

NAVISTAR, INC.		
CEMS (CORPORATE ENGINEERING MATERIAL SPECIFICATION)		NUMBER: CEMS BT-22
TITLE: Power Take-Off Clutch Flywheel Test		CURRENT ISSUE DATE: August 2009
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<i>This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.</i>		
Change Notice: Replaced "International Truck and Engine Corporation" with "Navistar, Inc." per corporate directive.		

1.0 SCOPE

This method covers a test procedure to screen combination hydraulic and transmission fluids for use in wet, multiple disc power take-off clutches.

FOR CLUTCHES EQUIPPED WITH SINTERED BRONZE LINING MATERIAL

2.0 APPARATUS

- 2.1 Production, wet, six disc clutch type independent power take-off unit (International part number 373707R94).
- 2.2 Flywheel with a moment of inertia of 13.2 slug·ft² (17.9 kg·m²).
- 2.3 Adapter (International part number 360742R2).

3.0 MATERIAL

- 3.1 New sintered bronze linings (International part number 376825R91).
- 3.2 New steel inner discs (International part number 374033R1).

4.0 PROCEDURE

- 4.1 Drill and tap two holes in the adapter, 15 to 30° above and below the centerline, for cooling water inlet and outlet. Install a baffle at the centerline to prevent short circuiting of the cooling water.
- 4.2 Install the adapter on IPTO unit and connect cooling water.
- 4.3 Install 2 quarts (1.9 litres) of test fluid in the IPTO unit.
- 4.4 Adjust the clutch lining pressure to obtain an initial dynamic clutch capacity of 550 lb-ft (746 N-m).
- 4.5 Maintain fluid temperature between 170 and 185°F (77 and 85°C).
- 4.6 With the test clutch disengaged, accelerate the flywheel to 540 rpm, engage clutch to stop the flywheel then disengage the clutch. Repeat this cycle 80 times per hour for 50 hours.
- 4.7 Measure and record the torque capacity of the clutch every four hours

5.0 REPORT

Report the rate of clutch capacity drop in pound-feet (Newton-metres) per 1000 engagements.

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FOR CLUTCHES EQUIPPED WITH ORGANIC LINING MATERIAL

6.0 APPARATUS

- 6.1** Hydraulically actuated independent power take-off unit (International part number 406792R91).
- 6.2** 3 gpm (11.4 litre per minute) remote hydraulic supply.
- 6.3** Heat exchanger or other device to maintain a constant fluid temperature.
- 6.4** Flywheel with a moment of inertia of 7.77 slug-ft² (10.54 kg-m²).
- 6.5** Torque measuring device.

7.0 MATERIAL

- 7.1** New clutch driven discs (International part number 381489R2).
- 7.2** New clutch plate assemblies (International part number 381490R91).
- 7.3** 5 gallon (19 litre) test fluid sample.

8.0 PROCEDURE

- 8.1** Install new clutch driven discs and clutch plate assemblies in IPTO unit and connect remote hydraulic supply and fluid heat exchanger.
- 8.2** Connect clutch input shaft to flywheel.
- 8.3** Secure the clutch output shaft with the torque measuring device so as to measure torque transmitted by the test clutch.
- 8.4** Maintain fluid sump temperature between 170 and 185°F (77 and 85°C).
- 8.5** With the test clutch disengaged, accelerate flywheel to 1275 rpm, engage the clutch at a gross lining pressure of 180 psi (1.24 MPa) then disengage the clutch. Repeat this cycle 80 times per hour for 30 000 cycles.
- 8.6** Record the following at start of test and after 2000, 10 000, 20 000 and 30 000 cycles:
 - 8.6.a** dynamic coefficient of friction throughout operating range (1275 to 0 rpm).
 - 8.6.b** static coefficient of friction--the maximum torque transmitted prior to slip.

9.0 REPORT

Report the following values after 2000, 10 000, 20 000 and 30 000 cycles:

- 9.1** Dynamic coefficient of friction at 100 rpm relative slip speed.
- 9.2** Lowest value for dynamic coefficient of friction over full range of 1275 to 0 rpm.
- 9.3** Static coefficient of friction.

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