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Designated according to Article 29 of Regulation (EU) No 305/2011

Member of EOTA
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# European Technical Assessment

# ETA-16/0379 of 27.06.2016

General part

| | |
|---|---|
| **Technical Assessment Body issuing the European Technical Assessment** | Österreichisches Institut für Bautechnik (OIB)<br>Austrian Institute of Construction Engineering |
| **Trade name of the construction product** | RESA-JOINT®<br>SILENT-JOINT$^{RESA}$FLEX®400<br>SILENT-JOINT$^{RESA}$FLEX®500<br>SILENT-JOINT$^{RESA}$FLEX®600<br>SILENT-JOINT$^{RESA}$FLEX®700<br>SILENT-JOINT$^{RESA}$FLEX®1000 |
| **Product family to which the construction product belongs** | Flexible plug expansion joints for road bridges |
| **Manufacturer** | RSAG Reparatur- und Sanierungstechnik AG<br>Hertistrasse 11<br>8304 Wallisellen<br>Switzerland |
| **Manufacturing plant** | Comprehensive list of manufacturing plants laid down in technical documentation |
| **This European Technical Assessment contains** | 25 pages including 14 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** | European Assessment Document (EAD) 120011-00-0107; Flexible plug expansion joints for road bridges with flexible filling based on a synthetic polymer as binder, edition June 2016 |

Specific parts

## 1 Technical description of the product

The flexible plug expansion joints RESA-JOINT® and SILENT-JOINT$^{RESA}$FLEX® are in-situ poured joints comprising of a specially formulated flexible polymer material and additional filling material made of rubber granules as joint filling material, which also forms the surfacing, supported over the deck joint gap by a thin metal plate and other suitable components. The subject of this European Technical Assessment is the complete flexible plug expansion joint kit.

The flexible plug expansion joint RESA-JOINT® and SILENT-JOINT$^{RESA}$FLEX® is defined in Table 1 of this ETA and depicted in the Annexes 1.1 – 1.9 of this ETA by means of exploded assembly drawings. A general drawing of the expansion joint is depicted in Figure 1.

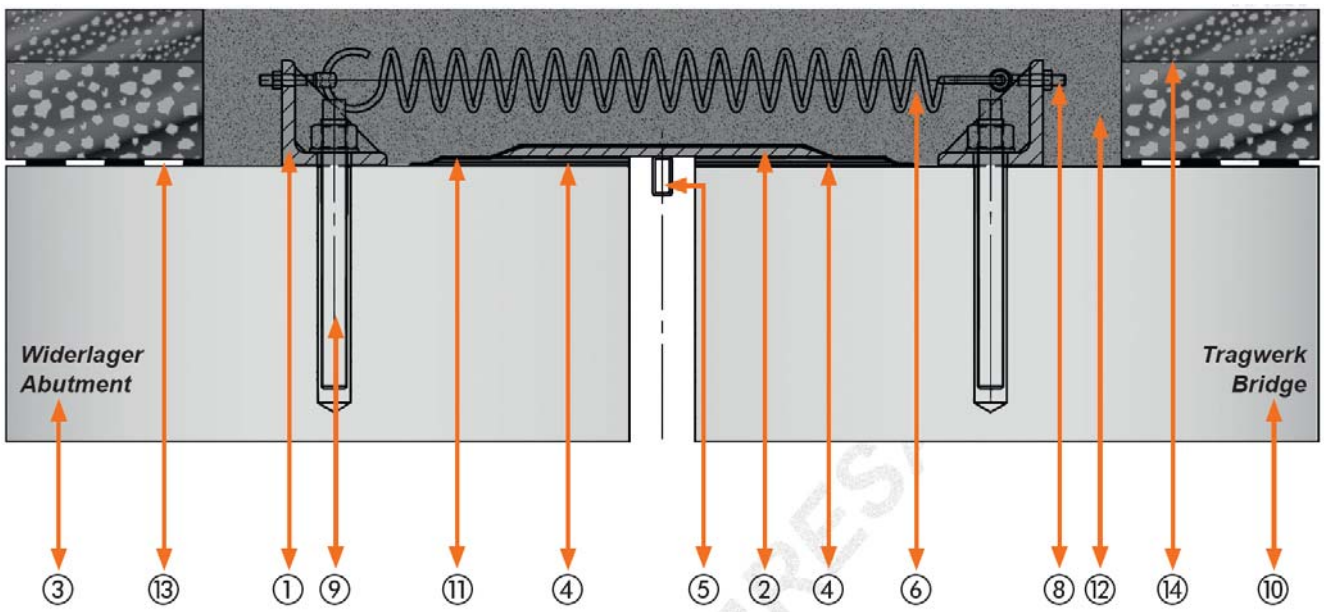



Figure 1: Standard cross section of the flexible plug expansion joint

Key:

(1) L-Brackets (where relevant)
(2) Bridging plate
(3) Abutment (not part of the kit)
(4) Sliding plate (where relevant)
(5) Fixing bolt (where relevant)
(6) Movement aid (Distribution system) – coil springs (where relevant)
(8) Eyebolt with hexagon nut (where relevant)
(9) Anchorage system (where relevant)
(10) Bridge deck (not part of the kit)
(11) Debonding strip
(12) Joint filling mixture consisting of binder made of flexible polymer and additional filling material made of rubber granules
(13) Bridge deck waterproofing (not part of the kit)
(14) Adjacent pavement (not part of the kit)

Surface dressing (not shown in Figure 1)

Note: “Where relevant” means depending on the design according to Annex 1 of this ETA

The positioning of the bridging plate (2) to the substructure (3 ,10) is granted either by centring elements (fixing bolts(5)) (relevant for RESA-JOINT® and SILENT-JOINT$^{RESA}$FLEX®, all types according to Table 1 of this ETA except SILENT-JOINT$^{RESA}$FLEX®1000(450-100/120)), depicted in Annex 1.1 to Annex 1.8 of this ETA, or by mechanical fixation (SILENT-JOINT$^{RESA}$FLEX® 1000(450-100/120)), depicted in Annex 1.9 of this ETA.

The substructure (3, 10), bridge deck waterproofing (13) and adjacent pavement (14) are not part of the kit.

Provisions for proper installation of the kit are provided for each delivered kit.

The substructure (bridge structure) must provide a minimum compressive strength according to concrete class C25/30 according to EN 206.

The nominal movement capacity is 50 mm – 100 mm for SILENT-JOINT$^{RESA}$FLEX® (depending on the type of the expansion joint, see Table 1) and 30 mm for RESA-JOINT® respectively, according to the declaration of the manufacturer. The minimum/maximum width of the joint in central position is 400 mm – 1000 mm for SILENT-JOINT$^{RESA}$FLEX® (depending on the type of the expansion joint) and 500 mm for RESA-JOINT® respectively, according to Table 1. The minimum/maximum thickness D is given in Table 1 and depicted in Annex 1.1 to Annex 1.9 of this ETA, whereas this thickness is to be applied without any change over the whole length (perpendicular to the traffic direction).

For the selection of the appropriate type of expansion joint for the individual work, the concerned tension $e^+$ and compression $e^-$ for the movement capacity according to Table 1 thereafter shall be considered.

