

Improving the braking performance of trailers with compressed air brakes (O3, O4)

Resolution of 17 October 2024 on the basis of the recommendations of the Executive Committee Vehicle Technology

Introduction

The number of trucks with strong endurance braking systems is increasing since a long time. With increasing electrification of vehicles more highly efficient energy recuperating systems will be installed in future. This leads to the situation that the use of friction brakes is more and more reduced.

Depending on the use of the commercial vehicle, e.g. predominantly long-distance driving on flat terrain, brake pads and linings often do not reach a temperature that is needed for the development of optimum brake performance. With trailers in particular, this can lead to the brake pads and linings "falling asleep", which can result in a reduction in braking force.

On the other hand, the maximum brake force which may be installed in trailers is limited by the upper line of the compatibility band as currently shown in diagrams 2 (for truck and full-trailer) and 4A (for semi-trailer) of Annex 10 of UN Regulation No. 13.

Trailer manufacturers expressly refer to the conditioning or reactivation of brake pads after long periods of non-use. However, this does not seem to be widely recognised in road traffic. The German Road Safety Council (DVR) proposes the following possible solution to improve the situation of decreasing trailer braking performance caused by brake pads and linings „falling asleep“.

Recommendation: Amendment to UN Regulation No. 13, Annex 10 - Extension of the compatibility bands at higher control pressure ($p_m \geq 500$ kPa)

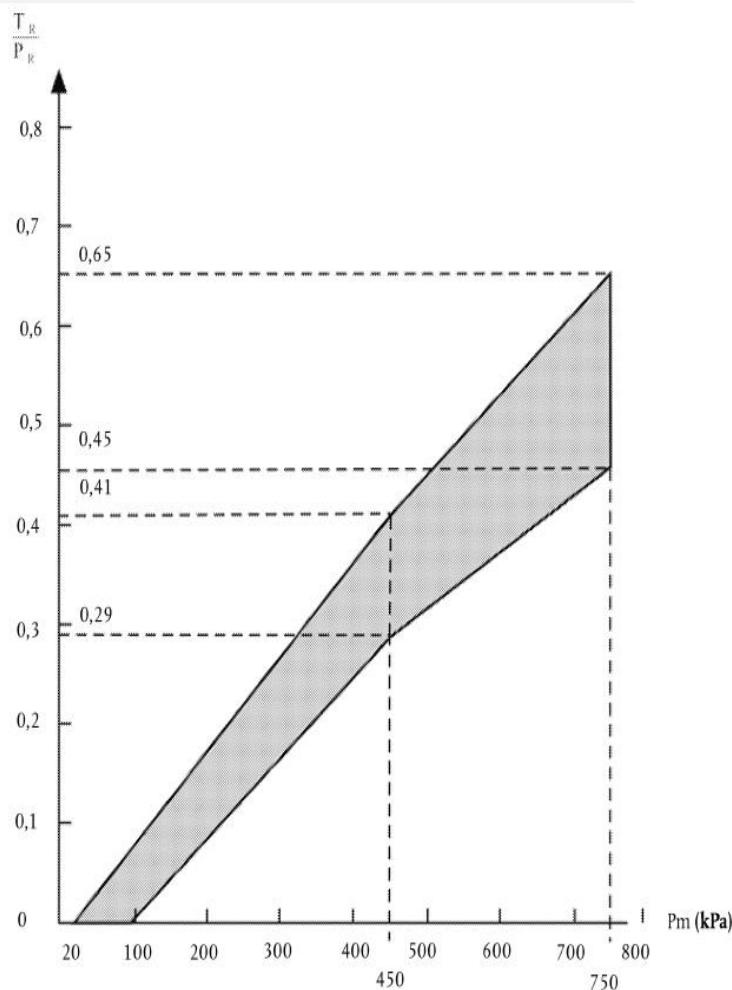
Annex 10, paragraph 1.1 of Regulation No. 13 defines the requirements for compatibility between towing vehicles and trailers. The compatibility bands were defined more than 50 years ago, when antilock braking systems (ABS) were not available. The goal was to ensure that the towing vehicle and trailer had a similar brake performance and simultaneously lock the wheels of the towing vehicle and trailer in order to achieve the best

stability of the combination. The axles of the towing vehicle and trailer have to brake their own masses.

