



## European Technical Approval ETA-13/0232

English translation prepared by DIBt - Original version in German language

Handelsbezeichnung  
*Trade name*

Einprofilige "MAURER XW1 Dehnfuge"  
*Nosing expansion joint "MAURER XW1 Expansion Joint"*

Zulassungsinhaber  
*Holder of approval*

Maurer Söhne GmbH & Co. KG  
Frankfurter Ring 193  
80807 München  
DEUTSCHLAND

Zulassungsgegenstand  
und Verwendungszweck  
*Generic type and use  
of construction product*

Einprofiliger Fahrbahnübergang für Straßenbrücken  
*Nosing expansion joint for road bridges*

Geltungsdauer:  
*Validity:* vom  
*from*  
bis  
*to*

28 May 2013  
28 May 2018

Herstellwerk  
*Manufacturing plant*

Werk 1  
Werk 2  
Werk 3  
Werk 4

Diese Zulassung umfasst  
*This Approval contains*

13 Seiten einschließlich 5 Anhänge  
*13 pages including 5 annexes*

## I LEGAL BASES AND GENERAL CONDITIONS

- 1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:
  - Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products<sup>1</sup>, modified by Council Directive 93/68/EEC<sup>2</sup> and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council<sup>3</sup>;
  - *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998<sup>4</sup>, as amended by Article 2 of the law of 8 November 2011<sup>5</sup>;*
  - Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC<sup>6</sup>;
- 2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.
- 3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.
- 4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.
- 5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.
- 6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.

<sup>1</sup> Official Journal of the European Communities L 40, 11 February 1989, p. 12  
<sup>2</sup> Official Journal of the European Communities L 220, 30 August 1993, p. 1  
<sup>3</sup> Official Journal of the European Union L 284, 31 October 2003, p. 25  
<sup>4</sup> *Bundesgesetzblatt Teil I 1998*, p. 812  
<sup>5</sup> *Bundesgesetzblatt Teil I 2011*, p. 2178  
<sup>6</sup> Official Journal of the European Communities L 17, 20 January 1994, p. 34

## II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

### 1 Definition of the product and intended use

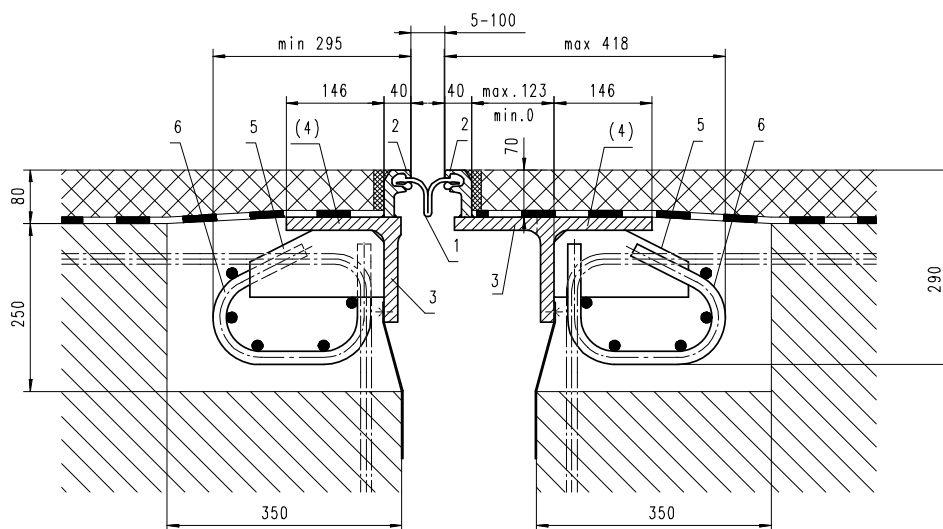
#### 1.1 Definition of the construction product

The nosing expansion joint for road bridges "MAURER XW 1 Expansion Joint" is a kit, which consists of the following components:

Position No.

