



FITTING INSTRUCTIONS FOR THE INSTALLATION AND REMOVAL OF DRUM BRAKE LININGS FOR PASSENGER AND LIGHT COMMERCIAL MOTOR VEHICLES

In case of queries, please contact the brake lining supplier directly and not the FEMFM.

These fitting instructions are intended for trained specialists only! Installation and removal work may only be carried out if the following instructions have been read and understood. No liability will be accepted for damage caused by failure to comply with these fitting instructions.

1. Important general statements:

Brake linings / lined brake shoes are part of the brake system and as such are safety critical parts. All work must therefore be executed with the utmost care. **Brake linings / lined brake shoes must only be replaced by persons possessing the necessary expertise.** Incorrect work may lead to total failure of the brake system. These fitting instructions are a guideline for standard repair work. **The specific instructions of the vehicle and brake system manufacturers must therefore always be followed over the instructions in this installation guideline. No liability is accepted for damages resulting from non-compliance with the specific instructions of the vehicle and brake system manufacturers.** Brake linings / lined brake shoes must be replaced in axle sets. Do not use brake linings / lined brake shoes other than those specified for the particular vehicle type.

WARNING



- To minimise exposure, **avoid inhaling non-exhaust emissions and fine brake dust.**
 - Perform brake maintenance in a well-ventilated area.
 - When performing repair work, **do not clean brake parts with compressed air.**
 - **Wearing personal protective equipment, especially safety shoes, gloves, safety goggles, and respirators, is strictly required.**

WARNING



- **Do not bring brake linings, drums, shoe platforms, brake hoses etc. into contact with greases, oils, other lubricants or mineral-oil based cleaning agents as this could lead to brake failure. If necessary replace any parts which become contaminated.**
- **Do not use any sharp tools, as inappropriate use of these might cause damage. Use special tools only (torque spanner, spring, pliers, riveting tools, etc.).**
- **Should damage be observed on any part of the brake system while working on it, it must be remedied appropriately before the vehicle is put back into service.**
- **In case the brake system is equipped with an electric parking brake function (electrical parking brake), the special instructions of the vehicle or brake system manufacturer must be followed with respect to the default setting of the brake after the replacement of brake linings / lined brake shoes, and/or the replacement of brake drums. An incorrect default setting can lead to dangerous malfunctions of the brake system!**

2. Dismantling:

Before starting to work on the brake system attach a warning notice to the steering wheel that the vehicle is under repair, chock the wheels not being worked on, jack up the vehicle and ensure its stability. Begin working on one brake of the axle at a time. The second brake may serve as a guide for the correct positioning of the individual parts during reassembly. All working steps must be identical for both brakes on the same axle.

CAUTION

- **Do not actuate the brake after a brake drum has been dismantled.**
- **Shoe retracting and holding down springs are under spring tension; relieve in a controlled fashion. Springs must not be overextended or deformed.**
- **After having dismantled the brake shoes, use a spring clamp to prevent the piston of the wheel brake cylinder from coming out.**
- For dismantling, the brake shoe adjustment must be returned to its original setting according to the brake manufacturer's instructions.
- In the case of a split design (drum/hub), pull off the brake drum.
- With monobloc designs, remove any grease caps if fitted. Loosen the fastening nut. Remove taper roller bearings or ball journal bearings and dismantle the brake drum using an appropriate hub drawer. Protect wheel bearings against ingress of dirt.
- Note the installed locations of the individual parts to be dismantled. Make a sketch, if necessary.

NOTE If an ABS system is installed, do not change the sensor setting.

- Remove brake shoe locating devices (e.g. holding-down springs, spring clamps, etc.).
- Remove retaining or tension springs using spring pliers.
- Remove brake shoes; disconnect handbrake cable, if necessary.

3. Subsequent steps:

- Clean shoe platform and brake parts with non-mineral-oil based cleaning agents.

WARNING



- Do not clean brakes with compressed air, a stiff brush or something similar that may cause dust which, if inhaled, can be harmful to health. Wear a respirator, if working in a poorly ventilated area.
- All mechanical parts must work smoothly and be fully serviceable. Grease moving brake parts or rods lightly, as specified by the vehicle manufacturers.
- Ensure that the grease does not contact the brake lining material or drum working path as this could lead to brake failure.

- Push the wheel brake cylinder pistons simultaneously back up to their limit stop by exerting even pressure. Secure piston position by means of spring clamp.

CAUTION Avoid possible spillage of the brake fluid contained in the fluid reservoir, if necessary by draining some of the fluid into a suitable container. If inappropriately handled, brake fluid may cause serious injury or damage. Observe the brake fluid manufacturer's instructions.

- Check brake wheel cylinders for leakages. No brake fluid must emerge when the dust collars are lifted off, otherwise, overhaul or replace brake wheel cylinders in axle sets.
- The drum diameter must not exceed the allowed wear. In case of heavy cracks or deep crazing the drums may be skimmed by axle within the permissible vehicle manufacturer's tolerances or replaced by axle.
- In the case of skimmed drums, select oversized linings to suit the drum diameter where applicable.

With lined brake shoes, all subsequently mentioned work relative to fitting of liners will not apply:

- Drill off the brake linings from the inside of the shoe using a drill corresponding to the rivet diameter.
- Remove the rivet with a suitable punch.
- Check brake shoes for damage (e.g. deformation, heavy corrosion, cracks, etc.) and replace by axle, if necessary.

