



# Technical product description & Technical conditions for the use of Composite brake block LL

## Jurid 847

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<b>1. Preliminary note</b> .....	3
<b>2. Applicable provisions and standards</b> .....	3
<b>3. General description</b> .....	4
<b>4. Technical parameters for JURID 847</b> .....	4
Application parameters .....	4
Nominal Physical parameters .....	4
<b>5. Marking</b> .....	5
<b>6. Product Layout</b> .....	6
<b>7. Material Safety Data Sheet</b> .....	6
<b>8. Product appearance</b> .....	7
<b>9. Drawings</b> .....	8
<b>10. Design of the brake system for freight wagons with composite brake blocks LL</b> .....	9
Design of the braking system for wagons.....	9
10.1.1 Required braking performance .....	9
10.1.2 Braking system structure of freight wagons with LL-blocks.....	9
10.1.3 Wheels / wheel sets applied .....	9
10.1.4 Monoblock wheels according to the EN 13979-1 / UIC 510-5 .....	10
10.1.5 Monoblock wheels applied.....	10
10.1.6 Brake markings on wagons .....	10
<b>11. Brakes operation, testing and maintenance</b> .....	10
11.1.1 Recommendations for the use of the brakes .....	10
11.1.2 Brake operation at speeds below 50 km/h .....	10
11.1.3 Brake operation in winter conditions .....	10
11.1.4 Control activities .....	12
11.1.5 Checking the brake blocks.....	12
11.1.6 Checking the wheels.....	12
<b>12. Other provisions</b> .....	13
<b>13. Recycling and disposal</b> .....	13
<b>14. Shelf life (life span)</b> .....	13
<b>15. Storage requirements</b> .....	13

## 1. Preliminary note

This document contains the conditions of use for the operation, inspection and maintenance of wagons to be respected when using V-BKS LL composite brake blocks (CBB), and the general technical parameters of the V-BKS JURID 847.

## 2. Applicable provisions and standards

This document is based on the following provisions and standards:

UIC 432	TSI Freight Wagons. Driving speed. Technical conditions to be met.
UIC 543	Brake. Regulations for the equipment of wagons.
UIC 544 -1	Brake. Braking.
UIC 542	Brake parts - Interchangeability.
UIC 541 -1	Brake. Regulations concerning the design of the various brake components.
UIC 541 -4	Brakes. Braking by using organic brake blocks. EN 13979-1 Rail transport. Wheel sets. Monoblock wheels. Admission procedure. Part 1: Forged and rolled wheels.
UIC 510-5	Technical approval for Monoblock wheels.
EN 15877-1	Rail transport. Railway vehicles marking. Part 1: Freight wagons.
EN 13979-1	Railway applications. Wheelsets and bogies. Monoblock wheels. Technical approval procedure. Forged and rolled wheels.
EN 15313	Railway applications – In-service wheelset operations requirements – In-service and off-vehicle wheelset maintenance.
EN 15877-1	Railway applications – Marking on railway vehicles - Part 1: freight wagons.
UIC 472	Brake test card and wagon charter for freight trains in international rail traffic.
UIC 421	Rules concerning the composition and braking of freight trains in international traffic.
AVV	General Contract for the Use of Freight Wagons.
UIC 510-2	Trailer vehicles. Conditions for the use of wheels of different diameters in different types of transmissions.
UIC V-BKS	Design guidelines (LL).
UIC V-BKS	Damages catalogue.

### 3. General description

Limit values for V-BKS Jurid 847

The permitted range of technical applications (frame values) for composite brake blocks Jurid 847 are defined by the following standard frame conditions:

- Maximum speed tara:  $V_{max} = 120$  km/h
- Maximum speed loaded (22,5t/axle):  $V_{max} = 100$  km/h
- Min. axle load according to the UIC 530-2 charter
- Max. axle load 22.5 t (brake type S) - regulation \*\*/\*\* according to the UIC 432 / TSI can be applied
- Nominal diameter of a wheel set: 920 mm
- Shape of the Bg and Bgu brake block according to UIC 541-4
- Field of application: all UIC lines with an inclination of not more than max. 40 ‰.

