

Installation Manual Easy-Rail 2.00

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VOLKMANN & ROSSBACH GmbH & Co. KG
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1 General information

1.1 Preliminary notes

The Easy Rail 2.00 restraint system is made up primarily of the following elements:

- Guard rail beam profile A or B
- Posts C-100-60-25
- Support brackets
- Bolting material (see the parts list in Appendix 1)

which are then fitted together into a continuous stretch of guard rail.

In order that the declared performance of the original test report (ITT) can be achieved, assembly and installation are to be fulfilled exactly according to following requirements. In the case that there is a deviation from these requirements in the assembly and installation without consulting with the manufacturer, the liability for the defects of the building product is transferred from the manufacturer to the installation contractor.

In the case that the installation takes place in Germany, then it is independent of the surrounding temperature at the time of installation (except in the case of repairs). In regions where the minimum outside air temperature T_{min} according to EN 1991-1-5/NA is under -24°C , then installation is only to take place with the written consent of the manufacturer.

1.2 Manufacturer

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1.3 Intended Use

This product is a vehicle restraint system for installation on roads. Its purpose is the protection of non-involved persons or areas besides the road in need of protection. It also serves to protect oncoming traffic on a dual-lane road as well as protecting vehicle occupants in the case the vehicle leaves the roadway.

1.4 Storage and Transport

All guard rail construction parts are to be stored and handled in a technically correct manner. They are to be protected from dirt, corrosion and damage. Construction parts which are laid out for installation should be used within a short period of time. When shipping, the cargo must be securely fastened so that it does not shift. The personnel doing the shipping should be outfitted with personal protection equipment according to national regulations.

2 Technical data

Containment Level	N2	H1	L1
Class of Working Width	W3 ($W \leq 1.0$ m)	W4 ($W \leq 1.3$ m)	W4 ($W \leq 1.3$ m)
Dynamic Deflection	$D_N = 0.9$ m	$D_N = 1.2$ m	$D_N = 1.2$ m
Vehicle Intrusion	–	VI7	VI7
Installation Length	52 m	68 m	68 m
ASI value	A		
System Height	75 cm +/- 3 cm tolerance		
Driving depth	approx. 100 cm		
System Width	21.6 cm (A-profile) or 20.6 cm (B-profile)		
Post Center	2.00 m		
Weight per meter	19.9 kg (A-profile) or 18.9 kg (B-profile)		
Material	steel AMVR1 / S355JR		
Galvanizing of the steel and bolts	In accordance with EN ISO 1461 and EN 1179. For the beams alternatively: pre-galvanized material		
Expected durability	Approx. 20 years, shorter in the case of more severe atmospheric corrosion exposure		

3 Installation guidelines

3.1 General remarks

3.1.1 Place of installation

The system is a pile-driven guardrail system that has demonstrated the following performance classes in accordance with EN 1317-2:

- N2-W3-A
- H1-W4-A
- L1-W4-A

In choosing the place of installation the respective national regulations and the system performance, which resulted from the results of the crash tests according to EN 1317 (compare above: "technical data") are to be heeded.

According to regulations, the system can be used only if the available space behind the safety device is larger than the working width and / or is larger than the extremity lateral position of the vehicle on impact test according to EN 1317.

3.1.2 Limits of installation

General limits of installation cannot be specified because of varying local situations. Should the basic construction for any reason be deviated from because of the installation site, then

the required changes should always take place in agreement with the contractee and the manufacturer.

In the execution of the installation the general known rules of engineering are to be observed and adhered to.

3.1.3 Grounding

a. Soil class 1 and 2 in accordance with DIN 18300

The system is not suitable for this ground class and should not be installed under these conditions. An alternative would be to change the ground with suitable material.

b. Soil class 3 to 5 in accordance with DIN 18300

The system is suitable for this ground class and may be installed if the pile-driving time for each post does not exceed the times given in the table below and no deformation or damage to the heads of the posts occur, so that a flawless installation and functioning of the system is guaranteed. Damages to the hot dip galvanizing should be repaired in a technically correct manner. In the case that the posts are deformed or move from the correct position while pile-driving then proceed as in ground class 6/7.

System	Piling frame type	VR 100	VR 120	Hydraulic HRE 1000
	Power (Blows/min)	480	600	1000
	Energy (Nm)	420	480	770
EasyRail 1.33/2.00/4.00/6.00	Min	31 s	21 s	8 s
	Max	5,1 min	3,5 min	1,3 min
EasyRail OBB	Min	32 s	22 s	8 s
	Max	5,3 min	3,6 min	1,3 min
EasyRail XS 1.33/2.00/4.00	Min	21 s	15 s	6 s
	Max	3,5 min	2,4 min	0,9 min
EasyRail 3n	Min	19 s	13 s	5 s
	Max	3,1 min	2,2 min	0,8 min

c. Soil class 6 and 7 (DIN 18300) as well as with embedded cinder

In this case the post must be drilled. Posts needing to be shortened because of the condition of the ground may be undertaken only after written approval of the contractee and may not have a shorter pile-driven depth than 0,8 m.

Drilled holes are to be filled with appropriate material, followed by the pile-driving of the

posts. If necessary, bitumen material is to be used for the sealing of drilled holes. Embedding the post in concrete is not permitted.

When pile-driving hindrances are encountered, beyond the defined soil class, special arrangements need to be agreed upon.

3.1.4 Minimum installation length

The minimum installation length should be no less than 52 m for containment level N2 and no less than 68 m for containment level H1 and L1. Should the required tested length of the construction not be able to be met, the tested construction would then not meet the required system demands. With such a change of (shortened) construction, the construction in question should be agreed upon as a special onetime construction.

3.1.5 Permissible assembly temperatures

When the construction is taking place in Germany, it is not dependent upon the outside temperature at the time of the assembly. In regions where the minimum outdoor temperature T_{min} according to EN 1991-1-5/NA is under -24°C , the assembly may only take place with the written approval of the manufacturer.

3.1.6 Requirements for installation personnel

The construction is to be carried out exclusively by schooled and qualified personnel. The appointed installation team is to be led and watched over by a competent member with the appropriate expertise. Within Germany chapter 5.2.1 of ZTV-FRS 2013 applies. The installation personnel is to be equipped with their own personal protective gear according to the national requirements.

3.1.7 Control of the delivery / Labeling of the parts

The delivered system components are to be compared with the delivery note, examined for completeness, faults, damages at the construction site. Also the part lists in Appendix 1 are to be consulted.

Special components of the system (e.g. beams and posts) have the labeling mentioned in Appendix 2.

