



GAB Spor bilag 0-9

Anvendelsesbetingelser for kabeltrugsvelle

banedanmark





GAB Spor Bilag 0-9
Anvendelsesbetingelser for
kabeltrugsvelle
Version 1

LMMG
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Rapportskabelon 1.0

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GAB Spor bilag 0-9

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1 Anvendelsesbetingelser for kabeltrugsvelle

1.1 Anvendelsesområde

Bilaget omfatter krav til anvendelsesområde og udførelseskrav for kabeltrugsvellen iht. Banedanmarks komponenttegninger:

Kabeltrugsvelle for UIC60 1:40,	tegningsnummer log 60.01.7001, af 16.04.2015
Kabeltrugsvelle for UIC60 lodret	tegningsnummer P0023330 af 11.01.2016
Kabeltrugsvelle for DSB45 1:20	tegningsnummer P0023332 af 11.01.2016
Kabeltrugsvelle for DSB45 lodret	tegningsnummer P0023331 af 11.01.2016

(Banedanmarks versionsdatering).

Krydsende kabler, som ikke tillades ført i skærvelag iht. BN1-13, skal som udgangspunkt føres på tværs af spor i underført trækkerør iht. BN1-13. Trækkerøret kan etableres ved gravning ifm. etablering af ny sporkasse, eller det kan etableres ved opgravningsfri underføring som f.eks. styret underboring. Der ønskes ikke etableret tværgående trækkerør ved gravning/sugning af tværgående render.

Hvor særlige forhold gør sig gældende kan kabeltrugsvellen anvendes som alternativ til et underført trækkerør. Særlige forhold kan f.eks. være:

- Fysisk besværlige eller umulige forhold for etablering af bore- og modtagegrube for opgravningsfri etablering. F.eks. ved dobbeltsidige stejle dæmninger, op imod bygværker, i spormellemrum uden plads o.lign.
- Sporspærringsmæssigt vanskelige eller umulige betingelser for etablering af opgravningsfri underføring.
- Anvendelse ved et eksisterende tværgående kabeltrace i skærvelaget, hvor driften af kablerne ønskes opretholdt under etablering af en tværgående føringsvej. Her muliggør kabeltrugsvellen at føringsvejen etableres uden kapning af kabler.
- Uforholdsmæssigt høje anlægskostninger eller kontraktuelle omkostninger ved etablering af underført tracé. Til orientering oplyses, at alene *indkøbs*prisen for en kabeltrugsvelle er over kr. 10.000,- (2016).

Hvor sådanne særlige forhold er til stede, kan projekterne vælge at anvende kabeltrugsvellen. Anvendelsen godkendes igennem Banedanmarks proces for faglig ledelse spor.

Kabeltrugsvellen tillades anvendt til kabler med diameter op til 60 mm, dog tillades den *ikke* anvendt til følgende kabeltyper:

- Fødekabler til kørestrømsanlægget
- Returstrømskabler til kørestrømsanlægget
- Backbone / FTN fiberkabel
- Togforvarmekabler (1000/1500 V)
- Gamle kabeltyper med blykappe

1.2 Anvendelses- og indbygningskrav

Der skal anvendes en udgave af kabeltrugsvellen, der har samme skinnehældning som findes på de omkringliggende sveller.

To kabeltrugsveller må ikke indbygges tættere på hinanden i samme spor end 15 m.

Kabeltrugsveller må ikke indbygges med andre typer stålsveller som nabosveller.

Der skal være mindst 2 normalsveller mellem kabeltrugsvelle og isolerklæbestød eller laskepladesamling.

De tre dækplader på kabeltrugsvellen skal males i signalgul inden indbygning. Pladen/prægningen på midterdækpladen, som angiver tilspændingsmomenter, skal afdækkes under malingen.

Kabeltrugsvellen skal monteres med gummiformstykker i enderne og gennemførte føringsrør. Føringsrør skal leveres med ca. ½ m overlængde ved begge svelleender, så det kan føres ind i tilsluttende kabelrende og beskytte kabler i overgangssnittet. I den færdige installation skal føringsrør være ført ca. 0,2-0,4 m ind i kabelrenden.

Fra kabeltrugsvellens afslutning føres i ret forlængelse en tværgående kabelrende, hvori kabeltracéen fortsættes. Kabelrenden skal være nedfældet i skærvelag/terræn for ikke at udgøre en snublegenstand, og skal fortsættes ud til langsgående kabelrende, hvis en sådan findes. Hvis en langsgående kabelrende ikke findes, fortsættes den tværgående kabelrende ud af skærveprofilet eller højst 1,5 m fra svelleende.

Ved trækning af kabler etableres et lille plus (overlængde) i den tværgående kabelrende.

Samling og indbygning af kabeltrugsvellen skal ske i overensstemmelse med leverandørens beskrivelse, se leverandørbilag 2.

Sporbeliggenhedsmæssigt skal kabeltrugsvellen ved indbygning betragtes som en normalsveller, dvs. der er samme krav til stopning og sporbeliggenhed efter indbygning som ved enhver anden svelleudveksling.

Den færdigindbyggede kabeltrugsvelle indmåles med GPS-koordinater i UTMS-koordinatsystemet. Opmålingsdata afleveres som en del af som udført dokumentationen sammen med angivelse af den pågældende kabeltrugsvelles type, produktionsår og støbedato, som er stemplet i bunden af truget (aflæses inden indbygning).

Leverandørbilag 1: Produktbeskrivelse (på engelsk)

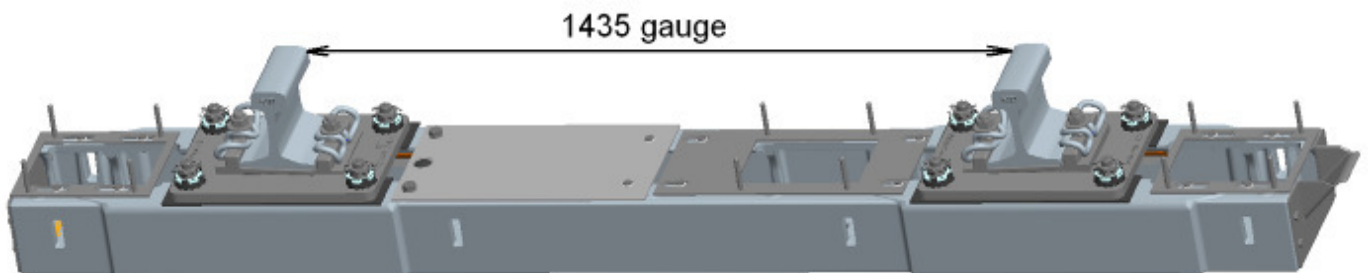
Leverandørbilag 2: Samlings- og indbygningsbeskrivelse (på engelsk)

**SCHWIHAG's hollow
sleepers (SKS) for tracks
S 49, S 54, UIC 60**

**for
Cable Crossings**



**for
Control and Safety Systems
(e.g. detection of hot boxes and jammed axles)**



..... **BRIEF DESCRIPTION**

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..... **BRIEF DESCRIPTION**

Imprint:

Document Brief description: SCHWIHAG's hollow sleepers (SKS) for tracks

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Subject to change without notice Schwihag AG has made every reasonable effort to include up-to-date and correct information in this brief description; however, it reserves the right to change technical data and product configurations at its own discretion and without prior announcement. The document is not covered by the revision service.

Disclaimer The details given in this brief description correspond to the up-to-date situation at the time of printing. Schwihag AG does not accept any liability for losses, including indirect and consequential damages, resulting from improper installation, use, maintenance or repair by the user.

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Version 2.10 dated 20/08/2012

..... BRIEF DESCRIPTION

1 Application

Schwihag hollow sleepers are used in tracks for the crossing of cables or ducts for liquid or gaseous substances.

They allow a permanent, safe cable crossing in tracks and switches, even when maintenance and straightening works are carried out by machines.

They provide a safe solution for accommodating cables or ducts in situations where crossing under the track is impossible or only at great expense – e.g. at bridges or in places with rocky ground.

The hollow sleeper is approved for all speeds.



Since covers and fastening elements are removable any existing cable connections need not be severed.

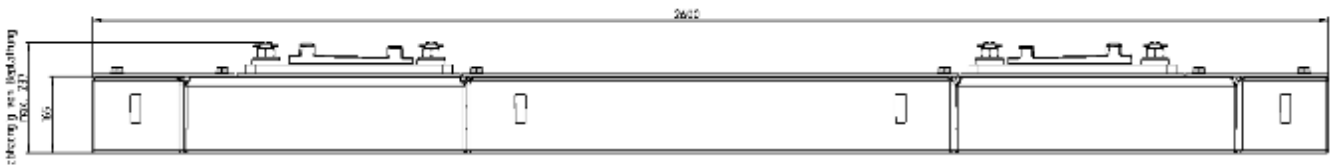
The hollow sleeper is also suitable for incorporating vehicle monitoring systems, e.g. systems for detecting hot boxes or jammed axles.

We will support you if you want to install your own systems in a hollow sleeper. We are always looking forward to new challenges.

..... **BRIEF DESCRIPTION**

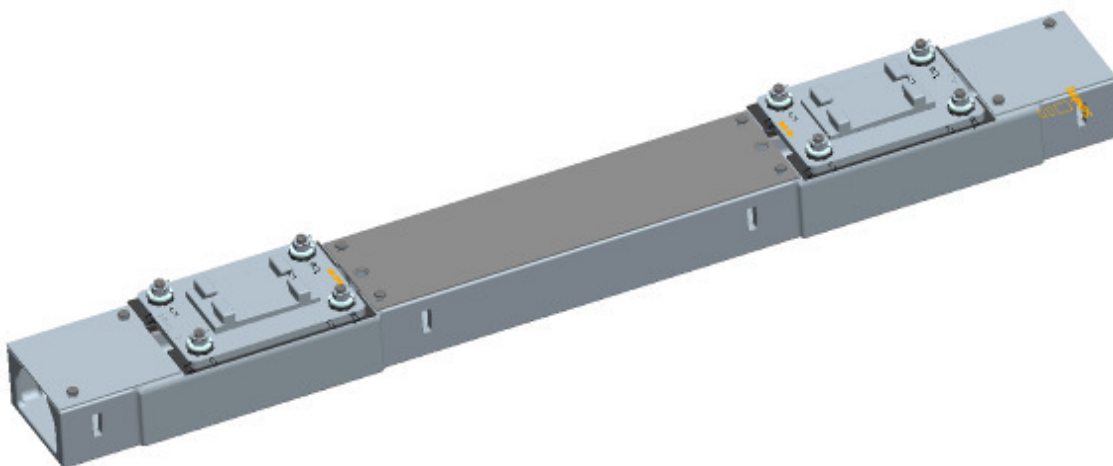
2 General dimensions of the sleeper and as-delivered condition

2.1 Sleeper dimensions



Sleeper height (without attachments):	~165mm
Height of the plate (depending on plate type):	~72mm
Total sleeper height (depending on plate type):	~237mm
Sleeper width	~310mm
Weight of sleeper body :	225 kg
Weight completely assembled:	315 kg

2.2 As-delivered condition



The sleeper is usually delivered completely assembled, including rail fastening set Skl 12, rail pad and baseplate pads.

The hollow sleeper can be delivered for track profiles S 49, S 54 and UIC 60 with the requested rail foot inclination.

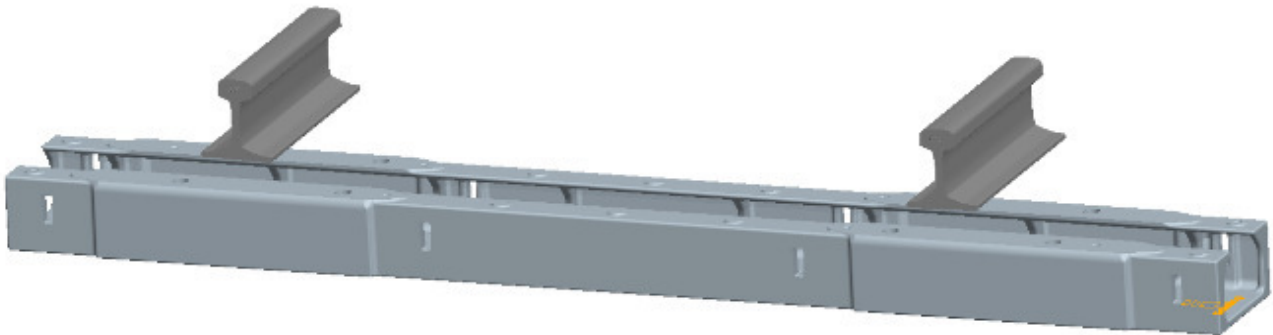
..... BRIEF DESCRIPTION

3 Installation

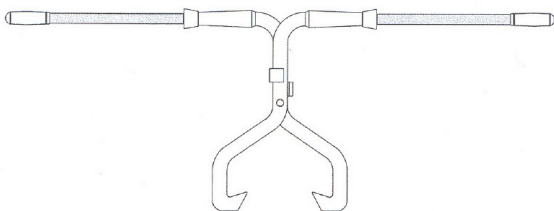
Installation of dismantled hollow sleeper

Because the hollow sleeper has an open U-shape it is possible to retrofit existing cable crossings – e.g. between two sleepers – without having to sever the connections.