Table 1: Standard geometry of flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® and RESA-JOINT® in respect to its movement capacity

| **Type** | **Total movement [mm]** | **Movement tension [mm]** | **Movement compression [mm]** | **Thickness [mm]** | **Joint width in central position [mm]** |
|---|---|---|---|---|---|
| | ***e*** | ***e*$^+$** | ***e*$^-$** | ***D*** | ***B*$^0$** |
| RESA-JOINT® | 30 | 19,5 | -10,5 | 70 - 100 | 500 |
| SILENT-JOINT$^{RESA}$FLEX® | | | | | |
| **400(150-50/70)** | 50 | 32,5 | -17,5 | 70 | 400 |
| **500(150-60/80)** | 50 | 32,5 | -17,5 | 80 | 500 |
| **500(150-80/100)** | 50 | 32,5 | -17,5 | 100 | 500 |
| **500(150-100/120)** | 50 | 32,5 | -17,5 | 120 | 500 |
| **600(200-50/70)** | 70 | 45,5 | -24,5 | 70 | 600 |
| **700(250-80/100)** | 70 | 45,5 | -24,5 | 100 | 700 |
| **700(250-100/120)** | 70 | 45,5 | -24,5 | 120 | 700 |
| **1000(450-100/120)** | 100 | 65 | -35 | 120 | 1000 |

The results of the assessment of mechanical resistance of the bridging plate and L-Brackets at ultimate limit state (ULS) are given in Tables 2a – 2c, whereas a partial factor $\gamma_{Q1}$ = 1,35 has been taken into account.

Table 2a: Dimensions of the bridging plate for the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) depending on maximum bridge gap and calculated for a minimum thickness of the expansion joint of 70 mm

| Maximum gap [mm] | 75 | 100 | 125 | 150 |
|---|---|---|---|---|
| Requested thickness of bridging plate [mm] | 4 | 6 | 7 | 8 |

Table 2b: Dimensions of the bridging plate for the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) depending on maximum bridge gap and calculated for a minimum thickness of the expansion joint of 120 mm

| Maximum gap [mm] | 75 | 100 | 125 | 150 | 175 | 200 | 225 | 250 | 275 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|
| Requested thickness of bridging plate [mm] | 4 | 5 | 6 | 7 | 8 | 9 | 11 | 12 | 13 | 14 |

Table 2c: Dimensions of the L-Brackets for the different types of the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX®

| Type according to Table 1 in this ETA | SJ 400 (150-50/70) | SJ 500 (150-60/80) | SJ 500 (150-80/100) | SJ 500 (150-100/120) | SJ 600 (200-50/70) | SJ700 (250-80/100) | SJ700 (250-100/120) | SJ 1000 (450-100/120) |
|---|---|---|---|---|---|---|---|---|
| Requested thickness of L-Brackets [mm] | 6 | 7 | 8 | 9 | 6 | 8 | 9 | 9 |

Table 2d: Dimensions of the bridging plate for the flexible plug expansion joint RESA-JOINT®, depending on maximum bridge gap and calculated for the minimum thickness of the expansion joint of 70 mm

| Maximum gap [mm] | 30 | 50 | 80 | 100 |
|---|---|---|---|---|
| Requested thickness of bridging plate [mm] | 2 | 3 | 5 | 6 |

Table 2e: Dimensions of the bridging plate for the flexible plug expansion joint RESA-JOINT®, depending on maximum bridge gap and calculated for the maximum thickness of the expansion joint of 100 mm

| Maximum gap [mm] | 30 | 50 | 80 | 100 |
|---|---|---|---|---|
| Requested thickness of bridging plate [mm] | 2 | 3 | 4 | 5 |

The complete joint is created on site by placing the anchorage system (where relevant), the bridging plate, the joint filling mixture and all related ancillaries in the longitudinal axis of the joint.

In its longitudinal axis the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT® include the carriageway with/without cyclist areas and with/without footpath, as depicted in Annexes 2.1 to 2.3 of this ETA. Separate devices for footpath and collision on kerbs are not considered because such elements are not part of the kit.

The components and materials which constitute the flexible plug expansion joint RESA-JOINT® and SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) are specified in clause 1.1 and in Annex 1.1 – Annex 1.9 in this ETA.

## 1.1 Technical description of the components

The components of the flexible plug expansion joint RESA-JOINT® and SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) are defined in clauses 1.1.1 to 1.1.8.

### 1.1.1 Joint filling material

The joint filling material, consisting of a binder made of flexible polymer and additional filling material made of rubber granules, is defined by the trade name of the binder and definition of the additional filling material, declared in technical documentation, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik, and stated in the control plan.

Regarding durability, the joint filling material retains its functionality for the working life addressed in clause 2 of this ETA.

Reaction to fire of the joint filling material: Class E

For the characterisation of the binder and the additional filling material and the defined mixture ratio, the relevant parameters are laid down in the technical documentation and are given in Tables 6a and 6b in Annex 3 in this ETA. The material characteristics are confidential[1] and are deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

### 1.1.2 Bridging plate

General information on the design of the bridging plate is laid down in drawings, depicted in Annexes 1.1 -1.9 of this ETA. The minimum steel grade is defined as S235JR, whereas the relevant mechanical properties and chemical composition according to EN 10025-2 are defined by an inspection document, type 3.1, according to EN 10204.

Regarding the possible use of steel elements for low temperatures EN 1993-1-10, Table 2.1, applies.

For corrosion protection, the bridging plate is either hot-dip galvanized according to EN ISO 1461 or made of stainless steel.

The minimum thickness of the bridging plate with respect to the width of the bridge gap and thickness of the joint filling mixture is given in Tables 2a and 2b of this ETA for SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and Tables 2d and 2e of this ETA for RESA-JOINT® respectively.

The bridging plate for RESA-JOINT® and SILENT-JOINT$^{RESA}$FLEX®, all types according to Table 1 of this ETA except SILENT-JOINT$^{RESA}$FLEX® 1000(450-100/120) is centred over the bridge gap by the fixing bolts. It is defined in the relevant technical documentation, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

The mechanical fixation of the bridging plate for SILENT-JOINT$^{RESA}$FLEX® 1000(450-100/120) to the substructure is done by means of bonded anchors according to ETAG 001 with hot-dip galvanized anchor rod. It is defined in the relevant technical documentation, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

### 1.1.3 Anchorage System (Fixation kit)

The anchorage system (fixation kit) for the L-Brackets is used for all types of SILENT-JOINT$^{RESA}$FLEX®, defined in Table 1 in this ETA.

[1] The technical documentation of this European Technical Assessment is deposited at the Österreichisches Institut für Bautechnik and, as far as relevant for the tasks of the notified product certification body involved in the assessment and verification of constancy of performance, is handed over to the notified product certification body.

The mechanical fixation of the L-Brackets to the substructure is done by means of bonded anchors according to ETAG 001 with hot-dip galvanized anchor rod. It is defined in the relevant technical documentation, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik, whereas for its design distances of the anchors and anchoring depth is defined in the relevant technical documentation, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

### 1.1.4 L-Brackets

The L-Brackets are used for all types of SILENT-JOINT$^{RESA}$FLEX®, defined in Table 1 in this ETA.

For the L-Brackets general information on the design is laid down in drawings, depicted in Annex 1.1 to Annex 1.8 of this ETA. The minimum steel grade for the L-Brackets is defined as S235JR, whereas the relevant mechanical properties and chemical composition according to EN 10025-2 are defined by an inspection document, type 3.1, according to EN 10204.

Regarding the possible use of steel elements for low temperatures EN 1993-1-10, Table 2.1, applies.

For corrosion protection, the L-Brackets may be hot-dip galvanized according to EN ISO 1461, even the joint filling mixture is acting as complete covering for the elements and, therefore, corrosion protection is not necessary.