Damages, defects or wrong deliveries are to be reported immediately to the deliverer. Packaging material is to be disposed of according to the local rules and regulations.

3.1.8 Cable clarification

Before beginning construction, the contractor should be informed of the place and the running of cables, pipes, wires etc. In the area of the underground lines no pile-driving is allowed. It is also understood that the instructions of the cable owners are to be followed.

3.1.9 Traffic Safety

The construction zones are to be secured according to the requirements of the respective countries.

3.1.10 Personal protective gear or equipment

Protective and reflective clothing, according to the rules and regulations of the respective countries are to be worn at all times.

3.2 Installation

The installation of the system is to be carried out in general according to the diagram of the system in Appendix 3. The description in Appendix 4 can be referred to in relation to the installation process.

In the building up of stretches of the guard rails, damage to the galvanized surfaces are to be avoided. When setting the posts always use a post protection attachment. Hitting galvanized surfaces directly with a hammer is not permitted.

Small defects on the galvanized surface are to be touched up after careful preparation through the application of a suitable zinc dust coating according to EN ISO 1461.

With the installation (new and rebuilt), as well as with repair work on guard rail construction, only new bolting materials are to be used.

3.2.1 Installation heights in differing situations

The installation height averages as a rule 75 cm +3 cm. The installation height is measured from the top edge of the driving surface, when the distance between the front edge of the system and edge of the solid driving surface is not larger than 0.6 m and slope of the side area is not more than 12%. In the case that the distance between the front edge of the system and the edge of the solid driving surface is greater than 0.6 m, or if the shoulder has an inclination of more than 12%, the installation height is to be calculated directly from the system at the place of installation.

Curbs with a height difference of more than 7.5 cm are to be avoided. In the case that higher curbs already exist and cannot be removed, then the system can be adjusted locally as a untested special construction.

Proceed in the process as follows:

If at all possible place the system so that the front edge of the beam runs flush with the front edge of the curb. The installation height is then to be correlated to the top edge of the driving surface. With a distance > 30 cm to the front edge of the curb correlate the height of the guard rail beam to the top edge of the curb height.

Installation heights that differ from the given values should be coordinated with the contractee

and require the written consent of the manufacturer.

3.2.2 Posts

The posts are to be inserted in the ground with an air or hydraulic pile driver and an appropriate striking attachment. The pile driver needs to have sufficient power or as the case may be enough driving pressure.

The posts are to be driven in vertically. Deviations of up to 7 cm on each side of the post over the area are permissible. In the case that there are objects in the ground that hinder the driving (e.g. rocks, roots etc.) it can happen that individual posts may become quite out of line or be twisted. If this should be the case with more than 20% of the posts, the corresponding soil class 6 and 7 procedure must be used to drill.

All posts have to be put with the closed side towards traffic.

The designated post distance (see Chapter 2 "Technical Data") may not be exceeded. In the case that a post cannot be set at the designated place because of adverse conditions at the construction site (cables, shafts, tunnels, tree roots, and the like) then it is to be set in the shortest possible distance from the designated position and an additional post is to be driven in the next "field".

3.2.3 Fittings

For a proper connection to be achieved, the screws should be set perpendicular in the connecting construction parts and are to be tightened according to regulations. The drilling tools need to be adjusted accordingly. When tightening the nuts, a washer should be placed under each nut to protect the zinc surface. Fishplates must not to be used to substitute washers.

For torques see the following table:

<i>Item No.</i>	<i>Bolt</i>	<i>Torque</i>
040.00	HRK (button head) Bolt with Nib M 16x27, 4.6 incl. Nut	70-140 Nm
040.01	HRK (button head) Bolt with Nib M 16x40, 4.6 incl. Nut	70-140 Nm
040.04	HRK (button head) Bolt with Nib M 16x45, 8.8 incl. Nut	70-140 Nm
040.40	Hex-head Bolt M 10x25, 4.6 incl. Nut	10-17 Nm (hand-tight)
040.43	Hex-head Bolt M 10x55, 8.8 incl. Nut	10-17 Nm (hand-tight)
040.43-2	Hex-head Bolt M 10x60, 4.6 incl. Nut	10-17 Nm (hand-tight)
040.54	Hex-head Bolt M 10x45, 8.8 incl. Nut	10-17 Nm (hand-tight)
040.54-1	Hex-head Bolt M 10x60, 8.8 incl. Nut	10-17 Nm (hand-tight)

The required tools for bolting are suitable socket wrenches or screw wrenches.

3.2.4 Support brackets

Spacers are generally to be built in perpendicular to the guard rail beams. Where by variances of possible shifting within the slots in the guard rail beams are permitted.

3.2.5 Beams

Beams with either profile A or B may be used. Where the beams connect, the overlap in principle is to be in the direction of traffic.

3.3 Deviations from the basic construction

The system is a straight running guard rail along level ground that has been tested according to EN 1317. Should there be a need to deviate from the basic construction in some way because of local conditions; this can only be done as an untested special construction that does not have the same qualities as the tested system. In any case this requires the approval of the contractee and the manufacturer.

In the execution of the installation the general known rules of engineering are to be observed and adhered to. Changes, which clearly lead to impairments to the functioning of the guard rail system are to be avoided.

In the case that subsequent work on the guard rail parts is necessary; no deviations from the standard parts should be performed, which could impair their way of functioning. This especially applies to the making of fitted parts (hole spacing, hole diameter, number of bolts, overlapping) and the shortening of posts. Cut edges are to be protected from corrosion with sufficient cold zinc coating

3.3.1 Fitted pieces

In order to make the length of the guard rail in accordance with local conditions, it may be necessary to install beams which are shorter in length than the standard building parts. These fitted pieces can be cut at the work site.

The following requirements are to be observed:

- Minimum length of 750 mm (profile overlapping 300 mm minimum)
- No exceeding of the given post spacing of the guard rail construction when installing.
- Cutting to length with a cutting machine or saw in a technically correct manner
- Drilling the holes of the bolt connections in a technically correct manner
- Touching up of the cut surfaces and the drilled holes of the bolt connections through the application of suitable zinc dust paint.

The installation of such fitted parts is to be reduced to a minimum. Only in exceptional cases (e. g. between two bridge structures) should fitted parts be installed.

In the case of particular building measures in medians such as vehicle crossings, tunnels or

bridge structures, transitions to concrete barriers, etc. more than 1- 2 fitted parts between such measures should not be used.

