

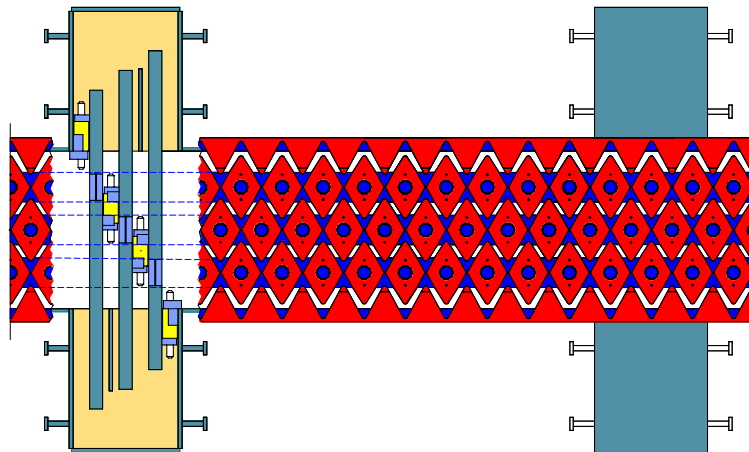


LOW-NOISE MAURER BLADE EXPANSION JOINTS XL TYPE

TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS SECTIONS

According to the requirements of:

German Federal Ministry of Transportation,
Building Industry and Housing
Department for Road construction, Road Traffic / Department S 25
Robert-Schuman-Platz 1
D-53175 Bonn - Bad Godesberg



Inspector:

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External controller:

German Federal Materials Testing Institute
University Stuttgart
Pfaffenwaldring 32
D-70569 Stuttgart

TECHNICAL APPROVAL

*of static and construction engineering
aspect according to TL/P-ING
CARRIAGE WAY CROSS SECTION
tested, see Inspection report-Nr.: 40/03
dated 15.12.03*

.....
Dipl.-Ing. W. Neumann, 58091 Hagen

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AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE	: CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

MANUAL

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0. Field of application

This Technical Approval covers often recurring constructions. Following limitation of the field of applications has to be considered:

- Moving direction $60^\circ \leq \alpha \leq 90^\circ$
- The superstructure on the gap has to be guided clearly, i.e. through a one-axis flexible bearing
- The carriage way inclination must not exceed 10% in the direction of the gap and 6 % rectangular to the gap. The specifications given on page 10 of this handbook are to be considered.
- Allowed displacements according to table 3.2 have to be maintained
- According to the ground plan, direction changes of the joint design are allowed only between two parapet units

Deviations are possible, they require however a test for each single case separately.

1. Persons in charge

1.1 Applicant and builder

MAURER SÖHNE GmbH & Co. KG
Frankfurter Ring 193
80807 Munich

Technical Bureau Munich
Mr. Dr. Braun, Mr. Volk

1.2 Producer of carriage way cross sections

MAURER SÖHNE GmbH & Co. KG

Technical Bureaus:

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80807 Munich

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Manufacturing sites

Frankfurter Ring 193
80807 Munich

Kamenzer Str. 4 - 6
02994 Bernsdorf

Installation crews

Frankfurter Ring 193
80807 Munich


Zum Holzplatz 2
44536 Lünen

Kamenzer Str. 4 - 6
02994 Bernsdorf

1.3 Producer of special components

See the "List of approved suppliers" according to the companies' work instructions QSA 1.810 in current version.

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1.4 Quality assurance

QA-System

The quality management system meets the DIN EN ISO 9001 standards. It was certified by DVS-Zert.

Monitoring

The supervision is divided into external and internal supervision. The documents and working instructions that form the basis of this TECHNICAL APPROVAL will be tested on their compliance with these regulations. Responsible for the External Monitoring:

German Federal Materials Testing Institute of the University Stuttgart
Pfaffenwaldring 32/ D-70569 Stuttgart

1.5 Approvals and verifications

Approvals for welding

Factory Munich	"The Extensive Proof of Suitability" according to DIN 18800 Part 7, DIN 15018 (DIN 18809 included in DIN 15018), DIN 4099 and DS 804
Factory Bernsdorf	"The Extensive Proof of Suitability" according to DIN 18800 Part 7, DIN 4099 and DS 804 (DIN 18809)
Branch Office Dortmund	"The Extensive Proof of Suitability" according to DIN 18800 Part 7, DIN 18809, DIN 4099 and DS 804

Approvals of factory welders

The condition to obtain an Approval is a Licence according to DIN EN 287-1.

Approvals of site welders

According to component demands, only welders with valid verification certificate according to DIN EN 287-1 and site welder's verification according to DIN 4099 are deployed. The related verification is at disposal on the site.

For blade welding with copper jaw touch according to QSA 1.510, Point 2.1 "Site welding of the blade" a special Certificate of Qualification has to be presented.

1.6 Producer's statement

MAURER SÖHNE GmbH & Co. KG declare herewith

- Compliance with the design conditions of all documents with the test certificates, listed in the index from 01.07.2003
- Compliance with quality assurance standards listed in the supervision contract from 01.04.2002.

Munich, 5 December 2003

Company management

Technical bureau

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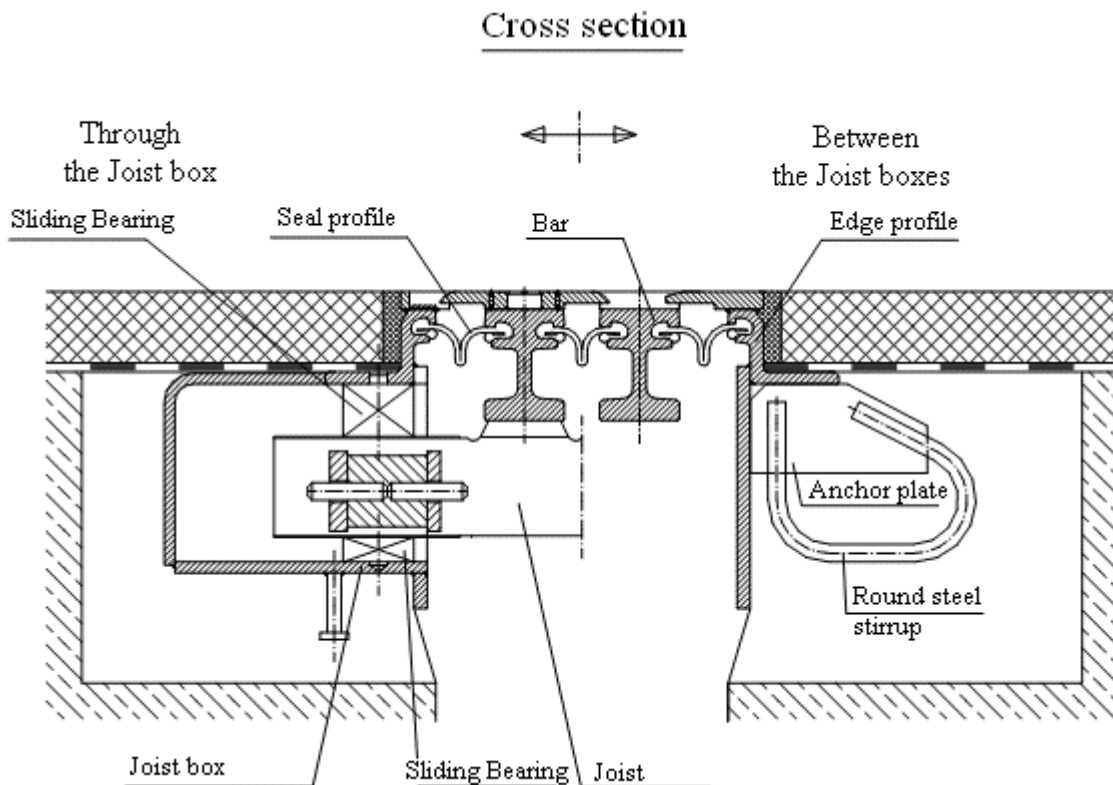
2. Description of the system

2.1 General items

At each MAURER-Blade expansion joint Type XL each blade is welded steep to the assigned cross bars. So an intern relocatable girder grid is provided. This cross section is to be applied in situations, where at both gap edges, i.e. at the abutment and at the superstructure there is enough space or enough space can be provided, to install the cross bar box in. Cross bars due to their construction demand the same expansion space at both gap edges. This Technical Approval covers the Types XL200 – XL600.

2.2 Mode of operation

The cross bars are positioned according to the moving direction of the structure. Other planned moving components than given are not going to be absorbed. For this reason bearings have to be placed under the movable superstructure in order to compensate the rectangular movement effectively.

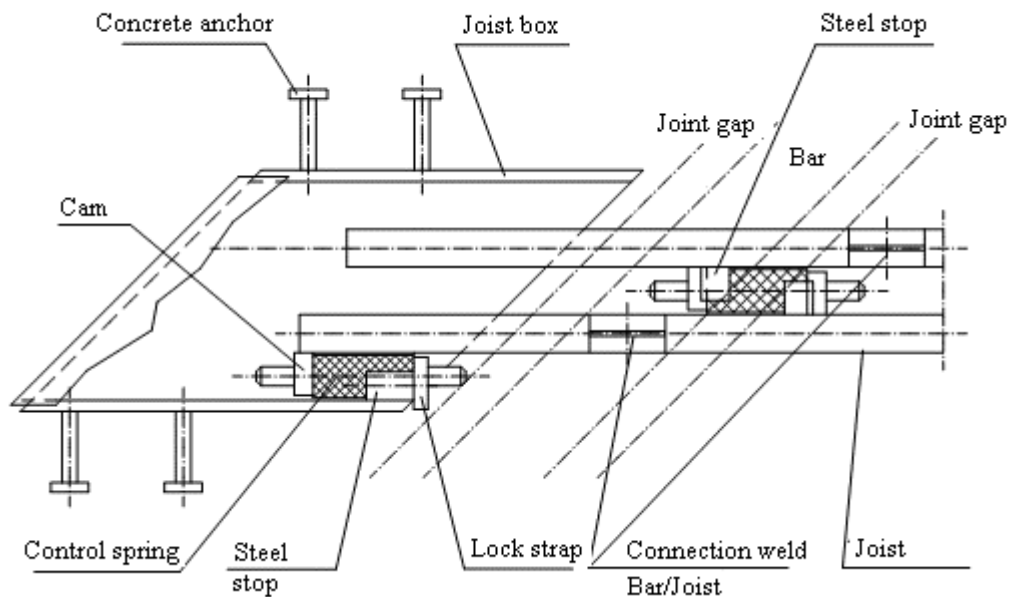


MAURER-blade expansion joints adapt always to the deformation of the structure. Control springs, positioned between cross bars or between the cross bar and the sidewall of the cross bar box, provide an equal distribution of the whole movement to each joint gap. Steel stops on cross bars prevent the opening of individual gaps for more than 100 mm.

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Ground view (XL 300)



The control springs consist of mostly closed cell Polyurethane, a suitable material for dynamic and shock stressed spring elements. The high allowed deformation (up to 80 % pressure deformation, relating to the uncompressed basic position) enables the production of elements with large allowed spring travel at small dimensions. The self absorbability of the material at the same time provides for oscillation and shock damping of dynamic stressed constructional parts.

The way of alignment of block pins for attachment of the control springs onto cross bars causes a compression of springs as the gap opens. At each opening state the springs are tense; the pressure pre-tensioning is lowest when the gap is closed.


Advantages of these control systems are:

- Adaptability to production tolerances
- Low accident sensitiveness
- Durability
- Insensitivity to movement enforcements
- Noise damping
- Possibility to expand individual gaps for maintenance works

2.3 Transmission of wheel load

The wheel loads burden diamond elements on the bars directly. Because of exocentric raiding wheel loads, based internal force variables are transferred through the bars over welded joints to cross bars. From there they are transferred over the bearing elements and control springs into the gap edges.

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2.4 Elastic bearing of cross bars

Cross bars at their structure edges are spring elastically set up on slide bearings. The cross bars lift-off from slide bearings within the cross bar box is prevented by means of a pre-stressed slide springs arranged above the cross bars.

Through this elastic bearing the momentum of the wheels is damped when transferred to the absorb elements of the cross section or to the neighbouring anchor parts. The arrangement of the elastomer bearing elements between all relatively converging components prevents any metal-to-metal contact and assures at the same time high damping of noises within the vulcanised rubber elements.

The elastomer bearing elements allow rotations about all three axes, whereby for instance unplanned restraint forces can be prevented.

2.5 Anchoring

Edge profiles are anchored with non stretchable anchor plates and welded round steel clamps in the concrete of the construction. The cross bar boxes have welded head bolt dowels to connect to neighbouring concrete. In steel bridges the edge construction is mounted on steel consoles or support holder parallel to the end cross beam.

2.6 Sealing profile

The bulbous-shaped EPDM strip is water proof and pullout seal and is installed in a claw in the edge beam and centre beams without the need for additional clamping bars. At the thickened places at the edge of the seal expansion joints a web is formed, which ends as a beaded rim. When the seal expansion joint is placed into the steel profile, the thickened part presses, using the wedging force, against the steel profile. By this means in addition to a form-locking connection, a friction-fitted Seal-/Steel profile contact is provided. At the same time the formed web with beaded rim acts as a lock which prevents jumping out in case of dragging forces. The connection is watertight, with the sealing element set below the road surface level. This way it is protected against direct wheel- or snowplough-contact.

The admissible displacement of the sealing profile rectangular in the direction to the gap is 95 mm. With its preformed articulated section it is possible to move the strip seal in direction of the carriageway without any appreciable strain. The admissible displacement in the direction to the gap of ± 50 mm causes a strain in the sealing profile.

Sealing elements can be replaced when the individual gaps are ≥ 60 mm. The gap width can be enlarged by moving the centre beams. The bulbous edge section of the sealing element locks it in the steel claw and is capable of withstanding wheel pressure on any impurities (e.g. stones, grit, snow etc.). The sealing element adapts to different kinds of joint design and bridge cross sections.

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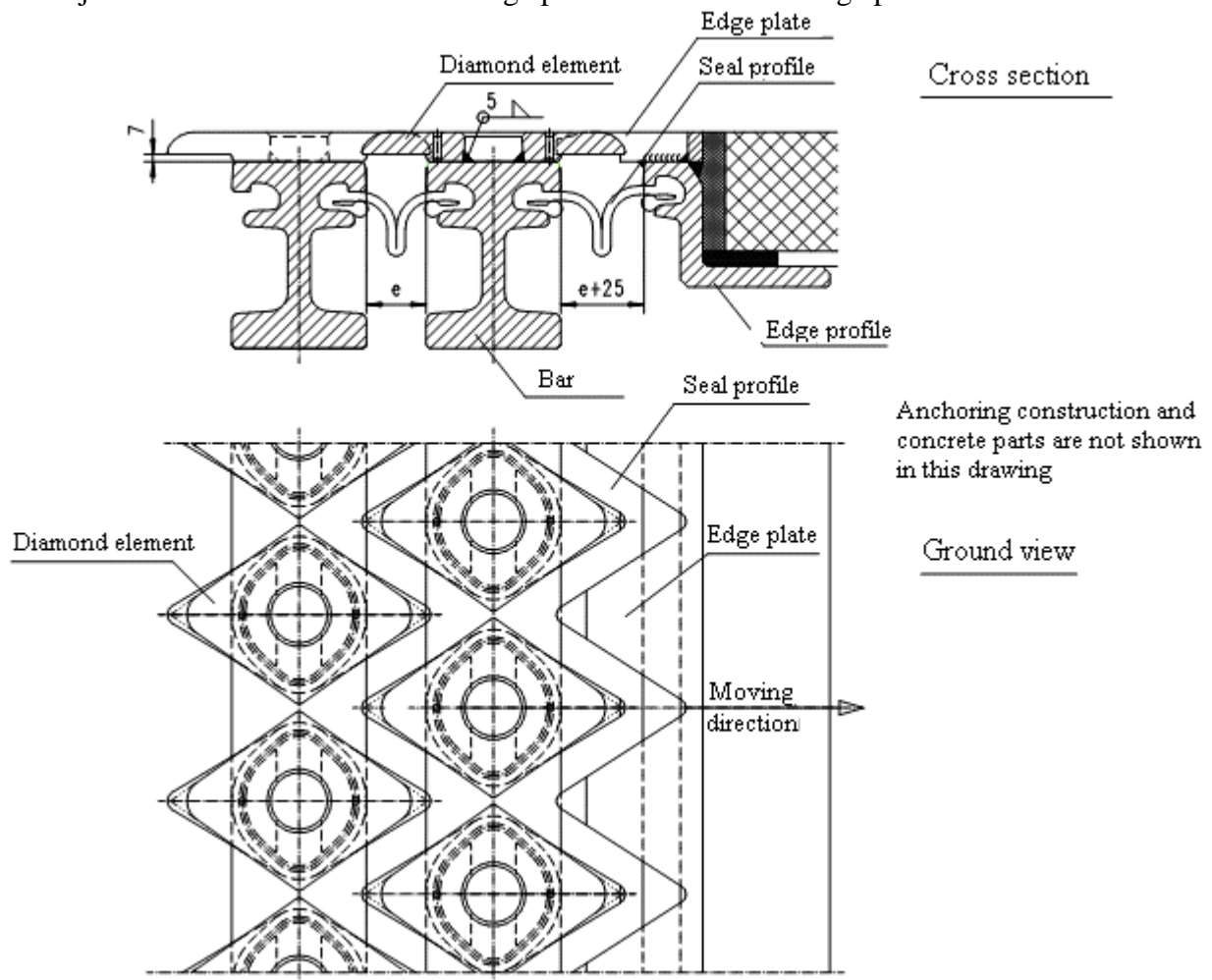


2.7 Noise reduction


On bridges the noise radiates not only from the driving surface but also underneath and is often additionally amplified by the swinging impulses of the bridge superstructure. The noises on uneven road surface and on cross sections are sensed as especially disturbing.

