX1	5101	UN2	22738	28458	1.31	79.7	Vapor					0.996	0.003				5.87			
MinGOX2	5101	UN2	22051	27595	1.31	79.7	Vapor					0.997	0.003	0.001			5.87			
Normal	5129	GAN	810	1013	2.5	86	Vapor					0.999	0.001				10.71			
LOX	5129	GAN	810	1013	2.5	86	Vapor					0.999	0.001				10.71			
LIN	5129	GAN	717	897	2.5	86	Vapor					0.999	0.001				10.71			
MaxGOX	5129	GAN	717	896	2.5	86	Vapor					0.999	0.001				10.71			
MinGOX1	5129	GAN	586	733	2.5	86	Vapor					0.999	0.001				10.71			
MinGOX2	5129	GAN	597	746	2.5	86	Vapor					0.999	0.001				10.71			
Normal	6001	GOX	20000	28574	28	293	Vapor						0.003	0.997			37.50			
LOX	6001	GOX	17000	24289	28	294.8	Vapor						0.003	0.997			37.25			
LIN	6001	GOX	20000	28578	28	294.8	Vapor						0.004	0.996			37.26			
MaxGOX	6001	GOX	25000	35722	28	292.4	Vapor						0.003	0.997			37.59			
MinGOX1	6001	GOX	11000	15716	28	296.1	Vapor						0.003	0.997			37.07			
MinGOX2	6001	GOX	15000	21431	28	293.3	Vapor						0.003	0.997			37.46			

AIR LIQUIDE				Process Specification										Project: K70101 ASU No.9 Kosice										
Air Liquide AGS GmbH				According to PFD No.: 792.86809; Rev. P1			Case:			Humidity: 65%			Cooling Water Temperature [°C]: 16			Rev.: 2			Date: 14/10/04			By: TV / JJ		
Design Conditions:				Ambient Temperature [°C]: 12		Ambient Pressure [bar a]: 1.013		Vapor Fraction		Composition (mol/mol)			Density		Remarks									
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase			N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	kg/m3										
Normal	6100	GOX		1.38	93	Vapor				0.004	0.996			5.973	0 - 200 Nm3/h									
	6100	GOX		1.38	93.1	Vapor				0.005	0.995			5.968	0 - 200 Nm3/h									
LIN	6100	GOX		1.36	92.9	Vapor				0.005	0.995			5.892	0 - 200 Nm3/h									
MaxGOX	6100	GOX		1.36	92.9	Vapor				0.005	0.995			5.892	0 - 200 Nm3/h									
MinGOX1	6100	GOX		1.28	92.3	Vapor				0.005	0.995			5.571	0 - 200 Nm3/h									
MinGOX2	6100	GOX		1.27	92.3	Vapor				0.004	0.996			5.524	0 - 200 Nm3/h									
Normal	6101	LOX	20000	1.38	93	Liquid				0.003	0.997			1127										
LOX	6101	LOX	20000	1.38	93.1	Liquid				0.003	0.997			1127										
LIN	6101	LOX	20000	1.36	92.9	Liquid				0.004	0.996			1128										
MaxGOX	6101	LOX	25000	1.36	92.9	Liquid				0.003	0.997			1128										
MinGOX1	6101	LOX	15000	1.36	92.9	Liquid				0.003	0.997			1128										
MinGOX2	6101	LOX	15000	1.35	92.9	Liquid				0.003	0.997			1128										
Normal	6133	LOX	20000	29	95	Liquid				0.003	0.997			1124										
LOX	6133	LOX	20000	29	95	Liquid				0.003	0.997			1124										
LIN	6133	LOX	20000	29	94.9	Liquid				0.004	0.996			1125										
MaxGOX	6133	LOX	25000	29	94.8	Liquid				0.003	0.997			1125										
MinGOX1	6133	LOX	15000	29	94.8	Liquid				0.003	0.997			1125										
MinGOX2	6133	LOX	15000	29	94.8	Liquid				0.003	0.997			1125										
Normal	6144	LOX	20000	29	95	Liquid				0.003	0.997			1124										
LOX	6144	LOX	17000	29	95	Liquid				0.003	0.997			1124										
