

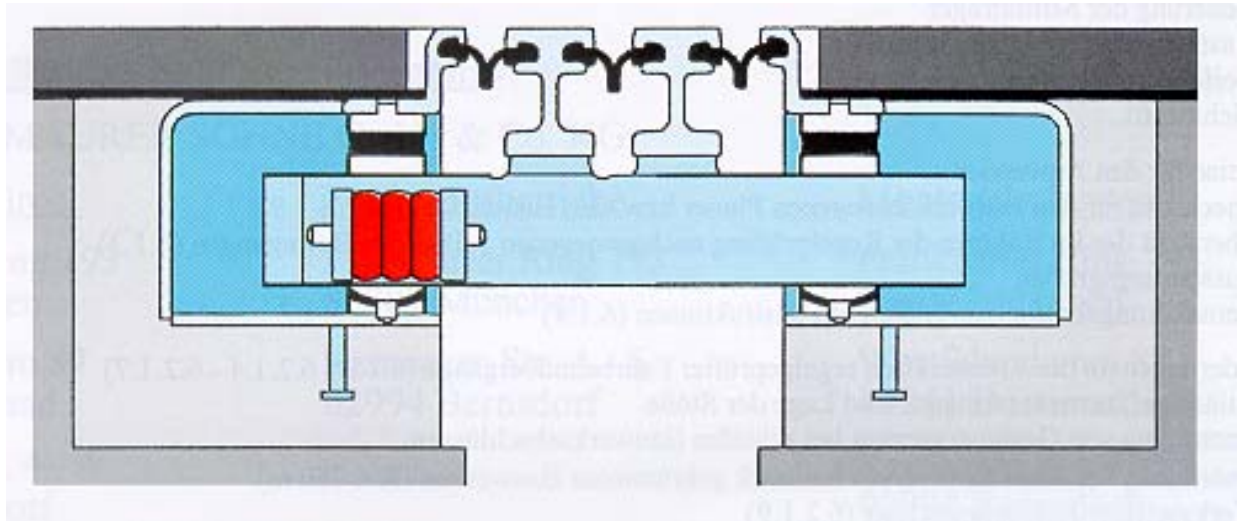


GIRDER GRID JOINTS (noise reduction included/not included)

TECHNICAL APPROVAL ACCORDING TO TL/TP FÜ (Status 03/05)

according to the requirements of the:

Federal Ministry for Traffic,
Construction and Development of Towns
Department Road Construction, Road Traffic / Resort S 18
Robert-Schuman-Platz 1
D-53175 Bonn




Checker:

Dipl.-Ing. Winfried Neumann
Homertstr. 10
D-58091 Hagen - Dahl

External Monitoring:

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

<p>Technical Approval of static and construction engineering aspect according to TL/TPFÜ (Status: 03/05) tested, see Inspection report-No.: 07/2007 dated 22.11.2007</p> <p>..... Dipl.-Ing. W. Neumann, 58091 Hagen</p>	<p>Regelprüfung Der Anwendung gem. TL/TPFÜ unter Prüfbericht-Nr.: <u>07/2007</u> vom <u>22.11.07</u> wird zugestimmt Geltungsdauer: <u>01.03.2018</u> Bundesministerium für Verkehr, Bau und Stadtentwicklung Abteilung Straßenbau Im Auftrag</p> <p>..... Bonn, den <u>07.03.2013</u> Az.: StB 17/<u>1133/20/20-185/157</u></p>
---	--

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGEWAYS AND BRIDGES	DATE: 1.05.2007

Manual


CONTENTS

Section	Title	Page
0.	Field of Application	1
1.	Persons in Charge	1
1.1	Applicant and Operator	1
1.2	Producer of the Expansion Joint	1
1.3	Producer of Special Components	1
1.4	Quality Assurance	2
1.5	Approval and Tests	2
1.6	Producer's declaration	2
2.	Description of the System	3
2.1	General	3
2.2	Types D160-640	3-4
2.3	Types DT160-240	5
2.4	Force Transfer of the Wheel Loads	5
2.5	Elastic Support of the Joists	6
2.6	Anchorage	6
2.7	Sealing Profile	6
2.8	Noise reduction	7-8
3.	Notes for the User	9
3.1	Checklist for Planning and Inspection	9
3.2	Overview of the Allowed Movements within the Scope of the Technical Approval	10-11
3.3	Allowed Construction Lengths Using Laterally Fastened Bearings	11-12
3.4	Transverse Displacement in Types DT160 and DT240 without Laterally Fastened Bearings	12-13
3.5	Recess-sizes	14
3.6	Anchorage powers	15
4.	Construction Requirements for Technical Approved Expansion Joints	16
4.1	Allowed Joist-interspaces and the Position of the Butt Joints	16
4.2	Arrangement of Parapet Units	17
4.3	Factory Provided Corrosion Protection	18
5.	Installation Instruction	19
5.1	Delivery	19
5.2	Assembly and Adjoining to Supporting Structure with Concrete Structural Members	19-22
5.3	Anchorage in cap area	22
5.4	Procedure for Bridges with Steel Road Surfaces	23
5.5	Control of the Assembly Dimensions	23-24
5.6	Sealing the Construction	24
5.7	Further Instructions	25
5.8	Site joints	26-28
Appendix	Certificate of acceptance / Protocol of mounting	29
6.	Instructions for Maintenance, Preservation and Exchange of Wear and Tear Elements	30
6.1	Accessibility	30
6.2	Constructional Elements Subjected to Continuous Checking	31-32
6.3	Replacing the Sealing Elements	32
6.4	Replacing the Wear and Tear Elements from above	33
7.	Construction Plans and Parts Lists	34
Enclosures	Six construction plans Inspection Report (2 pages)	

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640	ARCHIVE NO.
BLOCK	: DOCUMENTATION WITH TECHNICAL APPROVAL NOTE	<i>Technical approval Nr. 07/07 vom 22.11.07</i>
METHOD	: TECHNICAL APPROVAL ACC. TO TL/TP-FÜ (STAND: 03/05)	

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts - only upon approval.

Formats and contents are copyrighted!

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

0. Field of Application

Due to the implementation of the Version 5/07 the hitherto valid Version of November 20, 2002 is now void.

The technical approval covers Construction of frequently repeated methods of construction. Currently there are the following limitations of the range of use to be considered:

- At the gap, the superstructure in the expansion joints type D160-D640 must be leaded in a single way, for example by a one-way bearing
- In laterally elastic bearing expansion, joints type DT160/240 may be adjustable under consideration of the requirements in paragraph 3.2
- The carriageway may not exceed 10% slope orthogonal.
- The carriageway may not exceed 6% slope in the direction of the joint up to type D480, and 3% in larger types
- 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.
- Geometrical direction changes of lamellas in expansion joint types D/DT 160 are permitted as shown by Drawing 6.
- For noise reduction in the range $60^\circ \leq \alpha \leq 120^\circ$ rhombus elements may be used.

Deviations from the above limitations and subsequent specifications are possible, but they require a test for each single case separately.

1. Persons in Charge

1.1 Applicant and Operator

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

Technical Bureau Munich
Dr. Braun, Mr. Volk

1.2 Manufacturer of the Expansion Joint

MAURER SÖHNE GmbH & Co. KG

Technical Bureaus:

Frankfurter Ring 193
80807 Munich

Zum Holzplatz 2
44536 Lünen

Kamenzer Str. 53
02994 Bernsdorf

Manufacturing sites

Frankfurter Ring 193
80807 Munich

Kamenzer Str. 53
02994 Bernsdorf

Installation crews

Frankfurter Ring 193
80807 Munich

Zum Holzplatz 2
44536 Lünen

Kamenzer Str. 53
02994 Bernsdorf

1.3 Manufacturer of Special Components

See "The List of approved suppliers" in the appendix of the companies' work instruction QSA 1.810 in the current version.

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 TO DT240	ARCHIVE NO.
BLOCK	: 1 – PERSON IN CHARGE	PAGE: 1
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<div style="border: 1px solid green; padding: 2px; text-align: center;">Technical approval No. 07/07 of 22.11.07</div>

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts - only upon approval.

Formats and contents are copyrighted!!

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

1.4 Quality Assurance

QS-System

The Quality-Management-System meets the DIN EN ISO 9001 standards. It was certified by DVS-Zert.

Monitoring

The Monitoring 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 is the

German Federal Materials Testing Institute of the University of 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 Lünen	"The Extensive Proof of Suitability" according to DIN 18800 Part 7, DIN 18809, DIN 4099 and DS 804

Approval of factory welders

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

Approval of site welders

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

For blade welding with a 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 May 1, 2007
- Compliance with quality assurance standards listed in the supervision contract from March 1, 2002.

Munich, February 1, 2007

Company Management

Technical Bureau

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 TO DT240	ARCHIVE NO.
BLOCK	: 1 – PERSON IN CHARGE	PAGE: 2
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

2. Description of the System

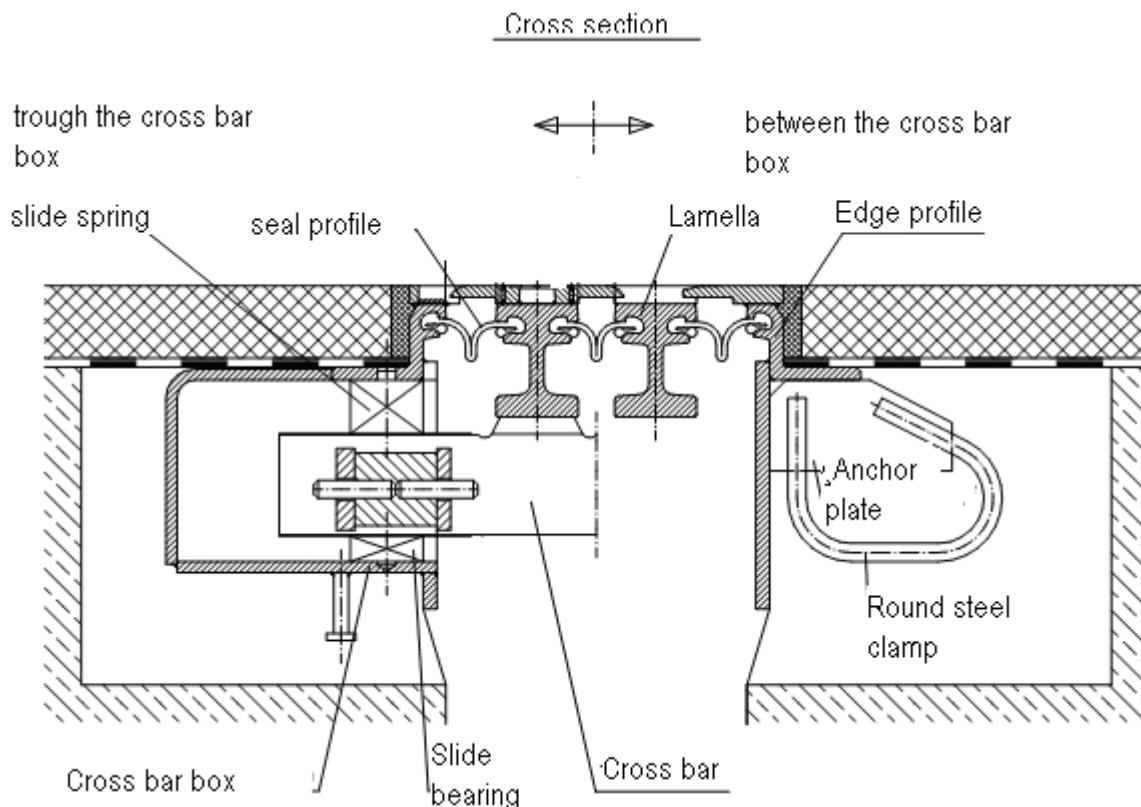
2.1 General

At each MAURER-Girder Grid expansion joint each lamella is rigidly welded to the assigned cross bars. So an internal relocatable girder grid is provided. This expansion joint is to be applied in situations where, at both joint edges, i.e. at the abutment and at the superstructure, there is enough space or enough space can be provided in which to install the joist- box.

The technical approval includes the types D160-D640 and DT160-DT240, where the construction forms D and DT differ with regard to their control system and the joist/lamella welding connection.

2.2 Types D160-640

The joists are positioned according to the moving direction of the structure. Planned moving components other than those 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..




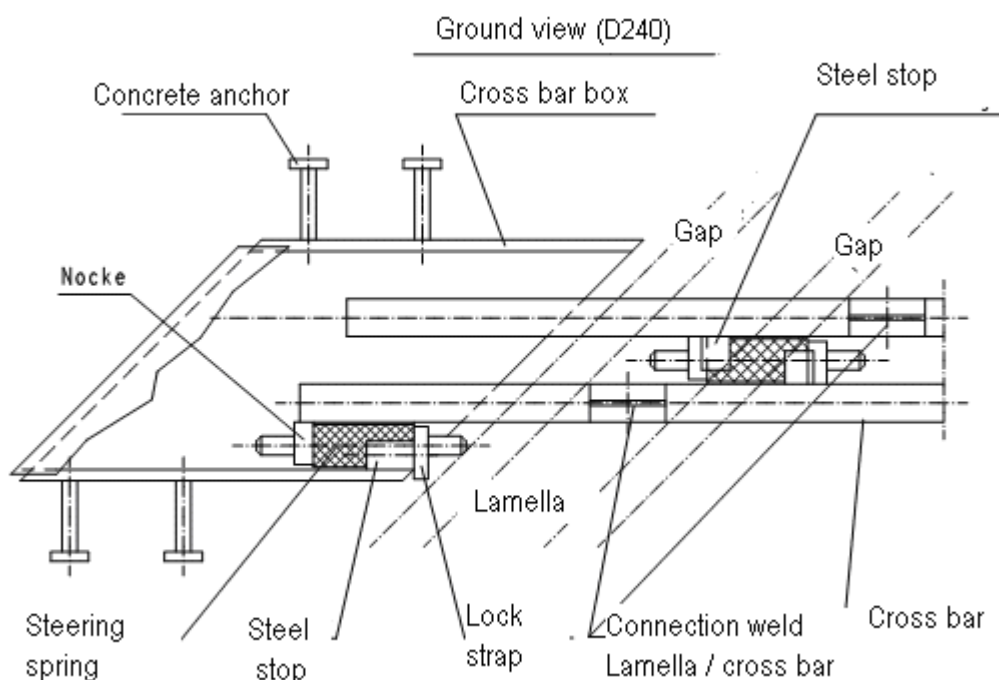
MAURER-girder grid expansion joints always adapt to the deformation of the structure. Control springs, positioned between joists or between the joist and the sidewall of the joist box, provide an equal distribution of the whole movement to each joint gap. Steel stops on joists prevent the opening of individual gaps for more than 80 mm.

