

LPG Cooling and Reliquefaction

135,000m³ LPG FPSO



Supply of shipboard systems to a 135,000m³ LPG FPSO not only reinforces Hamworthy's position at the forefront of gas liquid cargo handling systems in the specialised LPG FPSO market but also underlines the capability of the company's various divisions to cooperate effectively on a project.

Together, Hamworthy operations in Tranby and Moss in Norway, Aalborg in Denmark, and Poole in the UK meet the technically demanding requirements of the oil and gas industry, in this instance securing the contract to design and supply LPG cooling and reliquefaction plants for the record-breaking Sanha LPG FPSO.

Built at the Kure shipyard of Japan's Ishikawajima-Harima Heavy Industries, the vessel represents a joint venture between Single Buoy Moorings Inc. and Sonangol, the state oil company of Angola. Serving the Sanha condensate complex north of the Congo River, the vessel is designed to boost LPG production for lessee Cabinda Gulf Oil Company Limited, a wholly-owned subsidiary of the San Francisco based Chevron Texaco Corporation.

The vessel is designed to receive mixed LPG gas from two production platforms in Block 0, fractionate it onboard to separate butane and propane products, and chill each product stream for storage in tanks at atmospheric pressure to await periodic transfer to LPG export tankers for shipment and sale.

The scope of equipment supply includes large propane and butane cooling and reliquefaction plants, comprising skid-mounted units with screw compressors, together with 18 Svanehøj deepwell LPG cargo pumps and four booster pumps. The supply consists further of a Moss oil-fired inert gas generator and sewage treatment plant designed to treat the sewage of a crew of 60 persons.

A total of five cooling units serve the reliquefaction plant, with two as the second stage in a cascade system. The units are equipped with oil-injected screw compressors, and with commercial propane as a refrigerant. Propane cooling capacity is 197m³/hour from +35°C to -37°C, and butane cooling capacity 106m³/hour from +35°C to -7°C. Overall dimensions are 13.3 x 5.0 x 6.3m, and unit weight is 83 tons.

The reliquefaction plant is designed for operation with LPG with high ethane content in the liquid phase (5 mol%), and will serve the LPG cargo tanks as the first stage in a cascade system. The system comprises four reliquefaction units with oil-free screw compressors. Overall dimensions are 9.6 x 4.8 x 2.8m, and unit weight 34 tons.

All equipment for the Sanha LPG FPSO is designed and manufactured by Hamworthy with the cooling and refrigeration plants factory assembled as packaged units, tested and certified ready for installation inside the elevated deckhouse on the vessel's topside.

LPG Cooling and Reliquefaction - 135,000m³ LPG FPSO



Cooling plant installation onboard 'Sanha' LPG-FPSO

LPG Cooling Plant

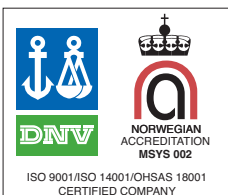
- ▶ Overall dimensions: 13.3m x 5.0m x 6.3m
- ▶ Unit weight: 83 tons
- ▶ Total number of units: 5
- ▶ Two units will serve the reliquefaction plant as second stage in a cascade system
- ▶ Equipped with oil injected screw compressors and commercial propane as refrigerant
- ▶ Propane cooling capacity: 197m³/hr from +35°C to -37°C
- ▶ Butane cooling capacity: 106m³/hr from +35°C to -7°C



Reliquefaction plant installation onboard 'Sanha' LPG-FPSO

LPG Reliquefaction Plant

- ▶ Overall dimensions: 9.6m x 4.8m x 2.8m
- ▶ Unit weight: 34 tons
- ▶ Total number of units: 4
- ▶ Equipped with oil free screw compressors
- ▶ Designed for operation with LPG with high ethane content in liquid phase (5 mol%).
- ▶ The plant will serve the LPG cargo tanks as first stage in a cascade system.



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The manufacturers reserve the right to alter the specification and data to incorporate improvements in design. Certified drawings will be issued on request.

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