

ASSEMBLY INSTRUCTIONS

for the vehicle barrier system

KREMSBARRIER 1 MH2

for pile-drivable subgrades



Performance class in accordance with EN 1317-2:

Containment level:	H2
Impact severity level:	B
Working width:	W4

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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	H2
Impact severity level / ASI	B / 1.2
Working width class / level	W4 / 1.3 m
Test length	57.00 m
System dimensions	
System width	765 mm
System height	870 mm
Ram depth	897 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 C108/2 and C108/3 (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 C125 posts

The minimum 1700 mm long C125 post is to be driven vertically into the subgrade with a suitable pile driver, so that the upper edge of the post section is 803 ± 40 mm above the reference level. The open ends of the C125 post sections are to be aligned alternately and against the direction of traffic (see Fig. 2). The hole pattern must be on the upper end of the post section (post head).

The pile driver must be equipped with a suitable drive head to fit the C125 section, in order to prevent deformation or damage to the hot-dip galvanised coating on the post head. A guide adapted to the C125 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 1900 mm.

2. Install sliding profile S1

The sliding profiles are attached to the C125 posts with M16 cover plates. In order to do so, a coach bolt M16x30 FK 6.8 together with a cover plate M16 is inserted into the elongated hole 36x18 on the narrow side of the C125 post and fixed in place with a washer 40x18x4 and hexagon nut M16 FK 6.

The sliding profiles are to be positioned so that the flanges are aligned between the decking location clips and post sections. 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. 1).



Figure 1

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 M16x30 FK 6.8, washers 40x18x4 and nuts M16 FK 6 (see Fig. 2).



Figure 2

3. Install C125 post reinforcement

A C125 post reinforcement is to be equipped to the post head of each C125 post section so that the open side of the C125 post is closed off and the bore holes 36x18 mm on the reinforcement flanks and the narrow sides of the C125 post is covered (see Fig. 3).



Figure 3

4. Install damping semi-shells S1

In each case, two S1 damping semi-shells are to be placed together so that a cylinder is formed with two flattened sides and the hole patterns are congruent (with the exception of the manufacturer's emblem).

This cylinder is fastened with two coach bolts M16x40 FK 6.8, which are inserted through the congruent elongated holes 18x36 mm into the post flange 18x36 mm reinforcement of the C125 post and the 18 mm diameter bore holes of the semi-shells and fastened in place with a washer 40x18x4 and hexagon nut 16 FK 6 on the inside of the cylinder (see Fig. 4).

Which of the two damping semi-shells rests against the post section has no influence of the functionality of the system.

5. Install S1 guardrail (crash barrier)

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 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 in place every ~1.900 mm, once centrally in the jointed area, once in the centre of the guardrail and at each pair of damping semi-shells in each case with a coach bolt M16x40 FK 6.8 (see fig. 2 and 4).

In doing so, the coach bolts M16x40 FK 6.8 are inserted through the existing cover plate M16, through the elongated hole 25x18 mm in the guardrail and the elongated hole 30x18 mm of the two damping semi-shells. A washer 40x18x4 is positioned on the inner side of the damping semi-shells and fixed in place with a coach bolt M16x40 FK 6.8 and a hexagon nut M16 FK 6.

The guardrail joint is additionally secured with six coach bolts M16x30 FK 6.8. It is to be ensured when tightening the hexagon nuts M16 FK 6 that the drop-shaped anti-twist protection for the bolt head is correctly positioned in the elongated hole of the guardrail.

A washer 40x18x4 is to be aligned under each hexagon nut M16. The exception to this is the four off-centre bolts in the crash barrier joint, where two reinforcement flanks are to be installed instead of the washers 40x18x4 (see fig. 5).



Figure 4



Figure 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.
M16 / 6.8	35 Nm	150 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.

