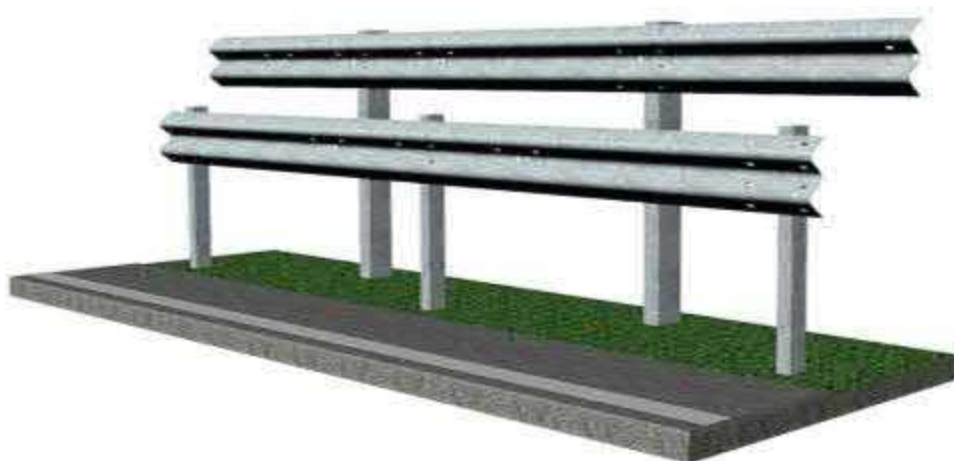


ASSEMBLY INSTRUCTIONS

KREMSBARRIER 2 RH3

for pile drivable subgrades



Performance class in accordance with EN 1317-2:

Containment level:	H3
Impact severity level:	B
Working width:	W5

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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	W5 / 1,7 m
Test length	57,00 m
System dimensions	
System width	617 mm
System height	1.215 mm
Ram depth	985 and 870 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 RESTRAINT SYSTEM ACCORDING TO B202/2 AND B202/3 (SEE APPENDIX)

Pre-assembly of the components of the vehicle restraint system in the factory is not necessary.

Because the vehicle restraint system is not pre-tensioned, the ambient temperature is not relevant for installation.

1. V140-post pile drive



The V140 post, at least 2,200 mm long, is to be driven vertically into the ground with a suitable pile driver until the upper edge of the post comes to rest $1,215 \pm 40$ mm above the reference level.

The 18x36 mm slots at a distance of 80 and 150 mm from the end of the post must be located at the upper end of the post (post head). The open side of the V140 post faces away from traffic (see Fig. 1).

The pile driver must be equipped with a driving cap for the V140 cross section so that exact guidance is provided and no deformation or damage occurs to the hot-dip galvanising at the head of the post.

The regular separation of the axes of the posts is 1,900 mm.

Figure 1

2. Installing guide rail S1A (upper rail band)

In the impact area, the guardrails must be overlapped based on the direction of travel so that it is not possible for the vehicles to get hooked. The end of the rail facing the roadway in the impact area (upper area) has drop holes. The end of the rail facing away from the roadway in the impact area (lower area) has slots.

The guardrails are bolted every ~1,900 mm to the V140 posts. For this purpose, an M16 FK 4.6 round-head screw is pushed through the 26x20 mm slot in the guide and rail and the lower 30x18 mm slot in the V140 post, facing away from the road (see Fig. 2 to 4), a 40x18x4 washer is applied on the inside of the post and secured with an M16 FK 5 hexagon nut.

The M16 FK 4.6 round-head screw is used in lengths 35 and 55 mm. The M16x55 round-head screw is needed where the rail joint is bolted to the V140 post (see Fig. 2 and 3).



Figure 2



Figure 3

Tighten the round-head screws so that the guide rail flanks are pressed firmly to the V140 post, but no permanent deformation occurs (see Fig. 4).

