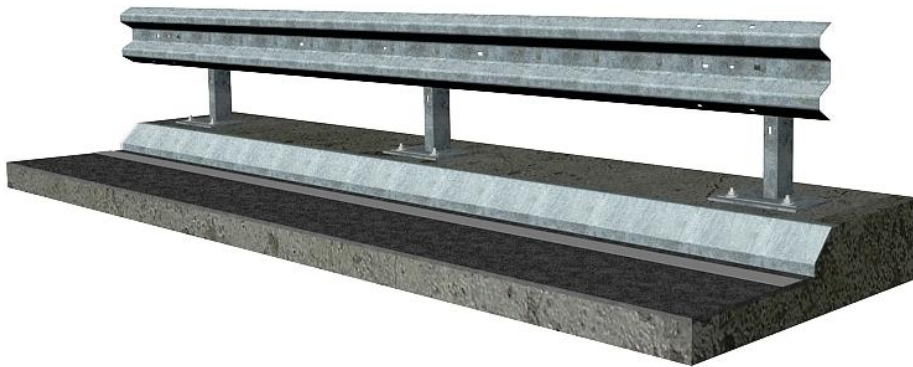


# ASSEMBLY INSTRUCTIONS

for vehicle barrier system

## KREMSBARRIER 1 RH1C

on artificial earth



Performance class in accordance with EN 1317-2:

Containment level:	H1
Impact severity level:	B
Containment range class:	W3

Production and sales:

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ID: VTMD123

Edition: 01/2015

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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	B / 1.2
Range of effectiveness class / level	W3 / 1.0m
Test length	57.00 m
System dimensions	
System width	507 mm
System height	750 mm
Drilling depth	130 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 (structure)**

In the event of vehicle impact, the vehicle barrier system and the vehicle itself serve to convey the force (nominal characteristic values) into the foundations (the structure). These forces are dependent on the alignment of the vehicle barrier system on the structure.

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

- Dissipation of characteristic forces is ensured.
- Concrete strength minimum C25/30
- Reinforcement in accordance with structural requirements
- Evenness of the surface in the area of the anchoring:  
maximum deviation 5 mm over 0.50 m barrier length

*Note: The vehicle barrier system can be anchored on steel constructions, if the dissipation of forces corresponds to the alignment of determined*

*characteristic values. The design of the anchoring for the vehicle barrier system on the steel construction must also be agreed with the manufacturer.*

### **Installation of vehicle barrier system in accordance with Type Specification Sheets D123/2, D123/3 and D123/4 (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. Create anchoring**

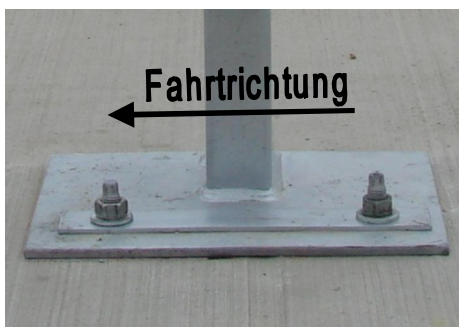
Each C125 baseplate upright is to be anchored with two concrete bolts TSM B16x190 in accordance with Type Specification Sheet TSM 190 (see appendix) .

It is recommended that the bore holes for the anchor pairs are executed with the help of a drilling template, in order to ensure precise spacing of the anchors.

The bore holes are to be executed normally in line with the installation surface. The bore hole depth amounts to  $130\pm 3$  mm. The use of a drill stand with depth gauge ensures the precise depth.

The standard spacing of the anchor groups (=upright spacing) amounts to 1,900 mm.

#### **2. Positioning the C125 baseplate uprights**



**Figure 1**

The C125 baseplate uprights are to be placed onto the anchoring so that the anchors are positioned on the side facing away from the traffic (see Fig. 1).

The open side of the C125 upright section is to be aligned so that it points towards the respective carriageway (see Fig. 2).

