

**vossloh**

Vossloh RailWatch GmbH

# Pulsar

the innovative AI-driven  
monitoring



# The Pulsar

The Pulsar is our innovative AI-driven wayside monitoring system based on various sensor technologies. Equipped with high-resolution cameras, powerful microphones and a RFID reader, it's easy to install next to your infrastructure. Passing freight trains are captured at 200 images per second, then analysed using OCR, other computer vision processes and artificial intelligence and provided via our web portal or an interface solution. In addition to process data such as the UIC wagon number, the exterior view of the wagons and the wagon sequence, we also record condition data. The condition data provides information on the state of brake blocks, the presence of graffiti, the loading of dangerous goods, as well as indications for a wheelset damage.

The pulsar is set up and calibrated within one to two days. The installation does not require any authorization or work in or above the track. The pulsar is set up next to the track at a maximum distance of 8 meters and can detect trains travelling at full speed (up to 200 km/h). Its dimensions are 125 cm x 200 cm x 85 cm (WxHxD). These dimensions refer to the housing and do not include attachments such as the LTE antenna, RFID reader and microphones.

Only a standard 230 V / 16 A mains connection and an internet connection are required for technical operation. If a LAN connection is not available, data can be transmitted via LTE or 5G.

**Our Pulsar can be easily extended with additional sensors - for example, with a thermal camera to detect thermal anomalies on the wheel.**



# Description of the data

## Process data

The recorded process data, such as UIC wagon numbers, exterior views of the wagons and the wagon sequence, support you during incoming and outgoing goods inspections and facilitate the internal processes in your area of responsibility. You always have an overview of the incoming and outgoing trains and the order of their wagons when they arrive and depart. This increases your productivity and prevents unexpected downtimes - saving you time and money.

### UIC wagon number

The UIC wagon number is used to identify and assign the respective wagon. Our detection rate is 99% - achieved through a combination of optical methods and the analysis of RFID information.

### Wagon sequence

The wagon sequence shows you the order of the wagons in the train formation. This simplifies your inbound handling process - you can compare the wagon list with the incoming wagons conveniently from your desk.

### Exterior view

The detailed exterior view of the wagon, based on high-resolution images, allows you to check the wagon for external damage. Depending on the wagon type, you can also determine which kind of cargo is on the wagon.

## Condition data

The condition data gives you an overview of the state of the wagons arriving at your premises. You can assess whether a wagon may need to be suspended as soon as it arrives. This saves you time and money when loading and unloading and allows you to assemble a new train set that passes the wagon inspection without any complaints, ensuring that trains depart on schedule. Furthermore, condition data may enable you to prove that a damage was already present when the wagon arrived at your premises, if you are held liable.

### Brake block

Brake block detection gives you an overview of the condition of your brakes. You not only receive information on the thickness of the brake blocks, but also detailed images of the brakes. You can directly identify which brake blocks may need to be replaced.

### Wheelset damage

We provide you with information about suspected wheelset damage (flat spots, coatings or crumbling) on your wagon. The warnings for individual wheel sets are indicated by a traffic light system. Due to acoustic detection\*, we would like to point out that the interpretation always refers to the bogie.

\*Special characteristic of acoustic detection: The probability of the presence of wheelset damage is determined not only on the basis of the current measurement, but also taking into account the last measurements in our public station network. Repeated suspicious measurements thus lead to reliable conclusions. In order to ensure that the acoustic detection system functions optimally at your location, a train must pass the respective location at a speed of more than 40 km/h. Furthermore, there must be no acoustic interference in the area of the measuring station, such as rail impacts, etc.

● **Red wheel set:**

It is very likely that the associated bogie has wheelset damage, and there is a strong suspicion that this damage is on the shown axle.

● **Yellow wheel set:**

The associated bogie is assumed to have wheelset damage. The assignment to the axle is an initial assessment.

● **Green wheel set:**

No damage was detected.

In addition to this information, you will also receive an audio file - you can listen to the sound pattern of the passing train and trace the detected wheelset damage.

