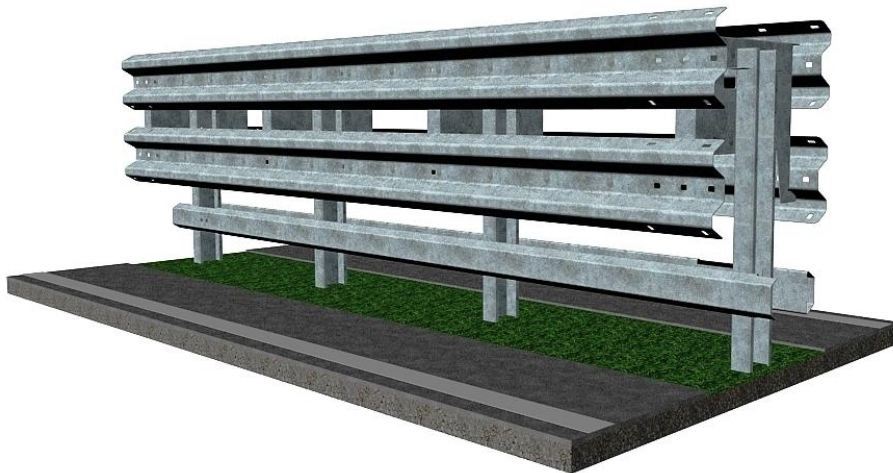


ASSEMBLY INSTRUCTIONS

for the vehicle barrier system

KREMSBARRIER 1 MH3 for pile-drivable subgrades



Performance class in accordance with EN 1317-2:

Containment level:	H3
Impact severity level:	B
Working width:	W7

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Safety instructions

As working on vehicle barrier systems should generally be categorised as especially dangerous, such tasks should always be carried out under the supervision and instruction of applicably trained specialist personnel.

These assembly instructions assume that supervision and instruction is provided by such specialist personnel on-site.

All construction personnel must wear personal protective equipment in accordance with EC directive 89/686/EEC.

Proper use

The task of a vehicle barrier system is to restrain and redirect vehicles straying off of the carriageway and thereby minimise the consequences for passengers as well as for other road users and objects worthy of protection.

Note: Vehicle barrier systems are generally to be used only in situations where straying off of the carriageway is likely to result in more severe consequences for vehicles and their passengers as well as for third parties or objects worthy of protection than a collision with the barrier system.

Technical description of the vehicle barrier system

Performance class in accordance with ÖNORM, EN 1317-2:	
Containment level	H3
Impact severity level / ASI	B / 1.2
Working width / level	W7 / 2.5 m
Test length	64.60 m
System dimensions	
System width	800 mm
System height	1,250 mm
Ram depth	1,170 mm

Transport

The following points are to be observed when transporting components of the vehicle barrier systems:

- A regulation load securing system is to be made available.
- When transporting on salt-treated roads, the components must be transported on enclosed / tarpaulin-covered truck trailers.
- Avoid contact with other aggressive transported materials (e.g. residual chemicals on the loading space).
- The lifting gear is to be designed for a maximum package weight of 2.5 t.

Note: A proper load securing system must also be used when transporting equipment for installation of vehicle barrier systems.

Requirements for installation

The executing contractor (=installation firm) must have the professional aptitude and general qualifications for the undertaking of such installation work.

The installation firm must be in possession of the technical equipment required for the professional and proper undertaking of the installation work. This includes, in addition to a fleet of vehicles adapted for this type of work, especially the pile-driving equipment for the required post segments with adapted drive heads and guides as well as drilling equipment, impact screwdrivers, mandrels and measuring equipment, etc.

The installation firm must maintain all relevant national and international laws, regulations, directives, etc. and ensure that the required permits are available and have been submitted in good time.

The following must be checked by the installation firm prior to the start of installation

- Possible existing installations in the area of the anchoring must be assessed and correspondingly taken into consideration
- The suitability of the subgrade (soil class, sufficient bore depth, evenness, etc.) is to be checked.
- The definitive reference line must be marked for installation of the vehicle barrier system.
- The delivery of materials must be checked for correctness and completeness and complaints must be immediately forwarded to the supplier.
- It must be ensured that the building site is properly secured.