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 3
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts – only upon approval.

Formats and contents are copyrighted!

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007




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 joists 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.

The advantages of this control system are:

- Adaptability to production tolerances
- Low accident sensitivity
- Durability
- Insensitivity to movement enforcements
- Noise damping
- Possibility of expanding individual gaps for maintenance works

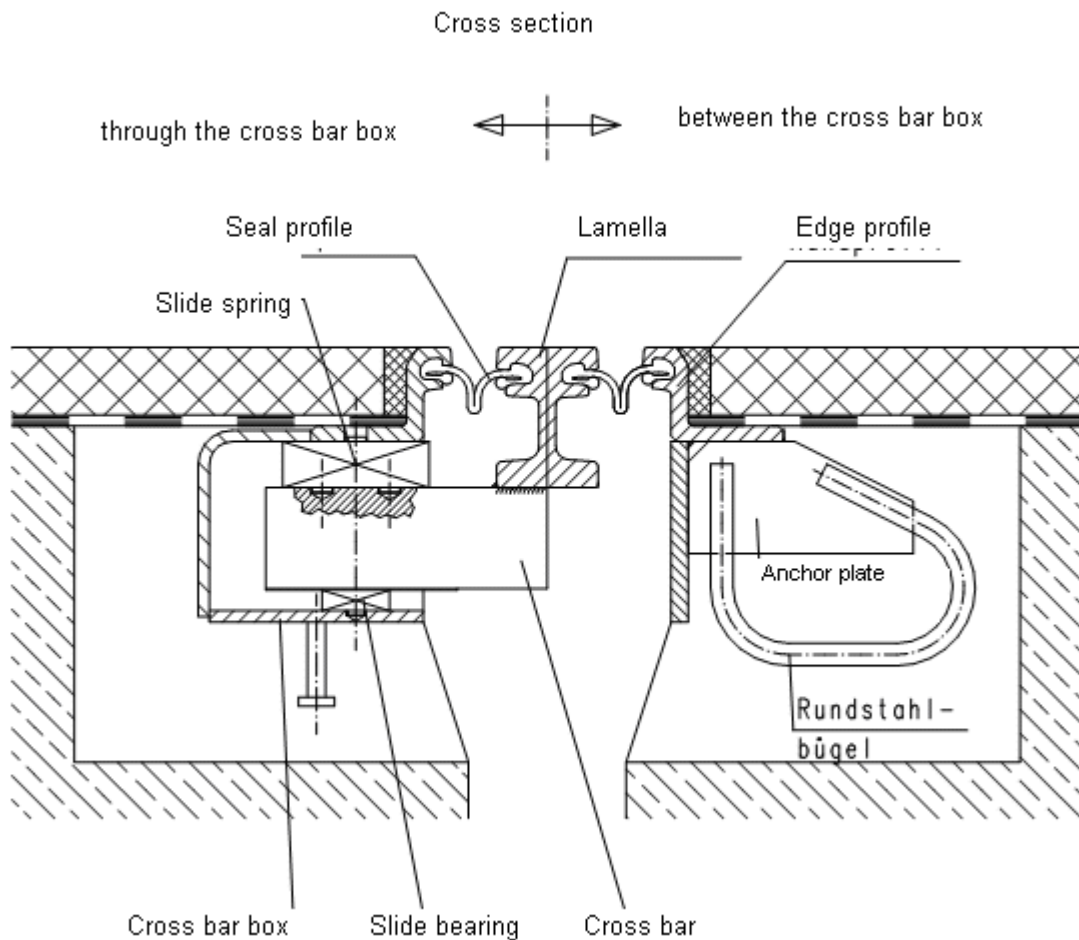
CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 4
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

2.3 Types DT160-240

The joists are aligned in the direction of movement of the structure. Other planned moving components of ± 30 mm parallel to joint axis are going to be absorbed.


The pressure-thrust-springs at the joint's edges control the constant distance of the beams among themselves according to the total width of the joint gap.



2.4 Transmission of wheel load

Lamellas are subject to direct wheel loads. Because of eccentric raiding wheel loads, based internal force variables are transferred through the bars over welded joints to the cross bars (joists). From there they are transferred over the bearing elements and control springs into the gap edges.

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 5
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

2.5 Elastic support of joists (cross bars)

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

Through this elastic bearing the momentum of the wheels is damped when transferred to the absorbent 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.

2.6 Anchorage

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


2.7 Sealing profile

The bulbous-shaped EPDM strip is a waterproof 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 the case of dragging forces. The sealing element is set below the road surface level, and thus protected against direct wheel- or snowplough-contact.

The admissible displacement of the sealing profile rectangular in the direction to the gap is 65 mm. With its preformed articulated section it is possible to move the seal strip in the direction of the carriageway without any appreciable strain. The admissible displacement in the direction to the gap of ± 40 mm causes a strain in the sealing profile.

Sealing elements can be replaced from above with a pry bar when the individual gaps are ≥ 25 mm. Whenever rhombic elements are used for the reduction of noise, the individual gap widths must be ≥ 60 mm. Gap width can be enlarged by moving the lamellas.

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 6
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

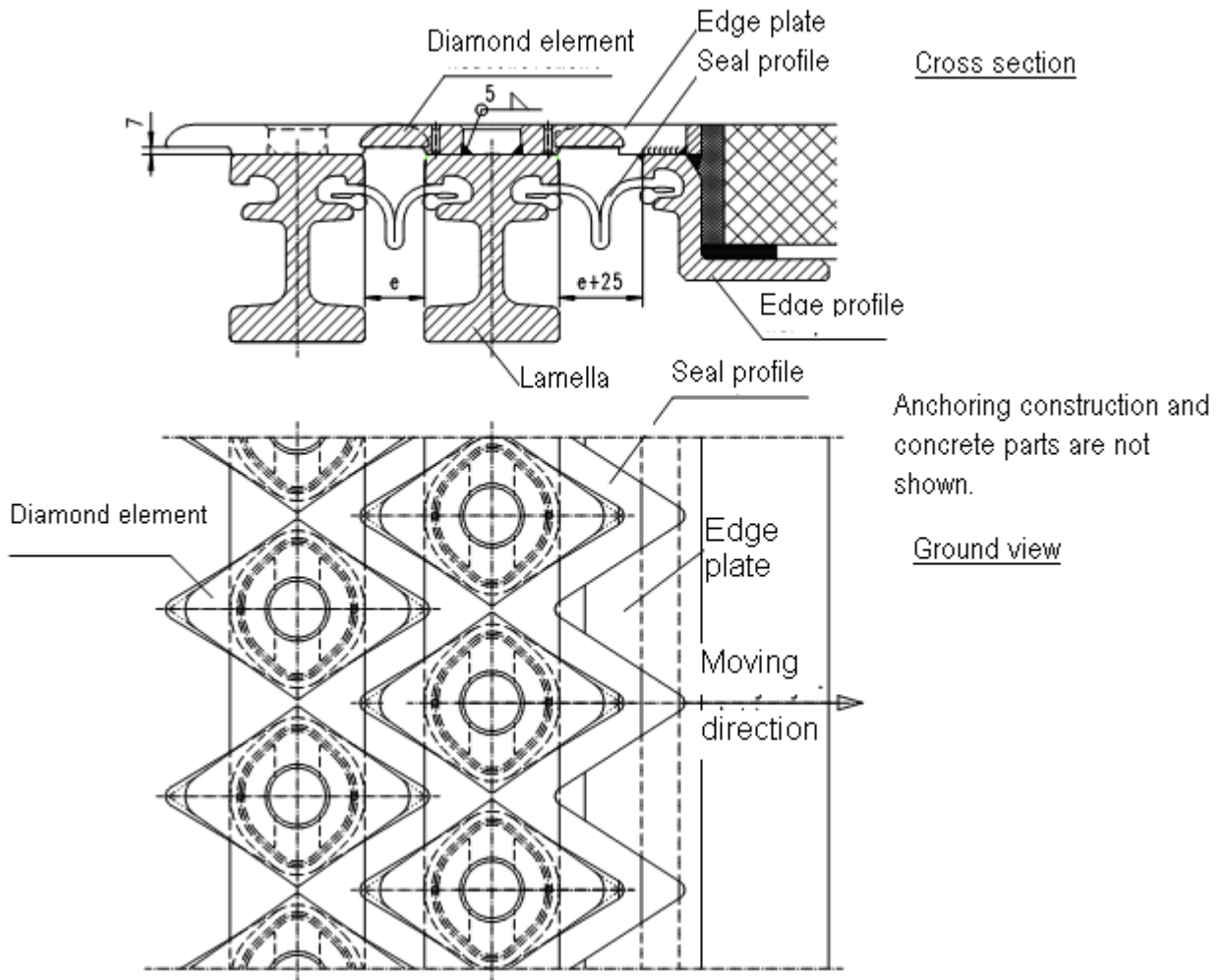
AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

2.8 Noise reduction (optional)

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 recognised as especially disturbing.

With the use of rhombic elements the tyres do not hit the steel edges rectangularly, but diagonally against rounded tops, and so a noticeable impact in noise reduction is achieved.

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



CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 7
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

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

By using rhombic elements the carriageway geometry travelled on is also changed. The influence on the wheel load spreading at the expansion joints was technically experimentally tested at the TU-Munich, with comparative analysis of results for the lamellas with and without rhombic elements. The truck wheel was put centric above the middle lamella and, in the second part of the experiment between two lamellas. Additionally the load position of 5 different gap widths was tested.

The results showed that the lamellas, both with and without the rhombic elements, had to absorb almost the same wheel load. In their present forms there are also no static relevant differences.

All other known design concepts for expansion joints have full validity for the rhombic elements too.

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

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

As the rhombic elements are pouch-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 in 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 lateral leaking later on.

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 8
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts - only upon approval.

Formats and contents are copyrighted!

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

3. Notes for the User

3.1 Checklist for the Planning and Inspection

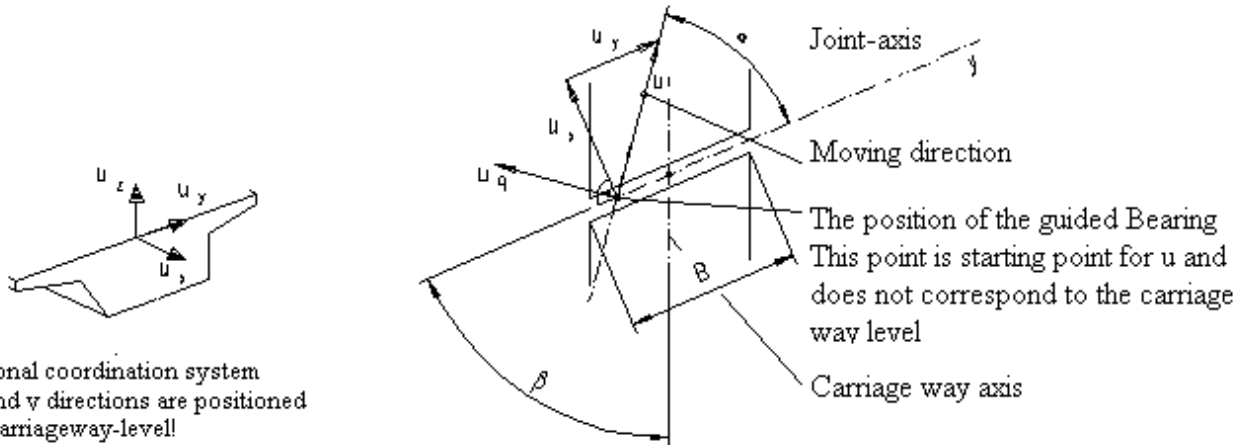
Hereunder all items are specified that must be observed with the structural planning and examination:

1	Field of application
1.1	Review of the ancillary conditions for the application area and the choice of the type of expansion joint.
2	Movements
2.1	Calculation of movements of the expansion joint from rotation and displacement of neighbouring components due to <ul style="list-style-type: none"> ■ Temperature ■ Shrinkage and Creep ■ Lifting during bearing removal ■ Braking/starting up ■ Displacement of fixed points ■ Elasticity of the foundation ■ Other Effects
2.2	Determination of the most unfavourable moving combinations at the expansion joint
2.3	Selection of expansion joint considering the allowable movement according to specifications in the Tables of part 3.2
2.4	Check of final cross girder deformations in respect of specifications according to ZTV-ING
3	Loads
3.1	Check whether the loads affecting the expansion joint are covered by load estimates according to TL/TP-FÜ (03/05) (special vehicles, inspection devices)
4	Pre-adjustment
4.1	Determination of the scheduled installation temperature and the appropriate pre-setting rectangular and parallel to the joint
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 3.5 for the anchoring of the expansion joint
5.2	In special cases: Dimensioning with approval of company Maurer Söhne
6	Anchorage
6.1	Planning of connecting reinforcement under consideration of the loads given in Part 3.6
6.2	Adjustment of reinforcements to the installation situation of the expansion joints
6.3	Designing of reinforcements capable of trouble-free mounting with anchoring in connecting brackets of the expansion joint
7	Handling by the company MAURER SÖHNE
7.1	Preparing overview and detailed drawings specific for the structure
7.2	Examination and proof of the geometrical operation conditions
7.3	Adaptation of joist arrangement to special construction requirements (clamping elements, recesses)

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 9
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

3.2 Overview of the Allowed Movements Determined Within the Scope of the Technical Approval - Types D160-D640

All acceptable movements may arise in any combination within the given tolerance areas. For the angles φ_x , φ_z and the displacement u_z following formulae are valid.




Orthogonal coordination system
The x and y directions are positioned at the carriageway-level!