### 4. Technical parameters for JURID 847

#### *Application parameters*

**Non-asbestos friction material for railway tread brakes with LL-friction level.**

JURID 847 is a UIC certified composite brake block material with LL friction level. Cast iron brake blocks in s-braked freight wagons can be replaced with JURID 847 without adjustment of the brake system. The material has a stable friction performance and thermal stability, a low sensitivity to wetness and is supposed to have low block and wheel wear. The effect of JURID 847 to the wheel also helps to decrease the noise level significantly. Jurid 847 fulfills the SNCF-shuntage test.

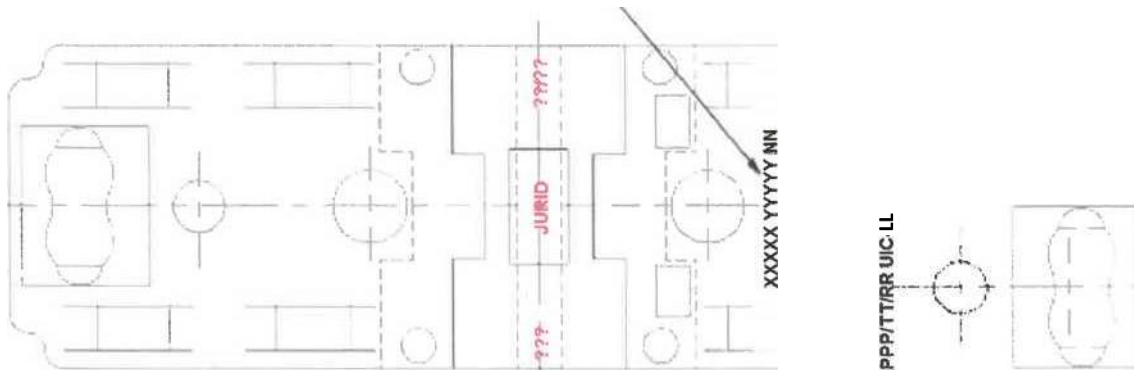
Manufacturer:	Federal Mogul Bremsbelag GmbH
Name of the block:	JURID 847
Drawing No.:	J-2042, J-2333
Dimensions:	250x80x60 mm, 320x80x60 mm
Weight:	2,7kg (Bgu), 3,5kg (Bg)
Block configuration:	2xBg, 2xBgu

#### *Nominal Physical parameters*

Physical parameters

Density	1,9	g/cm <sup>3</sup>
Hardness Rockwell	60-100	HRX
Thermal conductivity	0,9	W/m*K
Specific thermal capacity	1,0	J/g*K
Modul of comp. elasticity (20°C)	1800	MPa
Compressive strength	100	MPa

## 5. Marking



**XXXXX** - Art. Nr.

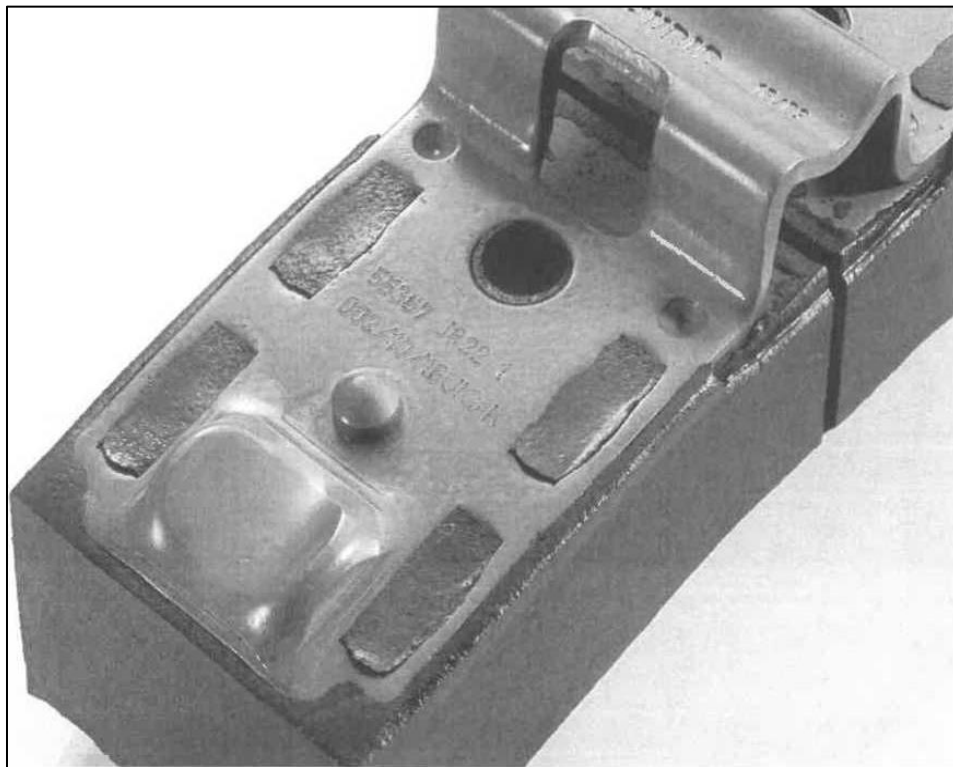
**YYYYYYY** - block type - material marking J847