The mechanical fixation of the L-Brackets to the substructure is done by means of bonded anchors according to ETAG 001 with hot-dip galvanized anchor rod (see clause 1.1.3 in this ETA).

The minimum thickness of the L-Brackets is given in Table 2c of this ETA.

### 1.1.5 Movement aid

The movement aid is used for all types of SILENT-JOINT$^{RESA}$FLEX®, defined in Table 1 in this ETA. The movement aids are designed as coil springs, made of metal, and are acting as distribution system within the joint filling material. For the coil springs and the eyebolts, material and dimensions as well as mechanical properties are defined by concerned technical data sheet and are laid down in the technical documentation, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.
The material characteristics and dimensions are confidential[2] and are deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

For the coil springs and elements for anchorage to the L-Brackets a corrosion protection is not foreseen as the filling mixture is covering the elements completely and thus providing the corrosion protection.

### 1.1.6 Debonding strip

The debonding strip is made of elastomer material. The type of material, material characteristics and dimensions are defined by its technical data sheet, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

### 1.1.7 Surface dressing

The surface dressing is made of aluminium oxide grains with size 1,41 mm – 2,0 mm. The relevant parameters are defined and laid down in the technical documentation deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

[2] The technical documentation of this European Technical Assessment has been deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik and, as far as relevant for the tasks of the notified product certification body involved in the assessment and verification of constancy of performance, is handed over to the notified product certification body.

1.1.8 Sliding plate

The sliding plate is used for the types 700(250-80/100), 700(250-100/120) and 1000(450-100/120) of SILENT-JOINT$^{RESA}$FLEX®, defined in Table 1 in this ETA.
The sliding plate is made of UHMW-PE. The material characteristics and dimensions are defined by its technical data sheet, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

## 2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

The flexible plug expansion joints SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT® are to be used in road bridges for the user categories vehicles, cyclists and pedestrians. The expansion joint system is designated to be applied in new structures and for refurbishment of structures.

The flexible plug expansion joints SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT® are to be used for operating temperature of -20° C up to +45° C, whereas for the use of steel elements for low temperatures EN 1993-1-10, table 2.1, is relevant.

The use in moveable bridges and steel bridges is not covered by this ETA.

The use of the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT® according to this ETA is covering a maximum slope in traffic direction of 10 %.

In general, the angle between the traffic direction and the axis of the expansion joint is 90 degrees. According to the declaration of the manufacturer, this angle can be reduced by 45° for the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® 400(150-50/70), 500(150-60/80), 500(150-80/100), 500(150-100/120), 700(250-80/100), 700(250-100/120) and RESA-JOINT® and by 25° for SILENT-JOINT$^{RESA}$FLEX® 600(200-50/70) and 1000(450-100/120) due to geometric reasons. The movement aids (where relevant) are always installed parallel to the main direction of movement.

The provisions made in this European Technical Assessment are based on a working life of the kit of 10 years. The indications given on the working life cannot be interpreted as a guarantee by the producer or the Technical Assessment Body, but are to be regarded only as a means for choosing the right product in relation to the expected economically reasonable working life of the works.
The indications are based upon the current state of the art and the available knowledge and experience for the joint filling mixture.

It is likely that the working life of flexible plug expansion joints is influenced by the following:
- Adjacent pavement,
- Traffic behaviour (including stationary, rolling, queuing traffic),
- Temperature,
- Slope of pavement,
- Support materials.

The flexible plug expansion joints SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT® do not contain replaceable components.

If the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) or RESA-JOINT® will be subject to actions resulting from seismic activity, which cause movements to occur outside of the design capability, then the flexible expansion joint would require to be repaired or replaced.

## 3 Performance of the product and references to the methods used for its assessment

### 3.1 Performance of the product

Table 3: Performance of SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT®

| Basic requirements for construction works | Essential characteristics | Assessment method | Performance |
|---|---|---|---|
| BWR 1 | Mechanical resistance | EAD 120011-00-0107 clause 2.2.1.1.1 | Mechanical resistance is given for the product according to the geometry depicted in Annex 1.1 – 1.9 in this ETA and Tables 2a, 2b, 2c, 2d and 2e in this ETA with partial factor $\gamma_{Q1}$ = 1,35. Clause 3.1.1 of this ETA |
| | Resistance to fatigue | EAD 120011-00-0107 clause 2.2.1.1.2<br><br>Fast occurring movement assessment based on:<br>Amplitude: + 2 mm<br>Frequency: 1 Hz | Resistance to fatigue is given for the product according to the geometry depicted in Annex 1.1 -1-9 in this ETA. |
| | Movement capacity | EAD 120011-00-0107 clause 2.2.1.1.3 | Declaration of the manufacturer according to Table 1 and Table 4 in this ETA |
| | Resistance to wear | EAD 120011-00-0107 clause 2.2.1.1.4 | No debonding or cracking of the joint filling mixture<br>No evidence of wear in the components of the kit |
| | Watertightness | EAD 120011-00-0107 clause 2.2.1.1.5 | Watertightness is given |
| BWR 4 | Level differences in the running surface under unloaded conditions | EAD 120011-00-0107 clause 2.2.1.2.1 | Clause 3.1.2 of this ETA |
| | Level differences in the running surface under loaded conditions | EAD 120011-00-0107 clause 2.2.1.2.2 | Clause 3.1.2 of this ETA |
| | Skid resistance | EAD 120011-00-0107 clause 2.2.1.3 | Clause 3.1.3 in this ETA |

#### 3.1.1 Mechanical resistance

The nominal movement capacity of the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT® and related maximum tensions and maximum compressions are given in Table 1 in this ETA.

For the design situation ultimate limit state (ULS), the fundamental combinations of actions and the combination of actions for fatigue limit state are considered.
For the design situation serviceability limit state (SLS) the characteristic combinations of actions and frequent combinations are considered.

Reaction forces resulting from fast occurring movements simulating over rolling traffic are less than those resulting from slow occurring movements. The maximum reaction forces, resulting from slow occurring movements are given in Table 4 below. The related maximum vertical deformations are stated thereafter.

Table 4: Comprehensive table of reaction forces (at -20 °C) for the flexible plug expansion joints SILENT-JOINT$^{RESA}$FLEX® and RESA-JOINT®

| Type | Reaction forces to be considered in the bridge design [kN/m] |
|---|---|
| RESA-JOINT® | 30 |
| SILENT-JOINT$^{RESA}$FLEX® | 40 |
| **400(150-50/70)** | |
| **500(150-60/80)** | |
| **500(150-80/100)** | |
| **500(150-100/120)** | |
| **600(200-50/70)** | |
| **700(250-80/100)** | 50 |
| **700(250-100/120)** | |
| **1000(450-100/120)** | |

For all types of the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® and for RESA-JOINT® according to Table 1 of this ETA the related maximum assessed deformations are not more then 11 mm (elevation) and not more then - 10 mm (dimple).

3.1.2 Level differences in the running surface

Under unloaded conditions:

Without imposed horizontal deformation and in unloaded conditions no level differences > 3 mm in the running surface and no steps > 2mm are occurring (without consideration of the surface texture) for all types of the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® according to Table 1 of this ETA and for RESA-JOINT®, as laid down in the technical documentation, deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik.

Under loaded conditions:

For all types of the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® according to Table 1 of this ETA and for RESA-JOINT® the assessed maximum level difference in the running surface after dynamic loading is given by ≤ 6 mm.