**Graffiti**

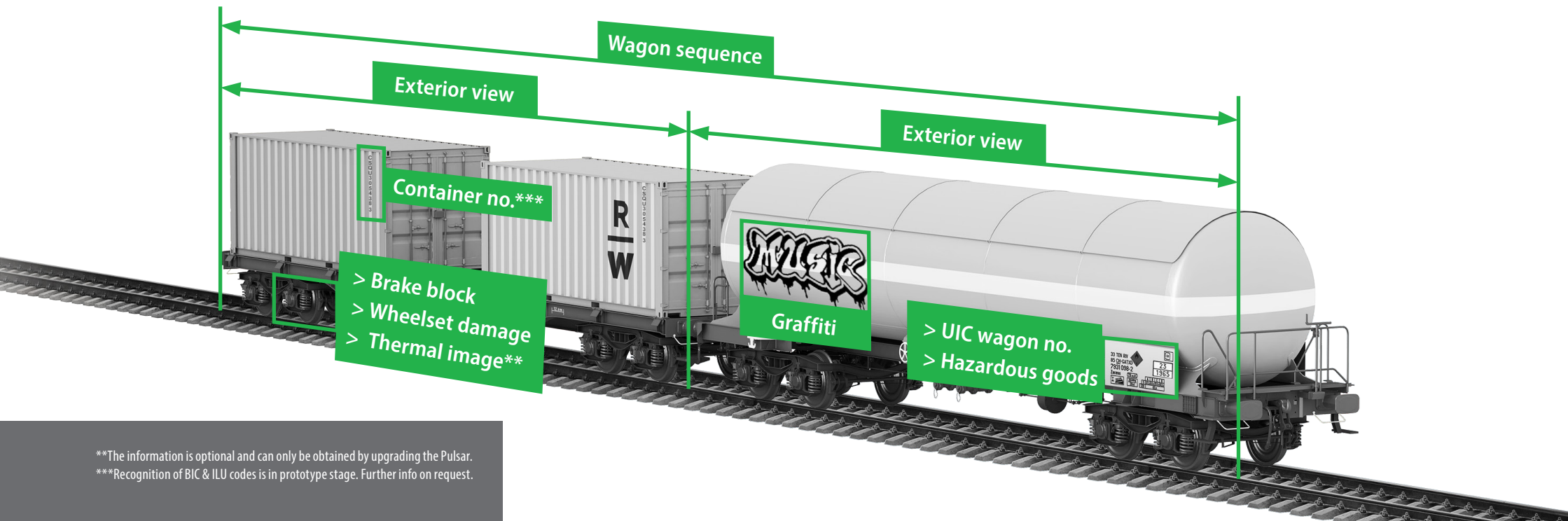
The graffiti information indicates whether graffiti is present on the wagon and if so, how many square meters of the wagon are covered by it. The exact position of the graffiti can be checked using the exterior view of the wagon.

**Hazardous goods**

You can use the hazardous goods information to identify whether there are dangerous goods on the train. By recognizing the dangerous goods sign, you receive the respective hazard number/UN number and thereby know directly what kind of dangerous goods the wagon is transporting.

**Thermal image\*\***

Thermal imaging data makes thermal anomalies in the area of the wheel visible. This allows you to detect hot axle bearings and seized brakes.



\*\*The information is optional and can only be obtained by upgrading the Pulsar.

\*\*\*Recognition of BIC & ILU codes is in prototype stage. Further info on request.


# Description of the provision of data

## Web-based portal

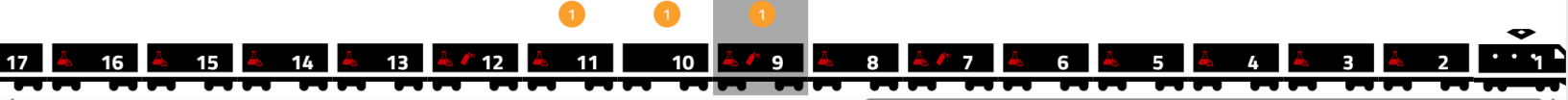
You will receive access to our web portal with the Traincheck, Fleetcheck and Wagoncheck interfaces. The information is presented to you visually.

