

## PREFACE



**Dear Readers,  
Honoured Customers,**

Reading this brochure with all containing information can be a step for you to be a more satisfied customer as we see ourselves as system provider for the delivery of new freight wagons for rail road and the corresponding bogies.

Our company's philosophy is based on our main principles "customer satisfaction, delivery reliability, best quality and long-term concepts for realisation of maximum success of the contract partners".

We work with most modern management methods, with firm organisation and high performance both in design and in production. You will benefit in several terms (conditions, delivery time, delivery reliability, one contact person per project) from our exceptional strategy and our unique German-Korean business model.

Please do not hesitate to ask us and we will convince you and our satisfied customers show us that we are on the right track to our huge goal. Our goal is not the track, our goal is the future, our goal is here and today and you as customer need today a reliable partner for your transport with our wagons.

We wish you success at all time, personal health and successful years, hopefully with us as your supplier.

Best regards,

**Dr. Thomas Steiner**

CEO

STEINER TECHNOLOGY GROUP (STG) GMBH

MD/Owner / CEO

STEINER CONSULT

## About us

**Steiner Consult** is an independent engineering and consultancy company with partner manufacturing locations in several industrial sections e. g. in Turkey, Serbia, Hungary, Spain, Portugal, China, Korea and Italy that has accumulated expertise and competency in the field of designing and manufacturing for the Rolling Stock material according to UIC, BS, AAR and other standards and machining industry including ToT contracts (Technology Transfer contracts).

Due to our longstanding and considerable expertise we are able to offer complete satisfaction to our customers.

### Employees in the Company:

Steiner Consult has own experienced staff, e. g.

- » Design Engineers
  - » Project Manager
  - » Administrative
  - » Management-Staff
  - » Project Rolling Stock Engineers
- » Foundation: March 2000 (as court registered company) with original foundation in 1993
- » Main activities: Railway Industry, Machinery Industry, Renewable Energy, Engineering and Consulting / Agency Activities

## Products in Rolling Stock delivered by our manufacturing partners

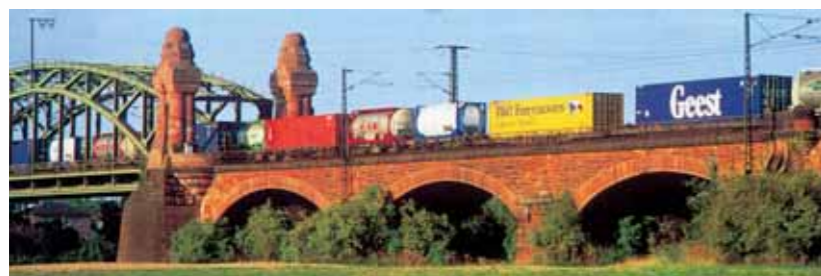
- » Container wagons with maximum load capacity in the market (UIC, RIV, AAR, RID, TSI)
- » Auto-carrier wagons with top moving deck by means of a mechanical system
- » Tank wagons for dangerous and toxic substances complying with the latest safety norms (incl. pressure tank cars and chemical tank cars)
- » Hopper wagons and Container flat wagons
- » Multivalent wagons for containers and motor vehicles
- » Ballast wagons and all other kinds of freight cars (e. g. Habbins, Laeers, Res, Sgnss, Falns, Talns)

- » Freight bogies (e. g. Y25Lsd1-K, BA 628 / 629, broad gauge bogies)
- » Bogies for motor driven and trailer cars according clients design
- » Car bodies for passenger train vehicles according clients



## Main activities / products in Rolling Stock

- » Consultancy work in Rolling Stock
  - » Planning of Rolling Stock projects
  - » Infrastructure Planning of Rolling Stock projects
  - » Pre-design, final design and engineering
  - » Planning and construction
  - » Mobile repair team
  - » Flexible customer support
  - » ToT (Technology Transfer)
  - » After Sales Service
  - » Spare Part Service
- » Manufacturing of new vehicles and prototypes by our suppliers
  - » Modernization and re-design by our suppliers
  - » Maintenance by our suppliers
  - » Repair after accident by our suppliers
  - » Approval, inspection and commissioning by our suppliers
  - » Renovation of historic vehicles by our suppliers
  - » Revision and main inspection by our suppliers
  - » Steel work by our suppliers
  - » Colouring by our suppliers
  - » Components and Subsystems by our suppliers (e. g. Aluminium)
  - » Manufacturing of components by our suppliers
  - » Products made from carbon steel, stainless steel and Aluminium



## Engineering + Design / Production

Our freight car Vehicle Development Department offers the complete development process, starting with preparation of the specification through to production assistance in manufacturing. Main areas of our activities are the engineering and prototyping for special new freight cars and **of course all kinds of freight cars and bogies.**

Complete systems and subsystems are designed and developed from conceptual stage to pre-series acceptance.