For doing so, all fastening elements are removed and the existing cables are placed inside the sleeper.



The sleeper can be pulled in / transported using Jafco sleeper lifters. These are hooked into the side openings (the 4 inner openings can be used for grabbing around the sleeper).



Jafco sleeper lifter

..... BRIEF DESCRIPTION

3.1 Installation of assembled hollow sleeper

This is possible if no existing cables have to be laid in the sleeper at the time of installation.

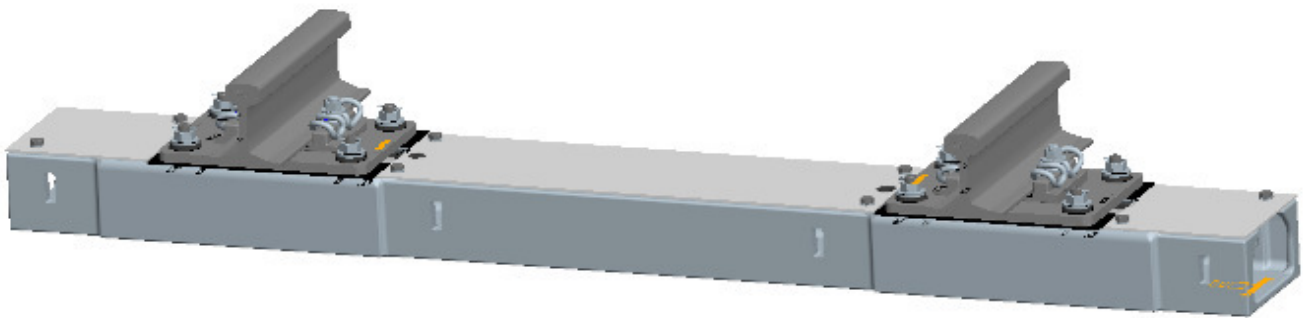
If the sleeper is to be installed completely assembled, the total height (including baseplates) of approx. 237mm must be allowed for.



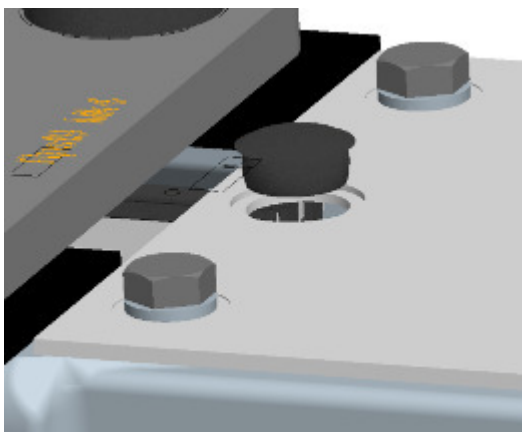
The sleeper can be pulled in / transported using Jafco sleeper lifters. These are hooked into the side openings (the 4 inner openings can be used for grabbing around the sleeper).

..... BRIEF DESCRIPTION

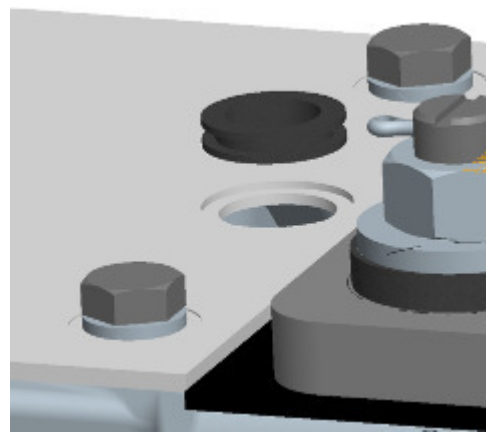
3.2 Cable ducts



The holes in the middle cover plate can be fitted with end cap SFL 34x1.3 or the cable penetration sleeve KD4, depending which is necessary.



End cap SFL 34x1.3



Cable penetration sleeve KD4

..... BRIEF DESCRIPTION

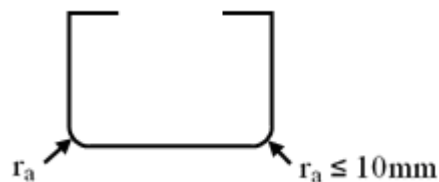
4 Specifications

Hollow sleeper

The hollow sleeper must be suitable for mechanical tamping; it must be suitable for functionally substituting an existing wooden or concrete sleeper.

The hollow sleeper must be made of the cast material EN-GJS-400-18C-LT according to EN 1563. Welded hollow sleepers are not permitted since it is impossible to regularly control the welded seams after the sleeper has been installed. The hollow sleeper should have removable covers and rail fastening plates to allow for laying of cables in the sleeper without having to sever the cable. The bottom of the hollow sleeper must have openings so that any entering water can drain off.

For ensuring that the sleeper remains in a stable position in the ballast and for preventing its “floating” the outside radius between the side wall and the bottom of the sleeper must be $r_a \leq 10\text{mm}$ (as for concrete and wooden sleepers).



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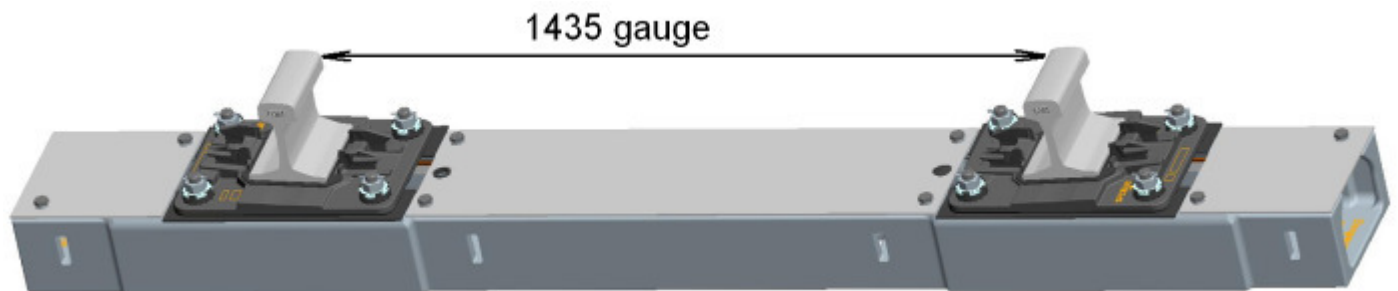
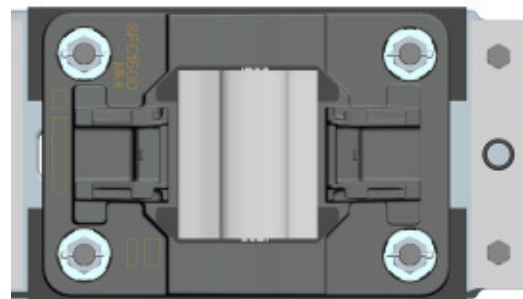
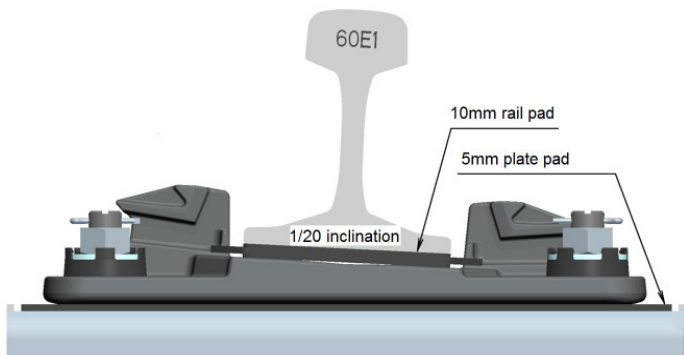
5 Overview of other sleeper types

SCHWIHAG hollow steel sleepers for cable crossings

Plate: SFC1500 Mk4 for

Rails: 60E1/56E1 with

assembly clip:FC1500



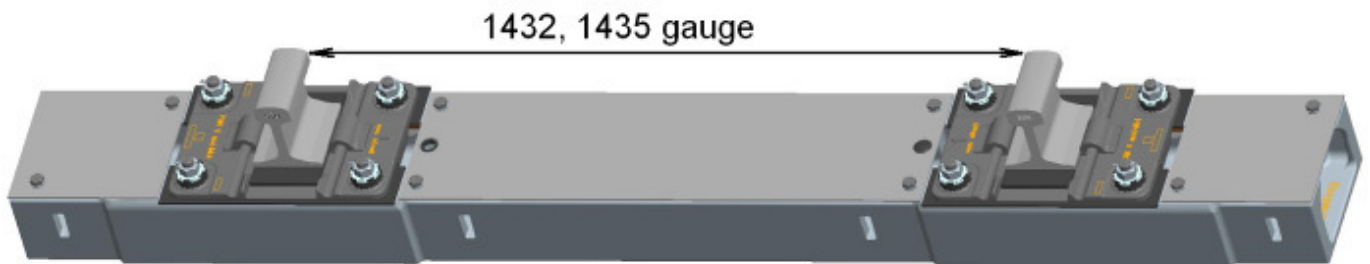
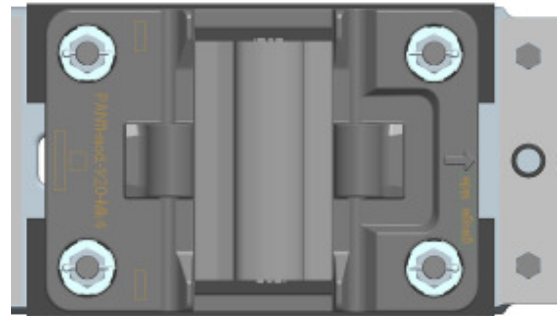
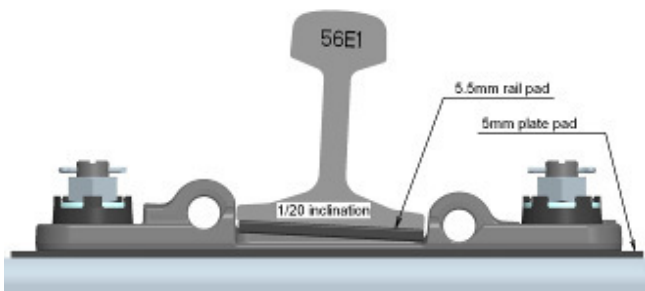
1. sleeper item no.: A04.00154 (P8065)

..... BRIEF DESCRIPTION

Plates: PAN11-mod-1/20-Mk4 1432(1435) for

Rail:56E1,

assembly clip: Pandrol PR401A/402A



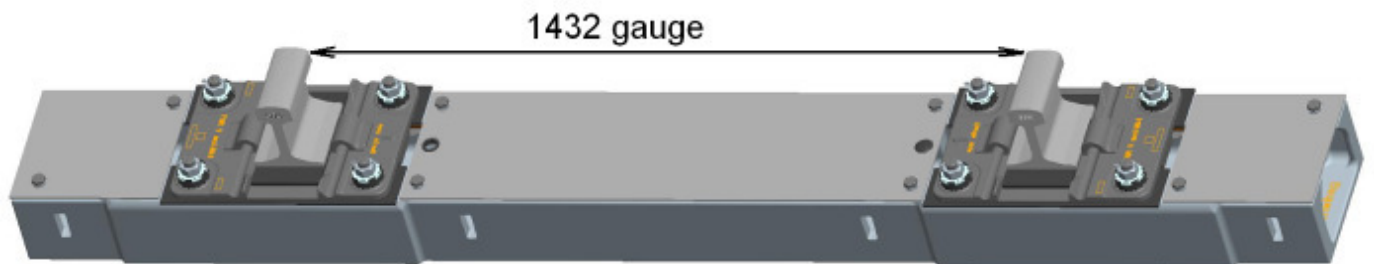
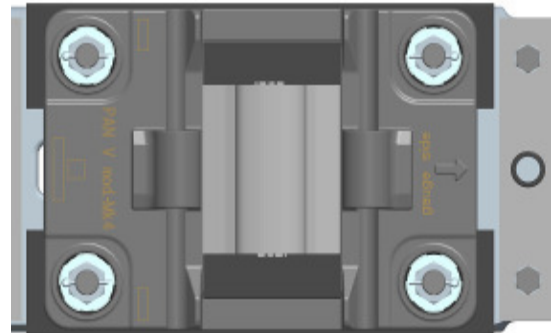
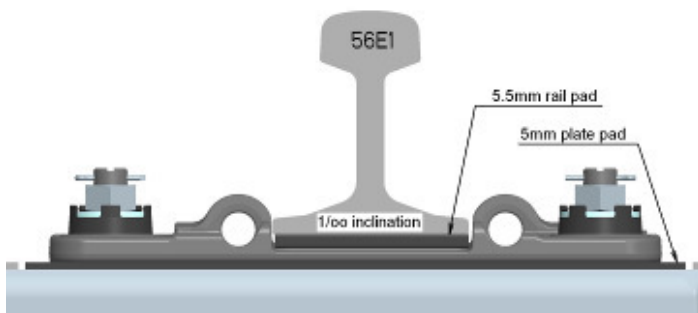
- 2. sleeper item no.: A04.00172 (1432),
- 3. sleeper item no.: A04.00171 (1435) (P8072)