- 1 Flexible elastomeric sealing element made of EPDM (replaceable) (for concrete and steel bridges)
- 2 Steel edge profile to hold the sealing element, steel grade S235J0<sup>7</sup> or S235J0 in combination with 1.4571 (hybrid profile) (for concrete and steel bridges)
- 3 Steel T-profile T 320x20 with one waved edge, steel grade S235J2 (only for concrete bridges)
- (4) or (instead of 3) a steel angle profile L 150x20, steel grade S355J2 with a waved edge welded with a flange FL 120x15, steel grade S235JR (for concrete and steel bridges)
- 5 Anchorage made of steel anchor plates 100x200x15 mm, S235JR (only for concrete bridges)
- 6 round steel bar stirrups Ø20, S235 JR for anchoring in concrete (only for concrete bridges)

The positions 2 to 6 are welded together.



Five corrosion protection systems acc. to EN ISO 12944-2<sup>8</sup> are optional parts of the kit. The systems are laid down in Manufacturers Technical Dossier (MTD)<sup>9</sup>. The choice of the system depends on national regulations.

<sup>7</sup> EN 10025-2:2004 Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels

<sup>8</sup> EN ISO 12944-2:1998 Paints and varnishes - Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments (ISO 12944-2:1998)

<sup>9</sup> The manufacturer's technical dossier (MTD) comprises all information necessary for the production and the installation of the product as well as for the repair of the expansion joint from that and it is deposited with DIBt. It was checked by DIBt and it was found to be in accordance with the conditions stated in the approval and the characteristic values determined during the approval testing.

The substructure (concrete in recess and starter bars) and the connection to the bridge deck waterproofing are not part of the kit. Boundary conditions are defined in clause 4.3.

Annex 1 shows the system built-up. The components and characteristics are specified in Annex 2 to 5.

## 1.2 Intended use

The expansion joint is used to ensure the continuity of the running surface as well as bearing capacity and the movement of the bridges whatever the nature of the structure constitutive material. The product is used for the user categories vehicles, cyclists and pedestrians for a operating temperature from -40 °C to +45 °C and shows certain characteristics which facilitate the use taking account of national requirements.

The kit is intended to use for bridges made from steel or concrete.

In the MTD to this ETA the manufacturer had given information about the requirements on the bridge construction for installation of the expansion joint.

The provisions made in this European technical approval are based on an assumed working life<sup>10</sup> of the expansion joint of 50 years, provided that the expansion joint is subject to appropriate use and maintenance. The sealing element is replaceable and is verified for an assumed working life of 25 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 2 Characteristics of the product and methods of verification

### 2.1 Characteristics of the expansion joint

The components of the product show the characteristic values with respect to the permissible tolerances in the MTD to this ETA. The manufacturer declares the values and the permissible tolerances for the required characteristics of the product in the MTD. The permissible tolerances do not affect the characteristics of the product and the assembled system negatively

The chemical composition and the characteristic values of the components of the kit and the manufacturing methods are confidential and deposited with DIBt.

Requirements concerning safety in case of mechanical stability, health and the environment and safety in use as well as durability in the sense of the essential requirements N° 1, N° 3 and N° 4 of the Directive 89/106/EEC are satisfied.

According to the manufacturer's declaration the expansion joint taking account of the EU database<sup>11</sup> does not contain any dangerous substances.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.

The property values of the product and the assembled system, which are verified by the approval test, are given in Annex 1 to 4. An evaluation oriented at the intended use of the product can be carried out by the user taking into account national requirements.

<sup>10</sup> "Assumed intended working life" means that it is expected that, when this working life has elapsed, the real working life may be, in normal use conditions, considerably longer without major degradation affecting the Essential Requirements.

<sup>11</sup> Notes are stated in Guidance Paper H: "A harmonized approach relating to dangerous substances under the Construction Products Directive", Brussels, 18 February 2000

## 2.2 Method of verification

The assessment of the fitness for the intended use of the nosing expansion joint has been carried out applying Article 9(2) of the Council Directive 89/106/EEC with regard to product area 01.07/02 "Expansion Joint for Road bridges".

## 3 Evaluation and attestation of conformity and CE marking

### 3.1 System of attestation of conformity

According to the Decision 2001/19/EC of the European Commission<sup>12</sup> system 1 of the attestation of conformity applies.

