

UIC CODE

571-4

6th edition, January 2014

Translation

O R

Standard wagons - Wagons for combined transport - Characteristics

*Wagons unifiés - Wagons pour le trafic combiné - Caractéristiques
Einheitsgüterwagen - Güterwagen des kombinierten Verkehrs - Merkmale*



INTERNATIONAL UNION
OF RAILWAYS



Documents

Document Sharing Hub

Leaflet to be classified in volumes:

IV - Operating

V - Rolling stock

Application :

With effect from 1 January 2014

All members of the International Union of Railway

Record of updates

1st edition, January 1976	First issue
2nd edition, January 1991	Reprint including 14 Amendments
3rd edition, July 1997	Not issued
4th edition, October 2004	New lay-out, inclusion of the conclusions of C5 committee and SC09 sub-committee, renumbering of points and appendices. Important: the points of this leaflet have been renumbered in the new edition. The first digit of each point has been increased by one (i.e. 0 becomes 1, 1 becomes 2 ...). Please take account of this when using cross-references from other leaflets.
5th edition, April 2011	Amendment to point 1.8 concerning wagons' suitability to SS running.
6th edition, January 2014	Overhaul of leaflet.

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

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Summary

This Leaflet specifies the characteristics of the standard wagons used for road-rail traffic. It is part of the question "Intermodal traffic transfer techniques - Technical conditions for the use of wagons and load units in international traffic".

It describes:

- wagons for the transport of containers and swap bodies,
- wagons for combined traffic, both Recess wagons and "Rolling Road" wagons,
- wagons for horizontally loaded roller units.

1 - General

1.1 - It is recommended:

- that the types of wagon referred in this leaflet as being standard be built in accordance with the sets of standard drawings managed by ERRI.

ERRI document DG4 (see Bibliography - page 83) contains general information on standard/partially standardised wagons, and on standard groups and components;

- that in order to improve aerodynamic efficiency, the solutions presented in *ERRI Report B12/RP54* (see Bibliography) be used, where these are economically viable.

- 1.2 - The interchangeable parts listed in *UIC Leaflet 570* (see Bibliography - page 83) shall be used for the construction of wagons for combined transport.

- 1.3 - The wagons shall be built:

- with or without devices to pass from one vehicle to another,
- with or without a screw brake,

in accordance with the conditions laid down in *UIC Leaflet 535-3* (see Bibliography).

Crossing facilities fitted in the centre of the wagon shall either comply with provisions in *UIC Leaflet 535-2*, or be built with characteristics which improve the protection afforded to staff.

- 1.4 - The tare of the wagons listed in this leaflet shall be that of air-braked wagons incorporating a screw brake which can be operated from the ground.
- 1.5 - The wagons shall not incorporate crossing gangways, and the underframe length stipulated in this leaflet shall be the distance between the buffer-fixing planes.

After manufacture, the underframe length must have a positive tolerance in all cases (complying with the relevant national standard).

- 1.6 - It must be possible for loaded wagons to be lifted either end, at the headstock:
 - in the area under the side buffers on bogie wagons (except for Type 4 wagons, where it should be under the headstock support),
 - in an extension of the sole bars for 2-axle wagons.
- 1.7 - The following wagons must be suitable for SS-Traffic:
 - wagons in accordance with point 2 - page 4,
 - wagons in accordance with point 3 - page 14 (except for type 4 wagons),
 - newly built wagons in accordance with point 1.4 - page 2 as from 1.1.2001. A wagon is suitable for SS-traffic if:

- it is equipped with a brake according to the conditions of *UIC Leaflet 541-04, Appendix A "Wagons suitable for SS running"* (see [Bibliography - page 83](#)) or,
- it is equipped with a brake according to the conditions of *UIC Leaflet 541-04, Appendix A "Wagons suitable for S running"* and fulfil the conditions of the ** or *** marking from *UIC Leaflet 432, Appendix C* (see [Bibliography - page 83](#)) and possibly in addition have a 120-line of the load table.1

Each wheelset or bogie shall be braked by a stand-alone and self-adjusting brake in relation to the load on each bogie. One technical solution is the equipment of each wheelset or bogie with a separate load-proportional valve, a separate relay valve and a separate brake cylinder / actuator.

○ **1.8 - On wagons suitable for the conveyance of large containers and/or swap bodies:**

- the securing systems for these loading units must incorporate standard spigots whose shape and manufacturing dimensions when new comply with the indications in [point C.1 - page 38](#) and the materials used must be of E260/450M quality at least, in compliance with *EN 10293* (see [Bibliography - page 83](#));
- the limits applicable for the lateral distance apart of the spigots, and the operational service limits for the spigots themselves, are given in [point C.2 - page 39](#).