3.1.3 Skid resistance

Table 5: Skid resistance of the flexible plug expansion joint SILENT-JOINT$^{RESA}$FLEX® (all types according to Table 1 of this ETA) and RESA-JOINT®

| Intended use | PTV value according to EN 13036-4 | |
|---|---|---|
| | With surface dressing | Without surface dressing |
| Carriageway | 77 | 38 |
| Footpath | 63 | 32 |

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

### 4.1 AVCP system

According to the decision 2001/19/EC of the European Commission the system(s) of assessment and verification of constancy of performance (see Annex V of Regulation (EU) No 305/2011) is 1.

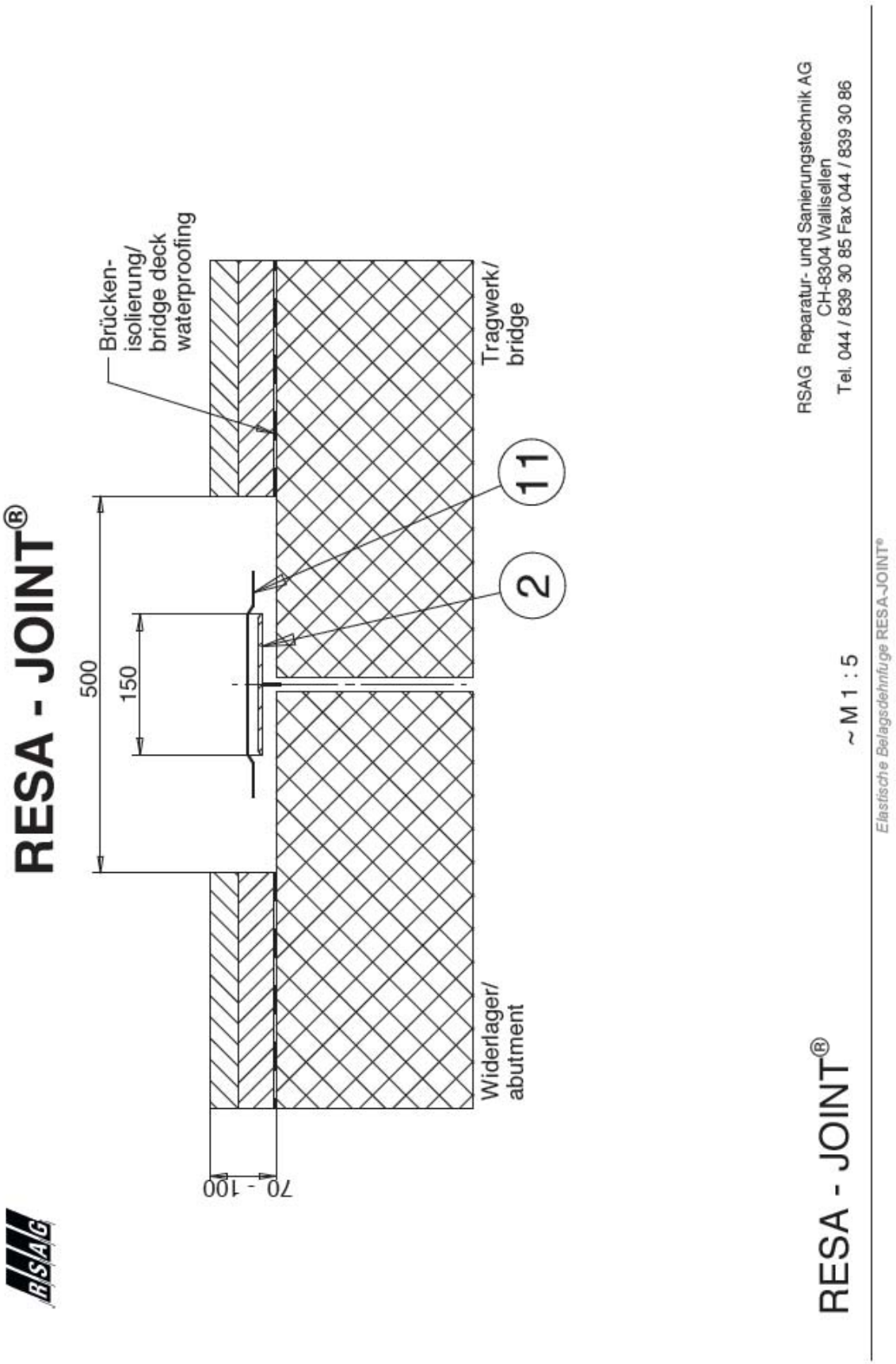
## 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in in the control plan deposited by the Technical Assessment Body Österreichisches Institut für Bautechnik.

Issued in Vienna on 27.06.2016
by Österreichisches Institut für Bautechnik

The original document is signed by:

Rainer Mikulits
Managing Director




| RESA-JOINT®<br>SILENT-JOINT[RESA]FLEX® | **Annex 1.1** of European Technical Assessment ETA-16/0379<br>Standard cross-section RESA-JOINT® |
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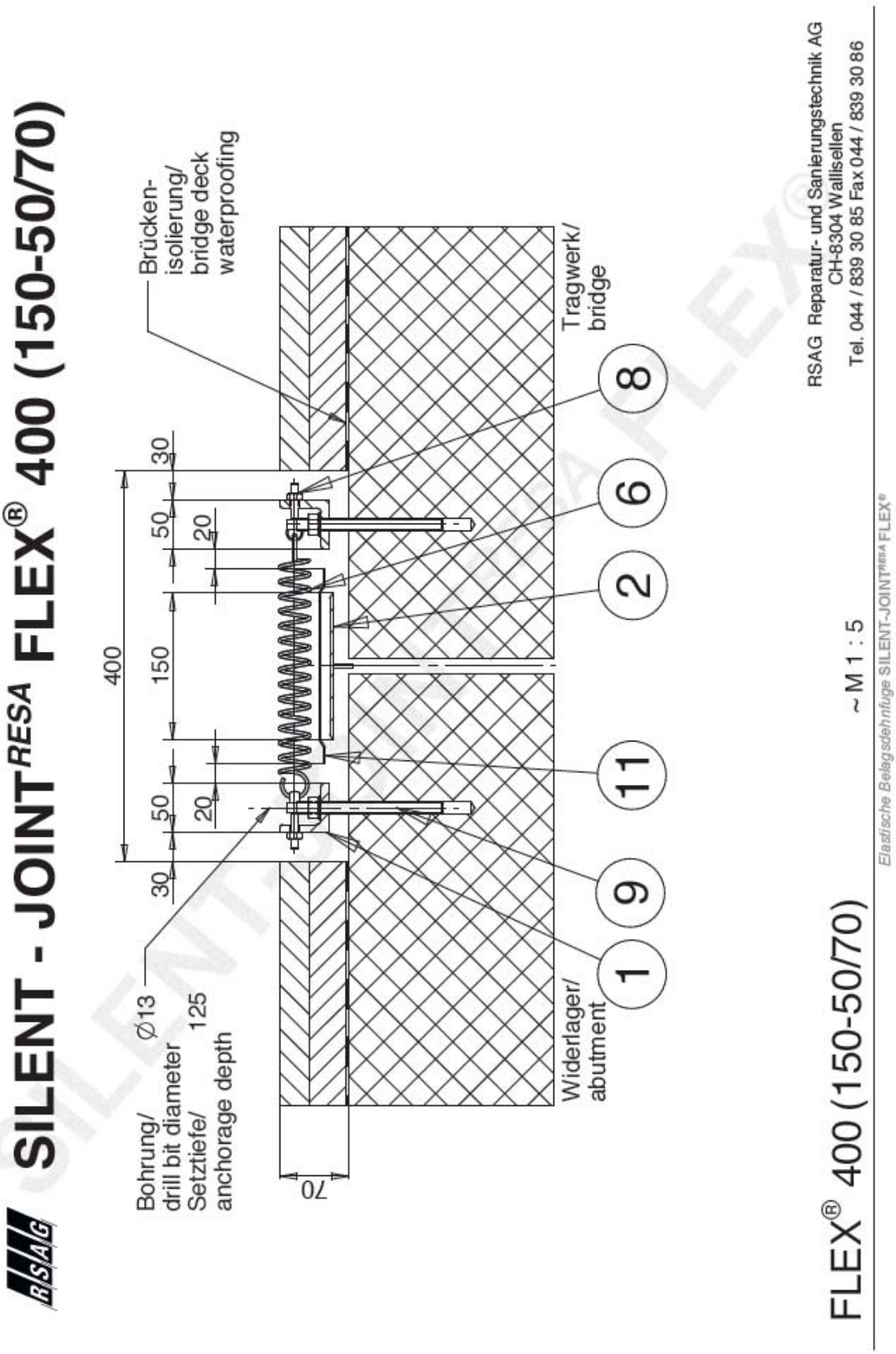