### ▼ Traincheck

Traincheck is a comprehensive overview of your trains with direct display of the respective wagon sequence as well as high-resolution detailed views of the individual wagons. Furthermore, you can see immediately all warnings and critical conditions relating to brake blocks and wheelset damages, as well as the presence of graffiti and hazardous goods. If required, a tabular wagon list can be downloaded at the touch of a button.



- Dashboard
- Fleetcheck
- Wagoncheck
- Traincheck
- Watchlist
- Blacklist
- Billings



**37** **37001-1**  
Position of axles/wheels in direction of measurement

Measurement time: 08.04.2024 04:22

Location: RFC 1 - Rheinbrohl (RBL)

Direction: Mannheim (DE) - Cologne (DE)

Classification: 7838 - Tank wagon


Brake block material: K/LL

Wagon keeper according to GCU:

Graffiti: 5 m<sup>2</sup>

Dangerous goods:

[Download wagonlist](#)



	4L	4R	3L	3R	2L	2R	1L	1R
<b>left/right brake block (mm)</b> <small>(Measurement accuracy without guarantee)</small>	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●
<b>Thermal image</b>	●	●	●	●	●	●	●	●
<b>Wheel flat</b>		●		●		●		●

#	🚚	📅	📍	🔍	📏	👁	🧪	🚦	📏	📷
		04/06/24 - 04/08/24	all	0-60 mm	all	all	all	0-100 m²	all	
33 888 7809-5	7809 - Zagns	06.04.2024 09:47	Industry - Chemnitz I	28	K/LL	-	no suspicion	0	Not interesting	
33 888 7809-3	7809 - Zagns	06.04.2024 09:47	Industry - Chemnitz I	32	K/LL	yes	no suspicion	0	Not interesting	
33 888 7809-4	7809 - Zagns	06.04.2024 09:47	Industry - Chemnitz I	21	K/LL	yes	no suspicion	0	Not interesting	
33 888 7813-8	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	47	K/LL	yes	no suspicion	7	Not interesting	
33 888 7813-1	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	51	K/LL	yes	no suspicion	0	Not interesting	
33 888 7813-6	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	47	K/LL	yes	no suspicion	0	Not interesting	
33 888 7813-5	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	49	K/LL	yes	suspicion	0	Not interesting	
33 888 7813-9	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	24	K/LL	yes	no suspicion	0	Not interesting	
33 888 7813-4	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	25	K/LL	yes	no suspicion	0	Not interesting	
33 888 7813-0	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	35	K/LL	yes	no suspicion	0	Not interesting	
33 888 7813-4	7813 - Zags	06.04.2024 09:47	Industry - Chemnitz I	37	K/LL	yes	suspicion	0	Not interesting	
37 888 7809-1-1	7809 - Zagns	06.04.2024 09:47	Industry - Chemnitz I	50	K/LL	yes	no suspicion	0	Not interesting	
37 888 7809-4	7809 - Zagns	06.04.2024 09:47	Industry - Chemnitz I	45	K/LL	yes	no suspicion	0	Not interesting	
37 888 7809-0	7809 - Zagns	06.04.2024 09:47	Industry - Chemnitz I	25	K/LL	yes	no suspicion	0	Not interesting	
37 888 7819-0	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	18	K/LL	yes	no suspicion	0	Not interesting	
37 888 7813-1	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	55	K/LL	yes	no suspicion	0	Not interesting	
37 888 7819-0	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	35	K/LL	yes	no suspicion	0	Not interesting	
37 888 7819-7	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	35	K/LL	yes	no suspicion	0	Not interesting	
37 888 7819-4	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	30	K/LL	yes	no suspicion	0	Not interesting	
37 888 7819-6	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	43	K/LL	yes	no suspicion	0	Not interesting	
37 888 7819-4	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	32	K/LL	yes	no suspicion	0	Not interesting	
37 888 7819-1	7819 - Zags	06.04.2024 09:47	Industry - Chemnitz I	51	K/LL	yes	no suspicion	0	Not interesting	

### ◀ Fleetcheck

With Fleetcheck, you always have an overview of all your wagons clearly organised in a tabular overview.

