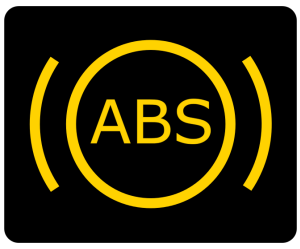
Competency 2

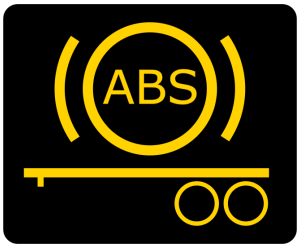
Brake System 3

Lesson Objective:
- Determine relevant means for optimization.
- Prepare for the theory test on the pneumatic brakes SAAQ.

ABS (*Anti-lock Braking System*)

The anti-lock braking system (ABS) is designed so that the driver can maintain control of his vehicle and prevent it from skidding during braking. When there is loss of traction, the ABS computer uses the wheel speed sensors to determine if one or more wheels are about to lock up during braking. Before a lockout occurs on a _____, the hydraulic modulator valve releases the brake pressure on it several times per second. The constant rotation of the wheels prevents skidding and helps maintain steering control.





Operation Indicators (warning lights)

The ABS warning light, usually _____ in color, lights up in the instrument panel for a few seconds when the ignition is switched on then goes out. However, if the warning light on the instrument panel or on the trailer remains on constantly, it will inform the driver that the ABS computer has detected an anomaly (defect) in its components and the system is _____ functioning. Nevertheless the conventional brakes are still working normally. At this time, it is essential to adapt your driving accordingly. In addition, the system should be repaired ASAP as soon as possible..

Driver Assistance System:

Some vehicles are equipped with a driver assistance system. This system uses the vehicle braking system to **improve** the **control** and **stability** of the equipment. A pictogram in the dashboard indicates its presence. It turns on for a few seconds when the ignition is switched to the on position, then turns off. The warning light flashes for each maneuver requiring its intervention. If it remains on, the system is inactive and should be repaired as soon as possible (ASAP).

ESP (*Electronic Stability Program*)

This system is integrated with the ABS (anti-lock braking system) computer and uses the same sensors and modulating valves. It manages the engine torque and sometimes even the engine brake. Additional sensors are added to convey information to the **ECU** (*Electronic Control Unit*) on the steering angle and the lateral displacement of the vehicle. The system may include anti-slip **(yaw control)** and anti-rollover **(RSP)**.

RSP (*Roll Stability Program*)

The purpose of this system is to prevent rollovers caused by excessive speed during a turn or sudden maneuvers. Under these conditions, it **automatically** reduces the engine torque and **applies** the **service brakes** in order to reduce the risk of overturning.

Anti-Slip (*Yaw control*)

Excessive vehicle speed, can cause slipping or even provoke a jackknife, **especially** on wet or icy road conditions.The purpose of this system is to **limit slippage**, preventing a Jackknife, by **reducing throttle** control and **strategically** applying the service brakes.

What to know about these systems:

These systems are not foolproof and can lose their efficiency when the steering angle is incorrect or when the load is unstable.

They become inactive in **ABS/OFF-ROAD** mode or when the **ABS/ATC** (Automatic Traction Control) system is in fault or is in diagnostic mode.

In addition, they can create and **record events.** Thus, as soon as one of the driver assistance systems intervenes, it can create an **event report.**

Despite their effectiveness, these driving assistance systems will never replace DEFENSIVE DRIVING applied by a professional driver.

BRAKING TECHNIQUES ON SLOPES AND ON FLAT TERRAIN:

Exit Ramps:

Anticipation of exit ramps is crucial. In order to optimize the stability of the truck, it is best not to brake when the truck is in the curve. The slowdown must therefore be completed before entering the _____. Well anticipated, an exit can even be negotiated without the use of the service brakes. Proper use of the Engine Brake Retarder is necessary.

Traffic Light:
When approaching a traffic light, it is **strongly recommended** that you **avoid** accelerating too much. **Anticipating** lights and traffic means **less strain** on the service brakes by **reducing** severe deceleration and reducing **unnecessary** stops.

Short Descents:
As you approach short descents, you should **release the accelerator** to reduce your speed. Thus, the acceleration caused by the slope, **gravity** will allow you to maintain your cruising speed without exceeding it. The engine brake can be used but with **good judgment**.

Long Descents:
As we approach a long descent, we must carefully observe the _____ and take in consideration weather conditions. This will make it easier to determine the deceleration required for the vehicle, in these circumstances. Therefore, the combination of braking and downshifting, before negotiating the slope, will allow you to reach the ideal gear for the _____.

This **anticipation**, combined with the use of the engine brake (retarder), ideally allows you to manage the slope without using the service brakes. In fact, the service brakes should be used only occasionally on certain portions of the slope, to keep the engine speed from exceeding the recommended _____. Using this approach will eliminate excessive rise in temperature of the brake drums and/or discs.

OnGuard from Meritor WABCO.

CMS (*Collision Mitigation System*)

This optional system uses a radar located in the front bumper. The radar determines the position as well as the speed of vehicles or objects in front of the tractor. It informs the driver of potential dangers by first changing the color of its _____, then emitting an audible signal.. Finally, if the risk of collision increases, it can apply the _____ up to 50% of the maximum power.

In the following example, a vehicle is detected in front of the truck at **230 feet (70 m)** and it is moving at **55 miles per hour (89 km/h)**