The height of the loading plane of the wagon when empty shall be indicated by using the symbol given in [point C.3 - page 40](#).

Point [C.3](#) shows an assembly diagram with fold-back spigots which takes account of the limit specifications as per [point C.2](#).

○ **1.9 - Unless markings specify otherwise, wagons must be able to run over a maximum break angle of 1° 30' on a 120 m-radius curve on ferry lines.**

1.10 - The play in the side bearers on wagons for intermodal transport shall be between 12^{+2}_0 mm and 6^{+2}_0 mm.

It is recommended that a value of 9^{+2}_0 mm should be used for new wagons for intermodal transport, which meet the safety curves in *UIC Leaflet 530-2, Appendix 3, Part 4*.

For old wagons for intermodal transport with a side bearer play of 12^{+2}_0 mm to 6^{+2}_0 mm attempts must be made to adjust the play to the recommended values for new wagons.

If the play is 6^{+2}_0 mm evidence must be produced that the safety conditions specified in *ERRI Report B55/RP8* (see [Bibliography - page 83](#)) are met when the wagon is carrying one or more empty or lightly loaded units.

1.11 - It is recommended that the last five digits of the wagon number are repeated on the upper surface of the wagon's outer solebars in order for the crane operators to identify the wagon more easily. This marking shall be made in accordance with the diagram in point I.1.

1.12 - Special markings for wagons used in intermodal transport also appear in *EN 15877-1* (see [Bibliography - page 83](#)).

2 - Wagons for containers and swap bodies

Wagons suitable for conveying large containers or swap bodies shall be of the following 9 types: 1, 2, 2a, 2b, 4, 4a, 5 and 6 suitable for running over lines to the continental loading gauge only, and type 3 suitable for running additionally over lines to the British loading gauge:

Type 1 - Short bogie wagons (Sgmmss, Sgkmmss, Sgjkmmss)¹.

Short bogie wagons (with or without shock absorbers) are wagons with two, 2-axle bogies suitable for 20 t maximum axle-loads.

Type 2 - Bogie wagons 60' in length (Sgss/Sgjss).

Wagons fitted with two, 2-axle bogies suitable for 20 t maximum axle-loads.

This type of wagon has been standardised in its two versions (with or without shock absorbers).

Type 2a - 60' bogie wagons (Sgnss).

Bogie wagons are wagons with two, 2-axle bogies without long-stroke shock absorbers, for use only in block trains and suitable for 22,5 t maximum axle-loads.

Type 2b - Bogie wagons > 60' in length (Sggnss).

Wagons with two, 2-axle bogies without long-stroke shock absorbers, for use only in block trains and suitable for 22,5 t maximum axle-loads.

Type 3 - Bogie wagons, to British loading gauge.

Type 4 - Articulated bogie wagons, 80' in length (Sggrss).

Articulated wagons with three, 2-axle bogies, for use only in block trains and designed for 20 t maximum axle-loads. This type of wagon has been standardised.

Type 4a - Articulated bogie wagons > 80' in length (Sggmrss).

Articulated wagons with three, 2-axle bogies, for use only in block trains and designed for 22,5 t maximum axle-loads.

Type 5 - 2-axle wagons, 40' in length (Lgss).

Type 6 - Bogie wagons for the conveyance of large containers and swap bodies (Sgmss), suitable for 18 t axle-loads.

1. The meaning of the different letters is given in UIC Leaflet 438-2

○ 2.1 - Common provisions

2.1.1 - The maximum axle load of these wagons under S and SS running conditions are defined in *UIC Leaflets 510-2 and 700* (see [Bibliography - page 83](#)). Heavier axle loads may be admitted in the case of a bilateral agreement:

2.1.2 - The wagons shall incorporate fixed, folding away or retractable devices to secure large containers and swap bodies through their lower corner fittings or intermediate parts. Spigots in loading units shall be based on Appendix XXX (Appendix C in current version - April 2011) - page YYY and on the report *ERRI B12/RP17* (see [Bibliography - page 83](#)). Other solutions shall be admitted if they are demonstrated to offer at least the equivalent level of safety.

2.1.2.1 - The position of these devices (spigots) must be in accordance with [Appendix A - page 33](#).

2.1.2.2 - Loading plans shall be provided by the manufacturer in accordance with wagon characteristics.