The customer is to be informed immediately in writing in the event that deviations are determined and the matter is to be clarified.

If components for the vehicle barrier system are to be intermediately stored, then the following warehouse conditions are to be fulfilled:

- The storage area must be capable of bearing the load and must be accessible with an HGV truck.
- Galvanised components may not be stored on tall, damp grass, in standing water or mud.
- The packages are to be stored in the original packaging on wooden slats with approximately 150 mm gap to the ground.
- The components should be stored at a slight angle, so that water can drain off.
- The formation of puddles (collection of moisture) is to be avoided.
- Foil used for purposes of securing the layers during transportation is to be removed.
- The storage area may not be treated with defrosting agents.

Long-term storage of bundled components outdoors is to be avoided.

Suitable subgrade

The subgrade is considered suitable for the installation of the vehicle barrier system if the following conditions are fulfilled:

- Soil classes 3, 4 and 5 of ÖNORM B 2205 and compacted subgrade which can be graded into these soil classes.
- Degree of compaction $D_{pr} \geq 97\%$
- The subgrade is suitable for pile driving.

Soil classes 1, 3, 4 and 5 of ÖNORM B 2205 and compacted subgrades which can be graded into these soil classes and which contain no blocks are suitable for pile driving.

Note: If the subgrade is unsuitable for pile driving, then there is the option to drill boreholes to the required depth or install suitable empty pipes, which can subsequently be filled and compacted with suitable material.

Installation of the vehicle barrier system in accordance with data sheets B101/2 and B101/3 (see appendix)

It is not necessary to pre-assemble the vehicle barrier system components in the factory.

Due to the fact that the vehicle barrier system is not pre-stressed, the ambient temperature at the time of installation is irrelevant.

1. Ramming C160 posts

The minimum 2,300 mm long C160 post is to be driven vertically into the subgrade with a suitable pile driver, so that the upper edge of the post section is $1,130 \pm 40$ mm above the reference level. The two elongated holes 12x30 mm must lie in the upper half of the post section.

The pile driver must be equipped with a suitable drive head to fit the C160 section, in order to prevent deformation or damage to the hot-dip galvanised coating on the upper end of the post (post head). A guide adapted to the C160 section is to be mounted to the pile driver near the upper edge of the ground in order to ensure precise positioning of the post during the pile driving process.

The regulation centre distance of the posts is 1,267 mm.

2. Install sliding profile S1



Figure 1



Figure 2

The sliding profiles are attached to both sides of the C160 posts. In order to do so, a coach bolt M10x25 FK 4.6 is fed through the inner side of the sliding profile through the elongated hole 12x30 in the upper flank of the sliding profile and through the

elongated hole 12x30 mm of the C160 post and fixed in place with a washer 11 and hexagon nut M10 FK 5 (see Fig. 1).

The sliding profiles are to be overlapped in the jointed area in accordance with the direction of traffic, so that vehicles cannot get caught up on them (see Fig. 2).

The carriageway facing the respective slide profiles in the joint region (upper part) is indicated by the stamped plate marked with \triangle on voestalpine crash barriers. The sliding member joint is to be aligned, as seen from the direction of travel on the respective carriageway, ~180 mm after the post axis and secured in place with three coach bolts M16x35 FK 4.6, washers 40x18x4 and nuts M16 FK 5 (see Fig. 2).

3. Mounting the H3 cross member

The cross member H3 is to be aligned on the C160 post so that the two axially positioned bore holes diameter 12 mm in the cross member cover the elongated holes 12x30 mm in the C160-post and the C160-post is positioned between the level of the upper hole diameter 12 mm and the guide tabs projecting from the cross member.



Figure 3



Figure 4

Two hexagon bolts M10x25 FK 4.6 are inserted through the bore hole diameter 12 mm in the cross member and the elongated hole 12x30 mm in the post and are fixed in place with a washer 11 and a hexagon nut M10 FK 5 on the inner side of the post section (see Fig. 3 and 4).