Right and left C125 baseplate uprights are to be used in accordance with the alignment to the right and left sides of the carriageway.

It is to be ensured that the C125 baseplate uprights are placed onto the anchor pairs so that the anchor is positioned centrally in the elongated hole of the baseplate. For each pair of anchors, a baseplate reinforcement with bore diameter 22 mm is to be

placed on the previously positioned concrete bolts TSM B16x190 so that the elongated holes in the baseplate are covered. The baseplate reinforcement together with the upright is fixed in place with a washer 40x18x4 and a hexagon nut M18 FK 8 for each concrete bolt and fastened to the specified torque (see Fig. 1).

For the usual lateral inclination of  $-2.5\%$  to  $+6\%$ , the upright is to be aligned normally to the installation surface (surface of the cap, retaining wall, etc.). The longitudinal inclination of the installation surface is generally not considered.

Differing curb heights are to be considered in accordance with national stipulations.

### 3. Mount spacer C

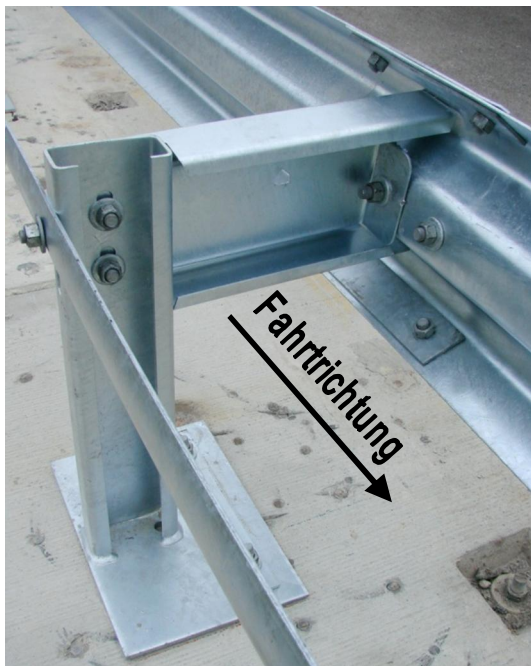


Figure 2

"Spacer C" has recesses in both sides which serve to accommodate the C125 upright.

Right and left "spacer C's" are to be used in accordance with the alignment to the right and left sides of the carriageway.

Each "spacer C" is bolted in place to the C125 upright with two coach bolts. In order to do so, the coach bolts M16x30 FK 6.8 are placed through the drop-shaped holes in the spacers and are inserted into the sides of the uprights through the elongated holes 12x36 mm and fastened in place on the inner sides of the upright with a washer 40x18x4 and a hexagon nut M16 FK 6 (see Fig. 2).

### 4. Mounting the guard rail (crash barrier) S1

The guard rail S1 is to be overlapped in the joint area in relation to the direction of travel, so that vehicles cannot get caught (see Fig. 2). 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 spacer C (every ~1,900 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 spacer where the guard rails adjoin (see Fig. 3).



**Figure 3**



**Figure 4**

The guard rail joint is additionally to be bolted with six coach bolts M16x30 FK 6.8 (see Fig. 9).

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.

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. 3).

## **5. Mounting the bracing band**

The slightly curved cross section of the bracing band is bolted to the C125 baseplate uprights so that the sides are in contact with the rear sides of the uprights (see Fig. 2 and 5).

In order to do so, a coach bolt M16x40 FK 6.8 is inserted through the upper-most elongated hole 36x18 mm from the side of the C125-upright which faces away from the traffic, and is then fed through the elongated hole 40x18 mm in the bracing band, where it is fixed in place with a washer 40x18x4 and a hexagon nut M16 FK 6.



