Brake systems
in agricultural and forestry vehicles

Europe-wide implementation of the new provisions
Increased brake system safety
As per the new EU regulations EU 2015/68 and EU 167/2013
New provisions

The new brake provisions for agricultural and forestry vehicles, which will take effect gradually and with grace periods, are designed to increase the safety of roads throughout all of Europe. These new provisions have consequences for the technology of towing vehicles and trailers.

For trailers with pneumatic and hydraulic brakes, the braking curve responsible for braking performance has been shifted dramatically upwards:

New dual-circuit pneumatic brake system

Under the new provisions, newly-purchased agricultural vehicles with pneumatic brake systems must fulfill the same basic requirements as lorries.

From a technical point of view, it is now mandatory that an anti-freeze pump or a dehumidifier be integrated into the system. The brake control circuit (yellow line) must be monitored, and in the event of a problem, cause the trailer to brake automatically.

Furthermore, as per ISO 7638-2, an electrical connector (5/7 pole ABS plug) must be installed on the towing vehicle. This connector will allow for the brake system to be monitored electronically from the trailer, as well as for the trailer to be towed with electronic braking systems (ABS or EBS).

With the new provisions, an automatic load-dependent braking system (ALB) must be installed on the trailer.

Important to know:

Attached to an older towing vehicle, a new trailer brakes too hard. Although wear and tear is greater due to the trailer constantly overbraking, the trailer can still be used without reaching a safety-critical level.

On the other hand, the situation becomes dangerous when an older trailer is attached to a new towing vehicle: In front, the driver’s required braking performance is achieved with a relatively lower brake pressure, which, however, results in a lack of pressure or reduced braking performance on the trailer in back.

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New dual-circuit hydraulic brake system

With the introduction of the new EU provisions for brake systems in agricultural vehicles, a new, dual-circuit brake system will be used for hydraulic trailer brakes. Although this provision only applies to new vehicles, existing tractors and trailers can for the most part switch to the new system.

**Functions:**

**Towing vehicle:** A new trailer brake valve secures the oil pressure supply of both standardised brake connectors: During operation, the brake line, with its already-recognised male connector (standardised as per ISO 5676:1983), increases the brake pressure from 0 to 150 bar, pressure which continues to be used by the customary single-circuit brake to operate the service brake on the trailer. The new, additional line, with its male connector coupling (as per ISO 16028:2006/DIN 10), maintains a continuous, constant pressure of 15–35 bar. A drop in the pressure in this line will cause the trailer to brake automatically. An electrical connector (as per ISO 7638-2, 5/7 pole ABS plug) should be installed on the towing vehicle, in order both to monitor the trailer electronically and to be able to tow trailers with electronic braking systems. Intelligent trailer brake valves on the towing vehicle are downward compatible and can accommodate both older single-circuit or new dual-circuit brake systems.

**On the trailer:** The central element on the trailer in the figure below is the new dual-circuit emergency brake valve (NBV16). All the necessary functions are performed from this single unit, which includes the brake line, the additional line, the breakaway function, and the auxiliary brake with pressure reservoir, as well as the automatic load-dependent braking system (ALB) and reservoir emptier. The electrical connection is used for the system monitor, the immobiliser and the power supply for the automatic braking system. It is possible to route the brake line and the additional line to the second trailer.

**Transitional provisions:**

The deadlines for registering new vehicles with single or dual-circuit hydraulic trailer brake systems are specified in the EU regulation. It should be noted that vehicles already equipped with brake systems that meet EU standards can be put into circulation in Switzerland and EU-countries. For tractors, the grace period expires in 2020. The deadlines for trailers are yet to be fixed.

**Example on a R3a tandem vehicle**

1. Hydraulic dual-circuit emergency brake valve with ALB and reservoir
2. Load sensor for ALB (automatic load-dependent braking system)
3. Brake line and an additional line for the 2nd trailer
4. Electrical system monitoring with ABS plug 7638-2
5. Mechanical emergency brake
New dual-circuit hydraulic emergency brake valve

The effectiveness of hydraulic brake systems in agricultural trailers has been proven on countless occasions. This is also true for the breakaway safety function, which for years has been servicing trailers that travel at speeds of up to 40 km/h. These positive experiences are being carried over into the next stage of development.

The new dual-circuit hydraulic brake system, with its additional line, provides users with an element of security that surpasses any of its regular functions. For the driver, the system is also a reassuring visual feature, both on the towing vehicle and on the trailer.

A sturdy component on the trailer

The new emergency brake valve (NBV16) is the central component of the new trailer. It incorporates the brake line, the additional line, the emergency brake valve with pressure reservoir and the automatic load-dependent braking system (ALB), regardless of whether the towing vehicle is equipped with an older single-circuit or a new dual-circuit brake system.

The trailer brakes are therefore guaranteed to function in accordance with the new legal requirements. During normal operation, the emergency brake valve NBV16 is in “stand-by mode” and transfers the brake pressure to the brake cylinder.

Other features and advantages:

- Braking is automatically triggered by pressure from the reservoir as soon as the pressure in the additional line drops.
- Breakaway system: Ensures the automatic braking of the trailer when the brake lines are ripped from the couplings mechanically.
- Provides the pressure reservoir with a constant supply of oil.
- Monitors the pressure level in the reservoir electronically, and relays low values to the brake monitoring system in the tractor.
- Allows for the direct installation of a pressure control valve, which subsequently allows for the newly-prescribed ALB controller to be added to the vehicle in a compact and space-saving manner.
- Along with a sensor on a sprung axle, controls the NBV16 automatically and in proportion to the brake pressure.
- The reservoir pressure can be released manually, before the trailer is switched off and the brake lines are uncoupled.
- If the coupling is incomplete, the brake pressure in the reservoir will work as an immobiliser.