4. Mounting the joint reinforcement

The joint reinforcement is aligned form-closed in order to reinforce the joint in the guardrail between the guardrail joint and the cross member, and is fixed in place with the threaded assembly on the guardrail joint.

In order to do so, the four elongated holes in the joint reinforcement must align, as seen in the direction of traffic flow, with the three overlapping elongated holes after the impact axis and the elongated hole in the in the guardrail joint (see Fig. 5).



Figure 5



Figure 6



Figure 7

5. Install S1 guardrail (crash barrier)

Two guardrails are to be aligned on both sides of the cross member H3 with the upper edge of the guardrail at 820 ± 40 mm or $1,250\pm 40$ mm above the reference level (see Fig. 6).

Note: In order to facilitate access to the bolts, first mount the lower pair and subsequently the upper pair of guardrails.

The guardrails S1 are to be overlapped in the jointed area in accordance with the direction of traffic, so that vehicles cannot get caught up on them. The drilled 9 mm diameter hole indicates that the guard rail in the joint region (upper part) is facing the respective carriageway. In order to be able to overlap the guardrail in the jointed area, the carriageway side of the guardrail ends (lower part) are goosenecked.

The guardrails are bolted together with the joint reinforcement in the guardrail axis at each cross member H3 (every ~ 1.267 mm) using a coach bolt M16x35 FK 4.6 (see Fig. 5).

The guardrail joint is additionally secured with six coach bolts M16x35 FK 4.6. It is to be ensured when tightening the hexagon nuts M16 FK 5 that the square-shaped anti-twist protection for the bolt head is correctly positioned in the elongated hole of the guardrail (see Fig. 7).

A washer 40x18x4 is to be aligned under each hexagon nut M16 FK 5.

6. Shims

Generally, the vehicle barrier system should be installed so that shims are not required. However, if shims are required due to conditions on site, then the following points must be observed:

- The regulation centre distance of the posts is to be retained as far as possible.
- If the longitudinal elements have to be sawn, it is to be ensured that the cut is made clearly.
- The cut is to be executed so that the swarf cannot damage the hot-dip galvanised sections (risk of extraneous rust or damage to the coating).
- The burrs are to be removed and the cut area is to be protected against corrosion with cold-galvanizing paint in accordance with EN ISO 1461.
- The hole pattern for joining a shim must correspond to the regulation design and the gaps to the corners may not be smaller than those of the regulation design.
- Flame cutting is generally impermissible for installation work!

7. Torques for threaded connections

Thread / strength class	Torque	
	min.	max.
M10 / 4.6	10 Nm	17 Nm
M16 / 4.6	35 Nm	70 Nm

It is to be ensured that a sufficiently large bearing surface is given in the clamped area for tightening unscheduled prestressed threaded connections when applying the above specified torques.

8. Conformity checks

The following checks are to be undertaken during the installation process and by way of final inspection:

- Correct alignment and bolting of the structural components
- Vertical gap between the barriers and upper edge of the tension bar and reference level
- Horizontal gap between the front edge of the protective barrier post and the respective reference line for the installation
- Continuous line of the longitudinal elements (protective barrier post, tension bar)

Suitable corrective measures are to be undertaken in the event of deviations outside the range of permissible tolerances.

It is to be checked that the system has been installed correctly in accordance with the installation instructions upon completion of the installation work and this should be documented in the acceptance certificate.

9. Clearing the construction site

All residual materials (including connecting devices), packaging and supporting timber, screw boxes, foil, packaging straps, etc. and any other rubbish must be removed from the site.

The construction site is subsequently to be swept clean.

Repairing the vehicle barrier system

All components which exhibit mechanical damage or deformation subsequent to an accident are to be replaced by new components. The installation of these components is to be undertaken in accordance with the installation instructions.

New connecting devices are generally to be used when repairing a vehicle barrier system.

