

Hydrogen Piston Engine Test Bench

CAPABILITY SHEET · H2 DUAL-FUEL TEST CELL · UNDER CONTRACT - EU EXPORT

THE PRODUCT

WHAT	Containerised hydrogen-combustion test cell: a ~40 kW industrial diesel engine instrumented from CI baseline to hydrogen dual-fuel operation (H2 port injection + diesel pilot) inside an ATEX Zone 1 twenty-foot container.
STATUS	Under contract for a German applied-research institute - engineered to EU ATEX, Machinery, LVD and EMC directives, with FAT/SAT procedures, QAP and functional-test documentation in scope.
MODES	Mode 1 diesel baseline (NOx / PM / CO2 / EGT / lambda logged); Mode 2 hydrogen PFI at 8-10 bar with diesel pilot, governor-based switching without ECU; instrumented for extended hydrogen-share research.

REFERENCE CONFIGURATION

HYDROGEN TRAIN	300 bar Type I/II cylinder bank, TPRD per cylinder vented clear; two-stage letdown to the 8-10 bar rail; ATEX Zone 1 fail-safe-closed primary solenoid (closes on power loss, air <5 bar, or ESD).
SAFETY CHAIN	Zone 1 interior; 6,000 m3/h ATEX fan = ~157 air changes/hour with hydrogen-supply interlock to proven flow; >=2 ceiling H2 detectors, 1oo2 alarm / 2oo2 ESD; external hardwired mushroom stop; DIN EN 60079-29 calibration.
LOAD PATH	Direct-coupled 400 V 3-phase 50 Hz alternator into an internal IP54 load bank of 60 kW class (1.5x engine) - no grid export, no water brake, no external dyno cell.
UTILITIES	Oil-free instrument air 6 Nm3/h at 10 bar with 50 L receiver, filter-dried to <= -20 degC dew point at point of use; 20 kVA container supply; 2 kVA UPS >=60 min keeping the safety chain live 24/365.

ENGINEERING & ASSURANCE

H2-SPECIFIC DESIGN	Injector bosses 30-60 mm from valve face (H2 diffusivity ~3x CNG - CNG distances deliberately not copied); FKM/PTFE sealing, NBR excluded; injectors at top of port; radiator air ducted separately from cell ventilation.
ACOUSTICS	50 mm mineral-wool lining >=20 dB(A) insertion loss; exhaust silencer >=25 dB(A) with secondary-stage provision; intake silencer; engineered to German TA Larm daytime limits.
DOCUMENTATION	Revision-controlled FAT and SAT procedures, quality assurance plan, manufacturing process plan, major calculations and functional testing process.

VARIANTS & ENGAGEMENT

VARIANTS	Larger engine classes, marine and rail auxiliaries, CNG/biogas dual-fuel cells, hydrogen-blend programmes, spark-ignited H2 conversions, fixed test-cell installations, emissions packages.
HYDROGEN LINE	Sits alongside our hydrogen power-to-power systems, boosting stations, leak-test rigs and burst chambers - one supplier across the H2 test chain.
ENGAGEMENT	Send your specification to sales@neometrixgroup.com - clause-by-clause compliance matrix and budgetary quotation within two working days. Export subject to GoI authorisation.

DEFENCE PROGRAMMES DESK

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Reference configuration reflects the bench under contract with a European research customer. All parameters re-scoped against the customer's specification at proposal stage.