### ▼ Wagoncheck


If you are interested in a particular wagon, you can see both the current measurements and historical measurements of this wagon in the wagoncheck view. You can analyze changes in the condition of a wagon since the last measurement or determine how long the wagon has been damaged.

**vossloh**

- Dashboard
- Fleetcheck
- Wagoncheck
- Traincheck
- Watchlist
- Blacklist
- Billings

08.04.2024 - RFC 1 - Rheinbrühl (RBL) ▼
Add to watchlist
Exclude wagon from dashboard view

#### Wagonprint



#### Keeper (GCU)

Wagon no. 37 888 7819-1-1  
Keeper: [redacted]  
VKM: [redacted]  
Telephone: +49 0201 888 8000  
E-Mail: [redacted]

#### WAGON HEALTH

37 888 7819-1-1  
Position of axles/wheels in direction of measurement

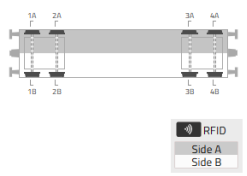
Axle 1: [redacted]  
Axle 2: [redacted]  
Axle 3: [redacted]  
Axle 4: [redacted]

#### Dangerous goods

336  
1093


336  
1093

#### Side detection

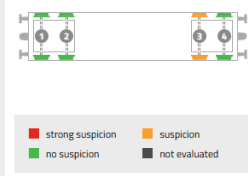


#### Brake blocks

Brake block material: K/LL



#### Wheel flats



■ strong suspicion    ■ suspicion  
■ no suspicion        ■ not evaluated

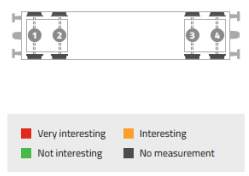
#### Graffiti

>5 m²

#### Train direction

Mannheim (DE) - Cologne (DE)

