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**Test Method for Measuring Power Consumption of Hydraulic Pumps  
for Trucks and Buses**

1. **Scope**—The testing technique outlined in this SAE Recommended Practice was developed as part of an overall program for testing and evaluating fuel consumption of heavy-duty trucks and buses. The technique outlined in this document provides a general description of the type of equipment and facility which is necessary to determine the power consumption of these engine driven components.

It is recommended that the specific operating condition suggested throughout the test be carefully reviewed on the basis of actual data obtained on the specific vehicle operation.

This document covers evaluation techniques for determining the power consumption characteristics of hydraulic pumps used on heavy-duty trucks and buses.

- 1.1 **Purpose**—The purpose of this document is to expand on the scope of the existing SAE J745. All of the specifications and apparatus utilized in that document for construction and industrial machinery can be utilized in this procedure. Information presented in the manner outlined as follows can be used to evaluate the hydraulic power requirements of fixed or variable displacement pumps after the vehicle duty cycle has been determined.

2. **Reference**

- 2.1 **Applicable Publication**—The following publication forms a part of this specification to the extent specified herein. Unless otherwise specified, the latest issue of SAE publications shall apply.

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

SAE J745—Hydraulic Power Pump Test Procedure

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3. **Evaluation Techniques for Fixed Displacement Pumps**—Three curves are required to evaluate highway power consumption. Examples of these are shown in Figure 1 which are based on 2.5, 5, and 25% of rated pressure. Factors that influence the selection of the proper pressure curve are axle weight, tire size, vehicle speed, steering geometry, etc. Figure 2 is required at 1000 pump rpm to represent maneuvering power consumption under conditions such as docking, parking, or low-speed city maneuvering.

NOTE—Only Test 2, Performance Characteristics, and Test 4, Response Time and Recovery Time, of SAEJ745 are relevant to power loss.

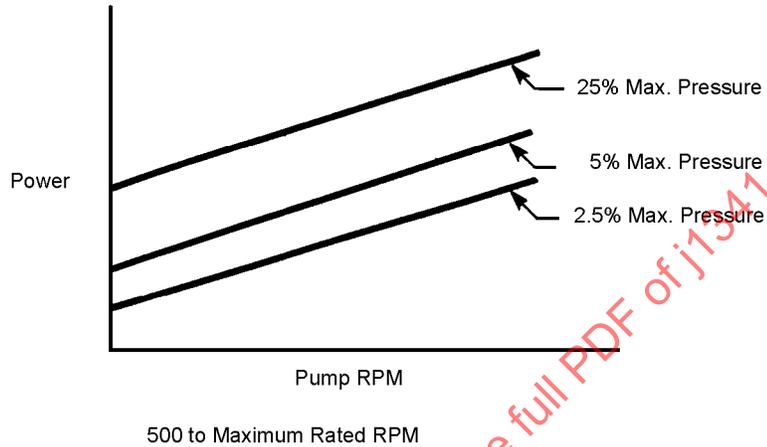


FIGURE 1—POWER VERSUS PUMP RPM

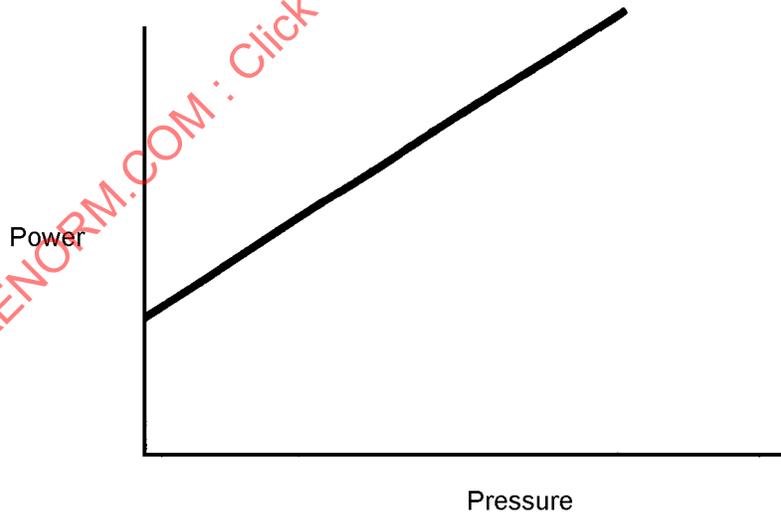


FIGURE 2—POWER VERSUS PRESSURE AT 1000 PUMP RPM

4. **Evaluation Technique for Variable Displacement Pumps**—Three curves shown in Figure 3 are used to determine power loss. These involve maximum rated rpm, 75% of rated rpm, and 50% of rated rpm. All curves are based on rated pressure.

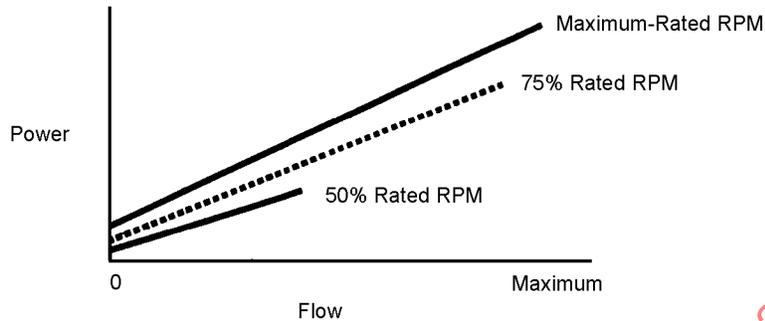


FIGURE 3—POWER-LOSS CURVES FOR VARIABLE-DISPLACEMENT PUMP

5. **Formatting Data Useful for Vehicle Computer Simulation Program**—Duty cycle has to be known for this activity. This duty cycle includes time spent in maneuvering power consumption versus highway power consumption operation. The curves in Figures 1, 2, and 3 can be used to determine power requirements. If required, data from these curves can be utilized to develop data in tabular form showing speed versus torque in 100 rpm increments which will be useful in vehicle computer simulation program.

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