With the use of diamond elements the tyres do not hit the steel edges rectangular but diagonal against rounded tops and so a noticeable impact and noise reduction is achieved.

The diamond elements are attached to the underneath lamellas through punched welding. The diamond elements tops project over the edges of the lamellas and don't touch neighbouring lamellas or the edge profile. The elements cover partly the neighbouring gap of the joint without building a passing through gap on the joint. There is sinusoid cut-out edge plates welded on the edge profiles.



This gives a noise reduction of approximately 7dB for cars and trucks compared to usual joints made with lamellas crossed over rectangular to the gap ($\varepsilon = 90^\circ$).

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By welded diamonds, the carriage way geometry is also changed. The influence on the wheel load spreading at the cross section construction was technically experimentally tested at the TU-Munich, Prüfamt Landverkehrswege with comparative analysis of results for the lamellas with and without diamond elements. The truck wheel was put centric above the middle lamella and at the second line of the experiment between two lamellas. Additionally the load position of 5 different gap widths was tested.

The results showed that the lamellas with and without the diamonds had to absorb almost the same wheel load. At present forms there are also none static relevant differences. But when the maximal single gap width expands from 70 mm to 100 mm the fatigue strength relevant gap dimension also changes from 52, 5 mm to 75 mm. That fact causes a rise of the fatigue strength relevant vertical load from 60% to 65%.

All other known design concepts for carriage way cross sections have full validity for the diamond variety too.

The tests showed no differences in traffic security concerning the tyre grip between the constructions of lamellas with and without diamond elements at non profiled surface.

As the diamond elements are hammer forged the driving surfaces obtain an additionally chequered structure. This provides a better grip between the wheel and the diamond element and it is carried out as advancement of technical traffic security regardless of positive test results.


As the diamond elements are pouched welded, there is a non welded gap on the outer edge of the contact surface. To prevent corrosion damages, the following method was developed to provide adequate sealing.

The gap is sealed to the outer edge by a special sealing material. Silicon mass is pressed through a borehole into a sealing groove of the welded construction. Two control gaps enable the operator to check whether there was enough sealing mass injected. After this procedure, the borehole is closed with a smashed in cylinder bolt. The hardening of silicon prevents later on lateral leaking.

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3. Notices for the user

3.1 Checklist for planning and inspection

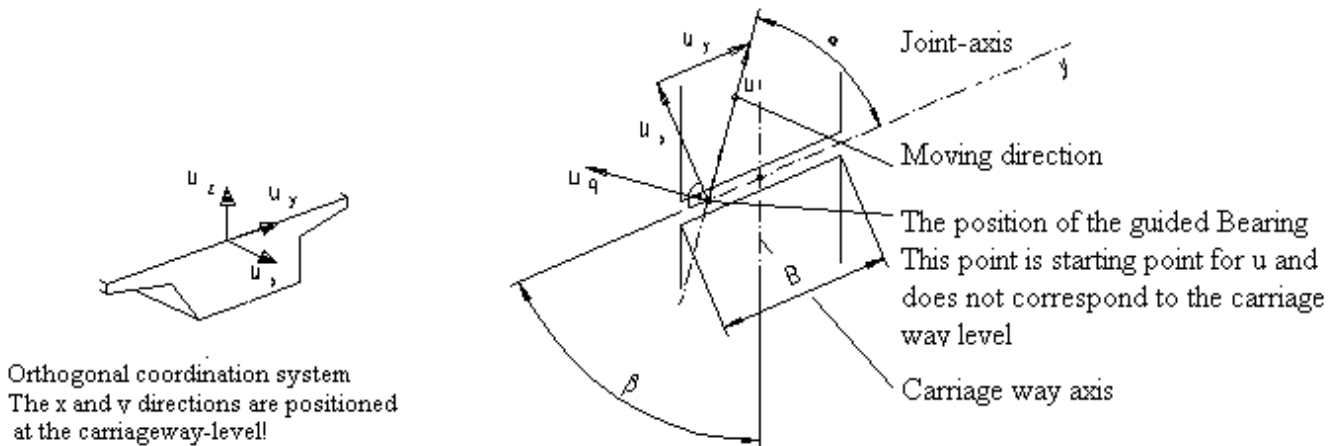
At the girder planning and inspection respect following points:

1	Field of application
1.1	Review of the ancillary conditions for the application area and the choice of the type of the cross-section
2	Movements
2.1	The calculation of movements of the cross section from rotation and displacement of neighbouring components due to <ul style="list-style-type: none"> ■ Temperature ■ Shrinkage and Creep ■ Lifting to exchange the bearing ■ Braking/drive away ■ Displacements of fixed points ■ Elasticity of the foundation ■ other Effects
2.2	Determining of adverse moving combination at the gap
2.3	Selection of Cross section considering the allowed movement according to specifications in tables in part 3.2
2.4	Check of final rectangular girder deformation in respect of specifications according to TL/TP-ING carriage way cross sections
3	Loads
3.1	Check of loads affecting the cross section through load estimates according to TL/TP-ING CARRIAGE WAY CROSS SECTIONS (special vehicles, inspection devices)
4	Pre-adjustment
4.1	Determination of the planned mounting temperature and the appropriate rectangular and parallel pre-setting according to the gap
4.2	Defining the change of dimensions of pre-adjustment in mm/°C
5	Recesses
5.1	Determination of the size und configuration of recesses according to Part 3.4 for anchoring of cross section's
5.2	In special cases: Dimensioning with approval of company Maurer Söhne
6	Anchoring
6.1	Planning of connecting armour or supporting constructions with steel constructions regarding the loads given in Part 3.5
6.2	Adjustment of reinforcements at the installation location of carriage way cross sections
6.3	Designing of reinforcements capable of trouble-free mounting with anchoring at connecting brackets of the cross section construction
7	Handling by the company MAURER SÖHNE
7.1	Issuing general arrangement and detailed drawings of specific structures
7.2	Examination and the proof of the geometrical operating conditions
7.3	Adjustment to the arrangement of the bars according to special construction requirements (clamping elements, recesses)

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3.2 Overview of the allowed moves determined within the scope of the Technical approval

All acceptable movements may arise in any combination within the given tolerance areas. Deviations from planned moving direction u are not allowed with XL200-600 types. For such types only $u_{q,zul} = 0$ is valid. For the angles φ_x , φ_z and the displacement u_z following formulae are valid.

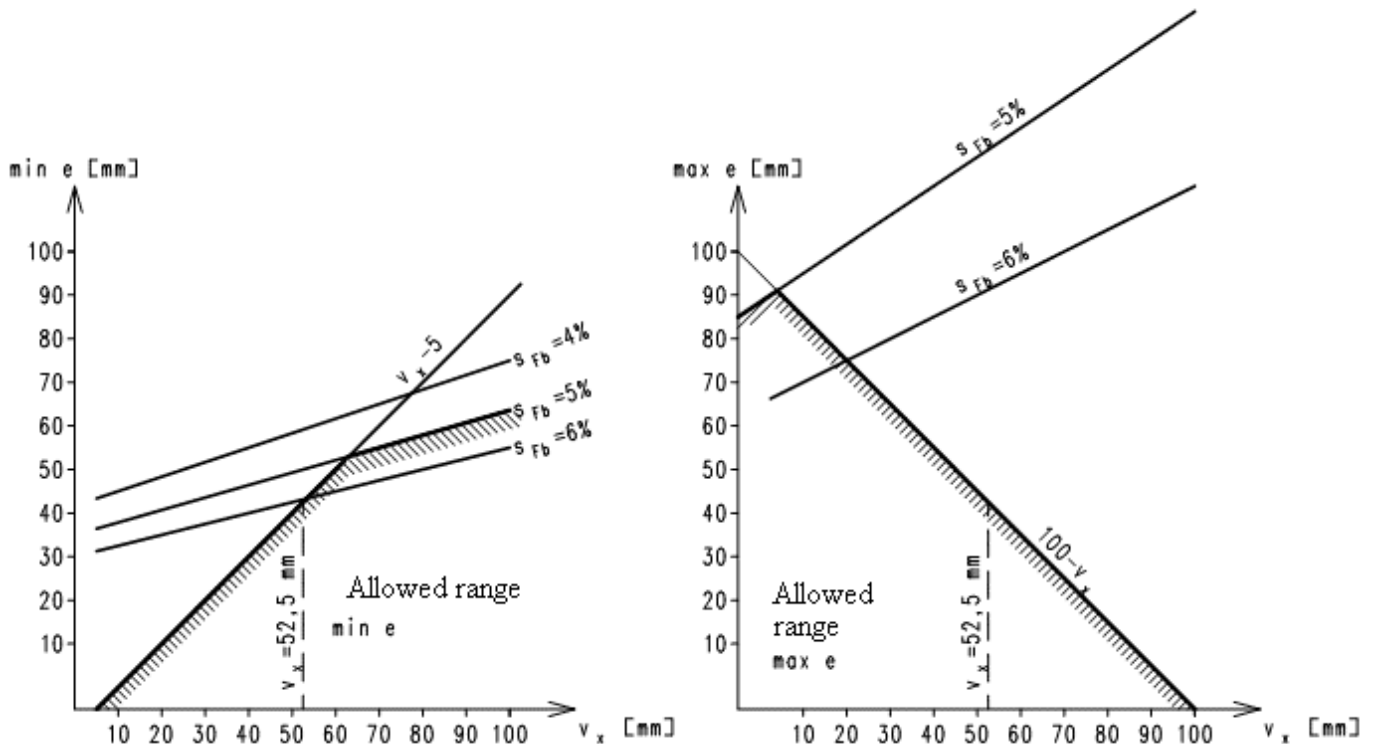


n	Type	u_x [mm]	u_z [mm]	u_z [mm]	φ_x	$\varphi_{y,stat}$	$\varphi_{y,dyn}$	φ_z	α [°]	β [°]
Number of sealing profiles		Total dilatation path	e=40 mm	e=50 mm	e=50 mm B=15 m			e=50 mm B=15 m		
2	XL200	190	$\pm 19,6$	$\pm 21,1$	$\pm 0,161^\circ$	$\pm 4,311^\circ$	$\pm 1,031^\circ$	$\pm 0,688^\circ$	$90^\circ \pm 30^\circ$	any
3	XL300	285	$\pm 29,4$	$\pm 31,7$	$\pm 0,242^\circ$			$\pm 1,031^\circ$		
4	XL400	380	$\pm 39,2$	$\pm 42,2$	$\pm 0,323^\circ$			$\pm 1,375^\circ$		
5	XL500	475	$\pm 49,0$	$\pm 52,8$	$\pm 0,403^\circ$			$\pm 1,718^\circ$		
6	XL600	570	$\pm 58,8$	$\pm 63,6$	$\pm 0,484^\circ$			$\pm 2,062^\circ$		

- n... Number of sealing profiles
- φ ... Movement direction of the superstructure ends (apply on guided bearings)
- u_x ... Movement component rectangular to the gap axis ($n \times 95$ mm)
- u_y ... Movement component parallel to gap axis ($\pm n \times 50$ mm (only for sealing profiles))
- u_z ... Height offset of the edge profile in z-direction as geometrical sustainable ($\pm 0,0754 \times n \times (90 + e[\text{mm}])$)
Limit in special cases of dimensioning (for example earth quake loads)
- u_q ... Movement component rectangular to moving direction
- φ_x ... Rotation about x-axis rectangular to the gap ($\pm \arctan((2 \times 0,0754 \times n \times (90 + e[\text{mm}]) / B[\text{mm}]))$)
- φ_y ... Rotation of cross bar bearings about y-axis (gap axis)
- φ_z ... Rotation about the z-axis at the driving surface ($\pm \arctan((u_{x,zul} - u_{x,vorh}) \times 2 / B)$)
- α ... Angle between gap axis y and moving direction u
- β ... Angle between gap axis y and carriage way axis
- s... Single gap width between the lamellas or between edge profile and lamella
- B... Gap length in y-direction

When these allowed movements are exceeded an inspection has to be exercised each time.

If the inclination of the carriage way surface rectangular to the gap exceeds $s_{Fb} > 5\%$, the dimension of u_x could be limited according to the dimensions of the pre-adjustment of carriage way cross sections v_x , because the movement of superstructure ends is possible through flexible bearings and the carriage way crossover is installed into the decline of carriage way surface and so decline changes occur in the area of the cross section. To match the demand according to TL/TP-ING CARRIAGE WAYCROSS SECTIONS part, 5.2 (3) of ($\Delta s_{Fb} \leq 2\%$) following arises:



The opening process:

$$\frac{\max e \times s_{Fb}}{90 + v_x + \max u_x} \leq 0,02 \quad \Rightarrow \quad \max u_x = 0,02 \times \frac{90 + v_x}{s_{Fb} - 0,02} \leq 100 - v_x$$

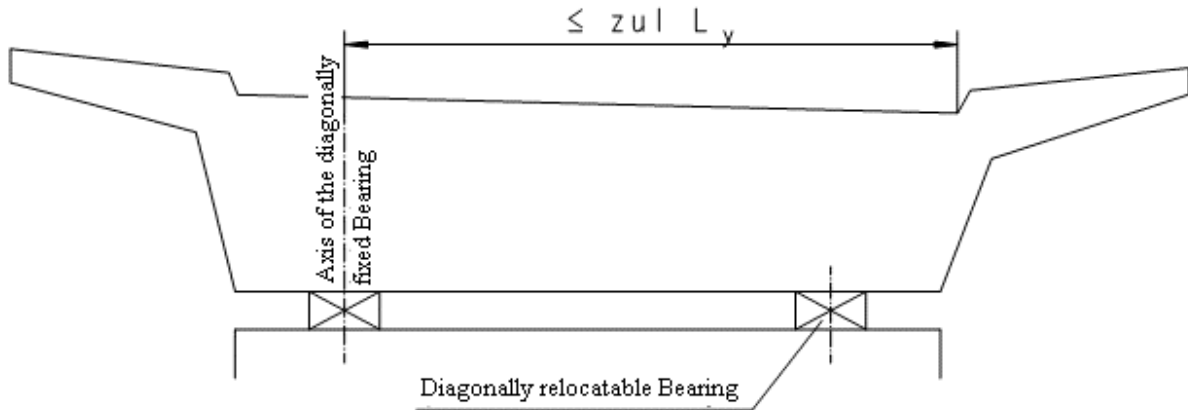
The closing process:

$$\frac{\min e \times s_{Fb}}{90 + v_x - \min u_x} \leq 0,02 \quad \Rightarrow \quad \min u_x = 0,02 \times \frac{90 + v_x}{s_{Fb} + 0,02} \leq v_x - 5$$

Jointly there is:

$$\text{zul } e = n \times (\max e + \min e) \leq n \times 95$$

3.3 Allowed constructional lengths in the carriage way area



With:

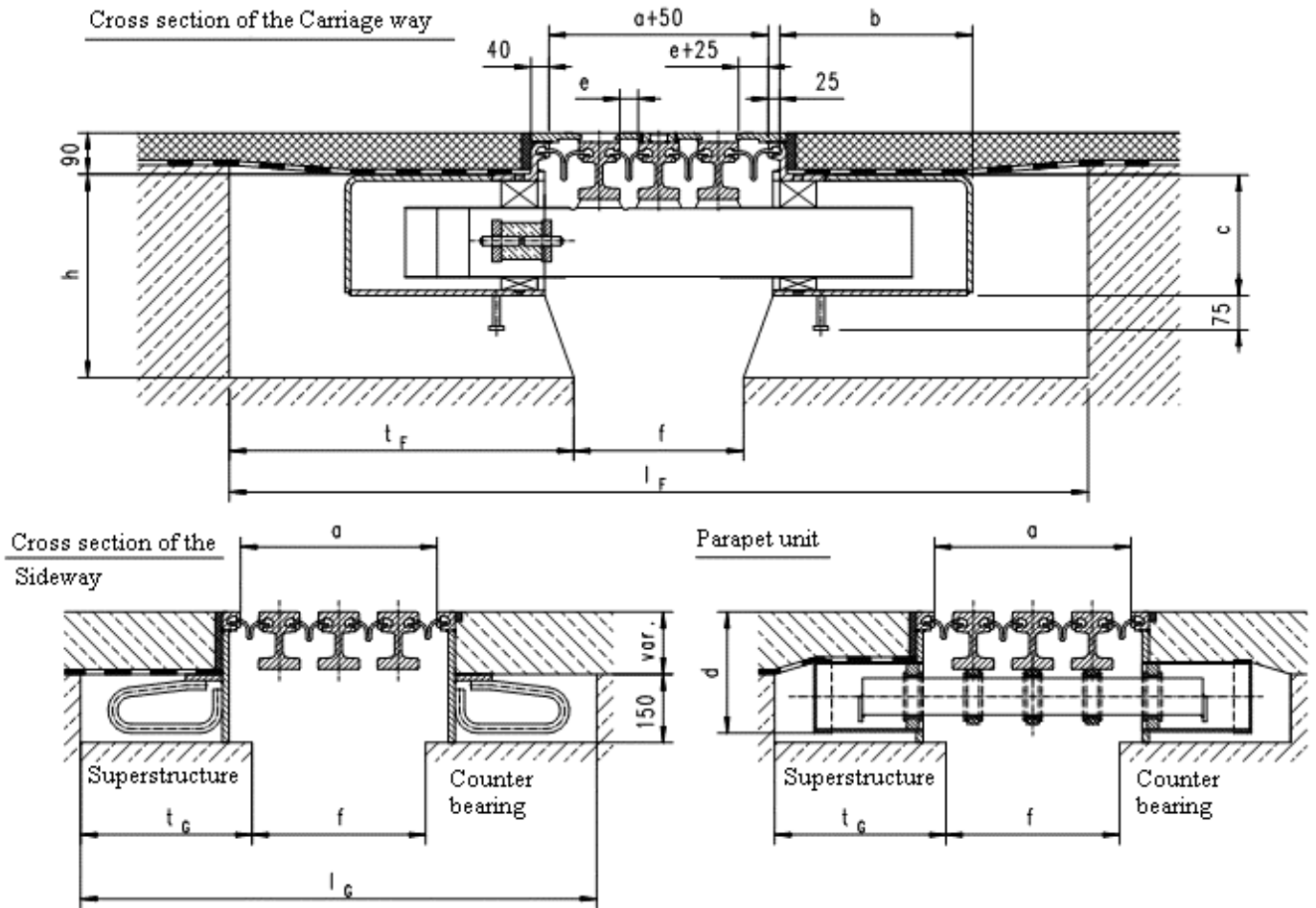
- n: number of sealing profiles
- zul L_y : allowed axis clearance of carriage way edge from rectangular fixed bearing in y-direction

where:

$$\text{vorh } L_y \leq \text{zul } L_y$$

n [-]	Prestressed concrete bridge with K+S zul L_y [m]	Prestressed concrete bridge without K+S zul L_y [m]	Steel girder concrete and steel bridges zul L_y [m]
2	11,1	25,0	16,7
3	16,7	37,5	25,0
4-6	22,2	50,0	33,3

