

BREAKING-IN AND ACCEPTANCE STANDARDS

Breaking-in and Testing Engines

52 EN

General

The life and performance of an engine depends greatly on the treatment it receives during the first few hours of operation. New or reconditioned engines should therefore be treated with great care during the break-in period.

The following basic rules should be observed

1. The engine should be broken-in under its own power.
2. Let the engine warm up slowly.
3. Increase speed slowly.
4. Run the engine at high speed only as long as is necessary to check for oil leaks, oil pressure, proper blower operation, and to measure the power output.
5. Use only high quality no-additive oil.
Summer: SAE 30
Winter: SAE 20

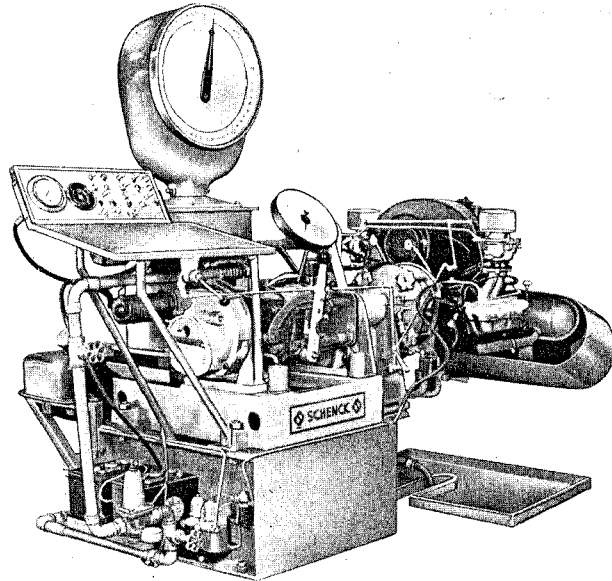


Fig. 248

Note:

After break-in or when changing the oil the first time at 500 km (300 mi.) the no-additive engine oil should be replaced with high quality approved HD-oil. At this time the by-pass oil filter element should be replaced. Thereafter the oil should be changed as specified in the Lubrication chart.

Rebuilt Engines

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Rebuilt engines are considered to be those which have (among other parts) new pistons, cylinders, and bearings.

Preliminary inspection

1. Adjust valve clearance (31 EN).
2. Adjust contact-breaker points and ignition timing.
3. Check V-belt tension (8 EN).
4. Fill engine to dip stick full mark with high quality oil (approx. 5 l or 5.4 qts.).

5. Check compression.

This test is best carried out with a spark plug compression gauge or a recording compression gauge. The throttle valve should be wide open. Remove all spark plugs and crank the engine with the starter.

The variation in pressure readings for all four cylinders should not exceed 1.2 kg/cm² (17 psi).

6. Check oil pressure.

Starting

Crank the engine several times with the ignition switched off before starting. In the case of engines that have been stored for some time it is advisable to oil the cylinders through the spark plug holes or to introduce oil through the intake while starting.

When the engine has started, the green oil-pressure warning lamp must go out immediately as the engine increases speed. If the lamp does not go out no oil is being pumped to the bearing surfaces.

The red generator warning lamp must also go out as engine speed increases.

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Testing during Break-in

Breaking-in

The time required for breaking-in the engine on the test stand should normally not exceed 60 minutes. This should be allocated as follows:

(kg values given for standard Schenk dynamometer are not mkg torque.)

- 20 minutes at 1500 rpm 2 to 4 kg
11 to 22 ft. lb.
- 20 minutes at 2000 to 2500 rpm 4 to 6 kg
22 to 33 ft. lb.
- 20 minutes at 3000 to 3500 rpm 6 to 8 kg
33 to 44 ft. lb.

Engine Type	RPM	Time for Consumption of 50 cc fuel (sec)	bhp DIN
1600	3500	11—12	48
1600 S	4000	10—12	58

In order to keep an accurate check on the engine temperature while these tests are being carried out, it is essential that an accurately calibrated remote reading oil thermometer be used.

A. Fuel System

After the engine has been started, check for fuel leaks at the fuel pump, fuel lines, or carburetors. Check fuel pump pressure and adjust idling speeds.