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 expansion width	s=27,5 mm	s=37,5 mm	s=37,5 mm B=15 m			s=37,5 mm B=15 m		
2	D160	130	$\pm 17,7$	$\pm 19,2$	$\pm 0,147^\circ$	$\pm 4,311^\circ$	$\pm 1,031^\circ$	$\pm 0,497^\circ$	$90^\circ \pm 60^\circ$	aany
3	D240	195	$\pm 26,6$	$\pm 28,8$	$\pm 0,220^\circ$			$\pm 0,745^\circ$		
4	D320	260	$\pm 35,4$	$\pm 38,5$	$\pm 0,293^\circ$			$\pm 0,993^\circ$		
5	D400	325	$\pm 44,3$	$\pm 48,1$	$\pm 0,367^\circ$			$\pm 1,241^\circ$	$90^\circ \pm 45^\circ$	
6	D480	390	$\pm 53,2$	$\pm 57,7$	$\pm 0,440^\circ$			$\pm 1,489^\circ$		
7	D560	455	$\pm 62,0$	$\pm 67,3$	$\pm 0,513^\circ$			$\pm 1,737^\circ$		
8	D640	520	$\pm 70,9$	$\pm 76,9$	$\pm 0,587^\circ$			$\pm 1,985^\circ$		

- n... Number of the sealing profiles
- u_x ... 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 ($\pm(\pm n \times 50$ 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)
- 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

If allowed movements are exceeded, there has to be an additional verification in each special single case.

AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

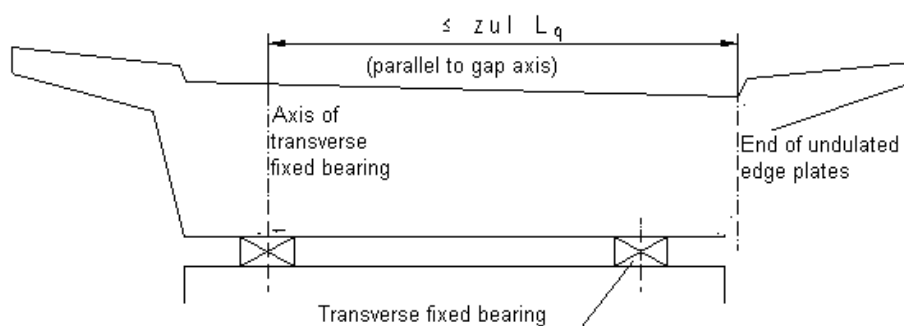
- Types DT160-DT240

All admissible movements can occur in optional combination within the whole range of tolerance. For angles φ_x, φ_z and for the shift u_z the formulae stated on page 10 apply.

n	Typ	u_x [mm] Total expansion width	u_z [mm] s=27,5 mm	u_z [mm] s=37,5 mm	u_q [mm]	φ_x s=37,5 mm B=15 m	$\varphi_{y,stat}$	$\varphi_{y,dyn}$	φ_z s=37,5 mm B=15 m	α [°]	β [°]
2	DT160	130	$\pm 17,7$	$\pm 19,2$	Abs. 3.4	$\pm 0,147^\circ$	$\pm 4,311^\circ$	$\pm 1,031^\circ$	$\pm 0,497^\circ$	$60^\circ \leq \alpha \leq 120^\circ$	arbitrary
3	DT240	195	$\pm 26,6$	$\pm 28,8$	± 30	$\pm 0,220^\circ$			$\pm 0,745^\circ$		

Instruction: The proof of incline change according to TL/TP-FÜ (03/05) Section 3.5.6 (3) is irrelevant for requested longitudinal incline $s_{Fb} \leq 6\%$!

3.3 Allowed construction lengths with laterally fastened bearings



Allowing for constructional bearing play of 1 mm it follows:

n	Diamond elements	Prestressed concrete bridge with shrinkage max. all. L_q	Prestressed concrete bridge without shrinkage max. all. L_q	Steel girder concrete and steel bridges max. all. L_q
[-]	[-]	[m]	[m]	[m]
2	not included	18,9	28,6	17,5
	included	13,2	20,0	12,3
3	not included	28,3	42,0	26,0
	included	20,8	31,4	19,3
4-6	not included	37,7	57,1	35,1
	included	28,3	42,9	26,3

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 11
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

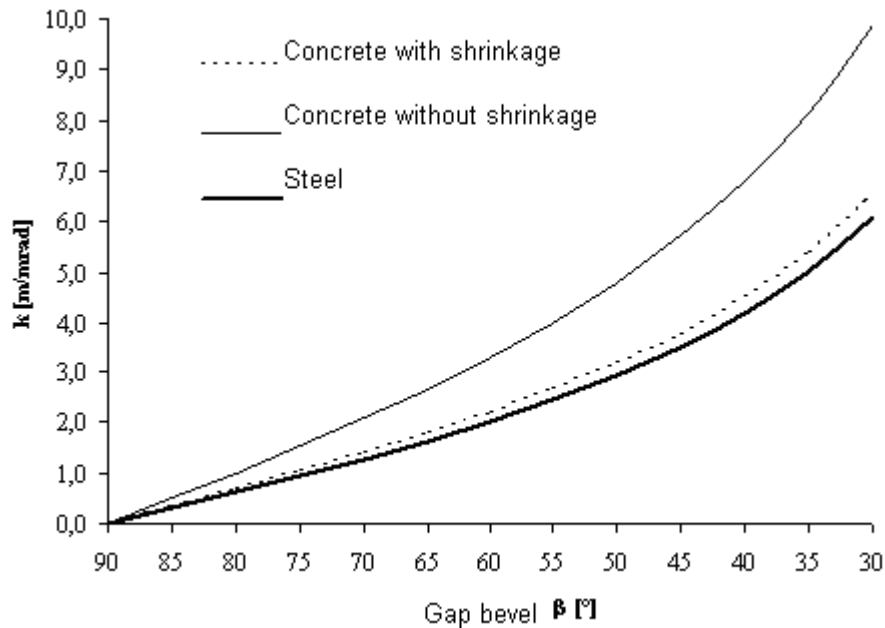
AUTHOR	:  MAURER SÖHNE Innovationen in Stahl	
CONSTR.	: CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

With oblique bridge ends the end field twist φ_y [mrad] of the superstructure has an effect on the allowed construction length L_q .

Distance between axis superstructure and expansion joint is assumed with $h = 2$ m:

$$\text{zul}L_q = \text{zul}L_q - k \times \varphi_y$$

(with $\text{zul}L_q$ according to upper table and k from diagram below))



3.4 Transverse Displacement in Types DT160 and DT240 without lateral Support

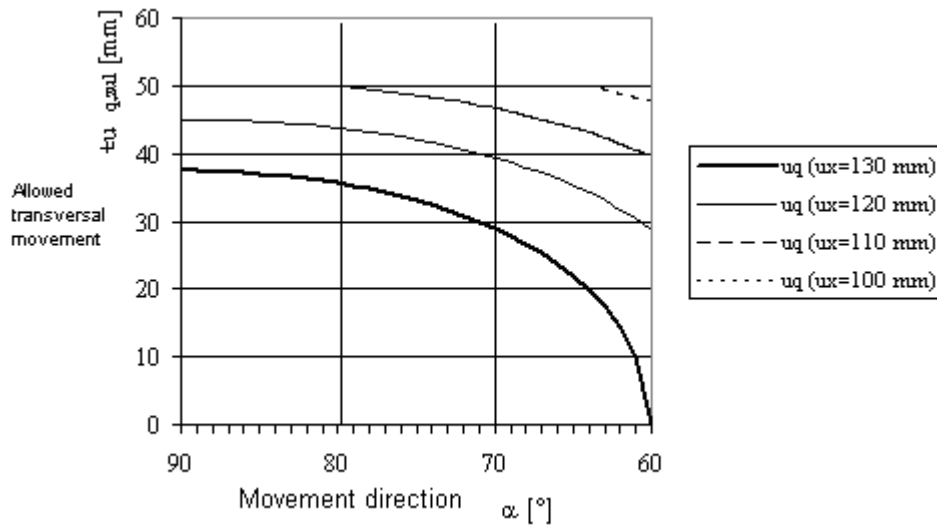
- without rhombic elements

For these joint types the superstructure must not necessarily be equipped with a guided bearing. So planned movements $\mathbf{u}_{q,zul}$ orthogonal to the main movement direction \mathbf{u} (direction of joists) are possible. For Type DT240 the $\mathbf{u}_{q,zul} = \pm 30$ mm is specified. With Type DT160 the allowed movement depends on the horizontal deformation capacity of the shear-thrust-spring and the displacements rectangular to joint axis \mathbf{u}_x . If \mathbf{u}_x with 130 mm is used in total, $\mathbf{u}_{q,zul}$ are minimal (see graph). For all smaller values \mathbf{u}_x the next lower curve from the graph must be used or $\mathbf{u}_{q,zul}$ shall be found out by computation.

For \mathbf{u}_x applies: $\mathbf{u}_x = \mathbf{u} \times \sin \alpha$

For $\mathbf{u}_{q,zul}$ applies: $|\mathbf{u}_{q,zul}| = 2 \times \sqrt{37,5^2 - \left(\frac{\mathbf{u}}{4}\right)^2} \leq 50\text{mm}$

CONS. PART	: GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK	: 3 – NOTICES FOR THE USER	PAGE: 12
METHOD	: TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>



If allowed movements are exceeded, there has to be an additional verification in each special single case.

- with rhombic elements

As rhombic elements are also scheduled for expansion joints with regular transverse displacement, tests are made to find out which circumstances have to be kept to avoid possible tensions.

Presuming that the minimum gap position is always smaller than the mid position, we get the following equation for the allowed transversal movement:

$$u_{q,zul} = \pm \left[n \times \left(6 - 1 - 1 + \frac{20}{32,5} \times (s_{min} - 5) \right) - L \times \alpha \times \Delta T \right]$$

where:

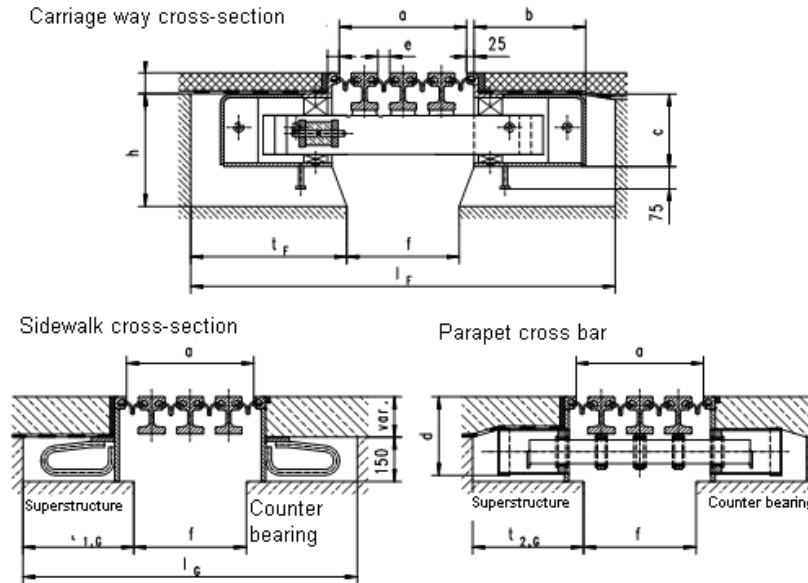
$u_{q,zul}$		(planned transversal movement u)
n		(number of sealing profiles)
s_{min}		(minimal gap)
L	= 12000 mm	(accordingly to the assumed maximum value)
α	= 12×10^{-6} 1/K	(coefficient of expansion for steel)
ΔT	= 47,5 K	(maximum temperature difference with steel and concrete steel bridges according to an installation temperature of 10°C)

	s _{min} = 5 mm	s _{min} = 37,5 mm
n	± u _{q,zul}	± u _{q,zul}
[-]	[mm]	[mm]
2	1	41
3	5	30*

*) Structural maximum value

Intermediate values can be interpolated.

3.5 Recess-sizes



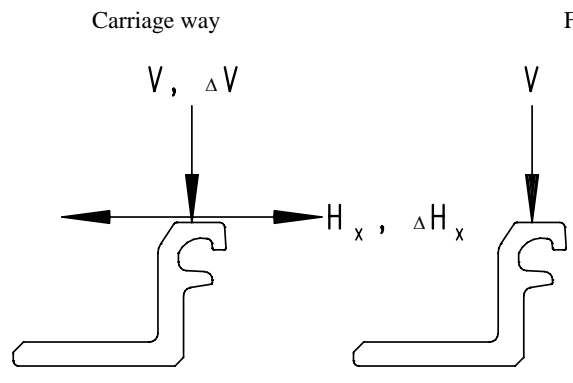
MAURER expansion joint			Structural dimensions				Concrete recess dimensions				Concrete joint dimensions			
n	Typ	α [°]	a [mm]	b [mm]	c [mm]	d [mm]	h* [mm]	t_F [mm]	$t_{1,G}$ [mm]	$t_{2,G}$ [mm]	f_{min} [mm]	f_{max} [mm]	l_F [mm]	l_G [mm]
2	DT160	90°-60°	150	200	175	255	300	350	335	335	150	200	850	820
	D160	90°-45°		217	216		340							
		44°-30°			236		360							
3	DT240	90°-60°	270	311	205	275	330	430	355	355	240	320	1100	950
	D240	59°-45°		297	226		350							
		44°-30°		330	246		370							
					380									
4	D320	90°-60°	390	377	246	370	520	365	365	350	440	1390	1080	
		59°-45°		407	266	390								
		44°-30°			276	400								
5	D400	90°-60°	510	509	266	390	650	375	375	460	560	1760	1210	
		59°-45°		525	286	410						1820		
6	D480	90°-60°	630	588	286	410	745	385	400	570	680	2060	1340	
		59°-45°		606	306	430						2090		
7	D560	90°-50°	750	682	306	430	800	395	450	680	800	2280	1470	
		49°-45°		687	326	450						2380		
8	D640	90°-60°	870	749	306	430	890	405	500	790	920	2570	1600	
		59°-45°		767	326	450						2670		

- all dimensions apply rectangular to the joint axis y
- *) if rhombic elements are part of the construction, the value for h has to be increased by 20mm!
- n = number of sealing profiles
- a , f and l apply for the setting dimension $e = 30$ mm for each joint gap. If dimension e differs, it has to be corrected by Δe .
- Recesses for footway joists 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.

