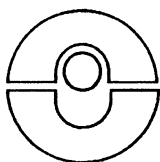


UIC Code

**8 2 7 - 1
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2nd edition, 1-1-90

**Technical specification
for the supply of elastomer components
for buffer and draw gear**



International Union of Railways

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Leaflet to be classified in Volumes :

- V - Transport stock
- VIII - Technical specifications

Amendments

Note

This leaflet is part of a set which also includes :

- Leaflet 520 : Wagons, coaches and vans — Draw gear
- Leaflet 526-1 : Wagons — Buffers with a stroke of 105 mm
- Leaflet 526-2 : Wagons — Buffers with a stroke of 75 mm
- Leaflet 527-1 : Coaches, vans and wagons — Dimensions of buffer heads — Track layout on S curves
- Leaflet 527-2 : Coaches, vans and wagons — Dimensions of buffer heads
- Leaflet 528 : Buffer gear for coaches
- Leaflet 529 : Long-stroke hydrodynamic shock absorbers — Technical conditions — Wagons
- Leaflet 827-2 : Technical specification for the supply of steel rings for buffer springs
- Leaflet 828 : Technical specification for the supply of welded components for buffers

Part 1 : Buffer gear.

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APPENDIX 1

Part 1 — Buffer gear

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1 - Purpose

1.1 - Nature of items

This specification defines the technical conditions to be satisfied by elastomer-based components for buffers.

1.2 - Classification

Category 1 : elastic components for wagon buffers with a stroke of 105 mm as covered by UIC Leaflet 526-1.

Category 2 : elastic components for wagon buffers with a stroke of 75 mm as covered by UIC Leaflet 526-2.

Category 3 : elastic components for coach buffers with a stroke of 110 mm as covered by UIC Leaflet 528.

1.3 - Documents quoted

UIC 526-1 — Wagons — Buffers with a stroke of 105 mm

UIC 526-2 — Wagons — Buffers with a stroke of 75 mm

UIC 528 — Buffer gear for coaches

UIC 843-2 — Plates, sheets and sections in weldable copper-bearing mild steel for wagon construction

ISO 37 — Rubber, vulcanised — Determination of tensile stress-strain properties

ISO 48 — Vulcanised rubbers — Determination of hardness (hardness between 30 and 85 IRHD)

ISO 188 — Rubber, vulcanised — Accelerated ageing and heat-resistance tests

- ISO 471 – Rubber – Standard temperatures, humidities and times for the conditioning and testing of testpieces
- ISO 815 – Vulcanised rubbers – Determination of compression set under constant deflection at normal high temperatures
- ISO 1653 – Vulcanised rubbers – Determination of compression set under constant deflection at low temperatures
- ISO 3302 – Rubber, dimensional tolerances of solid cast and extruded products

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2 - Characteristics

2.1 - Composition

The elastic components consist of elastomer rings and steel plate stiffeners.

2.1.1 - Metal stiffeners

Unless otherwise indicated in the order documents, the metal stiffeners shall be made of steel meeting the requirements of UIC Leaflet 843-2.

Their geometrical characteristics shall conform to the requirements of the drawings.

The stiffeners shall be correctly fettled and shotblasted so as to ensure that the elastomer is not damaged in service, particularly in the vicinity of the holes.

The arithmetic depth R_a of the metal surface roughness shall be 6 μm .

2.1.2 - Elastomer

No requirements are specified in connection with the type of elastomer which must provide the characteristics indicated on Table 1.

The surfaces of the elastomer parts shall be smooth and shall exhibit no cracks, pitting, bulges, joint slits or burrs.

The texture of the material should be homogeneous and compact.

2.1.3 - Components

The dimensions of the elastic components shall be in accordance with the requirements stipulated in the order or its accompanying documents.

The tolerances are as stated in the drawings, otherwise they correspond to class M3 of ISO Standard 3302.