**NN** – Nr. of press machine

**PPP** - batch number

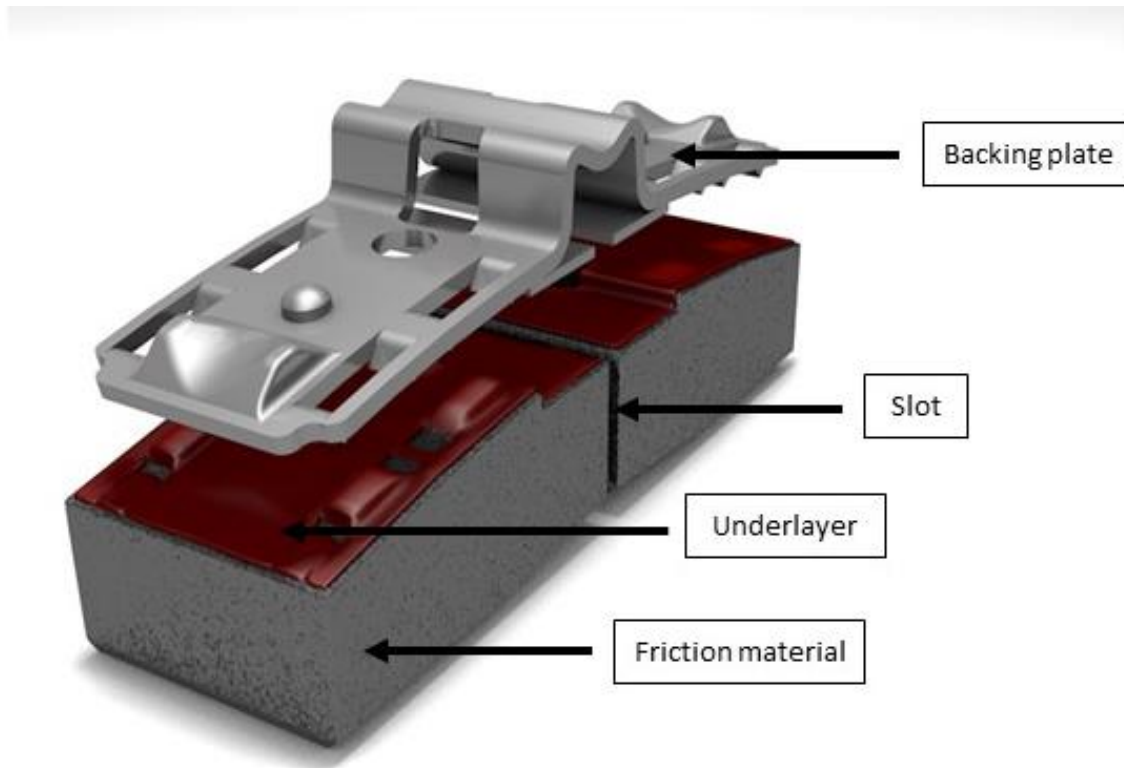
**TT/RR** - date of manufacture - week/year e.g. 07/20