3.6 Anchoring powers

Irrespective of the inclination of the carriageway, the V forces act always vertically and the H forces horizontally. The given forces are characteristic values according to DIN-Expert report 101. 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



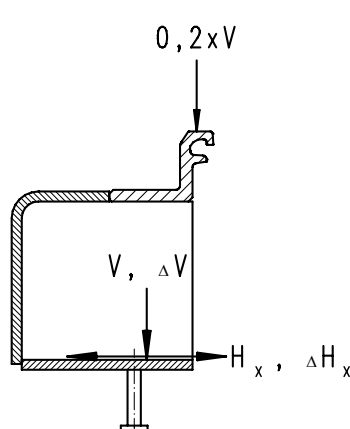
Moving resistance (friction and control)	
H_x [kN/m]	$3,0 + 1,5 \times n$
H_y [kN/m]	negligible

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

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

*) the specified forces apply for
wheel widths $b=0,60$ m at
carriage way and $b=0,40$ m at footway

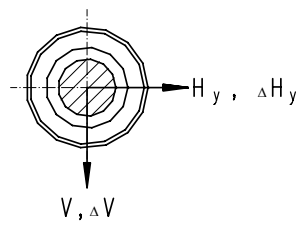
Joint box



Certificate for load bearing	
V [kN]	134,0
H_x [kN]	47,0
H_y [kN]	$47,4 \times \tan \alpha$

Certificate for tiredness		
ΔV [kN]	130,7	$(\kappa = -0,3)$
ΔH_x [kN]	31,5	$(\kappa = -0,73)$
ΔH_y [kN]	$31,5 \times \tan \alpha$	$(\kappa = -0,73)$

Parapet unit



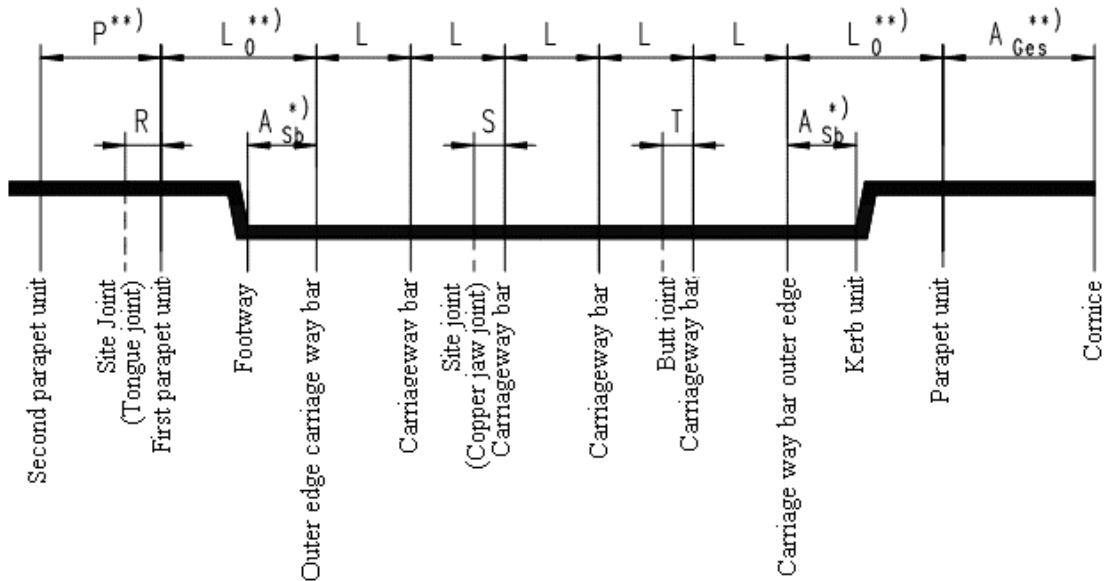
Certificate for load bearing		
V_{max} [kN]	42,2	
V_{min} [kN]	-41,7	
H_y [kN]	40,6	

certificate for tiredness		
ΔV [kN]	-31,3	$(\kappa = 0)$
ΔH_y [kN]	30,5	$(\kappa = 0)$

4. Construction Requirements for the technical approved expansion joints

4.1 Allowed cross bar interspaces and position of butt joints

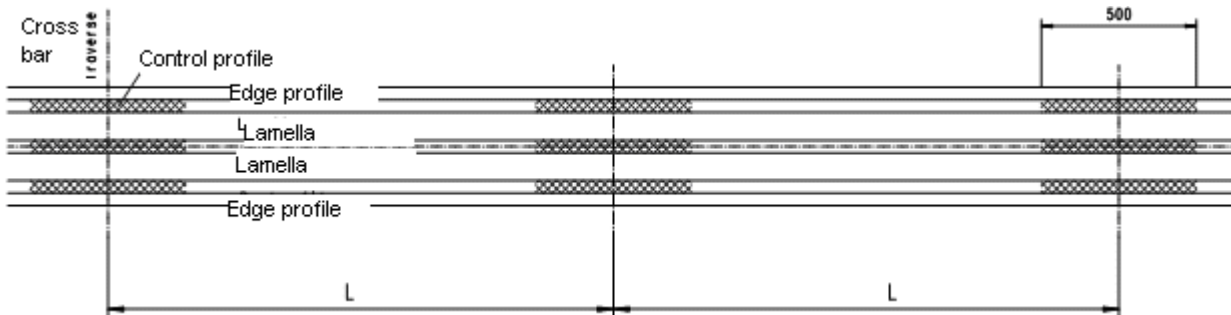
Cross section in direction of the Joint-axis



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

**)See Part 4.2

n	s	A_{Sb} [mm]	L [mm]	R [mm]	S_{min} [mm]	S_{max} [mm]	T_{min} [mm]	T_{max} [mm]
2-6	≤3%	≤830	≤1630	≤1630	115	500	60	370
	≤4%				118	467	65	342
	≤5%				122	433	70	313
	≤6%				125	400	75	285
7-8	≤3%							



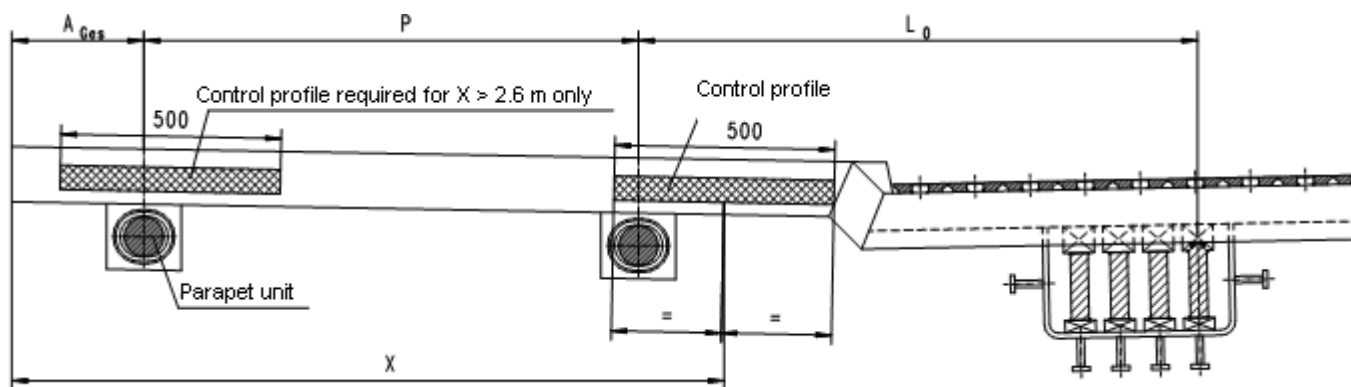
AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

When the bridge declination $> 3\%$ on all cross bar (joist) boxes of the carriageway a 0,5 m long guiding profile has to be inserted additionally.

4.2 Arrangement of the Parapet Units

In the movement spectrum of $105^\circ < \alpha < 75^\circ$ all parapet units normally are swivel-mounted, but at least one parapet unit has to be rotatable. At a single gap width of $e = 30$ mm they are installed rectangular to the joint axis. According to TL/TP-FÜ (03/05) the vertical nominal frequency $f_v = 120$ Hz and the horizontal nominal frequency $f_h = 40$ Hz shall not go below.

Therefore the projecting length A_{Ges} has to be limited.



n	A_{Ges} [mm]	L_0 [mm]	P [mm]
2-8	≤ 400	≤ 1700	0
	≤ 400	≤ 1700	≤ 1700
	≤ 600	≤ 1700	≤ 1500
	≤ 600	≤ 1500	0

Is the clearance between the outer edge of the parapet area and the middle of the pavement steering at the kerb unit $X > 2,6$ m, on the outer Parapet unit a 0,5 m long guiding profile has to be inserted additionally.

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	Technical approval No. 07/07 of 22.11.07
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

4.3 Factory Provided Corrosion Protection

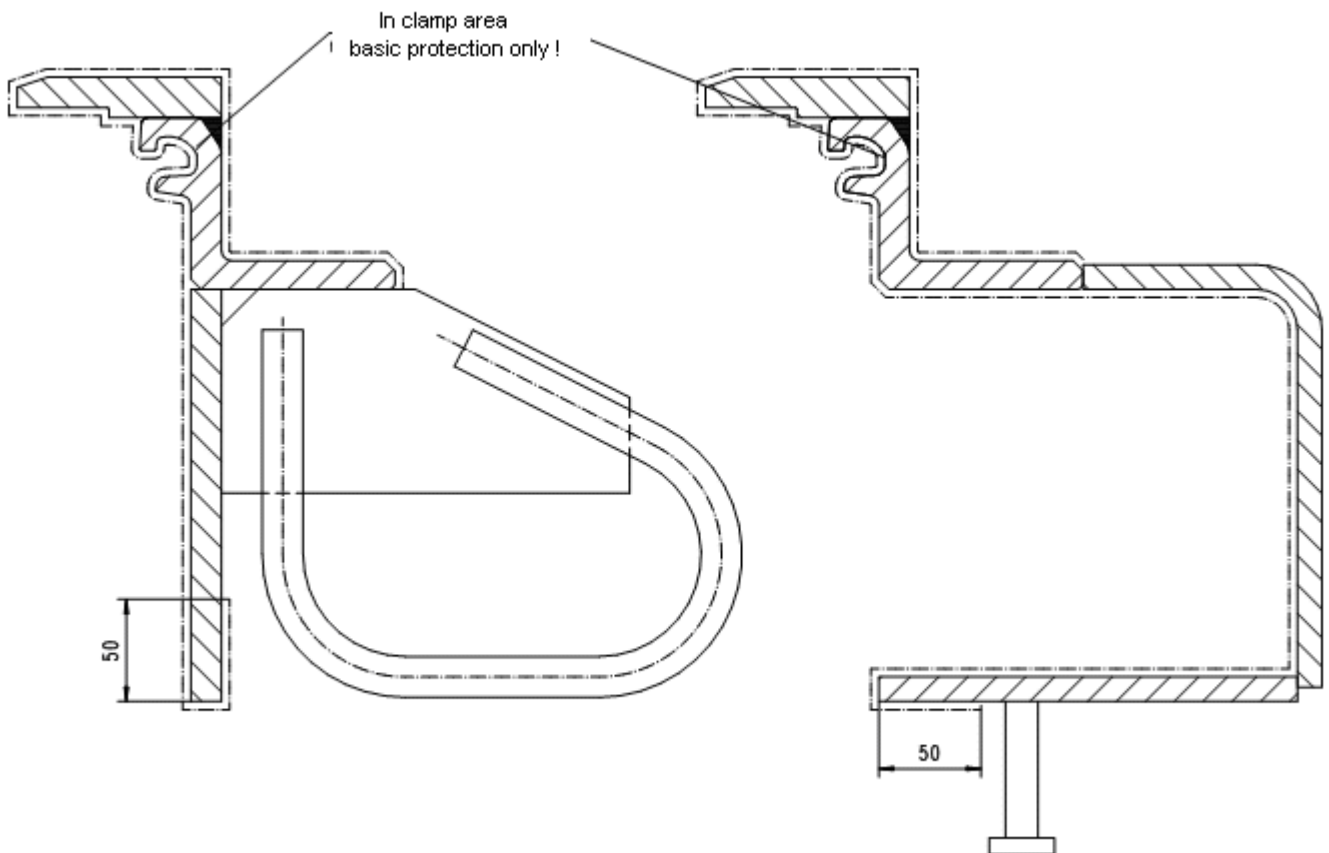
The corrosion protection of the constructions technically approved according to ZTV-KOR-Steel Constructions 2002

Annex A.

Corrosion protection system No. 1		Required layer thickness	Surface pre-treatment	Materials according to TL/TP-KOR-Steel Constructions 2002 Page No.
GB	EP-zink dust	70 µm	Sa 2½	94/95
1.DB	EP(micaceous iron ore)	80 µm per 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:



CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	<div style="border: 1px solid green; padding: 2px; display: inline-block;"> <i>Technical approval No. 07/07 of 22.11.07</i> </div>
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	PAGE: 18

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts - only upon approval.

Formats and contents are copyrighted!

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

5. Installation Instruction

5.1 Delivery

The expansion joints are delivered to site completely assembled in whole lengths or section wise. Auxiliary devices support the transport, storing and installation. They keep the expansion joints in the correct installation position and render a professional loading possible. 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 appropriately 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.

The weights per linear meter specified in the following table can be taken as standard values for the crane layout.

type	weight [kg/m]
DT/D160	200
DT/D240	290
D320	400
D400	530
D480	680
D560	830
D640	1040

Table: Weights per running meter for crane layout (guiding values)

5.2 Installation and connection to supporting structure in case of concrete parts

The size of recesses in the structural concrete must already be defined in advance as early as at the structure planning stage according to Part 3.5 or finally according to our construction drawings, and has to be executed accordingly. Always observe the proper width of the structural gap. The recess dimensions are to be checked once again just before installing and must be corrected if necessary. The surfaces of the recesses have to be treated as working gaps according to DIN 1045.

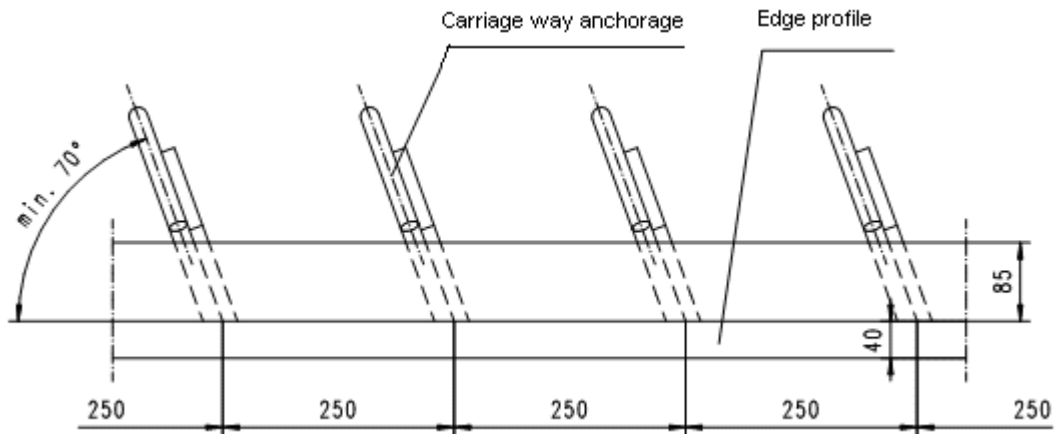
CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	PAGE: 19
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<div style="border: 1px solid green; padding: 2px; text-align: center;"> <i>Technical approval</i> No. 07/07 of 22.11.07 </div>

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts - only upon approval.

