



GE Energy
Oil & Gas

FLOTECH



Detailed Specification – RC30k Fuel Gas Compressor Package

Major Mechanical Items

Compressor –

GE Energy E702 two throw rated 1790 kW, single-stage horizontal balanced opposed crosshead type; water-cooled double acting lined cylinders. Each cylinder is fitted with manually adjustable variable head end clearance pocket (VVCP).

Both head end cylinders are fitted with pneumatically actuated unloader assemblies which hold the valves open when activated, reducing the capacity at higher suction pressures or low GT loading, providing considerable energy savings. The compressor PLC controls unloader system operation automatically.

Current configuration: Delivering 30,000 Nm³/hr at 14 bar(g) suction with 28 bar(g) discharge suiting 2 x Siemens Finspång SGT-800 gas turbines. Refer Datasheet attached.

The control system and package design allow easily flexibility to suit a wide variety of other gas flow and pressure requirements such as those for multiple GE LM6000 turbines.

Lubrication System –

Modular centralised cylinder & packing lubrication system with digital no flow timer. Frame lubrication is by crankshaft driven pump. Oil day tank included.

Main Drive –

Siemens direct drive electric motor rated at 1000 kW, 10,5/11kV, 50Hz, 6 pole EExn II T3, insulation class F.

Coupling -

TB Woods torsionally rigid coupling with guard in non-sparking material

Pulsation Bottles -

Suction & Discharge pulsation bottles with internal acoustic suppression devices are provided. Carbon steel construction, designed and certified in accordance with PED requirements.

Separators/vessels –

Gas inlet separator vessel is provided for liquid/condensate removal prior to compressor. A dual chamber discharge separator following the aftercooler for oil/condensate removal, with high efficiency coalescing elements rated at 0.1 ppmw limit oil carry-over (note that guarantee value is 0.5 ppmw maximum carry-over).

Automatic drain system and level switches are provided for safety control system.



GE Energy
Oil & Gas

FLOTECH



All pressure vessels are designed and certified according to PED.

Process Piping –

Piping generally in accordance with ANSI B31.3. Fuel-gas in/out connections to match 200NB ANSI#600 Flange.

Instrument sense (gas) and small bore process piping seamless 316ss tubing with 316ss “Swagelok” or equal brand compression fittings. Lube oil tubing is carbon steel.

Cooling System –

Package is supplied with Flotech shell & tube TEMA type BEM aftercooler, Flotech Kallt model T490-3000. Gas is cooled in the tubes by closed circuit inhibited water circulated through the shell.

Option: Closed circuit cooling system via a Flotech supplied fin-fan radiator designed for intended site ambient conditions. Coolant temperature to the package is monitored with radiator fans switched on/off to accommodate lower ambient or low turbine load conditions. Coolant is also supplied to compressor cylinders and shell & tube oil cooler.

Capacity Control System

The compression system is offered with flexible and efficient capacity control, which maintains constant gas delivery pressure to the gas turbines over the full range of expected suction gas pressures.

At design suction pressure, the compressor is set up to match the required turbine gas requirements with the recycle valve closed. As the suction pressure increases, the compressor will deliver more gas. To maintain the required discharge pressure the recycle valve will modulate open returning excess gas back to the inlet. As the suction pressure rises further more gas is recycled. To conserve energy and reduce recycle at higher inlet pressures, the package is fitted with head end valve unloaders, which partially deactivate cylinders thus efficiently reducing the gas throughput of the package.

Fixed Capacity Adjustment -

Fixed capacity control is achieved by manual adjustment of Variable Volume Clearance Pockets (VVCP) on each cylinder. This allows the basic compressor capacity to be changed efficiently, to suit varying gas compositions, turbine demand and site conditions.

Dynamic Capacity Control System -

Dynamic capacity control (0 – 100%) is achieved by gas discharge to recycle with automatic stepwise turn down by suction valve unloading of the head end. Gas for recycle is taken after compression from the discharge separator to the recycle control valve, before returning to the inlet separator. The recycle system is responsible for maintaining the required delivery pressure to the gas turbine. Unloaders are activated at start-up and the recycle control valve is fully opened, allowing gas to flow back to the suction side. This equalises pressure across the



GE Energy
Oil & Gas

FLOTECH



package during start.