**UIC-LL** - low coefficient of friction designation



## 6. Product Layout

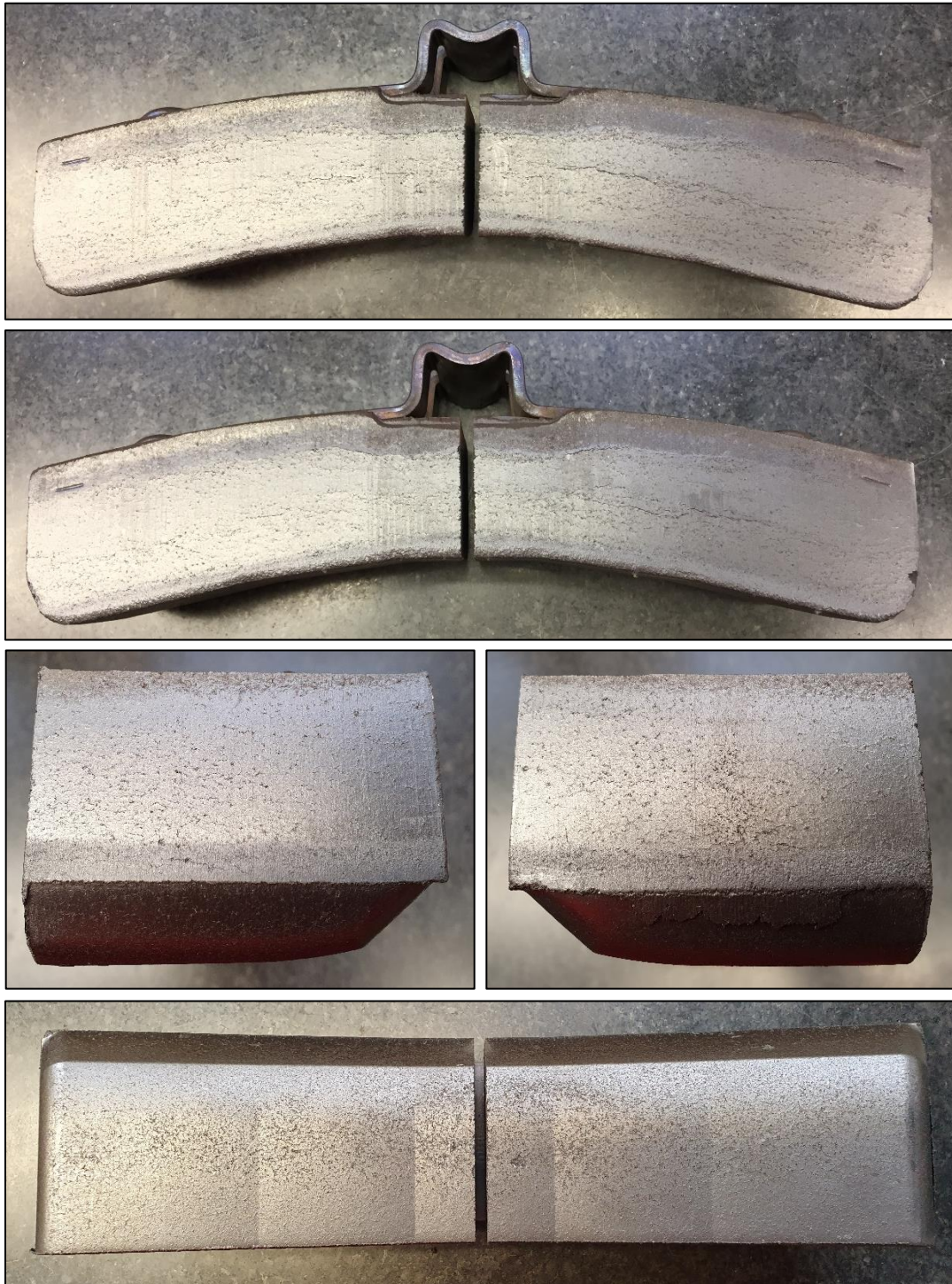
Description of parts, materials and designs



## 7. Material Safety Data Sheet

Document handover separately acc. actual legal requirements. This document will be updated continuously by time and/or necessity.

