

Flywheel Spin Test Procedure—SAE J1240

SAE Recommended Practice
Approved December 1978

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1. **Scope**—This recommended practice is intended to provide a uniform test procedure for flywheel assemblies to determine the rotative speeds at which they will either burst or withstand a specified limiting speed.

2. **Test Equipment**—The potential for serious injury to test personnel requires that greatest attention be given to safety. The spin chamber enclosing covers or doors must be properly designed and constructed to contain the flywheel and failed material. All rotating parts of the drive train between the power source and the spin chamber must have protective guards. The controls area should be safely isolated from the spin pit and drive train areas. A ventilation system should be provided for the removal of iron dust to prevent injury to eyes and lungs by the flying iron dust when the spin chamber doors are opened. The test area must have the cautionary signs and warning bells, etc.

The equipment may provide for testing of flywheels in the horizontal or vertical axis position. If desired, spin chamber may be evacuated to control the flywheel test temperature or to reduce its uncontrolled vibration and prevent quill shaft failure, which may be caused by air turbulence when testing inside small test chambers. The drive system adapters, etc., must be so designed that vibration is kept to a minimum. A disconnect clutch or equivalent cutoff system is recommended between the power source and the spindle to prevent extensive damage to the drive system components in case of sudden spindle seizure.

The following items are normally required for a test facility:

- 2.1 Burst test chamber and associated drive equipment.
- 2.2 Speed counter capable of recording burst speed or maximum speed attained.
- 2.3 Expendable type adapter flange for attaching the flywheel to the spindle shaft, etc.
- 2.4 Flywheel to adapter mounting hardware.
- 2.5 Test flywheel which is balanced to spin test speed requirements.
- 2.6 Soft lining of pit (wood, cardboard, etc. — when retrieval of failed flywheel pieces is necessary).
- 2.7 Dial indicator to check the concentricity and runout of the flywheel after it is mounted on the adapter flange.

2.8 Lifting crane.

2.9 Storage area and the necessary tools.

3. Test Procedure

3.1 Flywheels should be spin tested with the ring gear installed unless the ring gear is not part of the flywheel assembly.

3.2 Prior to spin testing, the flywheel is to be identified, checked for defects, and balanced to print specification. Hardness readings should be taken on all critical areas and recorded.

3.3 Clean all clamping faces and piloting bores on the flywheel and adapter free of dust and dirt.

3.4 Assemble the adapter flange to the spindle shaft and the flywheel to adapter flange.

3.5 Check and record flywheel concentricity and runout as assembled on the spin test adapter.

3.6 Record ambient and flywheel test temperature prior to spin testing.

3.7 Spin each flywheel assembly to the predetermined speed limit or until burst occurs. Acceleration rate to suit flywheel size and drive system capability.

3.8 Cracking or bursting of the flywheel assembly below the predetermined speed limit shall constitute failure.

3.9 When desired, chemical and physical analysis data can be obtained after testing the flywheel. Material strength is to be established by test bars removed from the critical areas of the broken flywheel parts. Chamber walls must be cushion lined to assure the reliability of this data. If broken parts from the critical areas are too small to permit removal of test bar, then test bar may be removed from another area with similar hardness level. If this is also not possible, a flywheel with similar strength level may be cut for test bar removal. However, the flywheel must have similar hardness, porosity, and defect levels in all critical areas and must be from the same pour of cast gray iron, nodular iron or steel, or must be from the same heat of forged steel.

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