



GAS PROCESSING UNIT, GANDHAR

Process Description

INTRODUCTION : LPG Recovery plant , Gandhar was designed to recover LPG from Natural gas produced during extracting Oil from Isolated Oil wells in and around Gandhar by M/S ONGC's Common Processing Facilities.

BRIEF PROCESS DESCRIPTION:

Natural gas comes from CPF of M/S ONGC as two streams. A) High pressure Rich gas at a pressure of 30.4 to 35.4 Kg/CM² (HP gas), B) Medium pressure Rich gas at a pressure of 19 to 21 Kg/CM² (MP gas).

After knocking down the entrained liquid if any in the suction drum, MP rich gas compressed to 30.4 to 35.4 Kg/CM² with the help of Booster compressors (Two running and One standby) driven by electric motors, passed through after cooler. This MP rich gas after compression goes along with HP rich gas and HVJ gas (HVJ gas pressure dropped across a control valve from 58 to 30.4 to 35.4 Kg/CM²) as feed gas to the compressor suction KOD through the flow control valve.

The Natural gas at 35.3 kg/cm²a is received into the feed gas suction K.O. drum (01-VV-00-001) where entrapped liquid is removed. The gas is then compressed to 62.3 kg/cm²a in feed gas compressor (01-KA-CF-001). The compressed gas is cooled down to 65°C by feed gas compressor after cooler (01-EA-00-001) and further down to 40°C using cooling water in feed gas trim cooler (01-EE-00-001). The gas from the feed gas trim cooler is routed to discharge K.O. Drum of compressor.

The gas from the discharge KOD is sent to the LPG unit.

Natural gas pressure at the inlet of LPG unit is controlled by varying the opening of the inlet guide vane of the expander. The feed gas is cooled to a temperature of 35°C in the feed gas pre-chiller (02-EE-00-002). Natural gas at 35°C is taken to the Feed gas moisture separator (02-VV-00-002) where condensed water is separated. The Natural gas, which is saturated with moisture, is dried using molecular sieve beds installed inside the feed gas

dryers. The dry gas is then filtered in feed gas filters (02-GN-00-001 A/B), so as to prevent molecular sieve particles from being carried over along with the gas.

The dried gas after passing through the gas filters (02-GN-00-001 A/B) is then chilled down to -20.2°C in main feed chiller (02-EP-00-001), where it exchanges cold with the Sep-I & Sep-II liquids and lean gas. The gas is sent to Sep-I (02-VV-00-005) and the liquid condensed is separated. The liquid is sent back to the feed gas chiller while the vapours are sent to the expander (02-EK-00-001).

The vapours undergo isentropic expansions to a pressure of $20.5 \text{ kg/cm}^2\text{a}$. Liquid thus condensed out is separated in the separator-II (02-VV-00-006) and sent to feed gas chiller.

Separator-I and separator-II liquids after partial cold recovery in the feed gas chiller form the feed to the light ends fractionator column (02-CC-00-001). Separator-II vapours are further sent to LEF overhead condenser (02-EE-00-007) for partial condensation of the LEF overhead vapours and its temperature goes to -33.7°C . Separator-II vapours are joined with LEF overhead vapours and cold of this gas is recovered in the feed gas chiller and the temperature at the outlet of feed gas chiller is 29°C . Lean Natural gas further gets heated up in the feed gas pre-chiller upto 36.3°C .

Lean Natural gas is at pressure of $18.9 \text{ kg/cm}^2\text{a}$ is part compressed by the work available from expander to a pressure of $24.1 \text{ kg/cm}^2\text{a}$. It is then compressed in the lean gas compressor (02-KA-CF-002) and sent to IPCL as semi rich gas.

LEF Column:

The liquid separated in the SEP-I & SEP-II after exchange of cold in feed gas chiller is heated up to 32°C and this forms the feed to the LEF column (02-CC-00-001). Heat to the column reboiler is supplied by the hot oil in the thermosyphon reboiler (02-EE-00-005). Reflux is generated by condensing part of the overhead vapours in the LEF condenser (02-EE-00-007) by using

separator-II overhead vapours. Reflux from LEF condenser is fed to the column top by the reflux pump (02-PA-CF-007) under flow control. Uncondensed LEF vapours from LEF condenser are routed to the feed gas chiller after the gas is mixed with Sep-II vapours. Liquid from the LEF column bottom flows to LPG column (02-CC-002).

LPG Column:

LPG column separates C3 and C4 from C5+ and LPG as per IS-4576 goes as top product. Heat to the column reboiler is supplied by the hot oil in the thermosyphon reboiler (02-EE-00-006). Overhead vapour is totally condensed in the overhead LPG column condenser (02-EA-00-003). Part of the condensed liquid is refluxed to the column through the reflux pump (02-PA-CF-004 A/B) under flow control and the rest is cooled to 43°C in LPG trim cooler (02-EE-00-008) and sent to storage.

The column bottoms is sent to the SBP column (02-CC-00-003). Heat to the column reboiler is supplied by the hot oil in the thermosyphon reboiler (02-EE-00-004). Overhead vapour which is pentane is totally condensed in the overhead SBP column condenser (02-EA-00-005). Part of the condensed liquid is refluxed to the column through the reflux pump and the rest is cooled to 43°C in Pentane trim cooler (02-EE-00-010) and sent to storage.

The column bottom product which is Special Boiling Point solvent (SBP) is cooled in SBP cooler (02-EE-00-009) at a temperature of 45°C and sent to SBP Intermediate tanks (02-VV-00-015 A/B) from where it is routed to storage through SBP transfer pumps 02-PA-CF-006 A/B.