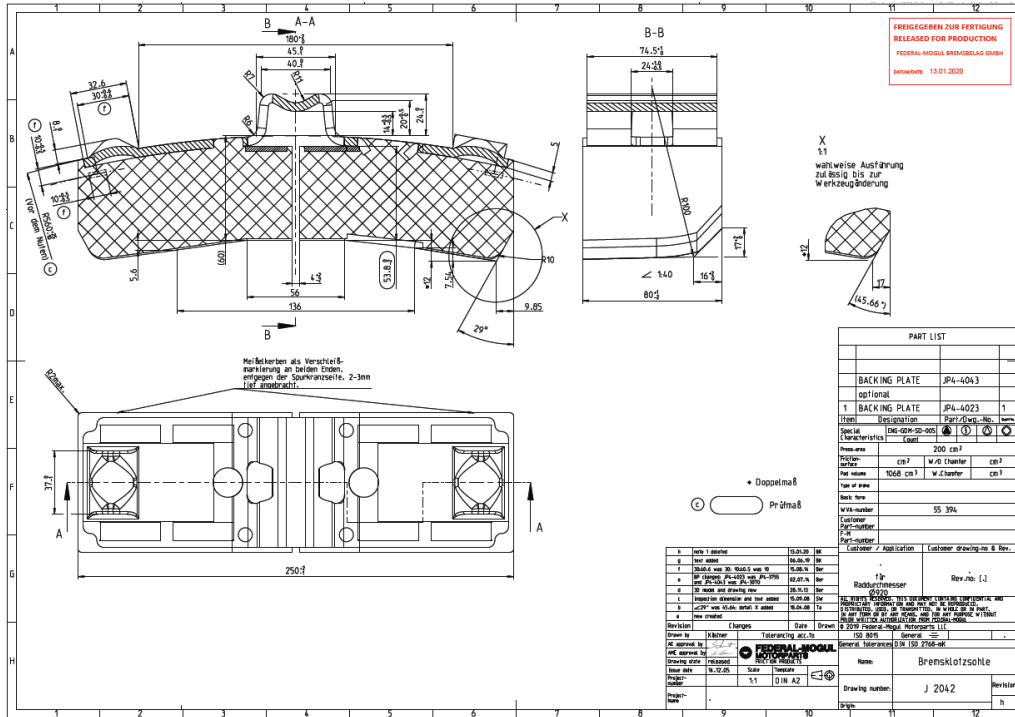
## 8. Product appearance



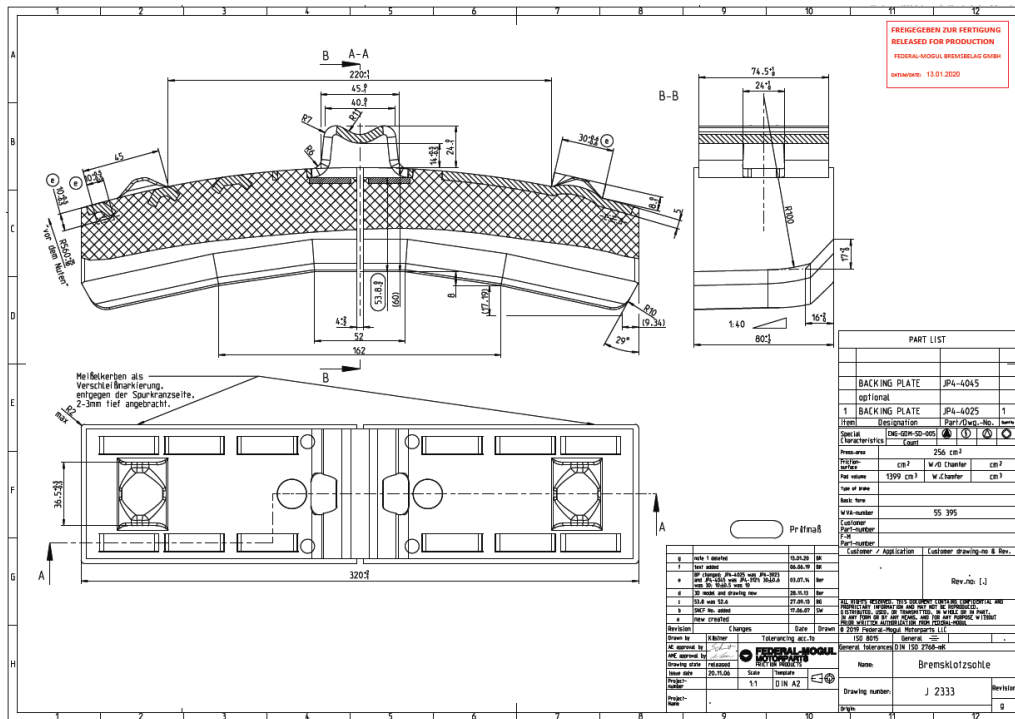
The typical block surface appears slightly open-pored, inhomogeneous, uneven and with degassing lines due to the manufacturing process. Damages in service to be assessed acc. to “AVV - General Contract of Use for Wagons (GCU)” and “1519 Use of composite brake blocks (CBB) - Damage catalogue”. See [www.UIC.org](http://www.UIC.org). Appearance for deliveries to be assessed acc. DRiV “Control plan No. 245” and related DRiV “boundary sample catalogue CBB”.