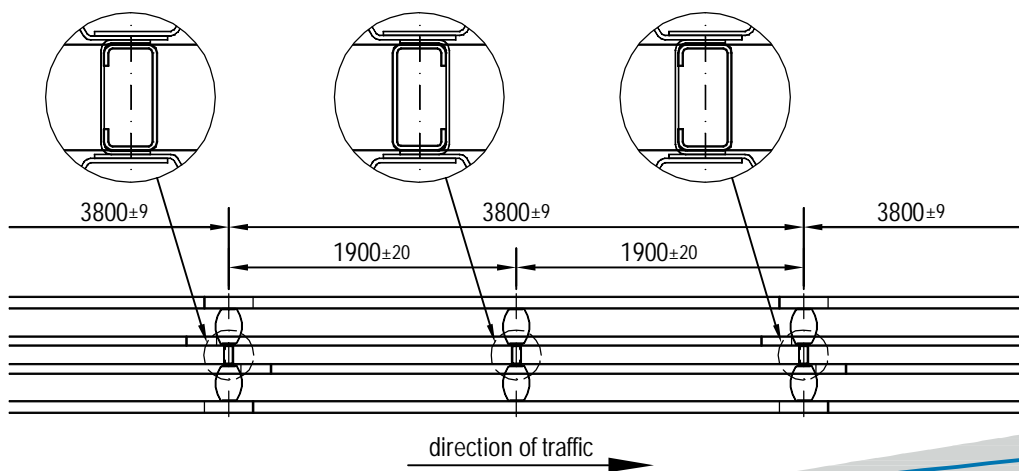
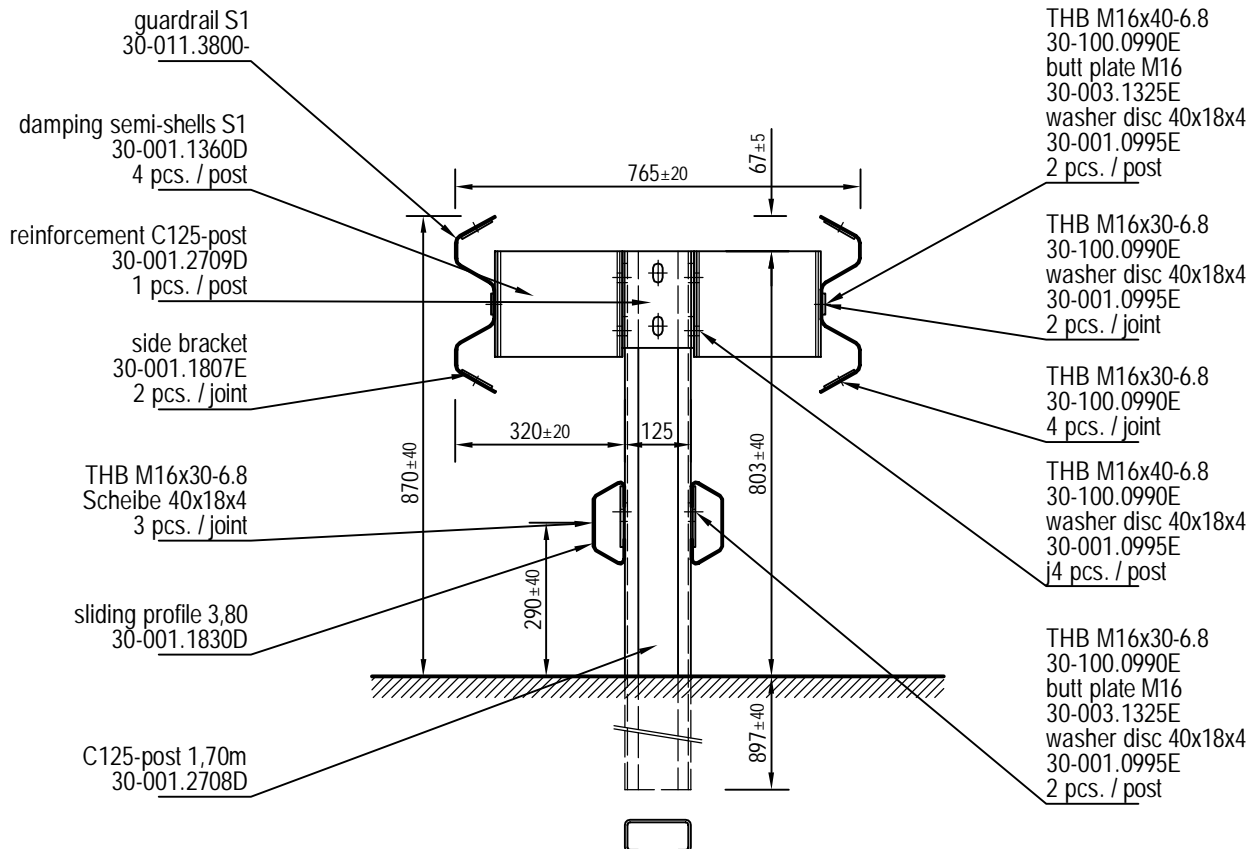
SAFETY BARRIERS