#### Thermal image

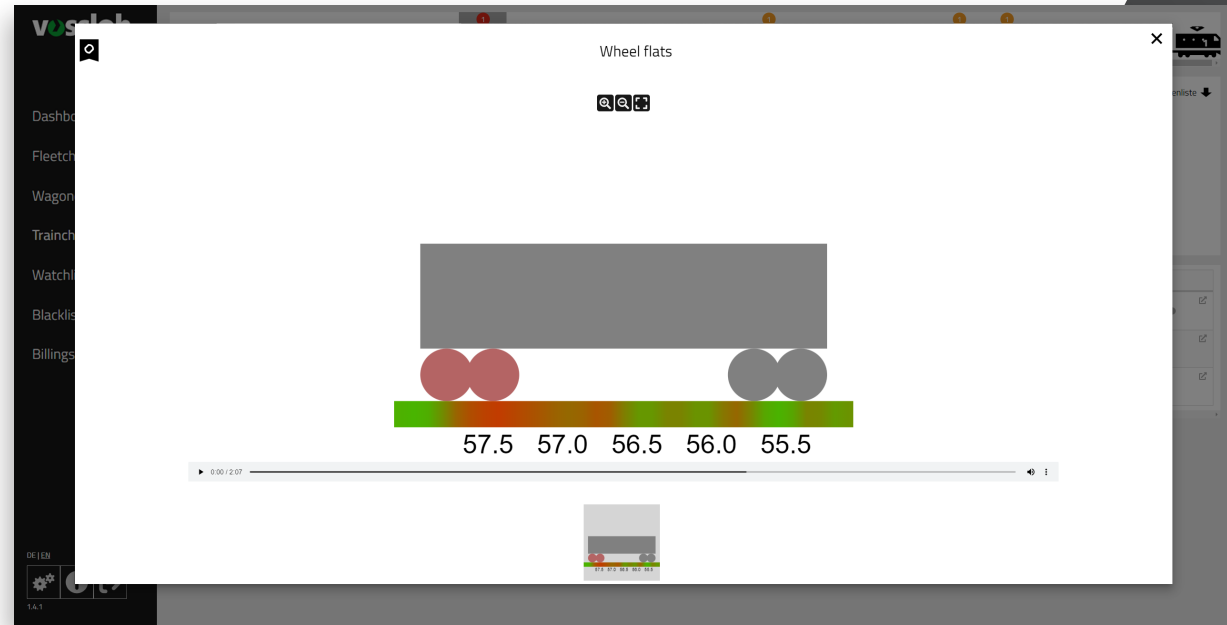


■ Very interesting    ■ Interesting  
■ Not interesting    ■ No measurement

## Detailed views of the individual measurement data

### Wheel flats ▶

Convince yourself of the existence of wheelset damage and listen to the recording of the train passage.

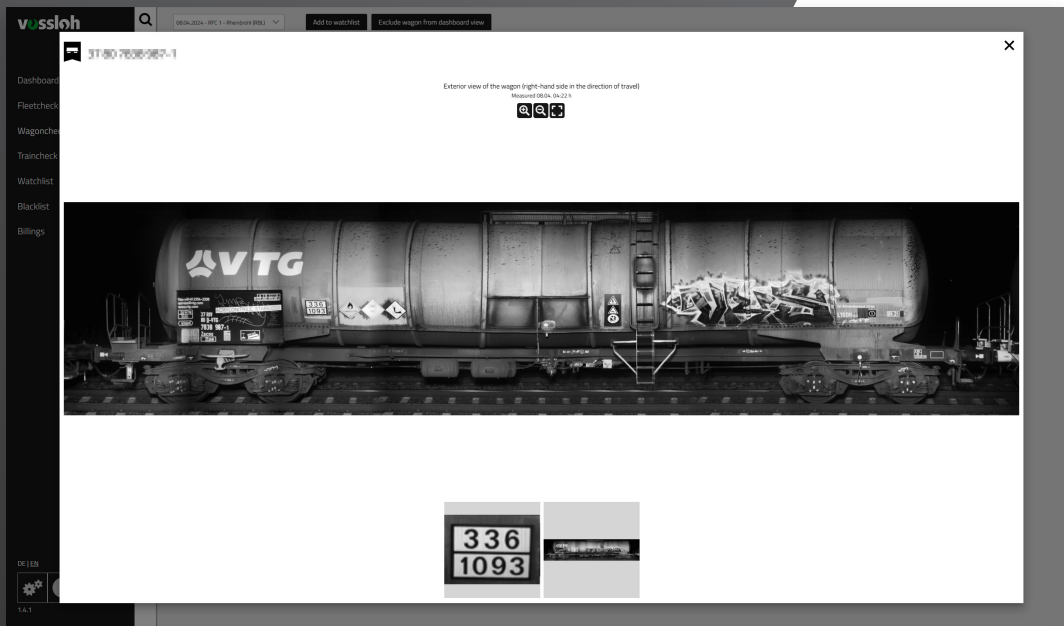


The screenshot shows a window titled "33 80 7100 716-3" with a search icon. It displays a train wagon with a dangerous goods sign that reads "239" and "1010". Below the wagon is a smaller version of the same sign. At the bottom left, there is a red diamond-shaped hazard symbol for "Gases". At the bottom right, there is a legend for the hazard codes:

239	Flammable gas, which can spontaneously lead to violent reaction
1010	Butadienes, stabilized or Butadienes and Hydrocarbon mixture, stabilized containing more than 40% butadienes

### ▶ Hazardous goods

A click on the dangerous goods sign provides further details on the hazardous substances loaded and enables an assessment of the hazard potential.



### ◀ Exterior view

The detailed exterior view of the wagon, based on high-resolution images, allows you to check the external condition of the wagon.