### We can offer the following scope:

- » Design concepts and detail design (incl. manufacturing drawings and complete documentation)
- » car body manufacturing
- » interiors
- » electrical design
- » development and engineering in 2D (AutoCAD) and 3D (AutoCAD Inventor Suite 2008/09, CATIA) in dwg format
- » FEM calculation static / dynamic
- » technical project management
- » ToT (Technology Transfer)
- » Support of the Homologation Process
- » TSI approval consulting



## Process Automation

The successful execution of complex and demanding projects in the field of process automation gives us an even more innovative drive. In our Automation Department (own partner office in Burghausen FIWA, Bavaria) we enhance your projects with our future-oriented solutions to optimize your existing systems. Together with you, we define concepts and we develop a very precise and eminently suitable solution. Our Bavarian partner FIWA has more than 150 electrical and automation engineers.

If so required we can support you on questions regarding:

- » SPS systems / bus systems
- » Planning / Projecting / Electrical diagram design and layout
- » Process visualisation
- » Start-up
- » Training
- » ToT (Transfer of Technology)

## Jig & Fixtures Design

Our Jig and fixtures Design engineering team will respond to your individual requirements and will agree with you on planning and realization to achieve precision in view of the application and conditions. We develop and design jigs and fixtures for assembly and disassembly as well as for examination of components.

Our scope of services comprises:

- » Specification preparation
- » Process chain analysis incl. first proposal
- » Selection of system components
- » Mechanical engineering
- » Electrical developments
- » Manufacturing support
- » Start-up
- » Training

## Expert Organisation

We examine your calculations for structural strength of railroad vehicles and rail sets. Additionally we certify your components and systems regarding their electromagnetic compliance with specified requirements.

Our vast experience in the process of new build and modernisation railroad vehicles puts us in the position to execute approval processes not only for components but also for the complete vehicles, starting with the application up to the final acceptance. Alternatively, we can provide relevant consultancy services to your company.

**We support our suppliers during the complete project until homologation of the prototypes and approval by the European Notified Bodies, the National Safety Authorities (NSA) and TSI Conformity Certificates.**



## Main Production Sites



- » Turkey
- » Former Yugoslavian Countries
- » Hungary
- » Slovak Republic
- » Portugal
- » Spain
- » Germany (Service & Spare part Business)
- » Italy
- » Asia
- » Korea
- » Own workshop for final assembly in Germany

## Products & Competencies in our manufacturing site Korea and its European site

### Manufacturing Workforce

The direct workforce employed in the manufacturing processes has the following capabilities:

» Total directs	<b>750</b>
» Welders	
» qualified welders:	80
» general welders:	30
» Mechanics	280
» Turners	60
» Other skilled workers	100

### Quality System & Certificates

- » **General Certificates**
- » **ISO 9001:2000** general certificate of quality management
- » **DIN EN 6700-2 / EN 15085-2, CL1** welding certificate for production of Rolling Stock material for rail cars issued by: TÜV Süd, Munich in June 2008
- » **Quality Certificate** issued by several railways organisations





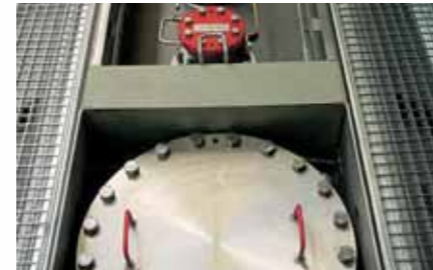
Wagon types



Bogie Production Y25Lsd1 respectively Y25Ls1-K (TSI)



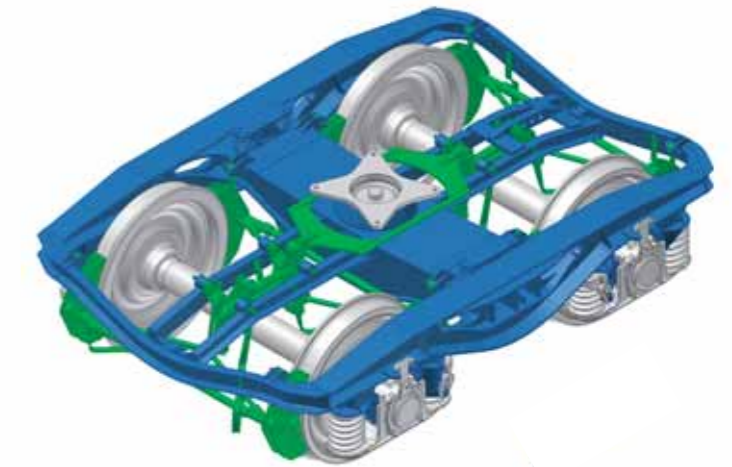
Sand blasting machine / painting cabin



Y25Lsd1 / Y25Ls1-K (TSI)



Bogie Y25Lsd1 is used for the European freight wagons. Maximum speed 120 km/h, maximum axle load 22,5 tons (now Y25Ls1-K).