2.1.3 - Any wagon part forming an obstacle above the loading plane must fold down or be retractable, so that loading and unloading operations can be performed.

2.1.4 - Wagons for carrying swap bodies or containers may be equipped with extra swivelling underframes in order to allow horizontal loading. These swivelling frames shall meet criteria set out under [point 5 - page 26](#).

2.2 - Type 1 wagons - Short bogie wagons (Sgmmss/Sgkkmss/Sgjkmmss) designed for 20 t maximum axle-loads

○ 2.2.1 - Main dimensions

2.2.1.1 - Wagons without shock absorbers (Sgmmss/Sgkkmss)

Length over buffers	15,790 m
Length of underframe	14,550 m
Minimum available length	14,500 m
Maximum height of loading plane above rail level	1,180 m
Distance between bogie pivots	10,750 m
Bogie-axle wheelbase	1,800 m
Wheel diameter	0,920 m or 0,760 m

2.2.1.2 - Wagons with shock absorbers (Sgjkmmss)

Length over buffers	16,940 m
Length of underframe	15,700 m
Minimum available length	14,600 m
Maximum height of loading plane above rail level	1,180 m
Distance between bogie pivots	11,300 m
Bogie-axle wheelbase	1,800 m
Wheel diameter	0,760 m

2.2.2 - Load characteristics

2.2.2.1 - Maximum tare

- Wagons without shock absorbers:
 - for a wheel diameter of 0,920 m: 18t
 - for a wheel diameter of 0,760 m: 16 t
- Wagons with shock absorbers: 18t

2.2.2.2 - Within the limits of their load carrying capacity, it shall be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots (wagons with damping device - [Appendix A, Fig. 1 - page 33](#); wagons without damping device - [Appendix A, Fig. 2 - page 33](#)).

2.2.3 - Equipment

2.2.3.1 - The wagons shall be built in one of the following versions:

- wagons without shock absorbers, intended for block trains working,
- wagons with shock absorbers, intended for working in ordinary trains.

2.2.3.2 - Wagons equipped with shock absorbers shall not be fitted with facilities to pass from one vehicle to another, they may however include a crossing facility in their middle section.

2.2.3.3 - Additional conditions applicable to wagons fitted with shock absorbers:

The maximum longitudinal displacement of the loading platform permitted by the long-stroke shock absorber must be 500 mm in both directions.

During impacts at speeds of up to 15 km/h the accelerations withstood by the load - the weight of which may be between one quarter and the totality of the maximum load C of the wagon - must not exceed the value of 2 g.

2.2.3.3.1 - It is recommended that the value of 2 g should also, if possible apply for a single 20' large container with gross weight of 7 t.

2.2.3.3.2 - After each impact, the loading platform must return immediately to its central balancing position and the shock absorber must then have its full efficiency in the event of another impact.

Observance of these conditions must be checked by conducting the dynamic tests defined in *UIC Leaflet 529* (see [Bibliography - page 83](#))

○ **2.2.4 - Operating conditions**

Irrespective of their load condition, individual wagons must be capable of running through curves in sidings which have a minimum radius of:

- 75 m (wagons without shock absorbers),
- 35 m (wagons with shock absorbers).

2.3 - Type 2 wagons - Bogie wagons, 60' in length (Sgss/Sgjss) designed for 20 t maximum axle-loads

○ **2.3.1 - Main dimensions**

2.3.1.1 - Wagons without shock absorbers (Sgss)

Length over buffers	19,640 m
Length of underframe	18,400 m
Minimum available length	18,400 m
Maximum height of loading plane above rail level	1,170 m
Distance between bogie pivots	14,600 m
Bogie wheelbase	1,800 m
Wheel diameter	0,920 m

2.3.1.2 - Wagons with shock absorbers (Sgjss)

Length over buffers	21,000 m
Length of underframe	19,760 m
Minimum available length	18,400 m
Maximum height of loading plane above rail level	1,180 m
Distance between bogie pivots	15,800 m
Bogie wheelbase	1,800 m
Wheel diameter	0,920 m

○ 2.3.2 - Load characteristics

2.3.2.1 - Maximum tare:

- Wagons without shock absorbers: 18 t
- Wagons with shock absorbers: 23 t

2.3.2.2 - Within the limits of their load carrying capacity, it shall be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots (see Appendix A - page 33).

2.3.3 - Equipment

○ 2.3.3.1 - The wagons shall be built in one of the following alternative versions:

- wagons without shock absorbers, intended for working in block trains,
- wagons with shock absorbers, intended for working in ordinary trains.