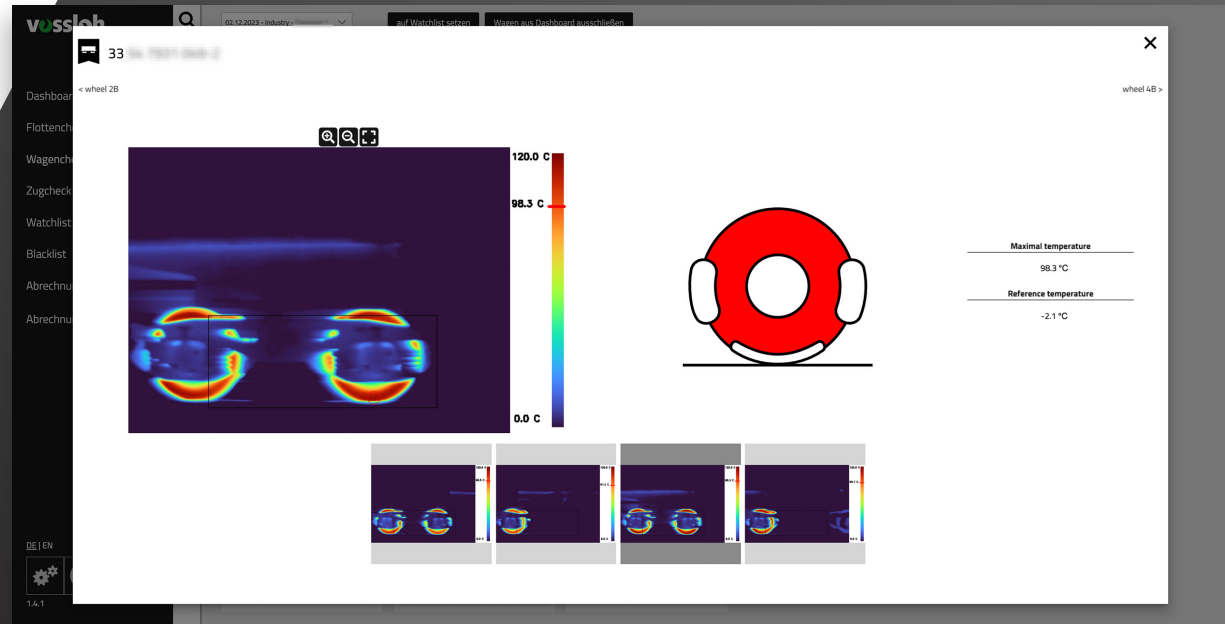
### ◀ Brake block

In addition to the automatic recording and millimeter-precise measurement of the brake block thickness, you can also examine detailed images of the individual wheels in Traincheck.



## Thermal image ►

You can see the heat radiation of the wheelset immediately on the thermal images, with blue areas indicating colder regions and red areas hotter regions. The warning is not based on absolute values but on the ratio of the maximum temperature compared to a reference temperature measured on the vehicle body.



## Interface (API)

In addition to our portal, you can also access the data via an interface solution. We offer you the option of using a standard interface (we specify the data fields and structure) or implementing a customized interface solution that integrates the data directly into your system. With both options you have the choice of whether we should actively send you the data as soon as it is available (PUSH) or whether you would prefer to retrieve the data on demand (PULL).

Each interface keeps the required data available for you in a dedicated database. In this way, we minimize latency and achieve the highest possible availability. The data is always provided via a REST API.

If you do not want to retrieve the data yourself (PULL), but would like us to send it to you as soon as it is available (PUSH), we will be happy to add a customised service that forwards the data directly to your system on arrival.



**Vossloh RailWatch GmbH**

Gutenbergstraße 16

53359 Rheinbach

Germany

**Contact**

[sales@vossloh-railwatch.com](mailto:sales@vossloh-railwatch.com)

[vossloh-railwatch.com](http://vossloh-railwatch.com)