3.4 Recess-sizes



MAURER-expan.joint			Construction measurements				Recess dimensions			Concrete-Gap dimensions			
n	Type	α [°]	a [mm]	b [mm]	c [mm]	d [mm]	h [mm]	t _F [mm]	t _G [mm]	f _{min} [mm]	f _{max} [mm]	l _F [mm]	l _G [mm]
2	XL200	90°-60°	190	237	226	255	350	400	300	170	190	970	770
3	XL300		330	337	246	255	370	500	350	300	330	1300	1000
4	XL400		470	437	266	255	390	600	400	430	470	1630	1230
5	XL500		610	540	286	255	410	700	450	560	610	1960	1460
6	XL600		750	650	306	255	430	800	500	690	750	2290	1690

- All dimensions rectangular to gap axis y
- n = number of sealing profiles
- a, f and l apply for adjustment dimension e = 50 mm per joint gap. If the dimension e differs, it has to be corrected with Δe .
- Recesses for pavement cross bars and cable conduits have to be considered individually
- due to the specific design of the construction, in special cases smaller recesses are possible. As long as the dimensions of the steel construction remain unchanged, suchlike deviation requires no special approval but falls within the competence of the bridge designer and the engineer competent for testing of the structure (consider the capability for concreting).
- Consider specifications given in Part 6.1.

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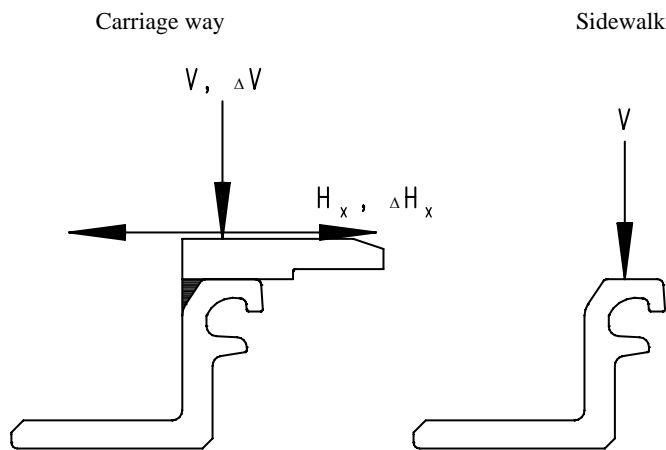
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3.5 Anchoring powers

Irrespective of carriage way inclination, V always acts vertical and H always horizontal. Stated power specifications apply at same size and direction for cross bar bearing boxes and edge profiles when connecting a steel bridge. The values for wear out evidence already contain the increase factor $\gamma_E = 1,25$.

Edge profile



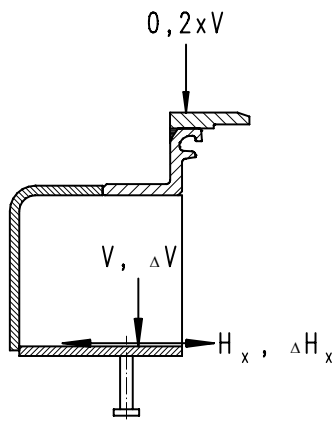
Moving resistance (friction and control)	
H_x [kN/m]	$3,0 + 1,5 \times n$
H_y [kN/m]	negligible

Certificate for load bearing		
	Carriage way	Footway
V [kN] *)	140	50
H_x [kN] *)	47,4	3,0
H_y [kN] *)	negligible	-

Certificate for tiredness		
ΔV [kN] *)	136,5	($\kappa = -0,3$)
ΔH_x [kN] *)	32	($\kappa = -0,73$)
ΔH_y [kN]	negligible	

*) The quoted loading lengths apply to wheel widths
($b = 0,60$ m for the carriageway and $b = 0,40$ for the footway)

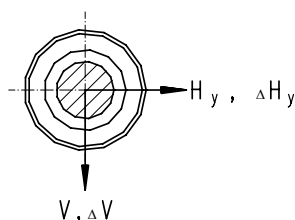
Cross bar box



Certificate for load bearing	
V [kN]	123,8
H_x [kN]	46,4
H_y [kN]	$46,4 \times \tan \alpha$

Certificate for tiredness		
ΔV [kN]	120,7	($\kappa = -0,3$)
ΔH_x [kN]	30,7	($\kappa = -0,73$)
ΔH_y [kN]	$30,7 \times \tan \alpha$	($\kappa = -0,73$)

Parapet unit



Load security according to	
V_{max} [kN]	39,6
V_{min} [kN]	-38,4
H_y [kN]	37,5

Weariness according to		
ΔV [kN]	-28,8	($\kappa = 0$)
ΔH_y [kN]	28,1	($\kappa = 0$)

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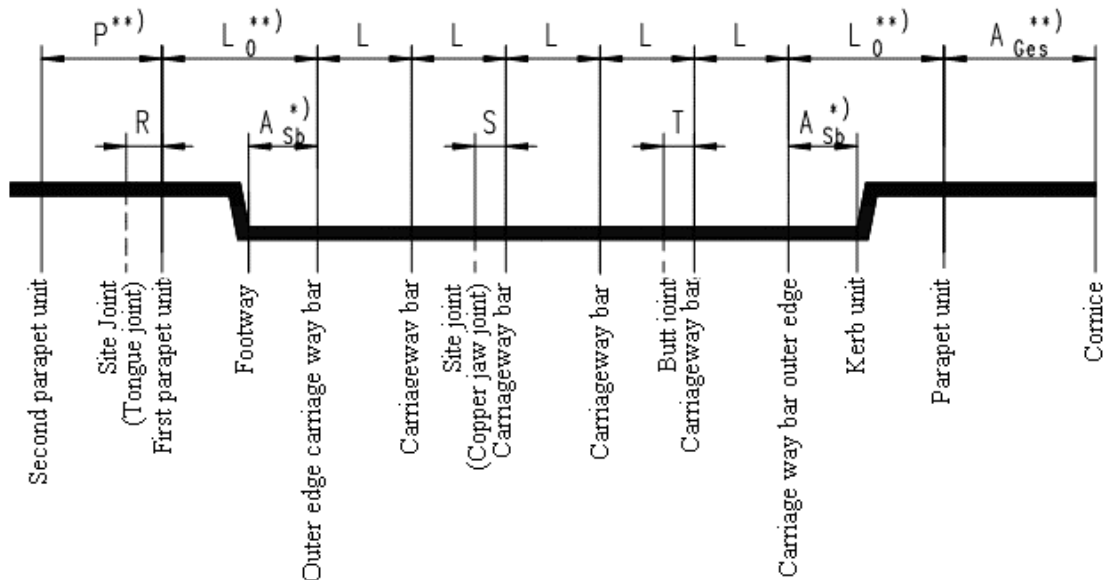
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4. Constructional requirements for the technical approved carriage way cross sections

4.1 Allowed cross bar interspaces and the arrangement of the joints

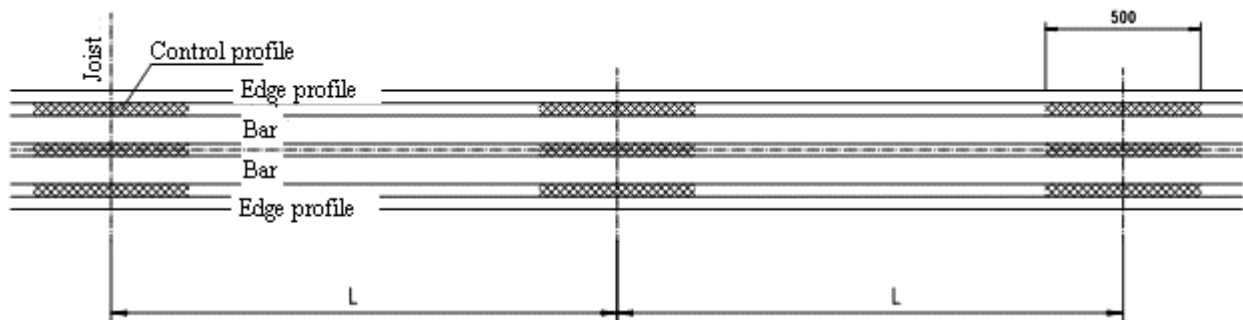
Cross section in direction of the Joint-axis



*) The values for A_{Sb} have to be maintained for each neighbouring n-1 Cross bar.

**) see Part 4.2

n	Type	s	A_{Sb} [mm]	L [mm]	R [mm]	S [mm]	T_{min} [mm]	T_{max} [mm]
2 to 6	XL200 to XL600	≤3%	≤830	≤1630	≤1630	≤570	60	370
		≤4%				≤527	65	342
		≤5%				≤483	70	313
		≤6%				≤440	75	285



When the bridge declination > 3% on all cross bar boxes of the carriage way an 0,5 m long guiding profile has to be inserted.

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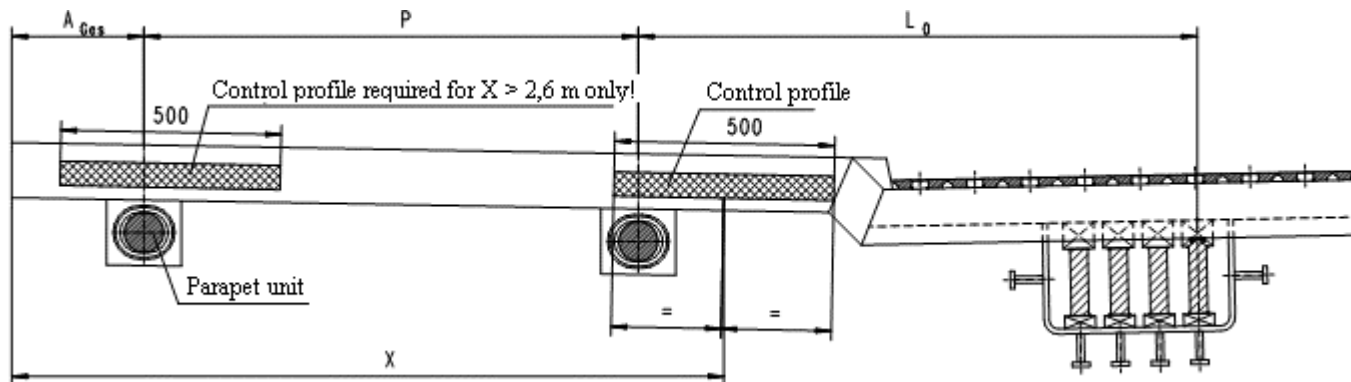
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4.2 Arrangement of Parapet units

The Parapet unit shall be of the swivel-type and built-in with a single gap recess-size of $e = 40\text{mm}$ rectangular to the gap axis. According to TL/TP-ING CARRIAGE WAYCROSS SECTIONS the vertical self frequency $f_v = 120\text{ Hz}$ and the horizontal self frequency $f_h = 40\text{ Hz}$ are not to be undershoot. Therefore the overhang length A_{Ges} has to be limited.



n	Type	A_{Ges} [mm]	L_0 [mm]	P [mm]
2	XL200	400	1630	0
		400	1630	1630
6	XL600	600	1630	1500
		600	1500	0

Is the clearance between the outer edge of the parapet area and the middle of the pavement steering at the kerfs shelf $X > 2,6\text{ m}$, on the outer Parapet unit additionally an 0,5 m long guiding profile has to be inserted.

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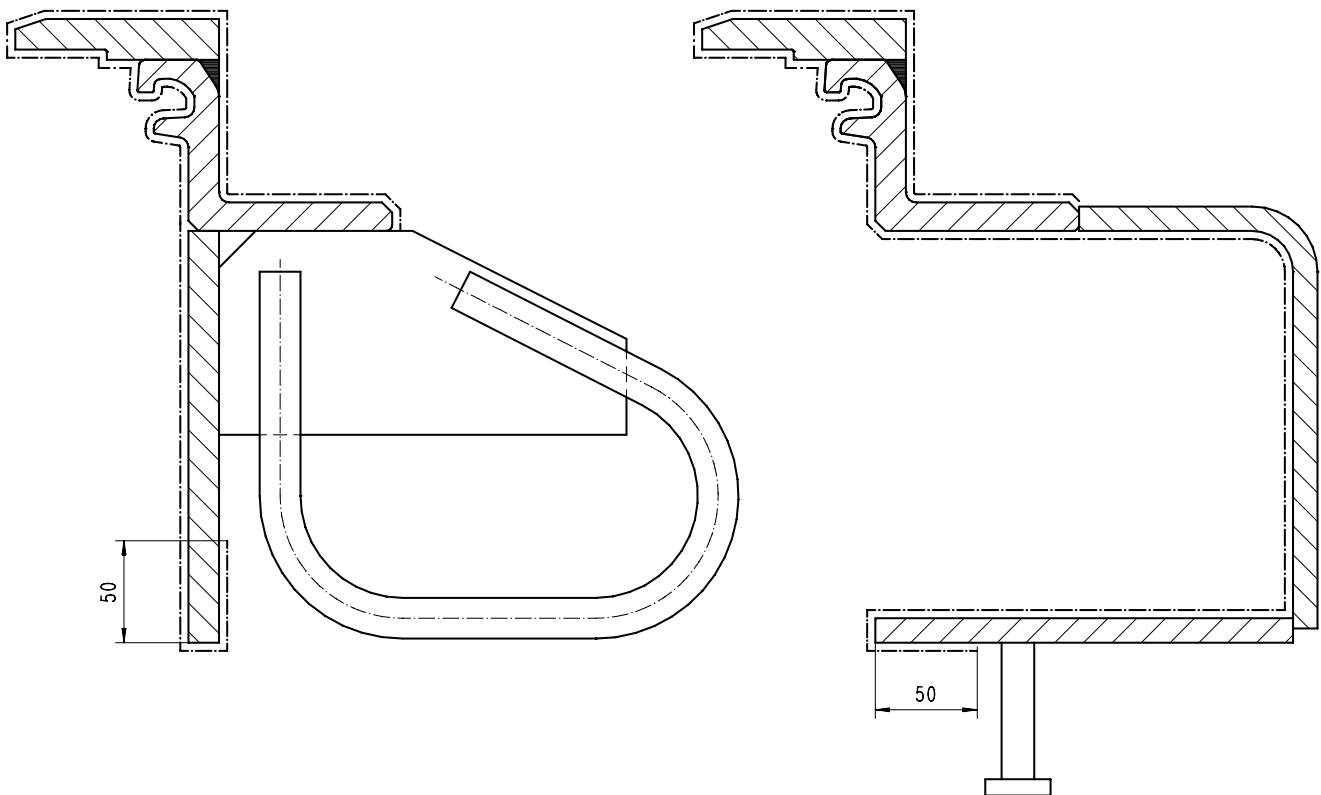
4.3 Factory provided corrosion protection

The corrosion protection of regularly tested constructions is executed according to ZTV-KOR-Steel constructions 2002
Appendix A


Corrosion protection system Nr. 1		Target layer thickness	Surface preparation	Materials according to TL/TP-KOR-Steel constructions 2002 Page Nr.
GB	EP-Zinc powder	70 µm	Sa 2½	87
1.DB	EP (micaceous iron ore)	80 µm each DB		
2.DB				
3.DB				
4.DB				

The blasting is executed in a flow through installation, the coating in airless-procedure following immediately.

The protected area is shown on following drawings:



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5. Installation instructions

5.1 Delivery

The Cross sections are delivered totally assembled at whole length or section wise on site. Auxiliary constructions support the transport, storing and installation, so cross sections maintain the right installation position and expert unloading. Hanging points for up and downloading are marked with colour, the installation position is marked and the total weight of each construction is stated on separate hanging plates or adhesive labels. The constructions have to be appropriate stored on site i.e. they have to be put on suitable underlay (i.e. on square shaped timber). Damage and dirt have to be prevented through well aired canvases.