The same applies to bridge structures. In this case, a maximum of 1 fitted part per stretch between 2 roadway crossings should be made. It is to be noted here that the guard rail beam expansion joints may in no case be shortened.

In the case of maintenance and repair work it should be attempted to be done without any fitted parts, even when an increased effort for the mounting and dismounting of the undamaged connection ranges arises because of this.

Construction parts are only to be changed using drills and cutting machines in a technically correct manner. Work on the construction parts using welders, cutting devices, mandrel and striking and bending tools are not permissible.

3.3.2 Use of radii

With the installation of radius beams it should be heeded that they are built in without tension.

In the case of curves with radii < 30 m pre-bent beams (so-called radii beams) must be used. Radii beams are available in increments of 2.5 m:

25 m – 22.5 m – 20 m – 17.5 m – 15 m – 12.5 m – 10 m – 7.5 m – 5 m – 2.5 m

Convex radii beams should be used for outside curves and concave for inside curves. It is not permissible to bend the guard rail beams during installation at the work site to the point that permanent deformation occurs.

Especially with concave radii beams (inside curves) care must be taken, that the edge overlapping is not far apart when bolting together. It is recommended, that the edge overlapping is first bolted together and then afterwards fastening the beam to the spacers. Enlarging the holes, e. g. by means of reaming is not permissible.

Basically tight radii beams have to do with untested special constructions, which do not have the same characteristics as the tested guard rail system. In this case it is definitely necessary to obtain the permission of the contractee and the manufacturer.

3.3.3 Use of deviations

Deviations with an inclination of 1:20 – in exceptional cases of 1:12 – are permissible. When the beginning of the guard rail stretch occurs in the area of an ascending slope, the system can be shifted to the side and if an installation height not exceeding 85 cm is taken into account it can be embedded into the slope.

This also applies to a stretch of guard rail in the transition area in section/embankment. At the same time the designed post spacing (see Chapter 2 "Technical Data") must not be exceeded.

In the case that deviations need to be implemented on the basis of national regulations, then these national regulations take effect.

3.3.4 Additional attachments

Additional attachments may affect the performance of the system and therefore should not be installed. Particularly traffic sign must not be mounted directly to the system.

In any case additional attachments require a written approval of the manufacturer. Permission is deemed granted for the following attachments, provided that a loss of performance can be excluded:

- Attached guide posts, which can be mounted on posts.
- Attached guide posts, which can be mounted together with the joint-bolting on the beam. Deviating from the drawings the bolt M 16x45 HRK (button head) with nib must be used at that place instead of the bolt M 16x30 HRK (button head) with nib.
- Traffic signs, as long as no dangers come about because of them.
- Guard rail reflectors, which are attached to the beam with HRK (button head) bolts at the middle punched hole.
- Guard rail post sheathings according to TL-SPU

For the mounting of additional attachments (e.g. anti-glare shield, underride protection, etc.) a written consent of the manufacturer is required.

The attaching of traffic signs is not permitted. Traffic signs may be erected within the area of work, as long as on impact they bend over or break off.

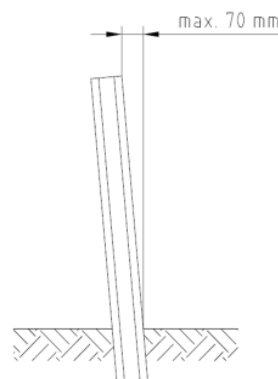
3.4 Controls, self-monitoring reports, installation tolerances.

After installation the construction is to be tested with the aid of the general known rules of engineering and the self-monitoring reports in Appendix 5 in agreement with this manual. Adherence to staying within tolerances of installation should be particularly taken into account.

Compliance to installation tolerances, the fixed position of the bolted joints and the technically correct alignment of the stretches of guard rails are in particular to be heeded.

The installation tolerances are as follows:

<i>Measurement</i>	<i>Tolerance</i>
Spacing of the posts lengthwise	$\pm 21 \text{ mm}$
Deviation of alignment of posts or beams	$\pm 70 \text{ mm}$ (see sketch)
Deviation of top edge of beam vertically	$\pm 30 \text{ mm}$



3.5 Repair, inspection and maintenance

As a basic principle all guard rail parts are to be replaced, which show obvious (plastic) permanent deformation.

When the parts of a considered stretch of guard rail are out of alignment up to approx. 30 cm, but not permanently deformed, then an alignment of the guard rail construction should be made.

In doing so corresponding and enlarged postholes are to be filled and sufficiently packed.

When damaged guard rails parts are replaced, special care must be taken when working in areas connected to the undamaged beams.

The beams remaining after removal may not be damaged (e.g. through the use of an angle grinder, mandrel or a hammer). Due to temperature determined length changes or larger sags from difficult drives to the building site, lengthwise hole patterns often do not coincide when connecting new beams with existing guardrails.

In the case that the distance between hole axes amounts to less than 5 cm, then the difference can usually be compensated for by the loosening of the bolts with several strikes. Otherwise proceed as follows.

As a general rule when repairs are undertaken in lower temperatures, the new beams are too short. The installation length between the post axes is greater than 4.00 m (e.g. 4.07 m), that is the overlapping amounts to less than 30 cm. This is not permissible.

As a result two fitted beam pieces must be cut in order to obtain an overall installation length > 4.00 m. (Example. 2.00 m + 2.07 m = 4.07 m). An additional post then needs to be set in order to not exceed the maximum spacing of the posts.

In the case of high temperatures or bigger sags the overlapping of the beams is as a general rule greater than 30 cm. In this case no fitted pieces need to be made. Instead new holes need to be drilled. This, however, is only permissible when the spacing between the new outer edges and the drilled holes is 40 mm or more.

As a basic principle however both fitted pieces and the drilling of new holes should be avoided, even when it means an additional effort through the removal or installation of adjoined sections.

Enlarged postholes in the shoulder of the road must be so packed that the newly rammed post is sufficiently stable. In the case that several damages at the same place due to accidents have occurred, then when necessary either the shoulder must be newly fortified or an additional post must be mounted if it is needed. This should be done in consultation with the contracting authority.

3.6 Reusability of guard rail parts

In the case of refitting and/or building alterations guard rail parts may be reused if:

- the building parts show no visible deformations and/or damages (e.g. torn out, reamed out or burned out holes)
- the zinc layer of hot-dip galvanised parts is 30 µm or more. Other zinc layers must show at least 50% of their original thickness.
- at labelled parts, the manufacturing identification and the test period identification can be clearly seen.

Materials for mounting (bolts, nuts, washers, Fishplates, connecting plates) that have already been built in at one time, may not be reused. New materials should always be used for installation. When repairing damages due to accidents only new materials may be used.

