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( Reaffirmed 1997 )

*Indian Standard*

# RECOMMENDATIONS FOR PRESSURES IN BRAKE LINES OF ROAD VEHICLES AND BRAKING EFFICIENCY

Automotive Vehicles Sectional Committee, EDC 38 [ Ref : Doc : EDC 38 (2324) F$_1$ ]

## 1. Scope

a) Determines and limits the values of pressures in the compressed-air lines of road vehicles and lines used to ensure pneumatic connections between tractors and trailers, and

b) Determines braking efficiency.

**1.1** It applies to vehicles for international commercial transport with trailers of a total loaded weight greater than 3·5 tonnes-force.

**1.2** It deals only with compressed-air braking devices with two lines, one service braking line and the other automatic braking line.

## 2. Values of Pressures in the Lines

**2.1** *Preliminary Definition of Nominal Pressure* — A pressure of n kPa in the brake line conventionally means a pressure of n kPa above the atmospheric pressure.

**2.2** *Service Brake Line ( Direct Brake Line )*

**2.2.1** The maximum operating pressure in the line of the service brake ( direct brake ) system shall be:

$$650 \pm 50 \text{ kPa}$$

**2.2.1.1** The reference value for pressure, as measured at the coupling point of the braking system and used for studying braking performances, shall be 450 kPa in the service brake ( direct brake ) line.

**2.2.2** The minimum pressure increase in the direct brake line leading to brake application shall be:

$$60 \pm 40 \text{ kPa}$$

**2.2.2.1** This value, measured at the coupling head, shall cause contact of the brake linings of each vehicle in the tractor-trailer combination. In addition, the relay valve shall start to operate at a pressure of not more than 50 kPa, also measured at the coupling head of the service brake ( direct brake ) line.

**2.3** *Automatic Brake Line*

**2.3.1** The pressure in the automatic brake line during normal running and the pressure in the compressed-air reservoir of the trailer fed by the automatic brake line shall be:

Between 650 and 800 kPa

**2.3.2** The operating of the low-pressure warning device in the automatic brake line shall be at:

$$450 \, {}^{+\,50}_{\;\;0} \text{ kPa}$$

as measured at the head coupling. The reasons for these values are given in Appendix A.

**2.3.3** *Operation of automatic brake* — The automatic brake shall start to function after the warning device has been in operation for a sufficient time, or in the case of breakage of the towing hitch. Its operation shall be progressive, as a function of the drop in pressure up to maximum efficiency.

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**3. Braking Efficiency** — The braking efficiency is defined by the braking ratios:

$$\frac{T_M}{P_M} \text{ and } \frac{T_R}{P_R}$$

where

$T_M$ = sum of braking forces at the periphery of all wheels of the tractor;

$T_R$ = sum of braking forces at the periphery of all wheels of the trailer or semi-trailer;

$P_M$ = permissible total loaded weight of the tractor; and

$P_R$ = permissible total loaded weight of the trailer, or, in the case of a semi-trailer, that part of the total loaded weight on the semi-trailer wheels.

**3.1** The braking ratios $\frac{T_M}{P_M}$ and $\frac{T_R}{P_R}$ of the tractor on the one hand and of the trailer or semi-trailer on the other shall each have the value of 0·45 when the control pressure measured at the level of the coupling of the service brake line is:

$450 \pm 50$ kPa for the braking ratio of the tractor;

$450 \begin{smallmatrix} +100 \\ 0 \end{smallmatrix}$ kPa for the braking ratio of the trailer or semi-trailer.

## APPENDIX A

*( Clause* 2.3.2 )

## REASONS FOR SELECTING PRESSURES FOR LOW-PRESSURE WARNING DEVICE

**A-1.** The adopted values have been chosen for the reasons outlined in **A-1.1** and **A-1.2.**

**A-1.1** *Tolerance* — The tolerance chosen provides ease of manufacture.

**A-1.2** *Pressures* — The maximum pressure of 500 kPa is low enough to ensure that the warning device functions only in the case of an actual defect. This allows the corresponding value not to be reached too frequently. At the same time the minimum pressure of 450 kPa is high enough, for this value of the pressure, to prevent any serious brake failure, and to ensure that the vehicle is still able to run with some degree of safety before the emergency brake comes into operation.

## EXPLANATORY NOTE

This Indian Standard aims at providing the acceptable values for pressure in compressed air lines of road vehicles and the trailers connected to these road vehicles. This standard is expected to provide the data for vehicle manufacturers and to be used as basis of agreement between the vehicle manufacturers and braking systems manufacturers.

This standard is in entire agreement with ISO/R1186-1970 ' Pressure in brake lines and braking efficiency ', issued by International Organization for Standardization.



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