

ASSEMBLY INSTRUCTIONS

for vehicle barrier system

KREMSBARRIER 1 RH1C

for soils suitable for pile-driving



Performance class in accordance with EN 1317-2:

Containment level:	H1
Impact severity level:	A
Containment range class:	W4

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Safety information

As working on vehicle barrier systems must generally be classified as hazardous, such tasks may only be undertaken under supervision and instruction by applicably trained specialist personnel.

The application of these assembly instructions assumes that supervision and instruction is provided by such specialist personnel.

Assembly personnel must wear personal protective equipment (PPE) in accordance with EC directive 89/686/EEC and applicable national regulations.

Proper use

Vehicle barrier systems are designed to restrain and redirect vehicles leaving the carriageway in order to minimise the consequences for passengers as well and for other persons or property worthy of protection.

Note: Vehicle barrier systems are generally only to be installed where the consequences for vehicles leaving the carriageway as well as passengers and other property worthy of protection is expected to be more severe than impact with the vehicle barrier system.

Technical description of the vehicle barrier system

Performance class in accordance with ÖNORM EN 1317-2:	
containment level	H1
Impact severity level / ASI	A / 0.7
Range of effectiveness class / level	W4 / 1.2 m
Test length	54.00 m
System dimensions	
System width	259 mm
System height	750 mm
Pile depth	823 mm

Transportation

The following points are to be observed when transporting the vehicle barrier system:

- The load is to be secured properly.
- The components are to be transported in covered trailers when transporting on salted roads.
- Avoid contact with aggressive transport goods (e.g. residual chemicals in the payload area).
- The lifting gear must be suitable for maximum package weights of 2.5 tonnes.

Note: Proper load securing is to be ensured also for the transportation of working equipment used for the installation of the vehicle barrier systems.

Requirements for installation

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

The installation firm must have the technical equipment available for the professional and proper execution of the installation work. This includes, in addition to a fleet of vehicles adapted for this type of work, suitable pile driving equipment for the required upright length with corresponding ramming heads and guides as well as drilling equipment, impact drivers, aligning punches, measuring equipment, etc.

The installation firm must maintain all applicable national and international laws, guidelines, directives, etc. during undertaking of the installation work and must promptly apply for and check for the availability of the required permissions for undertaking of such tasks.

Prior to beginning installation work, the installation firm must:

- Assess possible fixtures in the area of the anchoring and take into consideration accordingly.
- Check the suitability of the foundations (soil class, suitable bore depth, evenness, etc.).
- Mark out the applicable reference line for installation of the vehicle barrier system.
- Check the material delivery for correctness and completeness and to immediately inform the supplier in the event of complaints.
- Ensure that the construction site is suitably cordoned off.

The customer is to be immediately informed in writing and presented with a statement in the event of any faults or deviations.

If any of the vehicle barrier system components are to be placed into short-term storage, the following storage conditions must be fulfilled:

- The storage area must be capable of bearing the load, must be surfaced and must be sufficiently strong to bear the weight of an HGV driving over it.
- Galvanised components may not be stored on high or damp grass, in puddles or mud.
- The packages are to be stored in their original packaging materials at a height of approximately 150mm from the ground.
- The components are to be stored at a slight gradient, so that water can drain away.
- Avoid areas where pools of water may form (areas where moisture can collect).
- Foil intended to secure the load during transportation is to be removed.
- The storage site may not be treated with de-icing products.

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

Suitable subgrade

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

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

Soil classes 3, 4 and 5 of ÖNORM B 2205 and rolled-earth soil which can be graded into these soil classes and do not contain blocks are suitable subgrades for pile-driving.

Note: If the subgrade is not suitable for pile-driving, then it is possible to execute bore holes to the required depth and plan for appropriate empty tubes which can then be filled and compacted with suitable material.

Installation of vehicle barrier system in accordance with Type Specification Sheets E120/2 and E120/3 (see appendix)

It is not necessary to carry out pre-assembly of the vehicle barrier system components at the factory.

As the vehicle barrier system is not pre-tensioned, the ambient temperature is irrelevant during installation.

1. Pile driving of C100x60 uprights

The minimum 1500 mm long C100x60 upright is to be driven vertically into the subgrade with a suitable pile-driver, so that the upper edge of the upright stands 677 ± 40 mm above the reference level. The open side of the C125 upright section is to be aligned so that it points towards the respective carriageway (see Fig. 2). The hole pattern must be positioned at the upper end of the upright (upright head).