Wagons fitted with shock absorbers shall not be provided with crossing facilities.

○ 2.3.3.2 - Additional conditions applicable to wagons fitted with shock absorbers:

The maximum longitudinal displacement of the loading platform permitted by long-stroke shock absorbers must be 600 mm in both directions.

During impacts at speeds of up to 15 km/h, the accelerations withstood by the load - the weight of which may be comprised between one quarter and the totality of the maximum load C of the wagon - must not exceed the value of 2 g.

2.3.3.2.1 - After each impact, the loading platform must immediately return to its central balancing position and the shock absorber must then have its full efficiency in the event of another impact.

2.3.3.2.2 - It is recommended that this value of 2 g be also, if possible, complied with for a single 20' large container with a gross weight of 7 t.

Observance of these conditions must be checked by conducting the dynamic tests defined in *UIC Leaflet 529*.

○ 2.3.4 - Operating conditions

Irrespective of their load condition, individual wagons must be capable of running through curves in sidings which have a minimum radius of 75 m.

2.4 - Type 2a wagons - 60' bogie wagons (Sgnss) designed for 22,5 t maximum axle-loads

○ 2.4.1 - Main dimensions

Length over buffers	max. 19,830 m
Length of underframe	max. 18,500 m
Minimum available length	18,400 m
Maximum height of the loading plane above rail level	1,155 m
Distance between bogie pivots	14,200 m
Bogie wheelbase	1,800 m
Wheel diameter	0,920 m

○ 2.4.2 - Load characteristics

2.4.2.1 - Maximum tare: 20 t.

2.4.2.2 - Within the limits of their load carrying capacity, it shall be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots and the loading plan (see [Appendix A - page 33](#)).

2.4.3 - Equipment

It is recommended that crossing facilities be provided in the middle section of these wagons.

The wagons shall be built without long-stroke shock absorbers and designed for block-train working.

○ 2.4.4 - Operating conditions

Irrespective of their load condition, individual wagons must be capable of running through curves in sidings that have a minimum radius of 75 m.

2.5 - Type 2b wagons - Bogie wagons over 60' in length (Sggnss) designed for 22,5 t maximum axle-loads

○ 2.5.1 - Main dimensions

Length over buffers	21,780 m
Length of underframe	20,540 m
Minimum available length	20,520 m
Maximum height of the loading plane above rail level	1,110 m
Distance between bogie pivots	15,800 m
Bogie wheelbase	1,800 m
Wheel diameter	0,920 m

○ 2.5.2 - Load characteristics

2.5.2.1 - Maximum tare: 21,5 t

2.5.2.2 - Within the limits of their load carrying capacity, it shall be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots (see Appendix A - page 33).

2.5.3 - Equipment

Wagons shall be built without long-stroke shock absorbers and designed for block-train working.

○ 2.5.4 - Operating conditions

Irrespective of their load condition, individual wagons must be able of running through curves in sidings that have a minimum radius of 75 m.

2.6 - Type 3 wagons - Bogie wagons intended to be used for traffic with Great Britain

(Reserved).

○ **2.7 - Type 4 wagons - Articulated bogie wagons, 80' in length (Sggrss) designed for 20 t maximum axle-load**

2.7.1 - Main dimensions

Length of underframes	25,800 m
Minimum available length	12,270 m
Maximum height of the loading plane above rail level	1,170 m
Distance between bogie pivots	10,700 m
Bogie wheelbase	1,800 m
Wheel diameter	0,920 m

2.7.2 - Load characteristics

2.7.2.1 - Maximum tare: 27 t

2.7.2.2 - Within the limits of their load carrying capacity, it shall be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots (see Appendix A - page 33).

2.7.3 - Operating conditions

Irrespective of their load condition, individual wagons must be capable of running through curves in sidings that have a minimum radius of 75 m.

○ **2.8 - Type 4a wagons - Articulated 3-bogie wagons (Sggmrss) over 80' in length designed for 22,5 t maximum axle-loads**

2.8.1 - Main dimensions

Length over buffers	33,940 m
Length of underframes	32,700 m
Minimum available length	16,100 m
Maximum height of the loading plane above rail level	1,155 m
Distance between bogie pivots	14,200 m
Bogie wheelbase	1,800 m
Wheel diameter	0,920 m

2.8.2 - Load characteristics

2.8.2.1 - Maximum tare: 31 t

2.8.2.2 - Within the limits of their load carrying capacity, it shall be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots (see Appendix A).