## 4-axled tank wagon 95 m<sup>3</sup>

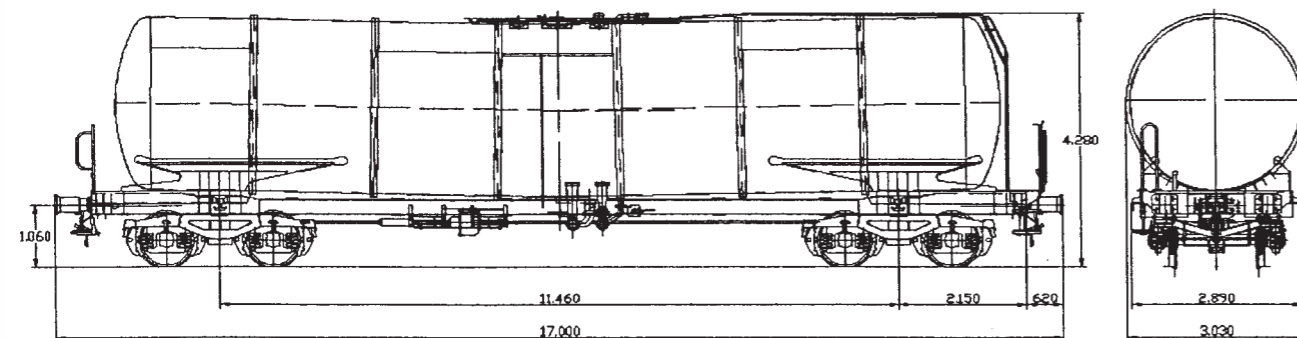
This **4-axled tank wagon** is suitable for transporting motor gasoline, diesel fuel and light fuel oil. The self-supporting welded tank is made of steel of the quality S355J2+N and is stabilised by external reinforcing rings.

There is a hinged dome – DN 500 –, a pressure control valve with flame guard and a venting valve on the crown of the tank. The emptying equipment consists of an internal, floor-operated drain valve – DN 125 – and draw valve on both side – DN 100 –. When the drain valve is opened the venting valve is forced open by a wire rope. The gas displacement is led from the tank crown down through one of the hollow reinforcing rings into a

T-piece and further through pipes to the connections that are on the same level as the draw valve.

The underframe consists of longitudinal girder, cross girder with the tank saddle and buffer beam. The buffer beams bear the coupler and buffers. The wagon is prepared for the installation of Z-AK. It meets the requirements of the TSI freight wagons.

Bogies of the type Y25Lsd1-K are used. The compressed-air brake KE-GP-A acts on both bogies via the middle brake leverage. Each wagon is equipped with a hand brake that can be operated from the end platform. The TSI Noise is fulfilled by using K-brake shoe.



### Technical data

4-axled tank wagon		Bottom valve	DN 125
Type	Zanes	Side valve	DN 100
Tare	24 500 kg	Venting valve	DN 80
Max. carrying capacity	65 500 kg	Forced-aeration valve,	
Max. total weight	90 000 kg	mechanically operated	DN 80
Axle base	11 460 mm	Swing check valves	DN 80
Length over buffers	17 000 mm	Air brake KE-GP	KE-GP-12"
Width of wagon	20 860 mm	Bogie	Y25Ls1-K
Height of wagon	4 280 mm	Running circle diameter	920 mm
Load volume	95 m <sup>3</sup>	Max. axle load	22,5 t
Tank diameter	3 030 mm	Buffer – class	A
Length of tank	14 930 mm	Min. drivable radius in a train	35 m
Design pressure of the tank	10 bar	V max. (dynamic)	120 km / h
Test pressure of the tank	4 bar	V max. (braking)	100 km / h
Container inclination	1°	Vehicle gauge	TSI Pattern C15 (G1)

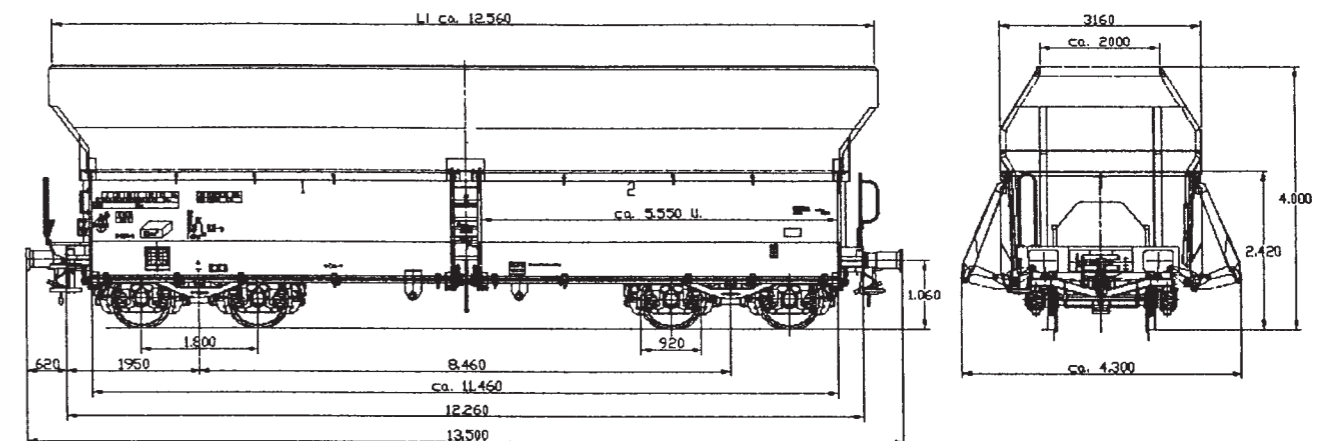
## 4-axled self-discharging wagon 95 m<sup>3</sup>

This **large-scale self-discharging wagon** is especially suitable for transporting bulk goods, particularly coal. It can be loaded from overhead bin, hopper and belt loading systems. It is unloaded by a pneumatic or optionally hydraulic opening of the side flaps into hoppers.