This system of attestation of conformity is defined as follows:

System 1: Certification of the conformity of the product by an approved certification body on the basis of:

- (a) Tasks for the manufacturer:
  - (1) factory production control;
  - (2) further testing of samples taken at the factory by the manufacturer in accordance with a prescribed test plan;
- (b) Tasks for the approved body:
  - (3) initial type-testing of the product;
  - (4) initial inspection of factory and of factory production control;
  - (5) continuous surveillance, assessment and approval of factory production control.

### 3.2 Responsibilities

#### 3.2.1 Tasks for the manufacturer

##### 3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use initial materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited with DIBt.<sup>13</sup>

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

##### 3.2.1.2 Other tasks for the manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of expansion joints in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

<sup>12</sup> Official Journal of the European Communities L 5 / 6 of 10.01.2001

<sup>13</sup> The control plan is a confidential part of the European technical approval and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

**3.2.2 Tasks for the approved bodies**

The approved body shall perform the

- initial type-testing of the product,
- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report/written reports.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the product stating the conformity with the provisions of this European technical approval.


In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform DIBt without delay.

**3.3 CE marking**

The CE marking shall be affixed on the product itself, the label attached to it; packaging; or accompanying commercial document, e.g. the EC declaration of conformity. The letters "CE" shall be followed by the identification number of the approved certification body and be accompanied by the following additional information:

- the name and address of the producer (legal entity responsible for the manufacture),
- the last two digits of the year in which the CE marking was affixed,
- the number of the EC certificate of conformity for the product,
- the number of the European technical approval,
- characteristics and classifications of the product on the basis of the ETA.

CE marking and accompanying information:

	<b>Letters "CE"</b>
<i>nnnn</i>	Identification number of notified body (system 1)
Maurer Söhne GmbH & Co. KG Frankfurter Ring 193 80807 München Germany	Name and address of the producer
13	two last digits of year of affixing CE marking
<i>nnnn-CPD-xxxx</i>	number of the EC certificate of conformity for the product
ETA-13/0232	ETA number
Nosing expansion joint	intended use
Classification of the system, declared values of the product and system characteristics see Annex 1 to 5 of ETA-13/0232	classification and characteristics of the product

#### **4 Assumptions under which the fitness of the product for the intended use was favourably assessed**

##### **4.1 Manufacturing**

The components of the kit of the expansion joints are factory-made according to the procedure laid down in the MTD. The components are assembled to the kit at the factory.

The European technical approval is issued for the kit on the basis of agreed data/information, deposited with DIBt, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to DIBt before the changes are introduced. DIBt will decide whether or not such changes affect the approval and consequently the validity of the CE marking on the basis of the approval and if so whether further assessment or alterations to the approval shall be necessary.

##### **4.2 Design and dimensioning**

The fitness for the respective use of the expansion joint results from use categories and characteristics stated in Annex 1.

The supplementing statements of the manufacturer stated in the MTD for design and dimensioning of the expansion joint shall be considered.

##### **4.3 Installation**

The fitness for use of the expansion can be assumed only, if the installation is carried out according to the installation instructions stated in the MTD by the manufacturer, in particular taking account of the following points:

- installation by appropriately trained personnel,
- installation of only those components which are marked components of the kit,
- installation with the required tools and adjuvant,
- precautions during installation,
- Inspection of the local bounding conditions,
- inspecting of the bridge deck connection and the correct preparation,
- inspecting compliance with suitable weather conditions,
- inspection during installation and of the finished product and documentation of the results.

The information as to the

- method of repair on site,
  - handling of waste products
- shall be observed.

#### **5 Indications to the manufacturer**

##### **5.1 Packaging, transport and storage**

Information on

- packaging,
- transport and
- storage

are given in the MTD.