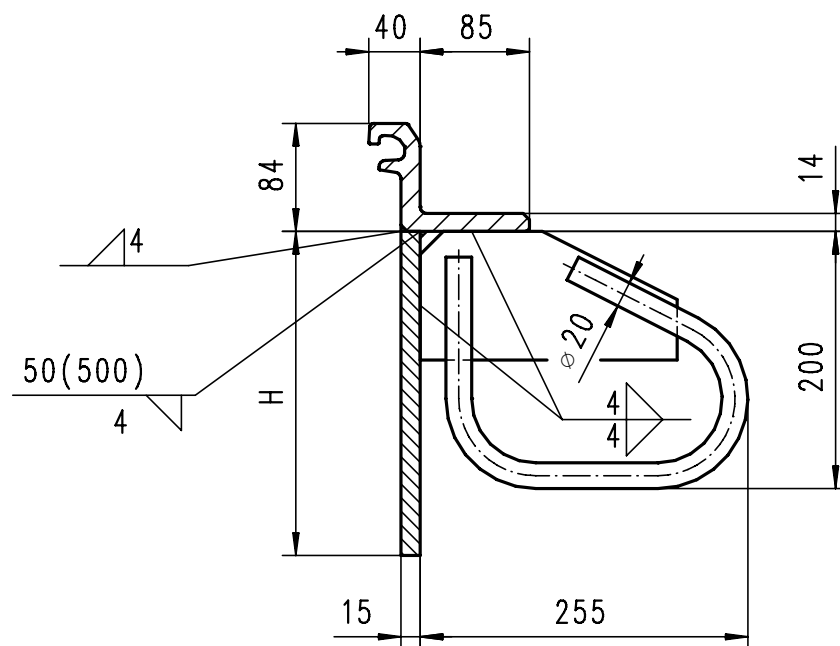
Formats and contents are copyrighted!

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

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



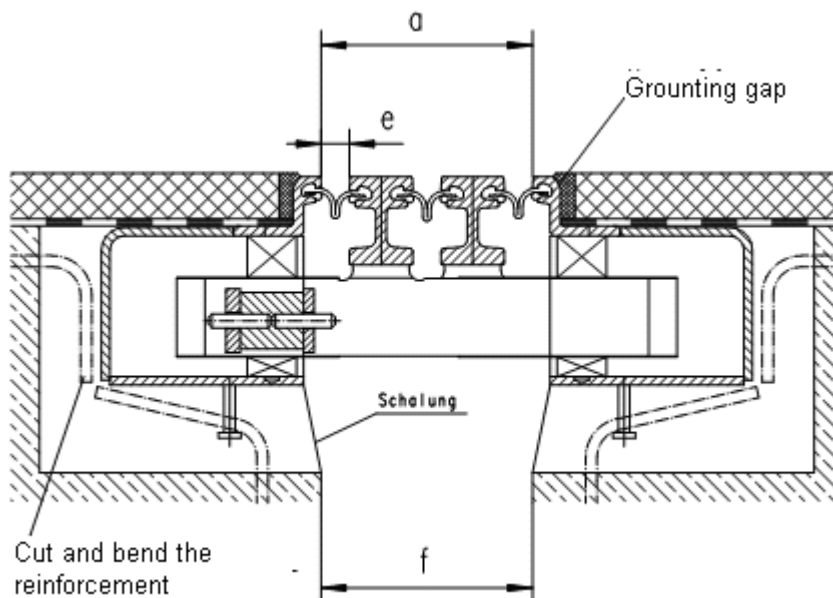
The following drawing presents the standard-edge profile. It is almost of same shape for all types. The only difference is in the height H of the standing plate. Normally it reaches to the lower edge of the joist-box. To enable the attachment of shuttering plates, this plate is lengthened by 30 mm. This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



CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	PAGE: 20
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	Technical approval No. 07/07 of 22.11.07

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

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.



Picture 1: Cross section joist box

The construction has to be lifted into the recess by using an adequate truck-mounted crane, then levelled to the required height according to the site engineer and assembled parallel to the longitudinal and transverse slope of the carriageway. Each construction has to be heaved into the recess by an 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 the longitudinal and transversal slope or the carriageway. 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 the cross section relating to the carriageway surface from ZTV-ING have to be observed.

After the carriageway crossover is aligned vertical stiffeners are welded on the sides of the 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 the first anchor slings next to the cross bar boxes is added if missing and welded with the site reinforcement, but not with the construction of the cross section. To shorten the period till loosening the installation holder as much as possible, first the welding is done only in the area next to the cross bar boxes 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 carriageway crossover firmly in its final position.

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	PAGE: 21
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	Technical approval No. 07/07 of 22.11.07

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

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

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. It is obligatory to stick 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 an even or higher strength than 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. Lastly, the shuttering within the joint gap has to be removed and the joint has to be cleaned.

5.3 Anchorage in the cap area

Anchorage of the expansion joint in the cap concrete 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 aid can facilitate the accurate installation.

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER PAGE: 22	<i>Technical approval No. 07/07 of 22.11.07</i>
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	

AUTHOR :	
CONSTR. : CARRIAGEWAYS AND BRIDGES	DATUM: 1.05.2007

5.4 Procedure for bridges with steel carriageways

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

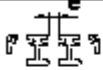
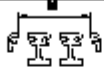
- a) Support on a continuous beam, mounted before the continuous girder.
- b) Support on individual consoles connected to the end cross girder
- c) Direct connection of the supporting sides of the joist- boxes to the end cross girder

The kind of construction largely depends on the 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 installation dimension

The bridge design engineer determines the temperature-dependent gap and installation dimensions. If there are no special requirements, the expansion joints are provisionally adjusted in the workshop to a structural 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. Dimensions for the temperature-dependent pre-settings can be obtained from the tables on the final drawings.

Installation dimensions for Type D...

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

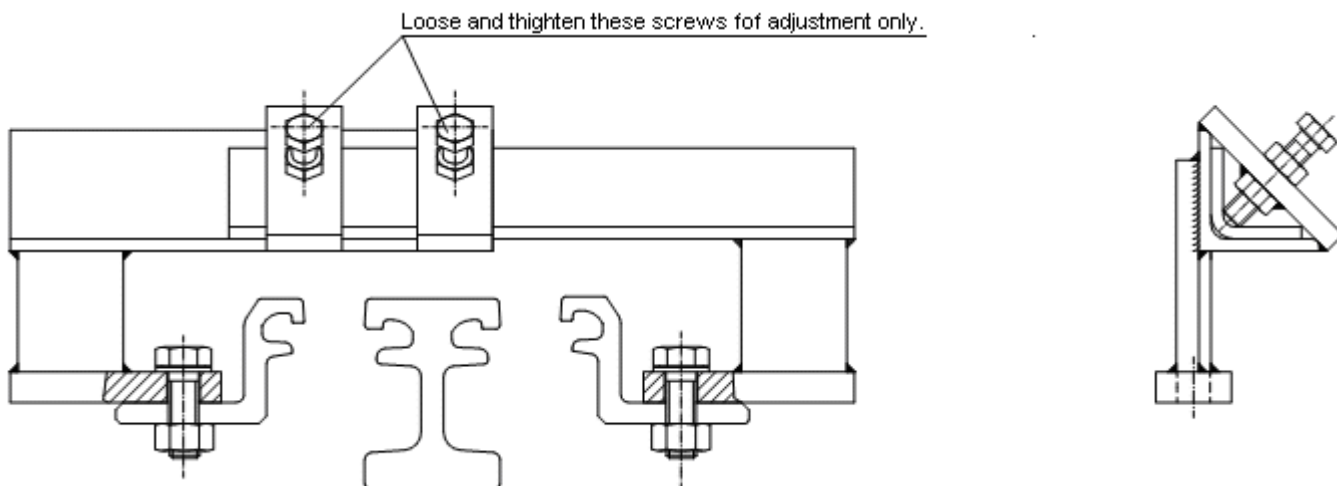
The mean structural temperature needs to be determined before assembly.

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 presetting 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.

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	PAGE: 23
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007



Picture 3: Movable 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 type DS160 and DT/D240, see paragraph 6.1).

The construction supervision has to certify any changes of the assembly dimension to our fitters.

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 insulation. The sealing has to be attached to the expansion joint over the entire length of the superstructure, i.e. also at 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.

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	<div style="border: 1px solid green; padding: 2px; text-align: center;"> <i>Technical approval</i> No. 07/07 of 22.11.07 </div>
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts - only upon approval.

Formats and contents are copyrighted!

AUTHOR :	
CONSTR. : CARRIAGEWAYS AND BRIDGES	DATUM: 1.05.2007

5.7 Further Advice

Appropriate measures should be taken in order to prevent driving over the joint before the pavement is applied. If there is no possibility of redirecting the site traffic running over the carriageway expansion joints, 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 butts according to chapter 5.8
- Sealing profiles generally are vulcanised.
- The rhombic elements in the 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 a 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 a 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.

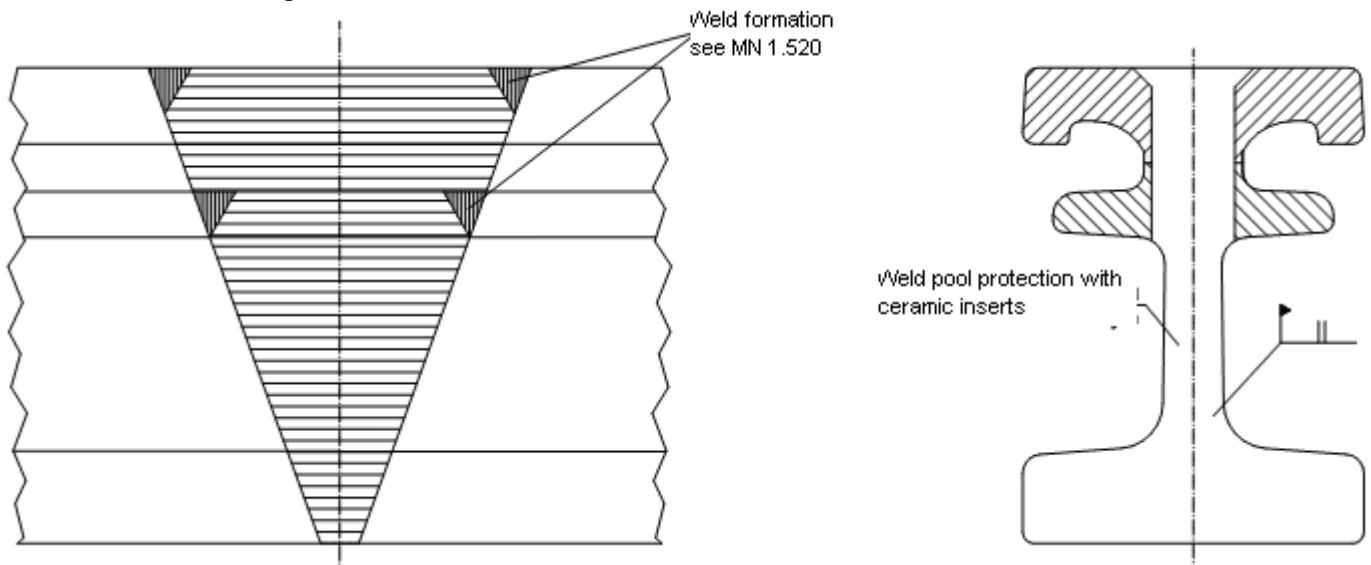
CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER PAGE: 25	<i>Technical approval No. 07/07 of 22.11.07</i>
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	

AUTHOR :	
CONSTR. : CARRIAGEWAYS AND BRIDGES	DATUM: 1.05.2007

5.8 Site joints

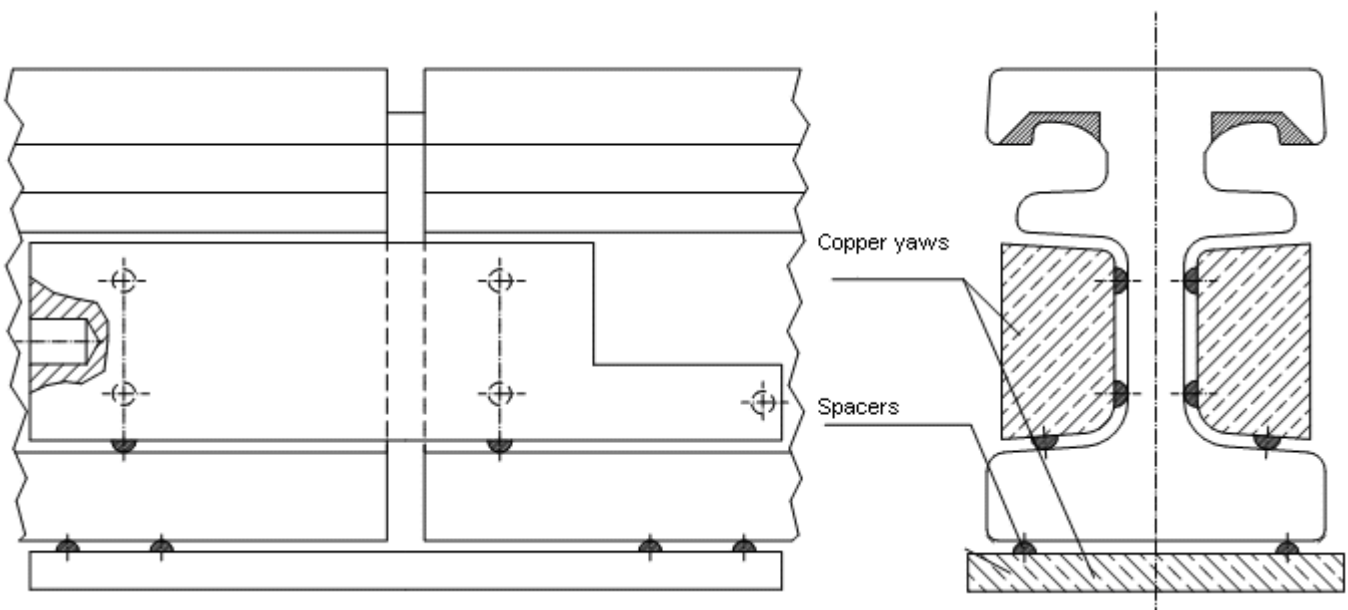
- CeraMag joint (into the carriageway)