LIN	6144	LOX	20000	29	94.9	Liquid				0.004	0.996			1125										
MaxGOX	6144	LOX	25000	29	94.8	Liquid				0.003	0.997			1125										
MinGOX1	6144	LOX	11000	29	94.8	Liquid				0.003	0.997			1125										
MinGOX2	6144	LOX	15000	29	94.8	Liquid				0.003	0.997			1125										
Normal	6500	LOX		2.8	95.6	Liquid				0.003	0.997			1114.4	max. 4000 Nm3/h									
LOX	6500	LOX		2.8	95.6	Liquid				0.003	0.997			1114.4	max. 4000 Nm3/h									
LIN	6500	LOX		2.8	95.5	Liquid				0.004	0.996			1115.1	max. 4000 Nm3/h									
MaxGOX	6500	LOX		2.8	95.5	Liquid				0.003	0.997			1114.9	max. 4000 Nm3/h									
MinGOX1	6500	LOX		2.8	94.9	Liquid				0.003	0.997			1118.0	max. 4000 Nm3/h									
MinGOX2	6500	LOX		2.8	94.9	Liquid				0.003	0.997			1118.0	max. 4000 Nm3/h									
Normal	6700	LOX		2.8	95.6	Liquid				0.003	0.997			1114										
LOX	6700	LOX	3000	2.8	95.6	Liquid				0.003	0.997			1114										
LIN	6700	LOX		2.8	95.5	Liquid				0.004	0.996			1115										
MaxGOX	6700	LOX		2.8	95.5	Liquid				0.003	0.997			1115										
MinGOX1	6700	LOX	4000	2.8	95.5	Liquid				0.003	0.997			1115										
MinGOX2	6700	LOX		2.8	95.4	Liquid				0.003	0.997			1115										

		Process Specification										Project: K70101 ASU No.9 Kosice Rev.: 2 Date: 14/10/04 By: TV / JJ	
Air Liquide AGS GmbH According to PFD No: 792.86809; Rev. P1		Case:										Humidity: 65% Cooling Water Temperature [°C]: 16	
Design Conditions:		Ambient Temperature [°C]: 12		Ambient Pressure [bar a]: 1.013		Vapor Fraction		Composition (mol/mol)			Density		Remarks
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase		N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O	
		Nm <sup>3</sup> /h	kg/h	bar(a)	K								
Backup	6701 LOX	24000	34298	1.28	90.3	Liquid			0.004	0.996			1141.2
Normal	6702 LOX			1.1	90.8	Liquid			0.003	0.997			1138
LOX	6702 LOX			1.1	90.8	Liquid			0.003	0.997			1138
LIN	6702 LOX			1.1	90.8	Liquid			0.003	0.997			1138
MaxGOX	6702 LOX	5000	7144	1.1	90.8	Liquid			0.003	0.997			1138
MinGOX1	6702 LOX			1.1	90.8	Liquid			0.003	0.997			1138
MinGOX2	6702 LOX			1.1	90.8	Liquid			0.003	0.997			1138
Backup	6721 LOX	24000	34298	29	92.3	Liquid			0.004	0.996			1137.7
Normal	6812 LOX			4	91.2	Liquid			0.003	0.997			1137
LOX	6812 LOX			4	91.2	Liquid			0.003	0.997			1137
LIN	6812 LOX			4	91.2	Liquid			0.003	0.997			1137
MaxGOX	6812 LOX	5000	7144	4	91.2	Liquid			0.003	0.997			1137
MinGOX1	6812 LOX			4	91.2	Liquid			0.003	0.997			1137
MinGOX2	6812 LOX			4	91.2	Liquid			0.003	0.997			1137
Backup	6821 GOX	24000	34298	28	288	Vapor			0.004	0.996			38.228
Normal	7010 GAN	29750	37187	1.13	293	Vapor		1.000					1.30
LOX	7010 GAN	29750	37187	1.13	294.8	Vapor		1.000					1.29
LIN	7010 GAN	29750	37187	1.12	294.8	Vapor		1.000					1.28
MaxGOX	7010 GAN	29750	37187	1.12	292.4	Vapor		1.000					1.29
MinGOX1	7010 GAN	29750	37187	1.12	296.1	Vapor		1.000					1.27