..... BRIEF DESCRIPTION

Plate: PAN V-mod-Mk4 for

Rail:56E1 with

assembly clip: Pandrol PR401A/402A



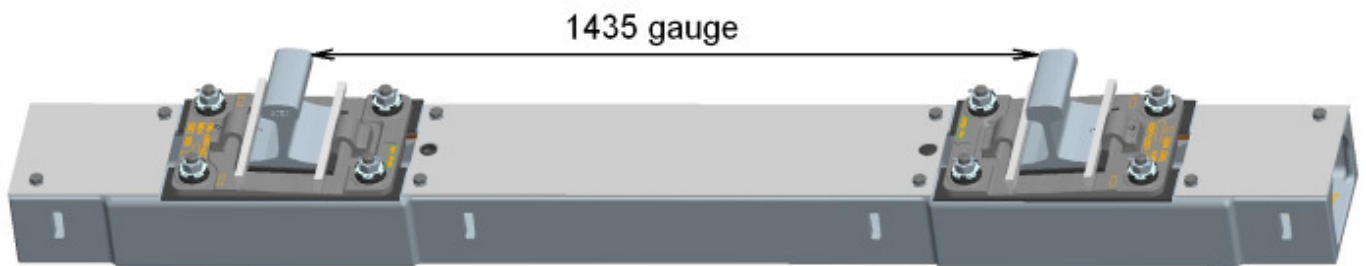
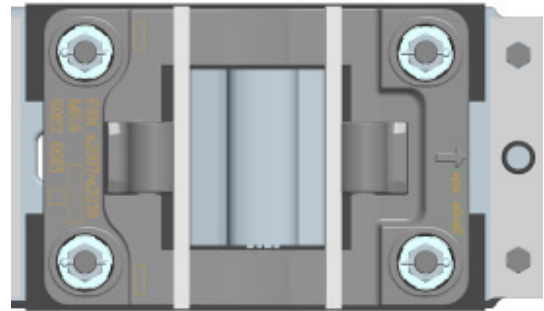
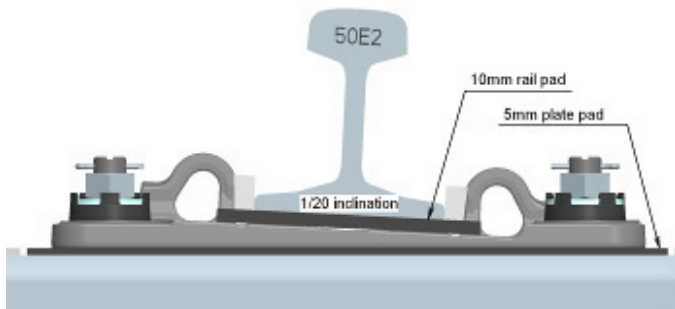
4. sleeper item no.: A04.00170 (P8071)

..... BRIEF DESCRIPTION

Plate: PAN e2007/e2039 Mk4 for

Rails: 50E2/60E1 with

assembly clips:e2007, e2039



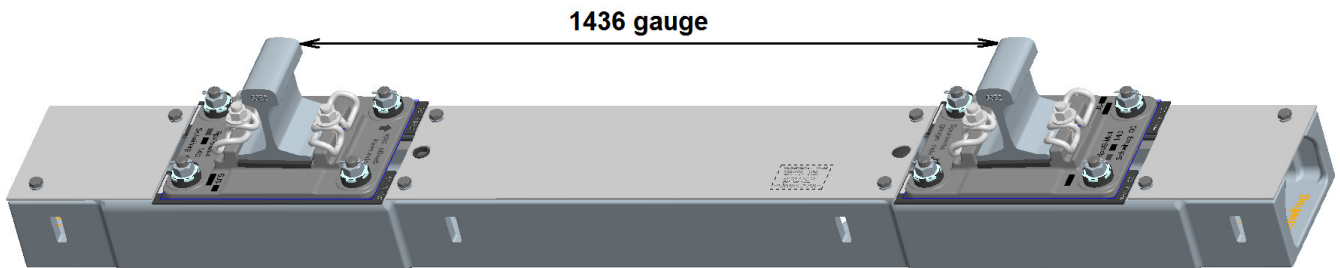
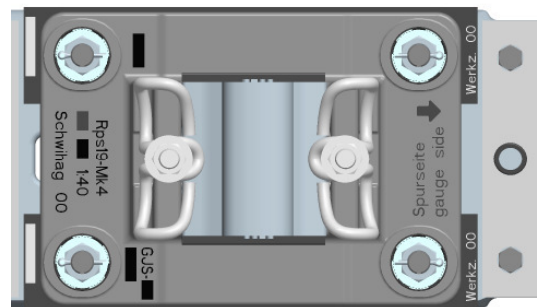
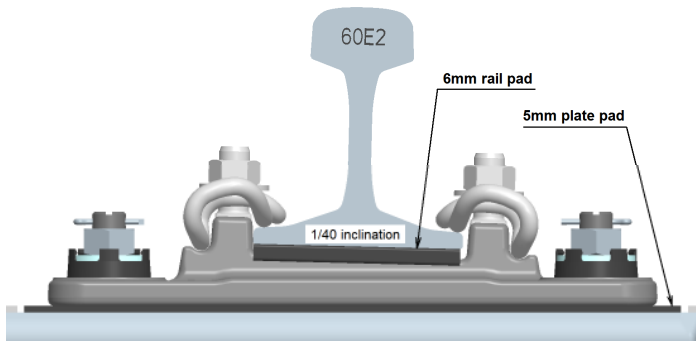
5. sleeper item no.: A04.00152 (P8382)

..... BRIEF DESCRIPTION

Plate: Rps19 Mk4 for

rail: 60E1 with

assembly clip: Sk112



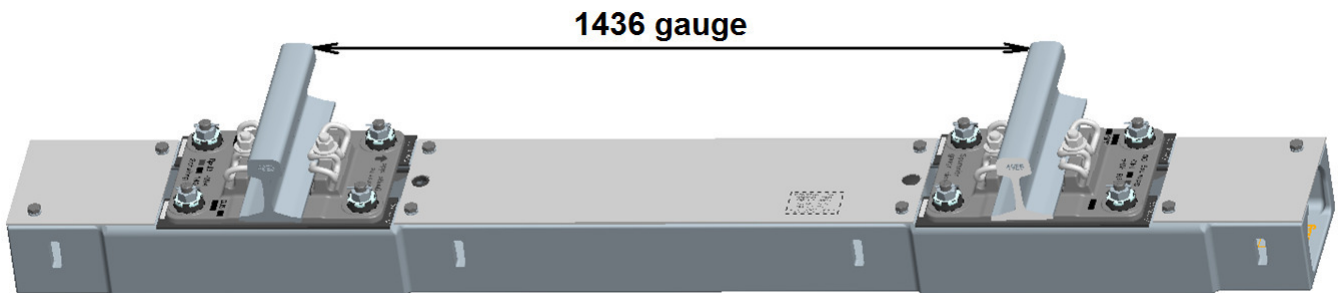
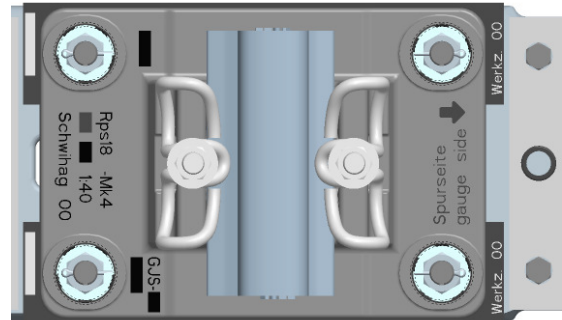
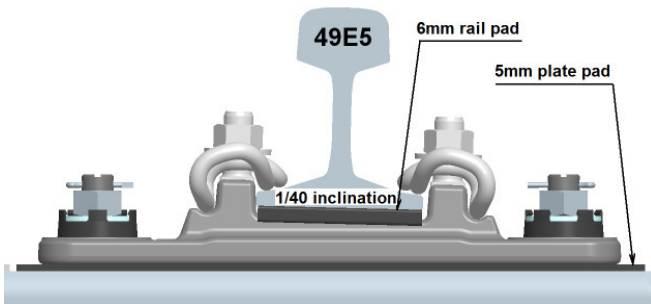
6. sleeper item no. A04.00390 (log 60.01.7001, material no.:)

..... BRIEF DESCRIPTION

Plate: Rps18 Mk4 for

rails: 49E5, 54E4 with

assembly clip: Sk112



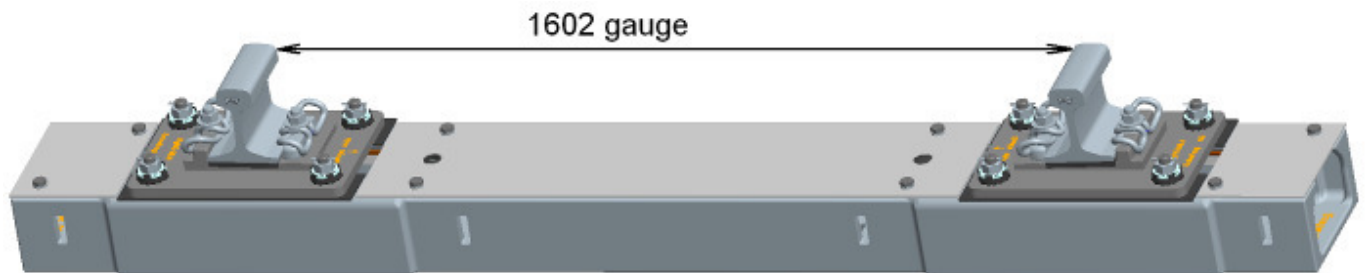
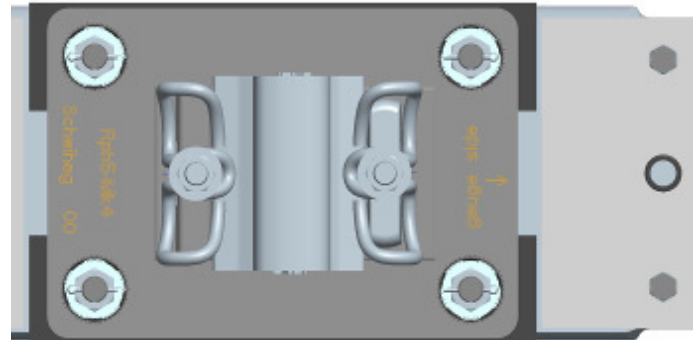
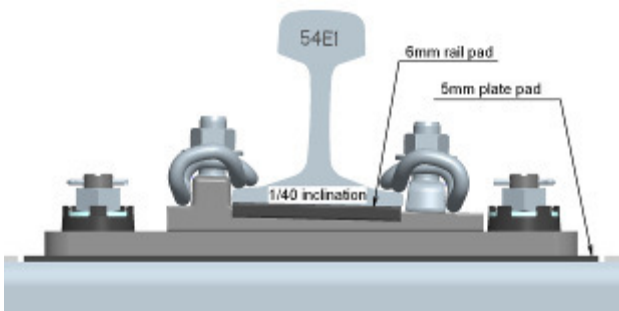
7. sleeper item no. A04.00391 (log 54.01.7001, material no.:

..... BRIEF DESCRIPTION

Plate: Rph5 Mk4 for

Rail: 54E1 with

assembly clip: Sk112



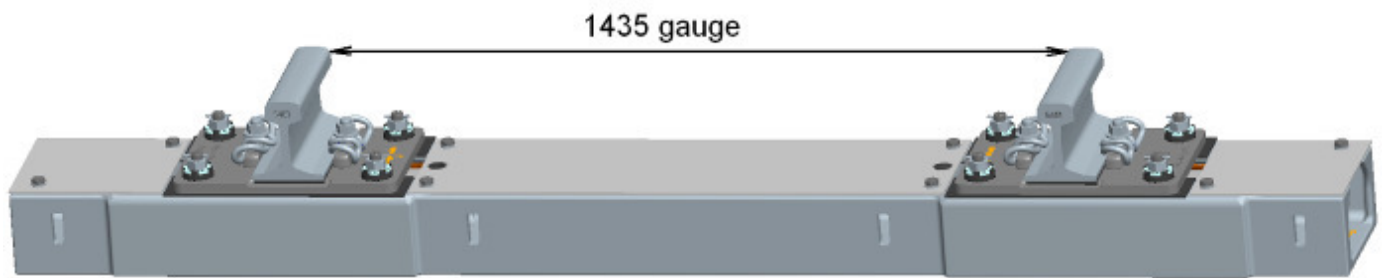
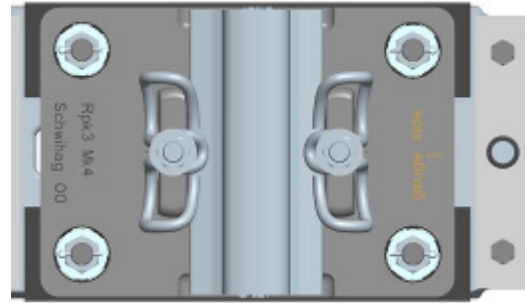
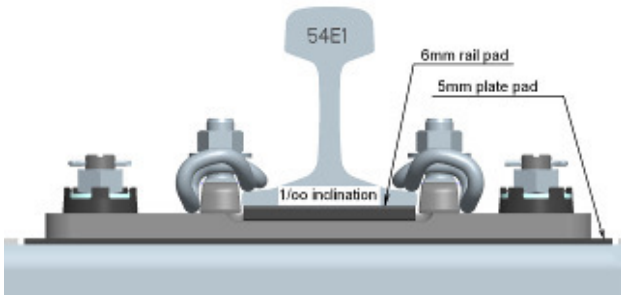
8. sleeper item no: A04.00262 (P8883)

