

# UIC CODE

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*Translation*

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## **Tractive units - Bogies and running gear - General provisions**

*Engins moteurs - Bogies et organes de roulement - Dispositions générales  
Triebfahrzeuge - Drehgestelle und Laufwerke - Allgemeine Bestimmungen*



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

## **Leaflet to be classified in Volumes :**

V - Rolling Stock

VI - Traction

VIII - Technical specifications

## **Application :**

With effect from 1 January 1994

All members of the International Union of Railways

*This leaflet applies to standard gauge lines*

## **Record of updates**

**1st edition, January 1994**                      First issue

**2nd edition, February 2003**                Retyped in FrameMaker

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

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## Summary

This leaflet sets out the minimum conditions for ensuring compatibility of the different types of rolling stock worked on international routes, in other words their conditions of approval. Its provisions apply to all new motor-bogie designs and to all existing motor-bogie types. This leaflet shall only apply to stock suitable for running on standard-gauge lines (1 435 mm).

# 1 - Scope of application

This leaflet sets out the minimum conditions for ensuring the compatibility of the different types of rolling stock worked in international traffic, in other words their conditions of approval.

Its provisions shall apply to all new power and also to existing power bogies which have been modified or their use changed (for example where the maximum speed has been increased).

This leaflet shall only apply to stock suitable for running on standard-gauge lines (1 435 mm).

It does not specify maintenance conditions to ensure that bogies run smoothly throughout their service life.

In addition to these general conditions, the bogies and their component parts shall comply with the conditions set out in the following leaflets (see [Bibliography - page 8](#)):

- *UIC Leaflet 513*: Guidelines for evaluating passenger comfort in relation to vibration in railway vehicles
- *UIC Leaflet 515-3*: Axle design calculation method
- *UIC Leaflet 515-5*: Tests for axle-boxes
- *UIC Leaflet 615-1*: General conditions applicable to component parts
- *UIC Leaflet 615-4*: Bogie-frame structure-strength tests

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## 2 - Characteristics of use

The bogies shall enable vehicles to negotiate 150 m radius curves when the vehicles are part of a trainset and 90m radius curves when the vehicles are isolated.

If the vehicles are also intended for loading onto train ferries, the bogies shall be suitable for running through 150 m radius curves with a ramp angle of 2,5°.

The bogies shall enable vehicles to run with cant deficiency in accordance with *UIC Leaflet 518* (see [Bibliography - page 8](#)).

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### 3 - Safety and ride quality

The bogies shall comply with the provisions of *UIC Leaflet 518* (see Bibliography - page 8).

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## 4 - Passenger comfort

Where motor bogies are used on passenger vehicles, ride quality shall be judged in accordance with *UIC Leaflet 513* (see [Bibliography - page 8](#)).

The bogies shall comply with limiting values calculated in accordance with the methods of assessing driver comfort as set out in *UIC Leaflet 518* (see [Bibliography - page 8](#)).



## 5 - Type-approval procedure for bogies

The special conditions which apply to bogie type-approval are described below.

The procedure extends from the design phase until the bogie is finally introduced into revenue service.

The design, construction and operating objectives of the bogie are usually defined in the following documents:

- specifications containing the parameters defined by the operator (scope of use, characteristics of use, minimum TBO, maintenance costs, running quality, minimum life span, maximum axle load) and the calculations to be carried out;
- national and international standards (ISO, CEN, CENELEC, ...)
- international regulations (UIC, RIC, ...)

The procedure shall be carried out in accordance with the following phases:

### 5.1 - Design

Before the bogie is built, the manufacturer shall demonstrate to the operator, by means of calculations, that the bogie meets the necessary requirements.

The manufacturer shall carry out an analysis of the effects of failures, taking into consideration manufacturing tolerances, maintenance tolerances, the slow deterioration in the characteristics of components, as well as their sudden failure, paying particular attention to parts and systems in which an element of innovation has been introduced and for which results of in-service operation under similar conditions are not available.

Calculations shall be made for the least favourable cases identified from this analysis.

As far as is possible, practical verification of these figures shall be carried out by means of bench tests and/or line tests.

