

Installation Manual

Super-Rail on Structure, Post Spacing 1.33 m (SR OS)

H2-W4-B ($W_N = 1.2$ m; $DN = 0.6$ m; test length = 36 m)

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1. General

For the assembly and installation of Super-Rail on Structure with 1.33 m post distance (SR OS), the regulations of RAL-RG 620 apply in their current version. In addition, the requirements shown below have to be met precisely in order to achieve the performance of the Initial Type Test (ITT) as declared in the test reports (see data sheet in Annex III). If the requirements are not complied with during installation without consulting the manufacturer, any liability for defects of the product passes from the manufacturer to the installer.

This construction product has been tested to EN 1317. The test results were achieved under the conditions described in the test report. However, the test report scenario cannot cover all applications that may occur in practice. Therefore, this installation manual defines the boundary conditions for installation in correspondence with the state of the art as set out in German installation regulations RAL-RG 620, ZTV-PS 98 and RPS 2009. Provided that these conditions are fulfilled, the barrier system can be expected to perform effectively.

The assembly drawings of the tested product correspond to RAL-RG 620 drawing S1.2-310, drawing B1.1-206 (screwing) and drawings B2.1-202/203 (anchoring on structure), see Annex I.

Product parts and components made by manufacturers producing to RAL-RG 620 and having a CE certificate for this product are compatible with the product.

This construction product does not contain any toxic substances or dangerous substances that must be monitored.

For an installation in accordance with RAL-RG 620, installation gangs have to be permanently supervised by qualified personnel¹. Self-inspection tests as required in RAL-RG 620 must be carried out, recording the results in accordance with Annex 9 of RAL-RG 620.

In regions where the minimal outside air temperature T_{\min} in accordance with EN 1991-1-5/NA is below -24°C , the installation requires the manufacturer's written confirmation. Within Germany, the product installation can be expected to be unaffected by the ambient temperature with the exception of repairs, see 15.

The durability of the construction product including the foundation structure is guaranteed by the fact that all components are galvanized. This also applies for places with a corrosive environment such as in industrial or sea atmospheres. Information on the assessment methods and the assessment of durability are contained in RAL-RG 620 and EN ISO 1461 or EN 10346.

In case the space requirements for the working width cannot be fulfilled due to the local situation and confined space, it can be contemplated whether the standard distance from the road edge can be reduced or whether the system Super-Rail Plus on structure (SR+ OS), which is certified for a higher containment level, can be considered to have a sufficient working width in the containment level required.

Directly in front of plinths, abutments or other obstacles that are designed to withstand an impact without collapsing, the system can be installed irrespective of the working width due to the analogy of SR OS with the SR VZB. In this case, the SR OS would support itself on the obstacle in the event of a collision.

The system has been tested without the involvement of a parapet and therefore may be installed without an additional parapet. Due to the test set-up on a 1.15 m wide edge beam, the system may be installed only on edge beams of 1.15 m width or more.

If a 75 cm wide emergency footway and a parapet are required in accordance with RiZ chapter 1 (German guideline drawings for bridges), the minimum edge beam width is 2.0 m.

Where in a justified exceptional case the distance between the front edge of the system and the edge beam is reduced to less than 50 cm, e.g. due to an existing high kerb (see section 4), the minimum edge beam width may be reduced by the equivalent amount. Accordingly, the minimum edge beam width is 0.65 m in case the front edge of the beam is installed flush with the front edge of the kerb.

¹ The term of "qualified personnel" applies for certified guard-rail assembly personnel or "certified skilled assembly fitters for safety barriers" according to RAL, for instance.

To the beginning and end of the installed length, transitions or terminals must always be added.

2. Storage and handling

All safety barrier parts have to be stored and handled properly. Manufacturer-specific requirements such as procedure instructions for storage and transport have to be observed.

The parts must be protected against dirt, corrosion and damage. Parts that are laid out for assembly must be assembled as soon as possible. Only lay out as much material at operation sections as can be installed within one day.

3. Anchoring on structure or strip foundation

There are no system-specific restrictions as to the maximal compatible inclination of the subsoil. For the posts, deviations of $\pm 2\%$ inclination transverse to the driving direction are admissible (corresponding to ± 2.1 cm to the front/rear referred to the post height above the upper edge of the edge beam).

RAL-RG 620, chapter 1, sections 5.7.11 and 5.7.12 have to be observed.

Installation of safety barrier posts directly into concrete is not admissible.

Where plastic mortar (PC) or plastic-mixed materials (PCC) are used, they must comply with TL BE-PCC.

When using chemical anchors, the anchor manufacturer's instructions have to be followed consistently. Only chemical anchors Hilti HVU M 16 x 125, quality 8.8 are admissible.

- The minimum concrete quality/strength must at least correspond to guideline drawing chapter 1 (C25/30).
- Anchors must be installed by appropriately trained personnel only.
- Only the components supplied by the manufacturer must be used and individual parts (e.g. mortar cartridge) must not be exchanged.
- Drilling of boreholes \varnothing 18 mm with carbide metal hammer drill in accordance with ISO or national standards or diamond core drilling system DD-EC 1 with top-spin technology. Pneumatic hammers and other core drilling systems are not admissible.
- The 125 mm borehole depth (= anchoring depth) has to be observed. Shortening of anchor rods (e.g. in case of drilling obstacles) is not admissible. If properly installed, the threaded section of the anchor rod must not project more than 15 mm out of the nut.
- The distance from edge and joints must not be less than 15 cm.
- The borehole has to be blown at least four times with a hand pump or oil-free compressed air (ISO 8573-1, Table 7.3, oil class 4, $< 5\text{mg/m}^3$). Any water must be removed completely.
- The minimal waiting times until installation of the posts in dependence on the temperature of the anchoring ground as per the table have to be observed. Only then must the post be fastened (torque = 90 Nm). Installation of the adhesive anchors at -10°C to -6°C with a 24 h waiting time is possible in exceptional cases.