B. Fuel Consumption and bhp tests at Full Load

When the engine has been run for 30 minutes, full load may be applied only for short periods. The following guiding values should be obtained:

C. Generator, Regulator, and Blower

Check the generator for smooth quiet running, and that the regulator functions properly. The blower impeller must under no circumstances drag against the blower casing. The engine requires several hours of operation under gradually increased loads and speed on the test stand for proper break-in.

Final Inspection

55 EN

A. Oil Leaks

After load and fuel consumption test inspect engine for oil leaks at the push rod tubes, oil pump, oil cooler, crankcase joint, and rocker box cover.

B. Oil Change

When the tests have been completed it is advisable to drain the oil, clean the oil strainer, and refill to full mark with a high quality no-additive oil.

HD oil should not be employed until the oil change at 500 km (300 mi). After this change follow the lubrication schedule on the lubrication chart.

C. Pre-installation Inspection

Before installing the engine, insure that the ignition, valve clearance, V-belt tension, and oil level are correct. Air filters should have new elements.

D. Storing Engines

Engines which will not be installed for some time after break-in tests should be protected against corrosion by injecting preservative oil into the carburetor air intakes during the last few revolutions before the engine stops. The exterior of the engine should also be sprayed with preservative.

Testing Partly Rebuilt Engines

56 EN

If an engine has been only partly rebuilt (i.e. new valves installed and seated), the full power tests should not be carried out until the engine has been run for at least 30 minutes on the test stand. If the crankshaft, bearings, pistons and cylinders have not been renewed, it is not absolutely necessary that the oil be changed after break-in is completed.

The following procedure should be carried out when testing partly rebuilt engines:

1. Preliminary inspection.
2. Check fuel system.
3. Fuel consumption and bhp tests at full load.
4. Check for oil leaks.
5. Pre-installation inspection.