..... BRIEF DESCRIPTION

Plate: Rpk 3 Mk4 for

Rail:54E1 with

assembly clip: Sk112



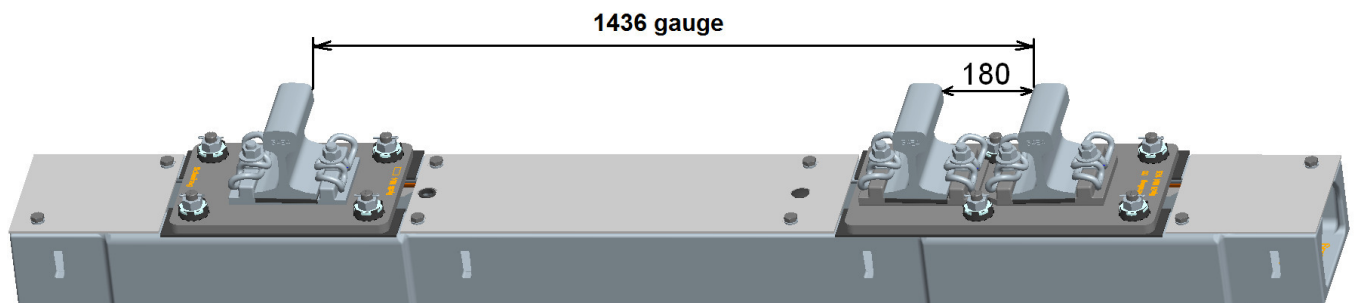
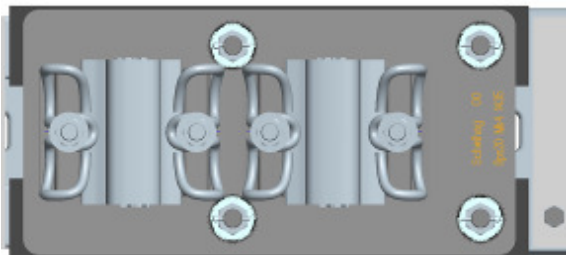
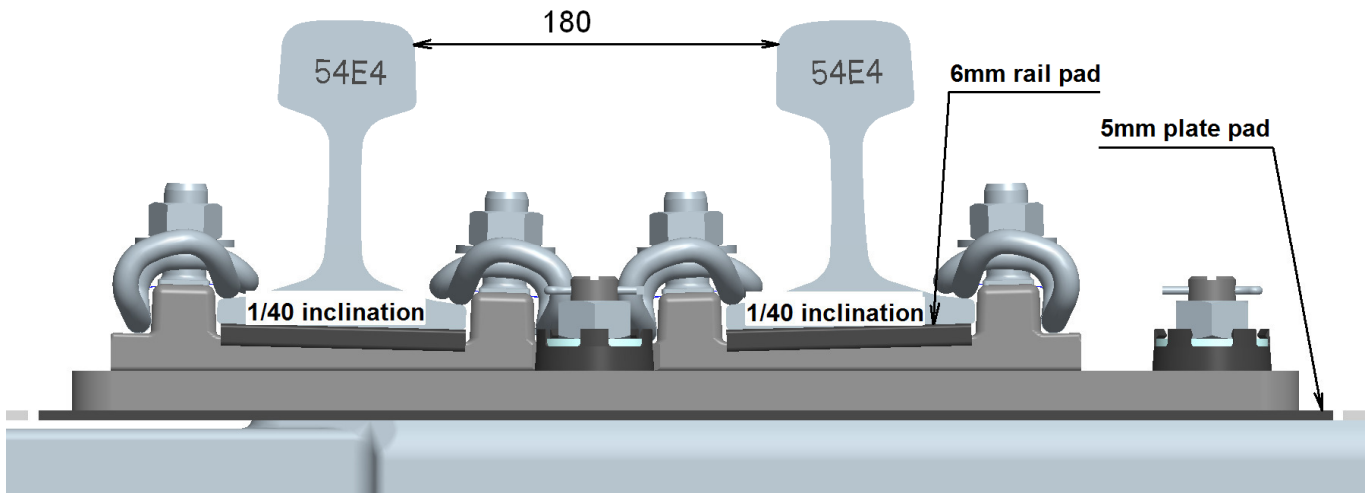
9. sleeper item no: A04.00545 (P9350)

..... BRIEF DESCRIPTION

Plates: RPS 20 Mk4 / RPS 18 Mk4 for

rails: 49E5, 54E4 with

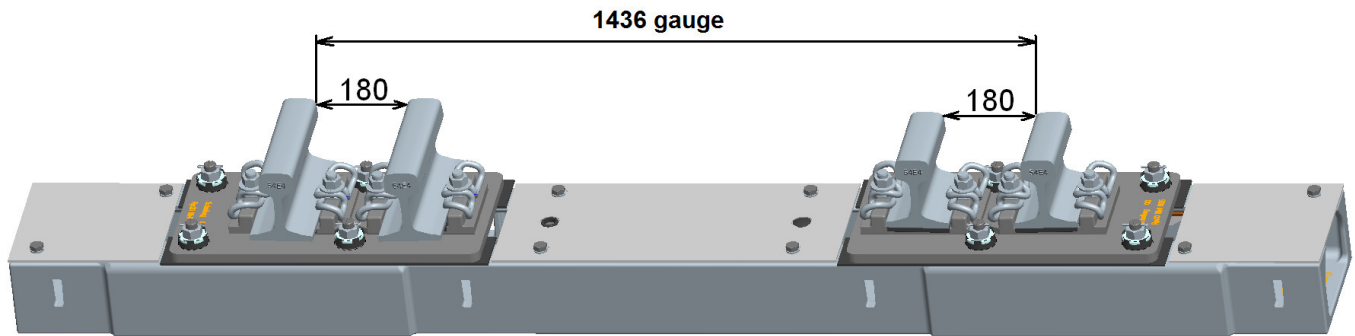
assembly clip: Sk112



10. sleeper (1 check rail or guide rail) item no. A04.00442 (log 54.01.7002, material no.:) 954 647)

..... **BRIEF DESCRIPTION**

Plates: RPS 20 Mk4 for rails: 49E5, 54E4 with assembly clip: Skl12



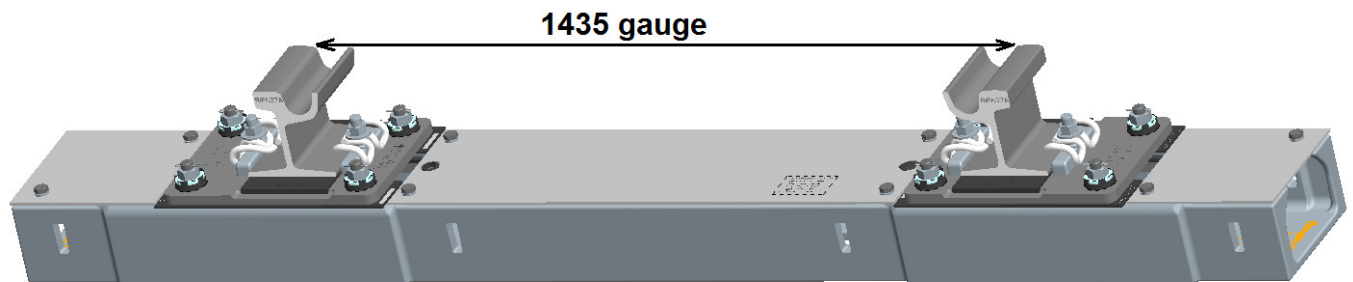
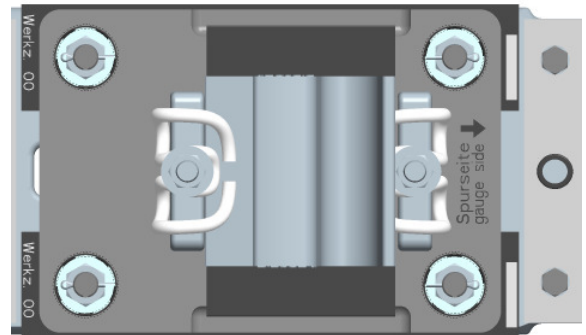
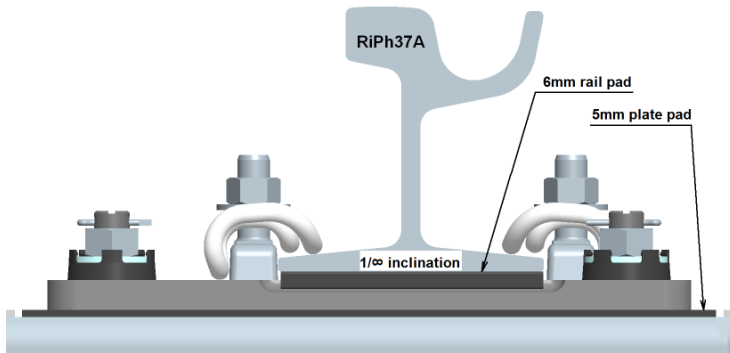
11. sleeper item no: log 54.01.7003, material no.: 957 823 (DB)

..... BRIEF DESCRIPTION

Plate: Rpk5 Mk4

Rails: RiPh37A

assembly clip: Skl 3



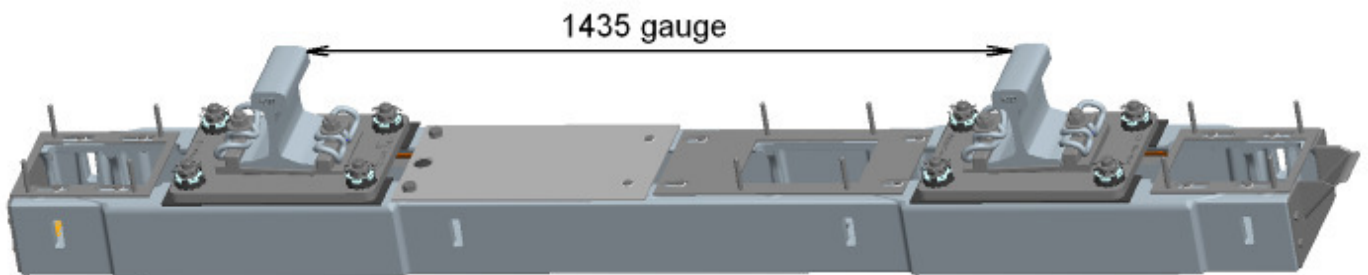
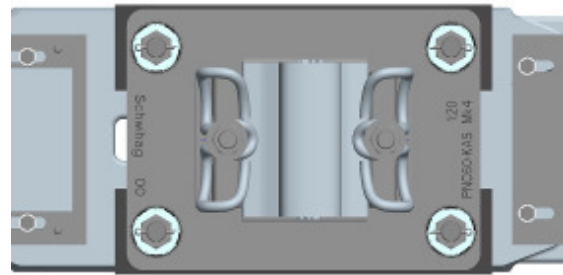
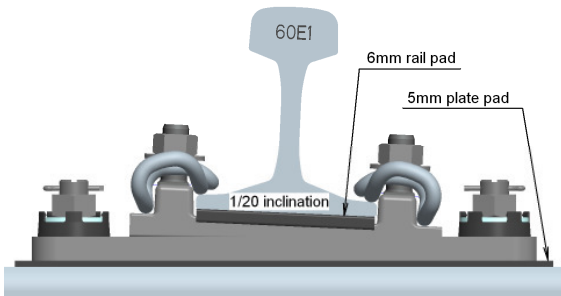
12. sleeper item no: A04.01013 (P0021611)

..... BRIEF DESCRIPTION

Plate: PNC60 KAS Mk4 for

rails: 60E1 with

assembly clip: Skl12



13. sleeper item no: A04.00397 (P8738)