Construction according to work instruction AA 1.541



- Copper jaw joint (into the carriage way as alternative to CeraMag)

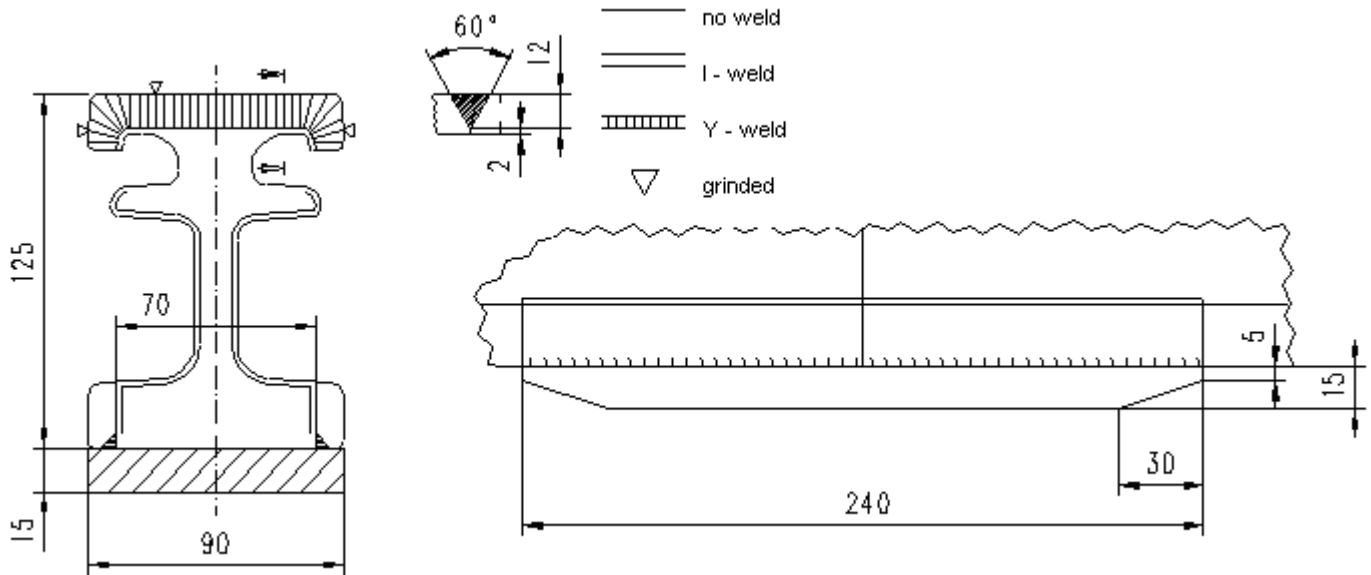
Construction according to work instruction AA 1.510



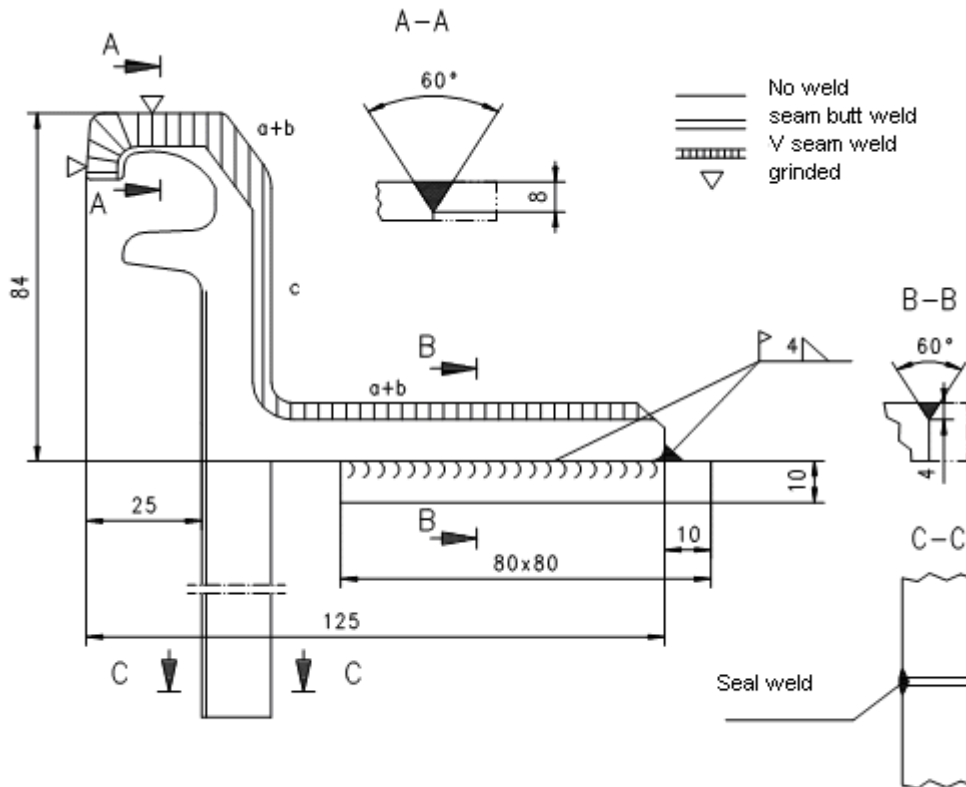
CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	Technical approval No. 07/07 of 22.11.07
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	PAGE: 26

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

Site joint of the lamella outside the carriage way
 Construction according to work instruction AA 1.510



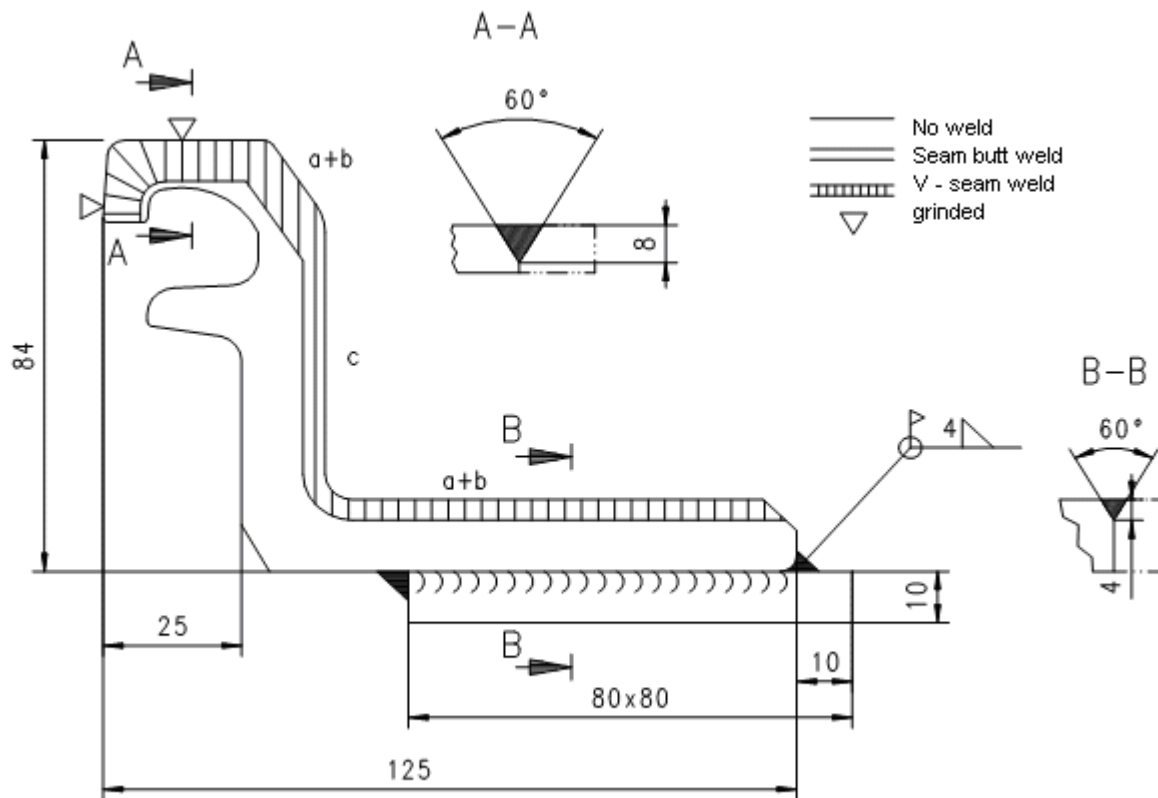
- Site joint of the edge profile in the carriage way
 Construction according to work instruction AA 1.510



CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 - NOTICES FOR THE USER	Page: 27
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	Technical approval No. 07/07 of 22.11.07

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

Site joint of edge profiles outside of the carriageway
Construction according to work instruction AA 1.510



- 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 test certificate 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.

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	Technical approval No. 07/07 of 22.11.07
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	PAGE: 28

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

	MAURER SÖHNE Innovationen in Stahl	CERTIFICATE OF ACCEPTANCE / PROTOCOL OF 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+50 = _____ mm (carriage at BW-Temp. _____ °C
 way)

Presetting at mounting: a+50 = _____ mm (carriage way) 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+50 = _____ mm (carriage at BW-Temp. _____ °C
 way)

Presetting at mounting: a+50 = _____ mm (carriage way) 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.**

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240 BLOCK : 3 – NOTICES FOR THE USER PAGE: 29 METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	ARCHIV NO. <div style="border: 1px solid green; padding: 5px; color: green;"> Technical approval No. 07/07 of 22.11.07 </div>
---	---

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

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

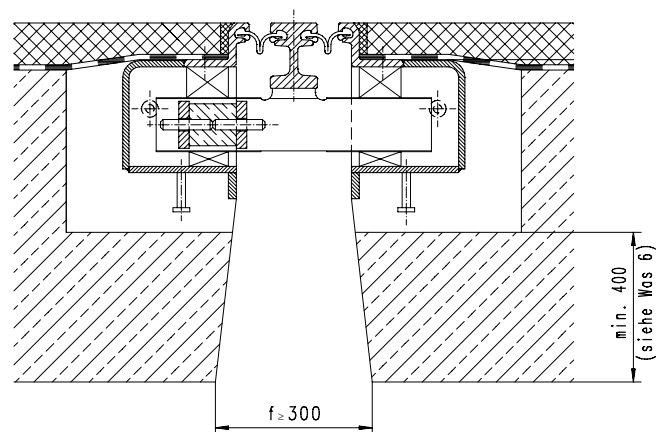
MAURER-Lamella-expansion joints are maintenance free within the service life provided of at least 20 years. But to spot eventually appearing defects on time before greater damage occurs, regular supervision and inspection of the components is appropriate. Frequency and extent are conforming to valid standards i.e.:

- DIN 1076
- Product specification sheet for construction supervision of 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 directly from the carriageway. 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 complies with the movement of the joint and the number and width of the Lamellas. Just underneath the expansion joint construction the light clearance f is in the centre position of the construction (see page 13):

Type	f [mm]
DT/D160 *	300
DT/D240 *	300...343
D320	380...470
D400	498...598
D480	615...725
D560	733...853
D640	850...980



*)

You can reach the planned dimension 300 mm for the types D/DT160 and DT/D240 through the enlargement under the joint for constructional reasons only.

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

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	PAGE: 30
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	Technical approval No. 07/07 of 22.11.07

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

6.2 Components which must be controlled regularly

(1) Sealing profiles

- dirt
- ageing
- butt joints
- damage
- secure hold
- tightness
- regular and sufficient gap widths

(2) Sliding elements

- dirt
- wear
- surface damage
- proper fixation
- smooth movement
- rubbing between individually movable parts

(3) Bearing and spring elements

- correct position
- damage
- crack free
- sufficient pre-stressing and fixation
- notable noise development

(4) Corrosion protection

On surfaces travelled over the corrosion protection is racked out in a short period of time, which, however, is of no meaning.

- underneath the sealing profiles
- in the footway area
- underneath the steel cover plates

(5) Steel supporting structure

- crack free at junctions and firm fit of mechanical connections
- welds on the lamella / joist
- site and factory butt joints of lamellas
- connection of control construction (cams and stoppers)
- anchoring of edge constructions
- condition of the concrete underneath the joist-boxes
- free movement of lamellas and joists (concreting defects)

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	PAGE: 31
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<i>Technical approval No. 07/07 of 22.11.07</i>

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

(6) Coating connection

- condition of the grouting gap between edge profile and coating
- deformation of the edge profile in the carriageway
- deformation of the edge profiles at the cap
- coating damages
- formation of ruts
- height evenness of joint edges
- superelevation of coating
-

(7) Plate cover plates in footway and at fascia

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

The control results have to be recorded in writing.

6.3 Replacement of sealing profiles

The removal or damage free mounting and dismounting of sealing profiles is possible from above at single gap widths of ≥ 25 mm. If the expansion joint is loaded with rhombic elements, the individual gap widths must be opened to at least ≥ 60 mm. For that the lamellas will eventually have to be displaced in transverse direction to the joint.

- opening of the joint gap by means of hoists
- dismounting the old sealing profile with special-fitting levers
- control of corrosion-grade of the steel claws
- check and renewal of corrosion protection (if necessary)
- eventual vulcanising the butt joint between remaining sealing profile and the one to be renewed
- paraffin oil greasing of steel claws
- folding in the new sealing profile with special-fitting lever
- right position control

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER	PAGE: 32
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<div style="border: 1px solid green; padding: 2px; text-align: center;"> <i>Technical approval No. 07/07 of 22.11.07</i> </div>

AUTHOR :	
CONSTR. : CARRIAGE WAYS AND BRIDGES	DATUM: 1.05.2007

6.4 Replacing the wear and tear parts from above of carriageway

If there is a maintenance catwalk or with larger types the removal from below is to be preferred.

• Dismantling the sliding bearings

Remove welds of some rhombic elements by drilling.

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

Enlarge the gap between the bars using hydraulic moulding presses to approx. 80 mm.

Erect the lifting gear.

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

Dismount the sliding bearing.

• Dismantling and mounting of sliding springs

Reconstruct the lifting gear after dismantling the sliding bearing.

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

Dismount the sliding spring.

Install a new sliding spring.

• Installation of sliding bearing

Reconstruct the lifting gear.

Hoist the lamella with the lifting gear.

Install sliding bearing.

Dismantle the lifting gear

Readjust the gap between lamellas.

