

12th edition, October 2008

Translation

O R

Wagons - Running speeds - Technical conditions to be observed

Wagons - Vitesses de circulation - Conditions techniques à respecter

Güterwagen - Fahrgeschwindigkeiten - Einzuhaltende technische Bedingungen



UNION INTERNATIONALE DES CHEMINS DE FER
INTERNATIONALER EISENBAHNVERBAND
INTERNATIONAL UNION OF RAILWAYS

Leaflet to be classified in Volumes:

IV - Operating

V- Transport stock

Application:

With effect from 1 October 2008

All members of the International Union of Railways

All provisions that are obligatory shall apply for all existing vehicles and those to be subsequently built.

However, a derogation will be given to SJ for Oms, Os-w, Lgs and Lhms wagons to run at 100 km/h.

Record of updates

1st edition, January 1953	First issue, entitled: "Characteristics of S and SS wagons"
10th edition, October 2005	Editorial additions: approval of amendments (point 3.6) by the groups of expert (GE2) in January 2005
11th edition, May 2007	2 and 3* markings
12th edition, October 2008	Requirements for articulated wagons

The person responsible for this leaflet is named in the UIC Code

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Summary

The purpose of the leaflet is to define all the conditions to be met for wagons to run at the maximum speeds of:

- 100 km/h,
- 120 km/h.

1 - General

o 1.1 - Running classes

1.1.1 - Wagons are allocated into one or other of two classes depending on whether they are capable of running at maximum permissible speeds of 100 km/h and 120 km/h.

Wagons are marked to indicate their class in accordance with the international marking and the corresponding indications for the load limits.

Running class	Maximum permissible running speed	Mark
S (normal)	100 km/h	S
SS (rapid)	120 km/h	SS

The ability of a wagon to run in Class S or SS trains depends essentially on:

- its dynamic behaviour which is related to its design features that guarantee the safety of running
- its braking capacity which should meet the requirement of *UIC Leaflet 543* (see [Bibliography - page 28](#)) regarding the brake equipment and the minimum percentage of the braked weight.

1.1.2 - Wagons built before 1 January 1979 must from 1 July 1998 meet the "Technical conditions to be observed by wagons to run at a speed of 100 km/h", attached as Appendix [A - page 14](#), to be able to run at 100 km/h under the maximum load for which they were designed.

1.1.3 - The following arrangements are laid down to enable RUs which want to run wagons on their lines without observing the percentages of braked weights required for Class SS:

1.1.3.1 - Wagons built before 1 January 1979

- which do not carry the SS mark,
- or which carry the SS mark, but for which the load limit in the SS condition is less than that permitted in the S condition,

can, on the initiative of any RU, be allowed to run at 120 km/h on its lines under the maximum load permitted by their design, if they satisfy the "technical conditions to be observed by wagons to run at a maximum speed of 120 km/h" attached as Appendix [B - page 17](#).

1.1.3.2 - Wagons built between 1 January 1979 and 1 January 2007

- which do not carry the SS mark,
- or which carry the SS mark, but for which the load limit in the SS condition is less than that permitted in the S condition,

can, on the initiative of any RU, be allowed to run at 120 km/h on its lines under the maximum load permitted by their design without any specific tests relating to dynamic behaviour if they comply with the characteristics described under point [2 - page 4](#) and are exempt from dynamic behaviour tests in accordance with point [3.6 - page 8](#).

1.1.3.3 - Wagons built after 1 January 2007 can, on the initiative of any RU be allowed to run at 120 km/h on the railway's lines under the maximum load permitted by their design without any specific tests relating to dynamic behaviour if they comply with the provisions described under point **1.1.3.2** and are equipped with a self-adjusting load-proportional braking system.

1.1.3.4 - The wagons of all RUs which meet the conditions described under points **1.1.3.1** - **page 2** to **1.1.3.3** should be marked as shown in Appendix **C** - **page 19**.

o **1.2 - RIV wagons**

Since 1 January 1979 any RIV wagons built must be able to run at 100 km/h, in the S condition, under the maximum load specified for this class.

1.3 - Bogie wagons

It is recommended that bogie wagons should be designed in such a way that they can run at 120 km/h when empty.

2 - Characteristics of S and SS wagons

Wagons to be built or converted

2.1 - Tare

The provisions of *UIC Leaflet 530-2* (see Bibliography - page 28) shall be observed.

NB : Observance of the provisions relating to the minimum braked-weight percentage - *UIC Leaflet 543* (see Bibliography - page 28) can result in higher minimum tares

2.2 - Axle load

The total axle load of the laden wagon shall not exceed a P value which depends on:

- the loading capacity of the lines *UIC Leaflet 700* (see Bibliography - page 28),
- the wagon braking equipment,
- the design features of the wagon,
- its dynamic behaviour.

The maximum value for P, in International traffic shall not exceed 22,5 t at 100 km/h and 120 km/h:

- for 2-axle bogie wagons,
- for 2-axle wagons.