Following table running meter loads can serve as guiding values for the crane layout.

Type	Load [kg/m]
XL200	250
XL300	350
XL400	500
XL500	600
XL600	800

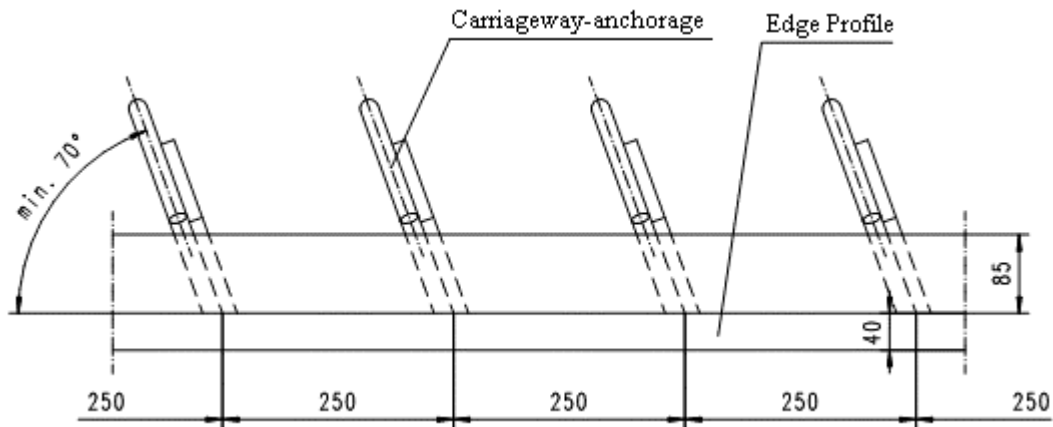
Table: Running meter loads for crane layout (guiding values)

5.2 Installation and Girder attachment to concrete components

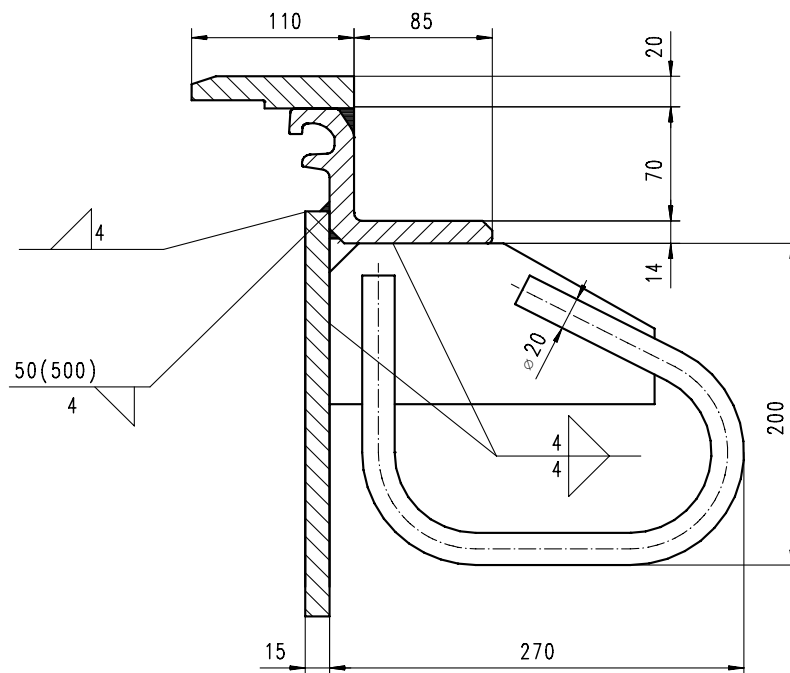
The size of recesses at the construction concrete is defined in advance as soon as at the structure planning according to Part 3.3 or finally according to our construction drawings and has to be erected accordingly. Always regard the proper width structure recess based on chosen setting dimension of the dilatation gap. The recess dimensions are to be checked once again just before installing and corrected, if necessary. The surfaces of the recesses have to be treated as working gaps according to DIN 1045.

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The girder attachment has to be executed in accordance with the rules of steel concrete or steel construction. A good connecting armouring has to be provided along the whole gap before installation. It has to be considered that normally anchoring loops at the edge profiles are placed rectangular to the gap. Expected variations from this direction are allowed only within the range of $90^\circ \pm 20^\circ$. As the anchoring armouring of the structure has to be parallel to anchor loops, that has to be considered as soon as at the structure planning and controlled on site.



The following drawing presents the standard-edge profile. It is almost of same shape for all types. The only difference is in the height H of the standing plate. Normally it reaches to the lower edge of the cross bar box. To enable the attachment, the steel plates are lengthened for 30 mm. That standard-edge profile is static equal to the construction for cross sections with a sealing profile according to Übe 1.



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A reinforcement in net or sling form has to be provided underneath the cross box as Reinforcement against split drag. See the construction plan after section 7 for appropriate data.

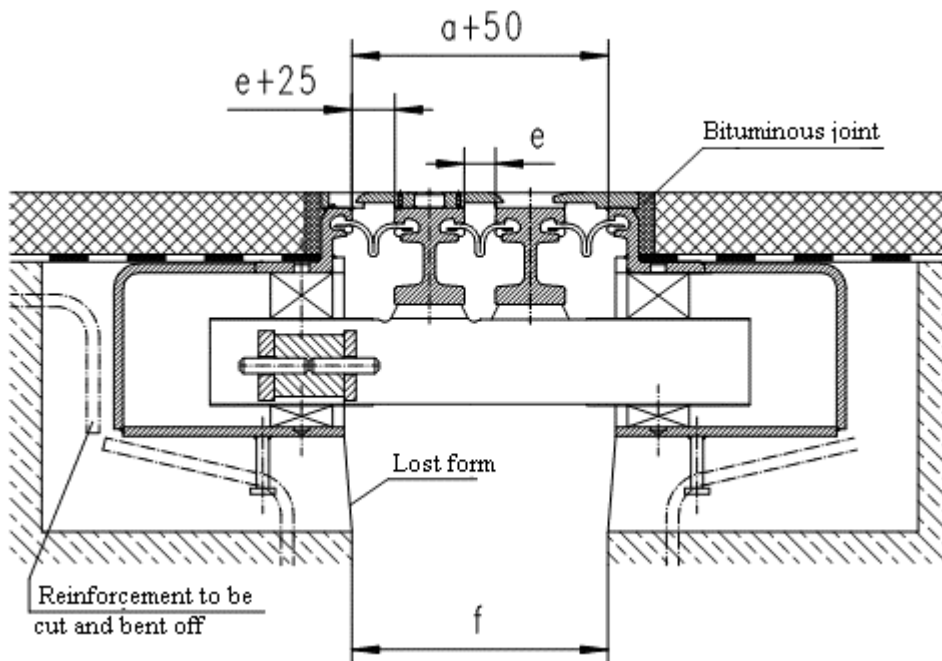


Abb. 1: Cross section of the cross bar box


Each construction has to be heaved into the recess by adequate truck mounted crane, then levelled to the required height and assembled parallel according to instructions of the site engineer and built in parallel to longitudinal and transversal slope or the carriage way. The edge profiles have to be aligned carefully along according to the ground plan and to the shear plan. Specifications of the height position of cross section relating to the carriage way surface from TL/TP-ING CARRIAGE WAYCROSSOVER have to be regarded.

After the carriage way crossover is aligned, vertical stiffeners are welded on sides of cross bar box as assistant support and the anchor slings and head bolt dowels of the cross bar box are welded with existing reinforcement. Take care, that the welding between the anchor slings and reinforcement first takes place on one side only. On the other side first additional structural steel for horizontal anchoring of head bolt dowels or at each of first anchor slings aside of cross bar boxes is added if missing and welded with the site reinforcement, but not with the construction of cross section. To shorten the period till loosening the installation holder as much as possible, first the welding is done in the area aside the cross bar boxes only then the installations holders are loosened, but not removed, and so additional bending strength is achieved although the possibility of motion is present.

Welding the remaining anchors with the reinforcement fixes the carriage way crossover stable at his final position..

After the attachment to reinforcements, the construction has to bear the appearing structure movements without influence on the later binding process of the concrete.

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After our personnel have finished the assembly, it must be checked and accepted by the construction supervisor and the completed installation of the construction has to be certified. Use the appropriate form referring to the construction.

Shuttering and concreting is carried out by the construction company. The recesses must be shuttered in such a way that the scheduled dimensions are obtained at the edge beam and the joist boxes. Attention must be paid to careful and close shuttering to avoid concrete tearing into the joist boxes and the joint gap between superstructure and abutment. A sealing drainage (acc. to drawing Was 11) must be assigned for the prevention of banking behind the edge beams.

The recesses must be cleaned carefully before concreting. Levels and axial position as well as the correct width of the expansion joint must be checked once again. Stick obligatory to the minimum measures of the concrete and the dimensions and position of reinforcements according to the constructional plan on page 4 after part 7.

Concreting the superstructure section requires the client's approval. The lean-mixed concrete must be low shrink and of even or higher strength as the structural concrete, at least quality C30/37. During concreting special attention must be paid to the compression of the concrete at the anchor plates, under the base plates of joist boxes and under the horizontal flange of the edge beams so that a solid bearing of the steel elements to the concrete is guaranteed and a sufficient composite action is obtained.

The steel and sealing elements must be protected during concreting or be cleaned with water immediately after the concreting procedure, so that there is no setting of concrete anywhere on the expansion joint.


After the setting of concrete the transit clamps, fastened on the superstructure, must be removed. Last, the shuttering within the joint gap has to be removed and the joint has to be cleaned.

5.3 Anchoring in the cap area

The anchoring of the cross section in the cap area is not allowed. A bitumastic filler has to be provided between the edge profile of the cross section and the cap area in the marginal and median strip range. The joint shows a wedge-shaped design to avoid cavitations. The bitumastic filler only allows movements of a few millimetres between the cap area and the structural concrete. Constructional design should ensure that larger movements remain impossible.

While concreting the cap area, due to inevitable construction tolerances, the end position of the possibly existent cover plates is to be considered. Shuttering aids can facilitate the accurate installation.

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5.4 Procedure for bridges with steel carriage ways

The working processes are analogue to fastening to concrete components (See chapter 5.2). Basically there are three different methods:

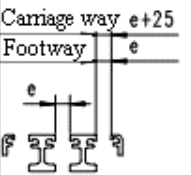
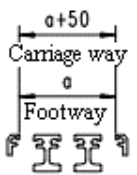
- a) Bearing on continuous beams which are positioned in front of the end cross girder
- b) Bearing on individual consoles with connection to the end cross girder
- c) Direct connection of the supporting sides of the joist box to the end cross girder

The kind of construction depends strong on structure and shall be planned, verified and proofed individually in detail. The TECHNICAL APPROVAL covers no steel connections. Start with the attachment of cross section to the steel superstructure when installing.

5.5 Control of the assembly dimension

The bridge design engineer determines the temperature-dependent gap and assembly dimensions. If there are no special requirements, the expansion joints are adjusted in the workshop for a structure temperature of +10 °C. The pre-setting already done in the factory and the relevant expected assembly temperature must be registered on the approved drawings. The dimensions for the temperature-dependent pre-settings can be obtained from the tables on the final drawings.

Installation dimensions for Type XL


			
Structural temperature	°C	Gap dimension e	Gap dimension a
	+ 5		
	+10		
	+15		
	+20		

The mean structural temperature shall to be determined before the assembly.

Picture 2: Example table for temperature dependent pre-adjustment

Directly before inserting the construction into the recesses the presetting must be checked by the construction supervision and, if required, readjusted by our fitters. If a correction of the pre-setting becomes necessary, this has to take place in the expected direction of movement. A higher structural temperature requires a closing, a lower structural temperature an opening of the construction. For that purpose the screws of the movable clamps (see picture 3) have to be unscrewed and then again tightened firmly after adjustment.

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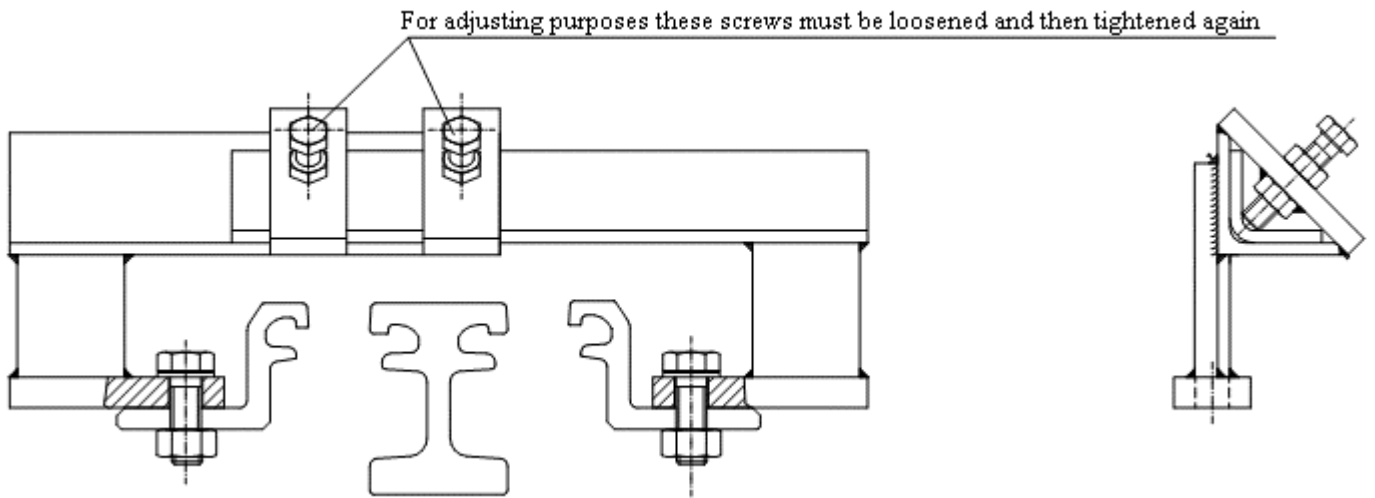


Abb. 3: Mobile installation holders

The slit opening f between skewback chamber wall and outer edge of the superstructure (See Picture 1) has to be checked. The rule is $a-10 \times n \text{ [mm]} \leq f \leq a+50 \text{ [mm]}$ (with the exception of the Type XL200, see Picture 6.1).


Possible changes of measures have to be acknowledged in writing to our specialists by the site engineer.

5.6 Sealing of the structure

In order to prevent the penetration of water between the edge profiles of the expansion joint and the concrete, the waterproofing has to be attached carefully and according to the relevant regulations. For the perfect connection a horizontal flange of 80 mm has to be provided, which must be cleaned carefully before applying the isolation. The sealing has to be attached to the expansion joint over the entire length, i.e. also in the marginal and median strip range.

During the surfacing operation the steel and sealing elements must be protected against impurities and excessive heat. A bitumastic filler according to the standard drawing Übe 1 has to be provided as a connection to the edge profiles of the superstructure section.

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5.7 Further notices

Appropriate measures should be taken in order to prevent driving over the cross section before the surfacing operation. If there is no possibility to redirect the site traffic running over the carriageway cross sections, then these need to be protected by bridge-crossings.

If due to the transportation and traffic related reasons site joints are required, the following has to be considered:

- Construction of joints according to chapter 5.8 to 5.11
- Sealing profiles general are vulcanised (see chapter 5.12)
- The diamond elements in connecting area are put in place after the connection of lamellas.

If the corrosion protection is damaged due to transport or installation, we recommend a touch up with single component air humidity hardening coating system:

- Machined grinding of steel parts, standard purity level PMA
- If this is not possible or flying rust is present, 20 µm of Stelpant-PU-Repair has to be applied as holding bridge. If machine grinding took part no holding bridge is allowed.

Surface Coating system:

Priming coating: 1 x 80 µm Stelpant-PU-Zinc
Don't allow greater overlapping with existing coating!

Surface coating: 2 x 80 µm Stelpant-PU-Mica, UV

Final coating: 1 x 80 µm Stelpant-PU-Mica, UV (colour according to plan)

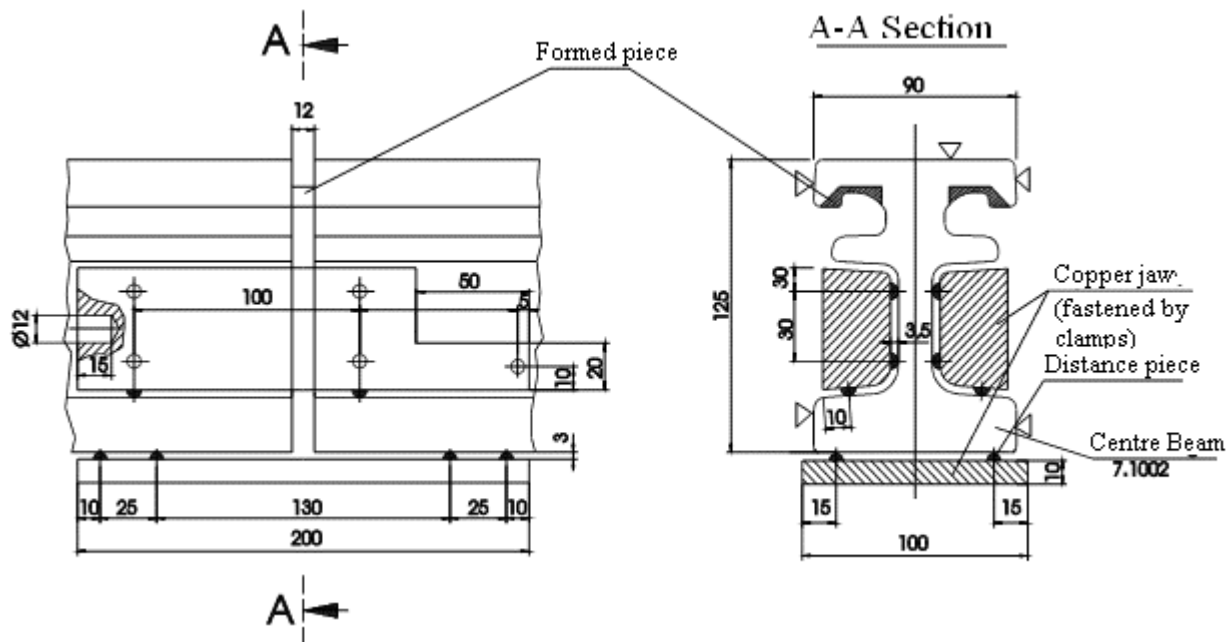
The holding bridge, priming coating and surface coating can be applied on the same day. The final coating can be applied 8 hours after the surface coating. For smaller mending jobs the appropriate coating material is to be delivered to the local construction supervisor so the final coating can be applied on the following day. All products are single-component and can be applied using a roller or brush even at air humidity up to 98%. Even at relatively low temperatures (about 0°C) the coatings dry very quickly.

