SAE The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE INFORMATION REPORT

SAE J2408

ISSUED OCT1997

Issued 1997-10

Clutch Requirements for High-torque Truck and Bus Engines

Foreword—Recent technological developments in diesel engine design have made higher torque output and lower operating speed engines readily available. As these engines push driveline components to their practical limit, it has become necessary to formulate a "Next Generation" clutch installation system to handle higher levels of output torque. While relating component torque capacity to design configuration is beyond the scope of SAE Recommended Practices, it is to be noted that the current truck and bus clutch heavy-duty clutch standards are considered to provide torque capacity to about 2850 N·m (2100 lb-ft) and the "Next Generation" clutch installation system is expected to provide torque capacity to about 4200 N·m (3100 lb-ft).

TABLE OF CONTENTS

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-8512 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER; (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS http://www.sae.org

1. ***Scope—***Although not limited to, these clutch requirements are normally used on trucks considered as Heavy Duty (Class 8).

1.1 **Purpose—**This SAE Information Report defines and discusses clutch and related component configurations which will become the subject of future SAE Recommended Practices to promote standardization of clutch installations and mounting dimensions for use with pull-type heavy-duty clutches.

2. ***References***

2.1 **Applicable Publications—**The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

The following publications define the existing clutch system design configuration which may need revision to define the "Next Generation" clutch installation system for higher torque engines:

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

SAE J373—Housing Internal Dimensions for Single- and Two-Plate Spring-Loaded Clutches
SAE J617—Engine Flywheel Housing and Mating Transmission Housing Flanges
SAE J1463—Pull-Type Clutch-Transmission Installation Dimensions
SAE J1479—Automotive Pull Type Clutch Terminology
SAE J1731—Pilot Bearings for Truck and Bus Applications
SAE J1806—Clutch Dimensions for Truck and Bus Applications
SAE J1857—Flywheel Dimensions for Truck and Bus Applications

2.1.2 TMC PUBLICATIONS—Available from The Maintenance Council, American Trucking Associations, 2200 Mill Road, Alexandria, VA 22314.

TMC RP 633 (T)—Effects of Drivetrain Torsionals

3. ***Definitions—***The following specific terms as used in this document are defined as follows:

3.1 **Heavy-Duty (Class 8) Trucks—**A truck or tractor rated by the manufacturer and certified to the US federal government to be for operation at a gross vehicle weight or a gross combination weight of 14 969 kg (33 001 lbs) and over.

3.2 **Next Generation Clutch Installation System—**The engine, clutch, transmission, and clutch-release system design parameters of the type defined in the referent documents which interface with the primary powertrain clutch as redefined to allow operation at engine output torque levels beyond the capability of the existing component designs.

3.3 **Soft Spring Rate—**A clutch-disc spring rate designed to have a low-torsional spring rate, internal damping, and long-torsional travel in order to avoid normal vehicle operation at or near the vehicle's drivetrain torsional resonance frequency. See TMC RP 633 (T).

4. ***Technical Requirements——***The SAE Truck and Bus Clutch Subcommittee and the SAE Truck and Bus Transmission Subcommittee in a joint meeting have identified the design parameters for the "Next Generation" clutch which will need to be revised to define the package size requirements for clutches which can handle the next higher level of torque. Some of these parameters are known and some are currently under development as follows:

4.1 Known Requirements—Design parameters considered fixed are as follows:

4.1.1 ENGINE FLYWHEEL HOUSING SIZE—SAE number 1.

4.1.2 PILOT BEARING REQUIREMENTS—Current 6306 size pilot bearing per SAE J1731.

4.1.3 TRANSMISSION INPUT SHAFT SIZE—60 mm (2.362 in) diameter shaft size with involute spline having TBD number of teeth and a 30 mm (1.181 in) diameter front pilot.

4.2 Requirements Under Current Study—Parameters which may change, but are not currently defined are as follows:

4.2.1 FLYWHEEL SIZE—The flywheel may be larger in diameter and have a higher thermal mass. The 430 mm (17 in) nominal size is considered as a practical maximum.

4.2.2 CLUTCH SIZE—The clutch may need to be larger in diameter and of greater thermal mass.

4.2.3 CLUTCH DAMPER REQUIREMENTS—The dampers may need to be larger in diameter and thicker to allow use of larger diameter springs to maintain correct torque capacity while using a soft spring rate.

4.2.4 RELEASE BEARING SIZE—The larger input shaft size will require an increased release bearing size. This larger size will increase the dimension across the housing's anti-rotation flats.

4.2.5 RELEASE YOKE SIZE AND PLACEMENT—The release yoke will need to be wider to conform to the wider bearing housing and placed at a greater distance above or below the input shaft to clear the larger release bearing.

4.2.6 CLUTCH BRAKE SIZE AND SPLINED ATTACHMENT—The brake friction facing size may need to be increased in diameter to provide increased capability for higher inertia. Connection to the input shaft may be through a means which will delete the two long slots in the input shaft. The current lead approach is to use a dedicated involute spline.

4.2.7 CLUTCH HOUSING LENGTH—The new flywheel and clutch size requirements may require a longer clutch housing for adequate clearance.

4.2.8 TRANSMISSION CLUTCH BRAKE SURFACE—Dimensions may need to be revised to conform to the new requirements of 4.1.3, 4.2.6, and 4.2.7.

PREPARED BY THE SAE TRUCK AND BUS CLUTCH SUBCOMMITTEE
OF THE SAE TRUCK AND BUS POWERTRAIN COMMITTEE