MinGOX2	7010 GAN	29750	37188	1.12	293.3	Vapor		1.000					1.29
Normal	7014 GAN	29500	36853	7.3	299	Vapor		1					8.234
LOX	7014 GAN	29500	36853	7.3	299	Vapor		1					8.234
LIN	7014 GAN	29500	36853	7.3	299	Vapor		1					8.234
MaxGOX	7014 GAN	29500	36853	7.3	299	Vapor		1					8.234
MinGOX1	7014 GAN	29500	36853	7.3	299	Vapor		1					8.234
MinGOX2	7014 GAN	29500	36853	7.3	299	Vapor		1					8.234
Normal	7100 GAN	29750	37187	1.31	79.6	Vapor		1.000					5.87
LOX	7100 GAN	29750	37187	1.31	79.6	Vapor		1.000					5.87
LIN	7100 GAN	29750	37187	1.3	79.6	Vapor		1.000					5.82
MaxGOX	7100 GAN	29750	37187	1.3	79.5	Vapor		1.000					5.83
MinGOX1	7100 GAN	29750	37187	1.31	79.6	Vapor		1.000					5.87
MinGOX2	7100 GAN	29750	37188	1.3	79.6	Vapor		1.000					5.82

AIR LIQUIDE			Process Specification										Project: K70101 ASU No.9 Kosice Rev.: 2 Date: 14/10/04 By: TV / JJ			
Air Liquide AGS GmbH			According to PFD No.: 792.86809; Rev. P1				Case:				Humidity: 65% Cooling Water Temperature [°C]: 16					
Design Conditions:			Ambient Temperature [°C]: 12		Ambient Pressure [bar a]: 1.013		Vapor Fraction		Composition (mol/mol)			Density	Remarks			
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase			N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O			
		Nm <sup>3</sup> /h	kg/h	bar(a)	K									kg/m3		
Normal	7101	GAN	29750	37187	1.26	96.9	Vapor		1.000					4.51		
LOX	7101	GAN	29750	37187	1.26	97	Vapor		1.000					4.50		
LIN	7101	GAN	29750	37187	1.25	96.8	Vapor		1.000					4.48		
MaxGOX	7101	GAN	29750	37187	1.24	96.7	Vapor		1.000					4.44		
MinGOX1	7101	GAN	29750	37187	1.25	97	Vapor		1.000					4.47		
MinGOX2	7101	GAN	29750	37188	1.25	97	Vapor		1.000					4.47		
Normal	7110	LIN	37658	47079	5.29	94.8	Liquid		0.999	0.001				718		
LOX	7110	LIN	37612	47021	5.31	94.8	Liquid		0.999	0.001				718		
LIN	7110	LIN	36017	45028	5.25	94.7	Liquid		0.999	0.001				719		
MaxGOX	7110	LIN	35925	44913	5.23	94.6	Liquid		0.999	0.001				719		
MinGOX1	7110	LIN	27251	34069	5.18	94.5	Liquid		0.999	0.001				720		
MinGOX2	7110	LIN	27678	34604	5.17	94.5	Liquid		0.999	0.001				720		
Normal	7111	LIN	32602	40758	5.29	94.8	Liquid		0.999	0.001				718		
LOX	7111	LIN	32630	40794	5.31	94.8	Liquid		0.999	0.001				718		
LIN	7111	LIN	31366	39214	5.25	94.7	Liquid		0.999	0.001				719		
MaxGOX	7111	LIN	31232	39046	5.23	94.6	Liquid		0.999	0.001				719		
MinGOX1	7111	LIN	25266	31587	5.18	94.5	Liquid		0.999	0.001				720		
MinGOX2	7111	LIN	24129	30167	5.17	94.5	Liquid		0.999	0.001				720		
Normal	7112	LIN	29102	36383	5.29	94.8	Liquid		0.999	0.001				718		
LOX	7112	LIN	29130	36418	5.31	94.8	Liquid		0.999	0.001				718		
LIN	7112	LIN	27866	34838	5.25	94.7	Liquid		0.999	0.001				719		
MaxGOX	7112	LIN	27732	34671	5.23	94.6	Liquid		0.999	0.001				719		
MinGOX1	7112	LIN	21766	27211	5.18	94.5	Liquid		0.999	0.001				720		
MinGOX2	7112	LIN	20629	25791	5.17	94.5	Liquid		0.999	0.001				720		
Normal	7113	LIN	29102	36383	5.29	81.6	Liquid		0.999	0.001				786		