2.8.3 - Operating conditions

Irrespective of their load condition, individual wagons must be capable of running through curves in sidings that have a minimum radius of 75 m.

2.9 - Type 5 wagons - 2-axle wagons, 40' in length (Lgss)

○ 2.9.1 - Main dimensions

Length over buffers	13,860 m
Length of underframe	12,620 m
Minimum available length	12,520 m
Maximum height of the loading plane above rail level	1,180 m
Wheelbase	9,000 m
Wheel diameter	0,920 m

○ 2.9.2 - Load characteristics

2.9.2.1 - Maximum tare: 12 t

2.9.2.2 - Within the limits of their load carrying capacity, it must be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots (see Appendix A).

2.9.3 - Equipment

These wagons are not equipped with long-stroke shock absorbers and are only suitable for running in block-train formations.

2.10 - Type 6 wagons - Bogie wagons (Sgmss) for the transport of large containers and swap bodies designed for 18 t maximum axle-loads

2.10.1 - Main dimensions

Length over buffers	19,340 m
Length of underframe	18,100 m
Minimum available length	15,780 m
Maximum height of loading plane above rail level	0,945 m
Distance between bogie pivots	13,500 m
Bogie wheelbase	2,000 m
Wheel diameter	0,840 m
Maximum side-bearer play	0,014 m

2.10.2 - Load characteristics

2.10.2.1 - Maximum tare: 18,5 t

2.10.2.2 - Within the limits of their load carrying capacity, it must be possible for loads to be distributed inside wagons in any way permitted by the position of the spigots (see [Appendix A](#)).

The positioning of the spigots allows a maximum usable length of 15,700 m for swap bodies.

2.10.3 - Equipment

These wagon are not fitted with long-stroke shock absorbers and are only suitable for working in block trains.

2.10.4 - Operating conditions

Irrespective of their load condition, the wagons must be capable of running through curves in sidings which have a minimum radius of 75 m.

NB: Additional rules for the curve radius on Network Rail lines are set out in *UIC Leaflet 503*.

With respect to the angle of attack on ferry tracks, attention is drawn to the special conditions set out in *UIC Leaflet 503* (see [Bibliography - page 83](#)).

3 - Recess wagons

Recess wagons for the conveyance of semi-trailers that can be grab-lifted, as well as, potentially, for containers and swap bodies, may be one of the following types of wagon:

Type 1a (reference wagon)	Wagons suitable for 16 t axle load;
Type 1b	Wagons suitable for 22.5 t axle load;
P-Type recess wagons and compatibility codes	

Recess wagons are two-axle bogie wagons.

In order to obtain the triangular P-label marking (without compatibility code) recess wagons which do not meet the criteria for type 1a and 1b variants shall meet the following conditions:

- The seating device shall be at a fixed height of 1130 mm or have an adjustable height including a position at 1130 mm above the loading surface;
- Satisfy all the recess loading gauge conditions of a type 1a recess wagon;
- May also satisfy the adjustment coefficients according to *UIC Leaflet 596-6* (see Bibliography - page 83);
- Horizontal loading tolerances shall comply with *UIC Leaflet 596-6*.

If the wagon's adjustable seating device does not have a position at a height of 1130 mm, the wagon may not be given a triangular P-label marking, but instead must carry the following marking:

Attenzione: Divieto di carico dei semirimorchi P con altezza della selletta a 113 cm
 Achtung: Verladung von Sattelanhängern P mit 113 cm Stützbockhöhe verboten
 Attention: interdiction de charger des semi-remorques P avec hauteur de la sellette à 113 cm
 Warning: prohibited to load wagon with "P" semi-trailers with a seating device height of 113 cm

In order to obtain the extra triangular C marking, the wagon shall be equipped with spigots for swap bodies and containers and comply with the adjustment coefficients in *UIC Leaflet 596-6 - Appendix D*.

The seating device of recess wagons shall be designed for a 2" Class H coupling pin, defined in *European Parliament and Council Directive 94/20/EC, point 1.3.8* and shall be equipped with a simple automatic locking device for the coupling pin to fix it in position. Manual unlocking shall be possible.

For wagons built after 01.01.2016, the seating device size shall meet the criteria set out in the standard *DIN 74085* (see Bibliography - page 83).

These wagons are not fitted with shock absorbers and are designed for block-train working.