Further possibilities for improving the corrosion protection can be obtained from the ZTV-KOR (Steel constructions).

After all works are done, the "Übe 2" form as an appendix to the building book according to DIN 1076, as well as the enclosed protocol of the mounting is to be filled in and signed. For cross sections, equipped with supervision marks of the external control institute, according to "Übe 2" lines 3 and 4, providing the certificates or test reports according to EN 10204 (DIN 50049) does not apply.

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5.8 Site joint of the lamella into the carriage way



Basic material:	S 355 J2G3 according to EN 10025 (St 52-3 according to DIN 17100)
Assistant material:	Electrode E 5154 B (R) 10 according to DIN 1913
Drying:	2 hours between 300 and 350° C
Preheating:	> 150° C measured 50 mm near by the weld
Temperature measurement:	Thermo chrome pin
Interlayer temperature:	150°C - 250°C
Weld form:	Steep flank shaft welding
Auxiliary material:	copper base for welding bath protection
Welding position:	W
Treatment:	Grinding of ∇ marked surfaces
Weld quality:	C or. B –grinded ∇- according to EN 25817
Certificate for welders:	DIN-EN 287-1-111 PBW WO1 wm t 15 PA bs gg With construction part referring additional corner weld test peace
Weld approval:	Colour penetration procedure with protocol

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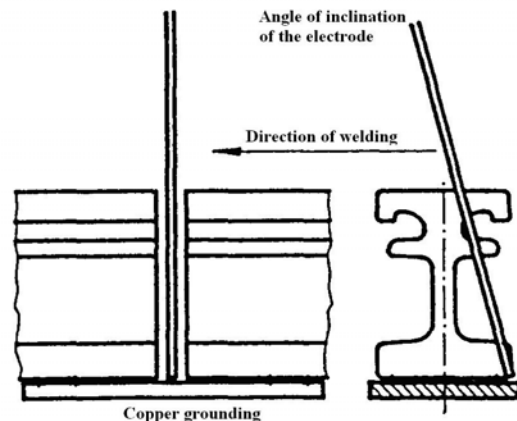
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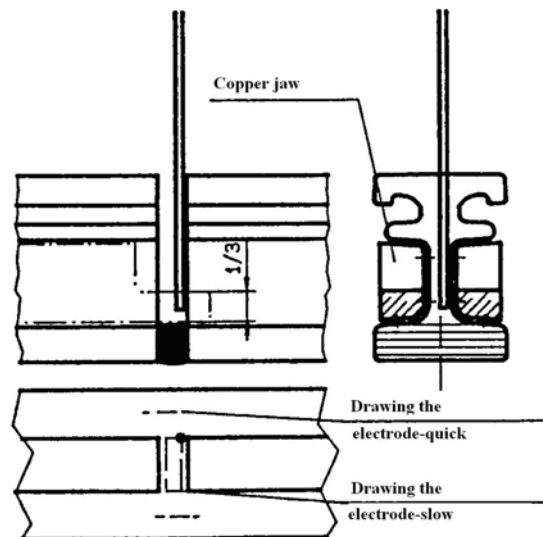


Assemble the lamella halves with = 12 mm air cleft. Edge displacement of middle beam ends through the welding mounting clamps has to be aligned in a way that prevents larger displacement as 2 mm. Attach the copper base to flange (See the drawing). The rod electrodes have to be applied to the flanks askew so that the melt out occurs.



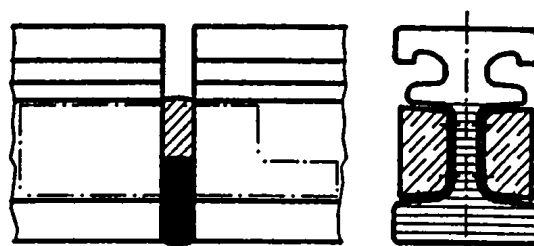
Preheat approximately 100 mm left and right of the joint to > 150° C. Welding of welding root, cinder removing. Sight inspection of root position (correct if necessary). Welding of filling and deck layers alternately from left then from right.

Sidewise inserting and adjusting of copper yaws. Welding of the truss ligaments (without cinder removal. Each electrode is melted without interruption). Take care that copper yaws are attached in a way where only 1/3 of truss ligament is covered (See the drawing).



Move the copper yaws so that the truss ligament is fully covered.

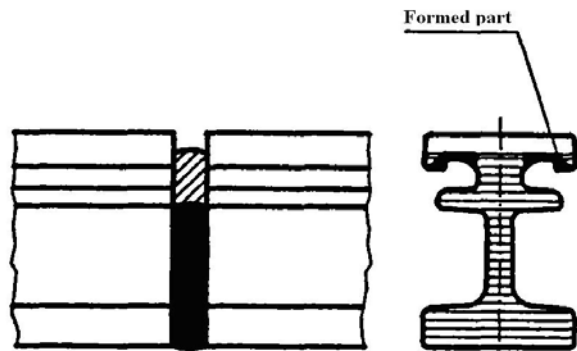
Truss welding to the upper edge
Copper yaws. Remove cinder (Welding of truss ligament without cinder removal), Swing!



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Remove the cinder on truss and flank. Adjust the form part and tack (see the drawing). Weld the truss head in the root area with a 2,5 mm-electrode, filling and deck layers with a 3,25 mm-electrode. **Strike grubs!**

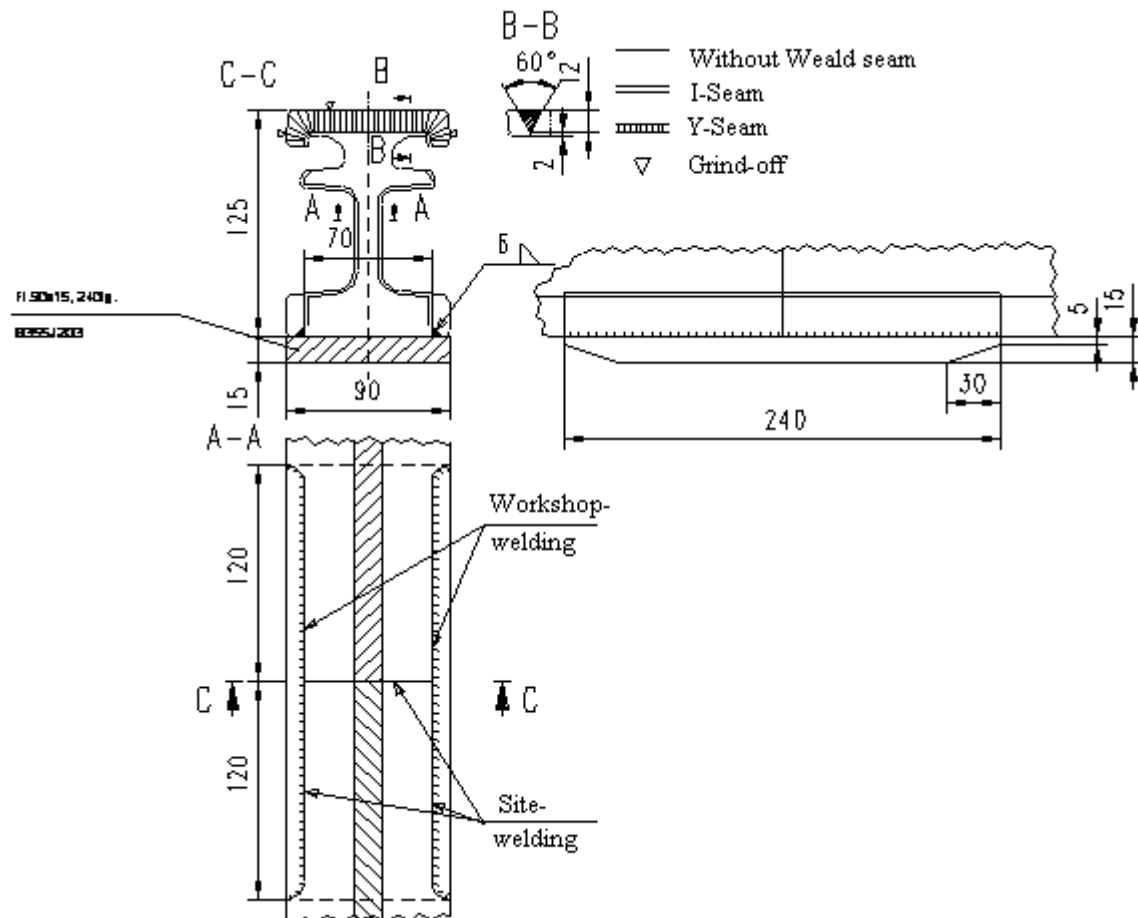
Cinder removal, then welding of filling and deck layers left and right.
Strike grubs!



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5.9 Site joint of the bar (strap joint) outside the carriage way



- a Fastening of underlying flat steel on one side)
 b Welding the fillet weld $a = 6$ mm) factory welding
 c. Assembling and tacking of bumping ends of the lamella
 d Welding the fillet weld $a = 6$ mm in the milled edge of the lamella
 e Welding of upper flange
 f Welding of seam weld (full seam butt)

Basic material:	S 355 J2G3 according to EN 10025 (ST 52-3 according to DIN 17100)
Supplementary material:	Electrode E 5154 B (R) 10 according to DIN 1913
Drying:	2 hours between 300 and 350 ° C
Preheat temperature:	> 150° C measured 50 mm aside of the weld
Temperature dimension:	Thermo chrome pin
Interlayer temperature:	150 - 200° C
Welding position:	h,w,s,ü
Weld quality:	C or B –grinded V-according to EN 25817
Certificate for welders:	DIN-EN 287-1-111 PBW WO 1 wm t 15 PA bs gg

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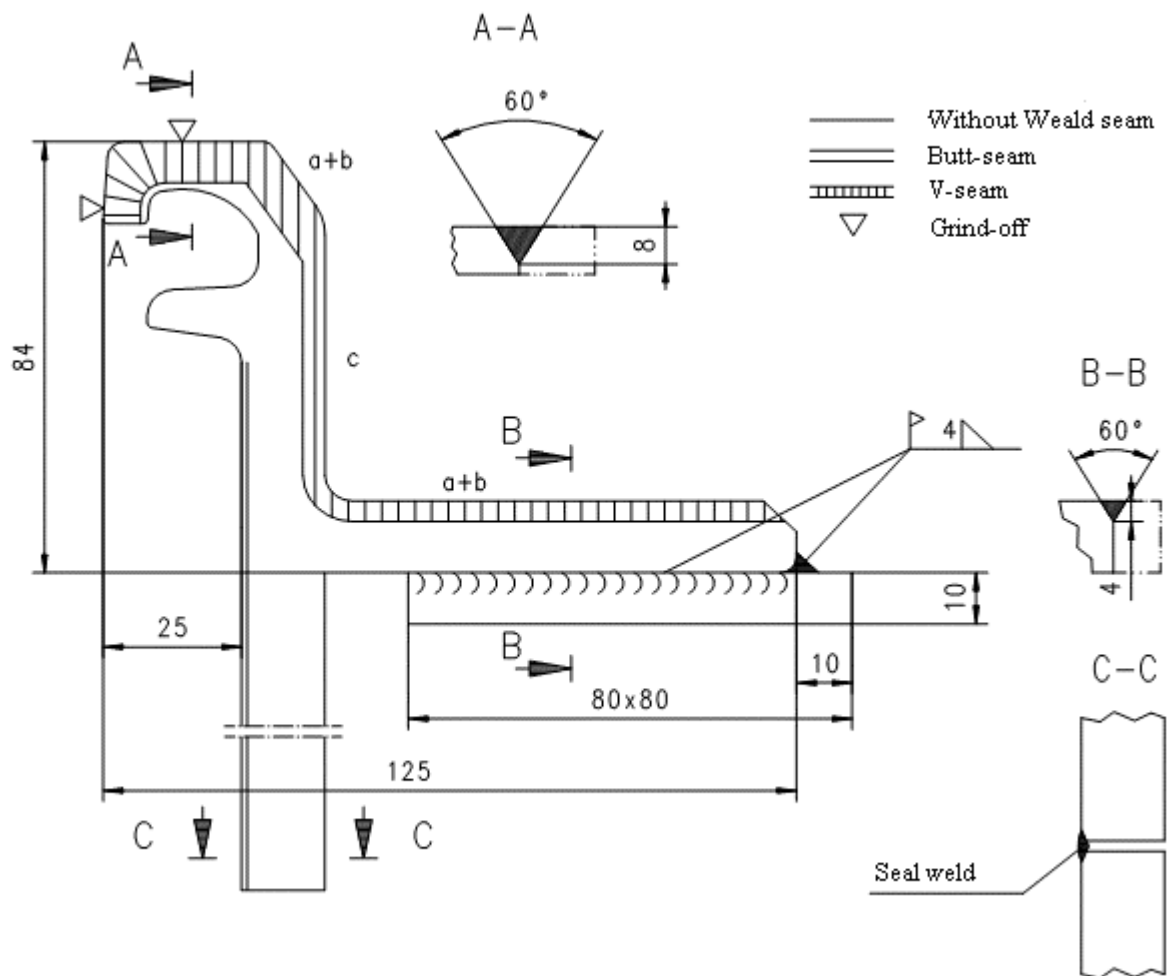
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5.10 Site joint of the edge profile in the carriage way



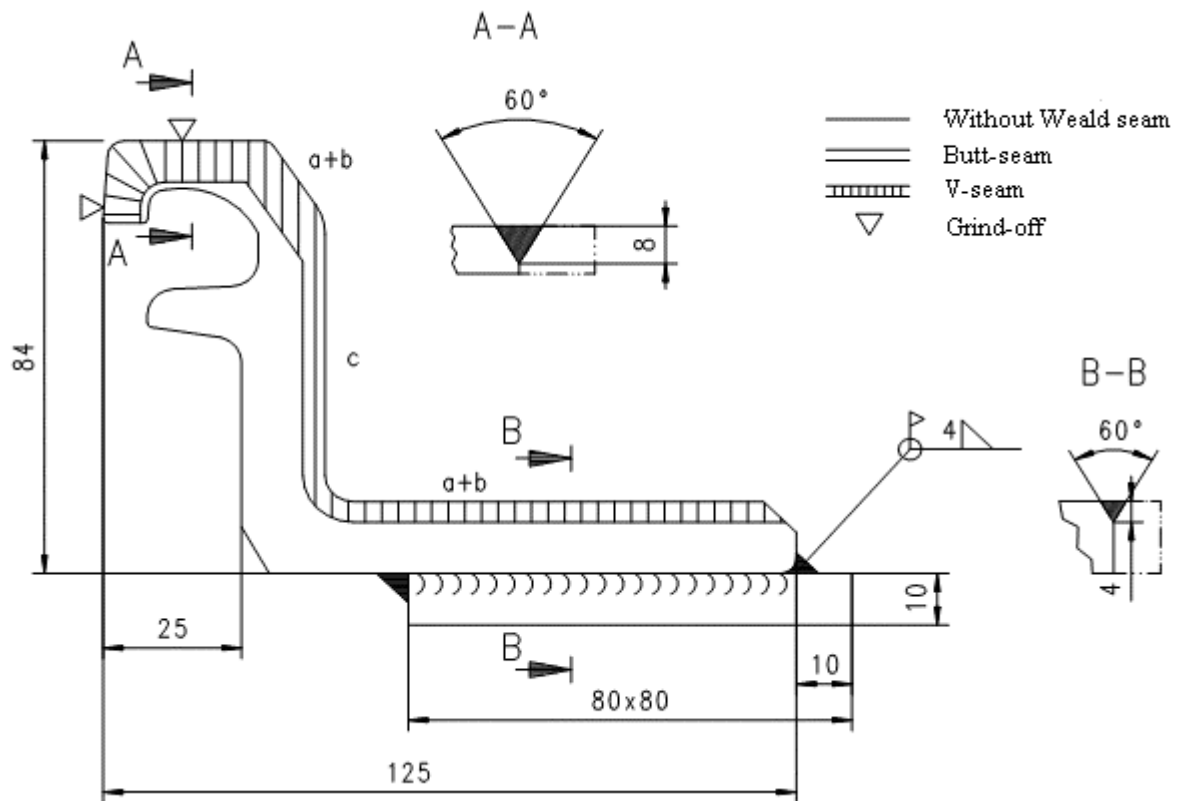
- a Fastening in the sheer plan contour in upper and under flank
- b welding of the upper and under flank
- c Welding of the catwalk in s-Pos.
- dG grinding of front sides truss head ▽

Basic material: S 235 JRG2 according to EN 10025 (St 37-2 according to DIN 17100)
 Supplementary material: Electrode E 5154 B (R) 10 according to DIN 1913
 Indirect material: non
 Welding position: W
 Weld quality: C or B - grinded ▽ - according to EN 25817
 Welder inspection: DIN-EN 287-1-111 PB WO1 wm t 15 PA bs gg

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5.11 Site joint of edge profiles outside of the carriage way



- a Tacking in the sheer plan contour in upper and under flank
- b Welding of upper and under flanks
- c Welding of the catwalk part in s-Pos.
- d Grinding of front side and truss head ▽

Basic material: S 235 JRG2 according to EN 10025 (St 37-2 according to DIN 17100)
 Supplementary material: Electrode E 5154 B (R) 10 according to DIN 1913
 Helping material: none
 Welding position: W
 Weld quality: C or. B - grinded ▽ - according to EN 25817
 Welder inspection: DIN-EN 287-1-111 PB WO1 wm t 15 PA bs gg

COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS	
SECTIONS	

VERFASSER :  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

5.12 Vulcanised joint of the sealing profile

If for technical reasons a joint on site is required, it has to be executed according to this instruction. The procedure matches the procedure inspection according to Prüfzeugnis GÜ 26/96 of the Institute for road, railway and airfield construction of the Technical University Munich..