Temperature in the anchoring ground	Min. waiting time *
-5°C to -1°C	5 h
0°C to 9°C	1 h
10°C to 19°C	30 min
20°C to max. 40°C	20 min

* The waiting times specified only apply to dry anchoring ground. If the anchoring ground is wet, the waiting times need to be doubled.

In the case of pre-fabricated anchors, the anchors must be of Grade 8.8. The minimum tightening torque is 70 Nm.

All anchoring parts are galvanised in accordance with RAL-RG 620. Stainless steel anchors are not admitted.

Testing of chemical anchors acc. to RAL-RG 620 drawing B2.1-202 (part no. 41.05) must be conducted with the test device Hilti DPG 100 and with a centric tensile load of not less than 50 kN. The typical test load is between 55 kN and 65 kN, while it must not fall below 50 kN within one or two minutes. Damage to the structure or slippage must not occur.

To check correct anchoring, a minimum of 3% of the anchors have to be stressed and after relief tightened with the appropriate torque of 80 Nm. No important slippage must occur. If more than half of the 3% anchors tested are defective, all anchors of the structure must be tested. In case that less than half of all the anchors are defective, it is sufficient to test two more anchors as well at the post concerned as at each of the two neighbouring posts.

The test results of the chemical anchor tests have to be documented in the appropriate testing form as per Annex 9 of RAL-RG 620.

In the case of pre-fabricated anchors, it is sufficient to present a certification by the precast anchor supplier instead of testing.

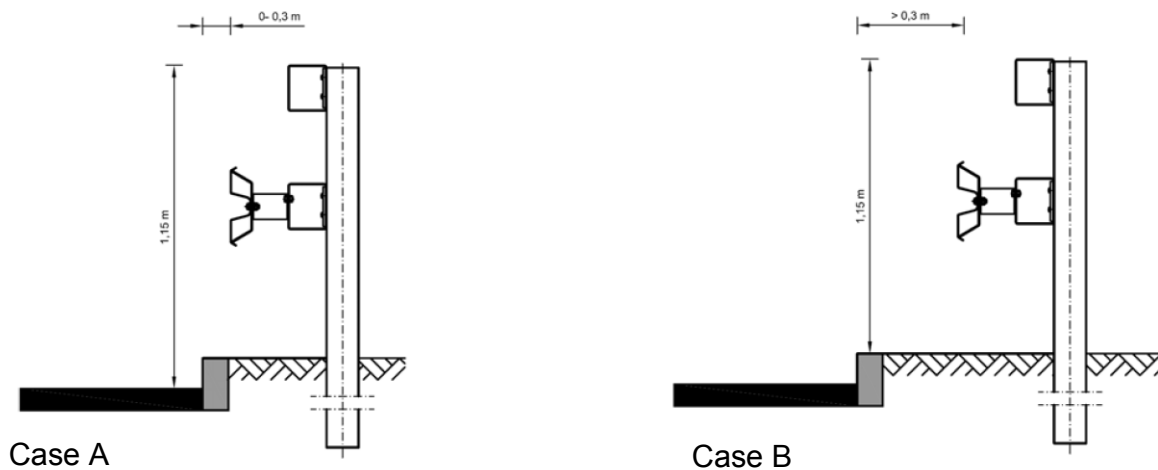
For sealing of the long-holes in the base-plates, it is recommended to either use the oval sealing plate (RAL part no. 41.41) or to fill holes with a grouting. If corrosion prevention measures are not taken, the inspection intervals specified at section 17 have to be respected.

4. Installation heights and limits of kerbs

At kerbs showing a height difference to the road surface of up to 7.5 cm (standard kerb), the installation height of the system is 115 cm \pm 3 cm for the upper box beams and 75 cm \pm 3 cm for the guardrail beams, measured from the road surface to the top of the beam. The standard heights apply at kerbs showing a height difference to the road surface of up to 7.5 cm.

The standard installation distance between the front end of the system and the road edge is 50 cm.

In the event that, on standard kerb, the system in has to be installed in a distance to the road edge of less than 50 cm, the datum for measuring the installation height shall be the area directly in front of the system. In that case, the heights shall be reduced to 105 cm \pm 3 cm for box beam and 65 cm \pm 3 cm for the guardrail beam.



At kerbs higher than 7,5 cm (high kerb), the system should be installed with the front of the guardrail beam in line with the edge of the kerb, given that this is possible and approved by the customer. In these cases, the height shall be measured from the road surface (see Case A).

In case the distance to the front edge of the high kerb is > 30 cm, the measured heights must be referred to the upper edge of the high kerb (see case B).

Other installation heights are possible only in justified and exceptional cases and then require a written approval of the customer.

At the beginning and end of a high kerb or edge beam, measures have to be taken to avoid that cars can under-run the barrier. If necessary, the shoulder has to be filled up to form a ramp up to the edge beam.

5. Assembly

Only parts that have been manufactured or supplied by a RAL-supplier are permitted.

This construction product does include neither components that have been preassembled at the factory nor pre-stressed parts.

Guardrail beams with A-profile or B-profile may be used equivalently.

The guardrail beams must overlap in traffic direction. The posts are to be installed with their closed sides towards the traffic (see Assembly Instructions in Annex II).