Construction parts that cannot be used any more, e.g. the cutting off of or the breaking up of parts, should be made unusable. So, too, the utilization of dismantled bolting materials should be applied to the corresponding national regulations.

3.7 Disposal / Recycling

Damaged building parts and building parts that cannot be used, are to be subjected completely to utilization / recycling or be installed in other areas of use (for example: farming, solar standing supports, private business)

3.8 Data for toxic substances

The individual guard rail components consist of 2 main building substances:

- steel
- zinc (hot dip galvanizing)

Both components are not toxic and are not in need of any special treatment or operation.

For on-site installation auxiliary substances are needed for the operation of machines and tools. For example these could be:

- diesel (e.g. compressor)
- pneumatic oil (e.g. operation of air pressure tools)
- gasoline (e.g. cutting off machine)
- grease or cutting paste (for the drilling of holes in guard rail parts)

In these cases the relevant data from the manufacturer and the requirements of the individual countries should be considered and heeded to.

3.9 Miscellaneous information

Because of its low height of 75 cm the system can be stepped over without any problem. Consequently there is no need to mount anything to assist in stepping over.

Appendix 1 - Parts List (4 m Section)

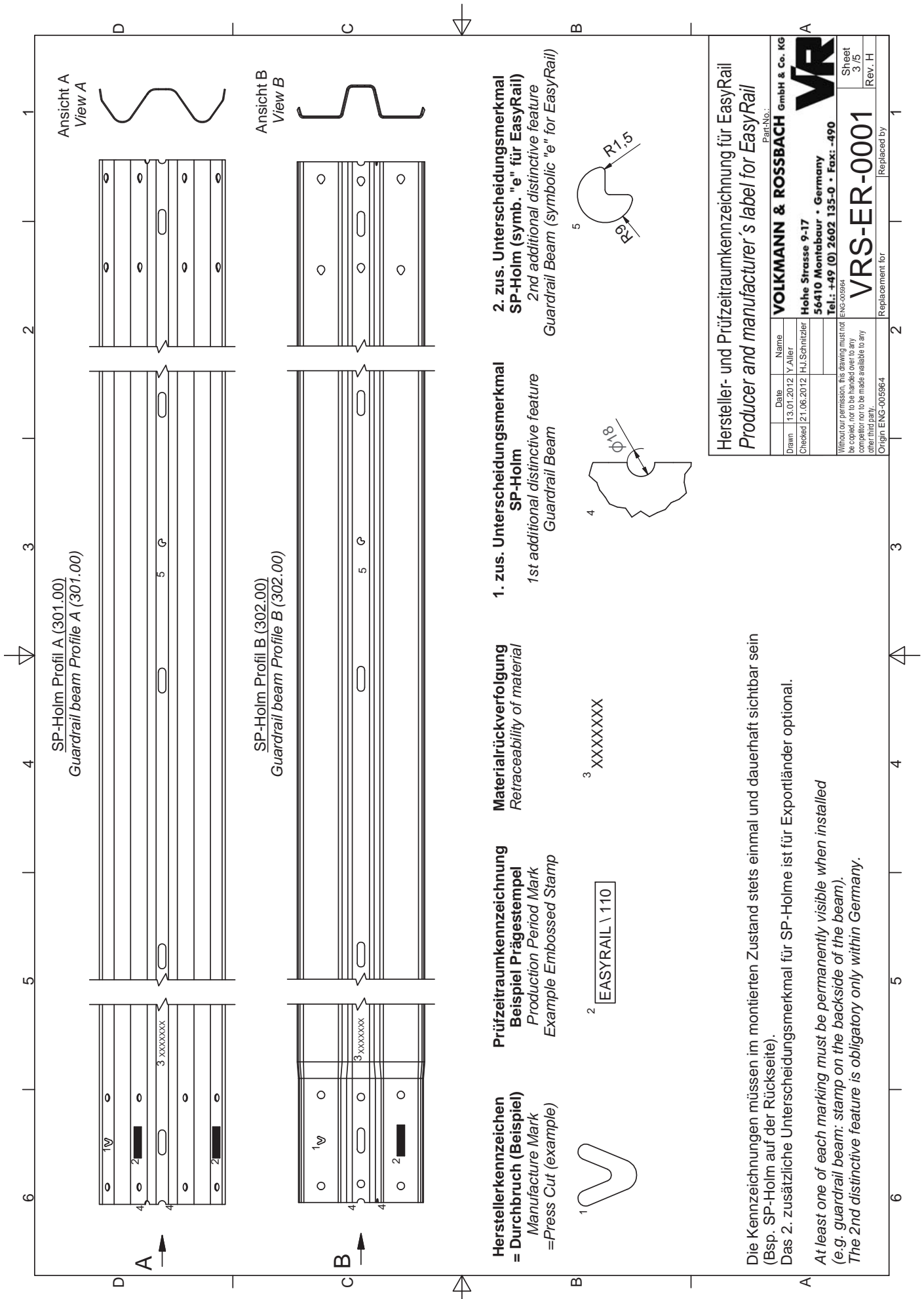
Easy-Rail 2.00, A profile, driven posts

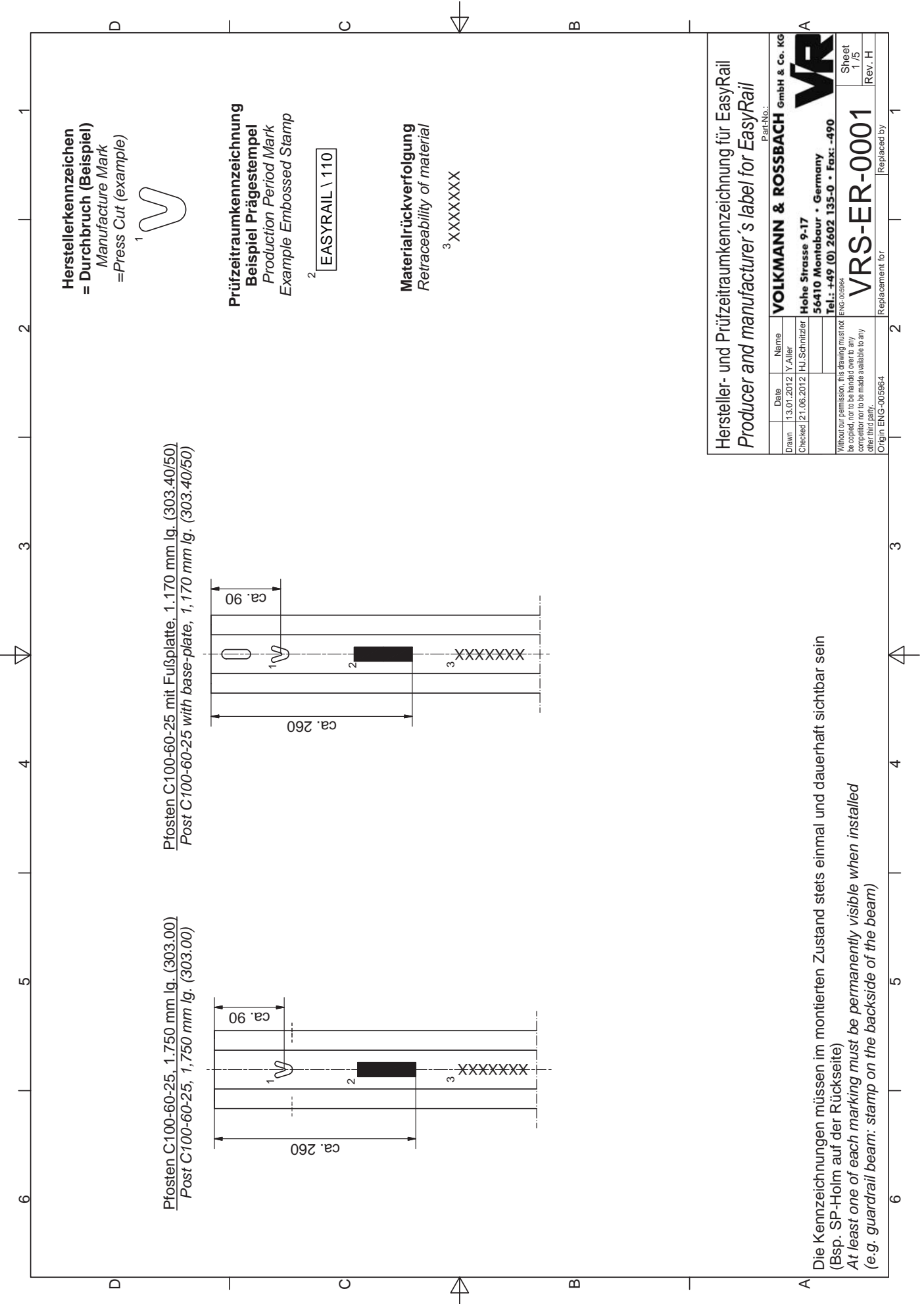
Qty./4m	Order No.	Item	Weight
2	010.10	Fishplate M 10	0.200 kg
8	040.00	HRK (button head) Bolt with nib M 16x27, 4.6 incl. Nut; ISO 4032-5	0.100 kg