The car body consists of the saddle-shaped bottom in a framework construction, the end walls, side walls and the cross girder that divides the cargo space into two chambers of equal size. The incline of the saddle-shaped bottom and corner linings ensure the complete emptying. The buffer beam bears the

coupler and buffers. The wagon is prepared for the installation of Z-AK. It meets the requirements of the TSI freight wagons. The four large side flaps can be opened and closed either in pairs or simultaneously. They can be operated from either the wagon platform or the bin. Bogies of the type Y25Lsd1 are used. The compressed-air brake KE-GP-A acts on both bogies via the middle brake leverage. The TSI Noise is fulfilled by using K-brake shoe.

The inside of the car body has a thick coating to reduce wear and tear.



### 4-axled self-discharging wagon

4-axled self-discharging wagon		Width of the discharging flap	ca. 600 mm
Type	Falns	Max. width of wagon	
Tare	24 500 kg	with open side wall flap	ca. 4 300 mm
Max. carrying capacity	65 500 kg	Air brake	KE-GP 12"
Max. total weight	90 000 kg	Bogie	Y25Ls1-K
Axle base	8 460 mm	Running circle diameter	920 mm
Length over buffers	13 500 mm	Max. axle load	22.5 t
Width of wagon	3 160 mm	Min. drivable radius in a train /	150 m
Height of wagon	4 000 mm	individual wagon	75 m
Load volume	85 m <sup>3</sup>	V max. (dynamic)	120 km / h
Length of the loading flap	ca. 12 560 mm	V max. (braking)	100 km / h
Width of the loading flap	ca. 2 000 mm	Vehicle gauge	TSI Pattern C15 (G1)
Length of the discharging flap	5 500 mm		

### Technical data

## 2-axled sliding wall wagon

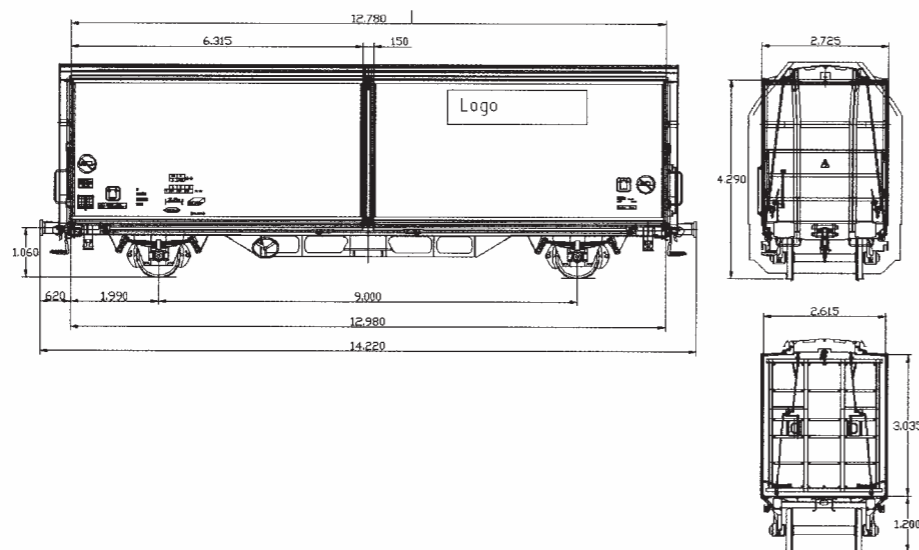
The wagon is ideal for transporting large volume and specific lightweight goods such as car parts in loading cages, goods transported on pallets or in containers.

The car body is designed as a steel structure whereby the underframe end wall, roof and central pillar form a sturdy framework. Standard components acc. to TSI are used as the bogie, brake, coupler and buffers.

The sliding walls are designed as steel frames / a lightweight framework construction and are covered with plastic-coated textile tarpaulins. The interfaces between the sliding walls and

car body – end wall profile, central pillar, roof and bottom boom – are designed to form a labyrinth. This guarantees sufficient protection for the load against the weather. The sliding walls are guided at the top and run on rollers at the bottom. They can be easily opened and closed by one person. Each of the sliding walls exposes around 50 % of the loading length on each side of the wagon.

There is a mobile and lockable dividing wall on one end of the wagon. This allows the loading area to be adjusted to the cargo.



