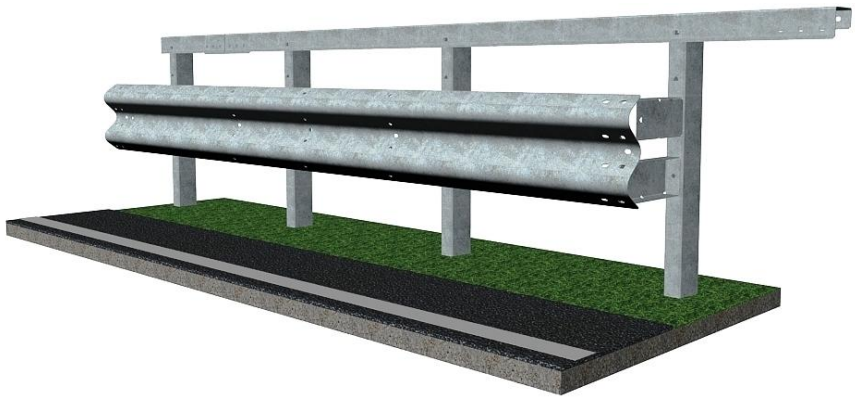
ASSEMBLY INSTRUCTIONS

for the vehicle barrier system

KREMSBARRIER 3 RH4V

for pile-drivable subgrades



Performance class in accordance with EN 1317-2:

Containment level:	H4b
Impact severity level:	B
Working width:	W5

Production and sales:

voestalpine Krems Finaltechnik GmbH

Schmidhüttenstraße 5, 3500 Krems, Austria

T.: +43/50304/14-670

F.: +43/50304/54-628

E-Mail: info.vasts@voestalpine.com

ID: VTMA305

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Contents

Safety instructions 3
Proper use 3
Technical description of the vehicle barrier system 3
Transport 4
Requirements for installation 4
Suitable subgrade 5
Installation of the vehicle barrier system in accordance with data sheets A305/2 and A305/3 (see appendix) 6
1. Pile drive V140 uprights 6
2. Mounting S3 spacers 6
3. Mount connecting bracket strut 7
4. Mount S3 strut 7
5. Mount guardrail (crash barrier) S3 9
6. Shims 10
7. Torques for threaded connections 10
8. Conformity checks 11
Repairing the vehicle barrier system 11
Durability of corrosion protection 12
Inspection and maintenance 12
Recycling / Disposal 12
Appendix 1 ..... Data Sheet A301/2
Appendix 2 ..... Data Sheet A301/3
Appendix 3 ..... Parts List KREMSBARRIER 3 RH4V

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	H4b
Impact severity level / ASI	B / 1.2
Working width / level	W5 / 1.7 m
Test length	72.00 m
System dimensions	
System width	600 mm
System height	1,200 mm
Ram depth	1,010 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 A305/2 and A305/3 (see appendix)

It is not necessary to pre-assembly 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. Pile drive V140 uprights

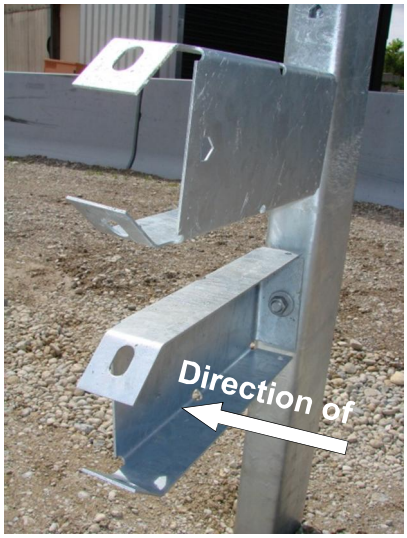
Figure

The 2,200 mm long V140 upright is to be rammed vertically into the subgrade using a suitable pile driver, so that the upper edge of the upright stands 1,190 mm above the reference level.

The elongated holes 18x36 mm spaced at 60 and 40 mm at the end of the upright must be aligned at the top end of the upright. The open side of the V140 upright should be aligned facing away from the traffic.

The pile driver must be equipped with a pile cap suitable for the V140 cross-section, in order to enable precise guidance and prevent possible deformation or damage to the hot-dip galvanised coating on the head of the upright.

2. Mounting S3 spacers



Figure

Two "S3 spacers" are mounted to each V140 upright (see Fig. 2).

In order to do so, mushroom head bolts M16x30 FK 6.8 are placed through the axially aligned drop-shaped holes spaced at 250 mm to each other and inserted through the 18x36 mm elongated holes on the front faces of the uprights and fixed in place with washers 40x18x4 and nuts M16 FK 6.