Table 1

Characteristics	Test method	Results to be obtained
– IRHD hardness	ISO/48	Presentation condition : D = value adopted in approval leaflet ± 5 IRHD. After ageing for 7 days at 70 °C : $\Delta D \leq \pm 5$ IRHD with respect to the presentation condition
– Strength and elongation at rupture	ISO/37	Presentation condition : R and Ar = value adopted in approval leaflet ± 15 %. After ageing for 7 days at 70 °C : $\frac{\Delta R \times 100}{R} \leq 20 \%$ $\frac{\Delta Ar \times 100}{Ar} \leq 30 \%$
– 200 % modulus of elasticity	ISO/37	Presentation condition : M = value adopted in approval leaflet ± 15 %. After ageing for 7 days at 70 °C : $\frac{\Delta M \times 100}{M} \leq 20 \%$
– Compression set after 25 % compression for 24 h at 70 °C	ISO/815	DRC ≤ 30 % (DRC = compression set)
– Compression set after 25 % compression for 24 h at – 30 °C, measured after stabilising for 3 min at – 30 °C (1)	ISO/1653	DRC ≤ 55 % (DRC = compression set)

(1) Additional tests can be carried out at – 40°C, provided that the corresponding values are specified by the purchasing railway.

2.2 - Characteristics of assembled buffer

2.2.1 - Static characteristics in presentation condition

The static characteristics of the assembled buffers, checked at least three days after assembly, should be in accordance with the provisions of :

- UIC Leaflet 526-1 for category 1 spring elements,
- UIC Leaflet 526-2 for category 2 spring elements,
- UIC Leaflet 528 for category 3 spring elements.

2.2.2 - Dynamic characteristics

The dynamic characteristics of the assembled buffers, checked at least three days after assembly, should be in accordance with the provisions of :

- UIC Leaflet 526-1 for category 1 spring elements,
- UIC Leaflet 526-2 for category 2 spring elements,
- UIC Leaflet 528 for category 3 spring elements.

2.2.3 - Performance under repeated loads

In the case of category 1 spring elements the assembled buffer should satisfy the endurance test specified in UIC Leaflet 526-1, Appendix 9.

2.3 - Mechanical characteristics of the spring assemblies

A spring assembly consists of a nest of spring elements and dividing plates of identical composition to that specified in the drawing of the buffer or appended documents.

H1 is the free height of the spring assembly installed in the unloaded buffer. This dimension is given in the drawing of the buffer (see Appendix 1).

2.3.1 - Mechanical characteristics after clamping

The compression/displacement curve, after clamping of the spring assembly at a height $H1$ for a minimum of 72 h at $23\text{ °C} \pm 2\text{ °C}$, shall be between the limiting curves specified in the drawing.

2.3.2 - Characteristics after dynamic stresses

After 10^4 dynamic compressions between the heights of $(H1 - 0.25\text{ C}) \pm 2\text{ mm}$ and $(H1 - 0.60\text{ C}) \pm 2\text{ mm}$ at a frequency of 6 cycles per minute :

- the elastomer should not exhibit any notches deeper than 2 mm, particularly near the locating studs,
- after stabilising for 24 h, with the spring assembly unclamped, the compression load required to obtain the height $H1 \pm 2\text{ mm}$ must at least be 10 kN,
- after stabilising for 24 h, with the spring assembly unclamped, the energy stored by the nest between $(H1 - 0.25\text{ C})$ and $(H1 - 0.60\text{ C})$ during the compression test should be at least 80 % of that recorded during the compression test after clamping.

2.3.3 - Compression set

After compression for 7 days at 70 °C , at a constant height of $H1 (\pm 2\text{ mm})$, the compression set of the spring assembly, determined 24 h after unclamping while hot, should not exceed 8 %.

2.4 - Manufacturing marks

Unless otherwise specified in the order or its accompanying documents, every spring element should be marked in relief on the side surface of the elastomer part with :

- the manufacturer's mark,
- the batch number,
- the last two figures of the year
e.g. : XY - 0 000 0000 - 86.