The rail joint is also additionally bolted with eight M16x30 FK 6.8 round-head screws (see Fig. 2 to 4). When tightening the M16 FK 6 hexagon nuts, it is important to pay attention to the correct seating of the drop-shaped anti-twist device of the screw head in the drop hole of the guide rail.

A 40x18x4 washer is to be placed under each M16 hexagon nut.

3. C100x60-post pile drive

The C100x60 posts are to be positioned approximately centred between the V140 posts. The post front edge of the C100x60 post is to be positioned 400 mm closer to the roadway than the V140 post (see Fig. 7).



Figure 4

The C100x60 post, at least 1,700 mm long, is to be driven vertically into the ground with a suitable pile driver until the upper edge of the post comes to rest 830 ± 40 mm above the reference level. The open side of the C100x60 post cross section is to be arranged so that it points in the direction of travel of the corresponding lane (see Fig. 5). The hole pattern must be positioned at the upper post end (post head).

The pile driver must be equipped with a driving cap matching the C100x60 cross section so that no deformation or damage occurs to the hot-dip galvanising at the head of the post. A guide mounted on the pile driver near the ground surface and adapted to the cross section of the C100x60 must ensure the exact positioning of the post during the driving procedure.

The regular separation of the axes of the posts is 1,900 mm.

Note: The driving cap must have a groove so that the cross section is supported on both sides during driving.

4. Mounting bracket S2A



Figure 5



Figure 6

The mounting bracket S2 is bolted to the post with an M10 FK 4.6 hexagon screw. The keyhole in the mounting bracket must match up with the upper of the two 18x36 mm slots on the front side of the post. The flank with the two 30x18 slots points toward the roadway (see Fig. 5). Starting from the mounting bracket, the M10 FK 4.6 hexagon screw is pushed through already applied washer 11 through the narrow side of the keyhole (narrow side up) and the slot (see Fig. 5). On the inside of the post a 120x40x2 tab is secured with the upper of the two axial Ø12 mm holes onto the M10 FK 4.6 screw and secured with a M10 FK 5 hexagon screw (see Fig. 6).

5. Installing guardrail S1A (bottom rail band)

In the impact area, the guardrails must be overlapped based on the direction of travel so that it is not possible for the vehicles to get hooked. The end of the rail facing the roadway in the impact area (upper area) has drop holes. The end of the rail facing away from the roadway in the impact area (lower area) has slots.