..... BRIEF DESCRIPTION

6 Photographs



..... BRIEF DESCRIPTION



..... **BRIEF DESCRIPTION**



..... BRIEF DESCRIPTION

Before: Cables separately between the sleepers in the track



After: tamped track, cable passing inside Schwihag hollow sleeper



..... BRIEF DESCRIPTION



..... **BRIEF DESCRIPTION**

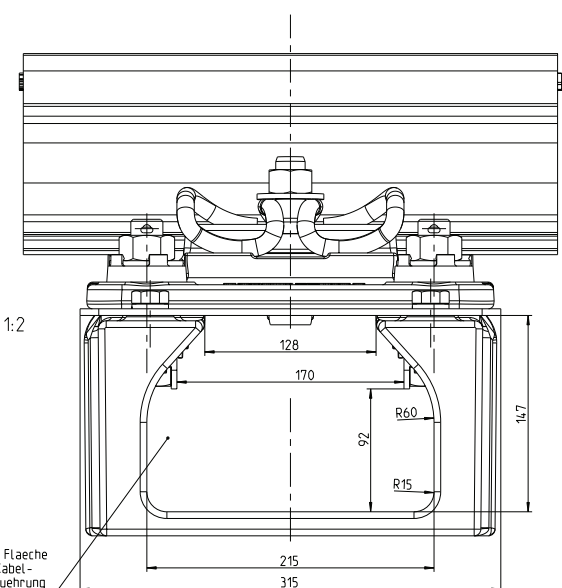
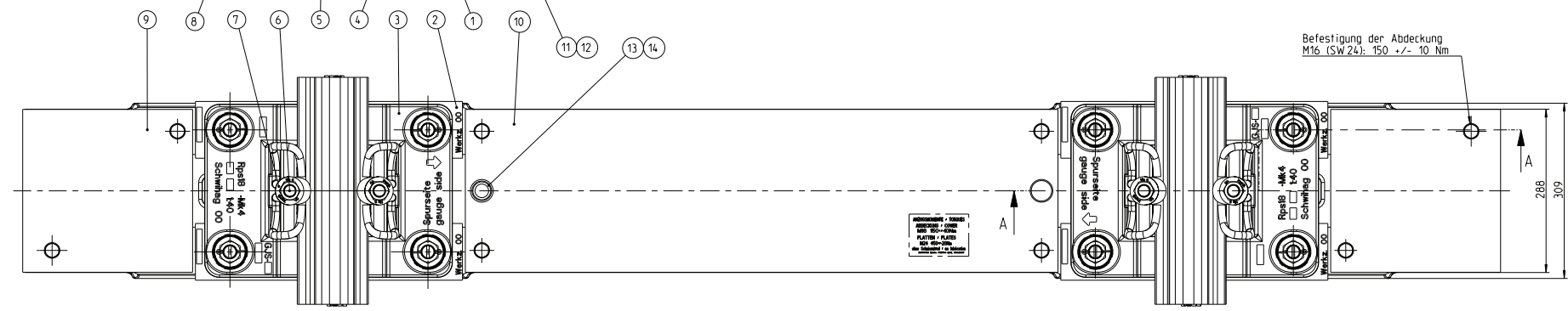
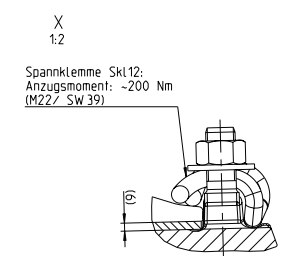
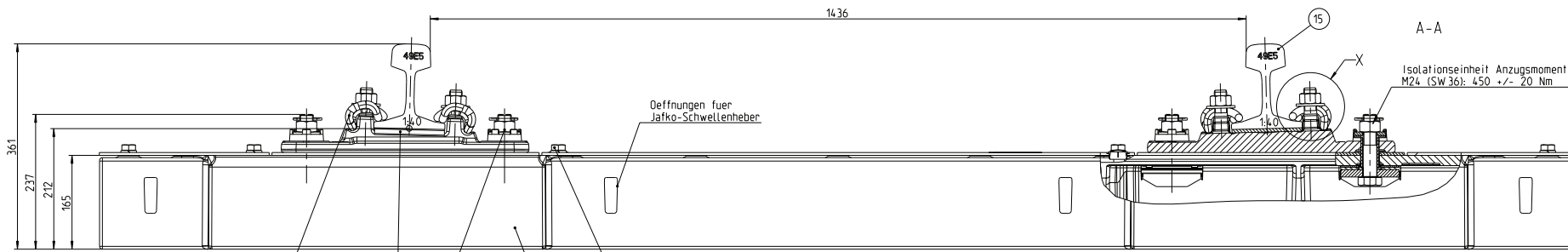
7 Drawings

For hollow sleeper with rail profile:

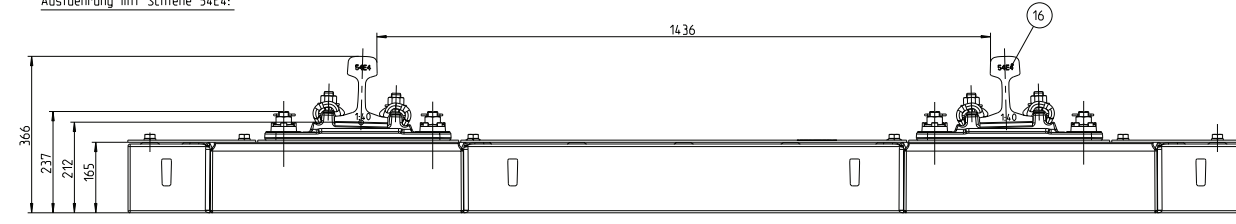
60E2 according to Iog 60.01.7001

49E5/54E4 according to Iog 54.01.7001

Hollow sleepers for other rail profiles, gauges or fastening systems (e.g. Pandrol 'e' clip or Fastclip) are available or can be manufactured upon request.



Ausfuehrung mit Schiene S4E4:



Materialbedarf fuer eine Hohlswelle

Lfd. Nr.	Menge	Benennung	Kurzbezeichnung	Zeichn.-Nr. DB/Schw/hag	DN-Bezeichnung	Werkstoff	Gewicht	Material-Nr.
alternativ 16	2	Schiene	S4E4	log 54.10.0002	Stahlsorte 260	-	916	362
15	2	Schiene	L495	log 49.10.0002	Stahlsorte 260	-	916	361
alternativ 14	2	Kabel-Durchfuehrungstuecke	KD 4	-	Kunststoff	0.003	954	859
13	2	Endkappe	SFL 34x1-3	-	Kunststoff	0.002	954	860
12	8	Federling	B 16	DIN 127	FSt	0.011	281	225
11	8	oK1-Schraube	M18x20	DIN EN ISO 4017	St 8.8	0.070	272	180
10	1	Abdeckung mitte	287x104.3x5	P7068	St	11.625	954	750
9	2	Abdeckung aussen	287x299x5	P7070	St	3.343	954	751
8	4	Spannklemme	Skt 12	log 30.1003	FSt	0.549	491	552
7	4	Unterschenke	US 6	log 40.9000	FSt	0.048	495	699
6	4	Haekenschraube mit Mutter	HS 32-55 • Mu M22	log 40.3001	St	0.403	491	349
5	2	Zwischenschraube (Regelausfuehrung)	Zw 664-6	log 54.35.1601	EVA	0.127	499	344
4	8	Isoliermehrl	IE1	log 55.7008	-	1.464	946	798
3	2	Rispenplatte	Rps18-Mk4	log 54.29.5800	s. Zeichnung	24.221	946	795
2	4	Zwischenschraube	Zwp 212	log 35.9002	HDPE	0.216	951	036
1	1	Hohlswelle fuer Gleise	S108KS	P8067	Sphaeroguss	224.517	946	793

Schienenbefestigung auf Hohlswelle fuer Kabelquerung (Schiene 49E5 und S4E4)

(Verwendungsbereich)

Tolerierung ISO 8015
Allgemeintoleranzen
DIN ISO 2768-1
DIN ISO 2768-2

302.748 49E5 LNVY 41 [W]
Werkstoff
s. Tabelle
Schulheg
Reg. Anfertigung

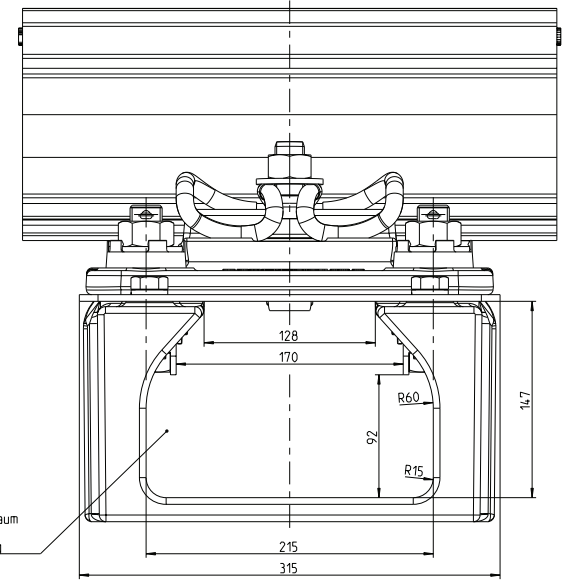
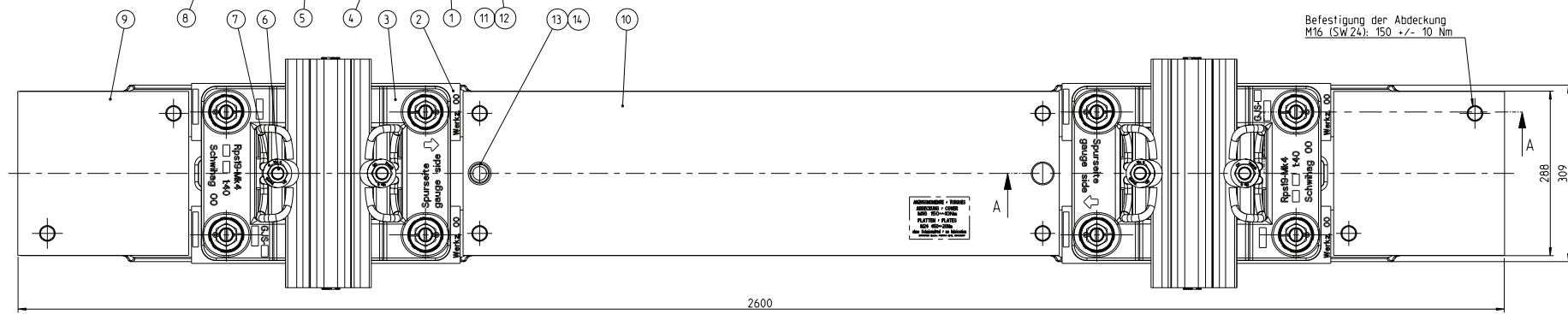
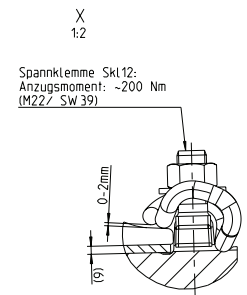
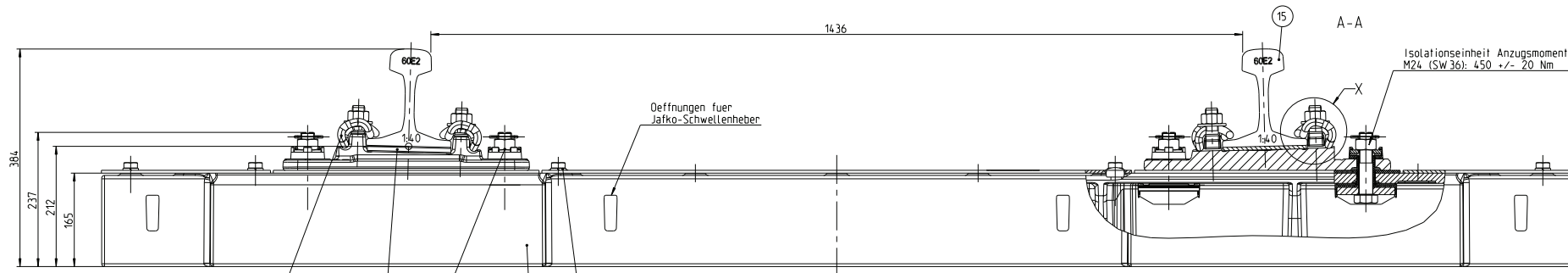
1:20
13.02.09
11.02.09
13.02.09

DB Netz AG
Fahrtwegtechnik
Oberbau LNVY 41

log 54.01.7001

Schienenbefestigung KS18 auf Hohlswelle fuer Gleise

log 54.01.7001



Materialbedarf fuer eine Hohlschwelle

Lfd. Nr.	Menge	Benennung	Kurzbezeichnung	DIN-Nr./Bezeichnung	Werkstoff	gewicht	Material-Nr.
15	2	Schiene	60E2	log 60.10.0001	Stahlsorte 260	489 457	
14	2	Kabel-Durchfuhrungseile	KD 4	-	Kunststoff	0.003 954 859	
13	2	Endkappe	SFK 34x1-3	-	Kunststoff	0.002 954 860	
12	8	Federling	B 16	DIN 127	FSt	0.011 281 225	
11	8	akt-Schraube	M16x20	DIN EN ISO 4017	St 8.8	0.070 272 580	
10	1	Abdeckung mitte	287x104.3x5	P7068	St	11.625 954 750	
9	2	Abdeckung aussen	287x299x5	P7070	St	3.343 954 751	
8	4	Spannklemme	SK1 12	log 36.1003	FSt	0.549 491 552	
7	4	Unterscheibe	US 6	log 40.9000	FSt	0.048 495 699	
6	4	Mutternschraube mit Mutter	HS 32-55 • M22	log 40.3001	St	0.403 491 349	
5	2	Zwischenschraube (Regelausfuhrung)	Zw 661-6	log 60.35.1601	EVA	0.159 499 343	
4	8	Isoliermehrl	IE1	log 55.7008	-	1.464 946 798	
3	2	Rispeplatte	Rps19-Mk6	log 60.20.5800	s. Zeichnung	24.516 946 796	
2	4	Zwischensplatte	Zwp 212	log 35.9002	HDPE	0.216 951 036	
1	1	Hohlschwelle fuer Gleise	S108KS	P8067	Sphaeroguss	224.517 946 793	