As an exemption from the provisions of *UIC Leaflet 530-1, point 2.1.1* (see Bibliography - page 83), these wagons may be designed to withstand a compressive force of:

- 1 200 kN along the automatic-coupler centre-line;
- 600 kN on each side buffer.

3.1 - "Recess wagons"

3.1.1 - Main dimensions

3.1.1.1 - Type 1a wagon

The dimensional characteristics of this wagon shall be as follows (see point D.1 - page 42):

Length over buffers	16,440 m
Length of underframe	15,200 m
Maximum height above rail level:	
- of top of solebars close to the bogie pivot	1,135 m
- of the semi-trailer loading plane	(see point E.1)
- of the loading plane of the securing brackets for swap bodies and containers	1,175 m
Distance between bogie pivots	11,200 m
Bogie wheelbase	1,800 m
Maximum wheel diameter ^a	0,760 m

a. The wear range to be taken into consideration must allow for the available loading gauge in the lower parts.

The inner longitudinal profile of the wagon shall lie within the envelope specified in point E.1 - page 44.

3.1.1.2 - Type 1b wagon

The dimensional characteristics of the wagon shall be as follows (see point D.2 - page 43):

Length over buffers	18,340 m
Length of underframe	17,100 m
Maximum height above rail level:	
- of top of solebars close to the bogie pivot	1,135 m
- of the semi-trailer loading plane	(see point E.2)
- of the loading plane of the securing brackets for swap bodies and containers	1,175 m
Distance between bogie pivots	13,300 m
Bogie wheelbase	1,800 m
Maximum wheel diameter ^a	0,930 m

a. The wear range to be taken into consideration must allow for the available loading gauge in the lower parts.

The inner longitudinal profile of the wagon shall lie within the envelope specified in point E.2 - page 45.

3.1.1.3 - Type-P recess wagon with compatibility code

The wagon has the following dimensional features:

Length over buffers	Manufacturer's choice, taking account of the profiles in <i>UIC Leaflet 596-6</i>
Length of underframe	
Height above rail level:	
- of the semi-trailer loading plane	See appendices to <i>UIC Leaflet 596-5</i> (drawings of envelopes)
- of the loading plane of the securing brackets for swap bodies and large containers	Manufacturer's choice
Distance between bogie pivots	See Appendix A.3 to <i>UIC Leaflet 596-6</i>
Bogie wheelbase	2,000 m maximum
Maximum wheel diameter ^a	Manufacturer's choice

a. The wear range to be taken into consideration must allow for the available loading gauge in the lower parts.

Envelopes for semi-trailers are defined in *UIC Leaflet 596-5*.

○ 3.1.2 - Load characteristics

3.1.2.1 - Type 1a wagons

Maximum tare 16,5 t.

The load limit of wagons for all categories of line for the conveyance of:

- 3-axle semi-trailers under S running conditions shall be	37 t
- 3-axle semi-trailers under SS running conditions shall be	35 t
- 2-axle semi-trailers under S and SS running conditions shall be	35 t
- swap bodies under S running conditions shall be	44 t
- swap bodies under SS running conditions shall be	35 t
- large containers under S running conditions shall be	44 t
- large containers under SS running shall be	35 t

Within its loading capacity limit, the wagon must be able to carry the following:

1. one road semi-trailer complying with the specifications in *UIC Leaflet 596-5*, which means the recess in the wagon must be able to support a maximum load of:
 - 13 t for a one-axle semi-trailer,
 - 23 t for a two-axle semi-trailer,
 - 27 t for a three-axle semi-trailer
 and the bolster a maximum load of 16 t.
2. containers/swap bodies complying with the specifications in *UIC Leaflet 592*;

3.1.2.2 - Type 1b wagons

Maximum tare 20 t.

Load limit for wagons in all categories of route, carrying:

- 3-axle semi-trailers (SS-braked):	38,5 t
- 2-axle semi-trailers (SS-braked):	36 t
- 2 and 3-axle semi-trailers (SS-braked):	38,5 t
- swap bodies (S-braked):	67 t
- swap bodies (SS-braked)	57 t
- containers (S-braked):	67 t
- containers (SS-braked):	57 t

Within its load-bearing capacity, the wagon must be able to carry:

1. a road semi-trailer compliant with the provisions of *UIC Leaflet 596-5*, according to which the wagon's recess must be able to withstand a maximum load of:
 - 13 t for a 1-axle semi-trailer,
 - 23 t for a 2-axle semi-trailer,
 - 27 t for a 3-axle semi-trailer,
 with the seating device bearing a maximum load of 16 t,
2. swap bodies/containers compliant with the provisions of *UIC Leaflet 592*;