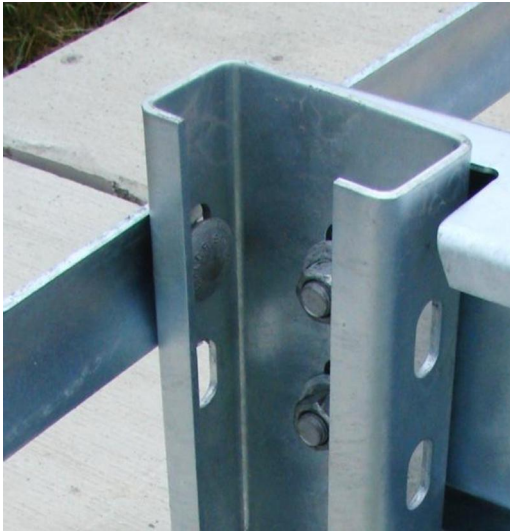


Figure 5

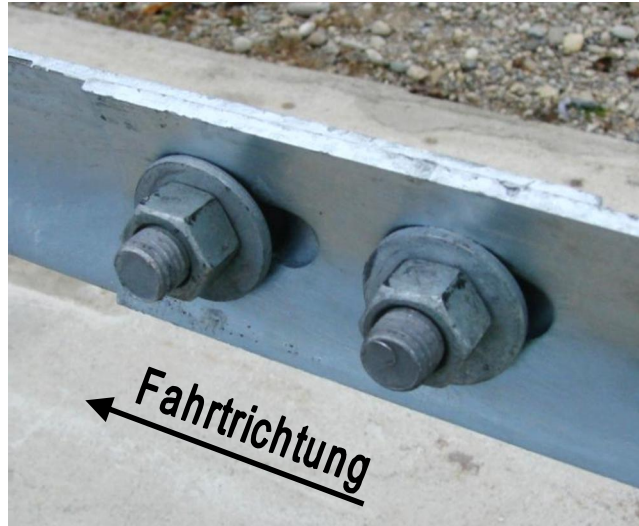


Figure 6

The jointed area of the bracing band is positioned ~700 mm after the guard rail joint, as seen from the direction of travel. The two elongated holes 40x18 in the joint must align and are bolted in place with two coach bolts M16x30 FK 6.8, each with a washer 40x18x4 and a hexagon nut M16 FK 6. In doing so, it is to be ensured that the bolt heads are placed onto side of the bracing belt facing away from the traffic (see Fig. 6).

## 6. 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!

## 7. Threaded assembly torques

Thread / strength class	Torque	
	min.	max.
M10 / 4.6	10 Nm	17 Nm
M16 / 6.8	35 Nm	150 Nm
M18 / 8.8	80 Nm	330 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.

## 8. Dilation construction in the area of carriageway transitions

The dilation construction enables temperature-specific movements of a bridge structure to be accommodated.

The execution of the dilation construction in the vehicle barrier system is dependent on the function of the barrier system and the amount of extension / retraction (e.g.  $\pm 100$  mm). This is to be agreed with the manufacturer.

## 9. 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.

## **10. 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  $\mu\text{m}$  per annum is to be expected. From this, an average galvanised layer of at least 70  $\mu\text{m}$  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.