The vulcanised joint is to be setup displaced to the according welded joints of steel profiles.

The side joint has to be executed by special trained staff only. The execution and control of such joints has to be protocol led.

-Work sequences

- (1) Profiles to be cut off rectangular.
- (2) Prepare the cutting edges.
- (3) Roughened cutting edges to be painted with EPDM solution
- (4) Crude rubber to be attached
- (5) Put EPDM profile onto the vulcanising core
- (6) Assemble EPDM profile and put into vulcanizing mould
- (7) Clamp the profiles into tensioning device
- (8) Put on the upper part of the mould and close the heating device
- (9) Heat the mould and start to vulcanize
- (10) Let the vulcanisation joint cool down
- (11) Remove the profile from the heating mould
- (12) Estimate the quality of the joint and record the data
- (13) Install the profile

COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS	
SECTIONS	

VERFASSER :  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

 MAURER SÖHNE	Certificate of acceptance / Protocol of the mounting
---	---

Order Number:

Construction: _____
Client (Building enterprise): _____
Contractor: Maurer Söhne GmbH & Co. KG

S c o p e o f s e r v i c e s :

type _____ r.m. _____ BA _____ Bl. _____ axis _____
 Presetting at delivery: a = _____ mm at BW-temp. _____ °C
 Presetting at mounting: a = _____ mm at BW-temp. _____ °C
 Structural gap f = _____ mm
 Correction on request of _____
 Start of operation: _____, _____ o'clock

type _____ r.m. _____ BA _____ Bl. _____ axis _____
 Presetting at delivery: a = _____ mm at BW-temp. _____ °C
 Presetting at mounting: a = _____ mm at BW-temp. _____ °C
 Structural gap f = _____ mm
 Correction on request of _____
 Start of operation: _____, _____ o'clock

Constructions correspond to the approved implementation plans

The corrosion protection is in due order

Approval of the mounting joint bar without complaints

Approval of site joints and vulcanisation joints of the sealing profiles without complaints

Defects: _____

Comments: _____


At: _____, date: _____

MAURER SÖHNE

CLIENT

Ø _____ **This protocol is to be enclosed as an appendix to the protocol Übe 2**

COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS	
SECTIONS	

VERFASSER :  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

6. Notices for maintenance, preservation and exchange of wear and tear parts

MAURER-Lamella-expansion joints in frame of planned use period for at least 20 years are maintenance free. But to spot eventually appearing defects on time, before greater damage occurs regular supervision and inspection of the components is appropriate. Periodic and extent are conforming with valid standards i.e.:

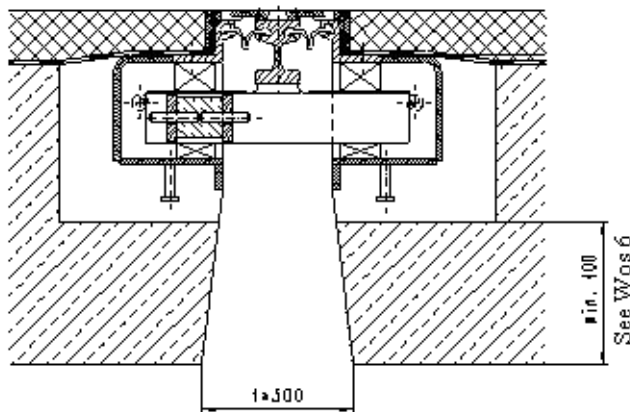
- DIN 1076
- Product specification sheet for construction supervision for buildings (M-BÜ-K)
- Form Übe 2
- Directive for the control, approval and preservation of constructional design and equipment of bridges (RBA-Brü 90)

6.1 Accessibility

All plastic parts can be exchanged from the carriage way. A maintenance and inspection run has to be provided with new constructions according to Part 6.2 (construction plan WAS 6 and directive RBA-Brü). The light width in the structure gap adapts according to the movement of the gap and according to the number and breadth of the Lamellas. Just underneath of the cross section construction the light clearance f is in the centre position of the construction (See page 12):


Type	f [mm]
XL200	300
XL300	350...380
XL400	480...520
XL500	610...660
XL600	740...800

*)
You can reach the planned 300 mm with the types XL200 through the enlargement under the gap for constructional reasons only.



With the change of the middle gap width $s=50$ mm of the carriage way crossover the dimension f changes for $n \times \Delta s$.

COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS	
SECTIONS	

VERFASSER :  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

6.2 Regularly controlled components

(1) Sealing profiles

- dirt
- aging
- joint connections
- damage
- secure hold
- closeness
- regular and sufficient gap widths

w


(2) Gliding elements

- dirt
- wearing out
- surface damage
- proper adjustment
- smooth movement
- rubbing between individually moveable parts

(3) bearing and spring elements

- correct position
- damage
- crack free
- sufficient pre-stressing and attachment
- notable noise production

COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS SECTIONS	

VERFASSER :  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

(4) Corrosion protection

- underneath the sealing profiles
- in the footpath areas
- underneath the steel plate covers.

On driven surfaces the corrosion protection is wearing out in short time and is of no meaning.

(5) Steel support construction

- crack free at junctions and firm fit of mechanical joints
- welds on the lamella / cross bar
- site and factory joints of lamellas
- attachments of steering construction (cams and stoppers)
- anchoring of edge construction
- condition of concretes underneath the cross bar boxes
- free movement of lamellas and cross bars (concrete defects)

(6) Coating joint

- condition of pouring gap between edge profile and coating
- deformation of edge profiles in the Carriage way
- Deformation des Edge profiles at the cap
- coating damages
- rut building
- height evenness of gap edges
- coating bank

(7) Steel cover plates in sidewalks and at the parapet area

- corrosion
- screw connection
- noise production
- constraints
- correct position

The control results have to be protocol led.

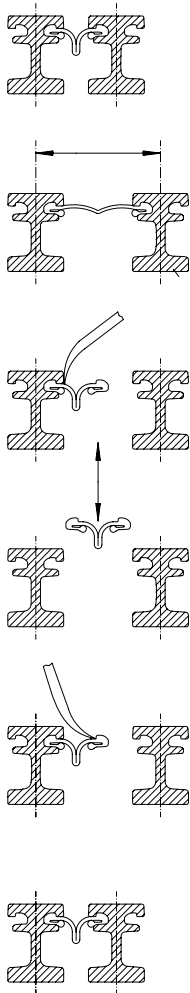
COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.	
BLOCK : PERSONS IN CHARGE		PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS		
SECTIONS		

VERFASSER :  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003


6.3 Replacement of sealing profiles

The replacement or damage free mounting and dismantling of sealing profiles is possible from above at single gap widths ≥ 60 mm. For that the lamellas have eventually to be displaced rectangular to the gap:

- opening of the Gap slit with hoists
- dismantling of old sealing profile with special-fitting levers
- control of corrosion grade of steel clamps
- control and renewal of corrosion protection (if necessary)
- eventual vulcanising of the joint between remaining and new sealing profile
- paraffin oil greasing of steel clamps
- interlacing of new sealing profiles with special-fitting levers
- right position control



COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS	
SECTIONS	

VERFASSER :  MAURER SÖHNE Innovationen in Stahl	
STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

6.4 Replacing the worn out parts

(1) Sliding bearings and springs (compare next page)

Surface dismantling is presented. If there is maintenance run or with larger types the dismantling from below shall be preferred.

- dismantling the slide bearing

Remove welds of some diamond elements by drilling

Dismount the sealing profiles in the lifting gear area if necessary.

Enlarge the gap between lamellas with hydraulic press at ca. 80 mm.

Erect the lifting gear.

Hoist the lamella with the lifting gear (slide spring is compressed).

Dismount the slide bearing.

- Dismantling and mounting of slide springs

Remodel the lifting gear after dismantling the slide bearing.

Press down the lamella with hydraulic press (slide spring is set free).

Dismantle the slide spring.

Mount a new slide spring.

- Slide bearing installation

Remodel the lifting gear.

Hoist the lamella with the lifting gear.

Install slide bearing.

Take the lifting gear apart.

Set the gap between lamellas.

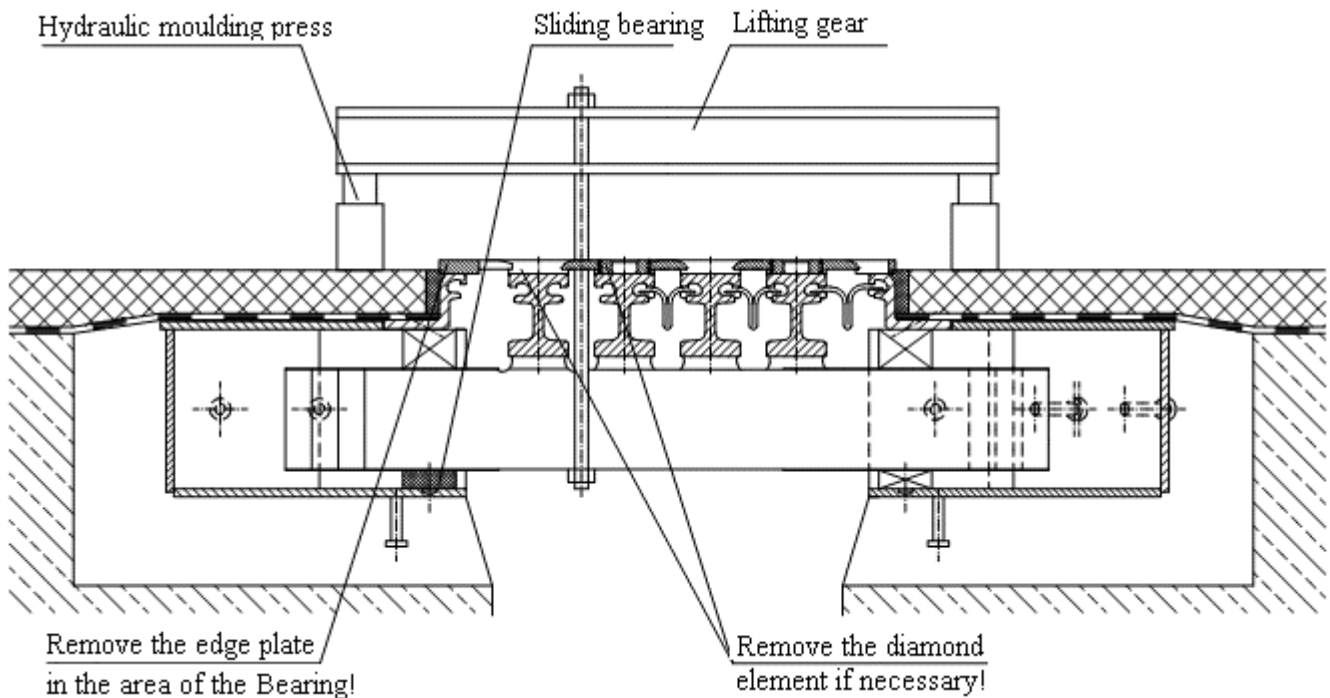
By installation from above mount the sealing profile.

Place new diamond elements.

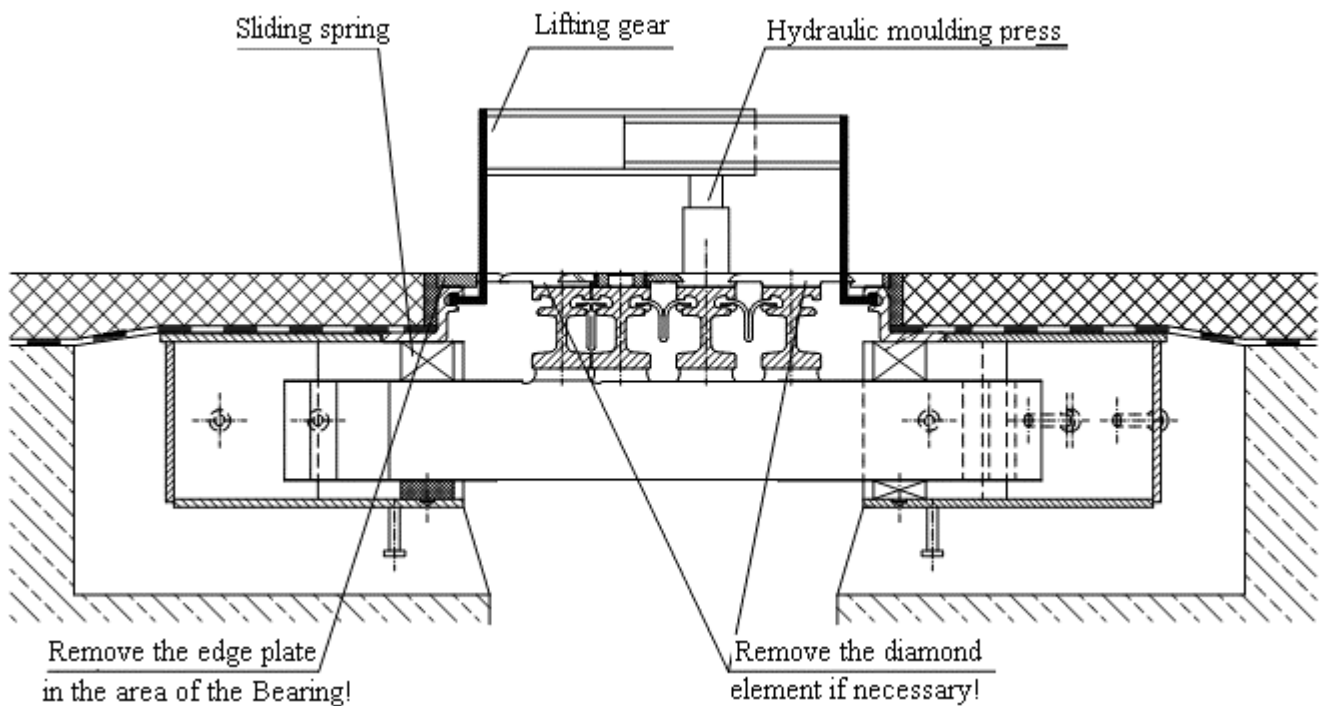
COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS	
SECTIONS	



Replacing of the slide bearings



Replacing of the slide spring



COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600


BLOCK : PERSONS IN CHARGE

PAGE: 1

PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS

SECTIONS

ARCHIVE NR.

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STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

(2) Control springs (See next page)

- Control spring dismantling

Press neighbouring lamellas together to contact with the help of hydraulic press.

Remove polyamide-holding bolts from control spring.

Remove the tense free control spring downwards.

- Control spring mounting

Install the spring and holding bolts in reverse order.

Reset the gap between lamellas.

COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	PAGE: 1
PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS	
SECTIONS	

VERFASSER :

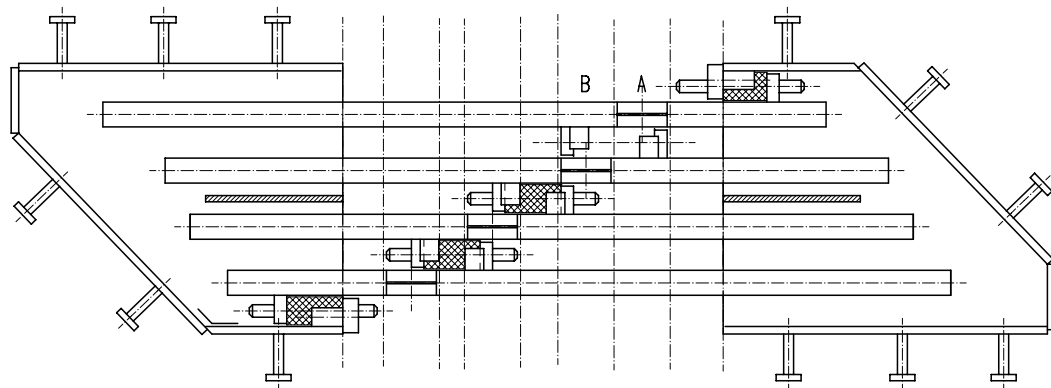
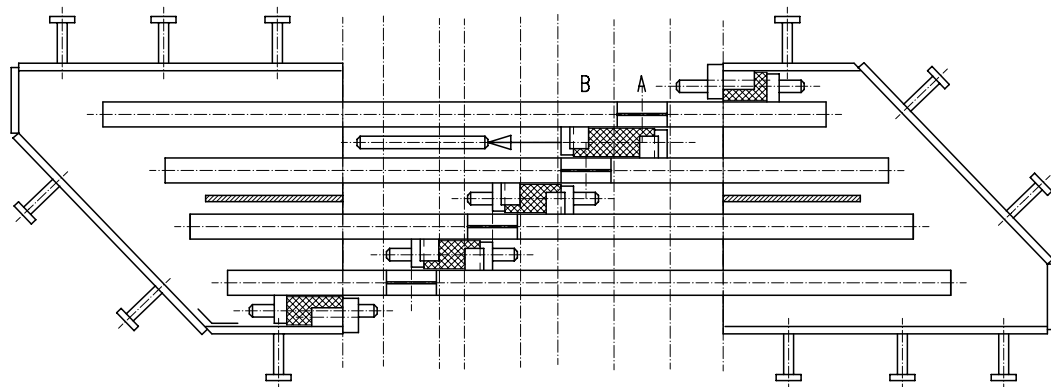
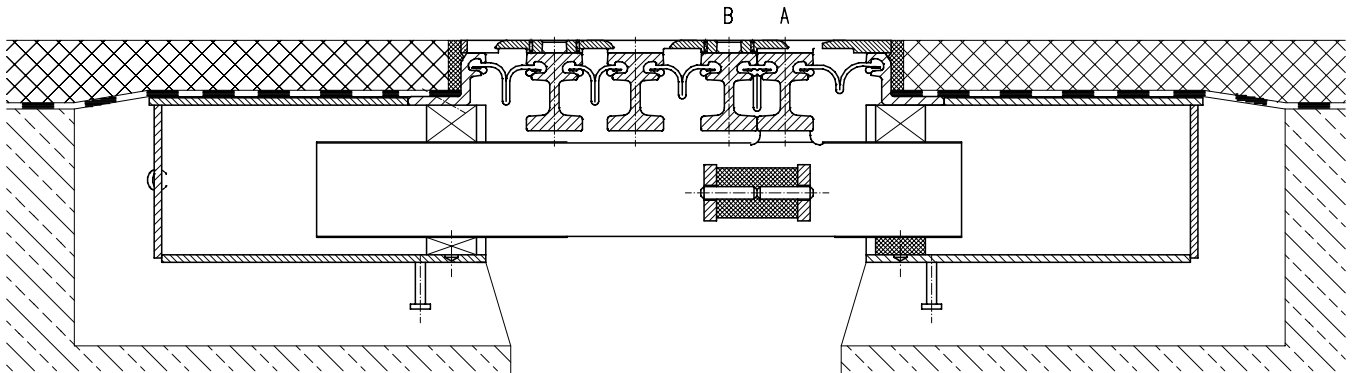
Seit 1876



MAURER SÖHNE
Innovationen in Stahl

STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES

DATUM: 1.07.2003



COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600

BLOCK : PERSONS IN CHARGE

PAGE: 1


PROCEDURE : TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS

SECTIONS

ARCHIVE NR.

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STRUCTURE : CARRIAGE WAY CROSS SECTIONS UND WAYBRIDGES	DATUM: 1.07.2003

7. Constructional drawings and part lists (6.2/6.3)

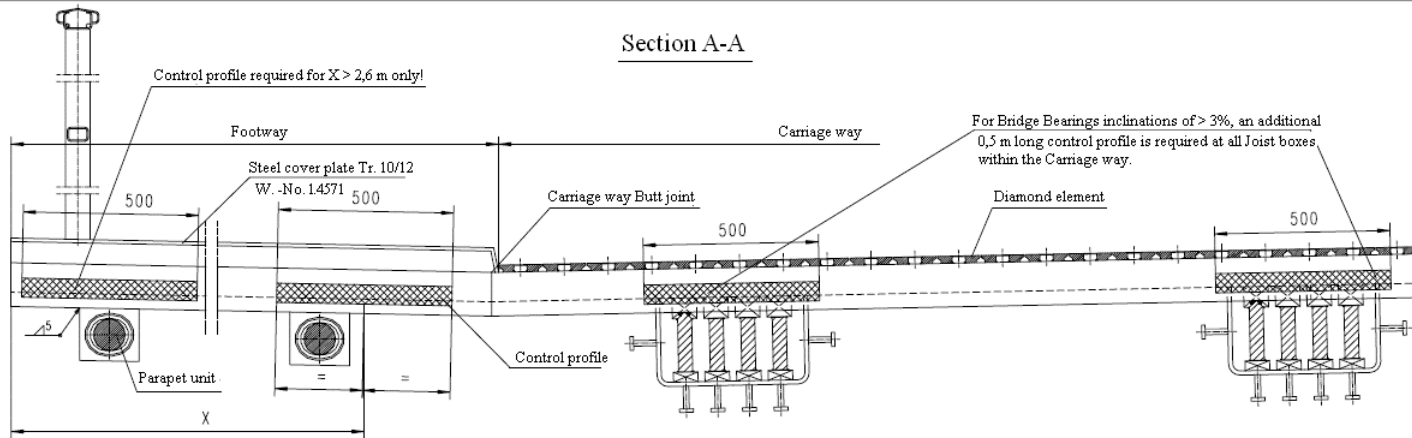
The constructional drawings show main characteristics and measures of constructions. They are independent of type and direction and serve for general judgement. Following constructional drawings are part of the request for the Technical Approval:

Page-Nr.	Item	Edition	Date	Change
1	Longitudinal section and top view $\alpha = 90^\circ$		1.07.2003	
2	Longitudinal section and top view $\alpha = 60^\circ$		1.07.2003	
3	Cross sections		1.07.2003	
4	Reinforcement plan		1.07.2003	

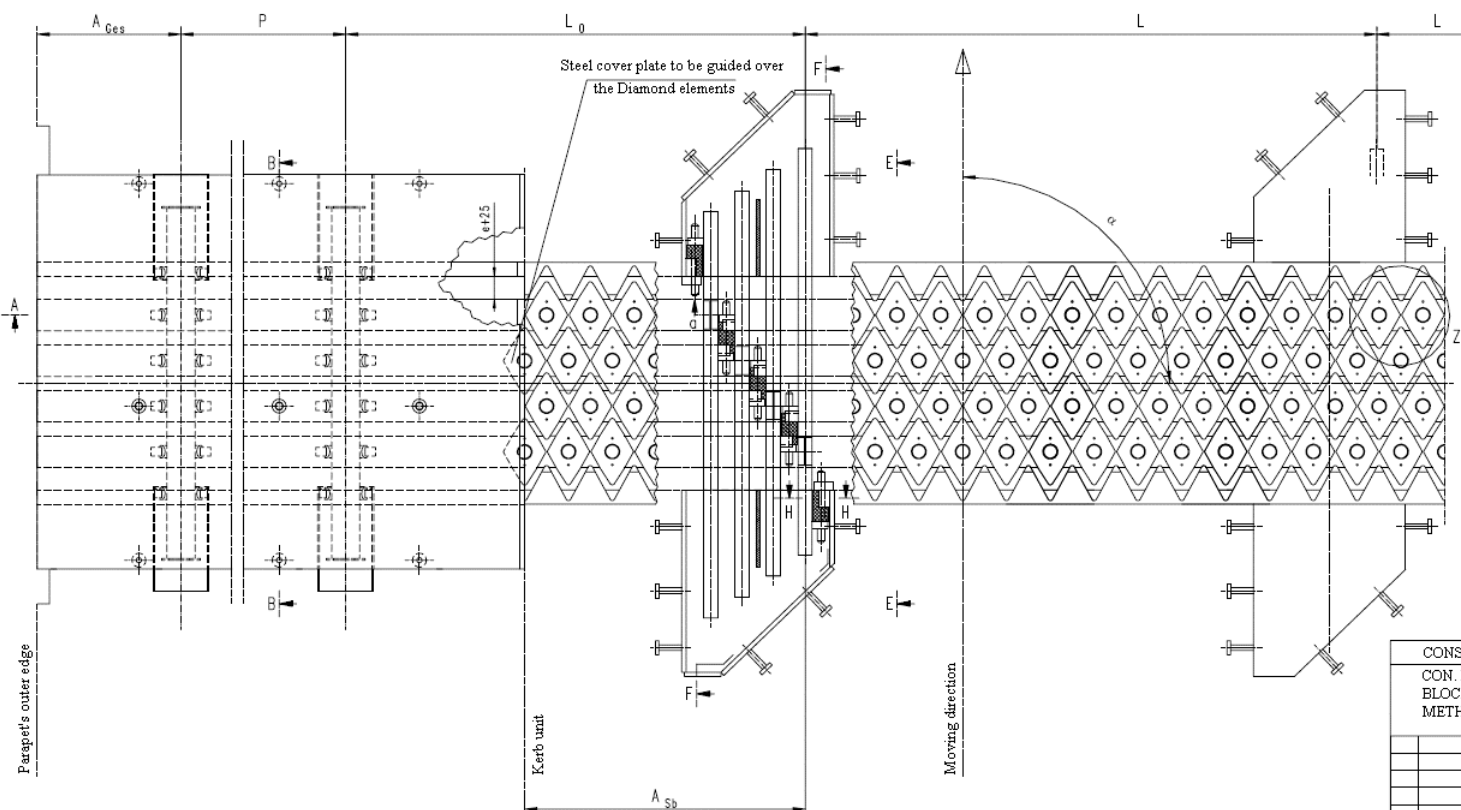
The basis for the technical approval is a variety of work instructions and standard drawings. Elaborating of these in the course of the construction's approval is not planned. The following table provides a summary of the materials of the main construction parts:

ITEM	Pos.	Tolerance	Semi finished part	MATERIAL	WEIGHT
Blade catch profile	1	DIN ISO 2768-m	Rolled section	S355J2G3	21,6 kg/m
TL/TP-ING CARRIAGE WAYCROSS SECTIONS metal plates	26	DIN EN 10029 C	Bl. 15	S235JRG2	
Lamellas	2	DIN ISO 2768-m	Rolled section	S355J2G3	46,6 kg/m
Sealing profile	3	-		EPDM (black) E2329, 60±5 Shore A	1,45 kg/m
Diamond element	28	DIN 7526 F	Drop forge part	S355J2G3	1,35 kg
Edge plate	29	DIN EN 10029 C		S235JRG2	19,0 kg/m
Cross bar	4	DIN EN 10029 C		S355J2G3	
Box half	16	DIN EN 10029 C		S235JRG, S355J2G3	
Parapet unit	20	DIN ISO 2768-m	Ø 60, 80, 90	1.4462, 1.4571, SBR 80 Shore A, S235JRG	
Elastomeric-slide bearing 70/80	5	DIN ISO 2768-m		S235JRG2, CR 60 Shore A, PTFE	0,8 kg
Elastomeric-slide springs 70/80	6	M2 DIN 7715		S235JRG2, NR 70 Shore A, PTFE	1,6 kg
Control spring	25	-		Polyurethane, Polyamide	0,35 kg
Carriage way anchor Übe 1	15	DIN EN 10029 C		S235JRG1	3,65 kg
Sidewalk anchor Übe1, 70° to 90°	14	DIN 1013	Rd. St. Ø 20	S235JRG1	1,36 kg

COMPONENT : LOW NOISE-BLADE EXPANSION JOINTS XL200 UP TO XL600	ARCHIVE NR.
BLOCK : PERSONS IN CHARGE	
PROCEDURE : REGULAR TEST ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS SECTIONS	

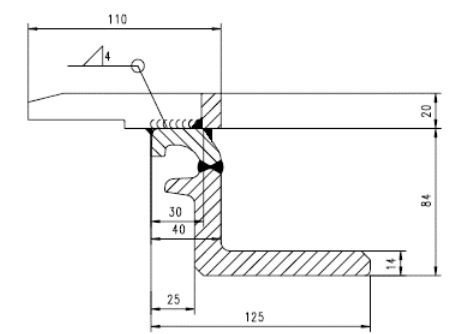


Top view

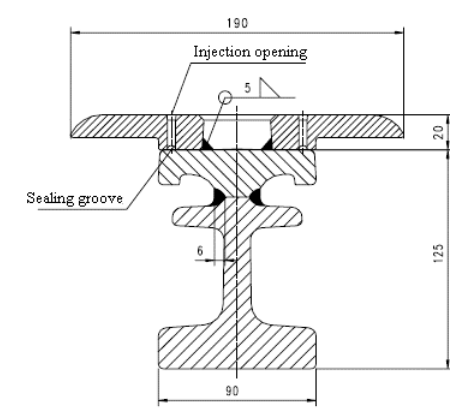


All allowed distances shall be obtained according to Section 4!

Edge beam Pos. 1 with Edge plate Pos. 29

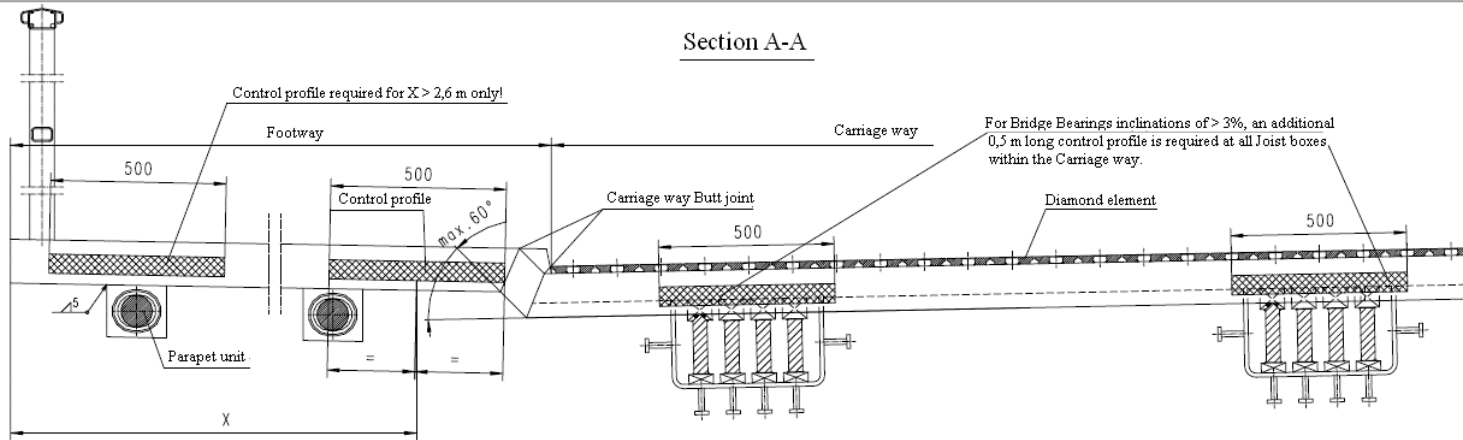


Pos. 2 with Diamond element Pos. 28



CONSTRUCTION: CARRIAGE WAYS AND BRIDGES			
CON. PART : LOW NOISE-BLADE EXPANSION JOINTS XL200 to XL600			
BLOCK : 6 - DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL			
METHOD : APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TL/TP-ING			
CARRIAGE WAY CROSS SECTIONS			
General tolerances DIN ISO 2768 Par: 1 middle	Weight	Product form, material	Order-No
Tag Proc. 1.07.03 Tech. Norm	None V2.1x	Name Longitudinal section and top view	Page Number 1
Ver: ion		Code number	Scale $\alpha = 90^\circ$
MAURER SÖHNE WÜRCHEN		Substitute for:	Reg.Nr TR100.1

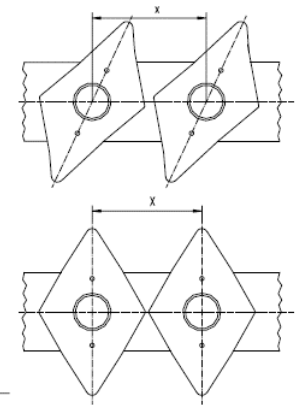
We reserve all rights for this drawing.