The pile-driver must be equipped with a pile cap suitable for the C100x60 section, in order to prevent deformation and damage to the galvanised coating of the upright head. A guide mounted near the upper edge of the terrain surface and adapted to the C100x60 section should serve to ensure precise positioning of the upright during the pile-driving process.



Figure 1

The standard spacing of the uprights amounts to 2000 mm.

Note: The pile cap must have a groove (see Fig. 1), in order that the upright section is supported on both sides during the pile-driving process.

2. Mount retaining bracket S1

The retaining bracket S1 is to be bolted to the upright with two hexagon bolts M10x25 FK 4.6. The two keyholes in the retaining bracket S1 must align with the two elongated holes 18x36 mm in the front side of the upright. The hexagon bolts M10x25 FK 4.6 are inserted through the pre-positioned washer 11 from the retaining bracket and through the narrow side of the keyhole (narrow side up) and into the elongated hole. On the inside of the upright, lugs 120x40x2 with drill holes diameter 12 mm are placed on the two bolts M10x25 FK 4.6 and fixed in place with two hexagon nuts M10 FK 5 (see Fig. 2).



Figure 2

3. Mounting the guard rail (crash barrier) S1L

The 4,320 or 6,320 mm long guard rail S1L is to be overlapped in the joint area in relation to the direction of travel, so that vehicles cannot get caught up on them. The 9mm drill hole indicates that the joint area (upper section) of the guard rail is facing the carriageway correctly. The side of the guard rail facing away from the carriageway (lower section) is bent, so that the jointed area of the guard rail can be overlapped.

The guard rails are bolted in place at the guard rail axes with coach bolts M16 FK 6.8 at each retaining bracket S1 (every ~2000 mm) (see Fig. 3 and 4).

The coach bolts M16 FK 6.8 used come in lengths of 30 mm and 40 mm. The coach bolt M16x40 is only to be used for bolting the retaining bracket where the guard rails adjoin.

The guard rail joint is additionally to be bolted with six coach bolts M16x30 FK 6.8. When tightening up the hexagon nuts M16 FK 6, ensure correct positioning of the drop-shaped anti-twist protection of the bolt heads in the elongated holes of the guard rail.



Figure 3



Figure 4

A washer 40x18x4 is to be positioned underneath each hexagon nut M16 FK 6. The exception to this are the four off-centre bolts in the joint area of the guard rail, where instead of washers 40x18x4, two crash barrier reinforcements are to be mounted (see Fig. 4).

4. Fitting parts

The vehicle barrier system should generally be installed so that no fitting parts are required. If fitting parts should be required due to local conditions, the following conditions must be fulfilled:

- The standard spacing of the uprights must be maintained as far as possible.
- If the longitudinal elements are to be cut, it is to be ensured that the cuts are made cleanly.
- The cuts are to be realised in such a way that the cutting chips cannot damage galvanised and coated components (risk of extraneous rust and damage to the coating).
- Burrs are to be removed and the cut surface is to be coated with cold-galvanizing paint to protect against corrosion in accordance with EN ISO 1461.
- The hole pattern for joining a fitting part is to correspond with the standard design and the bore hole edge spacing may not be smaller than that of the standard design.
- Flame cutting during the installation process is impermissible!

5. Threaded assembly torques

Thread / strength class	Torque	
	min.	max.
M10 / 4.6	10 Nm	17 Nm
M16 / 6.8	35 Nm	150 Nm

When tightening these irregular pre-tensioned threaded assemblies in the range of the above detailed torques, it is to be ensured that clamped areas are kept as flat and flush as possible.

6. Checking for conformity

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

- Correct alignment and bolting of the components
- Vertical spacing between the barriers and upper edges of the tension bars to the reference level.
- Horizontal spacing between the front edges of the crash barrier rails and the standard reference line applicable for the installation.
- Continuous alignment of the longitudinal elements (crash barrier rails, tension bars)

Corresponding correction measures are to be undertaken in the event of deviation from the allowed tolerances.

Once the installation work is completed, checks are to be made to verify correct execution of the work in accordance with the installation instructions and this is to be documented in the acceptance report.

7. Clearing the construction site

All residual materials (including connecting devices), packaging materials such as support pallets, bolt boxes, foil, packaging straps, etc. and all other waste is to be removed from the site.

The construction site is to be swept clean.

Repairing the vehicle barrier system

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

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

Durability of the corrosion protection

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

The protective duration of the galvanised coating is defined in EN ISO 14713 and is primarily dependent on the thickness of the coating. Generally, it can be assumed that the galvanised coating is applied evenly. Resulting from the known corrosion load created by the macroclimatic conditions given on roads of corrosion category C4, a zinc reduction of 2.1 to 4.2 µm per annum is to be expected. From this, an average galvanised layer of at least 70 µm results in a calculated protective duration of at least 15 years in accordance with EN ISO 1461.