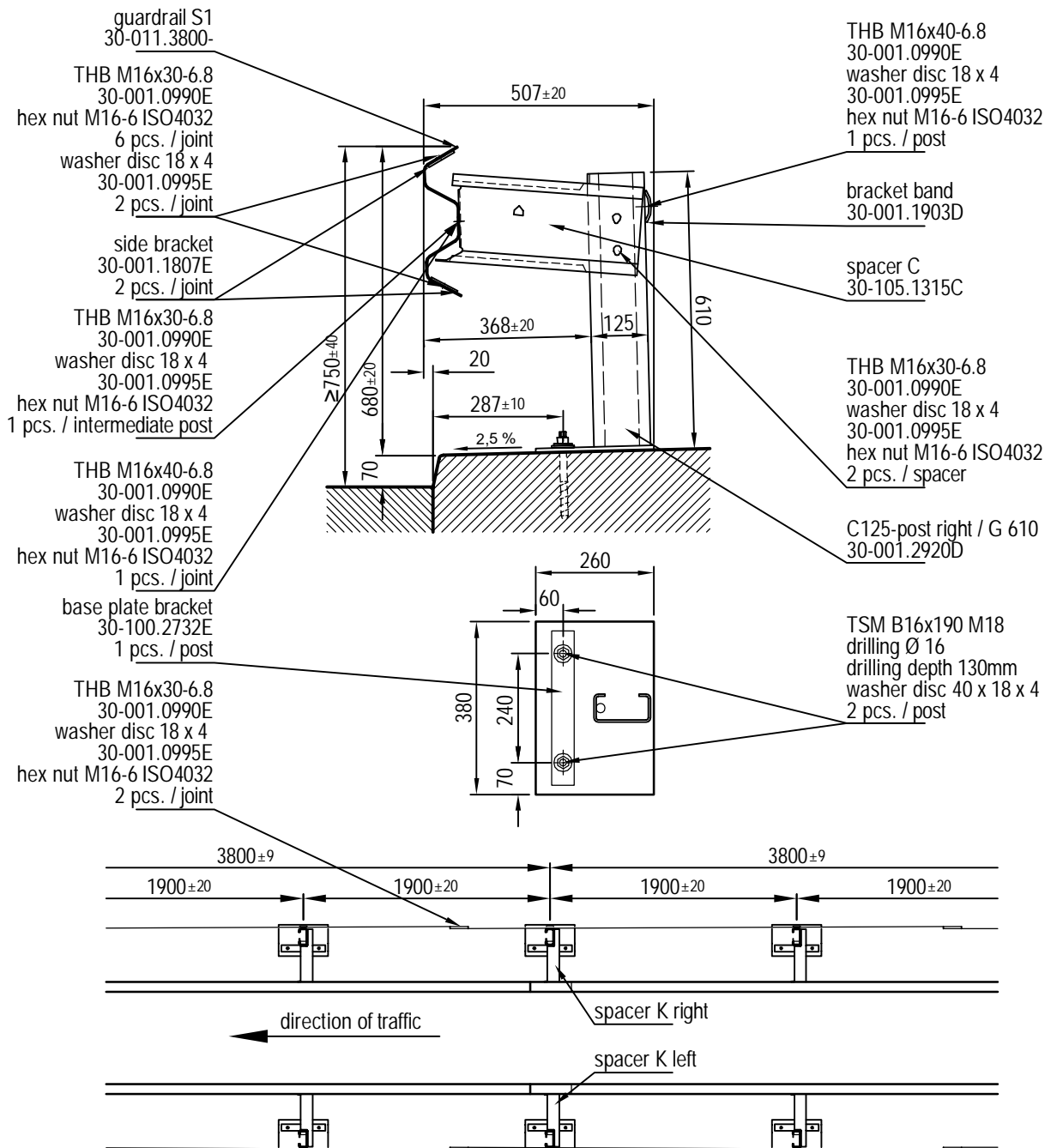
Toxic or hazardous materials are not used in vehicle barrier systems manufactured by voestalpine Krems Finaltechnik GmbH.