Note: Whether these bolts are inserted from the upright side or from the spacer side has no effect on the function of the system.

The open side of the upper spacer to be aligned to the direction of travel. The open side of the lower spacer is to be aligned away from the direction of travel (see Fig. 2).

3. Mount connecting bracket strut

Each V140 upright is fitted with two "connecting bracket struts", bolted on so that the upper upright end forms a supporting surface for the strut (see Fig. 3).

Figure

In each case, a mushroom head bolt M16x30 FK 6.8 is inserted from the inner side of the upright and through the lateral 18x36 elongated hole in the V140 upright. Subsequently, the connecting bracket is aligned with the elongated hole 30x18mm in such a way that the projecting side piece lies on the upper end of the upright pointing away from the upright and is fixed in place in each case with a washer 40x18x4 and nut M16 FK 6 (see Fig. 3).

4. Mount S3 strut

Figure

The "S3 strut" is to be put over the head of the upright from above so that the elongated holes 36x18 mm in the longer flange overlap the elongated holes 18x36 mm on the front face of the upright before being bolted in place with a mushroom head bolt M16x30 FK 6.8 (See Fig. 4). These are then fixed in place on the inner sides of the uprights in

each case with a washer 40x18x4 and hexagon nut M16 FK 6.

Additionally, the strut is bolted twice indirectly to each V140 upright via the "connecting bracket strut".

In order to do so, two mushroom head bolts M16x30 FK 6.8 are inserted from above, through the elongated holes 36x18 mm in the strut and the respective elongated holes 30x18 mm in the connecting brackets and fixed in place on the lower side of

Figure 5

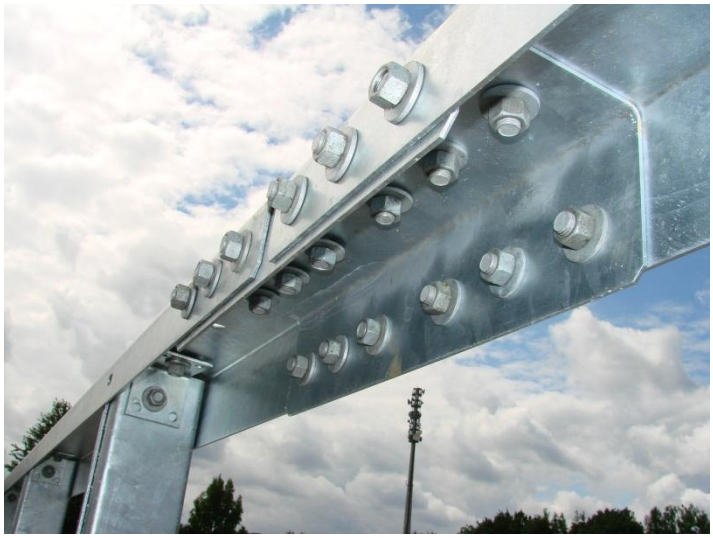


Figure 6

the connecting bracket in each case with a washer 40x18x4 and nut M16 FK 6 (see Fig. 4 and 5).

In the jointed sections, "strut S3" is connected to the "joint profile strut S3" (see Fig. 6).

The "joint profile strut S3" is to be inserted from below into the previously mounted strut S3, so that the hole pattern of the joint profile covers the hole pattern of the strut and half of the joint profile projects beyond the end of the strut.

The next "S3 strut" can now be inserted onto the joint profile from above so that the hole pattern is covered again (see Fig. 6).

The joint is to be bolted in place with 18 mushroom head bolts M16x30 FK 6.8. The side facing the traffic and the upper bolts are aligned on the inner side of the joint profile. The bolts facing away from the strut are then fixed in place in each case with a washer 40x18x4 and nut M16 FK 6 (see Fig. 6).

5. Mount guardrail (crash barrier) S3

The jointed areas of the guard rails are to be overlapped in relation to the direction of traffic, so that oncoming vehicles cannot engage with the guard rail. The jointed sections (upper part) of guard rail ends facing the carriageway have drop-shaped holes and are additionally labelled with ⌂, to designate voestalpine guard rail systems. The jointed sections (lower part) of guard rail ends facing away from the carriageway have elongated holes.

Figure 7

The guard rails are bolted in place to each pair of spacers (every ~1,333 mm) with four mushroom head bolts M16 FK 6.8 (see Fig. 8).

The guard rail joints are additionally to be bolted in place with four mushroom head bolts M16x30 FK 6.8 (see Fig. 9).