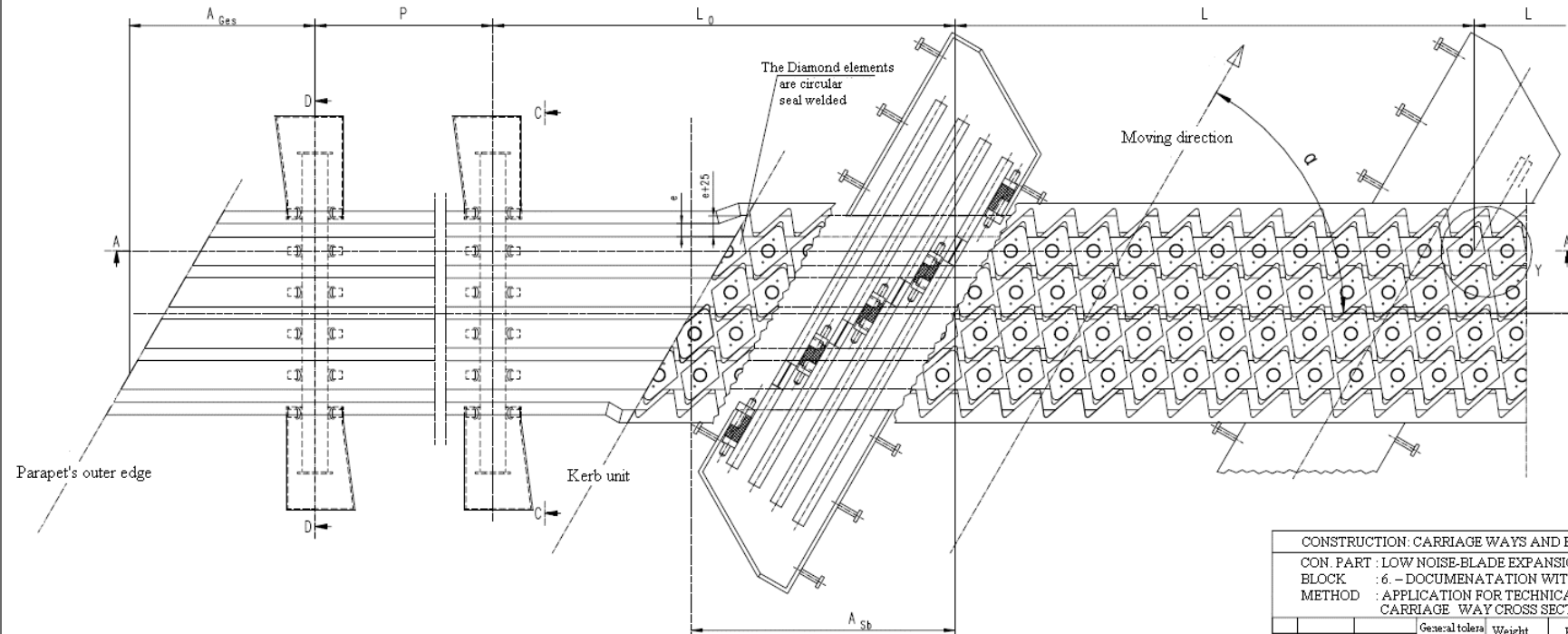
Section A-A

Detail Y/Z

for $70^\circ \leq \alpha \leq 90^\circ$
 $x = 125 \text{ mm}$
 for $60^\circ \leq \alpha < 70^\circ$
 $x = 130 \text{ mm}$



Top view



Parapet's outer edge

Kerb unit

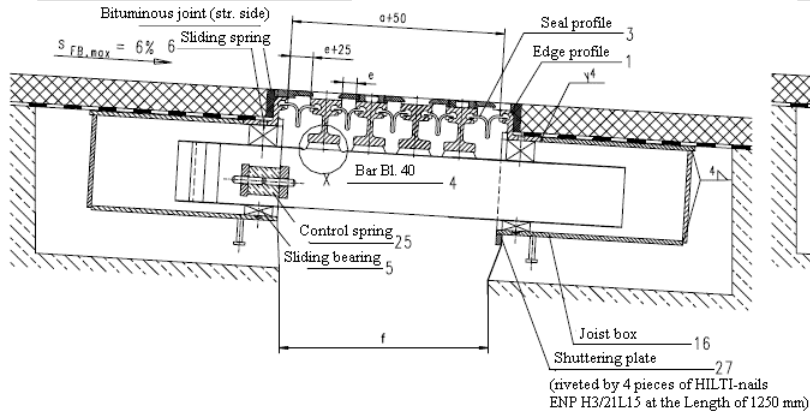
Moving direction

CONSTRUCTION: CARRIAGE WAYS AND BRIDGES			
CON. PART : LOW NOISE-BLADE EXPANSION JOINTS XL200 TO XL600			
BLOCK : 6 - DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL			
METHOD : APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TL/TP-ING			
CARRIAGE WAY CROSS SECTIONS			
General toler.	Weight	Product form, material	Order-No
DIN ISO			
2768 Par. 1			Page Number 2
middle	Tag	None	Name Longitudinal section and top view $\alpha=60^\circ$
	Proc. 1.07.03	Ver.1x	Scale
	Test.		
	Norm.		Reg.Nr
Ver:			Code number
ion			Substitute for:
			TR0100_2

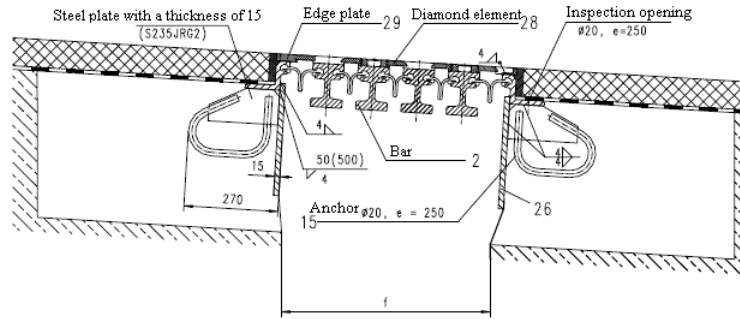
All allowed distances shall be obtained according to Section 41

We reserve all rights for this drawing.

Section F-F / Carriage way bar

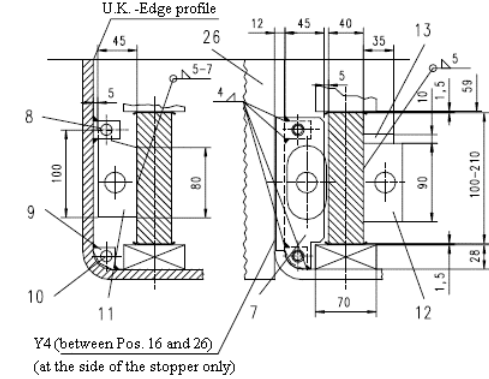


Section E-E

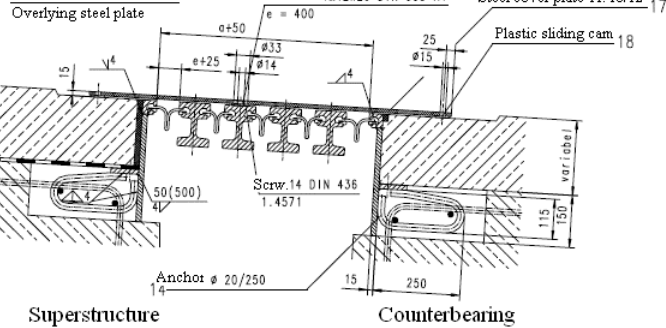


Section H-H

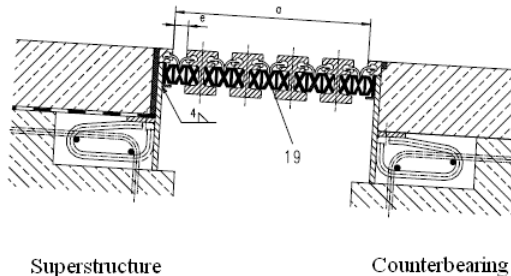
View a



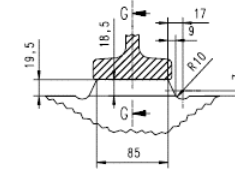
Section B-B



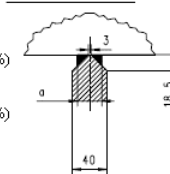
Section C-C



Detail X

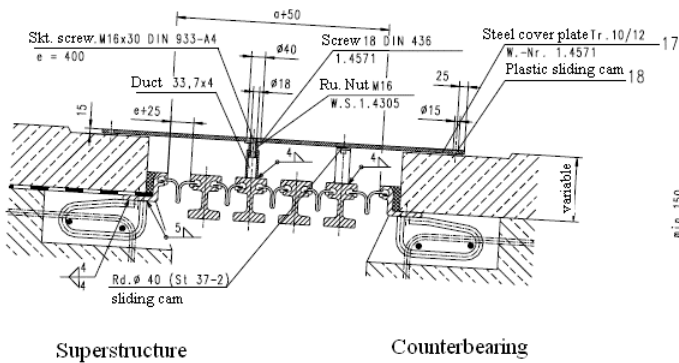


Section G-G

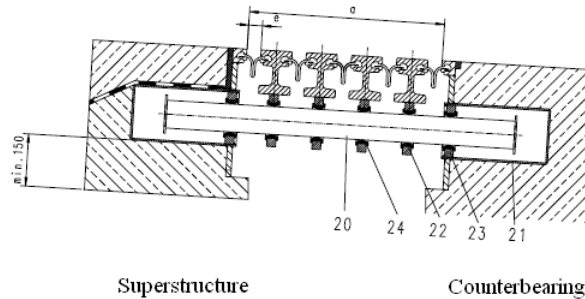


Section B-B; Type

Steel plates arranged on the uprights



Section D-D / Parapet unit



K-Weld (for $s \leq 3\%$)
 $a=33\text{mm}$

K-Weld (for $s > 3\%$)
 $a=36\text{mm}$

1	Edge profile	S235JRG2
2	Bar profile	S385J2G3
3	Seal-profile	EPDM
4	Bar-carriage way pl. 40xH	S385J2G3 /V2A
5	Elastomer bearing 70x80x28	S385J2G3, PTFE Chloropropene
6	Elastomer spring 70x80x2	S235JRG2, natural rubber, PTFE
7	Lock strap	S385J2G3
8	Stopper	S235JRG2
9	VK-Screw nut	S235JRG2
10	SKT-Screw M12x50	DIN 933-8.8
11	Cam	S385J2G3
12	Cam	S235JRG2
13	Stopper	S235JRG2
14	Footway unit anchor	S235JRG2
15	Carriage way anchor	S235JRG2
16	Joist box	S235JRG2/ S385J2G3
17	Tear-drop plate 10/12	i. 4571
18	Sliding cam	PUR
19	Footway control profile	Neoprene
20	Parapet unit ø60-90	1.5562
21	Cladding tube	S235JRG2
22	Rectangular bar stock 25	S235JRG2
23	Rectangular bar stock 25	S235JRG2
24	Socket	Neoprene
25	Control spring	ACLACELL/PA 6
26	ZTV-K Steelplate	S235JRG2
27	Shuttering plate	S235JRG2
28	Diamond element	S385J2G3
29	Edge plate	S235JRG2

CONSTRUCTION: CARRIAGE WAYS AND BRIDGES

CON. PART : LOW NOISE-BLADE EXPANSION JOINTS XL200 TO XL600

BLOCK : 6 - DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL

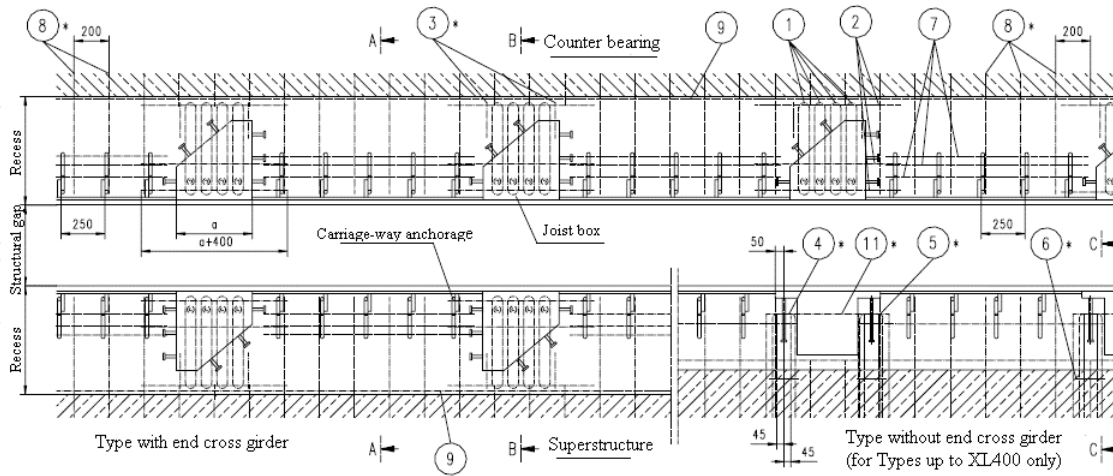
METHOD : APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TL/TP-ING

CARRIAGE WAY CROSS SECTIONS

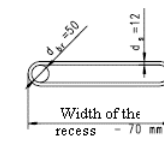
General tolerances DIN ISO 2768 Par. 1 middle		Weight	Product form, material	Order-No
Proc. 1.07.03		None	Name	Page Number 3
Test. Norm		None	Cross sections	
Ver. ion		MAURER SÖHNE MÜNCHEN	Code number	Reg.Nr
			Substitute for:	TRO100_3

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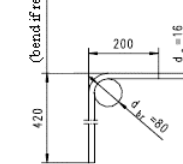
The dimensions of the recesses (t and/or h) and the width of the structural gap are to be determined according to chapters 3.4.



Pos. 1
for Quantity see Tabel

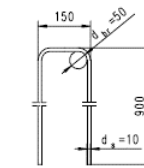


Pos. 3 *
for Quantity see Table
(bond if required)

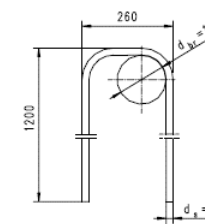


Typ	Pos. 1	Pos. 3
D201 GO	1x	1x
D301 GO	2x	2x
D401 GO	3x	2x
D501 GO	4x	2x
D801 GO	4x	3x

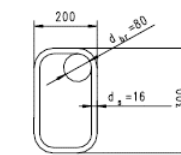
Pos. 4 *
4x for each box



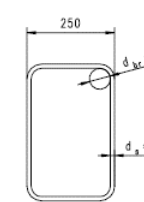
Pos. 5 *
4x for each box



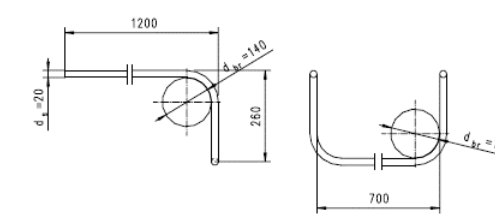
Pos. 6 *
4x for each box



Pos. 10
Distance a=200mm

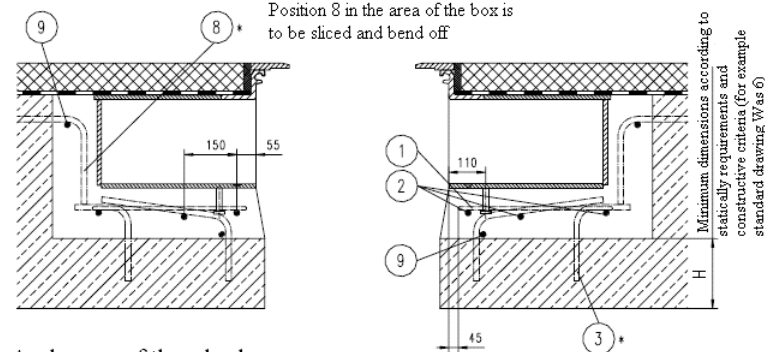


Pos. 11 *
1x for each box



Anchorage of the joist box

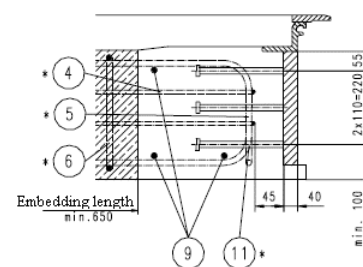
Section B-B



Anchorage of the joist box

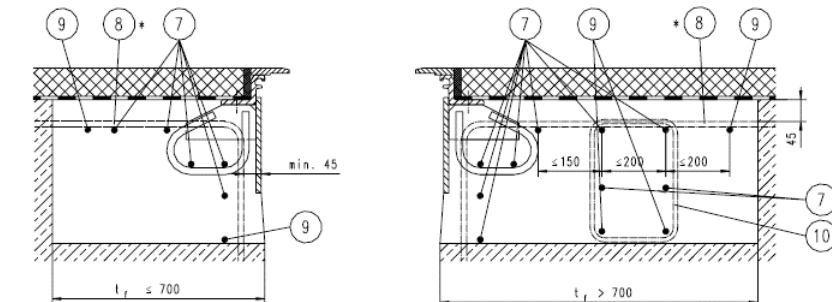
Section C-C

(Type without end cross girder for Types ≤ D401 GO)



Anchorage of the edge beam

Cross section A-A



In normal case, the reinforcing steels Pos. 1//4/5 and 8 are to be inserted rectangular to the gap. Angle deviations are permitted in the range of ± 20°.

Concrete within the recess ≥ C30/37 low-shrinkage concrete
Underneath the Joist-boxes Grain size 0/16 mm shall be used
Reinforcement in general ≥ Bst. 500 S
Reinforcement positions marked with an * are to be placed into the concrete of the girder.

Pos	Dimension	Notice
1	ø12	see rough draft
2	ø12xb	
3	ø16	see rough draft *
4	-	see rough draft *
5	ø10	see rough draft *
6	ø16	see rough draft *
7	ø10	L – corresponds to sight size between boxes
8	ø16	see rough * draft
9	ø16	L=B (carriage way)
10	ø16	see rough draft
11	ø14	see rough * draft

CONSTRUCTION: CARRIAGE WAYS AND BRIDGES			
CON. PART : LOW NOISE-BLADE EXPANSION JOINTS XL200 to XL600			
BLOCK : 6 – DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL			
METHOD : APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TL/TP-ING CARRIAGE WAY CROSS SECTIONS			
General tolerances DIN ISO 2768 Par: 1 middle	Weight None	Product form, material	Order-No
Proc. 1.07.03 Tech. Norm	Ver. 1x	Name Reinforcement plan	Page Number 4
Ver: ion		Code number	Reg.Nr
Substitute for:		TR0100_4	