Schienenbefestigung auf Hohlschwelle fuer Kabelguertung (Schiene 60E2)

(Verwendungsbereich)

Tolerierung ISO 8015
DN ISO 2768-1
DN ISO 2768-2

303.443 8254 | LNVY 41 | (W)

3. Tabelle | Schweiß

Ang: 01/02
 Datum: 26.09.2021

log 60.01.7001

Schienenbefestigung KS19 auf Hohlschwelle fuer Gleise

log 60.01.7001

DB Netz AG
Fahrwegtechnik
 Oberbau LNVY 41

..... MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

Installation of Schwihag hollow sleepers St08KS for tracks

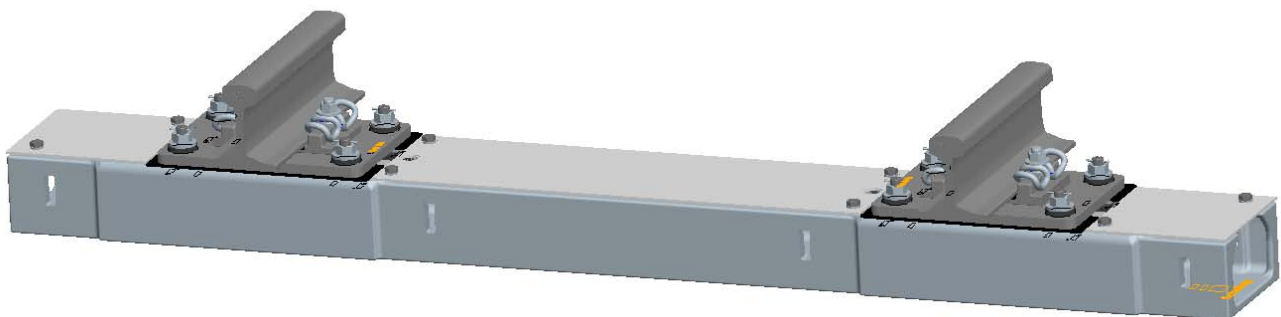
For rails:

60E2

according to Iog 60.01.7001

49E5/54E4

according to Iog 54.01.7001



.....: **MONTAGEANLEITUNG** :.....
ASSEMBLY INSTRUCTIONS

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Document Hollow sleeper for cable crossings, Schwihag type

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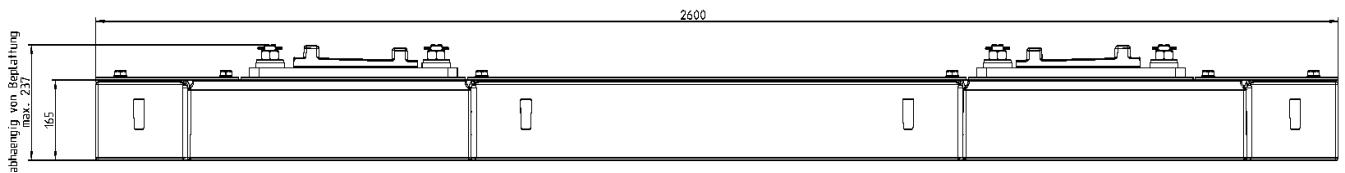
email: info@schwihag.com
Internet: www.schwihag.com

Version 5.00 dated 05.11.2009

..... MONTAGEANLEITUNG
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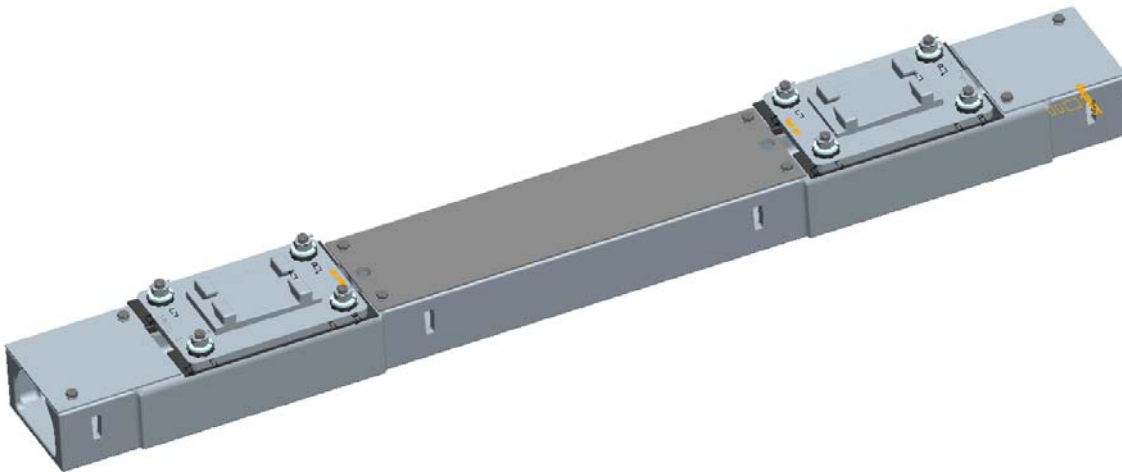
1 General dimensions of the sleeper and as-delivered condition

1.1 Sleeper dimensions



Sleeper height (without attachments):	~165mm
Height of the plate (depending on plate type):	~72mm
Total sleeper height (depending on plate type):	~237mm
Sleeper width:	~310mm
Weight of sleeper body:	225 kg
Weight completely assembled:	315 kg

1.2 As-delivered condition



Normally, the sleeper is usually delivered completely assembled, including rail fastening set Skl 12, rail pad and baseplate pads.



The threaded joints of the platings and covers do not have the necessary torque in their as-delivered condition.

.....: **MONTAGEANLEITUNG** :.....
ASSEMBLY INSTRUCTIONS

The following tools are required for dismantling and assembling the hollow sleeper.

1. Plate threaded connection M24 / SW36
2. Cover plates M16 / SW24
3. Plate threaded connection, torque wrench 450Nm
4. Jafco sleeper lifter for installation of the sleeper
5. Tyre lever / crowbar
6. For further information, see **Ril 824.3610**

.....: **MONTAGEANLEITUNG** :.....
ASSEMBLY INSTRUCTIONS

2 Preparation for sleeper replacement

2.1 Removal of ballast

The ballast in the area adjacent sleeper spacings must be removed. The adjacent rail fastenings must be undone. Ensure adequate unobstructed working space for replacing the sleepers. **Cf. Ril 824.3610.**

2.2 Installing complete sleeper

This is possible if it is not necessary to lay cables in the sleeper at the time of installation. If the sleeper is to be installed completely assembled, the total height (including baseplates) of approx. 237mm must be allowed for. The sleeper can be pulled in / transported using Jafco sleeper lifters. These are hooked into the openings in the sides (grab around (→ rails) possible).

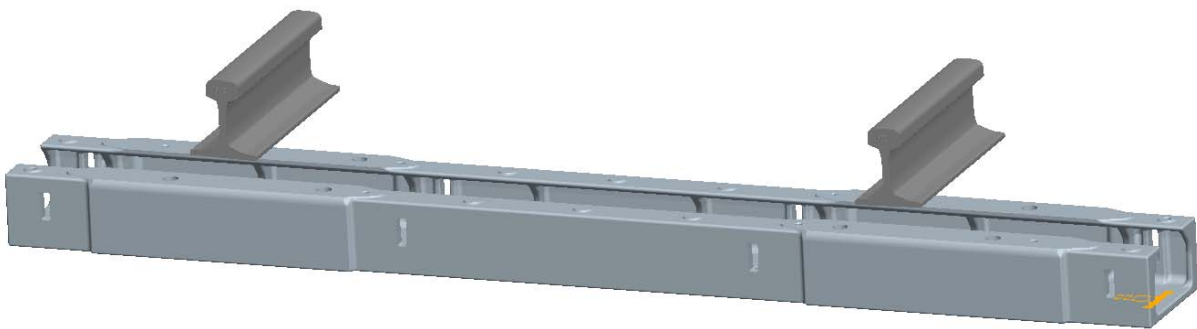


.....: **MONTAGEANLEITUNG** :.....
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2.3 Installing dismantled sleeper

If the sleeper is to be installed dismantled, first the cover plates and then the baseplates have to be removed. The covers must also be removed when replacing plates. (Accessibility of plate fastenings or insulation unit)

If the sleeper is pulled in completely dismantled, approx. 165mm must be allowed for the height of the sleeper body.

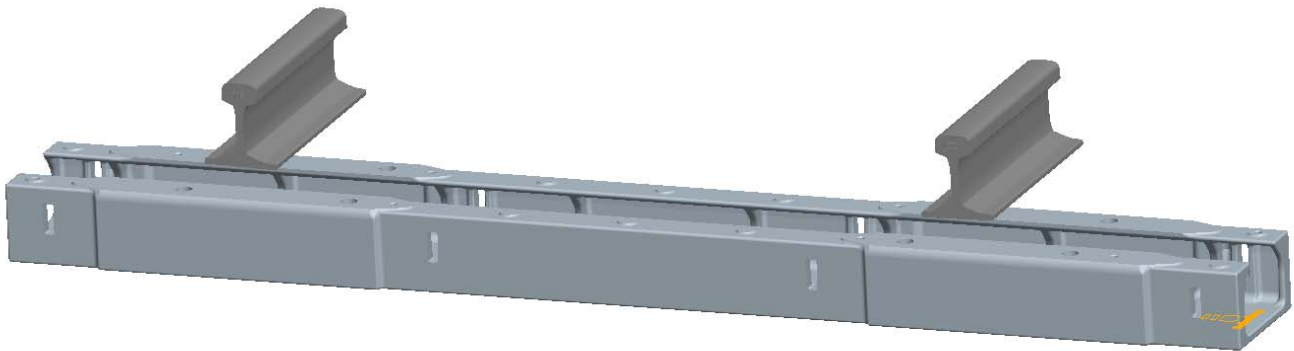


.....: MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

3 Assembling the sleeper

Assembly of the individual parts is described in the following:

3.1 *Pulling in sleeper body St08KS*



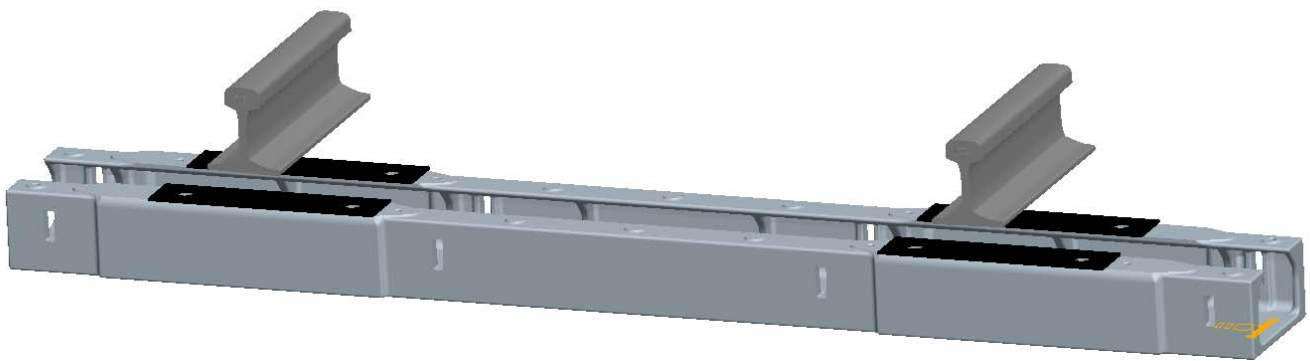
The sleeper can be pulled in / transported using Jafco sleeper lifters. These are hooked into the side openings (the 4 inner openings can be used for grabbing around the sleeper).



If it is necessary to place previously laid cables in the sleeper compartment into the hollow sleeper, this must be done prior to placement of the baseplate pads and baseplates.

.....: MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

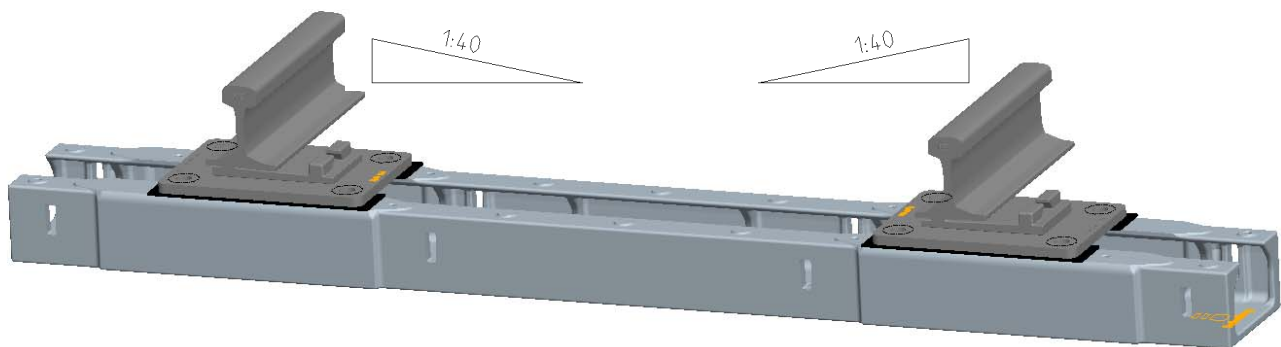
3.2 *Placing the 4 baseplate pads on the sleeper flange*



Ensure that the insulating plates are not exposed to large temperature fluctuations, e.g. due to direct sunshine, before assembly. Such exposure can cause the hole pattern to shift, resulting in assembly problems (with the insulating bushing). The baseplate pads Zwp 212 according to Iog 35.9002 must be used.

..... MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

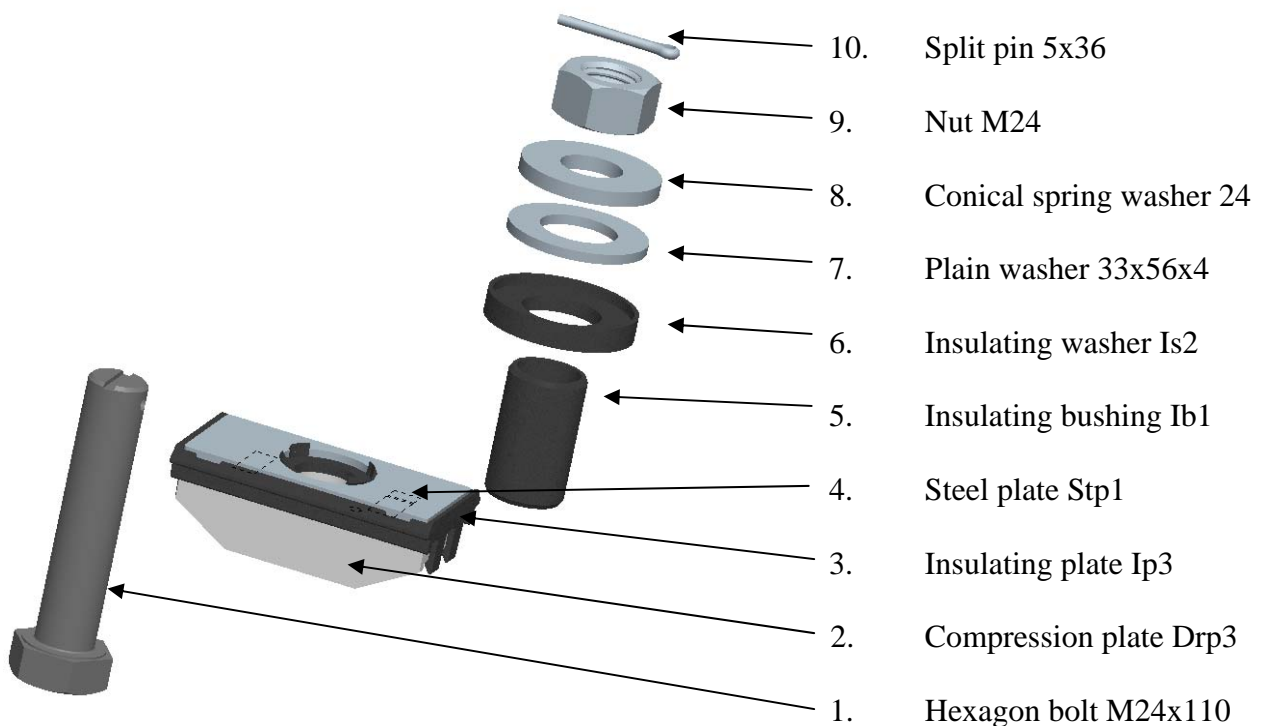
3.3 Positioning the baseplates



When positioning the baseplates, ensure that sloped plates slope up towards the outside. The baseplates must be aligned using the fastening holes in the sleeper.

..... MONTAGEANLEITUNG
 ASSEMBLY INSTRUCTIONS

3.4 Assembling the fastening and insulation unit



Individual parts of the insulation unit IE1 according to Iog 55.7008

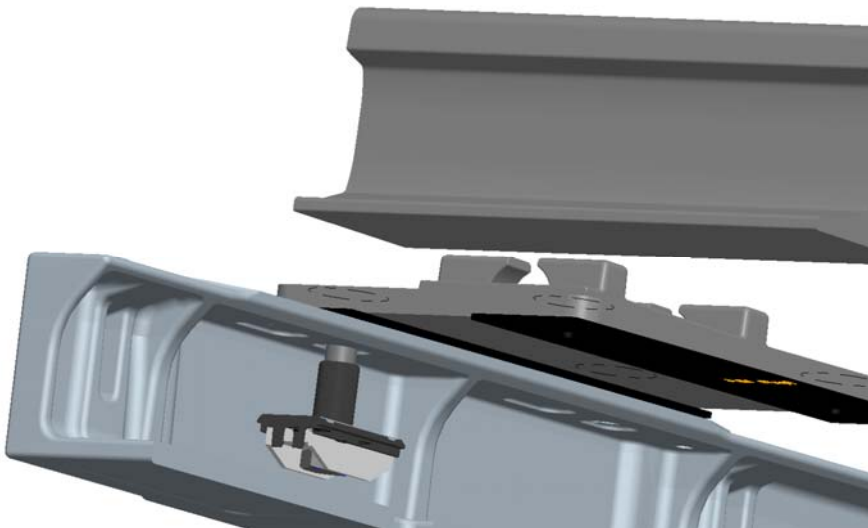
.....: **MONTAGEANLEITUNG** :.....
ASSEMBLY INSTRUCTIONS

Assemble Items 1 – 5 and install from below.

If cables have already been laid in the sleeper, they must be shifted to the side with the help of a tool (tyre lever, crowbar) to create the necessary working space.



Ensure that the cables are not damaged. If a cable is damaged, all work on the sleeper must cease immediately. The cable damage must be reported without delay.

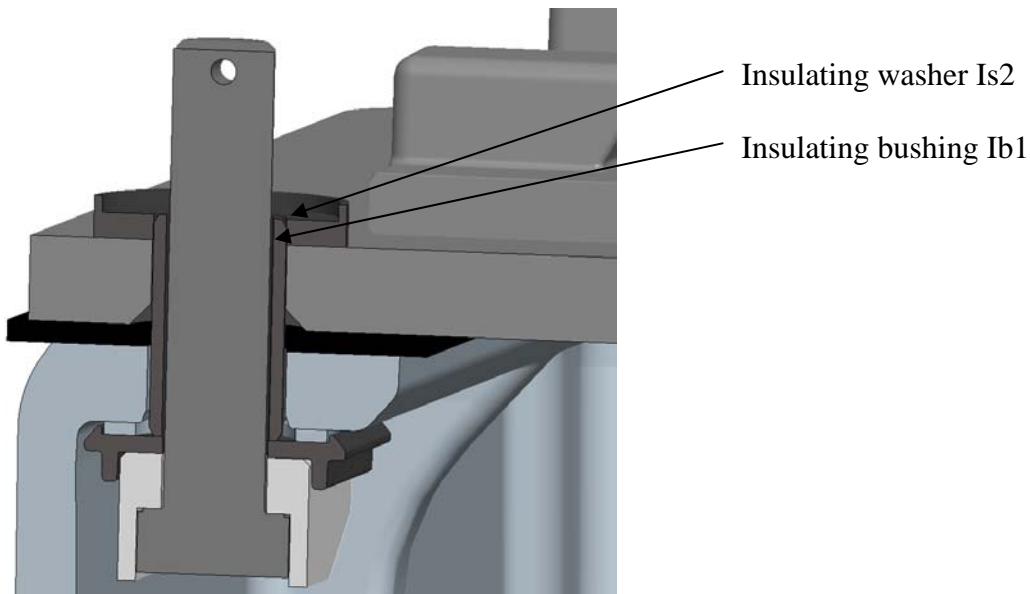


..... MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

Position the insulating washer Is2 (Item 6).

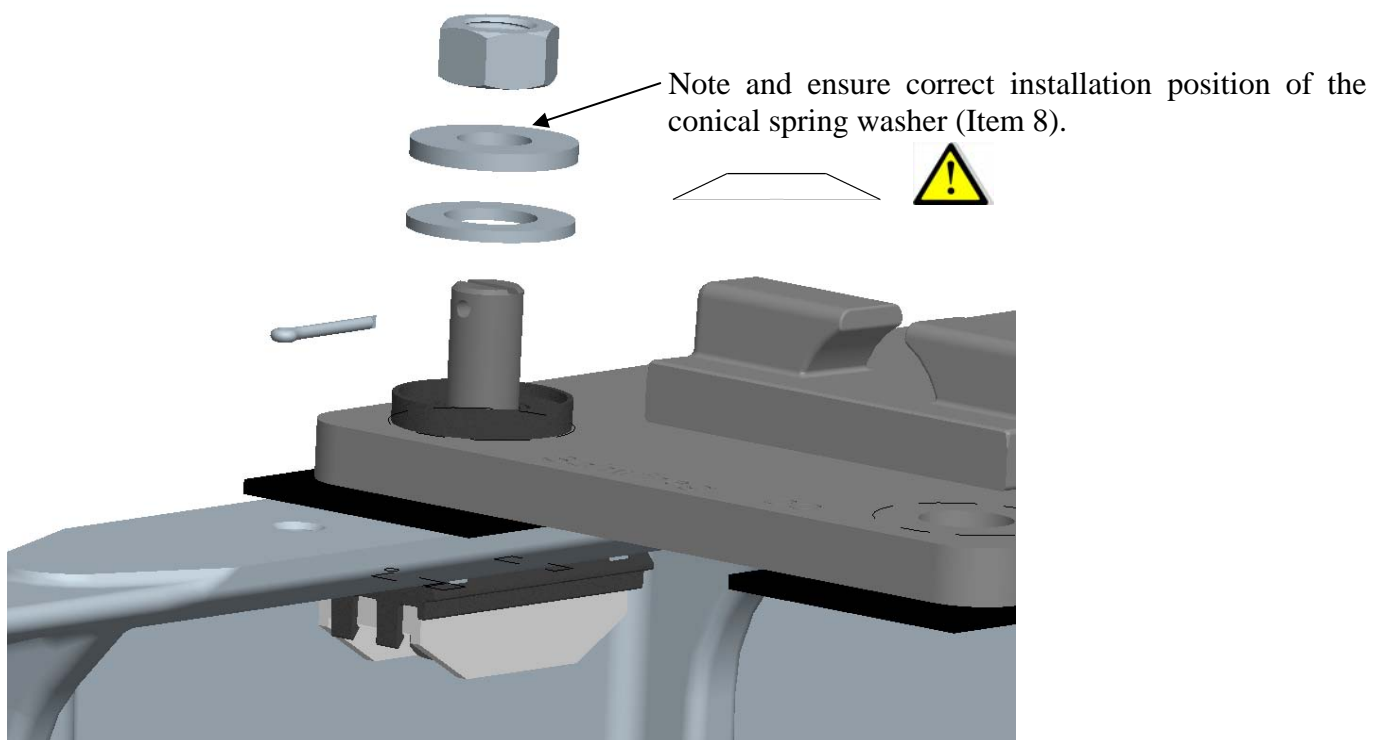


When positioning the insulating washer Is2 (Item 6), ensure that the insulating bushing Ib1 (Item 5) has been pushed into the insulating washer but that it does not protrude. The insulation bushing is used to centre the insulating washer.




..... MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

Threaded joint of the plate on the sleeper body

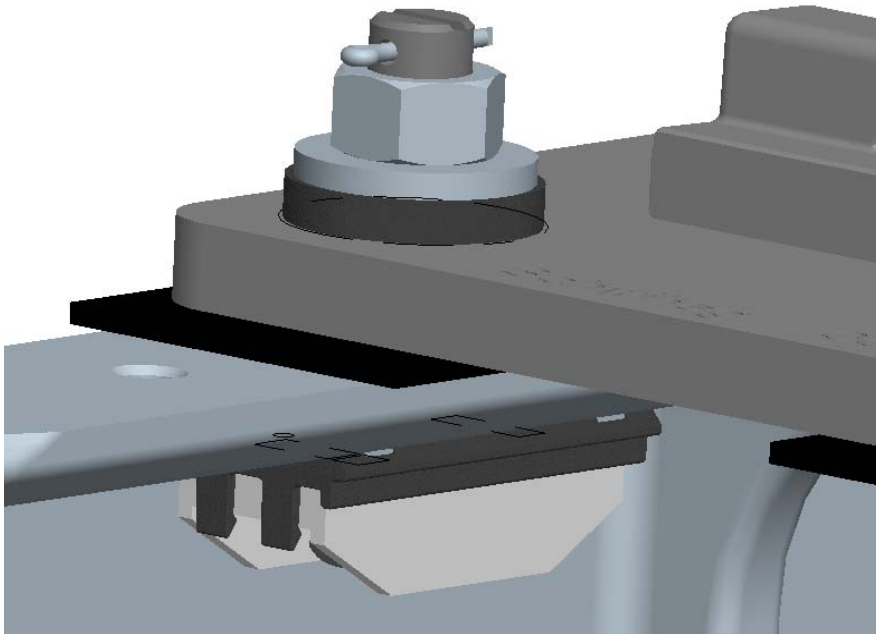


Note and ensure correct position of the plain washer (Item 7) and conical spring washer (Item 8) and install nut (Item 9).