# SAFETY BARRIERS

## KREMSBARRIER 1 RH1C

roadside restraint system  
on civil structures

product specifications Sheet D123/2



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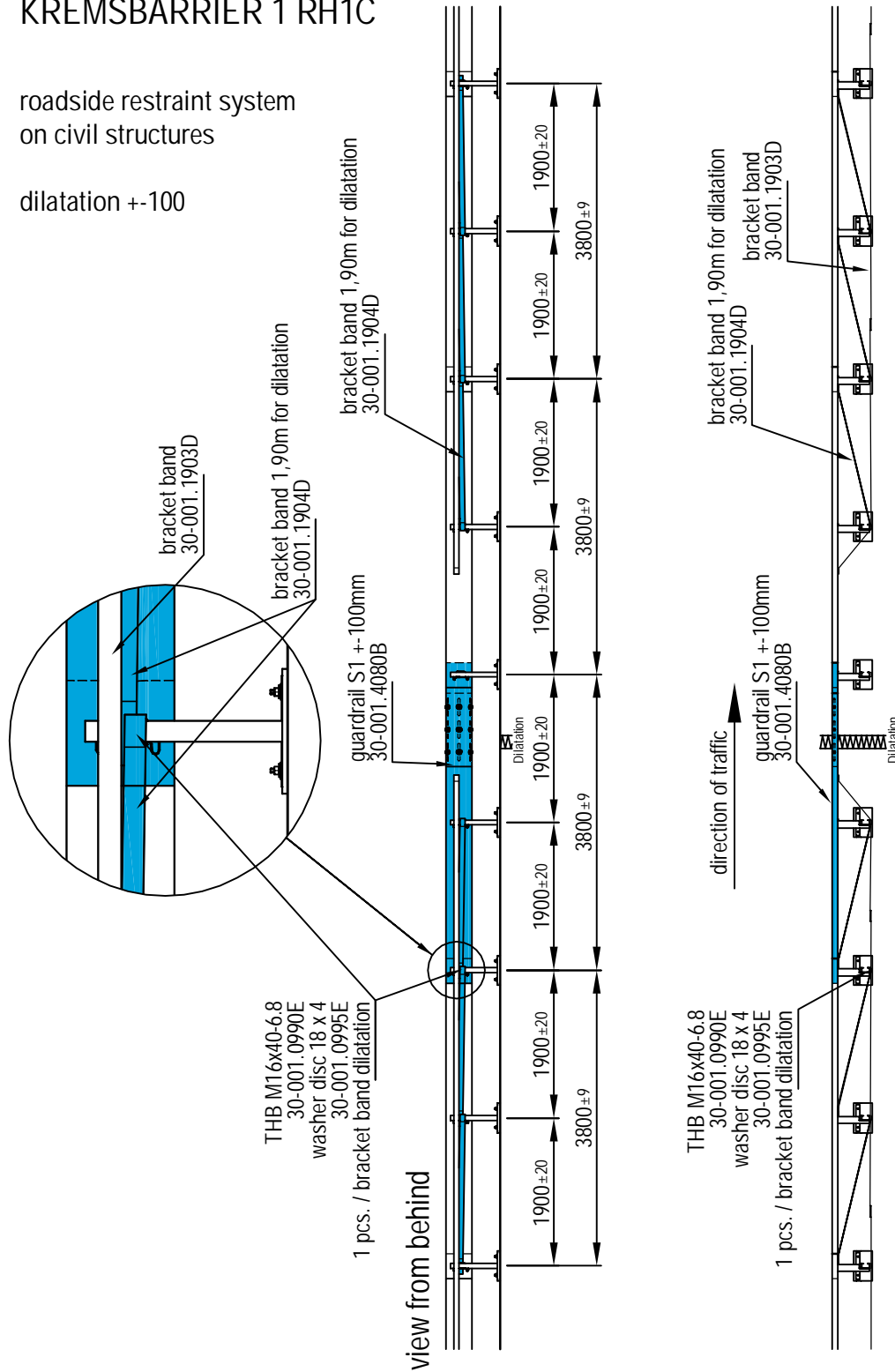
# SAFETY BARRIERS

