

SOUTHWEST RESEARCH INSTITUTE®

Fuels and Lubricants Research Division

NMMA 15 HP Detergency Test

Specifications

- NMMA TC-W3®

Objective

- Evaluate the ability of a lubricant to prevent piston ring sticking, cylinder scuffing, and seizure in two-stroke cycle outboard engines designed to run at fuel/lubricant ratios up to 100:1.

Field Service Simulated

- High-specific output, two-stroke cycle marine outboard engines operating at a premixed fuel /lubricant ratio of 100:1.

Test Fixture

- A Mercury 15 hp, two-stroke cycle, water-cooled, spark-ignition outboard engine is mounted in an outboard test tank.
- A closed coolant system maintains engine temperature and a special load wheel replaces the propeller to obtain proper rpm at wide-open throttle (WOT).



Test Parameters

- The test is conducted for 100 hours on a 55-minute WOT, five-minute idle cycle with a one-hour soak and compression check after each 10 hours of running time.
- The following conditions are maintained throughout the test:

| Parameter | Value |
|----------------------|-------|
| Engine speed, rpm | 4500 |
| Coolant-out temp, °C | 77 |
| Fuel flow, lb/hr | 21.5 |
| Fuel/lubricant ratio | 100:1 |

Test Parts Evaluation

- General engine condition is evaluated, with particular emphasis on pistons, rings, and piston pin needle bearings.

Used Lubricant Analysis

- None.

Pass/Fail Criteria

- Compression loss must be less than 20 psi within 100 hours of test operation.
- Piston scuffing must be limited to 15% circumferential and 20% area per piston side.
- Ring wiping must be limited to 5% of the circumference of any ring face.
- The piston pin needle bearing must fall easily from the bore of the wrist pin.
- Average adjusted second ring sticking must be greater than or equal to 8.0 merits.
- Average piston second land deposits must be greater than or equal to 5.0 merits.
- Two consecutive or concurrent passes must be obtained.

◆ We welcome your inquiries. For additional information, please contact:

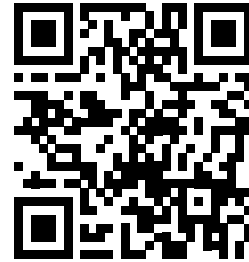
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