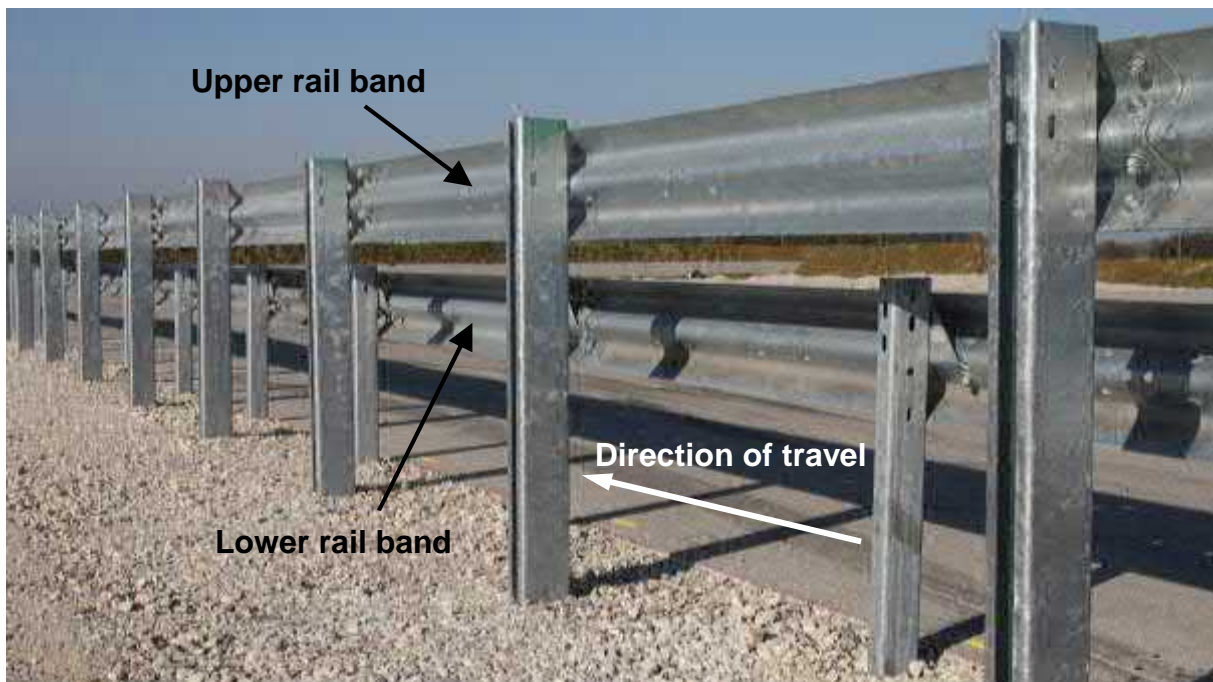


Figure 7

The guardrails are bolted every ~1,900 mm with two M16 FK 6.8 round-head screws at the 30x18 mm slots (see Fig. 7).



The M16 FK 6.8 round-head screw is used in lengths 30 and 40 mm. The M16x40 round-head screw is only to be used for screwing the mounting bracket in the rail joint.

The rail joint is also additionally bolted with six M16 FK 6.8 round-head screws (see Fig. 8). When tightening the M16 FK 6 hexagon nuts, it is important to pay attention to the correct seating of the drop-shaped anti-twist device of the screw head in the drop hole of the guide rail.

A 40x18x4 washer is to be placed under each M16 FK 6 hexagon nut.

Figure 8

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 / 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.

