vossloh

Vossloh RailWatch GmbH

Pulsar

the innovative AI-driven monitoring

As of: 05/2025

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 an RFID reader, it's easy to install next to your infrastructure. Passing freight trains are captured at 200 images per second, then analyzed 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 UIC wagon number, wagon sequence, exterior view of the wagons, dangerous goods, graffiti and container numbers, we also record condition data. The condition data provides information on the state of the brake blocks and indications for 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 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, or a camera tower for monitoring from above.

Description of the data

The recorded data supports you in your incoming and outgoing goods inspections and facilitates internal processes in your area of responsibility. You always have an overview of which trains and which wagons arrive and depart in which order. This increases your productivity and prevents unforeseeable disruptions - saving you time and, above all, money.

You also receive a precise overview of the condition of the wagons. This can support you in questions of liability and also enables you to identify wagons that may need to be suspended. This helps you to optimise your loading and unloading processes and you can put together a new train set in a more targeted manner that passes the wagon inspection without any complaints. This ensures that trains depart on schedule.

UIC wagon number

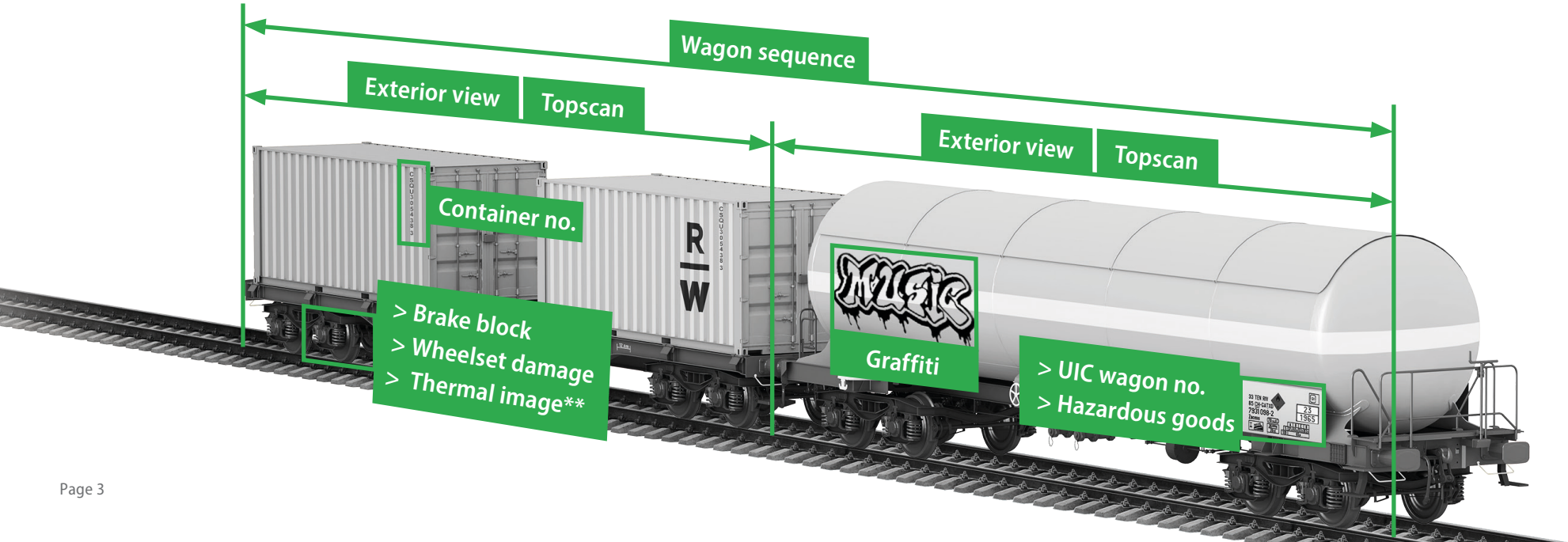
The UIC wagon number is used to identify and assign the respective wagon. All other information about the wagon is assigned to the corresponding UIC number. Our detection rate is 99% - achieved through a combination of optical methods and the analysis of RFID information.

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.