## KREMSBARRIER 1 RH1C

roadside restraint system  
on civil structures

dilatation  $\pm 100$

product specifications Sheet D123/3



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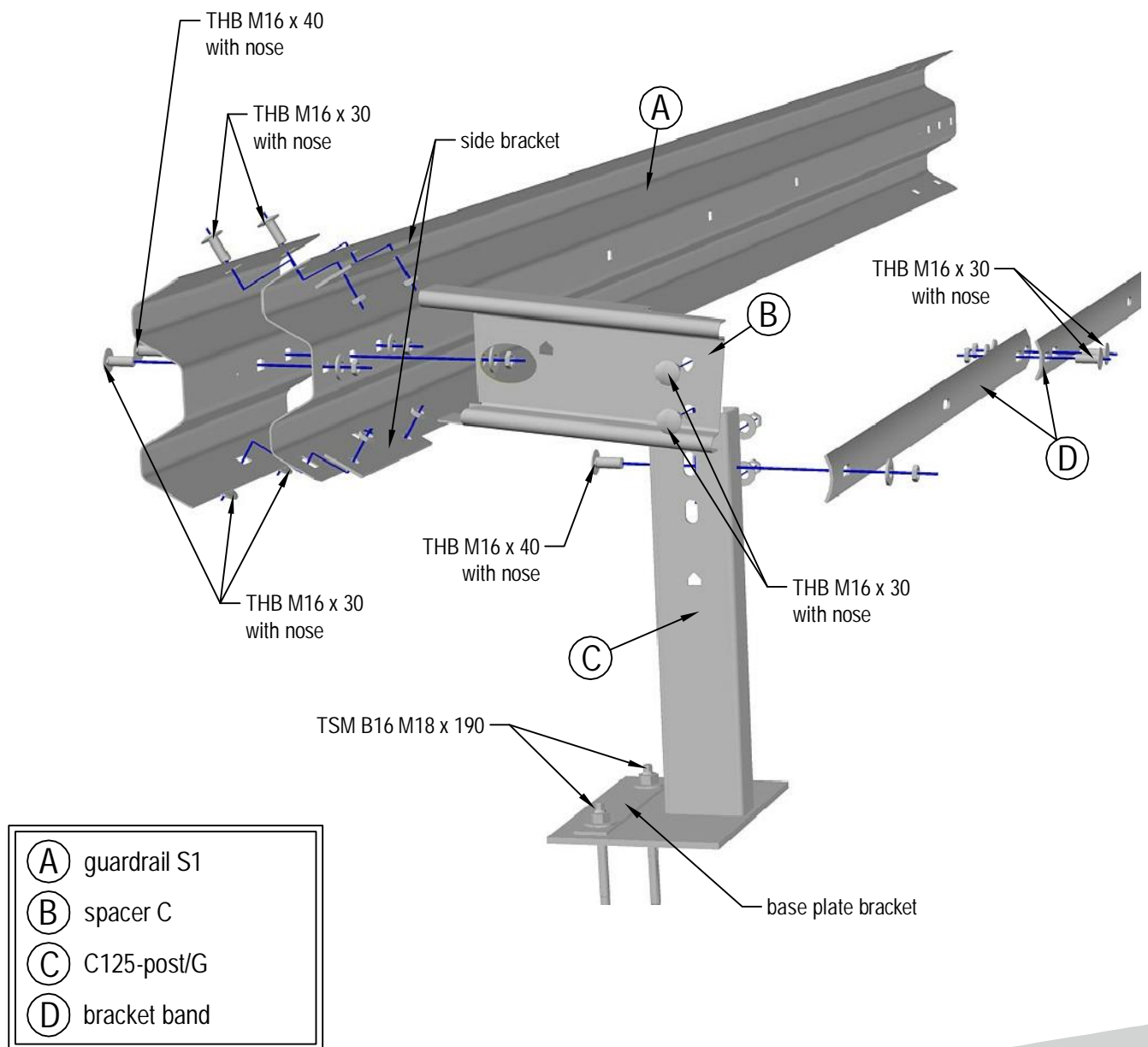
# SAFETY BARRIERS