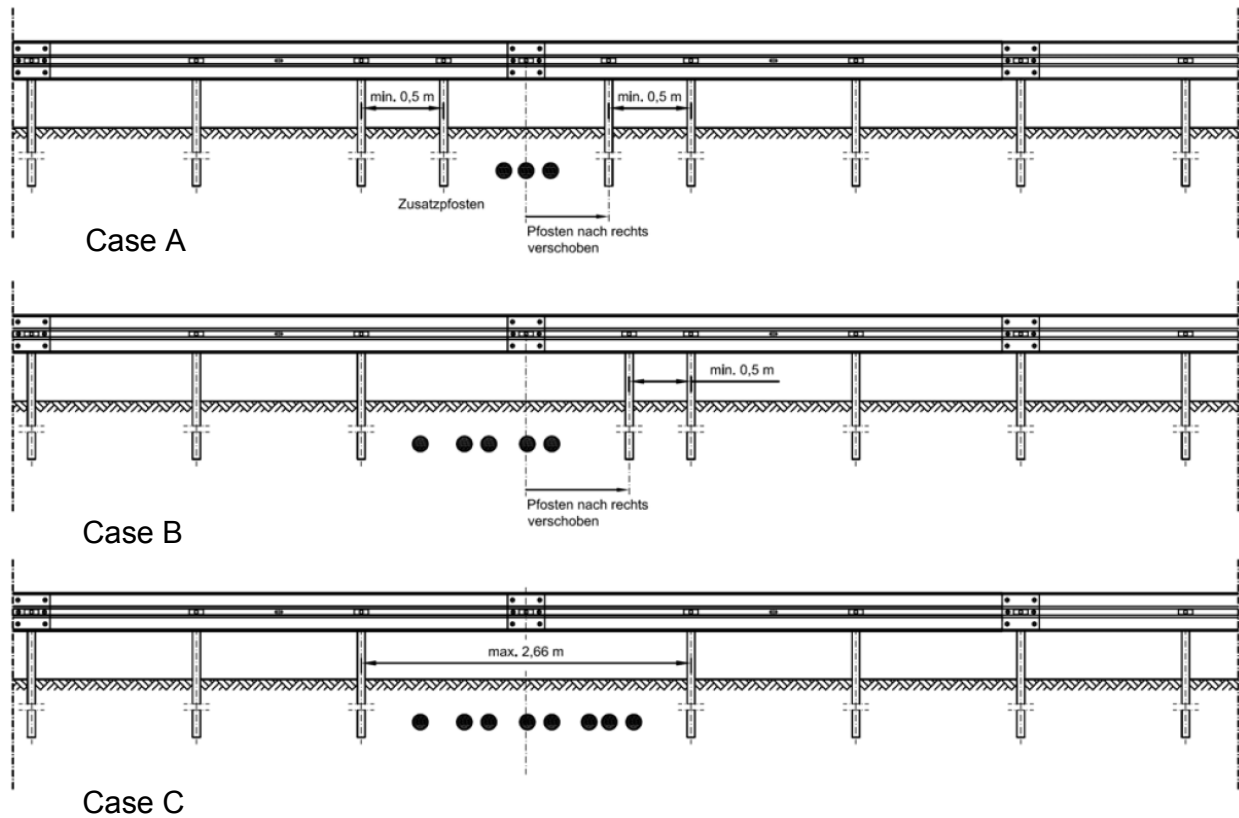
The box beams joints are to be installed with a 0.67 m offset right to the guardrail joints, (see Assembly Instructions in Annex II). Upper and lower box beams shall be installed in line to each other without any offset.

As a rule, the 1.33 m post spacing must not be exceeded. Where a post cannot be installed in the place intended, e.g. due to a shaft or expansion joint, this post have to be shifted. As this necessarily leads to a post distance of more than 1.33 m, an additional post must be inserted (see Case A).

Where the obstacle is so wide, that the additional post would have to be positioned closer than 0.5 m to the next post, the additional post may be omitted as an exception (Case B).

If the shifting of a post would likewise lead to a post distance of less than 0.5 m, this post may, with written consent of the customer, instead of being shifted also be omitted, provided that the distance between two posts does not exceed 2.66 m (Case C).

In all other cases, special measures have to be agreed on with the customer as engineering decisions.



More details regarding the assembly of the system are provided by the Assembly Instructions in Annex II.

6. Dilatations

Dilatation joints are to be installed in places where a movement joint (e.g. building expansion joint) is planned and the displacement path may be greater than about 2 cm. Example: the displacement path of a 30 m bridge at a temperature difference of 60°C is 2.2 cm. Accordingly, a dilatation joint is required. Short bridges of less than 30 m usually do not require dilatation joints.

In the area of carriageway expansion joints, the dilatation joints have to be installed symmetrically. Installation of posts with base plate must always start at the expansion joint. Dilatation joints are always to be supplied preassembled to the construction site and they are to be installed on the structure with the necessary post spacing.

For bridges of up to 400 m length, dilatation joints are to be designed as per RAL-RG 620 drawing S5.3-301 (see Annex I). On long bridges with spans of more than 400 m, several dilatation joints have to be installed every 400 m to compensate the different extension behaviours of the structure and the steel safety barrier. If this is not advisable, drawings of

dilatation joints allowing an axial displacement of ≥ 320 mm can be requested from the manufacturer.

The mean structure temperature at the time of installation is relevant for the adjustment of the dilatation joints. The bridge's movement due to temperature changes needs to be taken into account when installing the posts or precast anchors next to the expansion joints.

For the dilatation joints, $+10^{\circ}\text{C}$ is deemed to be the zero position at which the long-holes are just congruent. The post spacing relevant for installation results from the system length of the dilatation joint plus length change. For lengths outside the values given in the relevant drawings, the dimension for the pre-setting of the post spacing is to be extrapolated.

7. Screwing

Only screws made or supplied by an RAL manufacturer are admissible.

The screws have to sit vertically in the structural parts to be joined and properly tightened (see Assembly Instructions in table in Annex II).

In the dilatation area, the joint screws are to be tightened so as to enable the necessary movement of the moving structural parts. The nuts are to be locked properly (minimum tightening torque about 70 Nm).

The screws M 10x45 between post and box beam are to be hand-screwed. This corresponds to a tightening torque of not less than 17 Nm.

The screws M 16x27 for the joints of the guardrail beams, the screws M 16x30 and M14x30 for the box beam joints as well as the screws M 14x30 for the mounting of the deformation tubes to the box beams and the screws M 16x45 for fixing the guardrail beams have to be tightened with a torque of not less than 70 Nm.