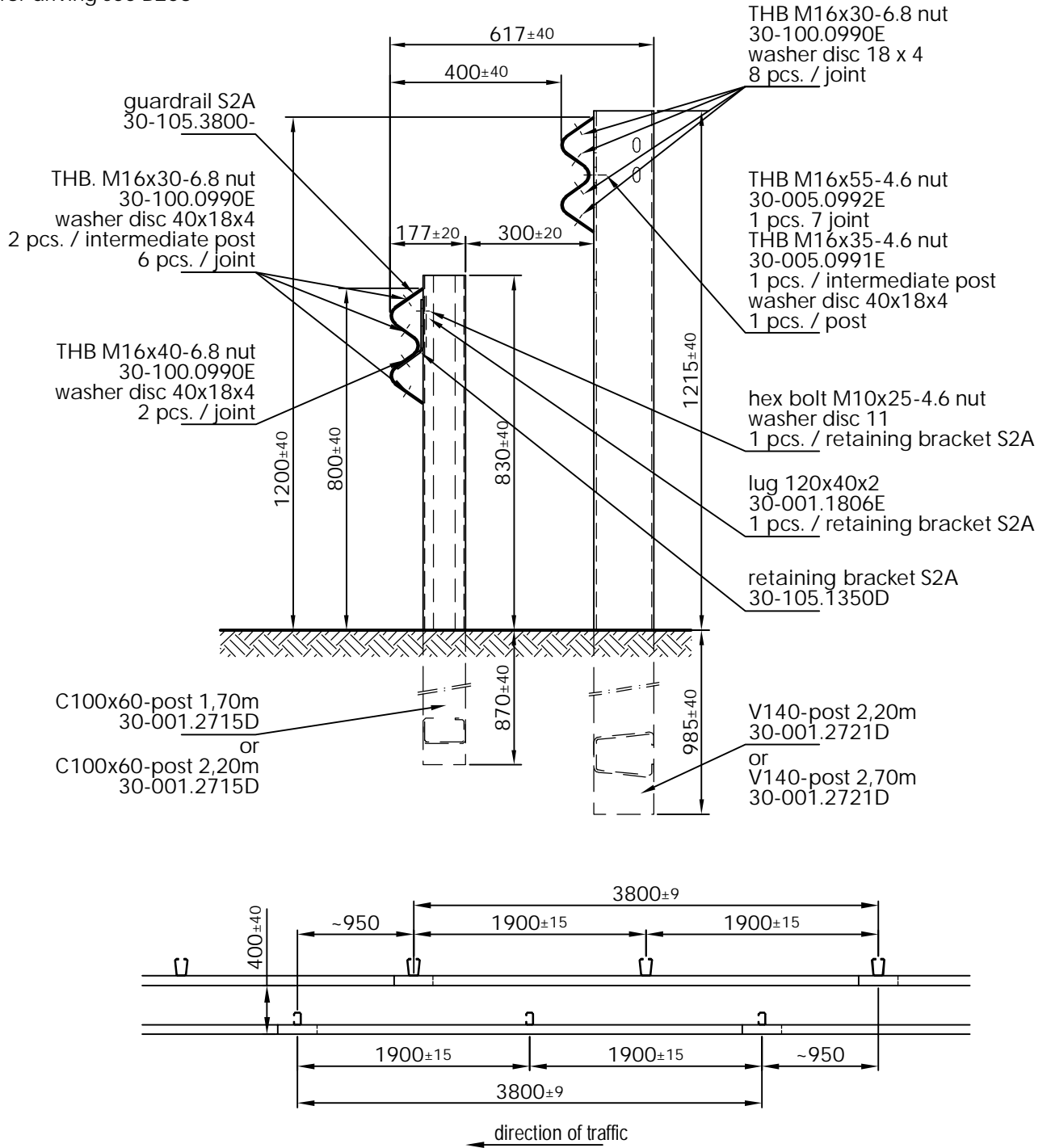
Vehicle barrier systems manufactured by voestalpine Krems Finaltechnik GmbH do not contain toxic or potentially hazardous materials.