Durability of corrosion protection

The vehicle barrier system's components are hot-dip galvanised in accordance with EN ISO 1461 to ensure its operational lifetime / durability of protection.

The duration of protection for galvanised coatings is defined under EN ISO 14713 and is essentially dependent on the thickness of the coating. Generally, it can be assumed that the zinc coating will erode continuously over the entire area. Due to the known effective macroclimatic corrosion load for roads, corrosion category C4, zinc corrosion amounting to 2.1 to 4.2 µm per year is to be expected. Therefore, calculating with the average zinc layer thickness of minimum 70 µm in accordance with EN ISO 1461, a protection duration of minimum 15 years is given.

Note: The above specified calculated duration of protection applies to macroclimatic effective corrosion loads only. Special macroclimatic conditions could lead to a reduced duration of protection.

Inspection and maintenance

Vehicle barrier systems manufactured by voestalpine Krems Finaltechnik GmbH are fundamentally maintenance free.

The vehicle barrier system is to be visually inspected as part of the continuous inspection trips carried out by the carriageway maintenance authority, however, this must be realised at least once per year, preferably after the winter season. In doing so, it is to be checked, among other things, that there are no deformed segments and that the bolting is correct.

Recycling / Disposal

Dismantled vehicle barrier systems or exchanged components replaced during the repair process are to be disposed of and recycled in accordance with statutory requirements. All vehicle barrier system components manufactured by voestalpine Krems Finaltechnik GmbH are 100% recyclable.

Packaging and other waste is to be recycled or disposed of in accordance with statutory requirements.

Vehicle barrier systems manufactured by voestalpine Krems Finaltechnik GmbH do not contain toxic or potentially hazardous materials.

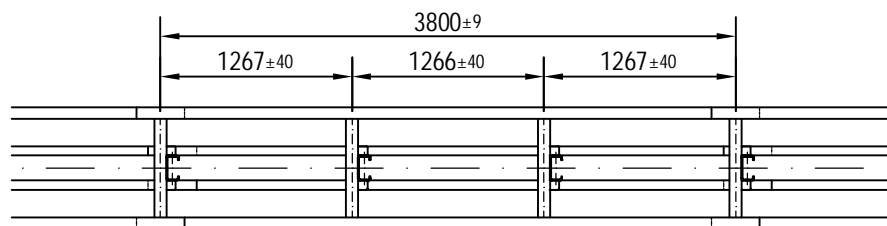
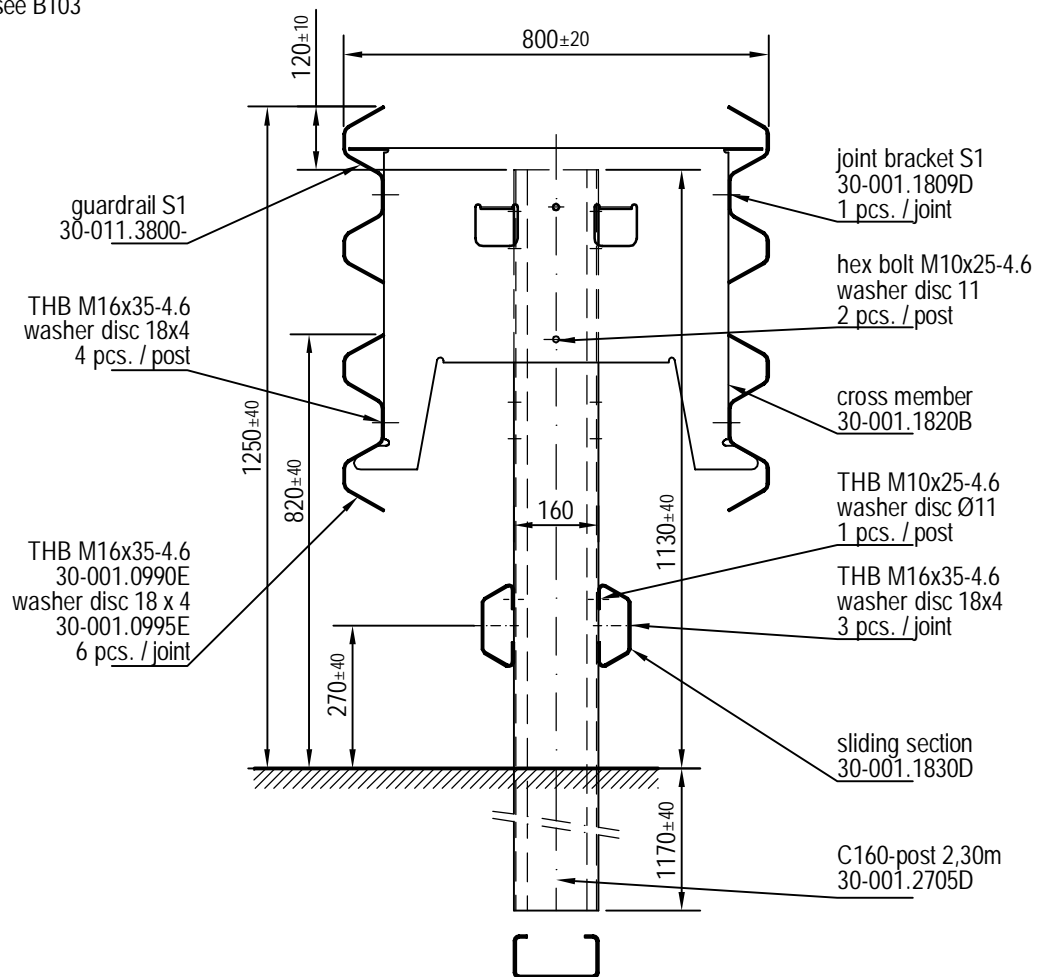
SAFETY BARRIERS