### 5.2 - Tests for granting provisional type-approval

Before the bogie is placed in service, the following tests must be carried out:

- bench tests to demonstrate the strength of the bogie's component parts, e.g. axle boxes, bogie frame, etc. Depending on the outcome of the failure analysis, other parts, such as springs, dampers, articulation systems, rubber elements, etc., may also need to be bench-tested;
- line tests to demonstrate the sound dynamic behaviour of the bogie: running safety and quality, comfort, track fatigue, special tests resulting from the failure analysis, etc.

These tests shall be carried out in accordance with existing international regulations and standards (UIC, CEN, etc.).

Provisional approval shall be granted on the basis of the results of these tests.

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### 5.3 - Type approval

Type approval is granted when sufficient in-service experience has been obtained to enable maintenance rules to be defined which will ensure that the behaviour characteristics of the bogie comply with requirements. Similarly, before type approval can be granted, maintenance rules must be established to cover risks associated with the failure of component parts. These maintenance rules, which are necessary to obtain type approval, only apply to the bogie concerned and the use for which it is intended.

# Bibliography

## 1. UIC leaflets

### International Union of Railways

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*Leaflet 510-2: Trailing stock - Conditions concerning the use of wheels of various diameters with running gear of different types*, 4th edition under preparation

*Leaflet 512: Rolling stock - Conditions to be fulfilled in order to avoid difficulties in the operation of track circuits and treadles*, 8th edition of 1.1.79 and 2 Amendments

*Leaflet 513: Guidelines for evaluating passenger comfort in relation to vibration in railway vehicles*, 1st edition of 1.7.94

*Leaflet 515-3: Rolling stock - Bogies - Running gear - Axle design calculation method*, 1st edition of 1.7.94

*Leaflet 515-5: Powered and trailing stock - Bogies - Running gear - Tests for axle-boxes*, 1st edition of 1.7.94

*Leaflet 518: Testing and approval of railway vehicles from the point of view of their dynamic behaviour - Safety - Track fatigue - Ride quality*, 2nd edition under preparation

*Leaflet 541: Brakes - Regulations concerning manufacture of the different brake parts*,

*Leaflet 543: Brakes - Regulations governing the equipment of trailing stock*, 11th edition, December 2001

*Leaflet 544-1: Brakes - Braking power*, 3rd edition of 1.1.66 - Reprint dated 1.3.79 incorporating 9 Amendments

*Leaflet 546: Brakes - High power brakes for passenger trains*, 5th edition of 1.1.67 - Reprint dated 1.1.80 incorporating 5 Amendments

*Leaflet 552: Electric power supply for trains - Standard technical characteristics of the train bus*, 9th edition of 1.1.97

*Leaflet 566: Loading of coach bodies and their components*, 3rd edition of 1.1.90 and addenda and 1 Amendment

*Leaflet 569: Regulations to be observed in the construction of coaches and vans suitable for conveyance by train ferry*, 2nd edition of 1.7.79 and 2 Amendments

*Leaflet 615-1: Tractive units - Bogies and running gear - General conditions applicable to component parts*, 2nd edition in course of preparation

*Leaflet 615-4: Motive power units - Bogies and running gear - Bogie frame structure strength tests*, 2nd edition in course of preparation

*Leaflet 811-1: Technical specification for the supply of axles for tractive and trailing stock, 4th edition of 1.1.87 with sulphur prints*

*Leaflet 811-2: Technical specification for the supply of axles for tractive and trailing stock - Tolerances, 1st edition of 1.1.88*

*Leaflet 812-2: Solid wheels for tractive and trailing stock - Tolerances, 1st edition of 1.1.86*

*Leaflet 813: Technical specification for the supply of wheelsets for tractive and trailing stock - Tolerances and assembly, 1st edition of 1.1.89*

*Leaflet 814: Technical specification for the official testing and supply of greases intended for the lubrication of railway vehicle roller bearing axle boxes, 2nd edition of 1.7.88*

## **2. Minutes of meetings**

### **International Union of Railways**

*Traction and Rolling Stock Committee (Question 5/A/7 - Item 2.2 - Requirements of motor bogies), May 1993*

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