Note: The above detailed calculated method of estimating the protective duration only applies to macroclimatic corrosion loads. Special microclimatic conditions could lead to a shorter protective duration.

Inspection and maintenance

Vehicle barrier systems from voestalpine Krems Finaltechnik GmbH are essentially maintenance-free.

However, the vehicle barrier system is to be visually inspected at least once per year, preferably after the winter season, as part of the continuous inspection trips undertaken by the carriageway maintenance team. In doing so, the system is to be checked for deformed components and correct bolting.

Recycling / disposal

Dismantled vehicle barrier systems or components exchanged within the process of repair work are to be disposed of in accordance with statutory regulations and recycled. Vehicle barrier system components from voestalpine Krems Finaltechnik GmbH are 100% recyclable.

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

Toxic or hazardous materials are not used in vehicle barrier systems manufactured by voestalpine Krems Finaltechnik GmbH.

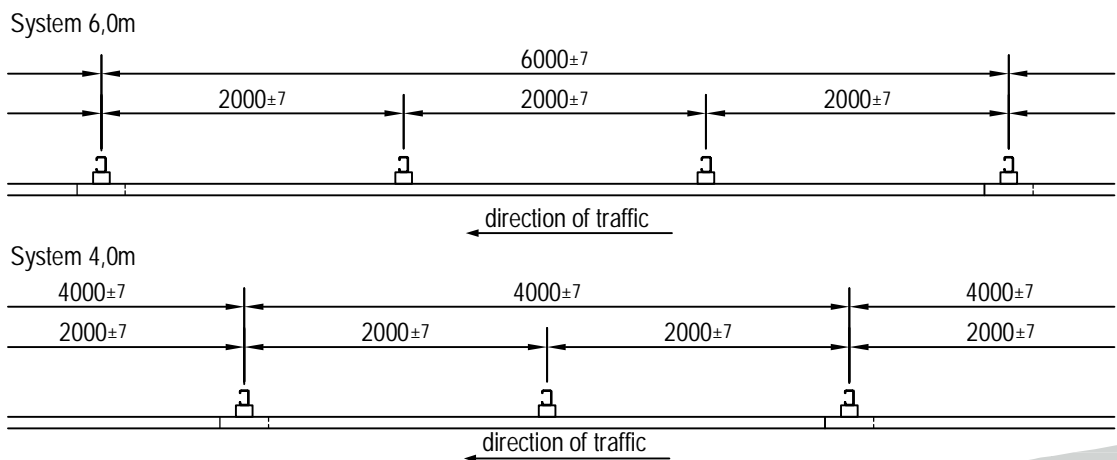
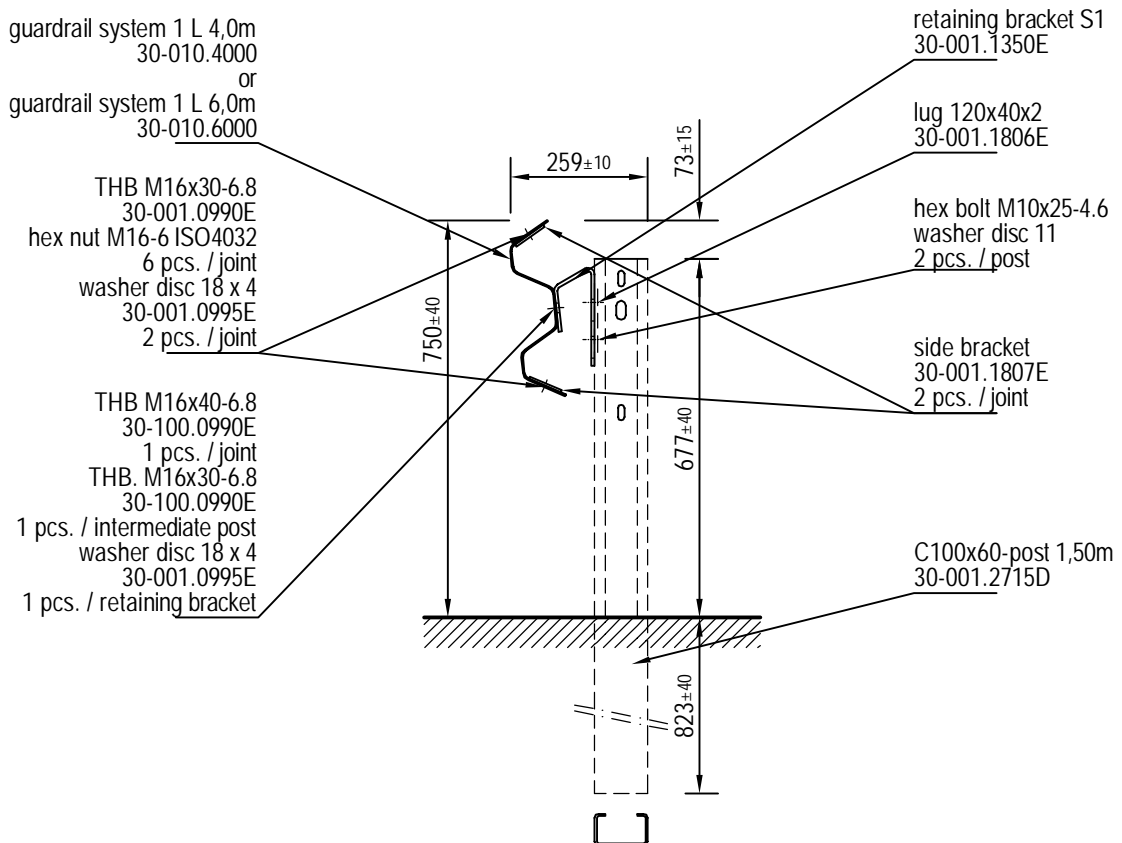
SAFETY BARRIERS