LOX	7113	LIN	29130	36418	5.31	81.6	Liquid		0.999	0.001				786		
LIN	7113	LIN	27866	34838	5.25	81.6	Liquid		0.999	0.001				786		
MaxGOX	7113	LIN	27732	34671	5.23	81.5	Liquid		0.999	0.001				786		
MinGOX1	7113	LIN	21766	27211	5.18	81.2	Liquid		0.999	0.001				788		
MinGOX2	7113	LIN	20629	25791	5.17	81.2	Liquid		0.999	0.001				788		
Normal	7128	LIN	29102	36383	5.29	81.6	Liquid		0.999	0.001				786		
LOX	7128	LIN	29130	36418	5.31	81.6	Liquid		0.999	0.001				786		
LIN	7128	LIN	24866	31088	5.25	81.6	Liquid		0.999	0.001				786		
MaxGOX	7128	LIN	23632	29545	5.23	81.5	Liquid		0.999	0.001				786		
MinGOX1	7128	LIN	21766	27211	5.18	81.2	Liquid		0.999	0.001				788		
MinGOX2	7128	LIN	20629	25791	5.17	81.2	Liquid		0.999	0.001				788		

AIR LIQUIDE				Process Specification										Project: K70101 ASU No.9 Kosice			
Air Liquide AGS GmbH				Rev.: 2										Date: 14/10/04			
Design Conditions:				By: TV / JJ													
Case		Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	Composition (mol/mol)				Density	Remarks			
			Nm <sup>3</sup> /h	kg/h	bar(a)	K			N <sub>2</sub>	Ar	O <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub> O				
Normal	7129	LIN	29102	36383	1.31	79.6	Mixed	2.1%	0.999	0.001				208			
	7129	LIN	29130	36418	1.31	79.6	Mixed	2.1%	0.999	0.001				208			
LIN	7129	LIN	24866	31088	1.3	79.6	Mixed	2.1%	0.999	0.001				207			
	7129	LIN	23632	29545	1.3	79.5	Mixed	2.1%	0.999	0.001				207			
MinGOX1	7129	LIN	21766	27211	1.31	79.6	Mixed	1.7%	0.999	0.001				242			
	7129	LIN	20629	25791	1.3	79.6	Mixed	1.7%	0.999	0.001				241			
Normal	7130	LIN			5.29	94.8	Liquid		0.999	0.001				718.0	normally no flow		
	7130	LIN			5.31	94.8	Liquid		0.999	0.001				718.0	normally no flow		
LIN	7130	LIN			5.25	94.7	Liquid		0.999	0.001				718.6	normally no flow		
	7130	LIN			5.23	94.6	Liquid		0.999	0.001				719.1	normally no flow		
MaxGOX1	7130	LIN			4.94	93.9	Liquid		0.999	0.001				722.9	normally no flow		
	7130	LIN			4.93	93.9	Liquid		0.999	0.001				722.9	normally no flow		
Normal	7143	LIN	3500	4376	5.29	94.8	Liquid		0.999	0.001				718			
	7143	LIN	3500	4376	5.31	94.8	Liquid		0.999	0.001				718			
LIN	7143	LIN	3500	4376	5.25	94.7	Liquid		0.999	0.001				719			
	7143	LIN	3500	4376	5.23	94.6	Liquid		0.999	0.001				719			
MaxGOX1	7143	LIN	3500	4376	5.18	94.5	Liquid		0.999	0.001				720			
	7143	LIN	3500	4376	5.17	94.5	Liquid		0.999	0.001				720			
Normal	7144	LIN	3500	4376	22	97.8	Liquid		0.999	0.001				709			
	7144	LIN	3500	4376	22	97.9	Liquid		0.999	0.001				709			
LIN	7144	LIN	3500	4376	22	97.7	Liquid		0.999	0.001				710			
	7144	LIN	3500	4376	22	97.7	Liquid		0.999	0.001				710			
MaxGOX1	7144	LIN	3500	4376	22	97.6	Liquid		0.999	0.001				710			
	7144	LIN	3500	4376	22	97.5	Liquid		0.999	0.001				711			
Normal	7150	LIN	820	1025	5.3	94.8	Liquid		0.999	0.001				718			
	7150	LIN	820	1025	5.31	94.8	Liquid		0.999	0.001				718			