European technical approval  
ETA-13/0232  
*English translation prepared by DIBt*

Page 8 of 13 | 28 May 2013

**5.2 Use, maintenance, repair**

Information on

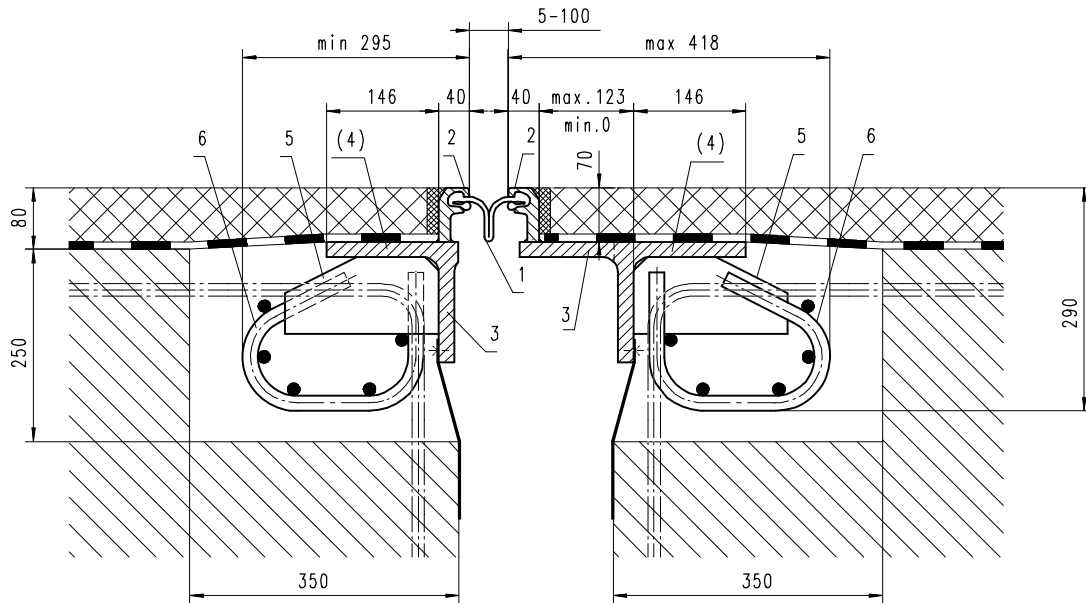
- use
- maintenance
- repair

are given in the MTD.

Dirk Brandenburger  
Head of Department

*beglaubigt:*  
Hemme





- 1 Flexible elastomeric sealing element made of EPDM ( replaceable) (for concrete and steel bridges)
- 2 Steel edge profile to hold the sealing element, steel grade S235J0 or S235J0 in combination with 1.4571 (hybrid profile) (for concrete and steel bridges)
- 3 Steel T-profile T 320x20 with one waved edge, steel grade S235J2 (for concrete and steel bridges)
- (4) or (instead of 3) a steel angle profile L 120x20, steel grade S355J2 with a waved edge welded with a flange FL 120x15, steel grade S235JR (for concrete and steel bridges)
- 5 Anchorage made of steel anchor plates 100x200x15 mm, S235JR (only for concrete bridges)
- 6 round steel bar stirrups Ø20, S235 JR for anchoring in concrete (only for concrete bridges)