## Technical data

2-axled sliding wall wagon		Loading width	2 615 mm
Type	Hbis	Loading area	33,4 m <sup>2</sup>
Tare	15 500 kg	Loading volume	102 m <sup>3</sup>
Max. carrying capacity	30 500 kg	Loading flap	2 x 6 315 mm
Max. total weight	45 000 kg	Air brake	KE-GP-A
Axle base	9 000 mm	Running circle diameter	920 mm
Length over buffers	14 220 mm	Max. axle load	22,5 t
Width of wagon	2 725 mm	Min. drivable radius	
Height of wagon (empty)	4 590 mm	in a train	35 m
Height of floor above top of rail	1 200 mm	V max. (dynamic)	120 km / h
Loading length	12 780 mm	V max. (braking)	100 km / h
Interior height of loading flap	3 035 mm	Vehicle gauge	G 2 / 400

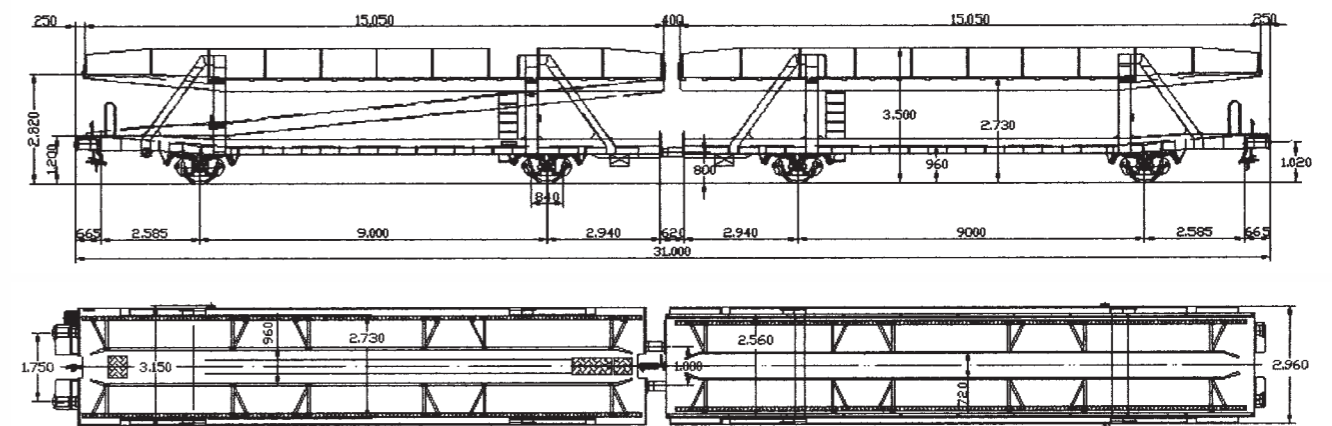
## 2 x 2-axled car wagon

The **double deck car carrier** is designed as a 2 x 2-axled, short-coupled wagon unit to transport automobiles. Two deck are available for loading. The upper decks is height-adjustable and can be used as a transport deck or loading ramp – max. 6° angle of inclination. When lowered it can be used for vehicles with a larger profile – e.g. minibuses, delivery vans, etc. It is loaded from the end via a ramp. Fold away loading ramps between the wagons allow speedy loading.

The underframe consists of longitudinal girder, cross girder and buffer beams that also bear the coupler and buffers. There are diagonal buffers to absorb the linear movement on the

central coupling point. The supporting pillars for the upper load deck bear the spindle drive for its height adjustment. The decks are made of anti-slip structured metal plates over the cross girder. The wagon is prepared for the installation of Z-AK. It meets the requirements of the TSI freight wagons and TSI noise.

Wheel sets with a 840 mm wheel diameter, leaf springs with double chain link suspension gear are provided as bogies. A compressed-air brake of the type KE-GP acts on two wheel sets on each half of the wagon via a middle brake leverage. Further customer wishes can be taken into account (e. g. wagon with spindle drive or cable winch drive).



### 2 x 2-axled car wagon

Type	Laaerss
Tare	32 000 kg
Max. carrying capacity	24 000 kg
Max. total weight	56 000 kg
Wheel-base	9 000 mm
Length over buffers	31 000 mm
Width of wagon	2 960 mm
Width of wagon cable hooks	3 150 mm
Height of the loading area, fist deck	960 / 1 200 mm
Height of the loading area, second deck	2 730 / 2 830 mm
Height of wagon (empty)	3 500 mm

Usable width of loading area	2 560–2 730 mm
Air brake	KE-GP-A
Running circle diameter	840 mm
Max. axle load	13,0 / 14,0 t
Buffer – Class	A
Min. drivable radius	
in a train	150 m
Min. drivable radius	
in a train individual	75 m
V max. (dynamic)	120 km / h
V max. (braking)	100 km / h
Vehicle gauge	TSI Pattern C15 (G1)