Figure 8

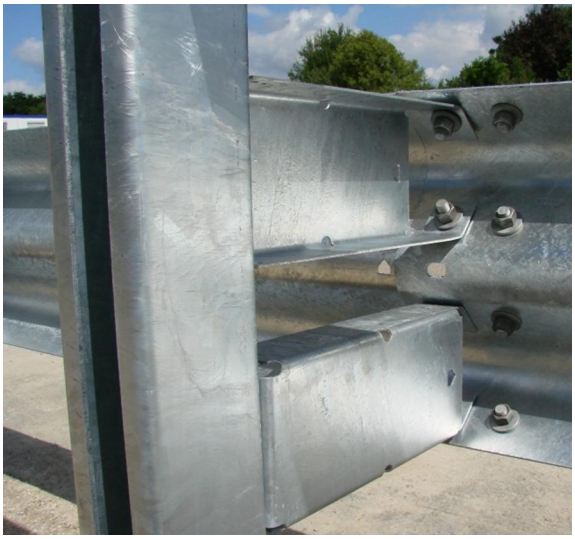


Figure 9

When tightening the hexagon nuts M16 FK 6, ensure correct alignment of the drop-shaped anti-twist protection of the bolt head in the drop-shaped hole of the guard rail. A washer 40x18x4 is to be aligned under each of the hexagon nuts M16.

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.

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.

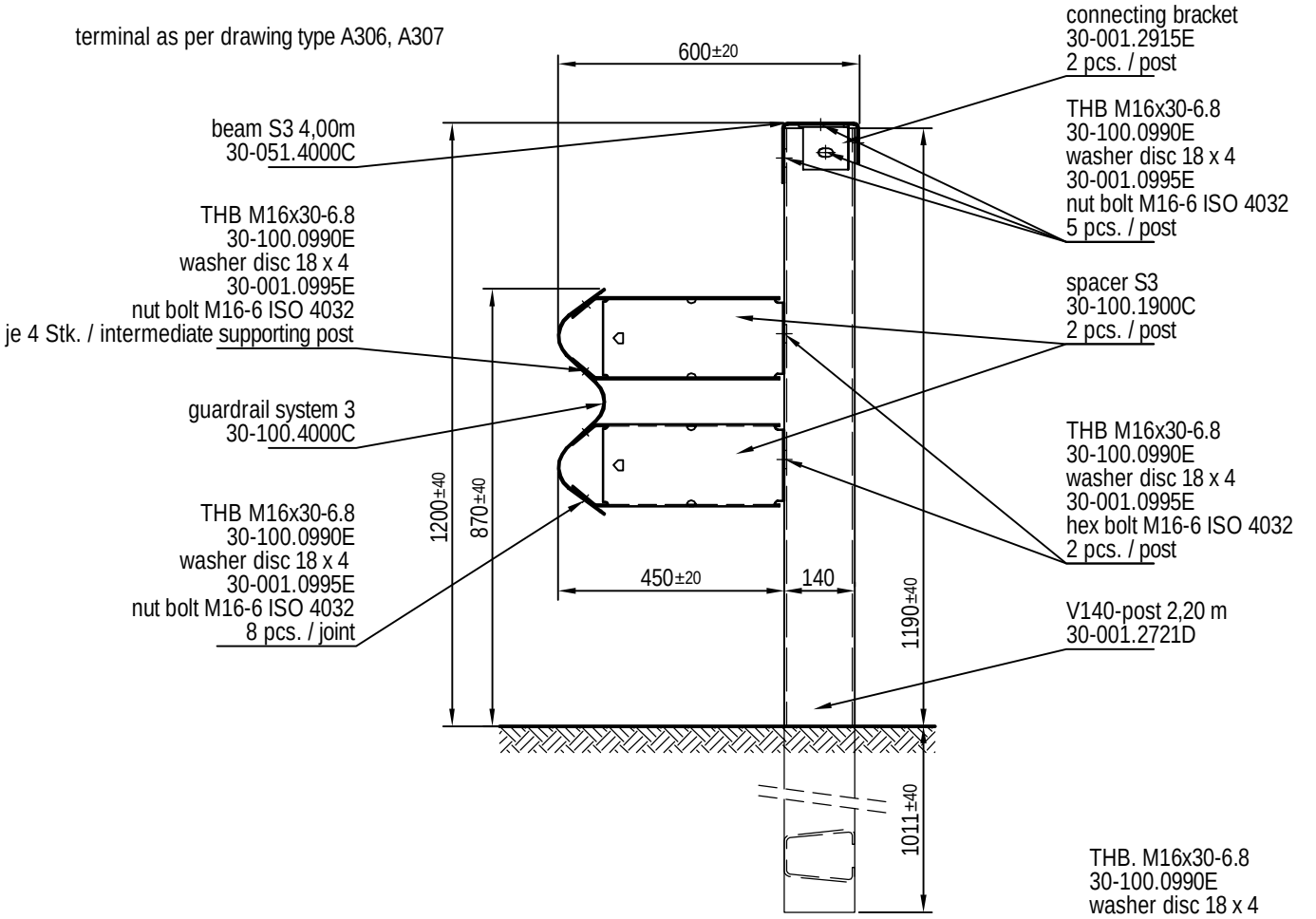
Packaging and other waste is to be recycled or disposed of in accordance with statutory requirements.