It is recommended to use an impact wrench with a maximal torque of 500 Nm which can be adjusted to the required torque.

Tools required for screwing:

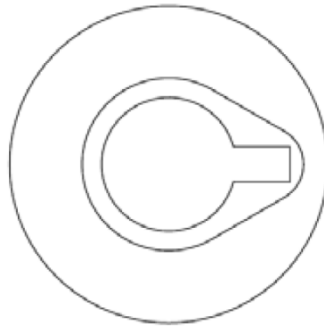
Wrench sockets

- for M16 SW 24 mm,
- for M14 SW 22 mm or SW 21 mm (depending on screw standard),
- for M10 SW 17 mm or SW 16 mm (depending on screw standard).

Wrenches

- for M16 SW 24 mm,
- for M14 SW 22 mm or SW 21 mm (depending on screw standard),
- for M10 SW 17 mm or SW 16 mm (depending on screw standard).

When screwing the beam joints, it has to be ensured that the nib of the button-head screw is located at the centre of the drop hole (see sketch).



Only hot-dip galvanised bolts must be used. The strength grades of 4.6 or 8.8 respectively must be strictly adhered to.

Reuse of screwing materials is not permissible.

8. Adjustments on site

The following applies where posts or longitudinal elements need to be shortened:

- Use a saw or cutting-off machine and deburr cut edges
- Drill holes properly
- Observe hole diameters and spacing as per the specifications of the relevant RAL-RG 620 drawing
- Protect cut edges and drilled holes against corrosion by using zinc dust coating (in acc. w. EN ISO 1461)

Thermal processing such as welding or flame-cutting is not permissible.

9. Installation in curves

Guardrail beams must be installed tension- and stress-free. In bends with a radius of < 30 m pre-bent beams (so-called radius-beams) must be used. Radius-beams are available in various lengths staggered in steps of 2.5 m:

25 m – 22.5 m – 20 m – 17.5 m – 15 m – 12.5 m – 10 m – 7.5 m – 5 m – 2.5 m.

The difference between inside and outside bends must be taken into account. For outside bends convex radius beams must be used while in inside bends concave radius beams are to be installed. Guardrail beams must not be bent on site or upon installation with such force that they are permanently deformed.

When installing radius beams ensure that the overlap at joints does not have gaps. It is recommended to first tighten the bolts at the joints and then to fix the beams at the deformation tubes.

Holes must not be widened, e.g. by means of broaching.

The following box beams are to be used in curves:

- Radius > 100 m: 4-meter box beam
- Radius > 50 m: 2-meter box beam
- Radius > 35 m: 1.33-meter box beam

10. Flares

Flares with an inclination of 1:20 (1:12 in exceptional cases) are permitted.

11. Installation in water protection reserves

No specific requirements apply to the system in water protection reserves.

12. Terminals

The installation of terminals directly to the system is not admissible. The barrier line on the structure must always be connected to a continuing pile-driven barrier system in front and behind of the structure.

13. Transitions

The following guards may be connected to the system:

a) by means of a transition system:

- SR (no drawing)
- SRL (RAL-RG 620 drawing S3.2-321)
- SR Eco (RAL-RG 620 drawing S3.2-322)
- SR Eco MÜF (analogous to RAL-RG 620 drawing S3.2-322)
- SRL OS (RAL-RG 620 drawing S3.2-357)
- SR Eco OS (RAL-RG 620 drawing S3.2-377)

b) by means of an untested, modified transition:

- EDSP/1.33 OS (RAL-RG 620 drawing S3.2-320)
- Concrete protection wall (Flextra SR-C, RAL-RG 620 drawing S3.1-325/326)

Connections to other safety barriers require a written confirmation by the manufacturer.²

14. Additional components

The following additional components may be mounted to the system:

- Guiding posts fastened to the post.
- Guiding posts fastened to the beam joint. In that case, the bolt with nib M 16 x 27 as specified in the drawing is to be substituted by a button head bolt M 16 x 45.

² Transitions that are permitted in Germany are listed in the "Einsatzfreigabeliste" issued by BASt (Bundesanstalt für Straßenwesen - Federal Road Research Laboratory).

- Guardrail beam reflectors fastened to the beam at the centre holes using button head screws.

Due to the structural design, the system can be climbed over. In justified exceptional cases, a rear-side climb-over aid may be installed with the written consent of the customer.

Any Installation of an additional component (e.g. top rails, anti-dazzle protection, traffic signs) requires the written consent of the manufacturer. These additional components can only be installed if changes to the system's behaviour are ruled out and this is certified by a notified body. The fixing instructions for the respective additional component have to be followed.

Traffic signs may be installed within the working width if they can be run over or they shear off.

15. Repair

As a general rule, all system parts showing a permanent (plastic) deformation must be replaced.

If only the guardrail beam and the deformation tube show a deformation after an impact, the system still provides sufficient residual protection against break-through.

In case damaged components are being replaced, special care must be taken regarding the joints between damaged and undamaged beams. The beams remaining after dismantling must not be damaged by the use of angle grinders, mandrels or hammers.

Due to temperature-related changes of length or major deflection after heavy collisions, the hole patterns of the beam joints may no longer match when connecting new beams to the remaining barrier. If the longitudinal deviation of the hole axes does not exceed 5 cm, the beams can usually be adjusted by loosening the bolts at several joints and retightening them after adjustment. If that is not, the following procedure is to be applied:

If repair work is carried out at very low temperatures, the new beams tend to be too short. In that case, the installation length between the post axes is greater than 4.00 m (e.g. 4.07 m), or, in other words, the beams overlap by less than 30 cm. This would be not permissible, so that two fitting beam pieces must be cut for achieving the needed length > 4.00 m. (for our example: $2.00 \text{ m} + 2.07 \text{ m} = 4.07 \text{ m}$). An additional post is not required.