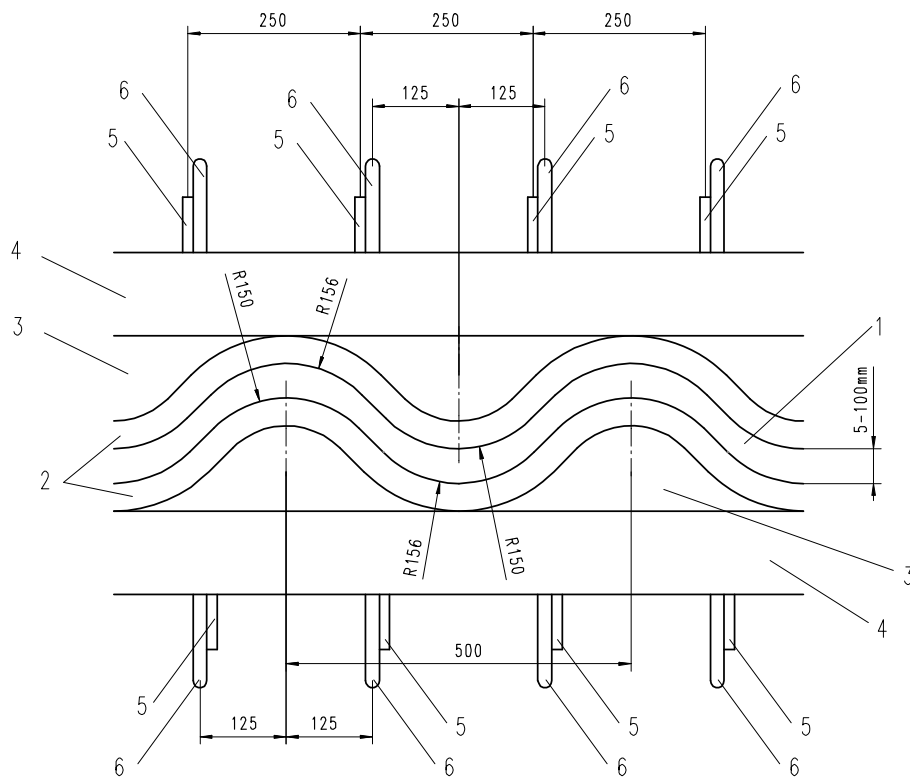
The positions 2 to 6 are welded together.

User categories	vehicles, cyclists, pedestrian
Slope in traffic direction	≤ 9 %
Slope in direction of the expansion joint	≤ 10 %
Operating temperatures	-40 °C ≤ T ≤ +45 °C
Working life	main components: 50 years replaceable components: 25 years
Mechanical resistance	pass
Resistance to fatigue	pass
Seismic behaviour	npd
Movement capacity (movement direction)	max. $u_{max} = 95$ mm
Minimum opening	min $e_{x,min} = 5$ mm
Vertical movement capacity	$u_z = 20$ mm
Cleanability	pass
Resistance to wear	not relevant
Watertightness	watertight
Release of dangerous substance	does not contain dangerous substances
Allowable gaps and voids	pass for $45^\circ \leq \beta \leq 135^\circ$
Level differences in the running surface	pass
Skid resistance	not relevant
Drainage Capacity	not relevant

Nosing expansion joint "MAURER XW1 Expansion Joint"

**System built up and classifications**

Annex 1

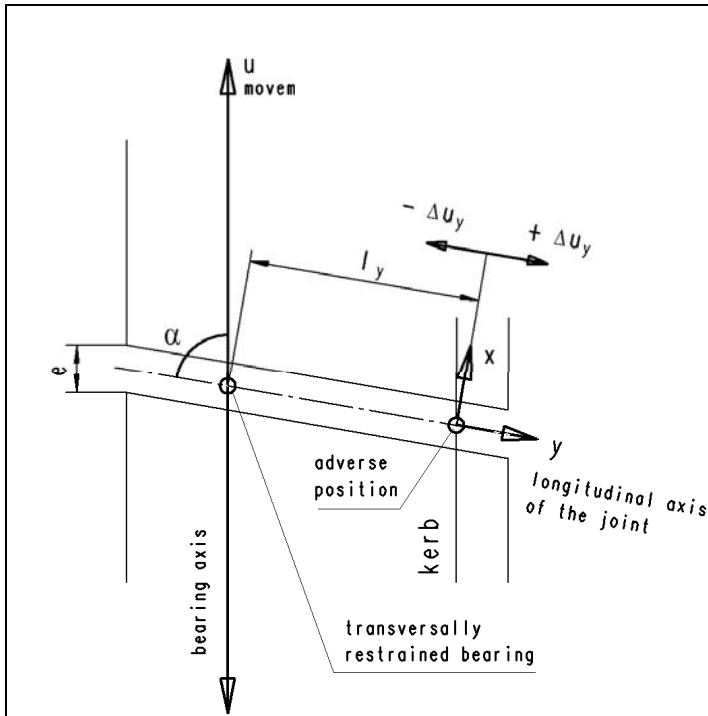


**Top view of XW 1**

**Working life:**

According to EN 1991-2 the assumed working life depends on traffic categories. For the expansion joint XW1 the following is valid:

For the modified load model FLM1 the constant amplitude fatigue limit has been verified. Therefore the requirement for an assumed working life of 50 years with  $N_{obs} = 2.5 \times 10^7$  (Number of lorries) is included.



