European Technical Assessment

ETA-13/0232

of 16 May 2018

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Nosing expansion joint "MAURER XW1 Expansion Joint"

Product family to which the construction product belongs

Nosing expansion joint for road bridges

Manufacturer

MAURER SE
Frankfurter Ring 193
80607 München
DEUTSCHLAND

Manufacturing plant

Werk 1
Werk 2
Werk 3
Werk 4

This European Technical Assessment contains

11 pages including 6 annexes which form an integral part of this assessment

This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of

ETAG 032 Part 4: "Nosing Expansion Joints", used as EAD according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

This version replaces

ETA-13/0232 issued on 28 May 2013
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Specific part

1 Technical description of the product

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

- round steel bar stirrups Ø20, S235 JR for anchoring in concrete (only for concrete bridges)
- Anchorage made of steel anchor plates 100x200x15 mm, S235JR (only for concrete bridges)
- Steel T-profile T 320x20 with one waved edge, steel grade S235J2 (only for concrete bridges) or 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)
- Steel edge profile to hold the sealing element, steel grade S235J0¹ or S235J0 in combination with 1.4571 (hybrid profile) (for concrete and steel bridges)
- Five corrosion protection systems acc. to EN ISO 12944-2² are alternatively parts of the kit. The systems are laid down in Manufacturers the technical documents³. The choice depends on national regulations.
- Flexible elastomeric sealing element made of EPDM (replaceable) (for concrete and steel bridges)

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

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

2 Specification of the intended use in accordance with the applicable European Assessment Document

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 an operating temperature from -40 °C to +45 °C. The kit is intended to use for bridges made from steel or concrete.

The performances given in Section 3 are only valid if the expansion joint is used in compliance with the specifications and conditions given in Annex B.

In addition the manufacturer gives in the technical documentation information about the conditions of the bridge for the installation of the expansions joints.

The verifications and assessment methods on which this European Technical Assessment is based lead to an assumed working life of the expansion joint of at least 50 years. 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.

¹ EN 10025-2 Hot rolled products of structural steels - Part 2: Technical delivery conditions for non-alloy structural steels
² EN ISO 12944-2 Paints and varnishes – Corrosion protection of steel structures by protective paint systems – Part 2: Classification of environments
³ The manufacturer's technical documents comprises all information necessary for the production and the installation of the product as well as for repair of expansion joint and it is deposited with DIBt.
3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

<table>
<thead>
<tr>
<th>Essential characteristic</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical resistance</td>
<td>Annex A1 and A5</td>
</tr>
<tr>
<td>Resistance to fatigue</td>
<td>Annex A1 and A2</td>
</tr>
<tr>
<td>Seismic behaviour</td>
<td>No performance assessed</td>
</tr>
<tr>
<td>Movement capacity</td>
<td>Annex A1, A3 and A4</td>
</tr>
<tr>
<td>Cleanability</td>
<td>Annex A1</td>
</tr>
<tr>
<td>Resistance to wear</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Watertightness</td>
<td>Annex A1</td>
</tr>
</tbody>
</table>

3.2 Hygiene, health and the environment (BWR 3)

<table>
<thead>
<tr>
<th>Essential characteristic</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content, release of dangerous substances</td>
<td>No performance assessed</td>
</tr>
</tbody>
</table>

3.3 Safety and accessibility in use (BWR 4)

<table>
<thead>
<tr>
<th>Essential characteristic</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to bridge gaps and levels in the running surface:</td>
<td>Annex A1, A3 and A4</td>
</tr>
<tr>
<td>- Allowable surface gaps and voids</td>
<td></td>
</tr>
<tr>
<td>- Level differences in the running surface</td>
<td></td>
</tr>
<tr>
<td>Skid resistance</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Drainage capacity</td>
<td>Not relevant</td>
</tr>
</tbody>
</table>

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with European Technical Guideline ETAG No. 032 the applicable European legal act is 2001/19/EC.

The system to be applied is: 1
5  Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 16 May 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow  beglaubigt:
Head of Department  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: no performance assessed
Movement capacity (movement direction): max. $u_{\text{max}} = 95$ mm, min $e_{x,\text{min}} = 5$ mm
Vertical movement capacity: $u_z = 20$ mm, pass
Cleanability: not relevant
Resistance to wear: watertight
Watertightness: no performance assessed
Release of dangerous substance: pass for $45^\circ \leq \beta \leq 135^\circ$
Allowable gaps and voids: pass
Leveldifferences in the running surface: not relevant
Skid resistance: not relevant
Drainage Capacity: not relevant

Nosing expansion joint "MAURER XW1 Expansion Joint" MAURER SE

System built up and classifications

Annex A1
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 \( N_{\text{obs}} = 2.5 \times 10^7 \) (Number of lorries) is included.
Movement capacity:
intermediate values may be calculated by linear interpolation

<table>
<thead>
<tr>
<th>α [°]</th>
<th>$u_{max}$ [mm]</th>
<th>$e_{x, min}$ [mm]</th>
<th>$u_{z, max}$ [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>90±24</td>
<td>95</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>±65</td>
<td>95 (90°*)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>±60</td>
<td>92.5 (65°*)</td>
<td>7.5</td>
<td></td>
</tr>
<tr>
<td>±55</td>
<td>90 (75°*)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>±50</td>
<td>90</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>±45</td>
<td>85</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

* 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"
MAURER SE

Movement Capacity
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.
Concrete

Anchorage forces in the round steel bar stirrups:

<table>
<thead>
<tr>
<th>ULS</th>
<th>FAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>force/anchor</td>
<td>force/anchor</td>
</tr>
<tr>
<td>$Z_d = 20,3 \text{ kN}$</td>
<td>$\Delta Z_d = 15,8 \text{ kN}$</td>
</tr>
<tr>
<td>$D_d = 39,1 \text{ kN}$</td>
<td>$\Delta D_d = 26,0 \text{ kN}$</td>
</tr>
</tbody>
</table>

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

Steel

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

<table>
<thead>
<tr>
<th>ULS</th>
<th>FAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$F_{x,d} = 9,6 \text{ kN}$</td>
<td>$\Delta F_{x,d} = 10,4 \text{ kN}$</td>
</tr>
<tr>
<td>$F_{y,d} = 5,5 \text{ kN}$</td>
<td>$\Delta F_{y,d} = 0 \text{ kN}$</td>
</tr>
<tr>
<td>$F_{z,d} = 55 \text{ kN}$</td>
<td>$\Delta F_{z,d} = 28,5 \text{ kN}$</td>
</tr>
</tbody>
</table>

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 an arm of $d = 61 \text{ mm}$ shall be to consider.
Installation

The performances of the expansion joint can be assumed only, if the installation is carried out according to the installation instructions stated in the manufacturer's technical documentation 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.