8	040.30	Washer Ø 18, DIN 126	0.010 kg
2	040.43-2	Hex head Bolt M 10x60 Mu, 4.6	0.050 kg
2	040.60	Washer Ø 11, DIN 126	0.004 kg
1	301.00	Safety Barrier Beam, A profile, t=2.5mm	37.000 kg
2	303.00	Post C-100-60-25, 1.750 mm	16.500 kg
2	304.00	Support Bracket, A profile, 6° inclination	1.200 kg

Easy-Rail 2.00, B profile, driven posts

Qty./4m	Order No.	Item	Weight
1	010.10	Fishplate M 10	0.200 kg
6	040.00	HRK (button head) Bolt with nib M 16x27, 4.6 incl. Nut; ISO 4032-5	0.100 kg
6	040.30	Washer Ø 18, DIN 126	0.010 kg
2	040.43-2	Hex head Bolt M 10x60 Mu, 4.6	0.050 kg
2	040.60	Washer Ø 11, DIN 126	0.004 kg
1	302.00	Safety Barrier Beam, B profile, t=2.5mm	37.000 kg
2	303.00	Post C-100-60-25, 1.750 mm	16.500 kg
2	304.10	Support Bracket, B profile, 6° inclination	1.200 kg

Appendix 2 - Marking of Parts



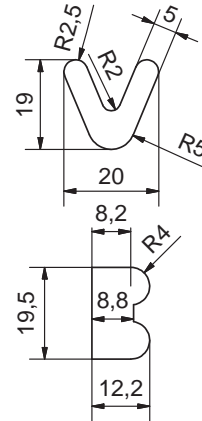


Freigegebene Hersteller und Herstellerkennzeichen für EasyRail

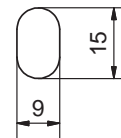
Approved producer and manufacture labeling for EasyRail

Stand/date: 24.07.2012

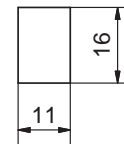
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56410 Montabaur



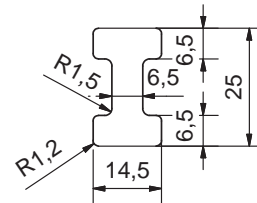
BBV Baustahl und Blechverarbeitungs-
gesellschaft mbH & Co. KG
Am Lokwerk 11
14774 Brandenburg



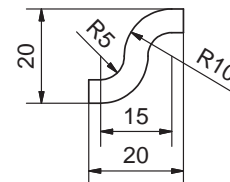
KFS Kirchmöser Formstahl GmbH
Am Lokwerk 11
14774 Brandenburg



ERWIN PEETZ GmbH & Co. KG
Finkenstrasse 14
57368 Lennestadt



ISKOOR Metals & Steel Ltd.
Industrial Area B
P.O. Box 555
Ramla 72104
Israel



SPIG Schutzplanken-Produktions GmbH
Schmelzer Straße 7
66839 Schmelz-Limbach

Hersteller- und Prüfzeitraumkennzeichnung für EasyRail
Producer and manufacturer's label for EasyRail

Part-No.:

Date	Name
13.01.2012	Y.Aller
21.06.2012	H.J.Schnitzler

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Origin ENG-005964

ENG-005964

VRS-ER-0001

Sheet

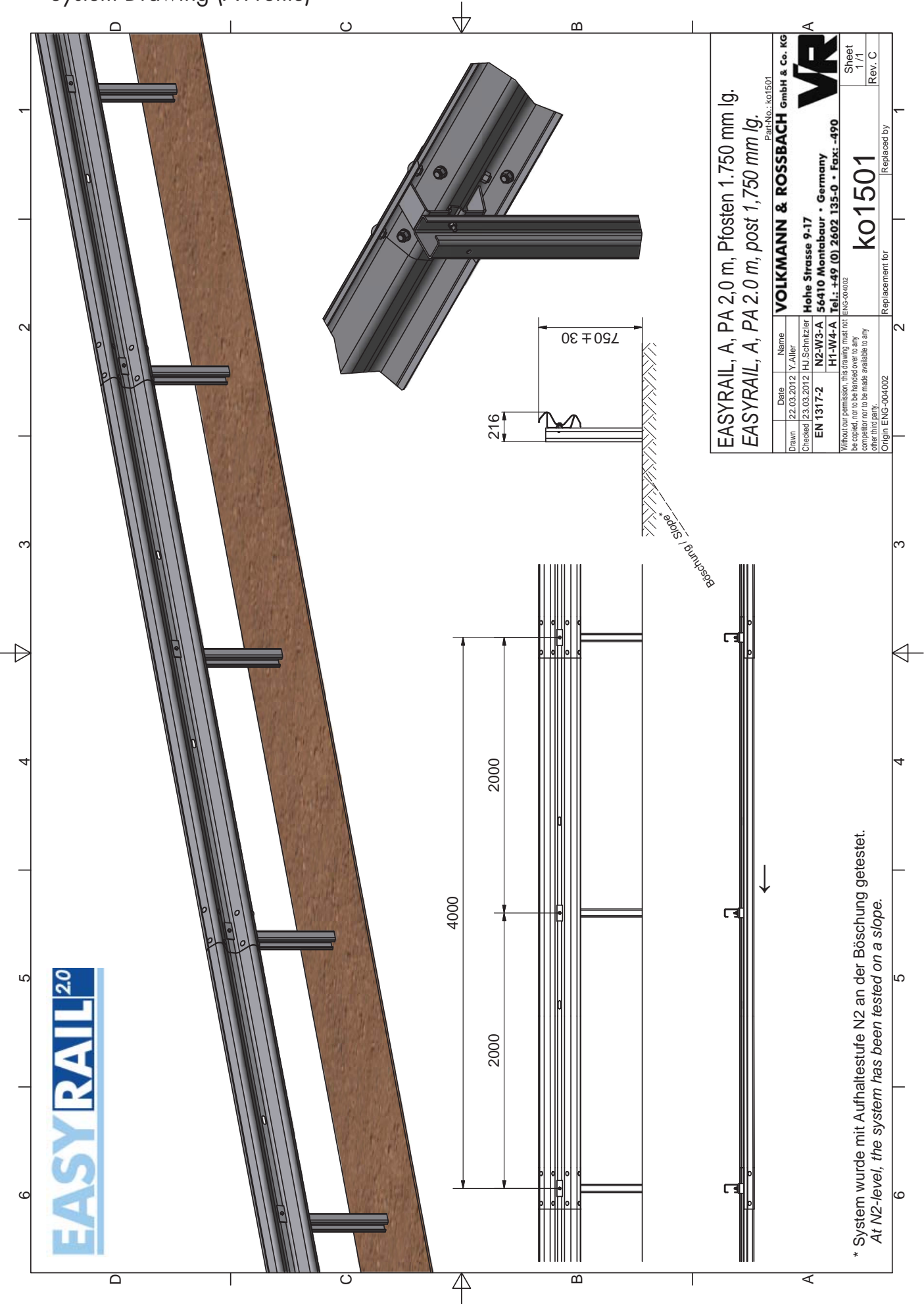
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Rev. H