At high temperatures or in the case of major deflection, the overlap of the bars is usually greater than 30 cm. In that case, fitting pieces are not necessary, but new holes need to be drilled. However, this is only permitted where the distance between the outer edges of the new and of the existing boreholes is greater than 2.5 cm.

Generally, both the use of fitting pieces and the drilling of new boreholes should be avoided, even if this means further effort due to dismantling and re-installing of the adjoining barrier.

After finishing installation works at roads already in operation (e.g. in case of repair), surplus materials have to be removed completely, so that the road is ready for operation. In case that the works are interrupted for several hours, the barrier ends must be left completely screwed and furnished with a fully-fixed temporary slope-down terminal (lowering angle, one beam, head piece - lying on the ground).

16. Reusability of parts

Used barrier parts (including butt plates, connecting plates and others) may be re-used for retrofitting and/or conversions, provided that:

- the parts do not have any visible deformation and/or damage (e.g. torn open, widened or burned out holes);
- structural parts have a residual zinc layer of $\geq 30 \mu\text{m}$ (pre-galvanised steel: $\geq 15 \mu\text{m}$);
- the manufacturer's mark and the test period mark are still visible on components which require marking.

Reused barrier parts with a minimum residual zinc layer of $55 \mu\text{m}$ (pre-galvanised steel with coating ZA300: $\geq 17 \mu\text{m}$; with coating Z600 or ZA600: $\geq 32 \mu\text{m}$) can be expected to have the same durability as new parts.

Fixing material (bolts, nuts, washers) that has been used before must not be used again. Only new fixing material must be used. For repairing damage caused by accidents new material must be used exclusively.

Components that cannot be used any more must be destroyed (e.g. by cutting off parts or dividing it) and recycled. The same applies for removed fixing material.

17. Inspection and maintenance

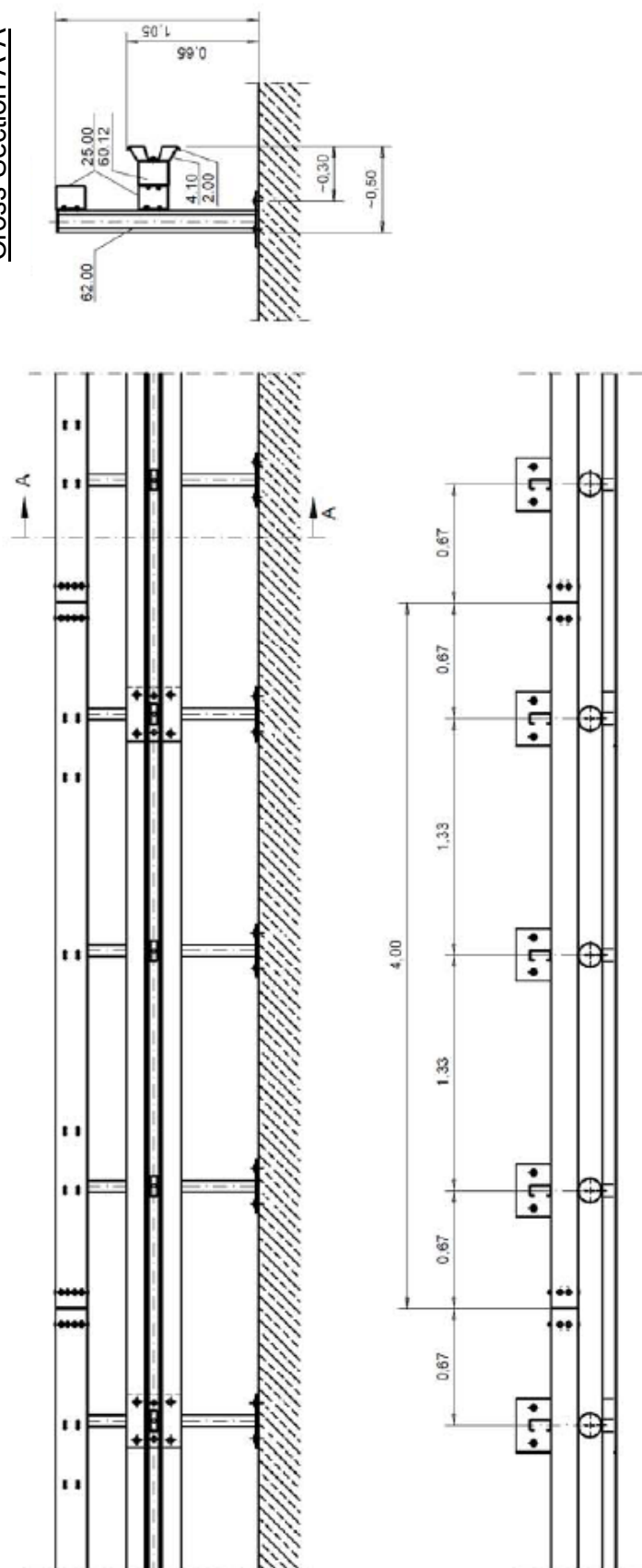
There are no specific requirements with regard to inspection and maintenance, with the following exception for installations on a strip foundation (see section 3):

If here the oval sealing plate (RAL part no. 41.41) is not used and the long holes of the base plates are not otherwise sealed (by filling filled or covering them), the anchors have to be inspected at 5-year intervals by random samples. The minimum anchor sampling size is 3%.

If corroded anchors are found, these anchors have to be replaced.


If a defective anchor bolt is found, two bolts at each, the affected post and also its left and right neighbouring posts, have to be inspected. Is then another defective post found, all anchors or the three posts have to be inspected and replaced as necessary.