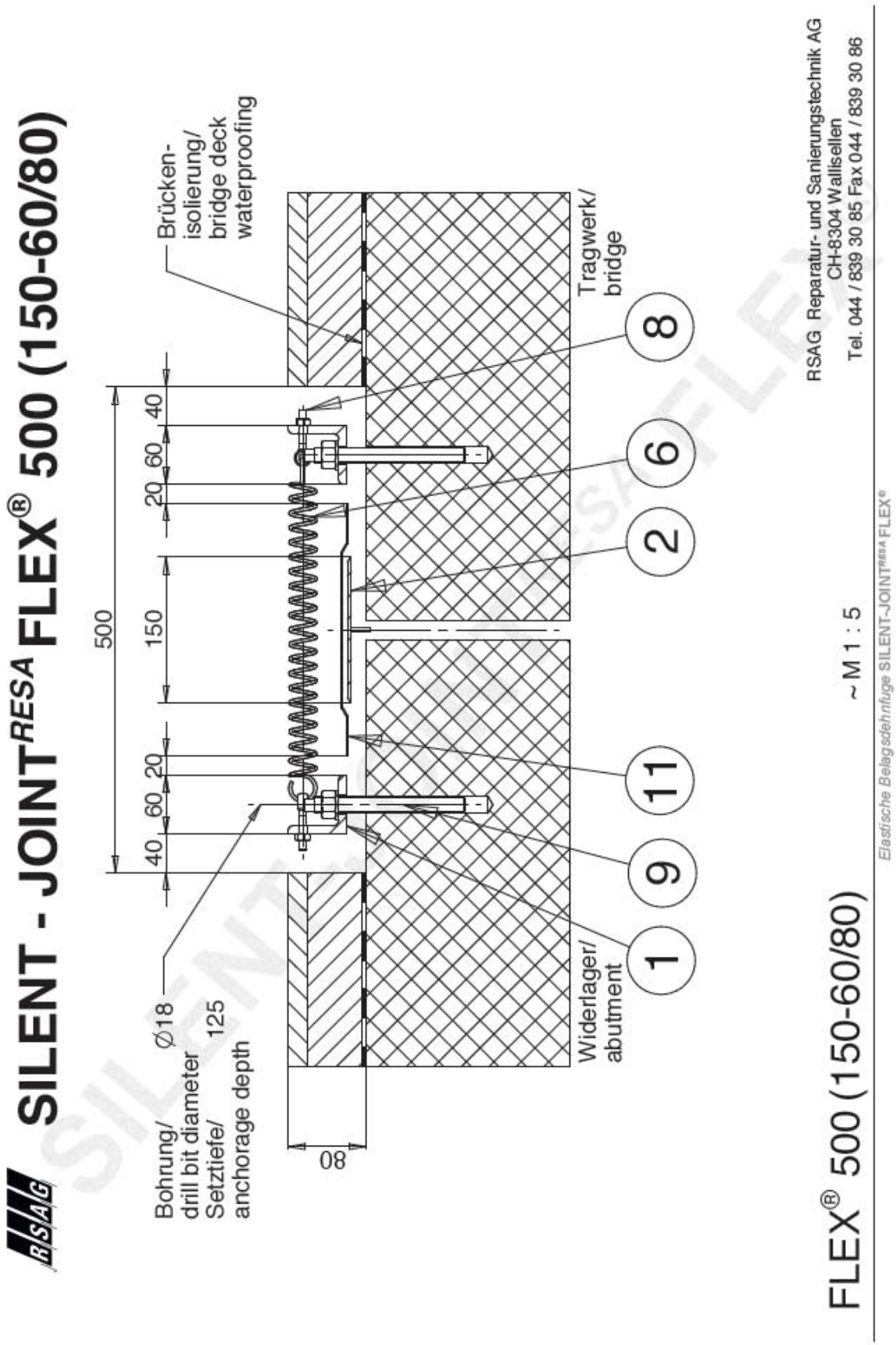


| RESA-JOINT®<br>SILENT-JOINT RESA FLEX® | **Annex 1.3** of European Technical Assessment ETA-16/0379<br>Standard cross-section SILENT-JOINT RESA FLEX® 500(150-60/80) |
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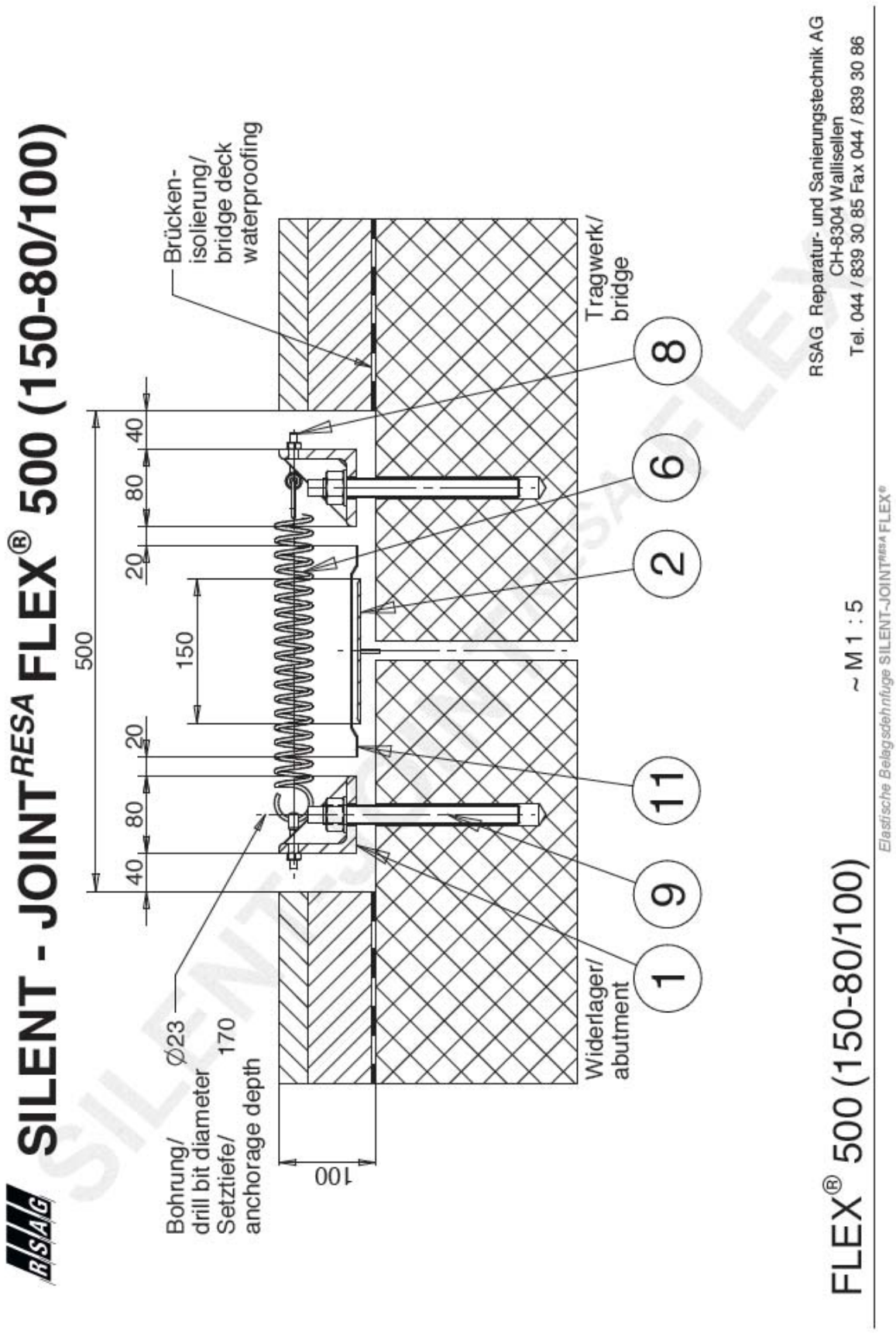