KREMSBARRIER 1 MH2

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

product specifications Sheet C108/2

for driving see C110 and C111



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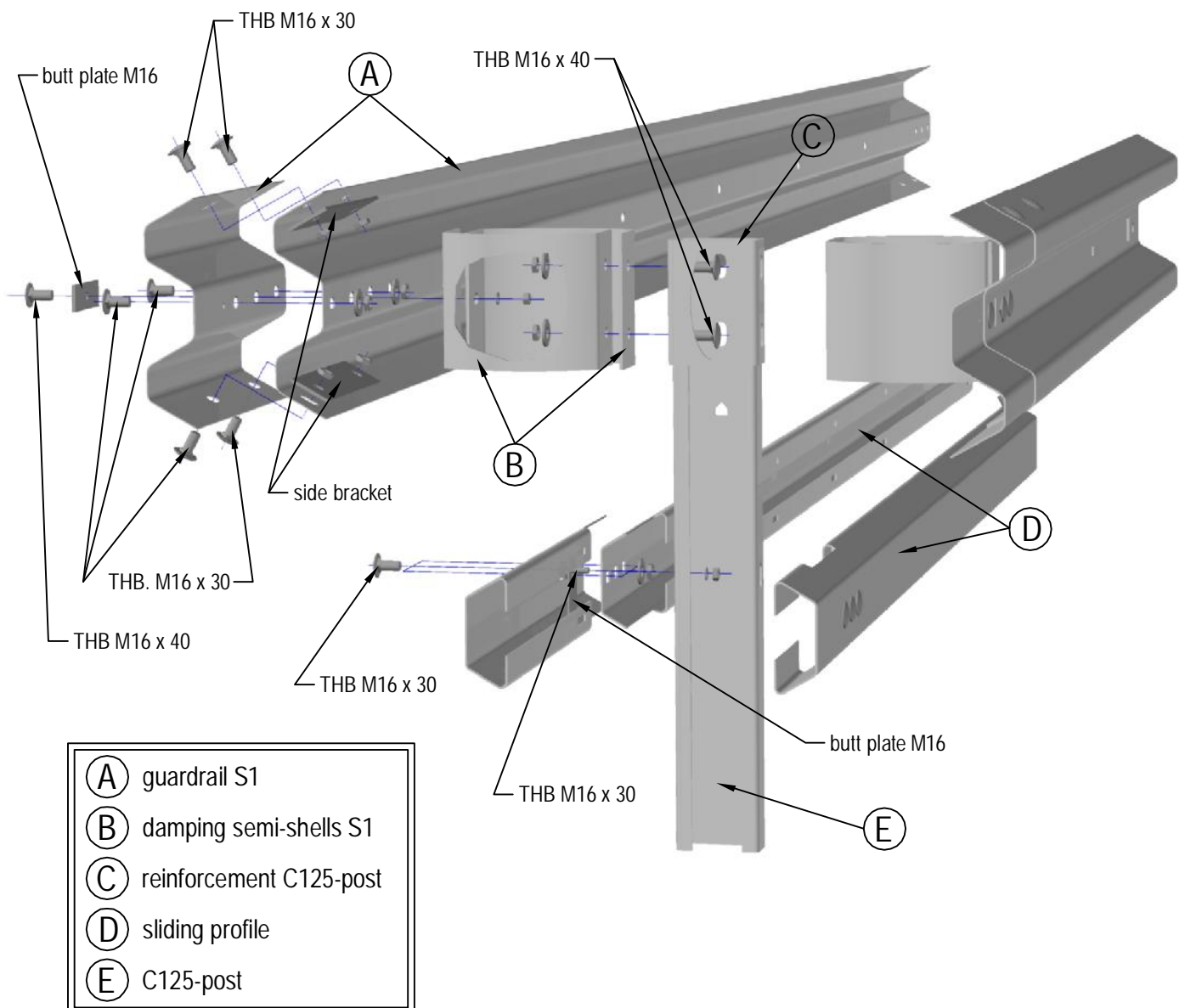
SAFETY BARRIERS

KREMSBARRIER 1 MH2

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

product specifications Sheet C108/3

installation drawing



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SAFETY BARRIERS

Parts list

KREMSBARRIER 1 MH2

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
2	guardrail S1 3,80m	46,50	30-011.3800-	S355JO	acc. to EN ISO 1461
8	damping semi-shells S1	3,51	30-001.1360D	S355JO	acc. to EN ISO 1461
2	sliding section 3,80m	28,79	30-001.1830D	S235JR	acc. to EN ISO 1461
2	C125-post 1,70 m	18,04	30-001.2708D	S235JR	acc. to EN ISO 1461
2	reinforcement C125-post	1,39	30-001.2709D	S235JR	acc. to EN ISO 1461
22	washer 40x18x4	0,03	30-001.0995E	100HV	acc. to EN ISO 10684
18	THB M16x30-6.8 with nose +nut	0,11	30-100.0990E	6.8	acc. to EN ISO 10684
12	THB M16x40-6.8 with nose +nut	0,13	30-100.0990E	6.8	acc. to EN ISO 10684
8	butt plate M16	0,20	30-003.1325E	S235JR	acc. to EN ISO 1461
4	side bracket	0,78	30-001.1807E	S235JR	acc. to EN ISO 1461

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