## Technical data (only one of the technical possibilities)

## 4-axled sliding wall wagon

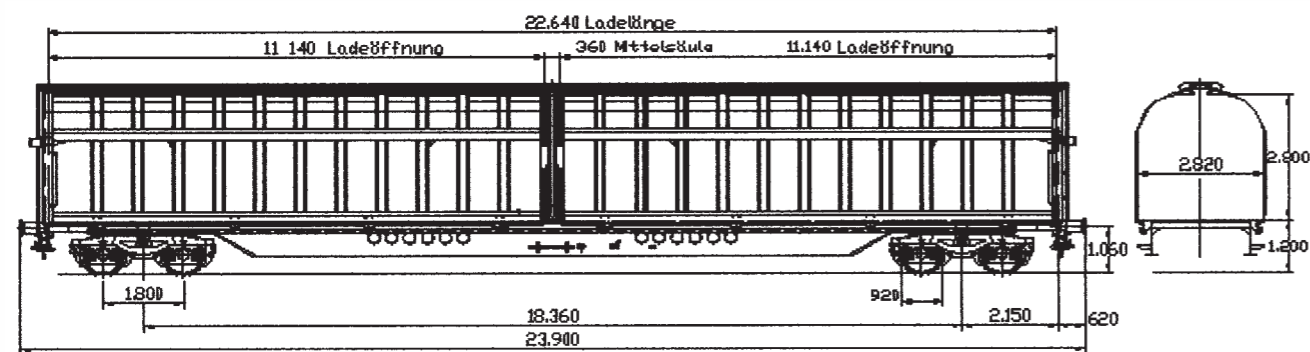
The wagon is ideal for transporting large volume and specific lightweight goods such as car parts in loading cages, goods transported on pallets or in containers, though its loading capacity also allows the transport of specific heavy goods such as reels of paper, sawn timber, fibreboards, etc. It can be economically loaded and unloaded from the side with a forklift truck since the opened sliding walls expose roughly half of the wagon's loading area.

The car body is designed as a steel structure whereby the underframe, end wall, roof and central pillar form a sturdy framework. Standard components acc. to TSI are used as coupler and buffers. Bogies of the type Y25Lsd1 are used. The compressed-air brake KE-GP-A

acts on both bogies via the middle brake leverage. The TSI Noise is fulfilled by using K-brake shoe.

All sliding walls are designed as hollow aluminium section frameworks with a covering of aluminium sheets. The interfaces between the sliding walls and car body – end wall profile, central pillar, roof and bottom boom – are designed to form a labyrinth. This guarantees sufficient protection for the load against the weather. The sliding walls are guided at the top and run on rollers at the bottom. They can be easily opened and closed by one person.

The wagon can be fitted with sliding and lockable dividing walls and metal wedges to secure the reels of paper and any other loads in place.



## Technical data

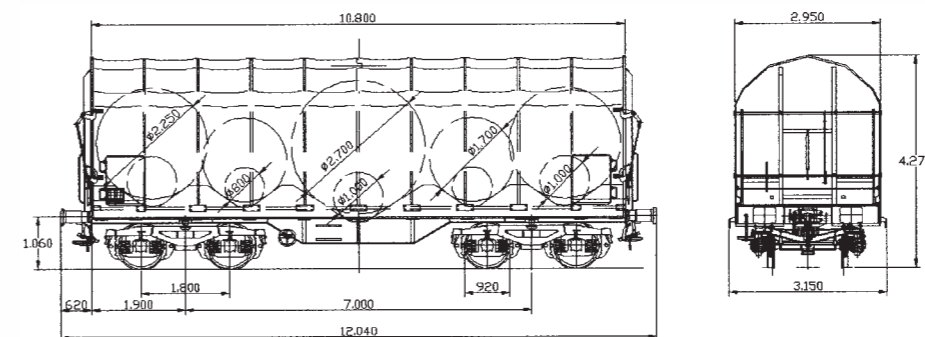
4-axled sliding wall wagon		Loading width	2 820 mm
Type	Habbiins	Loading area	63,8 m <sup>2</sup>
Tare	27 000 kg	Loading volume	170,0 m <sup>3</sup>
Max. carrying capacity	63 000 kg	Loading flap	2 x 11 140 mm
Max. total weight	90 000 kg	Air brake	KE-GP-A (K)
Axle base	18 360 mm	Bogie	Y25Lsd1-K
Length over buffers	23 900 mm	Running circle diameter	920 mm
Width of wagon	2 910 mm	Max. axle load	22,5 t
Height of wagon (empty)	4 275 mm	Min. drivable radius in a train	60 m
Height of floor above top of rail	1 200 mm	V max. (dynamic)	120 km / h
Loading length	22 640 mm	V max. (braking)	100 km / h
Interior height of loading flap	2 800 mm	Vehicle gauge	UIC 505-1 (G1)

## 4-axled coil wagon

The **coil transport wagon** from the Shimmns series is specially designed for the transport of strip coil. The loading area has recess to hold the coils of 800 to 2700 mm diameter. These recess are lined with a rubber fabric to protect the load. An adjustable load securing system prevents the load from slipping or tilting to one side.

The wagon body consists of external longitudinal girder, end wall, trough-shaped cross girder and the buffer beams. The buffer beam bear the coupler and buffers such as category A buffers, screw coupling and coupling hook with spring works. The wagon is prepared for the installation of Z-AK. It meets the requirements of the TSI freight wagons.