| RESA-JOINT®<br>SILENT-JOINT RESA FLEX® | **Annex 1.4** of European Technical Assessment ETA-16/0379<br>Standard cross-section SILENT-JOINT RESA FLEX® 500(150-80/100) |
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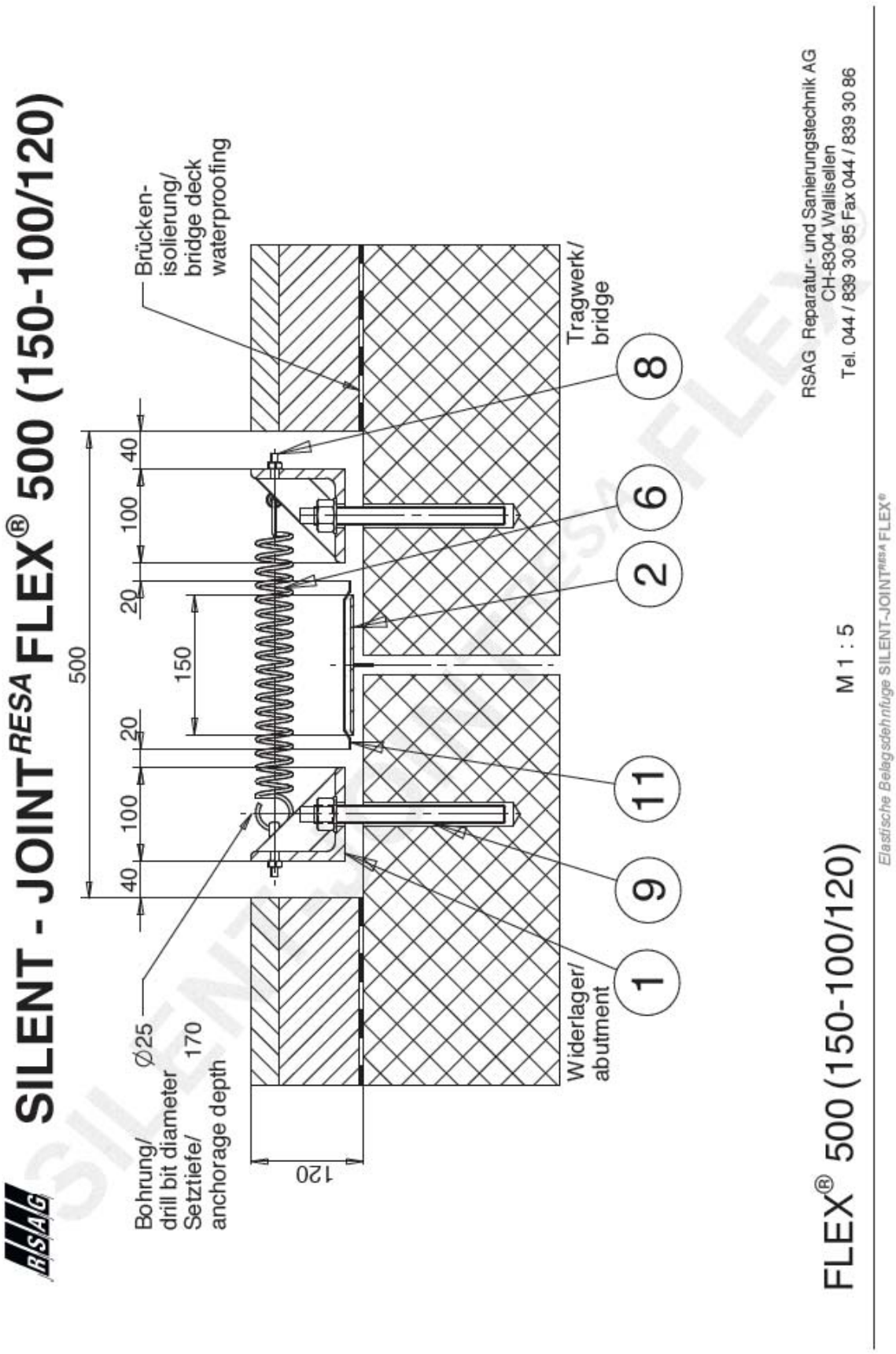