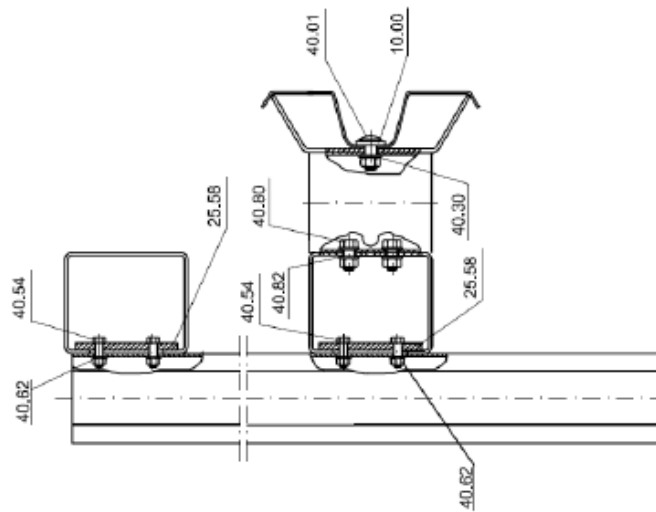
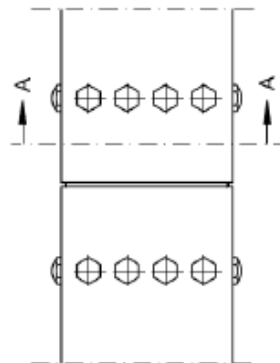
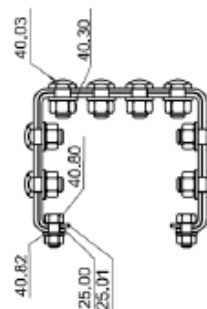
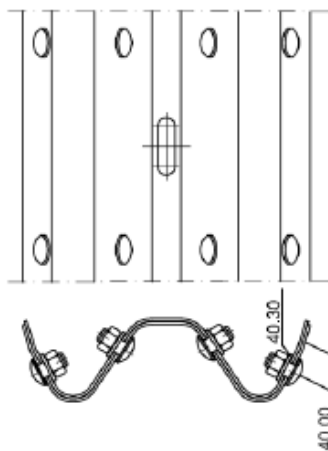
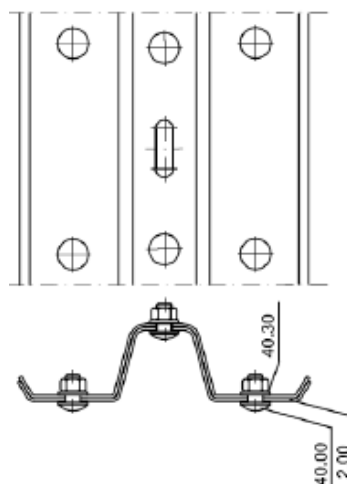
Cross-Section A-A



This products is patent-protected.

For screwing and anchoring seedings B1.1-206 and B2.1-202/203
Install A-profile beams analogously

Gütegemeinschaft Stahlrohrplanke e.V.	Stand: 03/10	Zchg. Nr. S1 2.310	<h1>SUPER-RAIL on structure</h1>	DIN EN 1317-2 H2 - W4 - B	 

Details PostsDetail Box Beam JointsCross-Section A-ADetail Beam Joints A-ProfileDetail Beam Joints B-Profile**SUPER-RAIL Bw Screwing Details**

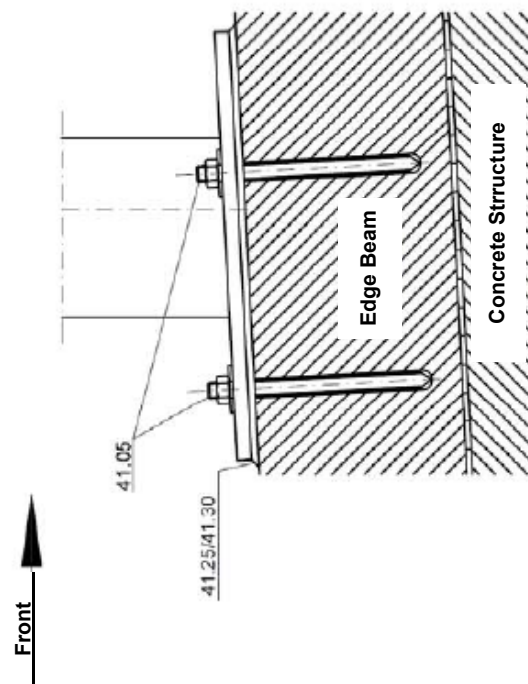
Zchg. Nr. B1.1-206

Stand: 04/07

Glücksmann Stahlschutzplanken e.V.

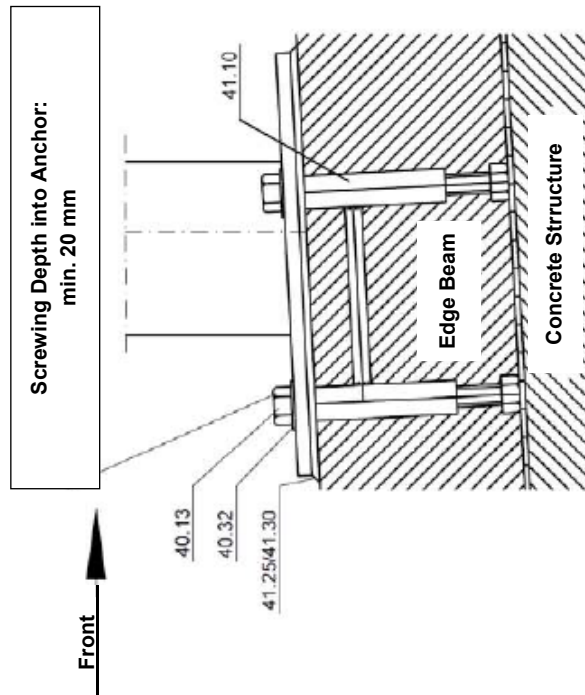
B1.1-206

Post Anchorage



 					
Zertif. Nr. B2.1-202 Stand: 03/10		SUPER-RAIL / SUPER-RAIL Plus with Chemical Anchors		Gütergemeinschaft Schallschutzplanken e.V.	