Replacement for

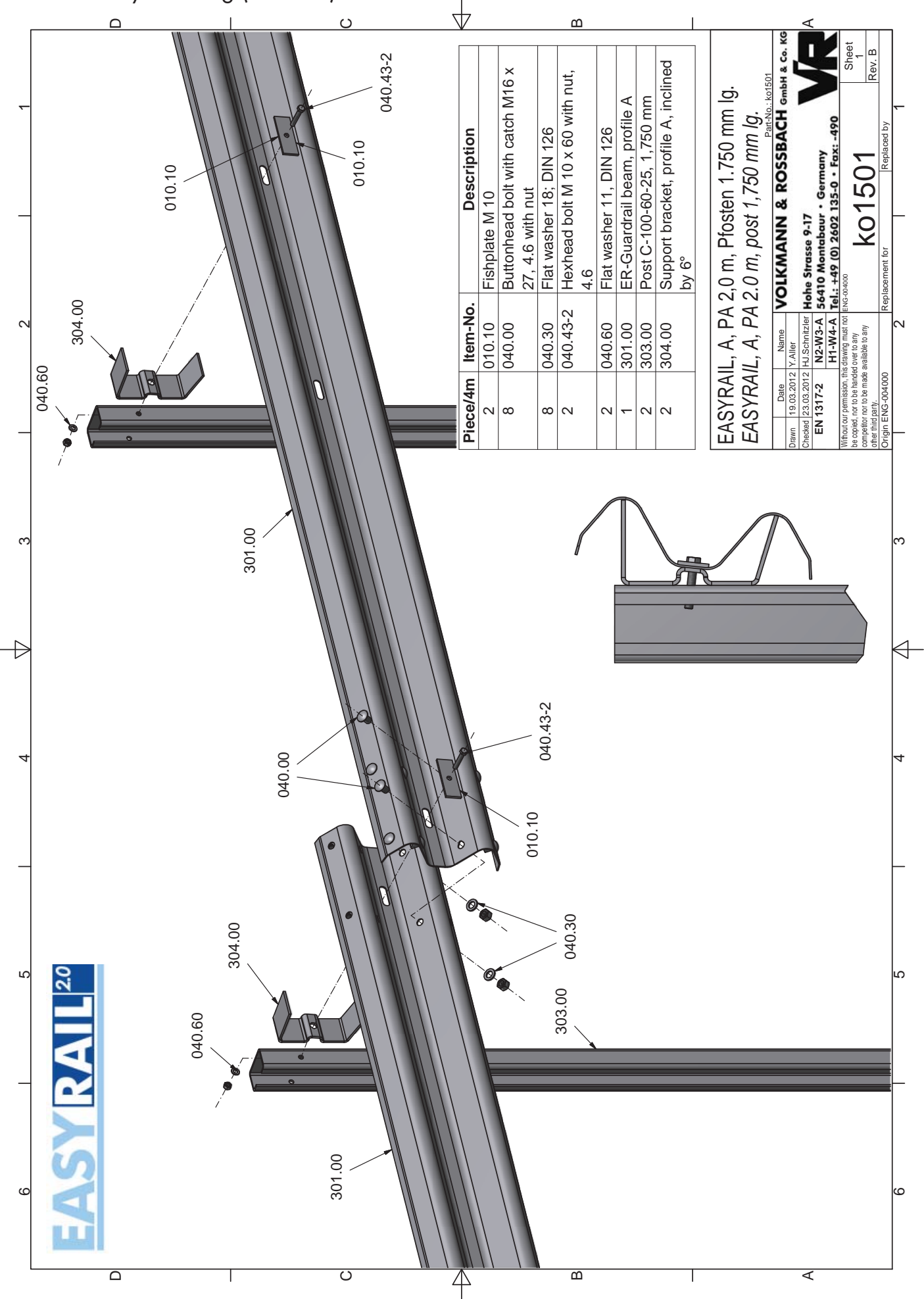
Replaced by

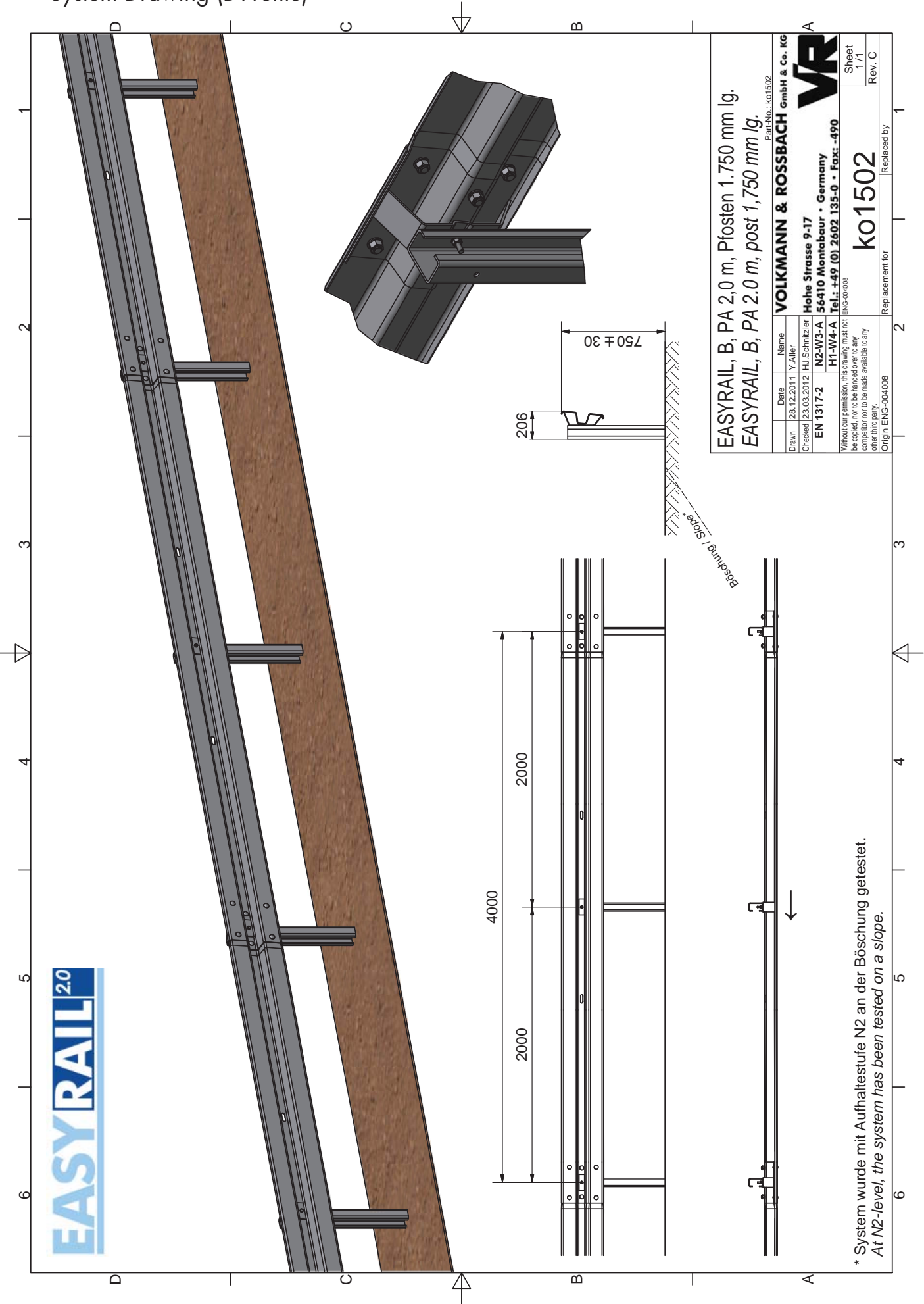
Appendix 3 - Drawings
System Drawing (A-Profile)



EASYRAIL, A, PA 2,0 m, Pfosten 1.750 mm lg. EASYRAIL, A, PA 2,0 m, post 1,750 mm lg.			
Drawn	22.03.2012	Y. Aller	Part-No.: ko1501
Checked	23.03.2012	H.J. Schrittzler	
EN 1317-2	N2-W3-A	H1-W4-A	
Without our permission, this drawing must not be copied, nor to be handed over to any competitor nor to be made available to any other third party.			
Origin ENG-004002			Replaced by
ko1501			Sheet 1/1
Replaced by			Rev. C

* System wurde mit Aufhaltestufe N2 an der Böschung getestet.
At N2-level, the system has been tested on a slope.

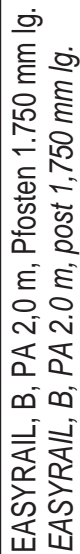




EASYRAIL, B, PA 2,0 m, Pfosten 1.750 mm lg.
EASYRAIL, B, PA 2,0 m, post 1,750 mm lg.

Drawn	28.12.2011	Y. Aller	EN 1317-2	N2-W3-A	H1-W4-A	Without our permission, this drawing must not be copied, nor to be handed over to any competitor nor to be made available to any other third party.	Origin ENG-004008	Replacement for	ko1502	Replaced by	Sheet 1/1	Rev. C
Checked	23.03.2012	H.J. Schützler	EN 1317-2	N2-W3-A	H1-W4-A	Without our permission, this drawing must not be copied, nor to be handed over to any competitor nor to be made available to any other third party.	Origin ENG-004008	Replacement for	ko1502	Replaced by	Sheet 1/1	Rev. C
VOLKMAN & ROSSBACH GmbH & Co. KG												
Hohe Strasse 9-17												
56410 Montabaur • Germany												
Tel.: +49 (0) 2602 135-0 • Fax: +49 2602 135-10												
Part-No.: ko1502												
VR												

* System wurde mit Aufhaltestufe N2 an der Böschung getestet.
At N2-level, the system has been tested on a slope.