## 9. Drawings

Short block – Bgu – 250mm



Long block – Bg – 320mm







## 10. Design of the brake system for freight wagons with composite brake blocks LL

### *Design of the braking system for wagons*

The following regulations contain conditions and further requirements that must be taken into account when designing the brake system for wagons with V-BKS (LL).

#### **10.1.1 Required braking performance**

Provisions of the UIC 543 leaflet apply to brake mass percentages.

Braking masses shall be determined on the basis of train or individual wagon braking tests in accordance with UIC 544-1 up to a maximum speed range.

**Jurid 847 is recognized as interchangeable as per definition in UIC 541-4 and V-BKS (LL).**

The braked weight shall be determined as for cast-iron brake blocks (P10). If Jurid 847 is used on new wagons, the braked weight shall be determined in accordance with point 2.2 of UIC 544-1 for cast-iron P10 blocks by brake calculations (see appendix N), or by calculation performed in accordance with appendix I, or by testing according to appendix F.

#### **10.1.2 Braking system structure of freight wagons with LL-blocks**

- Brake system components must comply with the requirements of UIC 542 leaflet for S or SS wagons.
- Brake shoes and brake blocks must be secured in a manner that prevents their replacement in accordance with UIC 541-1 leaflet (holders) and UIC leaflet 541-4 (blocks).
- When vehicles are converted from cast iron to LL-blocks, the conventional pneumatic and mechanical brake components can still be used.
- When equipping SS wagons, it is mandatory to use kink valve acc. UIC541-4.

In the deceleration condition, LL-blocks shall not adhere to any wheel surface and it shall be demonstrated that, with the maximum stroke of the piston, there is a gap of at least 7 mm on a single brake block.

If blocks made of different friction materials are used in a single vehicle, at least the individual wheel set must have the same type of blocks.

#### **10.1.3 Wheels / wheel sets applied**

Preferably, initial fitting with LL blocks should be combined with the installation of re-profiled wheels in order to comply with the inspection intervals as set out in UIC 541-4. Further conditions described in UIC 541-4 P.2.2.2.4.

### **10.1.4 Monoblock wheels according to the EN 13979-1 / UIC 510-5**

All Monoblock wheels that meet the requirements of EN 13979-1 and UIC 510-5 leaflet are permitted.

### **10.1.5 Monoblock wheels applied**

It is permissible to use all types of Monoblock wheel constructions already in service, except wheels made of materials R2, BV2, R8, R9.

For vehicles used in SS operation, it is recommended to use wheels that meet the requirements of EN 13979-1 and UIC 510-5.

### **10.1.6 Brake markings on wagons**

Wagons fitted with composite brake blocks shall be marked as specified in EN 15877-1 and UIC Leaflet 545, in particular with sign LL in a circle. It is recommended to write the type of LL block on the wagon too. Additional markings can be required by European or national rules.

## **11. Brakes operation, testing and maintenance**

### **11.1.1 Recommendations for the use of the brakes**

The train driver must be informed about the number of wagons assembled on the train which are braked with composite blocks (see UIC 472 Brake test card and wagon charter for freight trains in international rail traffic).

Due to the different friction coefficients of the V- BKS blocks compared to cast iron blocks, especially in the lower speed range and in relation to winter conditions, the following regulations for brake operation must be observed:

### **11.1.2 Brake operation at speeds below 50 km/h**

On trains where more than half of the wagons are equipped with V-BKS blocks, the braking performance during braking from an initial speed of less than 50 km/h is different from that of a train equipped with cast iron blocks. He is responsible for either an earlier start of the braking process or an increased pressure drop in the main pipe (HL-pipe).

### **11.1.3 Brake operation in winter conditions**

These regulations are based on UIC 421 leaflet and are therefore recommended for use.

Definition of winter conditions in terms of braking technology:

- temperature below 0 °C and
- snow blow on the travel path and / or
- rails covered with snow or ice and / or
- wagons covered by heavy layers of snow or ice at the place of application.