Topscan**
Thanks to a camera mast that does not require the track to be built over, the TopScan extends the external view of the wagon with an image from above. This makes it possible to identify individual conditions of the wagon, such as an open dome cover, and provides information about the current load.

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.

BIC/ILU Code
For loaded intermodal wagons, the BIC codes of the containers or the ILU codes of the semi-trailers are made available to you. This information can speed up loading and unloading processes.

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.

● *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.

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.

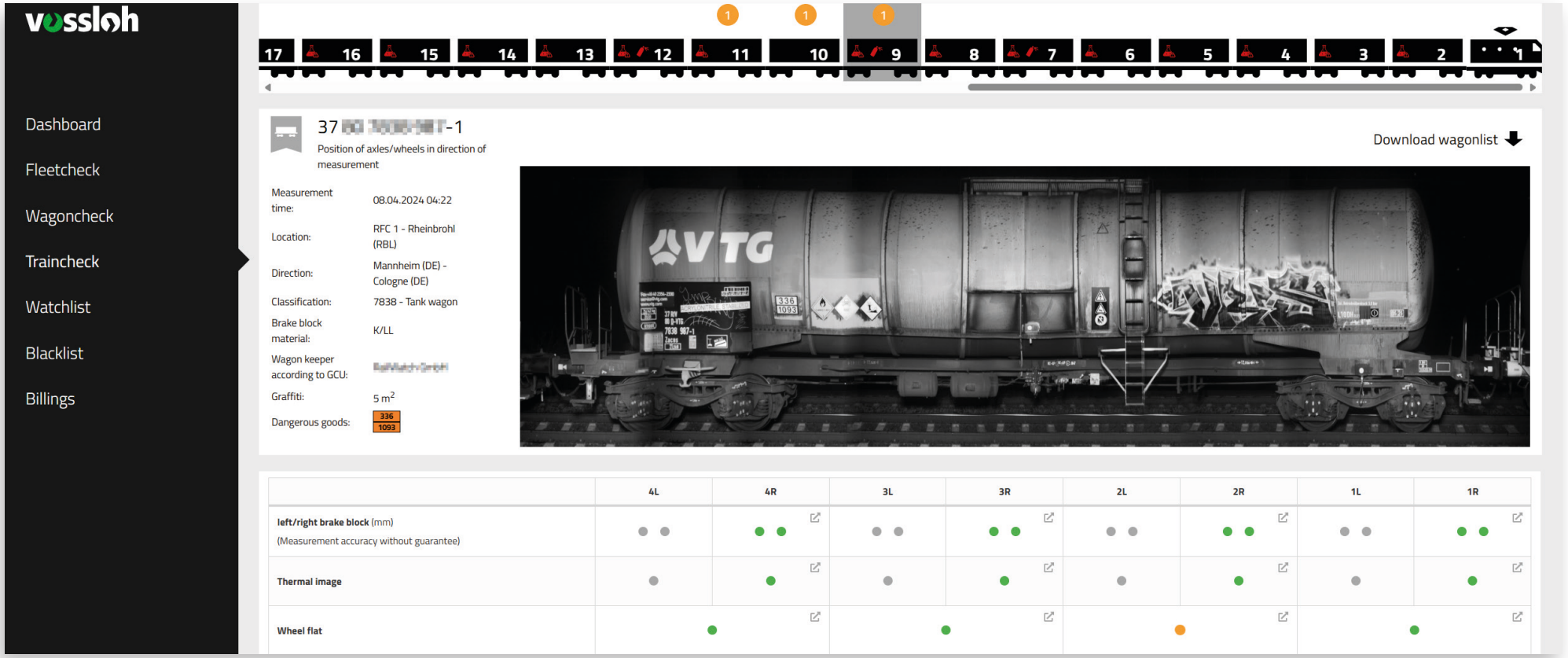
Description of the provision of data

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 and high-resolution detailed views of the individual wagons. If required, a tabular wagon list can be downloaded at the press of a button. You can also see recognised warnings and critical conditions of brake pads and wheelset damage, as well as the presence of graffiti and hazardous goods.