| RESA-JOINT®<br>SILENT-JOINT RESA FLEX® | **Annex 1.5** of European Technical Assessment ETA-16/0379<br>Standard cross-section SILENT-JOINT RESA FLEX® 500(150-100/120) |
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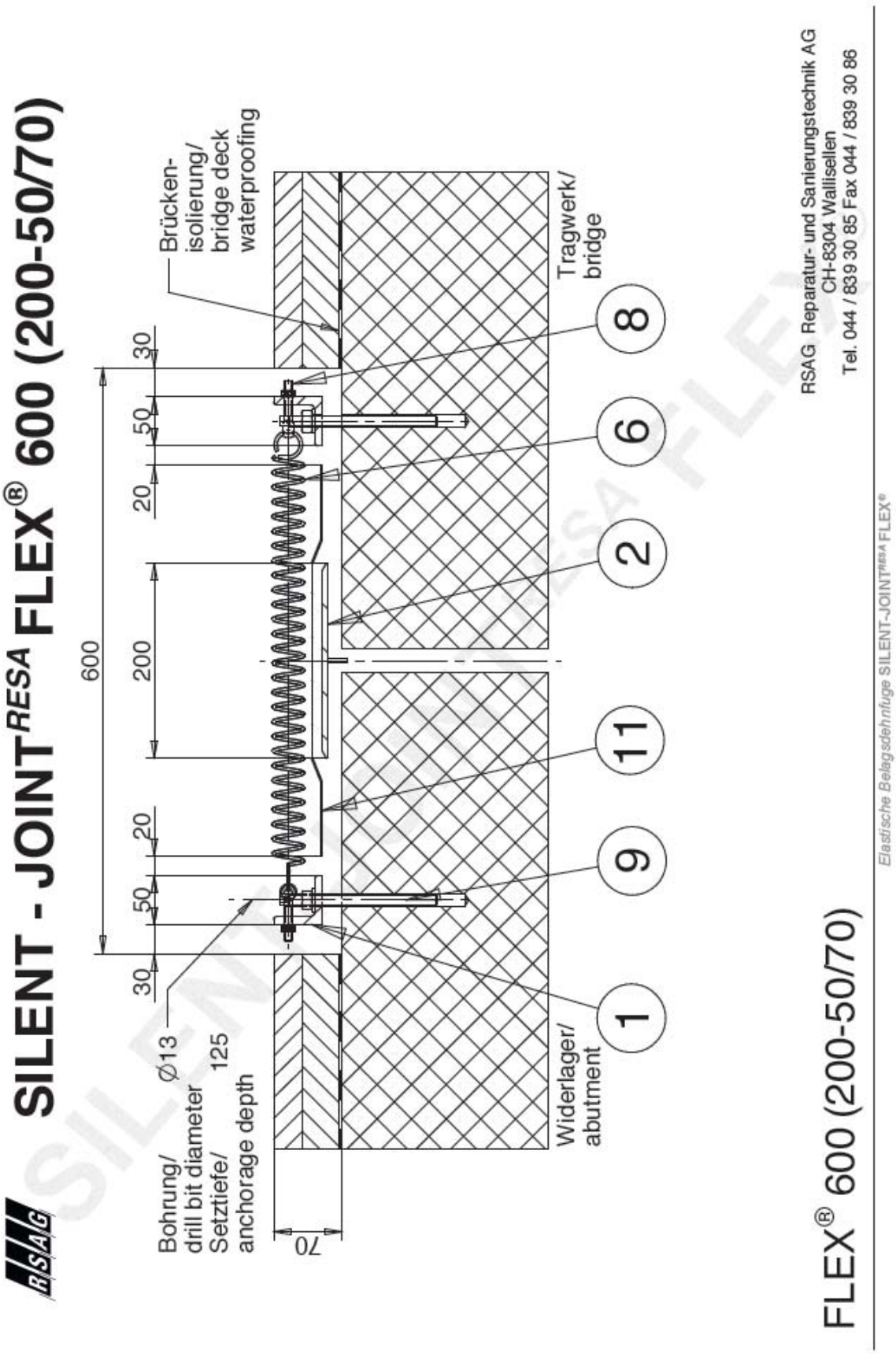


| RESA-JOINT®<br>SILENT-JOINT RESA FLEX® | **Annex 1.6** of European Technical Assessment ETA-16/0379<br>Standard cross-section SILENT-JOINT RESA FLEX® 600(200-50/70) |
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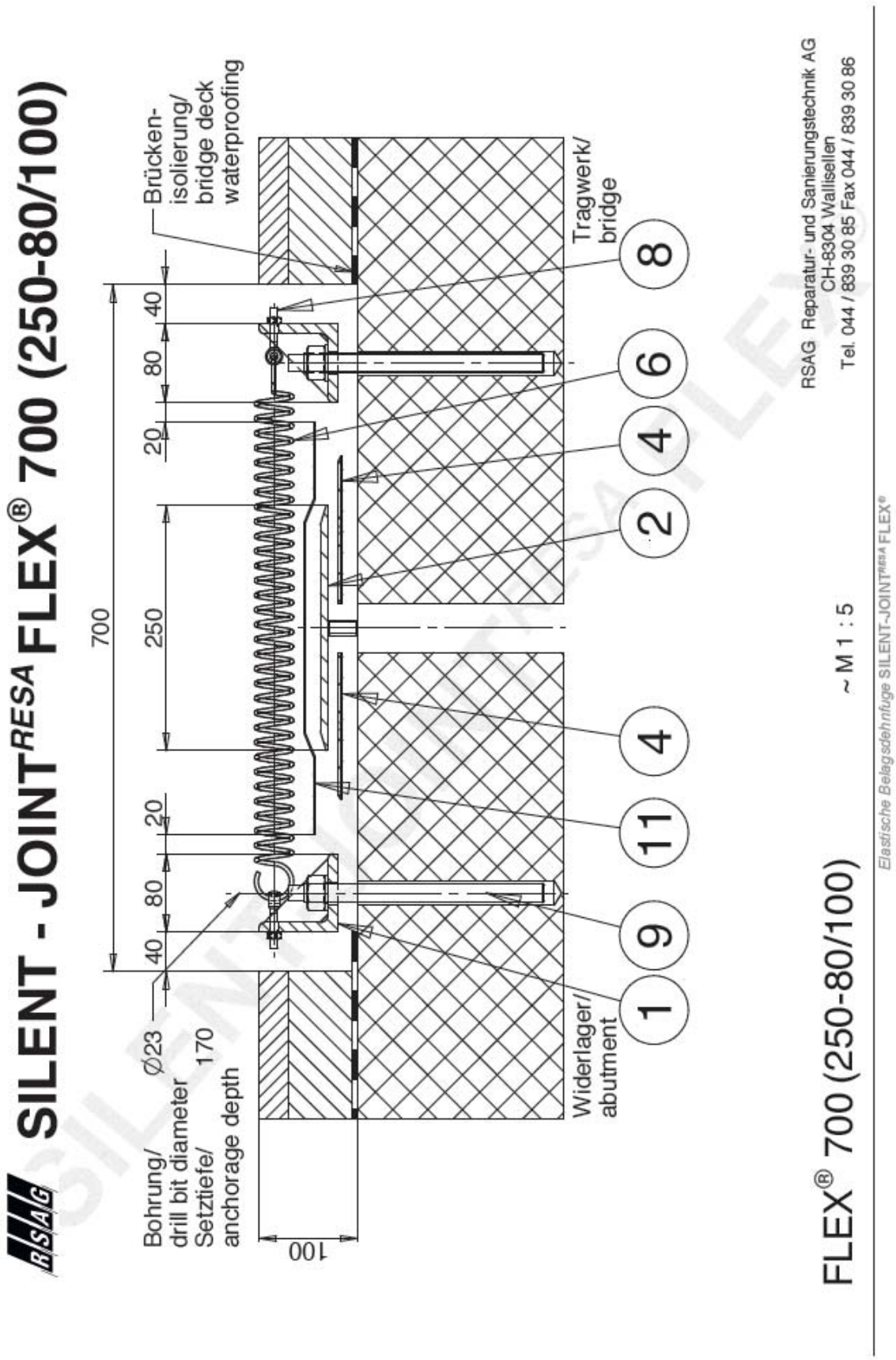


