Thermodynamic Design

COMPRESSOR MODEL		SKUEL643	SKUEL643
OPERATING POINT		Gas A, 42000 m³/h	Gas A, 35000 m³/h
GAS HANDLED		Lime Kiln Gas	Lime Kiln Gas
GUARANTEE POINT		X	
INLET CONDITIONS:			
VOLUME FLOW (DRY) NORMAL CONDITION: T_0 = 273.15 K; p_0 = 1.01325 bar	[Nm³/h]	29044	24202
INLET VOLUME FLOW	[m³/h]	42000	35000
WEIGHT FLOW (WET)	[kg/h]	47366	39470
SUCTION PRESSURE[1]	[bar (abs.)]	0.912	0.912
SUCTION TEMPERATURE	[°C]	45	45
MOLECULAR WEIGHT (WET)	[kg/kmol]	32.71	32.71
ADIABATIC EXPONENT [κ] (WET)	[-]	1.35	1.35
RELATIVE HUMIDITY	[%]	100	100
DISCHARGE CONDITIONS:			
DISCHARGE PRESSURE[1]	[bar (abs.)]	4.56	4.56
DISCHARGE TEMPERATURE WITH WATER INJECTION	[°C]	96	96
QUANTITY OF INJECTED WATER[2]	[kg/h]	6100	4950
POWER AND SPEED:			
POWER REQUIRED ALL LOSSES INCLUDED	[kW]	2970	2410
COMPRESSOR SPEED	[rpm]	3700	3120
TOLERANCES AT GUARANTEE POINT:			
PRESSURE INCREASE	[%]	± 0	
POWER CONSUMPTION	[%]	+ 4	
VOLUME FLOW	[%]	- 4	

[1] Pressure drop between compressor inlet/outlet flange and battery limit caused by silencers, inlet strainer and aftercooler is included.

[2] Condensate or boiler feed water required.

COMPRESSOR MODEL		SKUEL643	SKUEL643
OPERATING POINT		Gas B, 42000 m³/h	Gas B; 35000 m³/h
GAS HANDLED		Lime Kiln Gas	Lime Kiln Gas
GUARANTEE POINT			
INLET CONDITIONS:			
VOLUME FLOW (DRY) NORMAL CONDITION: T_0 = 273.15 K; p_0 = 1.01325 bar	[Nm³/h]	29044	24204
INLET VOLUME FLOW	[m³/h]	42000	35000
WEIGHT FLOW (WET)	[kg/h]	56296	54914
SUCTION PRESSURE[3]	[bar (abs.)]	0.912	0.912
SUCTION TEMPERATURE	[°C]	45	45
MOLECULAR WEIGHT (WET)	[kg/kmol]	38.88	38.88
ADIABATIC EXPONENT [κ] (WET)	[-]	1.31	1.31
RELATIVE HUMIDITY	[%]	100	100
DISCHARGE CONDITIONS:			
DISCHARGE PRESSURE[1]	[bar (abs.)]	4.56	4.56
DISCHARGE TEMPERATURE WITH WATER INJECTION	[°C]	96	96
QUANTITY OF INJECTED WATER[4]	[kg/h]	6000	4800
POWER AND SPEED:			
POWER REQUIRED ALL LOSSES INCLUDED	[kW]	3000	2410
COMPRESSOR SPEED	[rpm]	3680	3100

[3] Pressure drop between compressor inlet/outlet flange and battery limit caused by silencers, inlet strainer and aftercooler is included.

[4] Condensate or boiler feed water required.

Scope of Supply

The oil free process gas screw compressor unit is designed as a packaged unit (single lifting). The components of the process gas pipe system are supplied loose.

- compressor stage, type SKUEL643,
  casing of cast stainless steel G-X3CrNi134 (comparable with ASTM A 487 Gr. CA-6NM)
  rotors of forged stainless steel X3CrNiMo134 (comparable with ASTM A 182 Gr. F6NM)
  shaft seals at each shaft end: carbon rings
  injection nozzle made from stainless steel;
  incl. performance test with air (recalculated to gas conditions);

- main driver, steam turbine, 3.3 MW;

- baseframe for compressor stage and steam turbine, with integrated oil reservoir;

- complete lube-oil system, comprising:
  main oil pump, screw type, driven by electric motor EEx d
  standby oil pump, screw type, driven by electric motor EEx d,
  single oil cooler, plate type with stainless steel plates
  twin oil filter, with change over valve of continuous flow type,
  direct acting control valves,
  oil reservoir heating,
  lube-oil piping upstream oil filter made of carbon steel, downstream oil filters made of stainless steel
  suction strainer for each oil pump,
  manifold block, check, drain and vent valves.
  The components of the oil system are integrated in the compressor baseplate.

- 1 suction silencer and suction strainer,
  1 discharge silencer with dampening plate and venturi nozzle;

- internal gas piping sections including 2 expansion joints;

- 1 unloading valve, 1 non-return valve, 1 safety valve, supplied loose for installation into Purchaser's gas piping;

- driver coupling with non-sparking coupling guard;

- acoustic enclosure for compressor stage with force feed ventilation, for the reduction of the sound pressure level to 85 dB(A) at 1 m distance;

- local instrumentation, partially mounted on local racks, ready cabled to local junction boxes;

- painting, packing, testing and documentation;

- commissioning spares;

Exclusions:

- after- and bypasscooler;
- bypass piping, bypass control valve;
- control panel, UPS, MCC's;
- spare parts;
- service media;
- erection and commissioning.

Weight and dimensions

space requirements of the complete compressor set:	approx. L 9 m; W 5 m; H 5 m
weight of the complete compressor set:	approx. 45000 kg