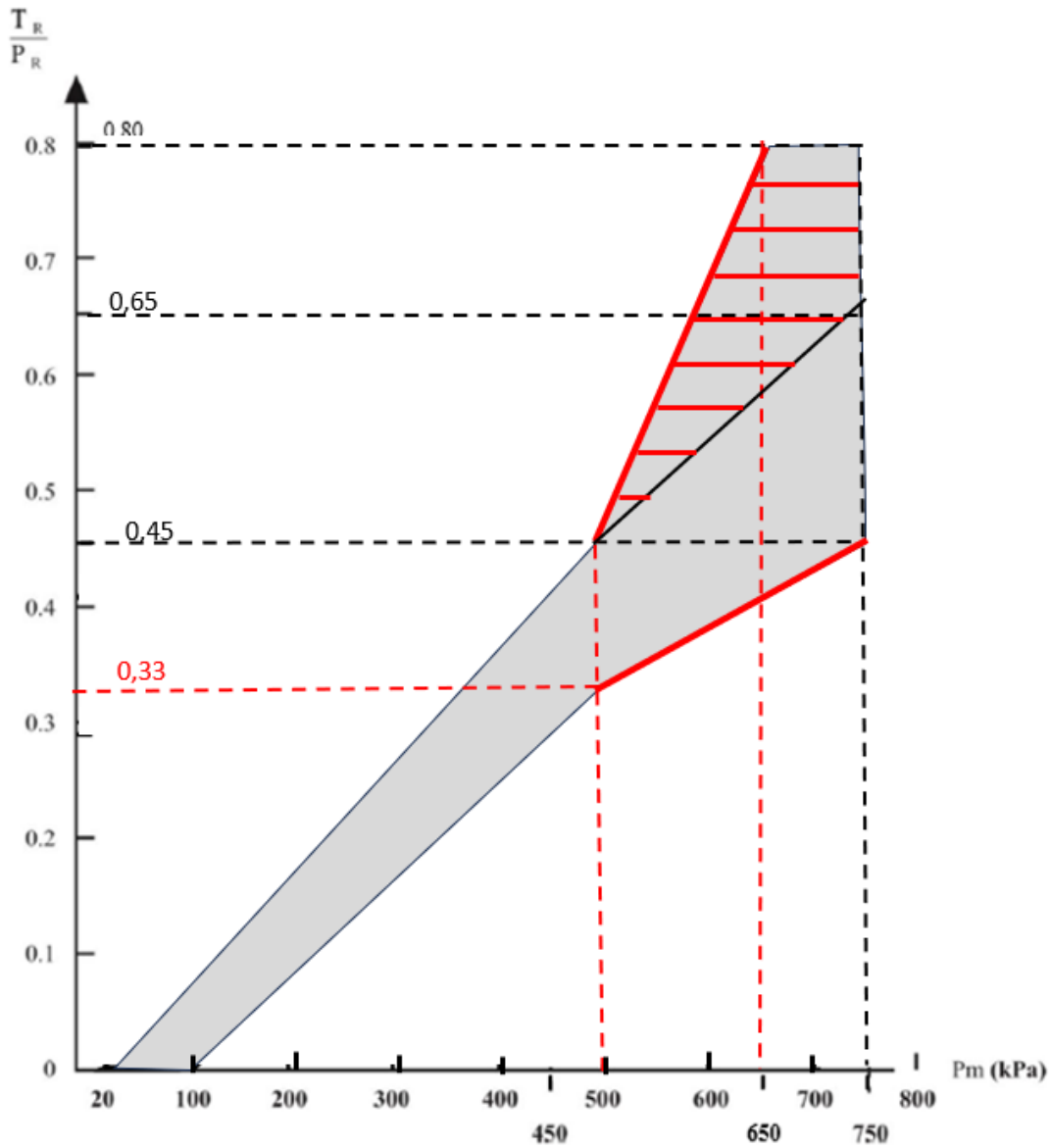
As a solution, the DVR proposes extending the compatibility bands at higher control pressure ($p_m \geq 500$ kPa). For this purpose, as shown below, diagram 4A (semi-trailers) in Annex 10 of UN Regulation No. 13 should be amended and a new diagram 5 (trailers) - instead of diagram 2 (towing vehicles) - should be added. This allows greater flexibility in the design of trailer brakes in order to achieve a higher braking performance when the brakes are „fallen asleep“.

At control pressures above $p_m = 500$ kPa, higher decelerations can therefore be realised. At lower control pressures ($p_m < 500$ kPa), brake compatibility for harmonising the braking forces between towing vehicle and trailer is ensured by the same properties as today.