Post Anchorage

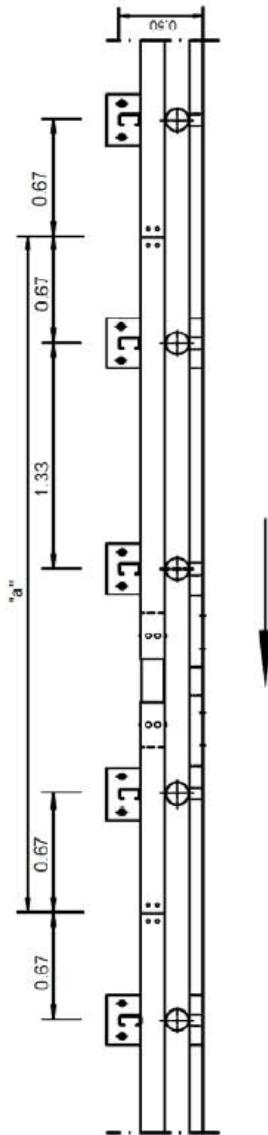
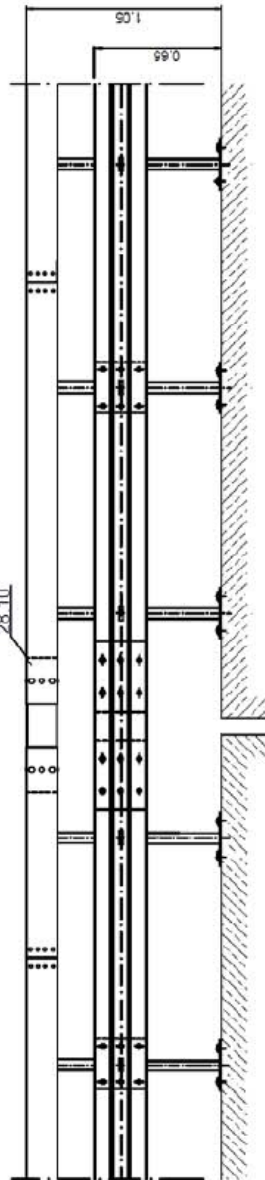


SUPER-RAIL / SUPER-RAIL Plus
with pre-fabricated Anchors

Zeng Nr. B2.1-203
Stand: 03/10

Gülegemeinschaft Stahl-Schutzplanken e. V.

B2.1-203



Center Position is 4.00 m at 10 °C

Post Distance for Dilatation Joint $\Delta L \leq 320$ mm					
Bridge Temp.	+40	+30	+20	+10	0 -10 -20
Post distance "a" in mm					
30 m	3989	3993	3996	4004	4007 4011
50 m	3982	3988	3994	4006	4012 4018
75 m	3973	3982	3991	4009	4018 4027
100 m	3964	3976	3988	4012	4024 4036
150 m	3946	3964	3982	4000	4018 4036 4054
200 m	3928	3952	3976	4024	4048 4072
250 m	3910	3940	3970	4030	4060 4090
300 m	3892	3928	3964	4036	4072 4108
350 m	3874	3916	3958	4042	4084 4128
400 m	3856	3904	3952	4048	4096 4144



Use mean values for intermediate sizes .

Fasten joint screwing so that the dilatation components can move as required

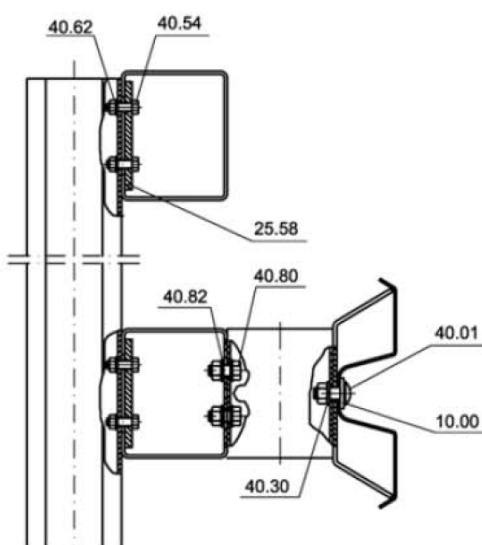
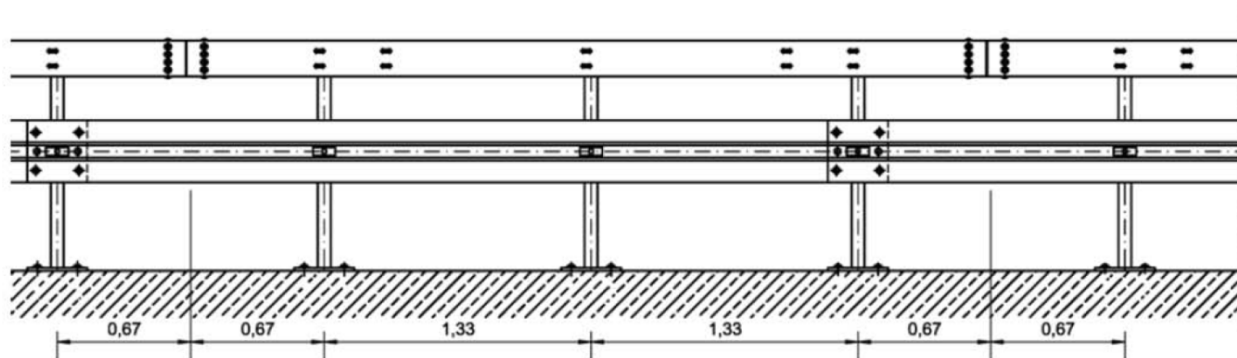
For guardrail dilatation Joint see drawings No. S5.3-101; L1.3-101

Only use dilatations per-mounted by manufacturer

Install A-profile beams analogously

Zehg. Nr. S53-301 Stand. 02/10		Dilatation Joint SUPER-RAIL AL ≤ 320 mm	 
Gütergemeinschaft Stahlschutzplaniken e.V.			