A gantry-like tarpaulin cover borne on arches offers protection against the weather, its edges are clamped to the end walls by locking systems. Rubber seals between the gantry tarpaulin and end wall edges provide sufficient protection against moisture. Arches connected to the tarpaulin cover are guided by rollers on lateral running rails. A leverage between the arches prevents the tarpaulin from collapsing when opened. Only one person is needed for opening and closing. The tarpaulin roof exposes approx. 2/3 of the loading area. Bogies of the type Y25Lsd1 are used. The compressed-air brake KE-GP-A acts on both bogies via the middle brake leverage. The TSI Noise is fulfilled by using K-brake shoe.



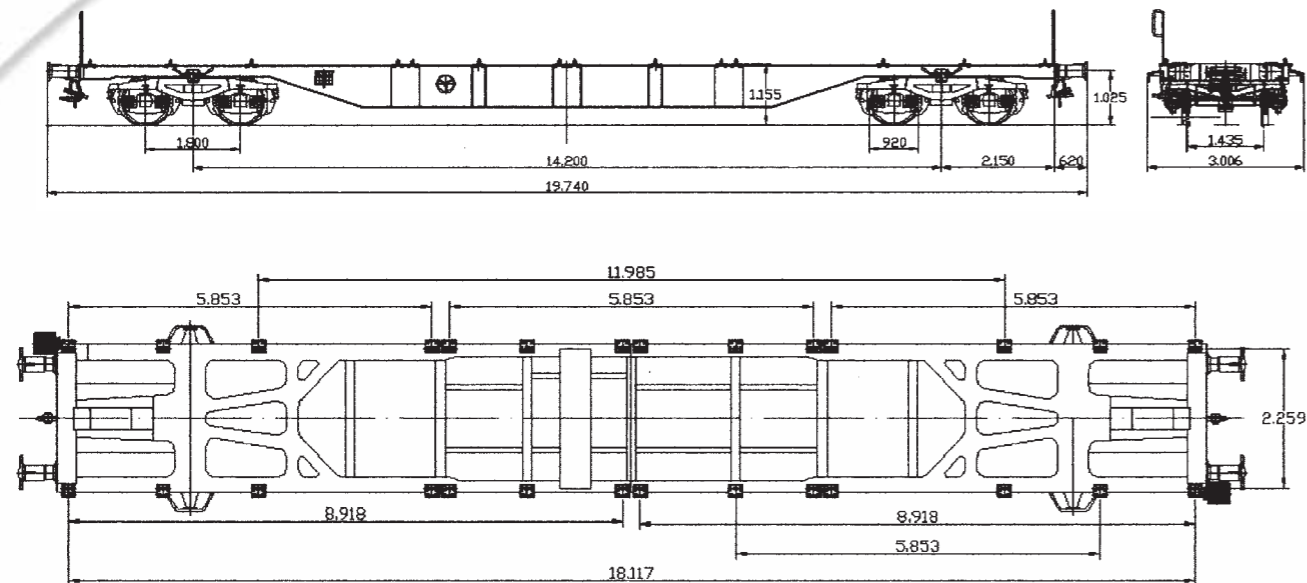
4-axled coil wagon		Bogie	Y25Lsd1-K
Type	Shimmns	Running circle diameter	920 mm
Tare	21 500 kg	Max. axle load	22,5 t
Max. carrying capacity	68 500 kg	Buffer – Class	A
Max. total weight	90 000 kg	Min. drivable radius in a train	150 m
Axle base	7 000 mm	Min. drivable radius in a train individual	35 mm
Length over buffers	12 040 mm	V max. (dynamic)	120 km / h
Width of wagon	3 150 mm	V max. (braking)	100 km / h
Height of wagon (empty)	4 275 mm	Vehicle gauge	TSI Pattern C15 (G1)
Number of loading recesses	5 units		
Usable width of loading recesses	352–2 035 mm		
Air brake	KE-GP A 12"		

## Technical data

## 4-axled container wagon 60 feet

The **container wagon** from the Rgnss series has been specially designed for the transport of containers and swap trailers. The loading pattern is listed separately. The variable use of the loading area by the different container / swap trailer lengths is allowed by foldaway container pins. The wagon underframe consists of the continuous external longitudinal girder, cross girder and buffer beams. The buffer beams bear the

coupler and buffers. This is made up of buffers – category A – screw coupling and coupling hook with spring works. The wagon is prepared for the installation of Z-AK. It meets the requirements of the TSI freight wagons. Bogies of the type Y25Lsd1-K are used. The compressed-air brake KE-GP-A acts on both bogies via the middle brake leverage. The TSI Noise is fulfilled by using K-brake shoe.