NOTE

- The contact areas between brake linings and brake shoes must be free from any lubricant.
- If corrosion protection coatings are to be applied use only temperature resistant paints.
- Do not use glue to fasten the linings! If required, such bonding must be carried out by authorized specialist workshops only.

Rivets:

The linings should be riveted to the shoe starting from the center and working to the ends using a riveting device. Observe the riveting force specified by the vehicle manufacturer.

CAUTION Excessive rivet forces may cause the lining to crack and tear off. Insufficient rivet forces may cause lining displacement on the shoes, which could lead to tear off or destruction of the lining. Both may induce total failure of the brake system!

4. Assembly:

NOTE

- Drum brake linings/shoes must have been stored in accordance with the storage conditions specified in the **FEMFM Catalogue of Characteristic Features** (<https://www.femfm.com/publications/catalogue>). The maximum storage period specified by the manufacturer applies from the date of manufacture and should not be exceeded. After the expiry of this storage period, the manufacturer can no longer guarantee the serviceability of the product.
- Check that all brake assembly springs are within manufacturer's tolerance.
- Do not dismantle and grease automatic friction-disc wear adjusters.
- In adjustment devices using threads, cams, wedges, etc., all parts must work smoothly in order to assure proper functioning.
- In automatic adjustment devices without friction discs, all parts of the adjustment device must be freely movable in order to ensure proper functioning. Apply brake grease sparingly, if necessary.
- Return the brake to its initial position by resetting the adjustment device. With automatic adjustment device observe the manufacturer's instructions.

Reassemble the brake parts in reverse order and working method as described under "Dismantling".

- When installing the springs, special care must be taken to install them at the right location and in their correct position - as previously noted.

WARNING Faulty assembly may lead to total failure of the brake system!



- In the case of a split design (drum/hub), place the brake drum in position.
- With the parking brake disengaged, check whether the brake lever on the brake shoe is in its basic position. If necessary, detach the parking brake adjustment device.
- In the case of combined hub and drum assemblies, place the brake drum in position, tighten the axle nut while observing the specified bearing clearance or torque setting. Replace self-locking nuts or split pins by new ones of the same type.

CAUTION Observe the vehicle manufacturer's instructions at all times. Any non-observance may cause total failure of the brake system as well as bearing damage and severe impairment of driving stability (e.g. locking of a wheel).

- Proceed as described in 2. and following to change the brake lining on the other end of the axle.

5. Brake shoe adjustment:

- Observe the vehicle manufacturer's instructions for the adjustment operation described below. While working on the adjustment, the brake fluid level in the fluid reservoir may change. Replenish in time using only new brake fluid specified for the particular vehicle type.

CAUTION If inappropriately handled, brake fluid may cause serious injury or damage. Observe the brake fluid manufacturer's instructions.

- Bring brake shoes into contact with the drum by means of the manual adjustment device and then release again far enough for the brake drum to rotate freely according to the vehicle manufacturer's instruction.

NOTE When correctly adjusted, the brake pedal should have free travel of approx. one-third of its total travel range.

- Adjust parking brake only after adjustment of both wheel brakes on the axle.
- Tighten the adjustment device for the parking brake or that for the mechanical brake, respectively, until the specified actuation travel on the control device is obtained. When lightly actuated, the braking torque on both wheels of the axle should be identical while the vehicle is jacked up. After disengagement of the brake, the wheels on the axle must rotate freely.
- In the case of an automatic adjustment device, the necessary adjustment is obtained by actuating the service brake or the parking brake several times. The process is complete when the operating travel of the service or parking brake has stabilised. This should not exceed one-third of the total operating travel for the service brake, while the free travel for the parking brake must correspond to the vehicle manufacturer's specifications.

WARNING If the specified values are not achieved, the entire brake system must be checked by an expert because the risk of a brake failure cannot be ruled out.



6. Functional test:

After having re-fitted the wheels and lowered the vehicle, be sure to observe the following points:

- Repeatedly actuate the brake until the brake pedal travel has stabilised at approx. one-third of its total travel. At a constant maximum pedal force, the pedal travel must not change even over a prolonged period of application.

WARNING If the pressure point and consistency cannot be achieved, recheck the entire brake system, as otherwise the risk of a brake failure cannot be ruled out.



- Check the brake system for leaks.
- Check the brake fluid level in the fluid reservoir and replenish to maximum filling line, if necessary.
- Use only new brake fluid of the grade specified for the particular vehicle type.

- CAUTION**
- If inappropriately handled, brake fluid may cause serious injury or damage. Observe the brake fluid manufacturer's instructions.
 - Perform trial brake applications at low speeds, keeping in mind that brake effectiveness may be somewhat reduced during the first brake applications. Do not apply excessive force or perform continuous brake applications in order to achieve faster bedding in of the liners.
- Always observe the bedding instructions of the vehicle manufacturer.
 - Observe traffic regulations when performing trial brake tests.
 - Carry out a functional test, e.g. on a rolling road, to ascertain that the system meets any legal requirements, which may exist; on trailers, check automatic reverse gear, if necessary.

7. General:

- Used brake linings / lined brake shoes and brake fluids must be disposed according the legal requirements applicable under national and /or local regulations.
- Brake linings / lined brake shoes are wear and tear parts and must therefore be checked at regular intervals.
- If the residual friction material thickness is less than 1 mm, or the wear indicator activates, or the thickness remains below the recommended thickness by the vehicle-/brake-/friction material manufacturer, all brake linings / lined brake shoes on an axle must be replaced by original equipment or by ECE R90-type-approved spare parts.

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