LIN	7150	LIN	726	908	5.26	94.7	Liquid		0.999	0.001				719			
	7150	LIN	726	908	5.23	94.6	Liquid		0.999	0.001				719			
MaxGOX1	7150	LIN	594	743	5.19	94.5	Liquid		0.999	0.001				720			
	7150	LIN	605	756	5.17	94.5	Liquid		0.999	0.001				720			
Normal	7151	LIN	10	12.0	2.5	86	Liquid		0.999	0.001				764			
	7151	LIN	10	11.9	2.5	86	Liquid		0.999	0.001				764			
LIN	7151	LIN	9	11.1	2.5	86	Liquid		0.999	0.001				764			
	7151	LIN	9	11.2	2.5	86	Liquid		0.999	0.001				764			
MaxGOX1	7151	LIN	8	9.9	2.5	86	Liquid		0.999	0.001				764			
	7151	ULIN	8	10.1	2.5	86	Liquid		0.998	0.002				764			

AIR LIQUIDE		Process Specification										Project: K70101 ASU No.9 Kosice			
Air Liquide AGS GmbH		According to PFD No.: 792.86809; Rev. P1					Case:					Rev.: 2			
Design Conditions:		Ambient Temperature [°C]: 12			Ambient Pressure [bar a]: 1.013			Humidity: 65%			Cooling Water Temperature [°C]: 16			Date: 14/10/04	
														By: TV / JJ	
Case	Stream	Normal Flow	Mass Flow	Pres.	Temp.	Phase	Vapor Fraction	Composition (mol/mol)				Density	Remarks		
		Nm³/h	kg/h	bar(a)	K			N₂	Ar	O₂	H₂	H₂O	kg/m3		
Normal	7170	GAN	3500	21	293	Vapor		0.999	0.001				24.24		
LOX	7170	GAN	3500	21	294.8	Vapor		0.999	0.001				24.08		
LIN	7170	GAN	3500	21	294.8	Vapor		0.999	0.001				24.08		
MaxGOX	7170	GAN	3500	21	292.4	Vapor		0.999	0.001				24.29		
MinGOX1	7170	GAN	3500	21	296.1	Vapor		0.999	0.001				23.97		
MinGOX2	7170	GAN	3500	21	293.3	Vapor		0.999	0.001				24.21		
Normal	7500	LIN		2.3	81.7	Liquid		0.999	0.001				784.4	max. 4100 Nm3/h	
LOX	7500	LIN		2.3	81.7	Liquid		0.999	0.001				784.4	max. 4100 Nm3/h	
LIN	7500	LIN		2.3	81.6	Liquid		0.999	0.001				784.9	max. 4100 Nm3/h	
MaxGOX	7500	LIN		2.3	81.6	Liquid		0.999	0.001				784.9	max. 4100 Nm3/h	
MinGOX1	7500	LIN		2.3	80.7	Liquid		0.999	0.001				789.1	max. 4100 Nm3/h	
MinGOX2	7500	LIN		2.3	80.7	Liquid		0.999	0.001				789.1	max. 4100 Nm3/h	
Normal	7700	LIN		2.3	81.7	Liquid		0.999	0.001				784		
LOX	7700	LIN		2.3	81.7	Liquid		0.999	0.001				784		
LIN	7700	LIN	3000	2.3	81.6	Liquid		0.999	0.001				785		
MaxGOX	7700	LIN	4100	2.3	81.6	Liquid		0.999	0.001				785		
MinGOX1	7700	LIN		2.3	81.3	Liquid		0.999	0.001				786		
MinGOX2	7700	LIN		2.3	81.2	Liquid		0.999	0.001				787		
Backup	7701	LIN	20000	1.13	77.7	Liquid		1					802.2		
Backup	7702	LIN	3500	1.13	77.7	Liquid		1					802.2		
Backup	7721	LIN	20000	11.65	78.6	Liquid		1					800.9		
Backup	7722	LIN	3500	22	79.5	Liquid		1					799.5		
Normal	7812	LIN		8	100.4	Liquid		0.999	0.001				686		
LOX	7812	LIN		8	100.4	Liquid		0.999	0.001				686		
LIN	7812	LIN		8	100.4	Liquid		0.999	0.001				686		
MaxGOX	7812	LIN		8	100.4	Liquid		0.999	0.001				686		
MinGOX1	7812	LIN	700	8	100.4	Liquid		0.999	0.001				686		
MinGOX2	7812	LIN		8	100.4	Liquid		0.999	0.001				686		
Backup	7821	GAN	3500	21	275	Vapor		1					25.908		
Backup	7861	GAN	16000	7	288	Vapor		1					8.202	only during steam shortage	
Backup	7862	GAN	20000	7	288	Vapor		1					8.202		