$u$  movement capacity in movement direction of the transversally restrained bearing with the movement related to transversal, longitudinal and vertical axis of the expansion joint  $u_x, u_y, u_z$

$\Delta u_y$  additional movement in direction of the longitudinal axis of the joint at the adverse position

$e$  gap width of the expansion joint in movement direction

$e_{x,min}$  minimum gap width perpendicular to the edge of the joint of the expansion joint

$\alpha$  angle between bridge movement direction and longitudinal joint axis

$L_q$  length of the expansion joint in longitudinal joint axis resp. distance between transversally restrained bearing axis and the adverse position

**Movement capacity:**

intermediate values may be calculated by linear interpolation

$\alpha$ [°]	$u_{max}$ [mm]	$e_{x,min}$ [mm]	$u_{z,max}$ [mm]
90±24	95	5	20
±65	95 (90*)	5	
±60	92,5 (65*)	7.5	
±55	90 (75*)	10	
±50	90	10	
±45	85	15	

\* if passing over by cyclist is intended

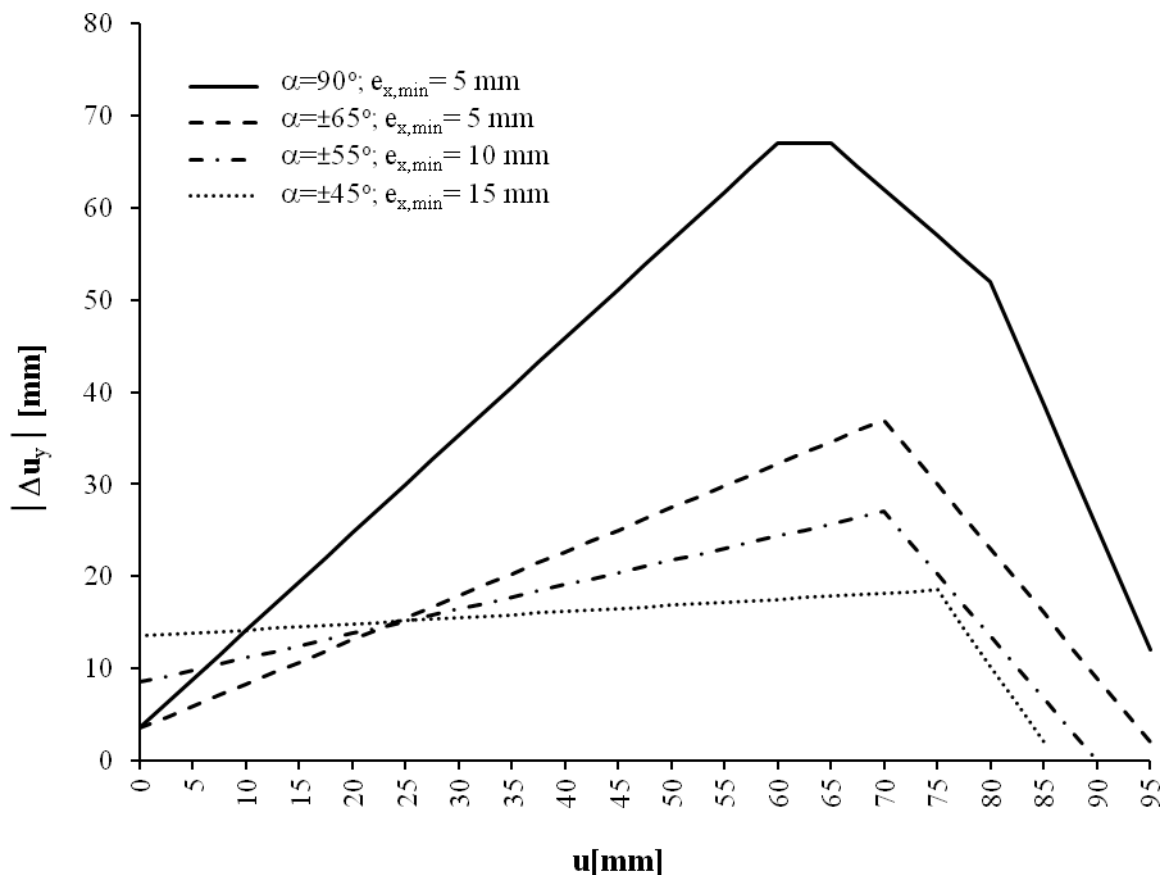
The XW1 expansion joint has to be designed to allow additional displacements  $\Delta u_y$  in longitudinal axis of the joint, which are caused by creep, shrinkage or temperature.