KREMSBARRIER 2 RH3

Roadside Restraint System suitable for pile driving ground conditions

product specification sheet B202/2

for driving see B203



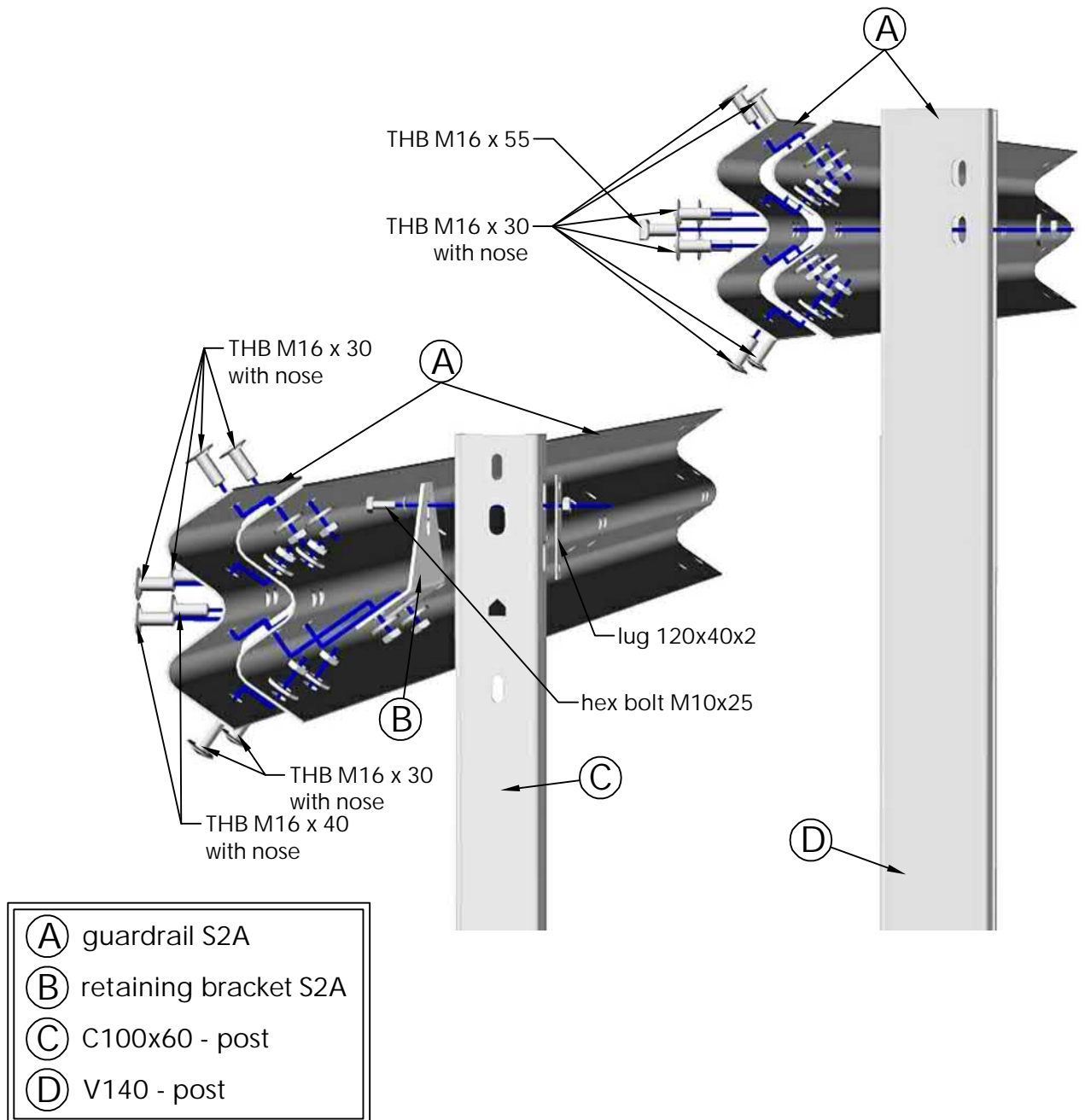
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KREMSBARRIER 2 RH3

Roadside Restraint System suitable for pile driving ground conditions

product specification sheet B202/3

installation drawing



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Parts list KREMSBARRIER 2 RH3

Road Restaint System suitable
for pile driving ground conditions



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 S2A 3,80	47,09	30-105.3800-	S355JO	acc. to EN ISO 1461
2	retaining bracket S2A	1,06	30-105.1350D	S235JR	acc. to EN ISO 1461
2	C100x60-post 1,70	13,16	30-001.2715D	S355JO	acc. to EN ISO 1461
2	V140-post 2,20 m	34,48	30-001.2721D	S235JR	acc. to EN ISO 1461
16	THB M16x30-6.8 with nose +nu	0,11	30-100.0990E	6.8	acc. to EN ISO 10684
2	THB M16x40-6.8 with nose +nu	0,13	30-100.0990E	5.6	acc. to EN ISO 10684
1	THB M16x35-4.6 +nut	0,14	30-005.0991E	4.6	acc. to EN ISO 10684
1	THB M16x55-4.6 + nut	0,17	30-005.0991E	4.6	acc. to EN ISO 10684
20	washer 40x18x4	0,03	30-001.0995E	100HV	acc. to EN ISO 10684
2	lug 120x40x2	0,10	30-001.1806E	S235JR	acc. to EN ISO 1461
2	hex bolt M10x25-4.6 +nut	0,04	ISO 4018	4.6	acc. to EN ISO 10684
2	washer 11	0,00	ISO 7091	100HV	acc. to EN ISO 10684

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