FRICTION ASSESSMENT SCREENING TEST (FAST)
BRAKE AND CLUTCH PROCEDURES

Application

These procedures are used to establish the friction and wear properties of clutch facing materials on a standard test machine.

Method A: Standard Clutch Procedure
Method B: Heavy Duty Clutch Procedure
Method C: Light Duty Brake Procedure
Method D: Heavy Duty Brake Procedure
Method E: Severe Duty Brake Procedure

Apparatus

1. Standard Ford, Dearborn developed, FAST machine (see Figure 1).

   Source: Bush Manufacturing
   Clawson, Michigan U.S.A.

2. T-Y recorder, with a 90 minute T axis.

   Source: Bush Manufacturing

3. Test Discs

   Cast iron discs, 180 mm diameter x 38 mm thickness of the following specification:

Total Carbon	3.35 - 3.65
Combined Carbon	0.60 - 0.80 desired
Manganese	0.60 - 0.90
Silicon	1.80 - 2.10
Phosphorus	0.20 max
Sulphur	0.12 max
Chromium (Optional)	0.05 - 0.15
Brinell Hardness	170 - 225

Date	Action	Revisions
2001 04 30	Revised	Editorial – no technical change A. Cockman
1994 02 28		

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Carbon-Silicon ratio must be adjusted to maintain physical properties and microstructure. The microstructure shall consist of flake graphite evenly distributed in a matrix of pearlite. Free ferrite, steadite or cementite not desired.

Source: Mintex Limited
Cleckheaton, Yorkshire

4. Laboratory Balance - capable of weighing to 0.001 g.

5. Desiccator - silica gel desiccant.

6. Files for sample preparation.

Materials

1. Emery paper 150, 220, 320 grit for preparing discs.

2. Acetone, technical grade.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

1. Machine settings are checked as follows:

1.1 Disc Run-out

Test disc run-out measured at the outer edge of the working surface under a no-load condition must not exceed 0.06 mm TIR.

1.2 Tension Rod Parallelism

The clamping load tension rod must be parallel to the test disc axis. This alignment is checked by setting the controls as follows:

(a) Pump on

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(b) Drive motor off

(c) Load arm in test position check parallelism of arm and disc face in accordance with the FAST machine manual.

(d) Transducer selector valve set to record friction pressure (equal to weight of load arm).

(e) Load valve 'E' in closed position.

When load valve 'E' is opened, the recorder trace must not deflect more than +/- 0.01 N/mm^2 (friction pressure).

1.3 Hydraulic Control System Accuracy

The hydraulic control system must be capable of maintaining friction pressure within 0.01 N/mm^2 of the value in Table 1 for the specified clamping pressure. This ability is checked by pushing up and down on the load arm during a test run until the clamping pressure ranges indicated on the clamping pressure gauge are in accordance with Table 1.

The transducer valve is set to record friction pressure during the check.

1.4 Wear Stop

The wear stop set screw must be adjusted to provide a 0.1 to 0.2 mm clearance between the load arm and test disc.

1.5 Test Room

The test atmosphere must be oil free. The room temperature must be 18 - 32 °C with a humidity of less than 90 %. Record actual room temperature on the test trace.

2. Test Procedure

2.1 Sample Preparation

Clutch facing samples shall not include rivet holes and the centre line of the sample shall be a radius of the disc. Disc brake pad samples shall be taken from the central area of the pad and the surface to be tested should remain untouched.

Drum brake lining surfaces should be filed flat and the sample taken from the central area of the lining.

The finished dimensions must be as follows:

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