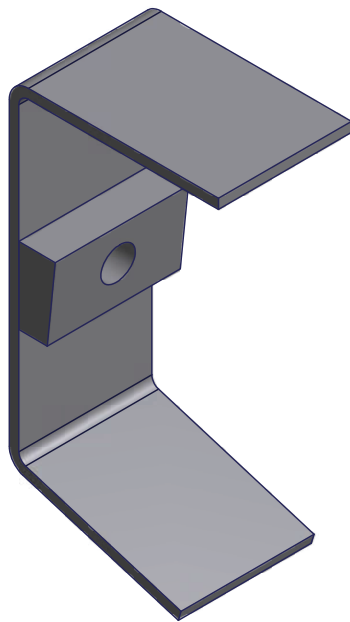
Piece/4m	Item-No.	Description
2	010.10	Fishplate M 10
6	040.00	Buttonhead bolt with catch M16 x 27, 4.6 with nut
6	040.30	Flat washer 18; DIN 126
2	040.43-2	Hexhead bolt M 10 x 60 with nut, 4.6
2	040.60	Flat washer 11, DIN 126
1	302.00	ER-Guardrail beam, profile B
2	303.00	Post C-100-60-25, 1,750 mm
2	304.10	Support bracket, profile B, inclined by 6°

EASYRAIL, B, PA 2,0 m, Pfosten 1.750 mm lg.
EASYRAIL, B, PA 2,0 m, post 1,750 mm lg.

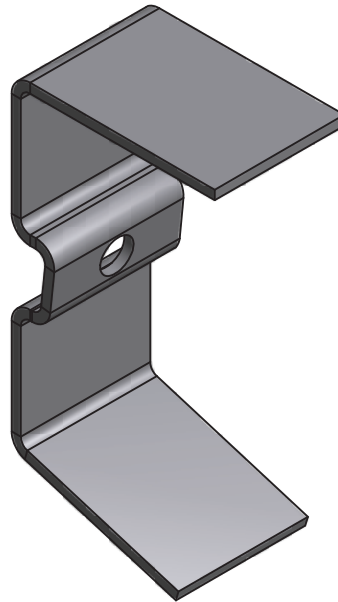
Part No.: ko1502		VOLKSMANN & ROSSBACH GmbH & Co. KG	
Date		Name	
28.12.2011		Y. Aller	
Checked		H.J. Schmitzlor	
Drawn		N2-W3-A	
23.03.2012		H1-W2-A	
EN 1317-2		H1-W2-A	
Without our permission, this drawing must not be copied, nor to be handed over to any competitor nor to be made available to any other third party.			
Replacement for		Sheet 1	
Origin: ENG-004/006		Rev. B	
Replaced by		ko1502	

Easy-Rail Support Brackets are available in two versions. Both versions can be used equivalently.

1. Support Bracket No. 304.00 for A-Profile, 6° inclination

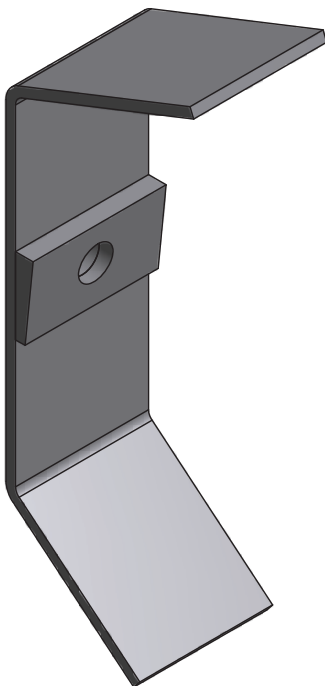


Version 1

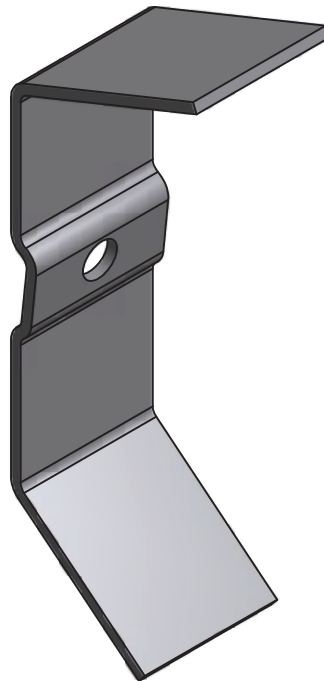


Version 2

2. Support Bracket No. 304.10 for B-Profile, 6° inclination



Version 1



Version 2

Appendix 4 - Assembly Instructions *

Assembly of the components according to the drawings of Appendix 3.



1. Test Track pre installation



2. Laying out the beams



3. Aligning beams ...



4. ... for piling frame



5. Laying outposts and brackets



6. Preparing of pile driver

* Sample System: Easy-Rail 1.33 (Post Distance 1.33m)



7. Driving posts into ground



8. Pre Mounting brackets and beams



9. Mounting of system step by step



10. completed EASY RAIL



10. Connection details



11. Rear side of system

Appendix 5 - Form for Internal Quality Control

Self Monitoring Report – EasyRail

Customer	Contractor (Stamp)
Project-Nr.	
Work Site	
Vehicles	

Team Leader	Team Member 2
Team Member 3	Team Member 4
Team Member 5	Team Member 6

No.	Achievement /Product	Linear Metres	Pieces	Hours
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Consecutively use these marks: + = ok, o = not ok, - = not inspected

<input type="checkbox"/> All system parts installed according to manual?	<input type="checkbox"/> Beam joints overlapping in direction of traffic? Overlapping 30 cm minimum (fitting parts)?
<input type="checkbox"/> Closed side of posts to traffic? Post distance correct?	<input type="checkbox"/> Support brackets installed with correct orientation?
<input type="checkbox"/> All fishplates installed?	<input type="checkbox"/> All screws and washers installed? Screwing torques correct?
<input type="checkbox"/> Minimum lengths of fitting parts 750 mm?	<input type="checkbox"/> Minimum distance of drilled joint holes to beam end 40 mm? Minimum diameter of drilled holes 18 mm?
<input type="checkbox"/> No posts shortened? None of the existing holes widened?	<input type="checkbox"/> System aligned laterally and heightwise?
<input type="checkbox"/> System identification stickers put (where required)?	

Name and Signature Contractor	Name and Signature Customer
-------------------------------	-----------------------------