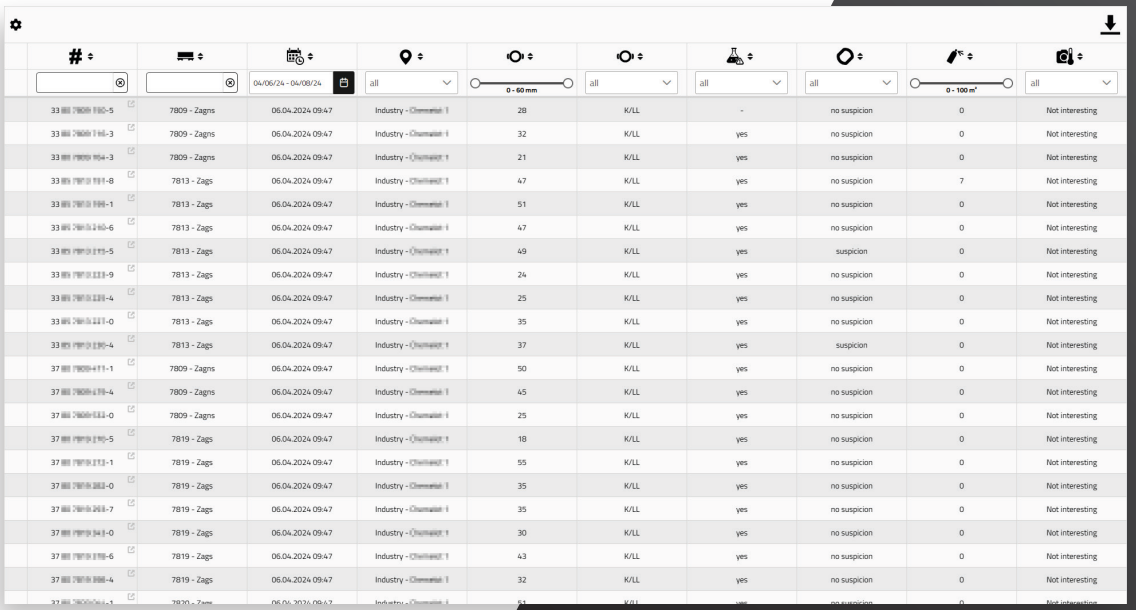


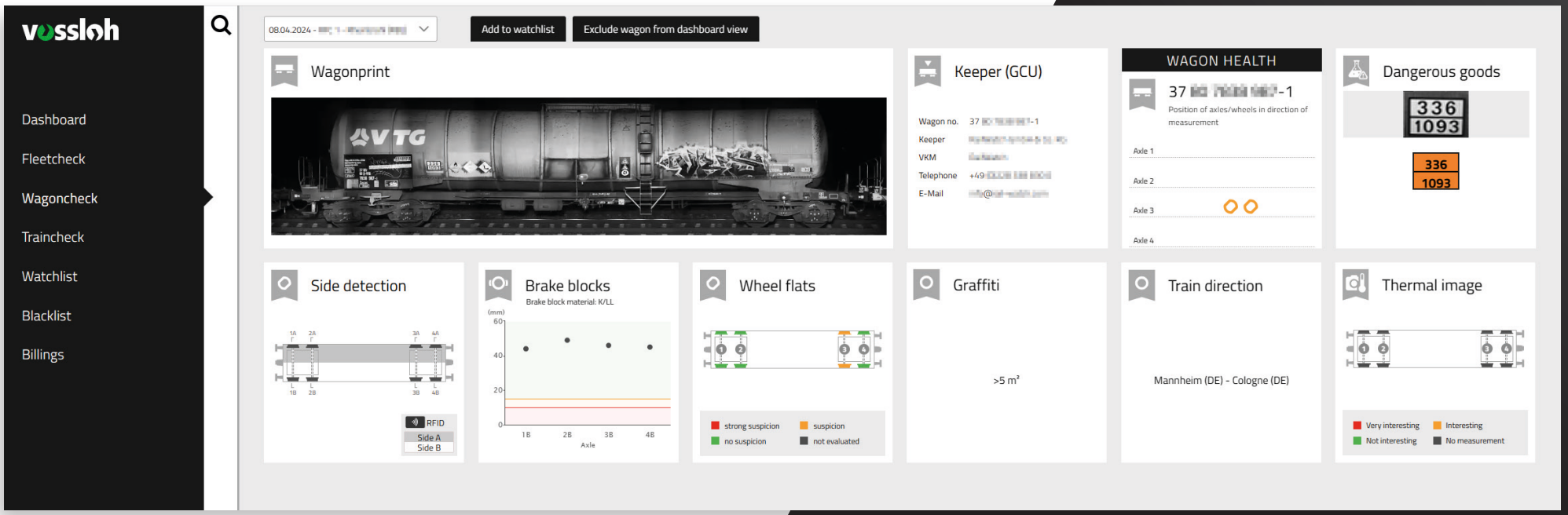
Fleetcheck ▶

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

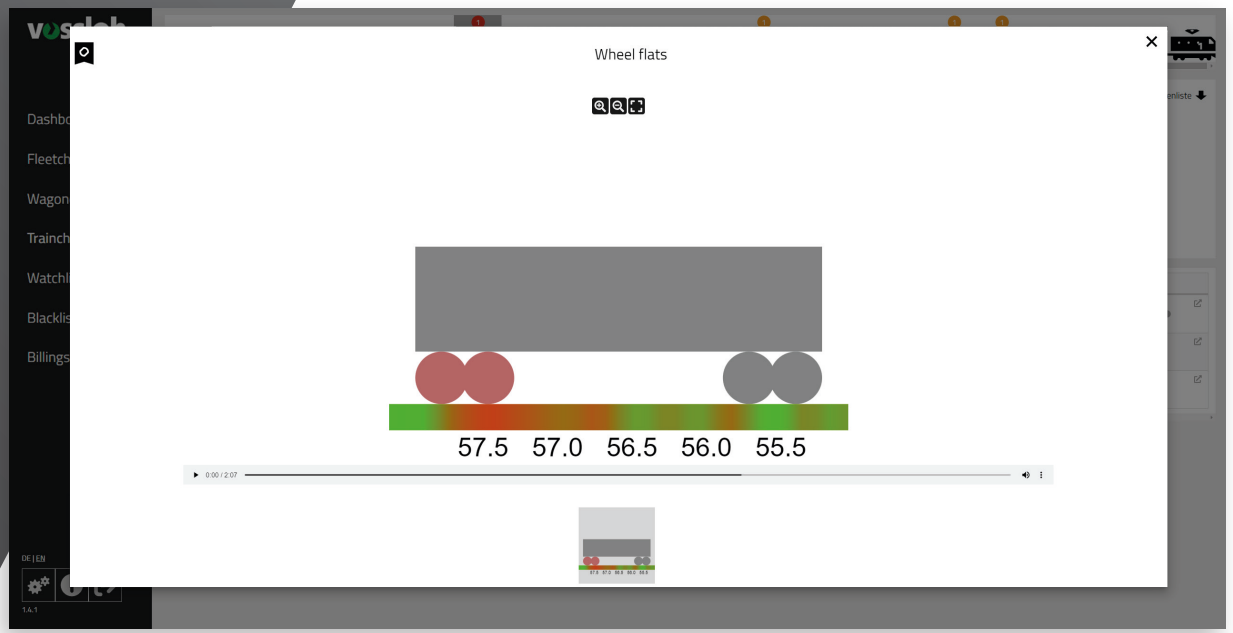
Wagoncheck ▼

If you would like to take a closer look at a vehicle, you can do so in our Wagoncheck. Here you will also find historical measurements and can analyse how the condition of a vehicle has changed since the last measurement or how long it has been damaged.