Annex II: Assembly Instructions SUPER-RAIL on structure



Pieces per 4 m:

6/8 pcs.	40.00	Bolt, button head, nib, M 16x27, 4.6, nut
3 pcs.	40.01	Bolt, button head, nib, M 16x45, 4.6, nut
32 pcs.	40.03	Bolt, button head, M 16x30, 8.8 incl. nut
41/43 pcs.	40.30	Washer 18
12 pcs.	40.54	Bolt, hexagonal, M 10x45, 8.8 incl. nut
12 pcs.	40.62	Washer 11,5x25x4
14 pcs.	40.80	Bolt, hexagonal, M 14x30, 4.6 incl. nut
14 pcs.	40.82	Washer 16
3 pcs.	10.00	Butt Plate M16
6 pcs.	25.58	Box beam fastening plate 155/50/10

Locking torque:

Bolt M 10:	finger-tight
Bolt M 16:	70 Nm, max. 140 Nm

Mount A and B Profile analogously



C Post-125: 1.04 m (62.00)
Post distance: 1.33 m
Post height: 1.04 m
tolerance ± 3 cm

Distance posts to road edge =
Distance system to road edge +39 cm



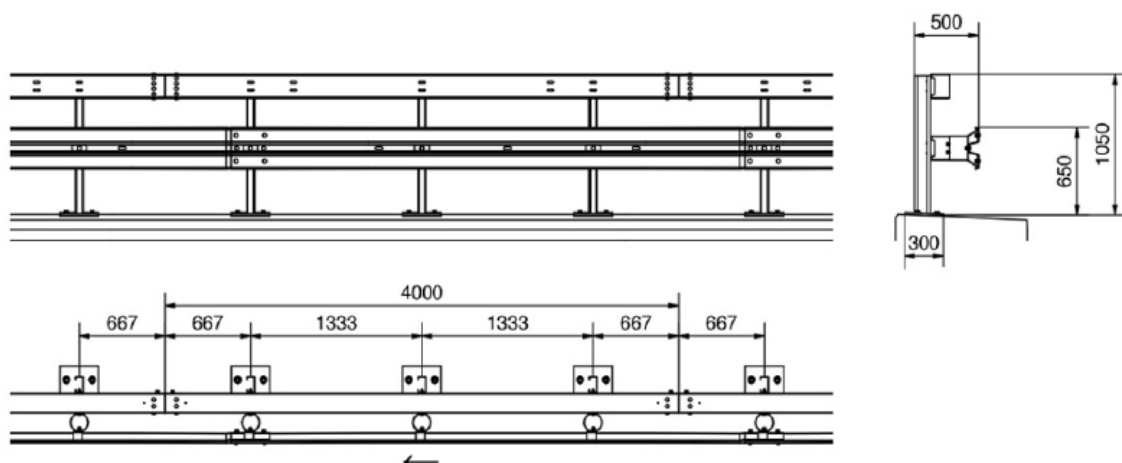
Fastening plate 155/50/10 (Part No. 25.58)

Connection to post:
2 pcs. Hexhead bolt M 10x45, 8.8 incl. nut (40.54) and 2 thick washers 11,5x25x4 (40.62) under each nut

	<p>16 pcs. button head bolt M16x30, 8.8 incl. nut (40.03) with washers 18 (40.30) under each nut</p> <p>and</p> <p>4 pcs. Hexhead bolt, M 14x30, 4.6 incl. nut (40.80) with Washer 16 (40.82) under each nut</p>
	<p>Do not mount upper and lower box beams with any off-set!</p>
	<p>Deformation tube 139.7x3.6x180 mm (60.12)</p> <p>Connection to box beam : 2 pcs. Hexhead bolt, M 14x30, 4.6 incl. nut (40.80) with Washer 16 (40.82) under each nut</p>
 <p>→</p>	<p>Fishplates (10.00) and button head bolt M16x45 with nib, 4.6 incl. nut (40.01) - washers 18 (40.30) under nuts for mounting beams and supporting brackets (4.00/4.01) to deformation tubes every 1.33 m.</p> <p>Guardrail beam joints: 6 pcs. (B-Profile) or 8 pcs. (A-Profile) button head bolt with nib M16x27, 4.6 incl. nut (40.00) - washers 18 (40.30) under nuts</p>

Annex III: Data sheet SUPER-RAIL on structure

	<h1>Super-Rail OS</h1>	Dated: 18.12.2013
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The single-sided vehicle restraint system for installation on structures is comprised of galvanised components acc. to RAL-RG 620. The lengths of the beams and posts as well as the dimensions of the deformation tubes are determining the shape of each segment. The system is characterised by its beams of 4 m length and a post spacing of 1.33 m. The posts are fixed to the structure by 4 chemical anchors or by pre-cast anchors. The open box beams are fixed to the posts by clamping connections at the rear. The open box beams are connected by butt joint connectors positioned inside of the beams. The joints of the guardrail beams overlap in direction of traffic. They are connected to each other by multiple screwings and connected to the lower box beams by deformation tubes. The standard distance between the system's front and the kerb is 0.5 m.

System Name	Super-Rail on structure
EG Certificate of Conformity	0120-CPD-2010
Initial Type Tests	TB11: PSB 34 TB51: PSB 28
Typic Material	Steel
System Width	0.50 m
System Height (form Road Surface)	1.15 m
System Length (Unit)	4.00 m
Weight per m of System Length	68.0 kg (A) / 67.0 kg (B)
Installation Length	36 m
Tested Installing Method	on structure

Performance acc. to EN 1317	
Containment Level	H2
Working Width (W_m)	W4 (1.3 m)
Impact Severity Level	B
Dynamic Deflection (D_m)	0.65 m
Vehicle Intrusion (VI_N)	No performance determined (NPD)

Nº 2013030