Install the sealing profile during removal from above.

Place new rhombic elements.

• Removal of control spring

The neighbouring lamellas linked by the control spring to be put together to contact with hydraulic presses.

Remove polyamide holding bolts of the control spring.


Remove the control spring free from tension downwards.

• Installation of control spring

Install the spring and holding bolts in reverse order.

Reset the gap between lamellas.

CONS. PART : GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 TO DT160 BIS DT240	ARCHIV NO.
BLOCK : 3 – NOTICES FOR THE USER PAGE: 33	<i>Technical approval No. 07/07 of 22.11.07</i>
METHOD : TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	

AUTHOR	:	 MAURER SÖHNE Innovationen in Stahl	
CONSTR.	:	CARRIAGE WAYS AND BRIDGES	DATE: 1.05.2007

7. Standard 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 No.	Description	Version	Date	modification
1	Longitudinal section and top view	b	19.09.1996	1.05.2007
2	Cross sections	b	19.09.1996	1.05.2007
3	Reinforcement plan 1	b	19.09.1996	1.05.2007
4	Reinforcement plan 2	b	19.09.1996	1.05.2007
5	Other details		1.05.2007	
6	Double-profile superstructures	a	20.06.2002	1.05.2007

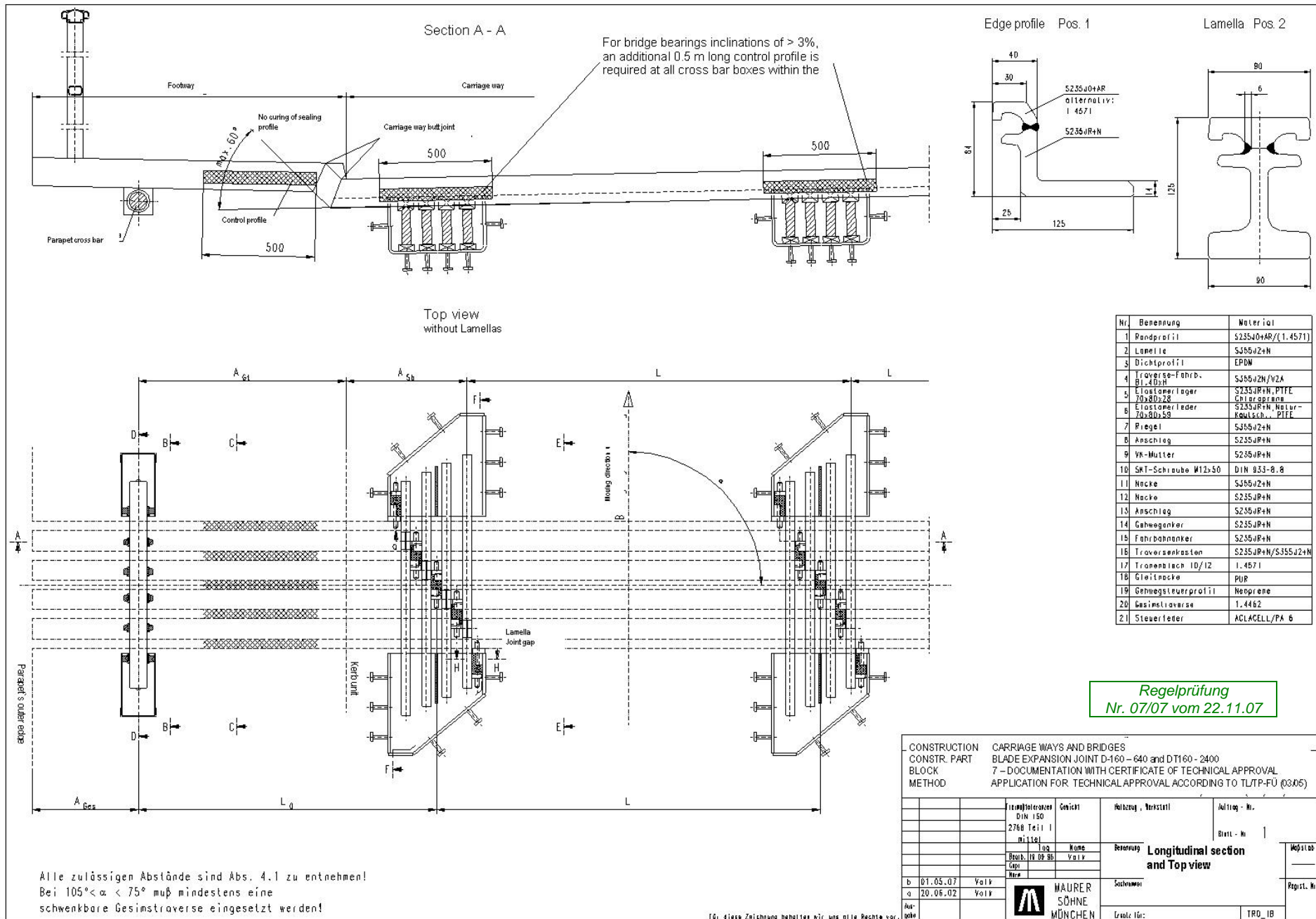
The basis for the technical approval is a variety of work instructions and standard drawings. Elaborating of these in the course of the construction's approval is not planned. The following table provides a summary of the materials of the main construction parts:

ITEM	Pos.	Tolerance	Semi finished part	MATERIAL	WEIGHT
Claw leg profile	1	DIN ISO 2768-m	rolled section	S355J2+N	21,6 kg/m
Lamellas	2	DIN ISO 2768-m	rolled section	S355J2+N	46,6 kg/m
Sealing profile	3	-		EPDM (black) E2329, 60±5 Shore A	1,45 kg/m
Rhombic element	28/29	DIN 7526 F	Drop forge part	S235JR+N	1,35 kg/m
Edge plate	30	DIN EN 10029 C		S235JR+N	19,0 kg/m
Joist	4	DIN EN 10029 C		S355J2+N	
Box half	16	DIN EN 10029 C		S235JR+N, S355J2+N	
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		S235JR+N, CR 60 Shore A, PTFE	0,8 kg
Elastomeric slide springs 70/80	6	M2 DIN 7715		S235JR+N, 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		S235JR+N	3,65 kg
Footway anchor Übe1, 70° to 90°	14	DIN 1013	Rd. St. Ø 20	S235JR+N	1,36 kg

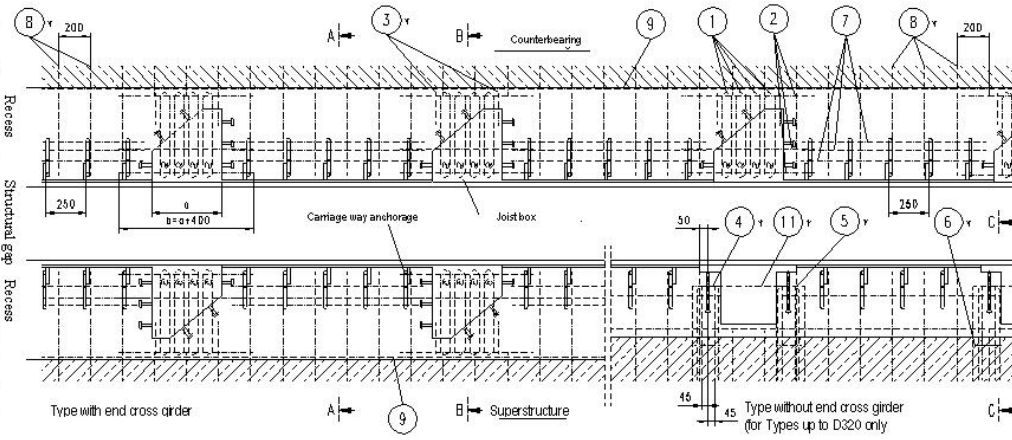
CONS. PART	:	GIRDER GIRD EXPANSION JOINTS TYPE D160 TO 640 AND DT160 TO DT240	ARCHIV NO.
BLOCK	:	7 – STANDARD DRAWINGS AND PARTS LISTS	PAGE: 34
METHOD	:	TECHNIC ALAPPROVAL ACCORDING TO TL/TP-FÜ (STATUS: 03/05)	<div style="border: 1px solid green; padding: 2px; text-align: center;"> <i>Technical approval</i> No. 07/07 of 22.11.07 </div>

This documentation is the property of MAURER SÖHNE GmbH & Co. KG. Any reproduction – also in extracts - only upon approval.

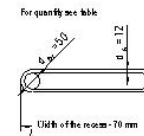
Formats and contents are copyrighted!



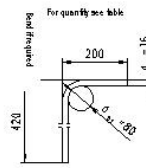
The dimensions of the recesses (i and/or h) and the width of the structural gap are to be determined according to chapters 3.4



Pos. 1

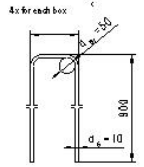


Pos. 3

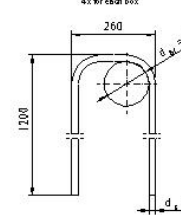


Movement direction 60° ≤ α ≤ 90°			
Typ	Pos. 1	Pos. 3	
DT 70/160	1x	1x	
DT 70/240	2x	2x	
D320	3x	2x	
D400	4x	2x	
D480	4x	3x	
D560	4x	3x	
D640	4x	3x	

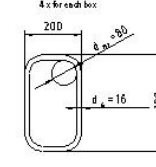
Pos. 4



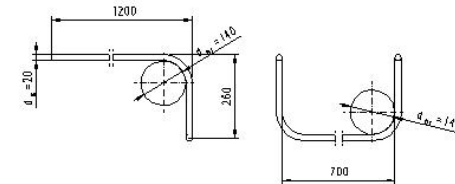
Pos. 5



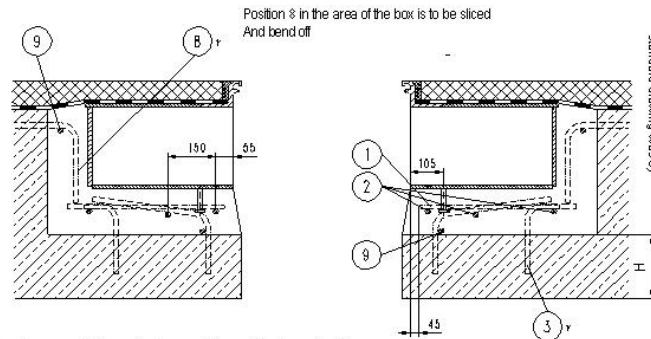
Pos. 6



Pos. 11

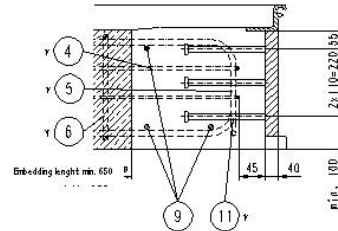


Anchorage of the joist box Section B—B



Minimum dimensions according to standards for the construction of concrete (for example standard drawing Was 6)

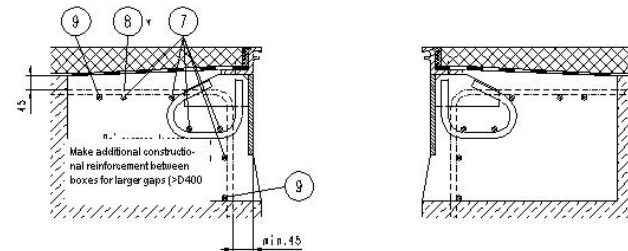
Anchorage of the joist box Section C—C
Type without end cross girder for types up to D320



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 with 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 * are to be placed into the concrete of the girder.

Anchorage of the edge beam Cross Section A—A

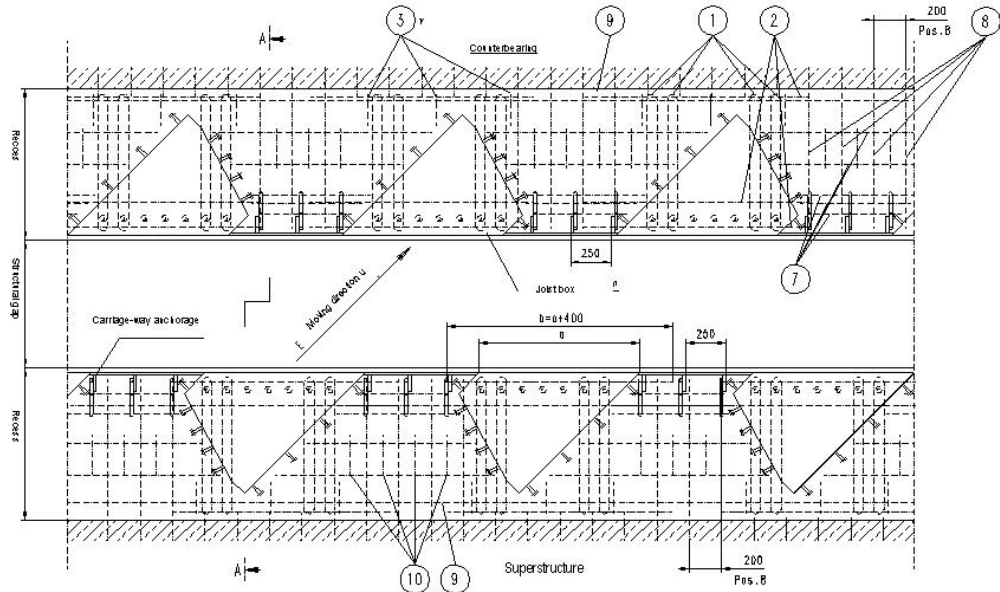


Pos	Dimension	Note
1	∅12	siehe Skizze
2	∅12b	
3	∅16	siehe Skizze
4	∅10	siehe Skizze
5	∅20	siehe Skizze
6	∅16	siehe Skizze
7	∅16	Lichtspritz zwischen Kästen
8	∅16	siehe Skizze
9	∅16	LEB (Längs)
11	∅20	siehe Skizze

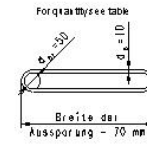
CONSTRUCTION	CARRIAGE WAYS AND BRIDGES
CONSTR. PART	BLADE EXPANSION JOINT D-160 – 640 and DT160 - 2400
BLOCK	7 – DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL
METHOD	APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TLTP-FU (03.05)
Verordnungsnummer DIN 150	2168 Teil 1
Bezeichnung	Reinforcement plan
Blatt-Nr.	3
Proj. Nr.	TR0_38
Vertrag	MAURER SÖHNE MÜNCHEN

Regelprüfung
Nr. 07/07 vom 22.11.07

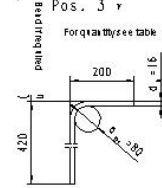
Ground view



Pas. 1

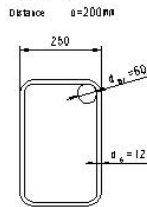


Pos. 3



Typ	Pos. 1	Pos. 3
D170160	1x	1x
D170240	2x	2x
D320	3x	2x
D400	4x	2x
D480	4x	3x
D560	4x	3x
D640	4x	3x

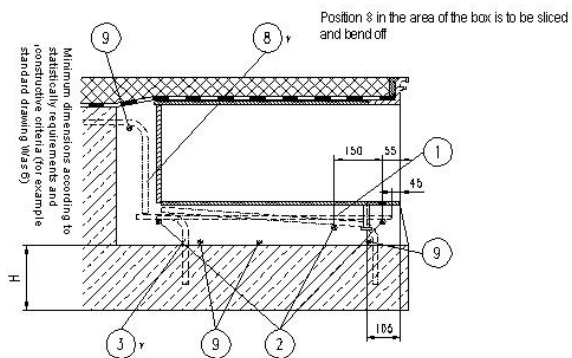
Pas. 10



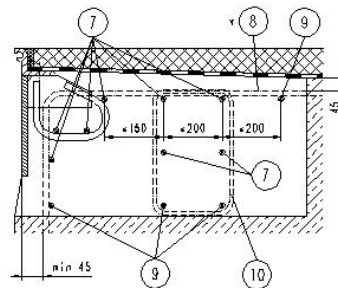
All dimensions in mm

Pos.	Dimensions	Remark
1	$\phi 12$	siehe Skizze
2	$\phi 12$	siehe Skizze
3	$\phi 16$	siehe Skizze
7	$\phi 16$	L entspricht Lichtmass zwischen Kästen
8	$\phi 16$	siehe Skizze
9	$\phi 16$	L=B (Fahrp.)
10	$\phi 12$	siehe Skizze

Anchorage of the joist box Section A - A



Anchorage of the edge beam:



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°.