○ 3.1.3 - Equipment

3.1.3.1 - During loading of semi-trailers onto type 1a wagons, the tyres must be assisted into the recess by means of two guides, one positioned either side of the recess, at a defined distance from the longitudinal centre-line. The semi-trailer must be precisely centred crosswise in the wagon using two appropriately-shaped (shell-shaped) plates positioned at each of the 4 corners of the recess, as well as on the front of the fixed scotches on the mid-transom of the recess, acting on the tyres as the vehicle is lowered into the recess and ensuring it is centred by ± 10 mm (see point G.1 - page 51) relative to the wagon's centre-line.

To allow long compact-tridem semi-trailers (maximum wheelbase 1,150 mm) to be centred on type 1a wagons, the rear of the scotch on the mid transom (in the direction of loading of the semi-trailer) must be made of two superposed parts with almost parallel profiles (see points E.1 - page 44 and G.1).

The same centring conditions must be achieved on type 1b wagons.

The same centring conditions must be achieved for P-type recess wagons with compatibility codes, using appropriate equipment.

In front, the coupling pin slots into the opening on the seating device provided for this purpose, the conical shape of which ensures that the semi-trailer is automatically and precisely centred by ± 8 mm either side of the wagon's centre-line.

The bearing plate for the seating device shall have a minimum clearance for movement of $\pm 7^\circ$ (c.f. *ISO 1726*) around the horizontal axis in order to adjust to the trailer's longitudinal inclination. It shall be possible to fix the seating device at the end of the wagon, or to lower it or fold it away in the recess during the conveyance of swap bodies and containers.

NB: It must be possible for one man to operate these devices from the ground under any weather conditions.

The semi-trailer shall be secured longitudinally in both directions by any two of the following devices: crossbeams - fixed scotches - removable scotches. These shall be fixed in the recess, and be wedged against the tyres.

NB: The scotches shall be shaped so as to absorb the longitudinal stresses that may occur during transit.

3.1.3.2 - Swap bodies and large containers shall be fixed on the wagon by means of bearing brackets that can be moved and folded down, on which the spigots are mounted. The shape of the spigot heads must be as shown in [Appendix C - page 38](#).

3.1.3.3 - To limit vertical oscillations of class C swap bodies, all wagons shall be fitted with additional brackets between the bearing brackets to support these bodies in the area of their main longitudinal beams.

The working face of these brackets must be situated at the same level or a few millimetres below the level of the loading plane.

The position of the spigots and brackets is given in [point H.1 - page 53](#) for Type 1a wagons and [point H.2 - page 54](#) for Type 1b wagons.

3.1.3.4 - All new wagons built from 1 January 1984 must be fitted with crossing facilities as per the provisions of *UIC Leaflet 535-2, point 2-E, paragraph 5.4*.

○ **3.1.4 - Operating conditions**

3.1.4.1 - Wagons may only be loaded or unloaded vertically using a crane or other lifting device.

3.1.4.2 - Type 1a wagons

Wagons must be able to operate without restriction:

- S-braked, with a maximum gross weight on rail of 60,5 t; the axle loads on the most heavily-loaded bogie must not exceed 16 t.
- SS-braked, with a maximum gross weight on rails of 51,5 t; the axle loads on the most heavily-loaded bogie must not exceed 15 t.

3.1.4.3 - Type 1b wagons

Type 1b wagons may be issued with the  and  compatibility codes in accordance with *UIC Leaflet 596-6* ([see Bibliography - page 83](#)).

The wagon must be able to run unrestrictedly under SS running conditions, with an 80 t maximum on-rail gross weight; the axle-loads of the heaviest loaded bogie shall not exceed 20 t.

3.1.4.4 - The wagon must be able to run without difficulty, whether empty or loaded and irrespective of the load:

- when coupled, over gravity humps profiled as per Appendix to *UIC Leaflet 522* ([see Bibliography](#));
- individually through 75 m-radius curves in sidings, without any component needing to be dismantled.

3.1.5 - Additional arrangements for the conveyance of special semi-trailers in accordance with option 1 as defined in *UIC Leaflet 596-5*.

3.1.5.1 - Type 1a or 1b wagons above can be adapted for the conveyance of semi-trailers as per *UIC Leaflet 596-5*. In this case the rear part of the semi-trailer shall rest inside the wagon recess with the suspension deflated, and its front part shall rest, through supporting plates, on plates fixed to the wagon and incorporating UIC-type spigots.