KREMSBARRIER 1 RH1C

Roadside Restraint System suitable
for pile driving ground conditions

product specification sheet D120/2

for driving see D121 and D122



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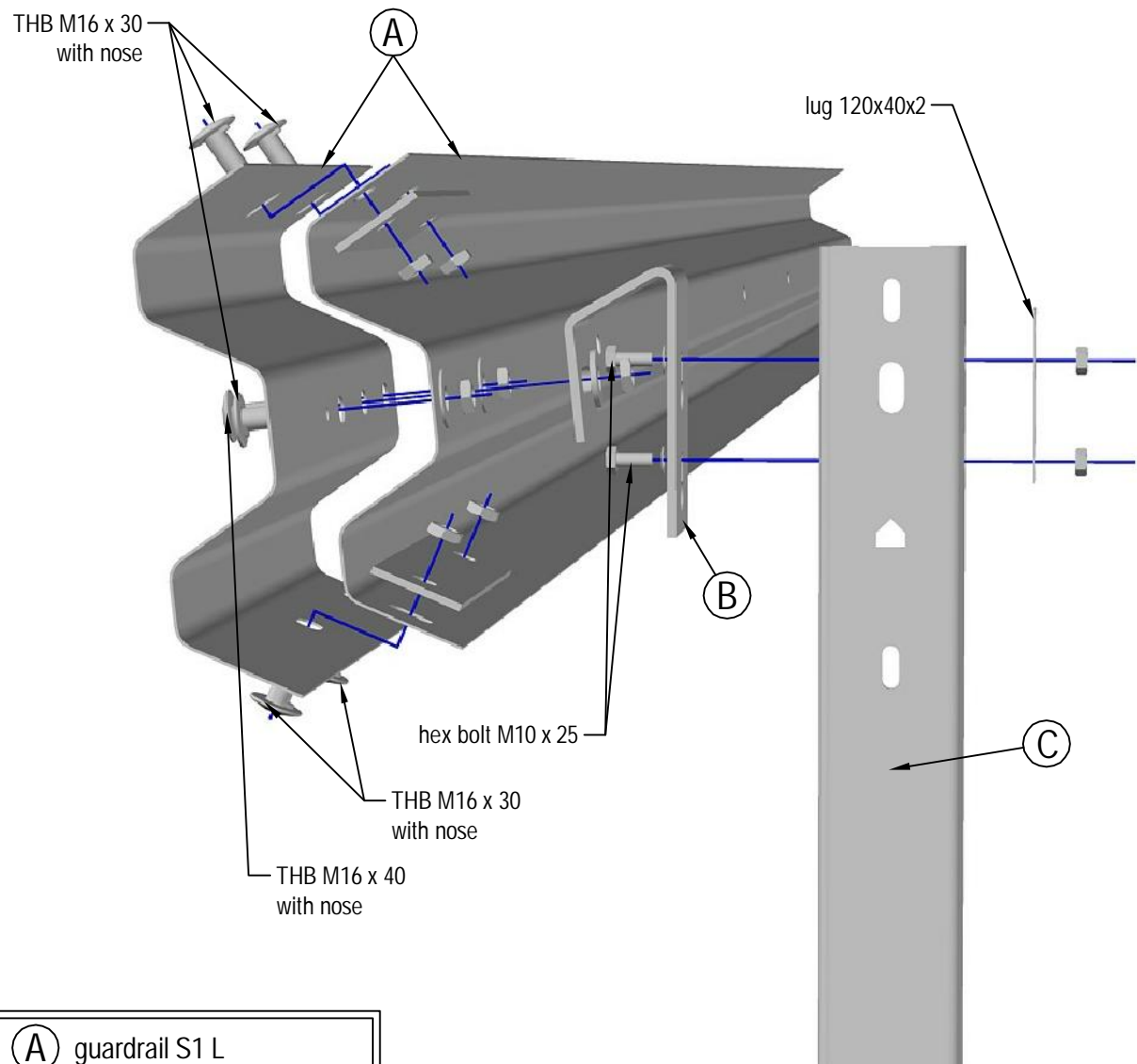
SAFETY BARRIERS