KREMSBARRIER 1 MH3

Restraint System for central medians and ground conditions suitable for pile driving

product specification sheet B101/2

for driving see B103



direction of traffic

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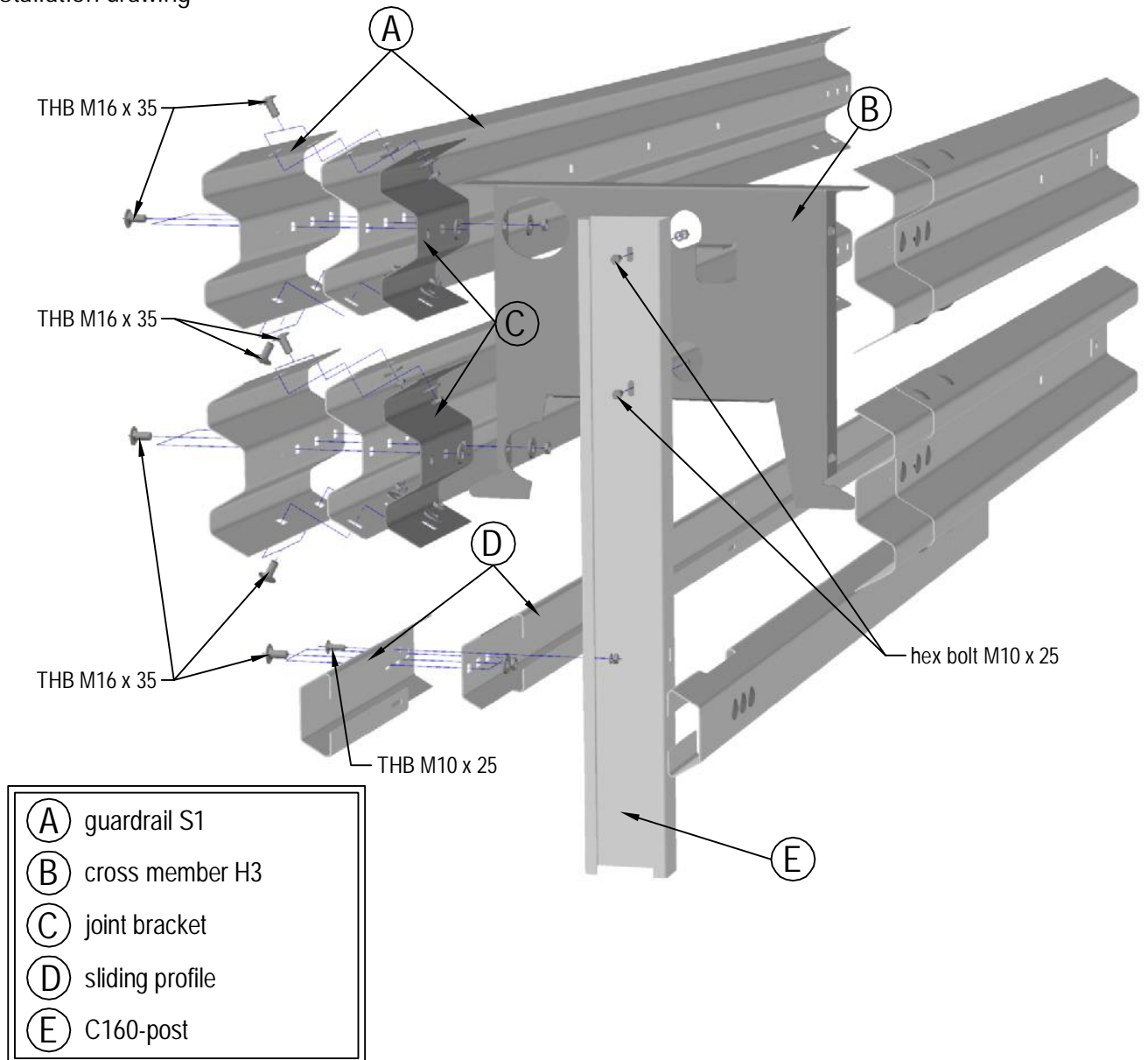
SAFETY BARRIERS