Performance and Fuel Consumption 1600 Engine

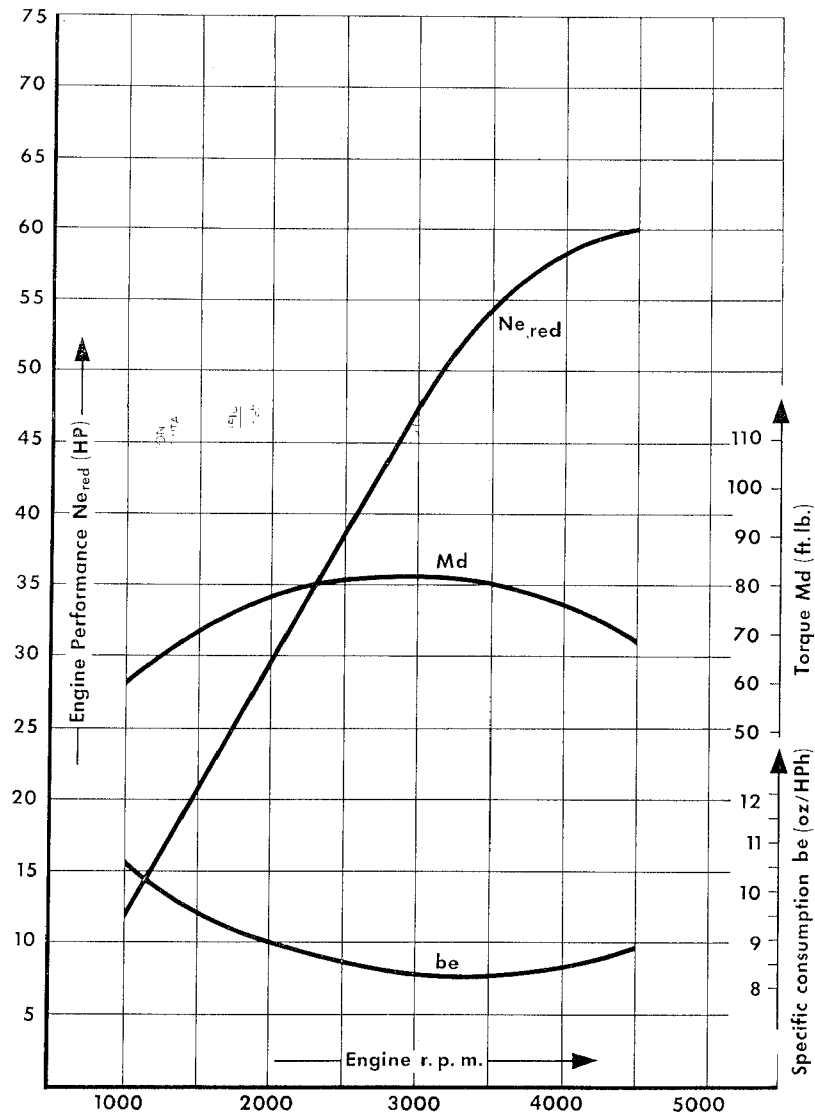


Fig. 249

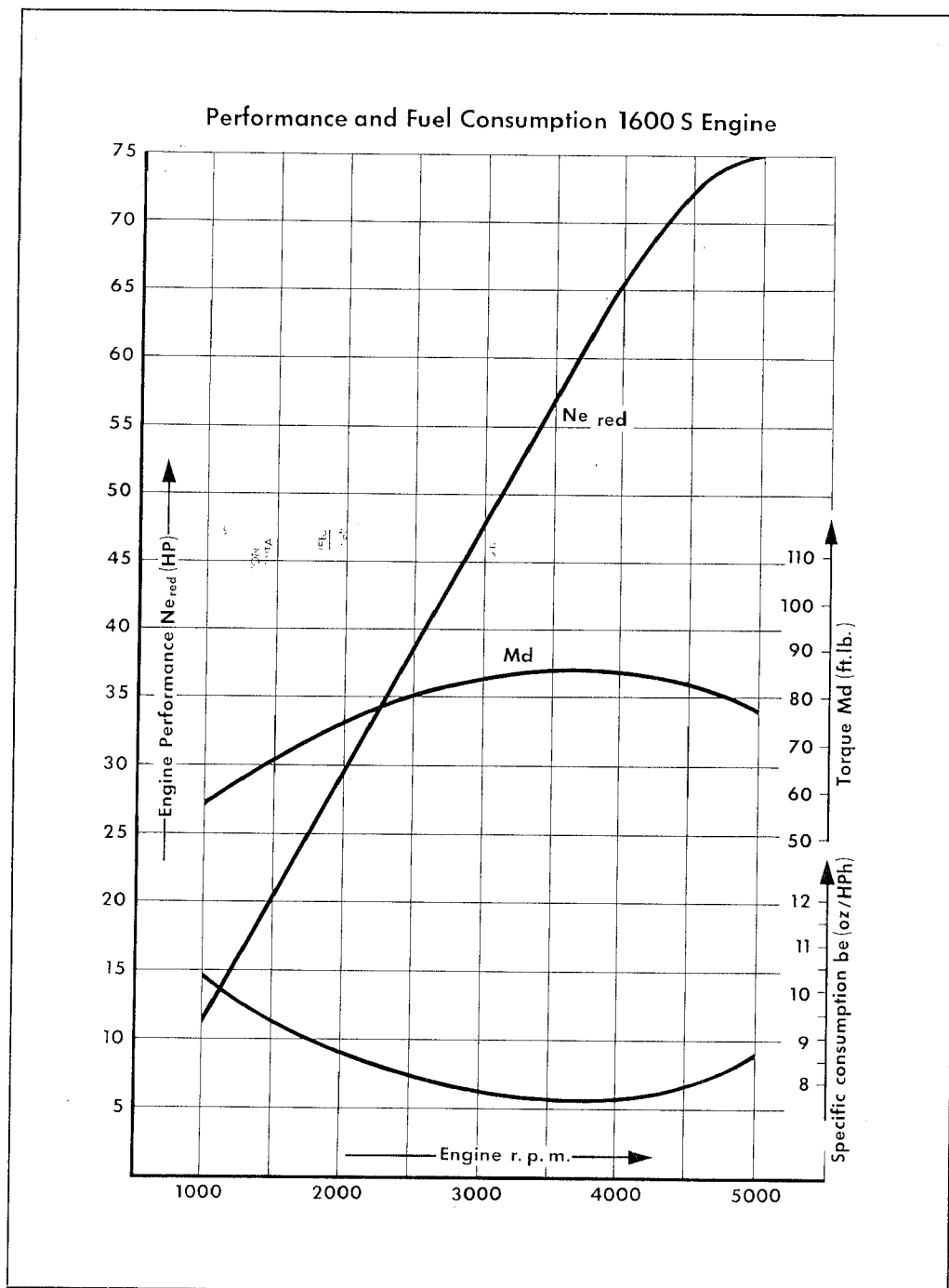


Fig. 250