Recycle Control Valve - Fisher (or equal) pneumatic actuated with control by 4 - 20 mA signal and I-P converter with valve positioner and pneumatic actuator. Sized for continuous duty at package discharge pressure, reducing to gas inlet line pressure.

Monitoring & Fault Annunciation & Alarm/Shutdown Safety System

Pressure transmitter -

- Gas inlet pressure (high & low alarm, shutdown)
- Gas pressure after 1st stage (high alarm, shutdown)
- Gas package discharge pressure (control logic)
- Compressor frame lubricating oil pressure (low alarm, shutdown)

Pressure indicator -

- Gas Inlet Pressure (from PIT)
- Gas Discharge Pressure (from PIT)
- Gas package discharge pressure (from PIT)
- Oil Pressure (from PIT)
- Instrument air pressure

Temperature transmitter -

- Gas temp after each 1st stage cylinder (high alarm, shutdown)
- Frame lubricating oil temperature (high alarm, shutdown)
- Coolant temperature to package (alarm)

Temperature indicator –

- Gas temp after each 1st stage cylinder (from TIT)
- Oil temperature (from TIT)
- Gas discharge temp at aftercooler
- Coolant temperature to package (from TIT)
- Coolant temperature from package

Flow switch –

- Lubricator operation (low shutdown)

Sight glass –

- Compressor oil crankcase
- Drain collector tank

Level switch –

- Inlet separator (high alarm, shutdown)
- Discharge separator lower chamber (high alarm, shutdown)
- Discharge separator upper chamber (high alarm, shutdown)



GE Energy
Oil & Gas

FLOTECH



Compressor oil sump (low shutdown)
Drain collector tank (high alarm)
Oil day tank (low alarm)

Vibration switch –

Compressor vibration (high, hard wired shutdown)

Thermister –

Compressor motor windings (high shutdown)

Pressure Relief -

Discharge full flow; relief set @ 50 bar(g)

Note! All safety valve outlets and vent line outlets are connected to a gas vent riser on the skid package. Compressor venting is separated from relief.

Inert gas connections -

Inerting valves are provided on the suction side to supply inert gas to the skid through one common connection

Control Cabinets / PLC

A control cabinet, is provided for the following functions: Stop, start, reset. All transmitter and trip switch signals required for safe operation are monitored by a Telemecanique-Modicon PLC, which also performs required start/stop sequencing and start permissives etc

Operator Interface –

An operator interface panel (MMI) with LCD display is provided on control cabinet door for operator communication with the PLC and package status indications.

Terminations for 4-20 mA analogue output signals and RS485 communication facility for digital signals are provided.

Electrical -

Control voltage is 24 VDC. All equipment located within the gas area hazardous zone is either Ex rated, or contained within suitable enclosure or isolated by an intrinsically safe barrier. Equipment earthed to earthing bar on skid side. Galvanised steel cable trays & solid copper wire earthing straps to main structure with common earth terminal provided. Junction boxes bottom entry type; IS and power circuits segregated.

Mushroom style local 'yellow' stop switch installed on skid to stop the compressor on purpose.

Option: MCC cabinets and starting gear for all motors is available



GE Energy
Oil & Gas

FLOTECH



Miscellaneous

Special Tools -

All special tools required for compressor maintenance are included

Commissioning -

Available at schedule of rates

Warranty -

New product warranty of 12 months from commissioning maximum 18 months from delivery.

Skid Dimensions -

The compressor package is designed to fit within acoustic enclosure (available as option). Panels of the enclosure are removable for easy access and maintenance. Dimensions of the complete package within enclosure are as follows:

Length - 4700 mm; Width - 4500 mm; Height - 4000 mm
Weight – 35,000 kg

Surface Finishing -

Structural members, piping, vessels, heat exchangers and other fabricated carbon steel surfaces finished by Altex-Devoe system:- Sand blast 2.5; inorganic zinc rich primer Catha-coat 302 to 25 micron dry film thickness (dft); epoxy intermediate Devshield 236 to 125 micron dft; colour finish coat with gloss urethane E-line 929 to 50 micron dft.

Proprietary finished machinery items (motor, compressor etc.) where integrity of undercoating is verified:- undercoat Devshield 236 as required and finish with E-line 929 to colour match (single colour) minimum total 125 micron dft.

Documentation -

2 Sets of full supporting documentation O&M Manuals & MDR's are provided. Additional sets available if required.