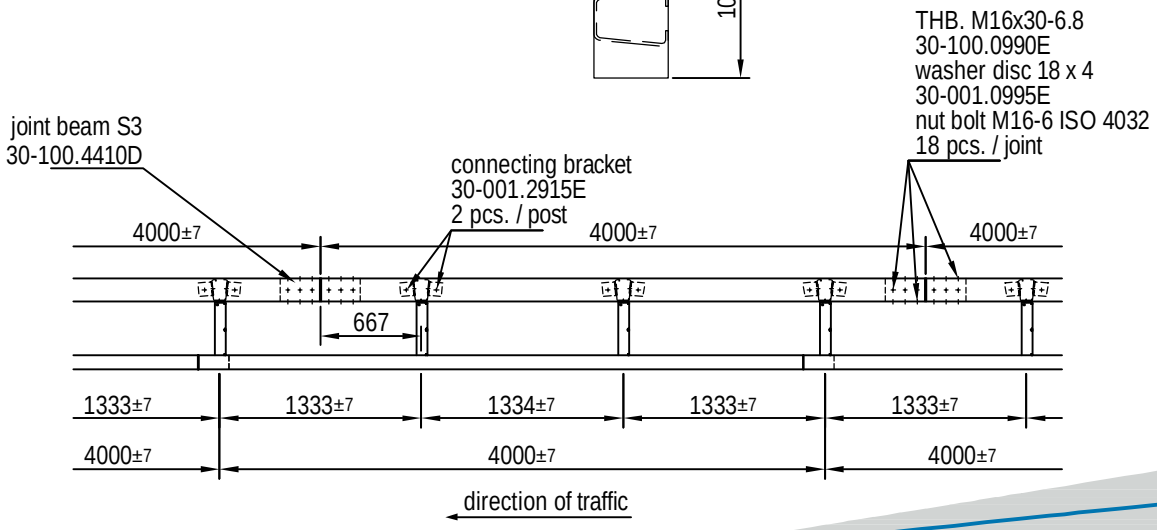
Vehicle barrier systems manufactured by voestalpine Krems Finaltechnik GmbH do not contain toxic or potentially hazardous materials.