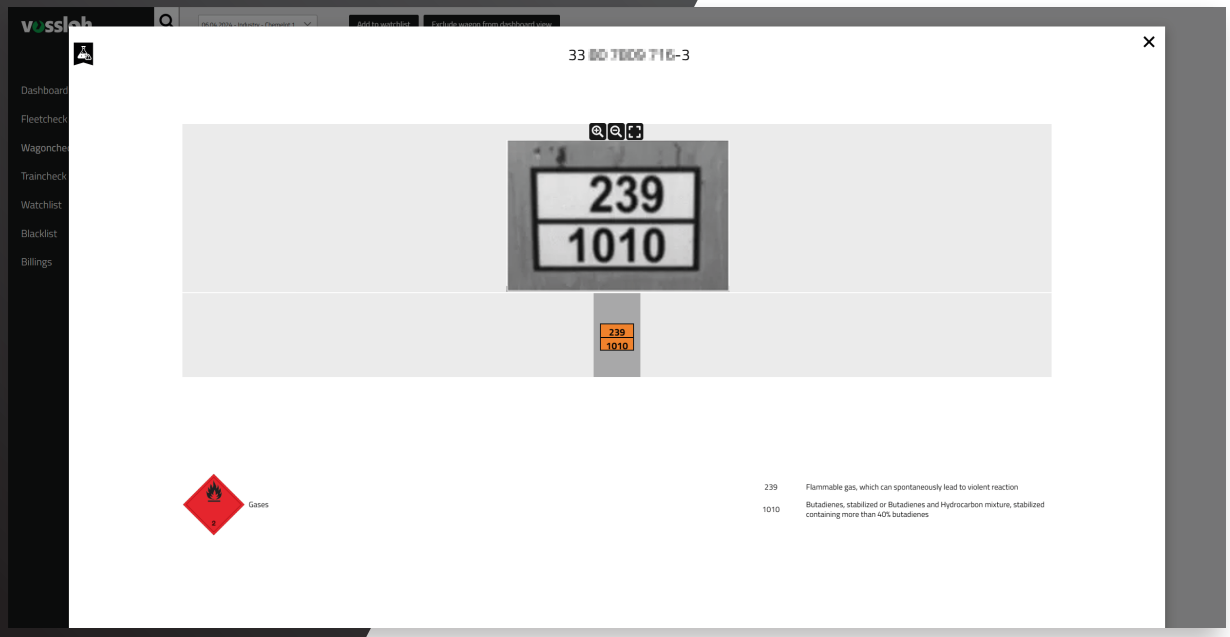


Detailed views of the individual measurement data



Wheel flats ▶

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

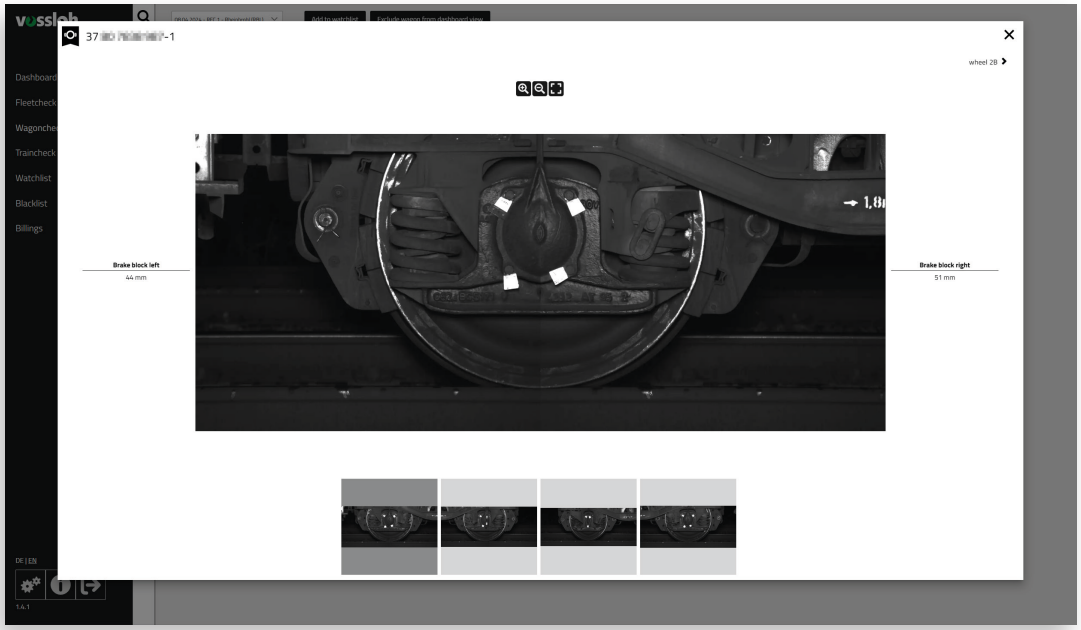


◀ **Hazardous goods**

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.