Current Diagram 4A (UN Regulation No. 13, Annex 10) - "Semi-trailers":

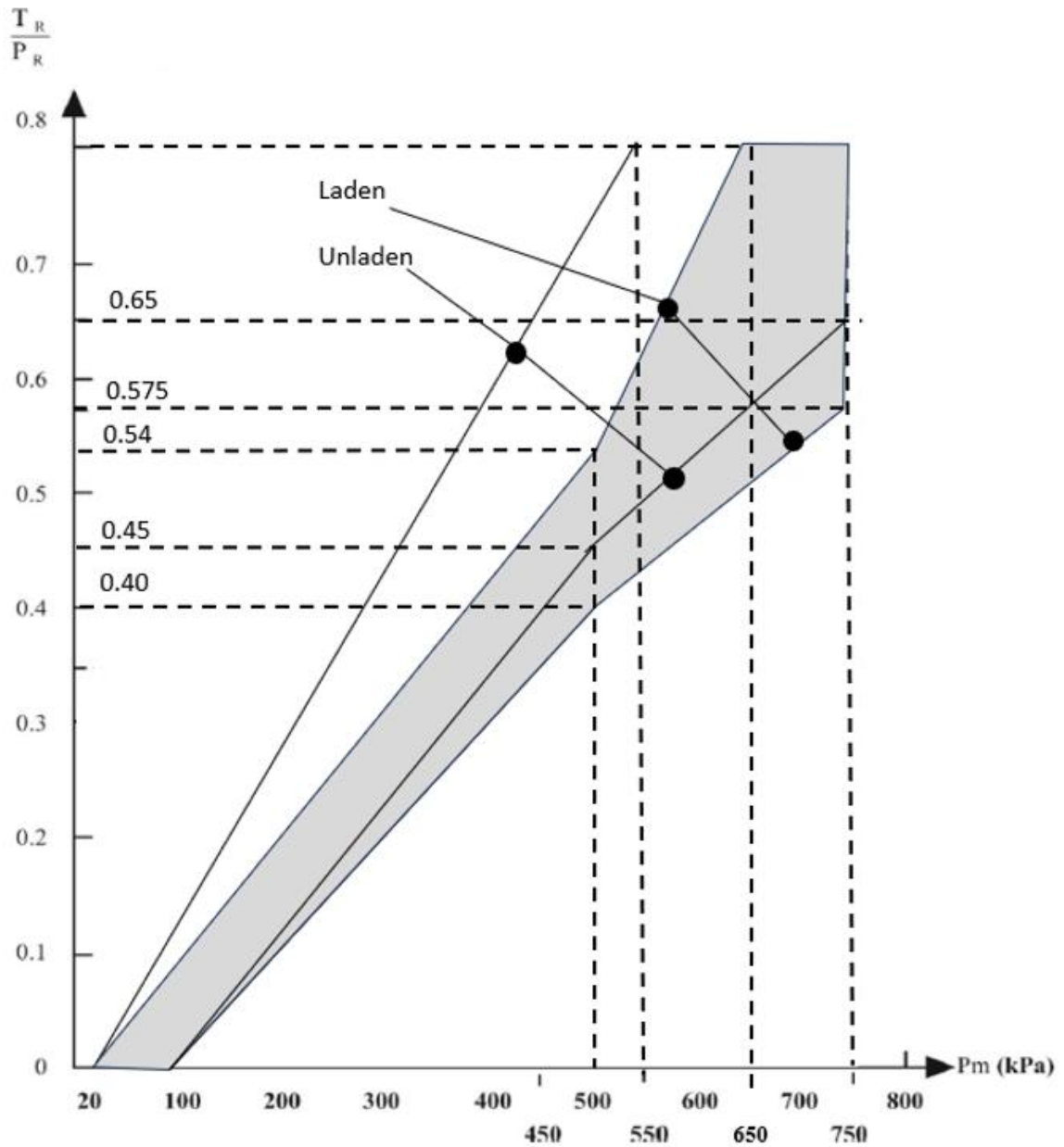


New Diagram 4A (UN Regulation No. 13, Annex 10) - "Semi-trailers":



The changes compared to the previous situation are shown in red hatching.

New Diagram 5 (UN Regulation No. 13, Annex 10) - "Full trailers and center-axle trailers":



Remark:

Currently, UN Regulation No. 131 (Series 00 and 01) for automated emergency braking assistance systems (AEBS) specifies that a maximum deceleration of 4 m/s^2 may not be achieved during the warning phase. To ensure that this value is not exceeded when towing a trailer, it is proposed to raise the kink in the characteristic curve of the compatibility bands from 450 to 500 kPa.

Signed

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President