3.1.5.2 - The plates used for securing the front part of semi-trailers shall be as strong as the supporting plates of spigots used for containers.

3.1.5.3 - Type 1a wagon

3.1.5.3.1 - The wagon must be fitted with plates incorporating UIC-type spigots, and stay within the inner dimensions given in **point E.3 - page 46**. It must no longer incorporate a bolster.

3.1.5.3.2 - The wagon, when modified as specified above to convey special semi-trailers in accordance with option 1, shall no longer carry compatibility code but shall receive instead $\triangle P$ compatibility code as per *UIC Leaflet 596-6*.

○ 3.1.5.4 - Type 1b wagon

3.1.5.4.1 - The wagon must be fitted with bearing plates provided with UIC spigots, and must comply with the interior envelope specified in **point E.4 - page 47**. The wagon may be fitted with a seating device if this does not impinge on the aforementioned interior envelope.

3.1.5.4.2 - Wagons modified to carry special semi-trailers (variant 1) in accordance with the above indications must be given compatibility code $\triangle N$ in accordance with *UIC Leaflet 596-6*. If the wagon is also fitted with a seating device, it must be given compatibility code $\triangle P$ in accordance with *UIC Leaflet 596-6*.

4 - Rolling road (RR) wagons

Type 4 series

Wagons comprising bogies with continuous loading surfaces for the conveyance of tractors with their trailers, or road trains (tractor unit and trailers).

There are two possible variations to this:

- Type 1a: Articulated bogies wagons for the conveyance of road vehicles, primarily on the transalpine route - $R_{r_{alpine}}$ (Saadkms).
These wagons comprise bogie couplings, and in two parts: three bogies and four axles for each.
- Type 1b: Bogie wagons for the conveyance of road vehicles with a large loading gauge, along routes across flat countries, $R_{r_{flat land}}$ (Saadkms).
These wagons comprise two bogies and four axles each.

4.1 - Main dimensions

	Type 4a (Saadkms) $R_{r_{Alpine}}$ Appendix J1	Type 4b (Saadkms) $R_{r_{flat land}}$ Appendix J2
Maximum length over buffers (with headstocks in place)	20,400 m	20,400 m
Length of underframe	18,350 m	18,350 m
Length of load		
- with headstocks	18,600 m	18,600
- without headstocks	19 000 m	19 000 m
Length between couplers	19,090 m	19,090 m
Max. height of loading surface above rail level (see Appendix N - page 65)		
- Above the hatches directly above the bogies	0,454 m ^a	0,600 m ^a
- elsewhere	0,414 m ^b	0,600 m ^b
Height of upper surface of solebar above rail level directly above the bogie pivots of the wagon when empty	1,060 m	1,106 m
Distance between bogie pivots	13,700 m 2x 6,850 m	13,700 m
Load width (perpendicular to tyres)		
- Of existing road vehicles	2,520 m	2,520 m
- Which may be changed if necessary to	2,680 m ^c	2,680 m ^c
Nominal value of the height of the coupler centre-line above rail level (empty wagon)	0,316 ^{+0,005} m	0,316 ^{+0,005} m

a. For a load of at least 13 t (road train, tractor + semi-trailer combination).

b. For a load of at least 6 t (semi-trailer).

c. Loading widths can be extended by removing the side centring rods which should not be taken into consideration when calculating solebar strength.

4.2 - Running gear - Special design

	Type 4a (Saadkms) Rr_{Alpine}	Type 4b (Saadkms) $Rr_{\text{flat land}}$
Axle wheelbase in bogie, minimum	0,700 m	0,900 m
Type of axles	Monobloc wheels with lateral braking	
Maximum weight per axle	7,50 t	9,75 t
Lateral play "q + w"	0,005 m	0,005 m
Side bearer play "J"	0,007 m	0,007 m
Wheel diameter:		
- min.	0,335 m	0,410 m
- max.	Depending on bogie and frame design, taking account of mandatory unification characteristics.	
Primary axle suspension	Approx. 10 % of complete spring stroke.	
Wear components	Visual inspection of all wear-exposed bogie parts that affect running safety should be possible without the need for an inspection pit at the side of the wagon and with the hatches open above the wheels.	
Running characteristics	Wagons must comply with the running stability conditions laid down in <i>UIC Leaflets 432 and 510</i> (see Bibliography - page 83).	
Load distribution per wheel	The vertical support must be designed to ensure even wheel-load distribution, whatever the deformation in the wagon underframe	