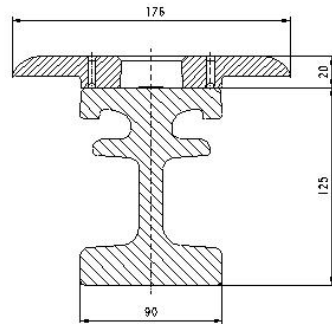
Concrete with the recess \geq C30/37 low-shrinkage concrete. Underneath the joist boxes (grain size 0/16 mm) shall be used. Reinforcement in general \geq Bst. 500 S.

Reinforcement positions marked with * are to be placed into the concrete of the girder.

Regelprüfung
Nr. 07/07 vom 22.11.07

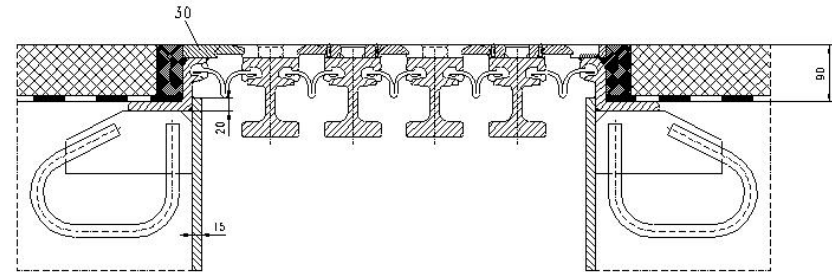
CONSTRUCTION		CARRIAGEWAYS AND BRIDGES	
CONSTR. PART		BLADE EXPANSION JOINT D-160 - 640 and DT160 - 2400	
BLOCK		7 - DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL	
METHOD		APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TLTP-FU (03/05)	
	Preis/Leistungs	Gewicht	Werkung, Herstell
	DIN 150		Antrag - Nr.
	2768 Teil 1		Blatt - Nr. 4
	Mittel		
	Bezb. B. 09.95	YpJK	
	YpJK		
	Mera.		
b	01.05.07	Yolk	
a	20.06.02	Yolk	
Angebot			Regist. Nr.
		MAURER SDHNE MÜNCHEN	190_48

Sealing with silicon mass



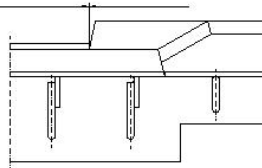
Back view

Cross-section Carriage way area
With diamonds



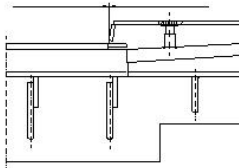
With cover plates

Carriage way Sidewalk

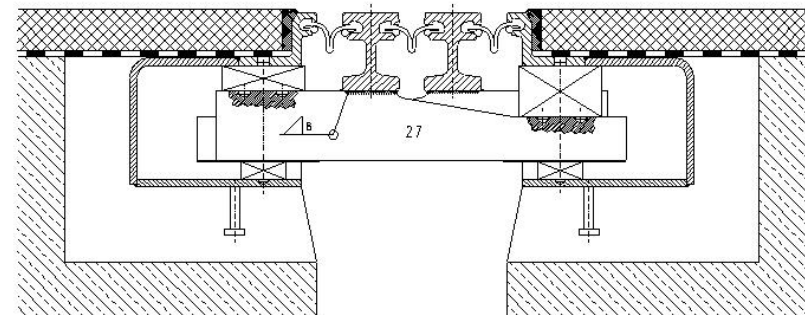


Without cover plates

Carriage way Sidewalk



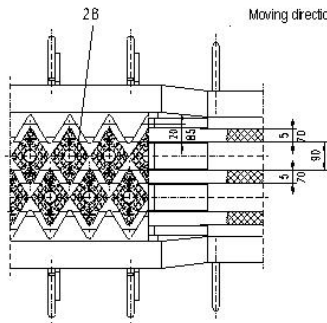
Section A - A Carriage way cross bar
Type DT 240



All expansion joints of this technical approval can be equipped with diamond elements.

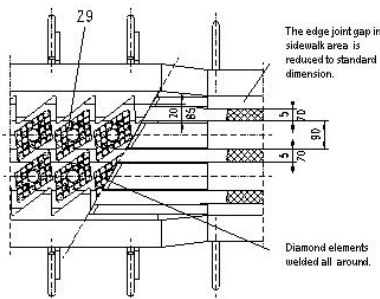
Whith already installed joints a checking in each single case is necessary.

Moving direction $\alpha = 90^\circ$



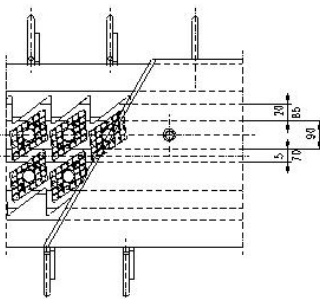
Position cover plates over diamond elements.

Moving direction $\alpha = 60^\circ$



The edge joint gap in sidewalk area is reduced to standard dimension.

Due to plate cover there is no need for joint gap reduction.

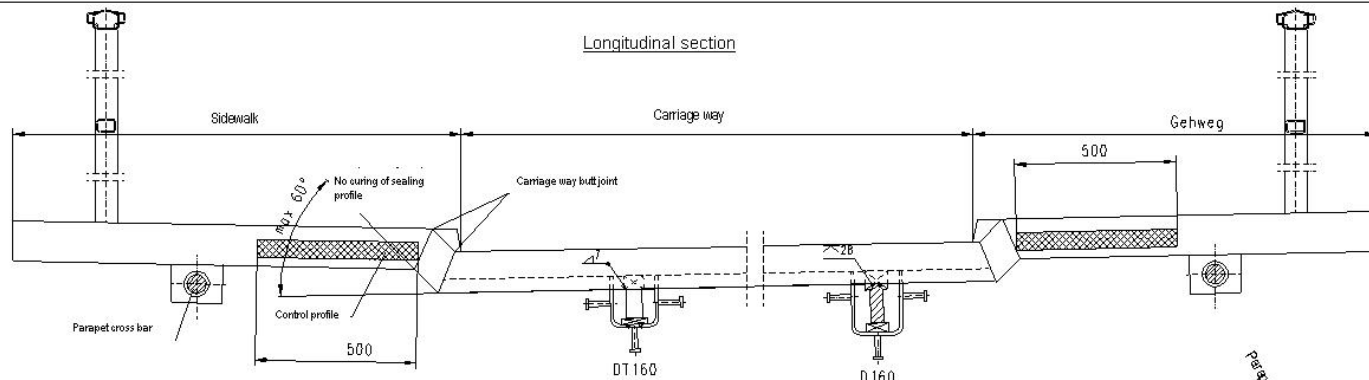


Diamond elements welded all around.

Regelprüfung
Nr. 07/07 vom 22.11.07

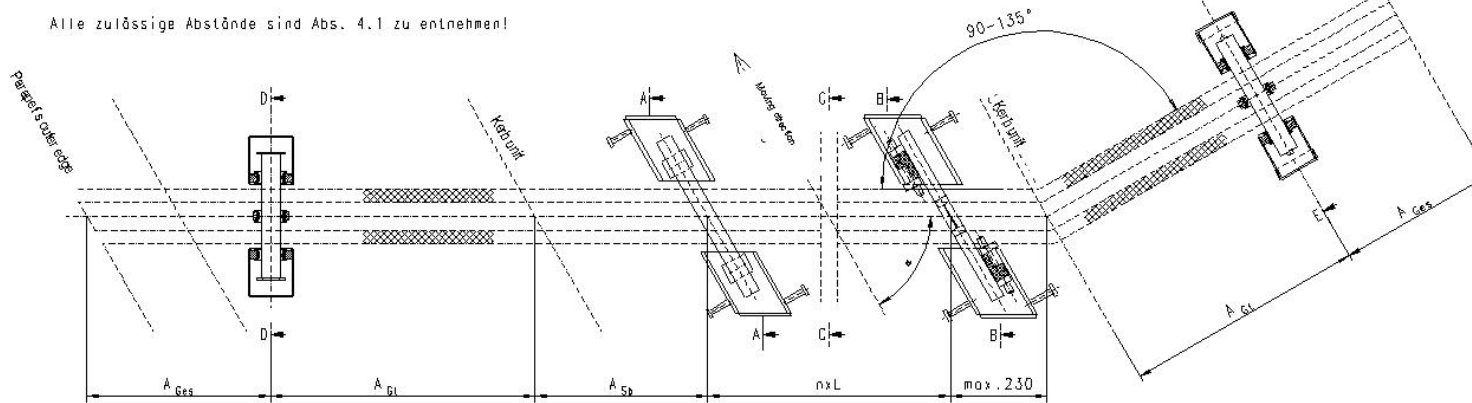
Nr	Benennung	Material
22	Schub-Druck-Feder DT160	S355J2H/NR
23	Schub-Druck-Feder DT240	S355J2H/NR
24	Elastomerlager 80x80	S355J2H/NR
26	Traverse DT160	S355J2N
27	Traverse DT240	S355J2N
28	Rautenelement ($\alpha = 90^\circ \times 10^\circ$)	S235JR+H
29	Rautenelement ($\alpha = 70^\circ \times 10^\circ$)	S235JR+H
30	Randplatte	S235JR+H

CONSTRUCTION		CARRIAGE WAYS AND BRIDGES	
CONSTR. PART		BLADE EXPANSION JOINT D-160 - 640 and DT160 - 2400	
BLOCK		7 - DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL	
METHOD		APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TL/TP-FÜ (03.05)	
2768	Teil 1	Blatt - Nr.	5
Maurer & Söhne		Other details	
Maurer & Söhne München		Regist. Nr.	
Datum		ST_5	



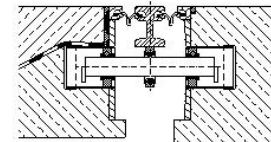
Top view without Lamellas

Alle zulässige Abstände sind Abs. 4.1 zu entnehmen!



Section E - E

Cornice cross bar in movement direction

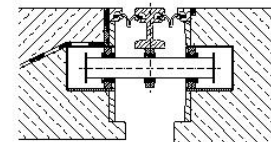


Superstructure Counterbearing

with Type D160 with $75^\circ \leq \alpha \leq 105^\circ$
(moving direction relating to Sidewalk)

Section D - D

Swiveling cornice cross bar

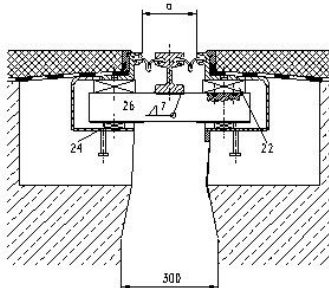


Superstructure Counterbearing

with Type DT160 mandatory
with Type D160 with $75^\circ \leq \alpha \leq 105^\circ$

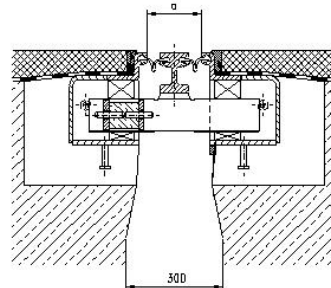
Section A - A

DT160



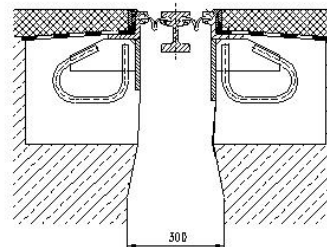
Section B - B

D160 (see also page 2)



Section - C

(see also page 2)



Regelprüfung
Nr. 07/07 vom 22.11.07

CONSTRUCTION CARRIAGE WAYS AND BRIDGES
CONSTR. PART BLADE EXPANSION JOINT D-160 - 640 and DT160 - 2400
BLOCK 7 - DOCUMENTATION WITH CERTIFICATE OF TECHNICAL APPROVAL
METHOD APPLICATION FOR TECHNICAL APPROVAL ACCORDING TO TLT/FU (03/05)

	Verordnungsnummer DIN ISO 2768 Teil 1	Stichtag	Halbzeug, Werkstoff	Arttrag - Nr.
	Müller			Blatt - Nr. 6
	Log. Name Betr. 17.10.10 Betr. Name	Vollk	Joint constructions with two profiles	
a	01.05.07	Vollk	Sachnummer	Regist. Nr.
Als gebe			 MAURER SÖHNE MÜNCHEN	Erstzul. / GZ
				1/00_6A

Für diese Zeichnung behalten wir uns alle Rechte vor.