



Dual-Fuel L35/44DF Four-Stroke Engine Moves towards Market Entry

Copenhagen,
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Classification societies award type approval

At an official event in Augsburg representatives from all major classification societies awarded type approval to MAN Diesel & Turbo's L35/44DF engine. The engine showed a perfect performance and is now certified for GenSet and Controllable Pitch Propeller (CPP) operation all over the world. Lasting from March 30 to April 2 this has been the longest type approval test (TAT) MAN has run so far. Within the shipping industry, all new engines require type approval before installation on board a ship. Class certificates are valid for 5-7 years.

The first L35/44DF's FAT (Factory Acceptance Test) will take place at MAN Diesel & Turbo's Frederikshavn, Denmark facility in May, for which the Type Approval Test in Augsburg is a prerequisite.

Members of the partaking 10 classification societies were impressed by the engine's performance. "The 35/44DF showed a spotless overall performance without any unplanned quick changes over from Gas to Diesel during operation or any of the type approval tests", sums up Dr. Günter Heider, Senior Manager at MAN Diesel & Turbo and Head of Test & Validation Four-Stroke Diesel & Gas Engines. "Among the features that were specifically appreciated and praised by the association members were the quick changes over from gas to diesel mode at 100% load, the restriction-free gas load performance at an overload of 110% and the engine's logic and clear modular design."

Type approval tests

The entire TAT process involves a series of thorough running tests along with the detailed study of all documentation, sketches and calculations relevant to proceedings.

There are three main test blocks:

1) Extreme Conditions Test

This tests the engine with minimal oil pressure and max temperature at 110% performance, a cyclic loading operation over the course of 40 hours and 1-

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hour full-torque test at 87% of the nominal speed with a shutdown by engine overspeed, all to stress the engine and its components as much as possible. The engine is opened up afterwards and its parts checked by the classification societies.

2) Emergency Operation

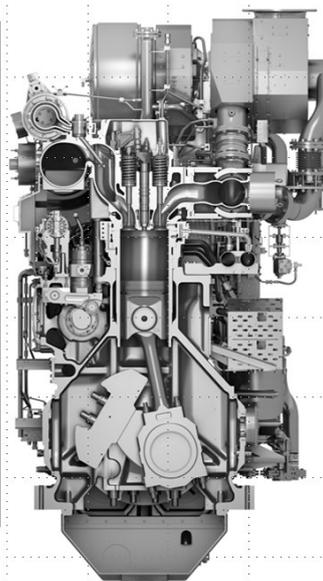
Here, the engine needs to perform in non-supercharged conditions (suction engine). This test block usually takes 1-2 days with just one or two classification societies present as observers.

3) Type Approval Test

This demonstrates an engine’s ability to perform under different, defined engine loads and covers the engine’s ability to switch smoothly from diesel to gas operation and back. The engine’s Alarm & Safety System is also tested to proof compliance with MAN’s Safety Concept for Marine DF Engines. In addition an Integration Test has to be performed to show the engine’s reliability in the event of the control system partly or completely failing.

Technical Data L35/44DF

Specification	Dimension	50 Hz	60 Hz
Bore / Stroke	mm	350 / 440	
Swept volume per cylinder	litre	42,3	
Cylinder configuration	-	6 – 10	
Turbocharger attachment		CS, CCS	
Engine speed	rpm	750	720
Rated output per cylinder	$kW_m/Cyl.$	530	510
Brake Mean Effective Pressure (BMEP)	bar	20	
Power range	kW_m	3.060 – 5.300	
Application: Marine		Dual fuel electric Dual fuel mechanic Aux. Genset	



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About MAN Diesel & Turbo

MAN Diesel & Turbo SE, based in Augsburg, Germany, is the world's leading provider of large-bore diesel engines and turbomachinery. The company employs around 14,500 staff at more than 100 international sites, primarily in Germany, Denmark, France, Switzerland, the Czech Republic, India and China. The company's product portfolio includes two-stroke and four-stroke engines for marine and stationary applications, turbochargers and propellers as well as gas and steam turbines, compressors and chemical reactors. The range of services and supplies is rounded off by complete solutions like ship propulsion systems, engine-based power plants and turbomachinery trains for the oil & gas as well as the process industries. Customers receive worldwide after-sales services marketed under the MAN PrimeServ brand.

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