

ACD's strength in LNG fueling is showing

Core to LNG (Liquefied Natural Gas) fueling applications are ACD pumps. From low pressure to high pressure requirements, ACD has developed a product range that meets industry demands for land, rail and marine fueling systems. ACD's broad product line of cryogenic pumps

and fueling systems are used in over 1,200 LNG or LCNG installations worldwide. Recent contracts have been awarded to ACD in both rail and marine on-board systems further expanding the company's reach into LNG markets.



LNG refueling, often used for buses and/or refuse trucks, is more simplistic in design compared to an LCNG station. To transfer LNG from the storage tank to the on-board vehicle tanks for buses and/or trucks, ACD's TC-34 submerged pumps are used.



ACD's TC-34 submerged pump (shown below) is the industry standard for LNG fueling stations and on-board 'boost' pump systems.



Typical pump requirements for LNG fueling facilities are:

Flow rate: 10-90 gpm
(38-340 lpm)

Differential Head: 50 – 1,600 feet
(15 – 488 meters)

Rpm range: 1,500 – 6,000

LCNG fueling stations require both a TC-34 pump and a high pressure reciprocating pump to increase pressures up to 3,600 – 5,500 psi (250 - 379 bar). ACD offers several high pressure reciprocating pumps to meet application requirements based upon the type of station, duty required and pumping parameters.

P2K

Duty: Light – Medium (2 – 8 hours/day)

Flow Rate: up to 6.6 gpm (25 lpm)

Discharge Pressure: up to 4,700 psi
(324 bar)*

Designed HP Rating: 15 – 40 hp (11-30 Kw)

Drive End: Grease Lubricated

Other Liquids Pumped: Lox, Lin, Lar

* Higher pressures available with smaller cold ends



X9 Series

Duty: Medium – Heavy Duty (6 - 18 hours/day)

Flow Rate: up to 37 gpm (140 lpm)

Discharge Pressure: up to 6,000 psi (414 bar)*

Designed HP Rating: 15 – 200 hp (11-150 Kw)

Drive End: Splash-Oil Lubricated

Other Liquids Pumped: Lox, Lin, Lar, Hydrogen

* 10,000 psi (690 bar) is available with 1.25" (32mm) cold end



SGV Series

Duty: Medium – Heavy Duty (6 - 24 hours/day)
Flow Rate: up to 37 gpm (140 lpm)
Discharge Pressure: up to 6,000 psi (414 bar)*
Designed HP Rating: 15 – 200 hp (11-150 Kw)
Drive End: Forced-Oil Lubricated
Other Liquids Pumped: Lox, Lin, Lar, Hydrogen

*10,000 psi (690 bar) is available with 1.25" (32mm) cold en



Driven by economic and environmental factors, LNG propulsion is a quickly developing technology for the shipping and rail industries. Starting with medium speed four-stroke engines using natural gas as propulsion fuel, a number of new technologies have been developed in recent years including those for two-stroke engines. One of the major innovations was the introduction of slow speed, two-stroke diesel engines using dual fuel (natural gas & diesel mixture) technology by MAN Diesel & Turbo (MAN) in 2011.

In addition to vehicle fueling, ACD's improved sealless AC-32 design is widely used for LNG bulk transfer applications in light end services. ACD currently offers six (6) sizes with flows and pressures up to 700 gpm (2,660 lpm) and 125 psi (9 bar), respectively. The pumps are designed in accordance with the NFPA (National Fire Protection Association) 79 Electrical Standards.

The AC-32 is designed for long life with zero leakage. The need for a conventional shaft seal is eliminated by integrally connecting pump and motor as a single unit design. Reliability of the sealless pump begins with an advanced motor design and system techniques to ensure liquid cooling of the motor is properly transferred throughout the pump to prolong motor life and reduce winding losses.



Other features include:

- state of the art inducers to provide the lowest possible NPSH by employing computer analysis utilizing hydraulic parameters to their highest degree
- lubricated bearings designed and manufactured to exacting specifications to operate in cryogenic fluids

These pumps are used universally in LNG off-loading and loading applications for trailers, rail tank cars, tank-to-tank transfer and recently in bunkering systems for LNG fueled ships. The sealless design, coupled with the motor and bearing configuration allow for reliable operation for an extended period of time (typically years). The benefits of the sealless pump are enhanced when submerged in a VJ sump (similar to the TC-34 installation) when no icing is visible and the system provides 'instant on' operation.



ACD's model MSP-SL Dual High Pressure Pump System will be used in TEEKAY's new 173,400 cbm ME-GI LNG carriers. The vessels will be built by DSME and will be Det Norske Veritas (DNV) classified.

ACD's reciprocating MSP-SL pumps increase low pressure (minimum 2.5 - 4.0 barg) LNG supplied from boost pumps to high pressure (350 barg) LNG. High pressure LNG is then discharged to a heat exchange system (provided by Cryoquip, Inc) which vaporizes the liquid to gas. The high pressure natural gas is then fed to the engine's high pressure fuel control valves through a manifold system designed by MAN.

For low pressure (8-10 bar), four-stroke marine engine requirements, ACD's MSP-34 submerged pumps are installed in the ship's cargo hull or the C-type LNG tank(s). Standard flow rates are 0.4 – 5.0 m³/h using a variable frequency drive



ACD's Model MSP-34 is shown installed in an Anthony Veder, 15,600 m³ LNG cargo ship. The FGS (Fuel Gas System) was designed and installed by TGE Marine Gas Engineering.

For more information, visit ACD's LNG products website at www.acdingpumps.com or contact Richard Young at ryoung@acdcom.com