Values for  $\Delta u_y$  are given in Annex 4.

Nosing expansion joint "MAURER XW1 Expansion Joint"

**Movement Capacity**

Annex 3



The additional movement capacity  $\Delta u$  in longitudinal direction depends on maximum required movement capacity of the bridge ( $u$ ), required minimum gap width perpendicular to the longitudinal axis of the joint ( $e_{x,min}$ ) and on skew angle.

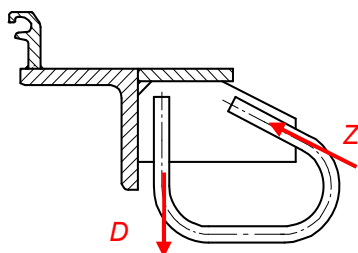
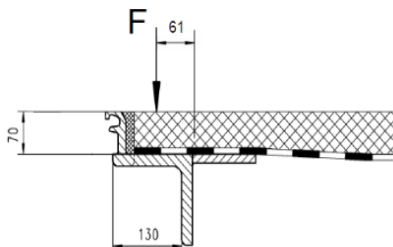
For cyclists are additional examinations necessary.

Nosing expansion joint "MAURER XW1 Expansion Joint"

**Additional movement capacity  $\Delta u$  for vehicles**

Annex 4

**Concrete**

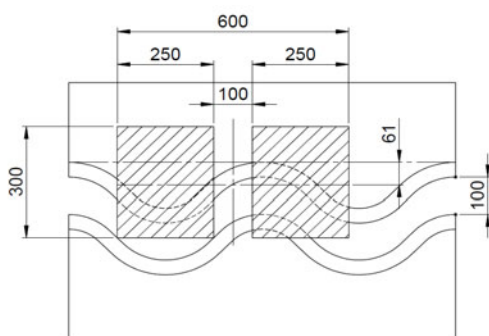
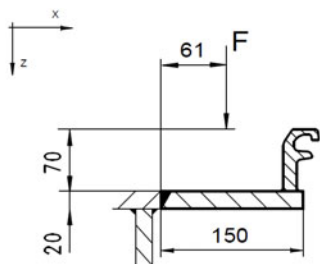


Anchorage forces in the round steel bar stirrups:

ULS	FAT
force/anchor	force/anchor
$Z_d = 20,3 \text{ kN}$	$\Delta Z_d = 15,8 \text{ kN}$
$D_d = 39,1 \text{ kN}$	$\Delta D_d = 26,0 \text{ kN}$

Distance between the anchor:  $a = 250 \text{ mm}$

**Steel**



Resulting actions for the design of a connection to a steel bridge

ULS	FAT
$F_{x,d} = 9,6 \text{ kN}$	$\Delta F_{x,d} = 10,4 \text{ kN}$
$F_{y,d} = 5,5 \text{ kN}$	$\Delta F_{y,d} = 0 \text{ kN}$
$F_{z,d} = 55 \text{ kN}$	$\Delta F_{z,d} = 28,5 \text{ kN}$

The forces are only for one of the twin tyre with  $b = 250 \text{ mm}$ .

For the design of the connection to the bridge the double load on a length of  $b = 600 \text{ mm}$  and a arm of  $d = 61 \text{ mm}$  shall be to consider.