

## Instruction for filling and bleeding hydraulic disk brake systems

All processes described in this instruction are applicable for brake fluid DOT4 and hydraulic fluid based on mineral oil. Never the less the fluids must never be mixed up, otherwise sealers get damaged.

Furthermore the safety data sheet of the respective fluid has to be regarded. Take care of health and environmental hazards and not to contaminate surrounding parts, especially painted surfaces.

Basically there are two possibilities to fill and bleed a hydraulic brake system. It is recommended to fill from bottom to top. In this case the fluid is filled in the brake caliper. A filling device, for example the Tost filling device, Part-No. 059004 or the brake fluid gun, Part.-No. 059020 / 059030, is necessary.

If there is no suitable tool available, the system can only be filled from top to bottom. The main brake cylinder is used as a pump. This proceeding is not applicable for all installation situations. Especially when more brake cylinders are installed it might not work. Helpful for this approach is also the use of a vacuum pump (Part-No. 059300 / 059330)

### 1. Filling and bleeding a system from bottom to top

- a) Unscrew the cover of the brake fluid reservoir. Position an absorbent pad under the reservoir.
- b) Connect the hose of the filling device with the bleeder valve of the brake caliper. For this purpose remove the dust cover and clean the valve with a dry cloth.
- c) Open the bleeder valve counter-clockwise. Bleeder valves with non-return function need at least two turns to open completely, other systems may need less. Please mention there are metric and imperial wrench sizes possible.
- d) Pressurise the fluid in the filling device. Check if the brake fluid is going through unobstructed and bubble free and if the connection to the bleeder valve is leak proof. The brake fluid is pushed fast and evenly through the brake system by the pressure in the filling tool.
- e) Shortly after pressurization of the filling device, brake fluid will appear in the fluid reservoir and fill it. Remove the fluid with a suitable tool before it will overflow.

<b>Tost GmbH Flugzeuggerätebau</b> Thalkirchner Straße 62 • 80337 München • ☎ 089-544 599-0 • Fax 089-544 599-70 EASA Production Organisation DE.21G.0065 • EASA Maintenance Organisation DE.145.0411 Design Organisation EASA.AP230 • <a href="http://www.tost.de">www.tost.de</a> • <a href="mailto:info@tost.de">info@tost.de</a>		Date:	Name:
	prepared:	10.10.2017	Ehrat
	checked:	16.10.2017	Maschkowitz

- f) When using a manual filling device, make sure to actuate the pump frequently to provide a constant filling pressure. Carry on removing fluid from the reservoir when necessary.
- g) Observe the escaping brake fluid in the reservoir. When filling an empty system, there will be many big air bubbles in the beginning. While taking progress the air bubbles will get smaller and rare. As soon as no air bubbles can be detected, the master cylinder has to be activated during the filling process. This will release further air accumulations and further air bubbles will appear in the fluid reservoir. Repeat this action several times. The system has to be flushed with at least 250 ml of brake fluid until no air bubbles will appear also if the master cylinders are actuated.

When only changing brake fluid, there will be discolored brake fluid and maybe air bubbles escaping in the fluid reservoir. The old brake fluid must be removed completely, there must also be no contamination left in the reservoir. Also actuate the brake cylinder in this case.

- h) To end the bleeding process close the bleeder valve at the brake caliper clockwise. If necessary, let the pressure escape from filling device and remove filling hose from the bleeder valve.
- i) If necessary, fill up the reservoir until the filling mark (plastic collar). Please mention the wear of the brake pads and brake disk is compensated by fluid from the reservoir. So do not fill the reservoir up to the maximum mark according the wear of the brake pads. Otherwise there can be an overflow when the pads or disk is changed. Mount the cover of the fluid reservoir.
- j) Carry out a braking test with the master cylinder. After a short actuation path there has to be a noticeable pressure point, as soon as the brake linings contact the brake disk. Maybe it is necessary to actuate the master cylinder several times before a pressure point can be noticed due to the fact that the brake linings have to be pumped onto the brake disk.
- k) At the end, all hoses and connections have to be checked for any leakages, mount dust cap of bleeder valve.

