

Recommended Brake Service Procedures to Reduce Exposure to Non-Asbestos Fiber



Technical Notice

For all ZF Off-Highway Solutions Minnesota Inc. non-asbestos brake linings

Manufactured brake linings no longer contain asbestos fibers. In place of asbestos, the linings contain a variety of materials, including glass fibers, mineral wool, aramid fibers, ceramic fibers, and carbon fibers. At present, OSHA does not specifically regulate these non-asbestos fibers, except as nuisance dust.

Medical experts do not agree about the potential long-term risks from working with and inhaling non-asbestos fibers.

Some experts nonetheless think that long-term exposure to some non-asbestos fibers may cause diseases of the lung, including pneumoconiosis, fibrosis, and cancer. Therefore, we recommend that workers use caution to avoid creating and breathing dust when working on brakes that contain non-asbestos fibers.

⚠ WARNING

1. Whenever possible, work on brakes in a separate area away from other operations.
2. Always wear a respirator approved by NIOSH or MSHA during all brake service procedures. Wear the respirator from removal of the wheels through assembly.
3. **NEVER** use compressed air or dry brushing to clean brake parts or assemblies. OSHA recommends that you use cylinders that enclose the brake. These cylinders have vacuums with high efficiency (HEPA) filters and workers arm sleeves. But, if such equipment is not available, carefully clean parts and assemblies in the open air.
4. During disassembly, carefully place all parts on the floor to avoid getting dust into the air. Use an industrial vacuum cleaner with a HEPA filter system to clean dust from the brake drums, backing plates and other brake parts. After using the vacuum, remove any remaining dust with a rag soaked in water and wrung until nearly dry.
5. Grinding or machining brake linings. If you must grind or machine brake linings, take additional precautions because contact with fiber dust is higher during these operations. In addition to wearing an approved respirator, do such work in an area with exhaust ventilation.
6. Cleaning the work area. **NEVER** use compressed air or dry sweeping to clean the work area. Use an industrial vacuum with a HEPA filter and rags soaked in water and wrung until nearly dry. Dispose of used rags with care to avoid getting dust into the air. Use an approved respirator when emptying vacuum cleaners and handling used rags.
7. Worker clean-up. Wash your hands before eating, drinking, or smoking. Do not wear your work clothes home. Vacuum your work clothes after use and then launder them separately, without shaking, to prevent fiber dust from getting into the air.
8. Safety data sheets on this product, as required by OSHA, are available from ZF Off-highway Solutions Minnesota Inc.

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Burnishing Procedures for ZF Off-Highway Solutions Minnesota Inc. Caliper Disc Brakes

Maximum torque will be achieved only after the brake has been properly burnished. Actual customer testing will be required to determine final acceptance and approval of brake system components.

It is recommended that the following SAE burnishing procedures be performed immediately following the installation and adjustment of the brake. These "SAE recommended practices" (J360; paragraph 7.3 for parking brakes and J786a; paragraph 5.5 for service brakes) are intended to be used as guidelines only. Contact the vehicle (or equipment) manufacturer for specific recommendations.

PARKING BRAKE: Make 10 stops from 10 MPH (45 m/sec) at 3 ft/sec²(0.9 m/sec²). Space the stops a minimum of 2.5 miles (4000 m) apart and operate the vehicle at 20 MPH (9 m/sec) between stops.

SERVICE BRAKE: Make at least 200 "Brake Snubs", not less than 50 in a series, from 40 to 20 MPH (64 to 32 km/hr) at 10 ft/sec²(3 m/sec²) in normal gear range. A "Brake Snub" is the act of retarding a motor vehicle between two positive speed values by the use of a brake system.

Accelerate to 40 MPH at moderate acceleration after each "snub" and drive 40 MPH (64 km/hr) between snubs.

At every 25th application (minimum), make a full stop from 40 MPH (46 km/hr).

APPLICATION INTERVALS:

- For light trucks and buses [6,000-10,000 lb (2,700-4,500kg) GVW]: 1.0 mile (1.6 km)
- For truck, bus, and combination of vehicles over 10,000 lb (4,500 kg) GVW: 1.5 miles (2.4 km)

NOTE: Other burnish procedures which produce similar braking conditions and performance characteristics are permissible.

After burnishing, adjust the parking brake and actuation system in accordance with ZF Off-Highway specifications (or the appropriate manufacturer specifications for components of the actuation system not supplied by ZF Off-Highway).

Immediately following any dynamic stop resulting from the application of the parking brake, the brake and disc must be inspected for any unusual wear or conditions and then adjusted in accordance with ZF Off-Highway specifications.

Recommended Disc Material

High quality brake discs should be used in conjunction with the caliper disc brakes. Depending on strength and performance requirements, low to medium carbon steel is generally recommended. Fabrication procedures are as follows:

1. Flame cut or machine to required outside diameter with inside diameter machined to size.
2. Stress relieve after all machining operations.
3. Blanchard ground to a surface finish of 54 Ra to 72 Ra with a visible cross-hatch pattern.
4. Surfaces to be parallel within 0.05 mm (0.002 in).
5. Surfaces to be flat within 0.13 mm (0.005 in).