KREMSBARRIER 1 RH1C

Roadside Restraint System suitable
for pile driving ground conditions

product specification sheet D120/3

installation drawing



- | | |
|-----|----------------------|
| (A) | guardrail S1 L |
| (B) | retaining bracket S1 |
| (C) | C100x60-post |

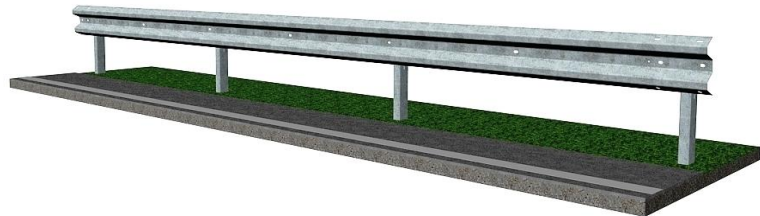
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SAFETY BARRIERS

Parts List

KREMSBARRIER 1 RH1C

Roadside Restraint System suitable
for pile driving ground conditions



Requirements for a field with a 6,00 m length

part	name of the item	weight [kg]	drawing- number	material / quality	corrosion protection
1	guardrail S1 L 6,00m	47,45	30-010.6000C	S355JO	acc. to EN ISO 1461
3	retaining bracket S1	1,82	30-001.1350E	S235JR	acc. to EN ISO 1461
3	C100x60-post 1,50 m	11,61	30-001.2715D	S355JO	acc. to EN ISO 1461
5	washer 40x18x4	0,03	30-001.0995E	100HV	acc. to EN ISO 10684
8	THB M16x30-6.8 with nose +nut	0,08	30-100.0990E	6.8	acc. to EN ISO 10684
1	THB M16x40-6.8 with nose +nut	0,10	30-100.0990E	5.6	acc. to EN ISO 10684
6	hex bolt M10x25-4.6 +nut	0,04	ISO 4018	4.6	acc. to EN ISO 10684
6	washer 11	0,00	ISO 7091	100HV	acc. to EN ISO 10684
3	lug 120x40x2	0,10	30-001.1806E	S235JR	acc. to EN ISO 1461
2	side bracket	0,78	30-001.1807E	S235JR	acc. to EN ISO 1461

Requirements for a field with a 4,00 m length

part	name of the item	weight [kg]	drawing- number	material / quality	corrosion protection
1	guardrail S1 L 4,00m	32,44	30-010.4000C	S355JO	acc. to EN ISO 1461
2	retaining bracket S1	1,82	30-001.1350E	S235JR	acc. to EN ISO 1461
2	C100x60-post 1,50 m	11,61	30-001.2715D	S355JO	acc. to EN ISO 1461
4	washer 40x18x4	0,03	30-001.0995E	100HV	acc. to EN ISO 10684
7	THB M16x30-6.8 with nose +nut	0,08	30-100.0990E	6.8	acc. to EN ISO 10684
1	THB M16x40-6.8 with nose +nut	0,10	30-100.0990E	5.6	acc. to EN ISO 10684
4	hex bolt M10x25-4.6 +nut	0,04	ISO 4018	4.6	acc. to EN ISO 10684
4	washer 11	0,00	ISO 7091	100HV	acc. to EN ISO 10684
2	lug 120x40x2	0,10	30-001.1806E	S235JR	acc. to EN ISO 1461
2	side bracket	0,78	30-001.1807E	S235JR	acc. to EN ISO 1461

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