KREMSBARRIER 1 MH3

Restraint System for central medians and ground conditions suitable for pile driving

product specification sheet B101/3

installation drawing



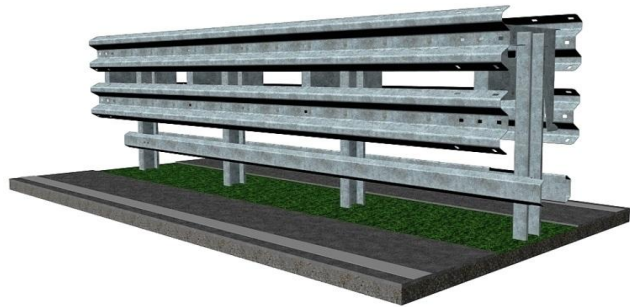
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SAFETY BARRIERS

Parts list

KREMSBARRIER 1 MH3

Restraint System for central medians
and ground conditions suitable
for pile driving



Requirements for a field with a 3.80 m length

part	name of the item	weight [kg]	drawing- number	material / quality	corrosion protection
4	guardrail S1 3,80m	46,50	30-011.3800-	S355JO	acc. to EN ISO 1461
4	joint bracket S1	3,44	30-001.1809D	S235JR	acc. to EN ISO 1461
3	cross member H3	15,57	30-001.1820C	S235JR	acc. to EN ISO 1461
3	C160-post 2,30 m	25,39	30-001.2705D	S235JR	acc. to EN ISO 1461
2	sliding section 3,80m	28,79	30-001.1830D	S235JR	acc. to EN ISO 1461
39	THB M16x35-4.6 +nut	0,13	30-001.0990E	4.6	acc. to EN ISO 10684
39	washer 40x18x4	0,03	30-001.0995E	100HV	acc. to EN ISO 10684
6	THB M10x25-4.6 +nut	0,04	DIN 603	4.6	acc. to EN ISO 10684
6	hex bolt M10x25-4.6 +nut	0,04	ISO 4018	4.6	acc. to EN ISO 10684
12	washer 11	0,00	ISO 7091	100HV	acc. to EN ISO 10684

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