

Leisure Marine and Small Engine Lubricants Section

Recertified NMMA TC-W3 AF-27 Lubricity Test

SPECIFICATIONS NMMA TC-W3

OBJECTIVE

The objective of this test is to enhance the ability to evaluate the lubricity of lubricating oils in two-stroke cycle gasoline engines using a refinement of the JASO M340-92 and TC-W3 CE-50 lubricity tests.

TEST FIXTURE

A modified Honda AF-27, type SK50MM, 50 cm³ air-cooled, single-cylinder, two-stroke cycle spark ignition engine is set up on a test bed and coupled to a high-speed 10 HP dynamometer. External cooling air is supplied to the engine by a variable delivery fan.

TEST PARAMETERS

A test is composed of four sets of five to seven “tightenings.” A “tightening” consists of measuring the torque decrease as the spark plug gasket temperature increases from 200 degrees C to 300 degrees C. The first and third sets are conducted using XPA-3259 reference lubricant. The second and fourth sets are conducted using a candidate lubricant. The sets are then compared using a prescribed statistical analysis. Each set is preceded by a 30-minute preliminary operation period at the test conditions of:

Engine speed, rpm	4000
Spark plug gasket temperature, °C	160 (320°F)
Torque, Nm	WOT
Exhaust gas CO concentration, %	6
Fuel oil ratio	50:1

The cooling fan is then stopped. During the tightening, the torque and spark plug gasket temperature are carefully monitored. When the spark plug gasket temperature reaches 300°C (572°F) the cooling fan is restored, and the engine is allowed to cool while running. When the spark plug gasket temperature is 160°C (320°F) the engine is allowed to stabilize for five minutes before starting the next tightening. During this time, the exhaust gas CO² is checked according to specification. This operational cycle continues until three sets of five to seven tightenings per set are obtained.

TEST PARTS EVALUATED

No test parts are evaluated.

PASS/FAIL CRITERIA

The candidate mean torque drop must be less than or equal to the NMMA 3259 benchmark oil, using the 90% statistical confidence limits.