KREMSBARRIER 3 RH4V

Road Restaint System suitable
for pile driving ground conditions

product specifications sheet A305/2





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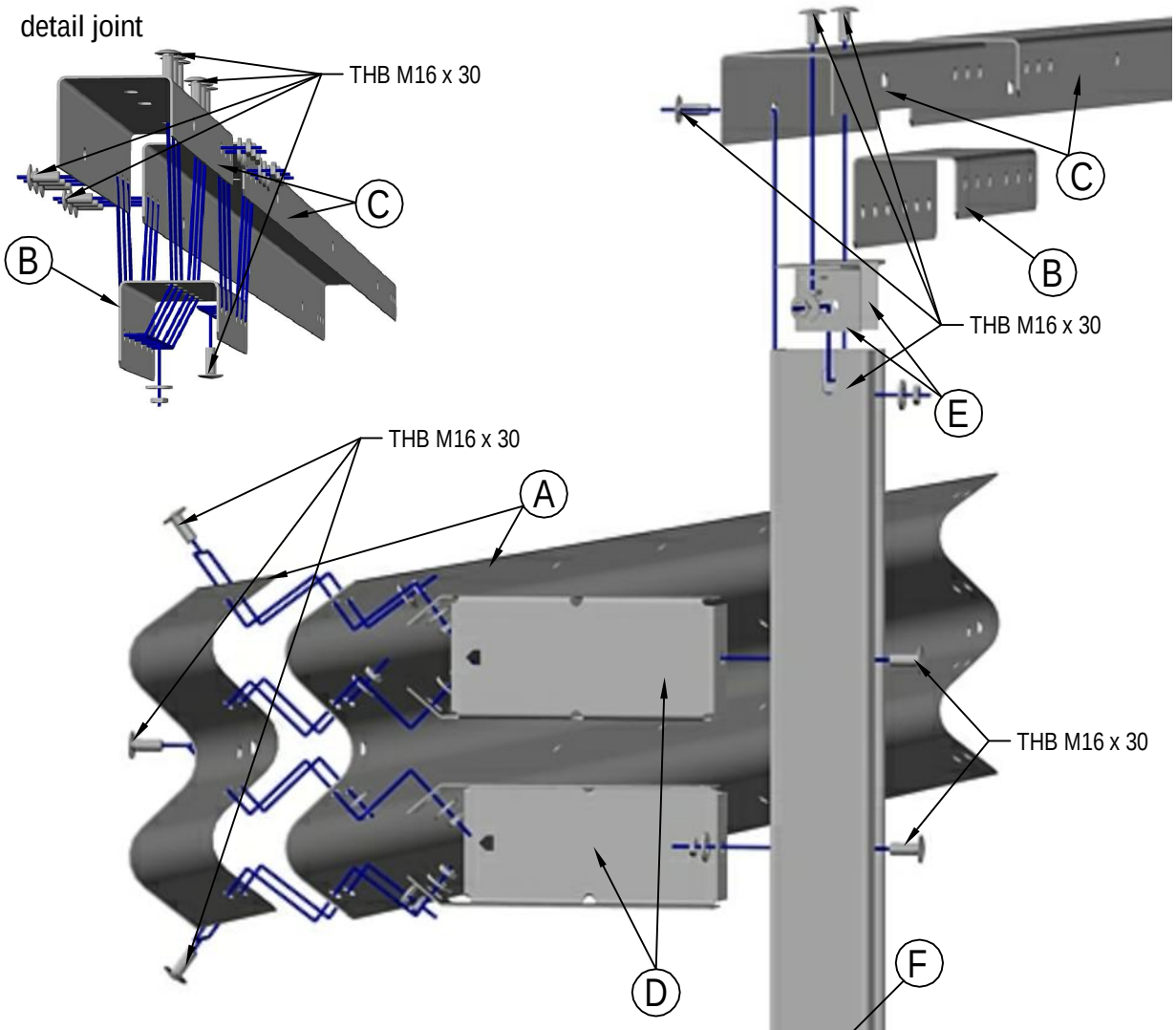
SAFETY BARRIERS

KREMSBARRIER 3 RH4V

Road Restaint System suitable
for pile driving ground conditions

product specifications sheet A305/3

installation drawing



A	guardrail S3	D	spacer S3
B	joint beam S3	E	connecting bracket
C	beam S3 4,00m	F	V140-post

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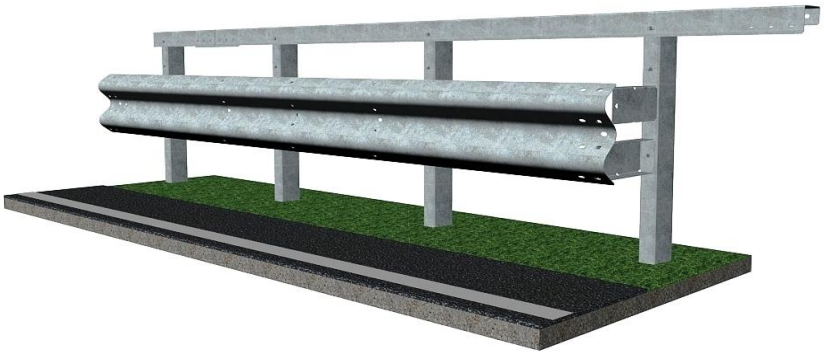
Partlist
KREMSBARRIER 3 RH4V

Road Restaint System suitable
for pile driving ground conditions



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 S3 4,00	61,72	30-100.4000-C	S355JO	acc. to EN ISO 1461
1	beam S3 4,00m	38,19	30-051.4000-	S355JO	acc. to EN ISO 1461
1	joint beam S3	5,07	30-100.4410D	S355JO	acc. to EN ISO 1461
6	connection bracket post	0,62	30-001.2915E	S235JR	acc. to EN ISO 1461
6	spacer S3	2,91	30-100.1900C	S235JR	acc. to EN ISO 1461
3	V140-post 2,20 m	34,48	30-001.2721D	S235JR	acc. to EN ISO 1461
55	THB M16x30-6.8 with nose +nut	0,08	30-100.0990E	6.8	acc. to EN ISO 10684
55	washer 40x18x4	0,03	30-001.0995E	100HV	acc. to EN ISO 10684

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