#### Actions to ensure the operation of the brakes

- Full braking (pressure drop in the main pipe  $\sim 1,5$  bar) must be performed before the start of a disconnected train or a part of a train. Before leaving the start station, check the released condition of the brake blocks on both sides of the train during a full braking test.
- When the train departs, the free running of the wheels of the train must be checked.

After departure from the initial station, the train driver should check service brake in service before reaching the intended maximum speed and possibly without applying the dynamic brake of the traction unit, whether the braking performance is sufficient.

If the train slows down in a normal manner, the brakes must be released immediately. If the braking performance is lower than expected due to winter conditions, release the brakes and try to warm up the brake friction components again.

If braking performance is very low, stop the train in rapid braking mode and keep the friction components warm during further travel by regular braking.

To this end, braking should be carried out:

- every 10 to 15 minutes, or
- every 20 to 30 km of a rail road section.

If the driver, after all these operations, considers that it is not sufficient to slow down the train while braking, then the train shall only be allowed to continue at reduced speed. This decision must be communicated by the engine driver to the train dispatcher via radio.

In addition, the above-mentioned brake check tests shall be carried out before approaching the vehicle:

- to a dead-end station,
- to a long drive from a steeply sloping hill.

Other activities to be carried out during winter operation:

- During brake tests, the tightness of the traction system is key important.
- When performing maintenance and repair work, the pressure chambers must be drained with care.
- The leak-tightness of the train is of particular importance in the brake tests.
- In case of a significant build-up of snow or ice on the wagons in service, either the equivalent conicity value or the alternative parameter of flange height (both defined in UIC 541-4) should be checked during maintenance and repair work.

#### **11.1.4 Control activities**

For the correct evaluation of the damages of V-BKS blocks and wheels braked by V-BKS blocks and the resulting measures, it is necessary to comply with the applicable national regulations as well as with the UIC damage catalogue.

#### **11.1.5 Checking the brake blocks**

The control activities during the operation of the V-BKS are described in the provisions of the AVV (General Contract for the Use of Freight Wagons, Appendix no. 10, item 3.8; ex. RIV 2000, § 28.14), according to which replacement is necessary if a brake block:

- shows a radial crack from the friction surface to the backing plate,
- has visible chipping of the friction part over a length greater than 1/4 of the length of the block,
- has metallic inclusions,
- is thinner than 10 mm within the block holder.

For further information regarding evaluating of the brake blocks damages, please refer to the damage catalogue.

The maintenance of vehicles equipped with V-BKS is the same as for wagons equipped with cast iron blocks.

#### **11.1.6 Checking the wheels**

In terms of wheels, it is appropriate to observe the following:

Wheel inspection during operation is carried out in accordance with AVV regulations.

The inspection of Monoblock wheels (in particular the running surface) under workshop conditions shall be carried out on the basis of visual inspection. Their condition is assessed on the basis of AVV or UIC 510-2 charter. Particular attention must be paid to visible signs of thermal overload (e.g. clearly visible and demarcated scrap under the wheel rim, blue colored wheel rim, material deposits), severe or uneven wear, damage to running surfaces and thermal cracks. When assessing the wheel profile, particular attention must be paid to the minimum and maximum thickness and height of the wheel flange.



## 12. Other provisions

Dispose of worn brake blocks according to national regulations.

## 13. Recycling and disposal

For the disposal of the blocks, the European standards written under EWC codes - Waste origin - EWC code are used:

16 01- End-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13,14,16 06 and 16 08) the waste code is used: 16 0112 Brake linings other than those mentioned in 16 0111

## 14. Shelf life & Life span

Under "optimum storage conditions", organic friction materials can be stored for a period of 2 to 3 years before being put into service for a further 2 years without any restrictions. This means that the recommended total time to use the product from production till reaching the wear limit is a maximum of 5 years. This recommendation is based on a wide range of experience and takes into account the chemical composition and behavior of the raw materials used in the manufacturing of brake blocks.

## 15. Storage requirements

The optimum conditions for storing of the brake blocks are as follows:

- Ambient temperature (18-25 ° C),
- To reduce the chemical reactions of organic ingredients, no light or moisture should be allowed to enter the room.

Protection of friction materials against all kinds of energy (heat, temperature, UV) and oxidation (humidity plus energy)