

WinGD delivers exceptional results in full-load X-DF-A ammonia engine test

Swiss marine power company WinGD has confirmed key parameters for its X-DF-A ammonia-fuelled engine design after full-load testing at its Engine Research and Innovation Centre in Winterthur, Switzerland. The performance and emission measurements deliver timely assurance as the first users prepare their vessels and auxiliary systems for ammonia fuel.

The tests confirm engine performance data that WinGD has published in its General Technical Data (GTD) software, available online, and guaranteed to customers. Operation on ammonia achieved the same thermal efficiency as for diesel fuel, with pilot oil consumption at the targeted 5% of overall fuel consumption at full load.

Emissions data was also encouraging, with ammonia emissions below 10ppm and N₂O below 3ppm. NO_x emissions for ammonia operation were well below those generated during diesel use. Crucially, the low emissions were achieved without the use of exhaust gas after-treatment, allowing WinGD to confirm that no ammonia slip catalyst (ASC) will be needed to operate the engine with ammonia fuel.

WinGD Vice President Research & Development Sebastian Hensel said: “Our well-structured development approach has paid off. After intensive efforts to understand the principles of ammonia injection and combustion, we are the first two-stroke engine designer to demonstrate 100% ammonia operation with 5% pilot fuel consumption and such low emissions.”

WinGD’s ammonia combustion investigations began in 2021 and have since progressed through several carefully planned stages. These include the use of proprietary technology such as the unique, full-scale Spray Combustion Chamber that enables combustion parameters to be observed under realistic two-stroke engine conditions. Performance predictions based on this and later rig testing have now been confirmed at full-load during engine testing.

The first engines will be delivered from mid-2025 for ammonia carriers owned by Exmar LPG, and bulk carriers operated by CMB.Tech, deploying 52- and 72-bore engines respectively, to be built in Korea and China. These ammonia engines will be the first low-speed ammonia engines to be delivered for commercial ships, marking the beginning of a new era for the shipping industry.

WinGD has already secured nearly 30 orders for X-DF-A engines in the bulk carrier, containership, tanker and LPG/ammonia carrier segments.

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WinGD in brief

WinGD advances the decarbonisation of marine transportation through sustainable energy systems using the most advanced technologies in emissions reduction, fuel efficiency, hybridisation and digital optimisation. With their two-stroke low-speed engines at the heart of the power equation, WinGD sets the industry standard for reliability, safety, efficiency and environmental design, backed by a global network of service and support. Headquartered in Winterthur, Switzerland since its origin as the Sulzer Diesel Engine business in 1893, today it is powering the transformation to a sustainable future.