NB : The running of 2-axle wagons with 22,5 t axle-loads at 100km/h and above is only possible on category D lines, the track gauge of which complies with the conditions in *Leaflet 700*, point 3.2.2.

2.3 - Brake equipment

The wagons shall be fitted with a continuous compressed-air brake:

- incorporating both a P position and a G position,
- complying, in both these positions, with the provisions of UIC Leaflets and, in particular, the minimum braked weight percentage defined in *UIC Leaflet 543*.

2.4 - Design features

The design of wagons must comply with *UIC Leaflet 510-1, 510-2, 510-3, 511, 512, 517, 530-1 and 530-2* (see Bibliography - page 28).

2.5 - Axles

2-axle wagons, fitted with double link suspension, that are suitable for running at speeds of 100 km/h or more with a 22,5 t axle-load, shall be fitted with axles in which the distance between outside surfaces of the wheel flanges is at least 1 418 mm, in compliance with *UIC Leaflet 510-2, point 1.7*.

2.6 - Suspension of two-axle wagons

2-axle wagons shall be fitted with a suspension that meets the requirements of *UIC Leaflet 518* (see [Bibliography - page 28](#)).

2.6.1 - Double ring suspension

This suspension defined in *UIC Leaflet 517, point 4* may be used under the following speed and load conditions: at 22,5 t per axle up to 120 km/h if the wheelbase of the wagons is not less than 8 m.

Existing wagons

- at 20 t per axle up to 120 km/h if the wagons do not satisfy the conditions of point [2.5 - page 5](#) and have a wheelbase > 6 m,

NB : Certain categories of wagon can be permitted to run exceptionally with a weight of up to 20,5 t per axle in accordance with the requirements of *Leaflet 700, point 3.2.1, first NB*.

- at 20 t per axle up to 100 km/h if the wagons have a wheelbase < 6 m,
- at 22,5 t per axle up to 100 km/h with a wheelbase such as $6\text{ m} \leq 2a^* \leq 8\text{ m}$ if they have been built or modified before 1/7/96.

2.6.2 - Other suspensions

(Reserved).

3 - Dynamic behaviour

3.1 - General

Before allocating a running class to a wagon with the maximum axle load specified for this wagon, the owning or registering RU shall check its dynamic behaviour by means of the tests described in point 3.2 - page 6.

The owning or registering RU shall make available to other RUs, if the latter so wish, the recordings of measurements and the results of tests in compliance with *UIC Leaflet 518*.

Failing justified objection to be notified to the owning or registering RU, the RUs must accept wagons of this type on their lines running under S or SS conditions with the weights per axle specified for each line category.

3.2 - Test conditions

Running tests to be done on wagons or running gear shall either be done according to the complete procedure specified in *UIC Leaflet 518* or according to the partial procedure specified in this leaflet. This type approval procedure enables the normal or the simplified method of measurement to be used depending on the operating conditions of the wagons.

The conditions for applying the simplified measuring method are laid down in *UIC Leaflet 518*.

In order to give general type approval to a new running-gear design (without having to subsequently carry out other tests), at least four tests should be carried out on the following types of wagons fitted with this type of running gear:

1. short wheelbase or short bogie pivot pitch wagon:
 - a. rigid body
 - b. flexible body
2. long wheelbase or long bogie pivot pitch wagon:
 - a. rigid body
 - b. flexible body.

The values to be used are given in the Table below:

2a*[m]	2-axle wagons		Bogie wagons	
	≤ 7	≥ 8	≤ 7	≥ 13
$C_t * \left[\frac{\text{kNmm}^2}{\text{rad}} \right]$	≤ 1 · 10 ¹⁰	≤ 1 · 10 ¹⁰	≤ 1 · 10 ¹⁰	≤ 1 · 10 ¹⁰
$C_t * \left[\frac{\text{kNmm}^2}{\text{rad}} \right]$	> 2 · 10 ¹⁰	> 2 · 10 ¹⁰	> 2 · 10 ¹⁰	> 2 · 10 ¹⁰

The order of the above tests is not specified, but the first type approval test shall be a test carried out according to the complete procedure.

The other tests can be carried out according to the partial procedure in accordance with point **3.3 - page 7** using the normal or simplified method of measurement.

The approval of new types of running gear shall be documented as specified in Appendix **E - page 23**.

3.3 - Application of the partial type approval procedure

When a wagon has already been type approved, modification of certain of its characteristics or of the conditions of its operation that affect its dynamic behaviour may require an additional test as specified in the partial procedure.

The conditions under which the partial procedure is applied are laid down in *UIC Leaflet 518* for bogie wagons and for 2-axle wagons. Some examples are given in Appendix **D - page 20**.

3.4 - Application of the simplified method of measurement to wagons built before 1 January 1979.

The simplified method of measurement can be used for the tests to check the dynamic behaviour which are specified in points:

- **A.2.1.7 - page 15** and **A.2.2.2 - page 16**,
- **B.3.2 - page 18**.