## KREMSBARRIER 1 RH1C

roadside restraint system  
on civil structures

product specifications Sheet D123/4

installation drawing



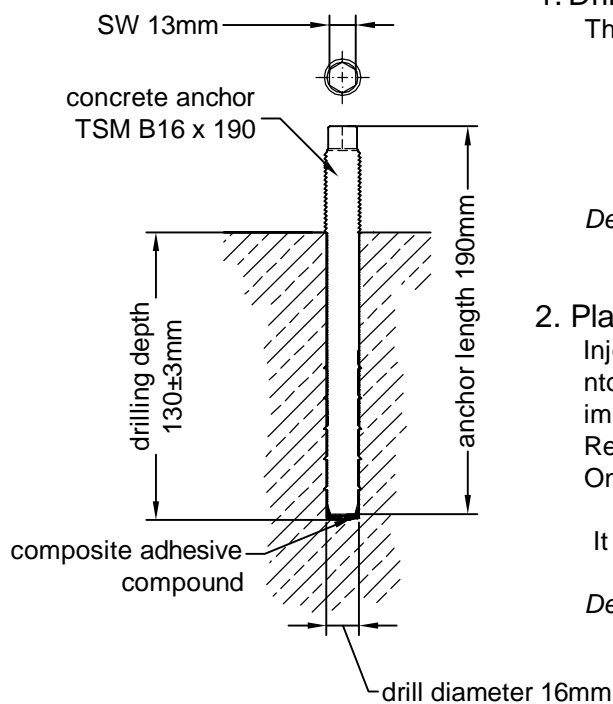
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# SAFETY BARRIERS

## CONCRETE ANCHOR TSM B16 x 190

Installation instruction

product specification sheet TSM 190



### 1. Drilling bore hole

The holes are normal to the mounting surface.

- drill diameter 16mm
- drill depth  $130 \pm 3$ mm
- controlling the drilling depth
- to clean the drill hole

*Details:* The use of a drill rig with a depth stop ensures accurate production drilling.

### 2. Placing the anchor

Inject composite adhesive compound (Chemofast) into the drill hole. Turn in screw to a depth of 130 mm, using an impact driver until the compound mass oozes out of the drill hole. Remove redundant compound mass. One cartridge lasts for about 33 pc. concrete anchors.

It is mandatory to follow the guidelines stated on the cartridge.

*Details:* Contribute to the mass of the composite is a special required to press the cartridge matched.



drilling bore hole



inject the compound mass



screw the concrete anchor

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# SAFETY BARRIERS

## Parts list

### KREMSBARRIER 1 RH1C

Road Restraint System  
on civil structures



Requirements for a field with a 3,80 m length

part	name of the item	weight [kg]	drawing- number	material / quality	corrosion protection
1	guardrail S1 3,80m	46,50	30-011.3800-	S355JO	acc. to EN ISO 1461
2	side bracket	0,78	30-001.1807E	S235JR	acc. to EN ISO 1461
1	bracket band	11,15	30-001.1903D	S235JR	acc. to EN ISO 1461
2	spacer C right	4,23	30-105.1315C	S235JR	acc. to EN ISO 1461
2	C125-post right/G 610	13,78	30-001.2920D	S355JO	acc. to EN ISO 1461
13	THB M16x30-6.8 with nose +nut	0,08	30-100.0990E	6.8	acc. to EN ISO 10684
3	THB M16x40-6.8 with nose +nut	0,10	30-100.0990E	5.6	acc. to EN ISO 10684
16	washer 40x18x4	0,03	30-001.0995E	100HV	acc. to EN ISO 10684
2	base plate bracket	0,69	30-100.2732E	S235JR	acc. to EN ISO 1461
4	anchor TSM B16 M18x190	0,27	-	10.9	TOGE-KORR
4	hex nut M18-8	0,04	DIN 934	8	acc. to EN ISO 10684

parts for dilatation

part	name of the item	weight [kg]	drawing- number	material / quality	corrosion protection
1	guardrail S1 3,80 ± 100	57,92	30-001.4080B	S355JO	acc. to EN ISO 1461
6	band bracket 1,90m for dilatation	5,24	30-001.1904C	S235JR	acc. to EN ISO 1461

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