Remarks:

- If there are problems with bleeding, remove fluid reservoir and store it as high as possible during the bleeding process.
- If there is residual air, remove main brake cylinder and brake caliper from installation position and tilt them around all axis.

## 2. Filling or bleeding a hydraulic disc brake system with drain hose and drain bottle

If there is no suitable filling device available, the system can be filled or bled with a transparent drain hose and collection container.

- Connect the drain hose with the bleeder valve. Therefore remove dust cap and clean the valve with a dry cloth. The hose can be let to a collection container, more sophisticated is the use of a vacuum filling and bleeding pump (Part-No. 059300 / 059330). This is a drain bottle formed as a bellow to support the fluid flow by a slight vacuum.
- Actuate the main brake cylinder with moderate force
- Open bleeder valve slowly and close, before the master cylinder reaches the end position. If there is a bleeder valve with non-return function installed, open it a half turn. In this case, there is no need to close it again.
- Bring master cylinder back in initial position, repeat Step b) and c).
- Go on with the bleeding process until there are no air bubbles or decolored brake fluid escaping the drain hose. Mention to refill the fluid reservoir if necessary to prevent air entering the brake system.
- When filling an empty system, it has to be flushed with at least 250 ml of brake fluid.
- If necessary, refill fluid reservoir until the filling mark (plastic collar). Please mention the wear of the brake pads and brake disk is compensated by fluid from the reservoir. So do not fill the reservoir up to the maximum mark according the wear of the brake pads. Otherwise there can be an overflow when the pads or disk is changed. Mount the cover of the fluid reservoir.
- Carry out a braking test with the master cylinder. After a short actuation path there has to be a noticeable pressure point, as soon as the brake linings contact the brake disk. Maybe it is necessary to actuate the master cylinder several

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times before a pressure point can be noticed due to the fact that the brake linings have to be pumped onto the brake disk.

- i) At the end, all hoses and connections have to be checked for any leakages, mount dust cap of bleeder valve.

Remarks:

- Air bubbles normally would climb up. When filling from top to bottom, they have to move down. So long hoses or higher vertical differences can make a filling device described in chapter 1 necessary.
- Basically filling from bottom to top is also possible with a filling pump. Please regard the according instruction of the pump.

### 3. General Notes

- Brake fluid DOT4 is hygroscopic. Only a little amount of water can lead to a massive loss of braking force and corrosion. Do not use old brake fluid to refill the system and change the fluid after 5 years.
- Frequently check the fluid level in the reservoir. It must not be under the minimum mark to avoid air entering the system. Please consider the dependency of the wear limit. So used systems should not be filled up to maximum marking to prevent overflow when changing brake pads or the brake disk. To add brake fluid use only the type designated for the system and open container immediately before use.

#### 4. Annual Control

- Check wear of brake pads and change them if needed. The wear limit describes the thickness of the brake pad without the lining carrier. The wear limits are:

UL brake caliper, Part-No. 058820      0.5 mm

BZM, Part-No. 058222      0.5 mm

BZT, Part-No. 08010X      0.7 mm

BZT M, Part-No. 08011X      0.7 mm

BZT2, Part-No. 0802XX      0.7 mm

BZT4, Part-No. 08040X      0.7 mm

TOG, Part-No. 0581XX      1.5 mm

30-9, Part-No. 0758XX / 0759XX      2.5 mm

30-63A, Part-No. 0768XX      2.5 mm

- The total thickness of brake linings at any point must not be less than this value. There are no large-area outbursts acceptable.
- Control brake disc surface and thickness. If there are deep grooves, deformations or cracks mount a new original brake disk. The minimum thicknesses are:

thickness [mm]	wear limit [mm]
1.5	1.3
2.0	1.7
3.5	2.7
4.0	3.5
5.0	4.3

thickness [mm]	wear limit [mm]
6.0	5.2
6.5	5.5
7.0	6.0
8.0	7.0

- Maximum axial throw is 0.2 mm
- Change brake fluid DOT4 after 5 years

- Control hoses and fittings for leakage and chafe marks
- Visual inspection of all components
- Function check of the brake system