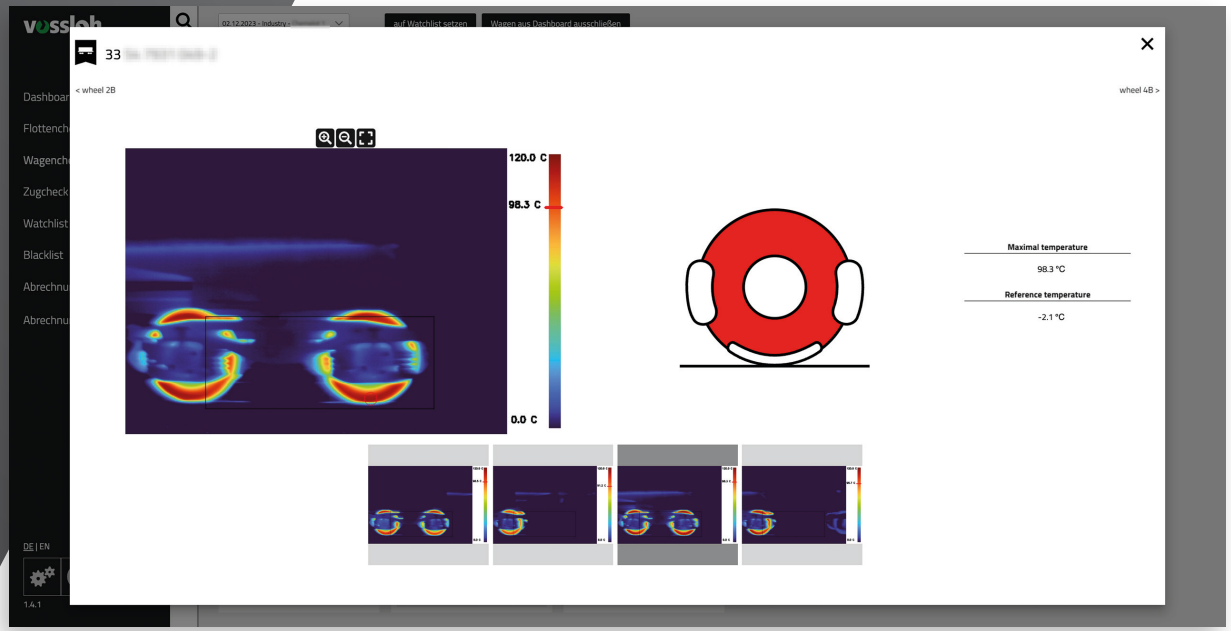


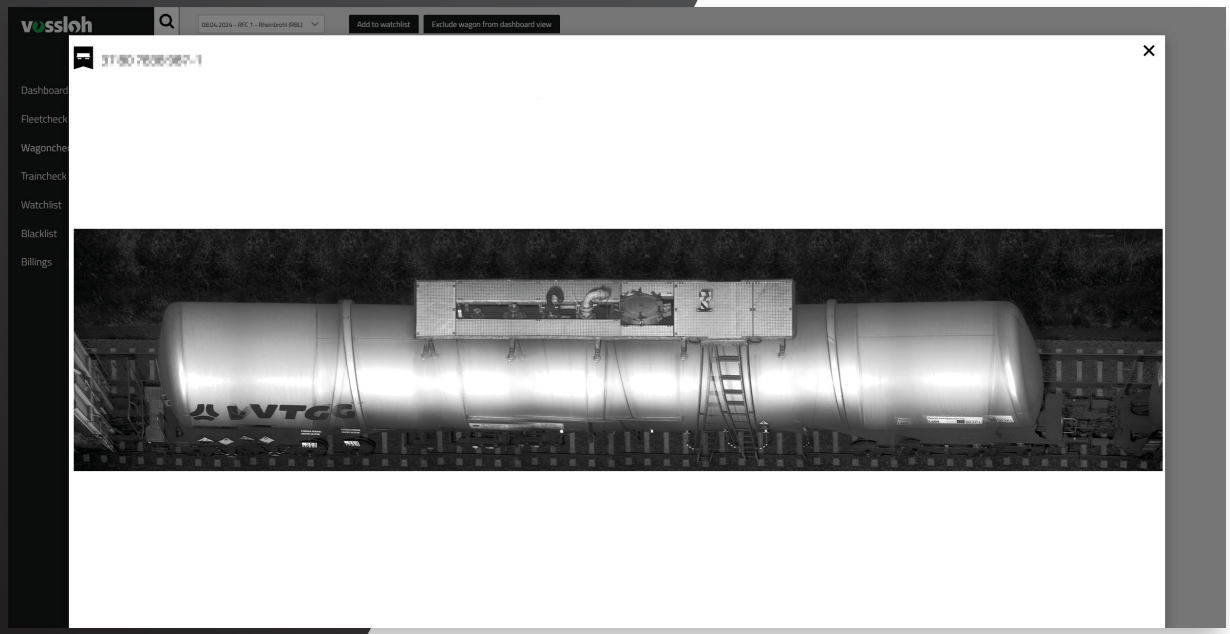
Brake block

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 all the details of the wheelset's heat signature, with the temperatures colour-coded (blue for cold and red for hot). In addition to this user-friendly display, you also receive information on the maximum temperature of the wheel.





◀ Topscan**

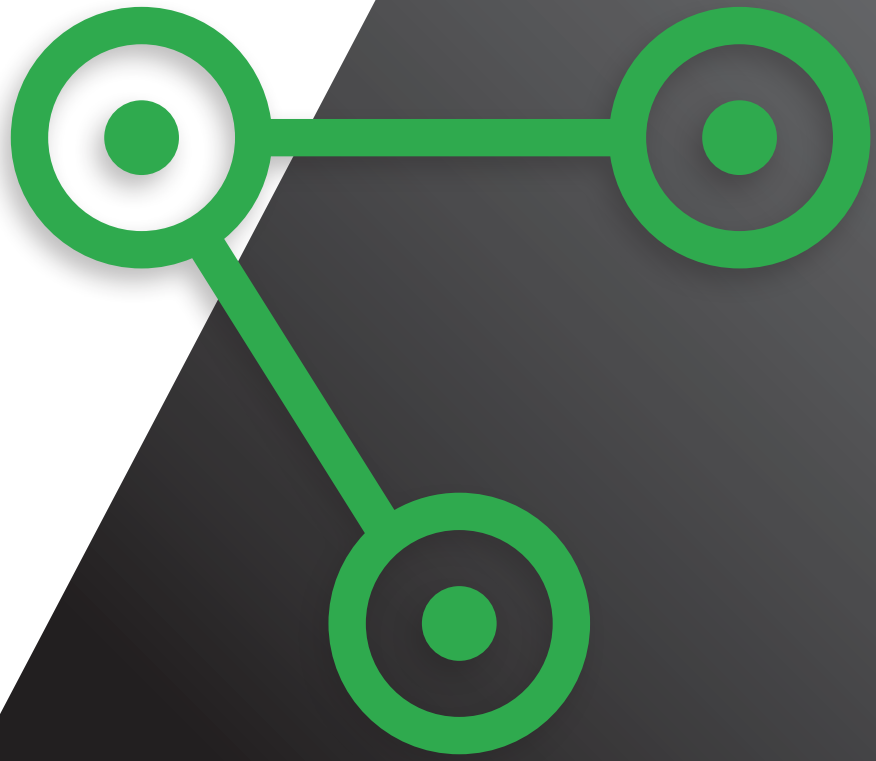
The addition of the top view makes inspection much easier. This additional perspective on the wagon means that open dome covers or incompletely closed roofs, for example, can be identified immediately. With open wagons, it is possible to recognize whether a wagon is unloaded or loaded and whether the load is unevenly distributed.

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.



*Special feature of acoustic detection: To enable acoustic detection of potential wheelset damage, the train must be travelling fast enough at the respective location that the force exerted on the rail by the wheelset damage is strong enough for it to be clearly audible. Furthermore, there must be no acoustic interference in the area of the measuring station, such as rail joints, etc.

**The information is optional and only available by upgrading the Pulsar.

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