

NOTA

This leaflet is part of a set which also includes the following leaflets :

541-1- Brakes — Regulations concerning the construction of the various brake components (1).

544-1- Brakes — Braking power.

546 - Brakes — High power brakes for passenger trains.

600 - Electric traction with aerial contact line.

640 - Motive power units — Inscriptions, marks and signs.

(1) The revision of Leaflet 541-1 is in progress.

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0 - GENERAL

1 - INSCRIPTIONS TO BE MADE ON MOTIVE POWER UNITS

2 - CONDITIONS TO BE FULFILLED BY A DYNAMIC BRAKE SO THAT THE BRAKING EFFORT PRODUCED BY THIS DEVICE CAN BE TAKEN INTO ACCOUNT FOR THE CALCULATION OF THE TOTAL BRAKE-WEIGHT

3 - POINTS WHICH HAVE TO BE TAKEN INTO CONSIDERATION IN AGREEMENTS BETWEEN THE RAILWAYS CONCERNED.

*** 0-GENERAL**

0.1 - Foreword

The international traffic with locomotives and motor coaches is covered by bilateral agreements.

In order to ensure that the braking effort produced by dynamic brakes — electric brakes (E brakes) and hydraulic brakes (H brakes) — is taken into consideration for the calculation of the total brake-weight these brakes must comply with the following conditions :

0.2 - Scope

These rules shall apply to dynamic brakes of electric, diesel-electric and diesel-hydraulic motive power units which use the rail/wheel adhesion in cases where the electric or hydraulic brake would have to be taken into account as producing an additional braking effort to that of the air brake, for the calculation of the total brake-weight. It is necessary to allocate the braking effort supplied by the dynamic brake to the total brake-weight, only if the total brake-weight thus obtained is higher than that obtained by the air brake, under comparable conditions.

1 - INSCRIPTIONS TO BE MADE ON MOTIVE POWER UNITS

* 1.1 - The combined brake-weights (achieved by the joint action of the air and dynamic brakes for the various air braking systems in which the dynamic brake takes part), determined in accordance with the provisions set out in Leaflet 544-1, must be shown on the outside of the vehicle, in compliance with the provisions in Leaflet 640.

1.2 - It is permitted to show the brake-weights for various speeds at which braking may be started.

*** 2 - CONDITIONS TO BE FULFILLED BY A DYNAMIC BRAKE
TO ENSURE THAT THE BRAKING EFFORT PRODUCED BY THIS
DEVICE CAN BE TAKEN INTO ACCOUNT FOR THE CALCULATION
OF THE TOTAL BRAKE-WEIGHT**

2.1 - The dynamic brake must be designed so that the adjustment of the braking action in relation to speed is automatic and provides the brake with a specific efficiency.

2.2 - When the dynamic brake and the air brake are operated simultaneously, the total braking effort must be such as to restrict the risk of skidding.

2.3 - The dynamic brake must be ready for use at any time ; the operation of the air brake valve must bring the dynamic brake into action automatically.

2.4 - The dynamic brake must come into operation automatically in cases of emergency braking or when the brakes are applied by any automatic system (automatic vigilance device, automatic train-running control, automatic train stopping device, etc....), installed on the line to be used.

3 - POINTS WHICH HAVE TO BE TAKEN INTO CONSIDERATION IN AGREEMENTS BETWEEN THE RAILWAYS CONCERNED

3.1 - Possible brake-weight reduction, which might result from a failure of the dynamic brake during braking ; it is necessary to examine the conditions under which the other systems remaining operative in this case come then into operation to provide a braking effort and within which time-lag, and also whether they can be used once or several times.

3.2 - Speed ranges at which the dynamic brake must be used.

3.3 - It seems advisable that the dynamic brake be able to be operated alone, independently of the air brake, on account of the inherent advantages of this brake.

3.4 - Assessment of the checking possibilities, when the motive power unit is stationary, regarding the availability of the dynamic braking system.

3.5 - Possible use of anti-skid devices.

3.6 - In the case of electric brakes, appraisal of the reliability of the electric circuits concerned (number and type of electric equipment used ; independence of brake-current circuits of each motor, etc.....).

2.5 - Driver's cabs must be equipped with indicators showing, at least for the leading motive power unit, the braking effort, or a representative value, and with visual indicators showing, in the occupied driver's cab, that the braking effort of the remote-controlled units is at least equal to the minimum braking effort. It is, furthermore, admitted that the visual indicators point out that this minimum braking effort is not attained.

2.6 - In the event of failure of the dynamic brake during braking, the air brake must come into operation forthwith and automatically.

2.7 - On motive power units equipped with a dynamic brake, it is necessary to monitor the temperature in the braking circuit. If the dynamic brake, for which the temperature in the braking circuit is monitored, is automatically switched out of service, this must be preceded by a warning signal.

2.8 - On motive power units equipped with a hydraulic brake, driver's cabs must be fitted with a device indicating, when the units are stationary, that the hydraulic brake is ready to operate, and this at least for the motive power unit concerned.

2.9 - The electric braking effort must remain virtually independent of voltage and frequency variations permitted in the contact line or in any other source of energy coming into play in the braking.

3.7 - In the case of electric brakes, dependence or independence of the brake in relation to the voltage in the catenary or other sources of energy used during braking.

3.8 - Possible use of protecting or monitoring devices :

- for the electric brake : overcurrent relays in the armature and excitation current circuits of motors, monitoring relays for the operation of brake resistance ventilators, temperature-detectors for brake resistances, etc.....
 - for the hydraulic brake : monitoring devices to check the temperature of the braking liquid.
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APPLICATION

With effect from 1 January 1985 as regards obligatory provisions for the vehicles to be built.

All Railways in the Union.

RECORD REFERENCES

Headings under which the question has been dealt with :

- Electric braking of motive power units : existing devices, characteristics, efficiency, conditions of use, profitability.
(5th Committee -M.P.- : Leipzig, May 1965 ; Stockholm, May 1967).
- Conditions to be fulfilled by an electric brake so that, by agreement between the Administrations concerned, the extra braking effort produced by this device may be taken into account when calculating the total brake-weight of a powered unit.
(5th Committee -M.P.- : Florence, May 1968).
- *Question 5/T/FIC* : New version of Leaflet 544-2 «Conditions to be observed by a dynamic brake so that, by agreement between the Railways concerned, the extra braking effort produced by this device can be taken into account for the calculation of the brake-weight.
(Traction and Rolling Stock Committee : Paris, October 1982).
- *Question 5/T/FIC* : Revision of Leaflet 544-2.
(Sub-Committee for Braking : Paris, January 1983).