 Assembly torque for final assembly: 450 ± 20 Nm

.....: MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

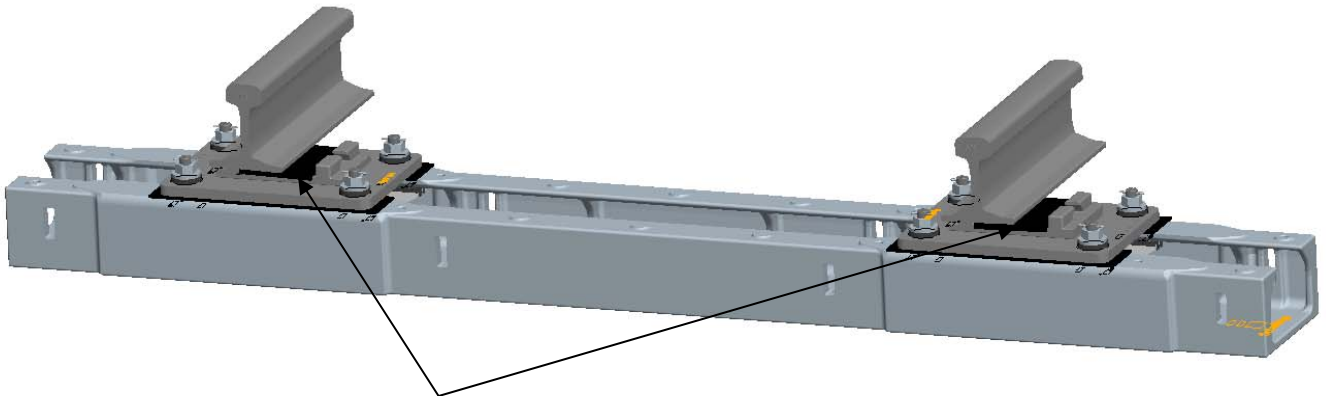
Tightening torque and locking



Insert split pin 5x36 (Item 10) and secure (after reaching tightening torque of 450 Nm). It must be possible to easily insert the split pin by hand. If the split pin hole in the screw overlaps with the nut, it is necessary to check whether there is a foreign body between the parts to be screwed together.

..... MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

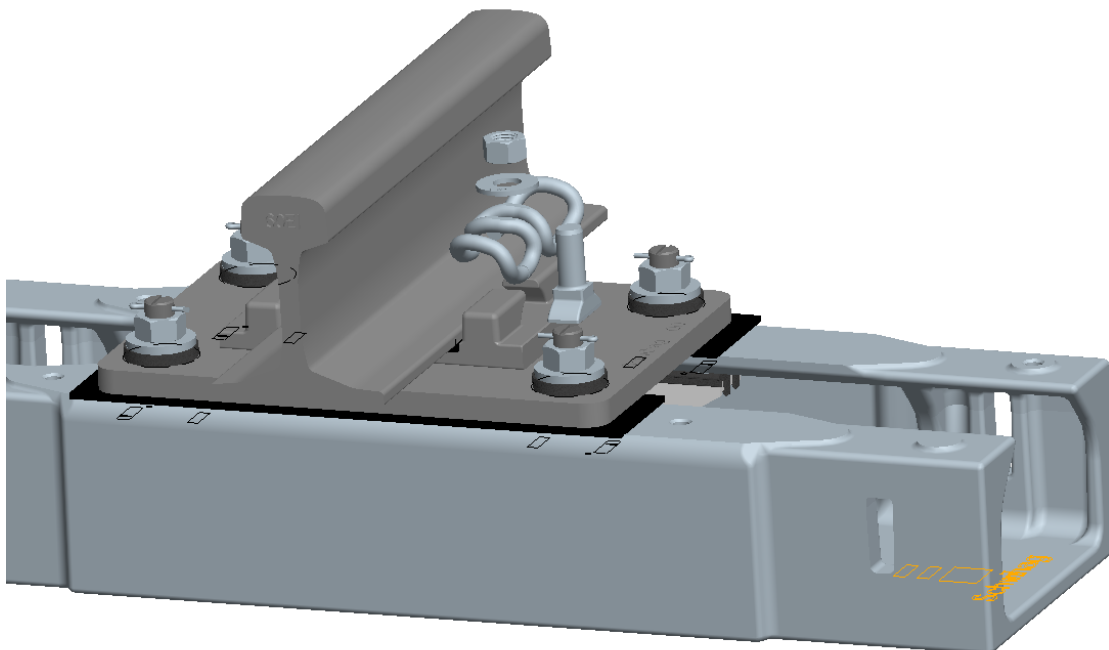
3.5 Assembling the sleeper on the track



Place the (Zw) rail pads on the baseplates

Assemble the rail fastening Skl 12 on the baseplates:

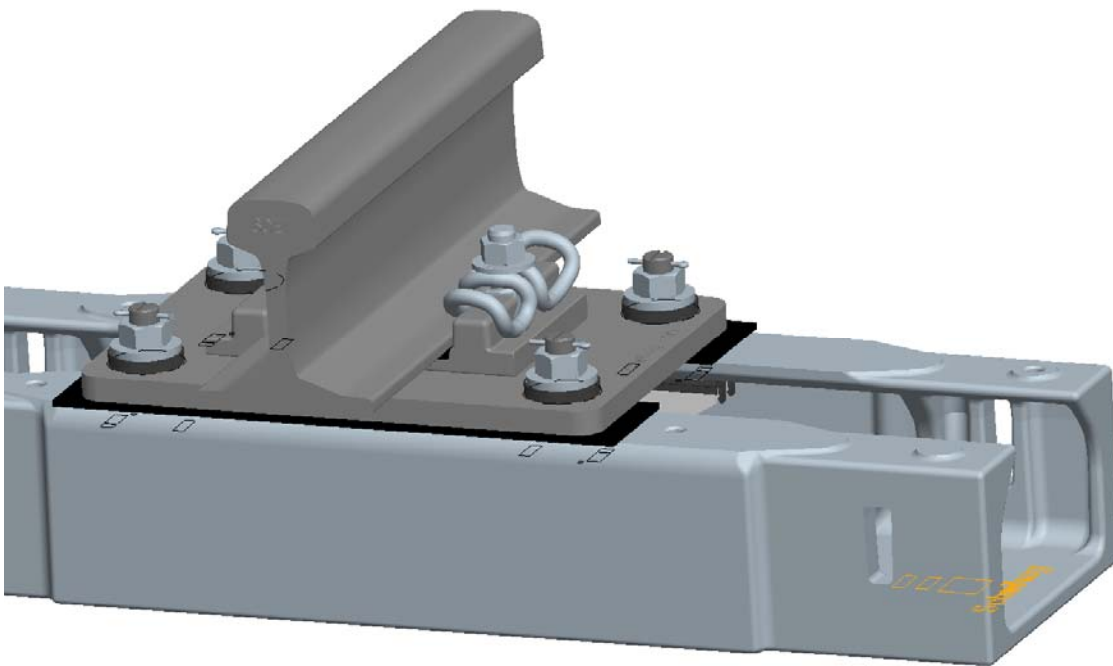
1. Lift sleeper, push hook bolt Hs32-55 into the screw chamber.
2. Position Skl 12.
3. Position plain washer Uls6
4. Position and tighten nut M22



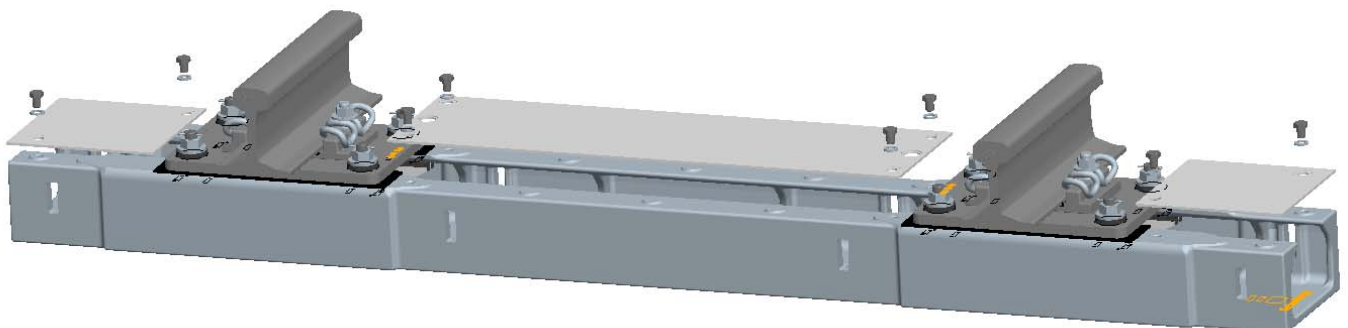
.....: **MONTAGEANLEITUNG** :.....
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The Skl 12 has reached the proper installation position if the middle loop of the assembly clip touches the rail base once the nut has been tightened or there is a gap of up to 2 mm. The tightening torque required to reach the installation position is max. 200 Nm.



3.6 Mounting the covers



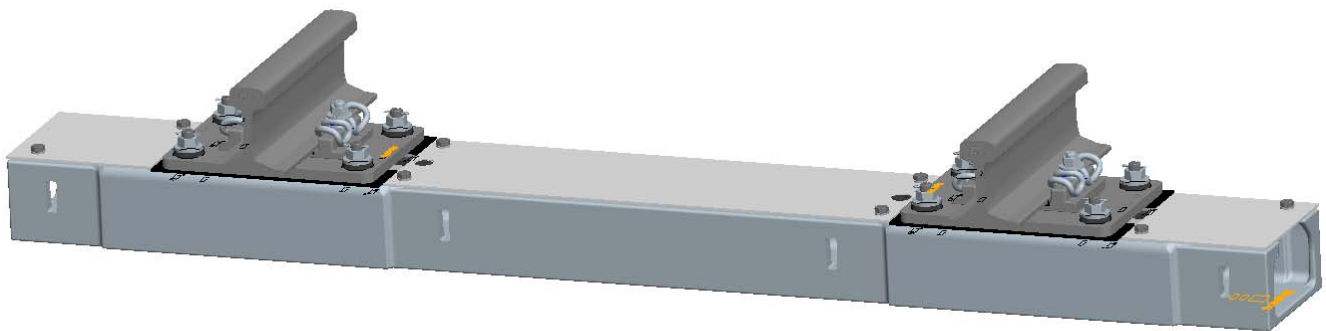
Mount the covers (floor plates) using 8 No. M16x20 hexagon bolts and spring washers.



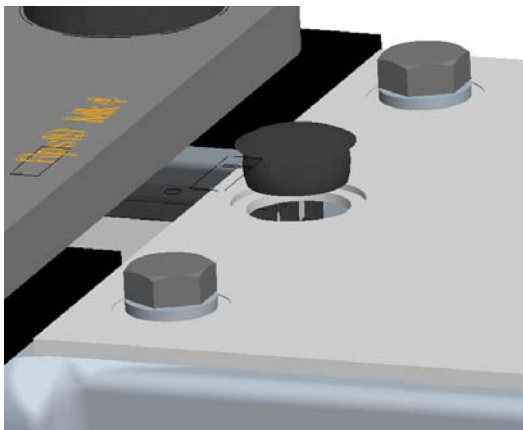
Assembly torque for final mounting of the screws for the cover is 150 ± 10 Nm.

..... MONTAGEANLEITUNG
ASSEMBLY INSTRUCTIONS

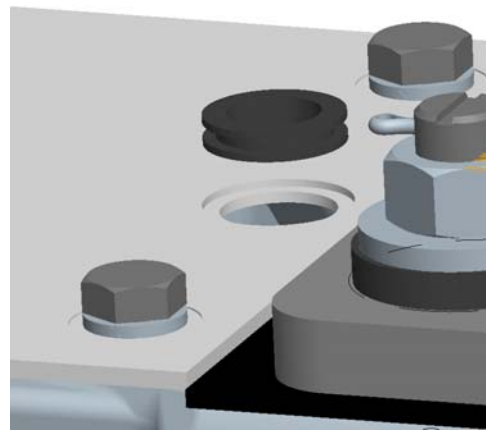
3.7 Ready assembled sleeper



The holes in the middle cover plate can be fitted with end cap SFL 34x1.3 or the cable penetration sleeve KD4, according to requirements.



End cap SFL 34x1.3



Cable penetration sleeve KD4

.....: **MONTAGEANLEITUNG** :.....
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4 Individual replacement of plate fastening and insulating parts

The procedure for the individual replacement of the fastening and insulating parts of the plate fastening is as follows.

1. Remove cover plate. If replacing fastening units in the middle of the sleeper, removing the inner plate will suffice. If replacing the outer fastening, only the outer plate must be removed.
2. Remove locking split pin and undo threaded joint.
3. If there are any cables in the sleeper, they must be shifted onto the side opposite the threaded joint to be removed with the help of a tyre lever.
4. Push the cables until the screw package can be removed from below.
5. Install the replacement parts as described in 3.4.

5 Assessing damage to the fastening and insulation unit

Visual assessment:

- Check for completeness of the insulation unit IE1 parts. See 3.4.
- Check assembly order of the fastening and insulating parts. See 3.4.
- Thread of the hexagon bolt damaged.
- Thread of the nut damaged.
- Are there any foreign bodies between the parts to be assembled?
- Split pin broken
- Snap-on fastening on insulating plate is broken. If at least 2 snap-on fastenings are broken, the insulation plate must be replaced.