The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
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SURFACE VEHICLE RECOMMENDED PRACTICE

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Air Starter Motor Test Procedure

1. Scope—This SAE Recommended Practice provides a standard procedure for testing the output performance and plotting the performance curve of air starting motors.

2. References

2.1 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J543—Starting Motor Pinions and Ring Gears
SAE J544—Electric Starting Motor Test Procedure

2.1.2 ISO PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 7650—Commercial vehicles and buses—Mounting dimensions for starter motors of type 1, 2, 3, and 4

3. Description

3.1 Testing Procedure—The starter shall be mounted in a test stand as shown schematically in Figure 1. Performance curves are established by running the starting motor in one of two methods. Method A involves plotting a curve from discrete points while Method B is achieved by operating the motor in a continuous mode while the output is automatically recorded and/or plotted. Deviation from either of these two methods shall be noted on the performance curve. Air pressure shall be measured at the starter inlet port and adjusted as required to maintain a constant value during the entire test. The air pressure should not exceed the recommendation of the manufacturer. All torque measurements should be reflected to the starter output shaft. Ambient air temperature should be recorded. The supply air moisture and lubricant content should be noted. All data shall be reduced to the standard conditions of 1 Bar (14.7 psig) and 21 °C (70 °F).

3.1.1 TEST METHOD A—Run the starting motor at various discrete torque loads and record the air inlet and exhaust pressure, air temperature, torque, air flow, and speed. Sufficient points should be recorded and a linear regression method should be used to generate smooth torque, power, and flow curves from the respective data points. A typical performance curve is shown in Figure 2.

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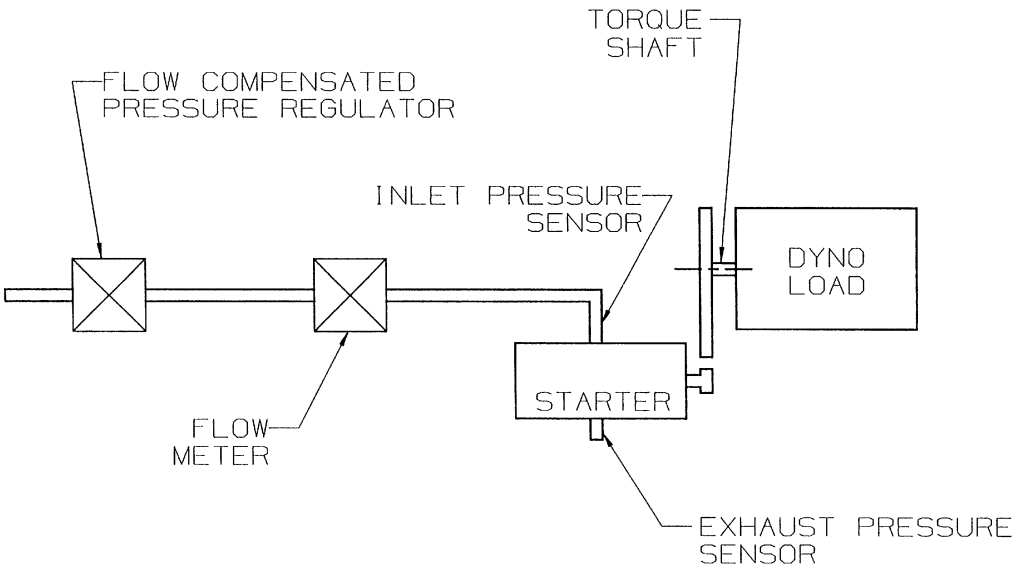

FIGURE 1—STARTER MOTOR PERFORMANCE TEST ARRANGEMENT

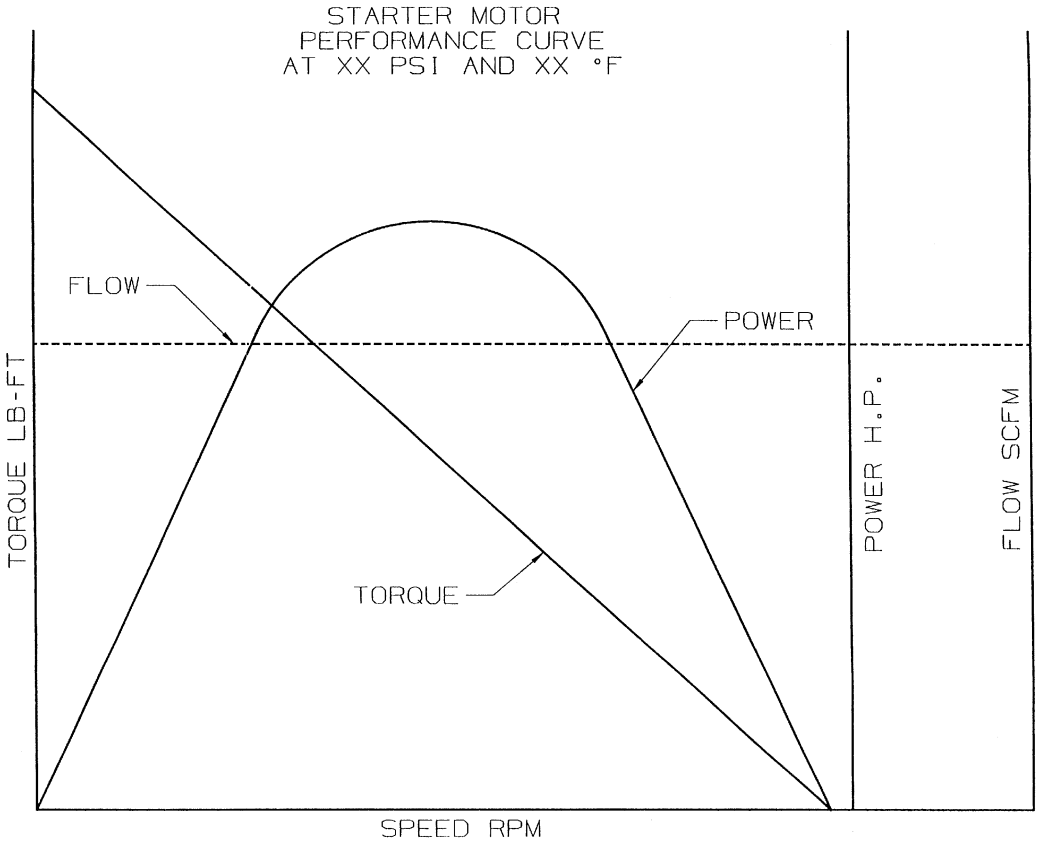

FIGURE 2—STARTER MOTOR PERFORMANCE CURVES AT SPECIFIC PRESSURE AND AMBIENT TEMPERATURE