### Technical data

4-axled container wagon		Air brake	KE-GP A
Type	Sgnss	Bogie	Y25Lsd1-K
Tare	19 500 kg	Running circle diameter	920 mm
Max. carrying capacity	70 500 kg	Max. axle load	22,5 t
Max. total weight	90 000 kg	Buffer – Class	A
Axle base	14 200 mm	Min. drivable radius	
Length over buffers	19 740 mm	in a train	35 m
Width of wagon	3 006 mm	V max. (dynamic)	120 km / h
Height of wagon (empty)	1 155 mm	V max. (braking)	100 km / h
Loading	Container	Vehicle gauge	TSI Pattern C15 (G1)

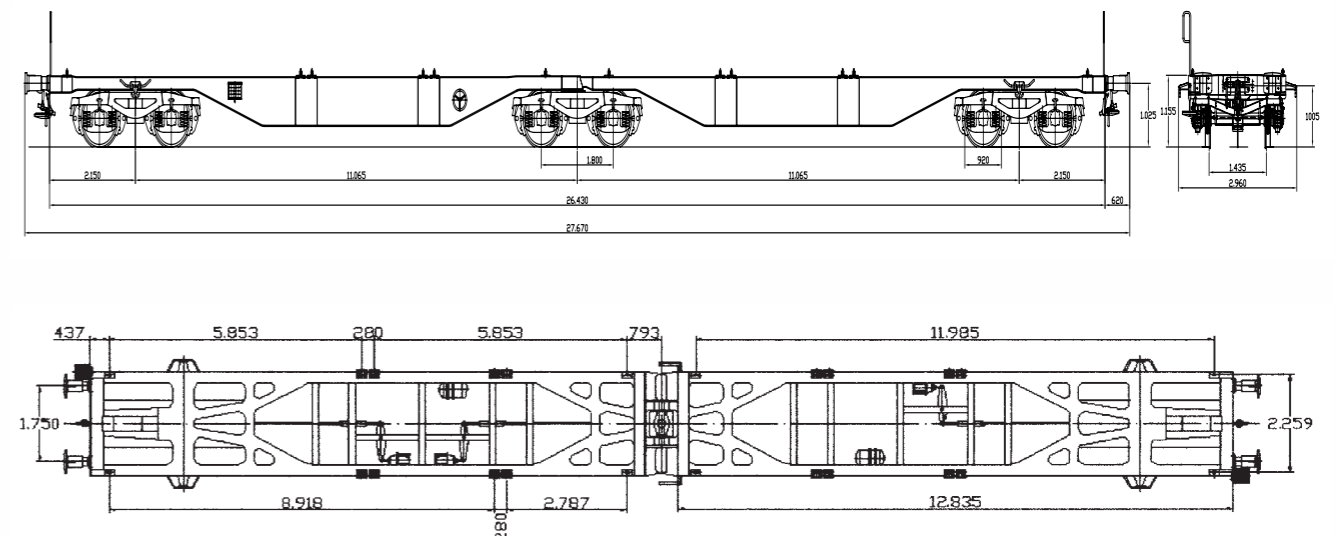
## 6-axled container wagon 80 feet

The **6-axled container wagon** from the Sggmrss series consists of a two-part unit and is specially designed for the transport of containers and swap trailers. The two halves of the wagon are connected by a spherical bearing that is supported on the center bogie by a pivot. The loading pattern is listed separately. The variable use of the loading area by the different container/swap trailer lengths is allowed by foldaway container pins.

The wagon underframe consists of the external longitudinal girder, cross girder and buffer beams. The outer buffer beams at the ends of

the wagon bear the couplers and buffers. These are made up of buffers – category A – screw coupling and coupling hook with spring works. The combination of pivot and spherical bearing is arranged on the central buffer beam. The wagon is prepared for the installation of Z-AK. It meets the requirements of the TSI freight wagons.

Bogies of the type Y25Lsd1-K are used. The compressed-air brakes KE-GP-A act on both bogies via the middle brake leverage. The TSI Noise is fulfilled by using K-brake shoe.



6-axled container wagon		Bogie	Y25Lsd1-K
Type	Sggmrss	Running circle diameter	920 mm
Tare	28 000 kg	Max. axle load	22,5 t
Max. carrying capacity	107 000 kg	Buffer – Class	A
Max. total weight	135 000 kg	Min. drivable radius	
Axle base	2 x 11 065 mm	in a train	35 m
Length over buffers	27 670 mm	V max. (dynamic)	120 km / h
Width of wagon	2 960 mm	V max. (braking)	100 km / h
Height of wagon (empty)	1 155 mm	Vehicle gauge	TSI Pattern C15 (G1)
Loading	Container		
Air brake	2 x KE-GP A		

### Technical data



## Some references

**We have designed and manufactured  
(our partners) partner location:**

- » Coaches (passenger coaches for Spain and Germany)
- » Workshop and repair coaches for Spain
- » Wagons for the transport of general goods
- » Tank wagons for dangerous and toxic goods
- » Container platform cars, Falns cars, tank cars, flat wagons
- » Containers
- » Swap bodies
- » Bogies for passenger and freight vehicles
- » Brake testing equipment
- » Bearing extractors
- » Wheel set changing stations
- » Bimodal semi-trailers and bogies
- » Forged and cast steel spare machine parts
- » Carts for dragging vehicles with damaged wheels
- » Mounting of compressed air brake on rail vehicles
- » Capital equipment
- » Design for DMU, EMU trains