| RESA-JOINT®<br>SILENT-JOINT RESA FLEX® | **Annex 1.7** of European Technical Assessment ETA-16/0379<br>Standard cross-section SILENT-JOINT RESA FLEX® 700(250-80/100) |
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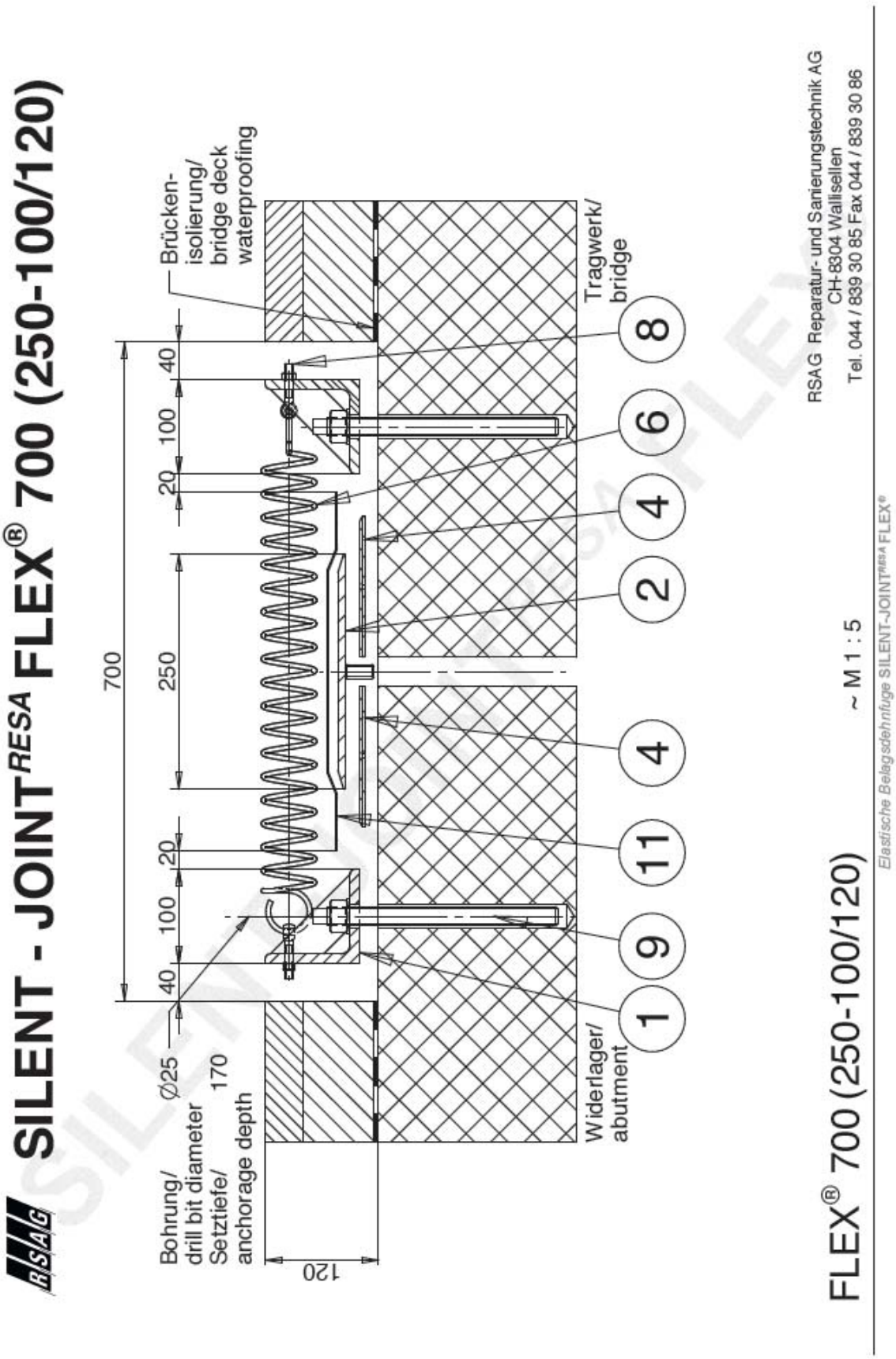
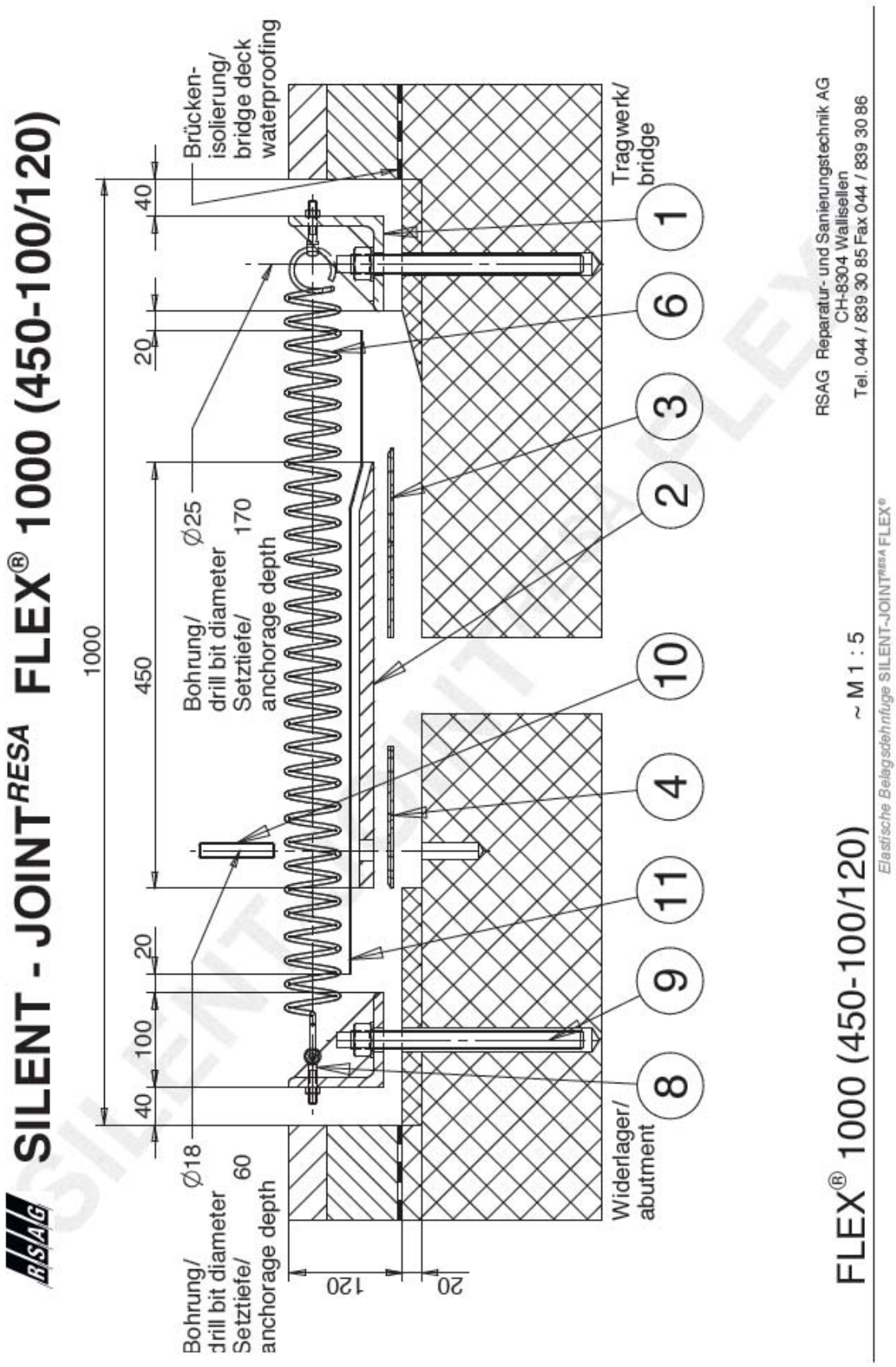





| RESA-JOINT®<br>SILENT-JOINT RESA FLEX® | **Annex 1.8** of European Technical Assessment ETA-16/0379<br>Standard cross-section SILENT-JOINT RESA FLEX® 700(250-100/120) |
|---|---|

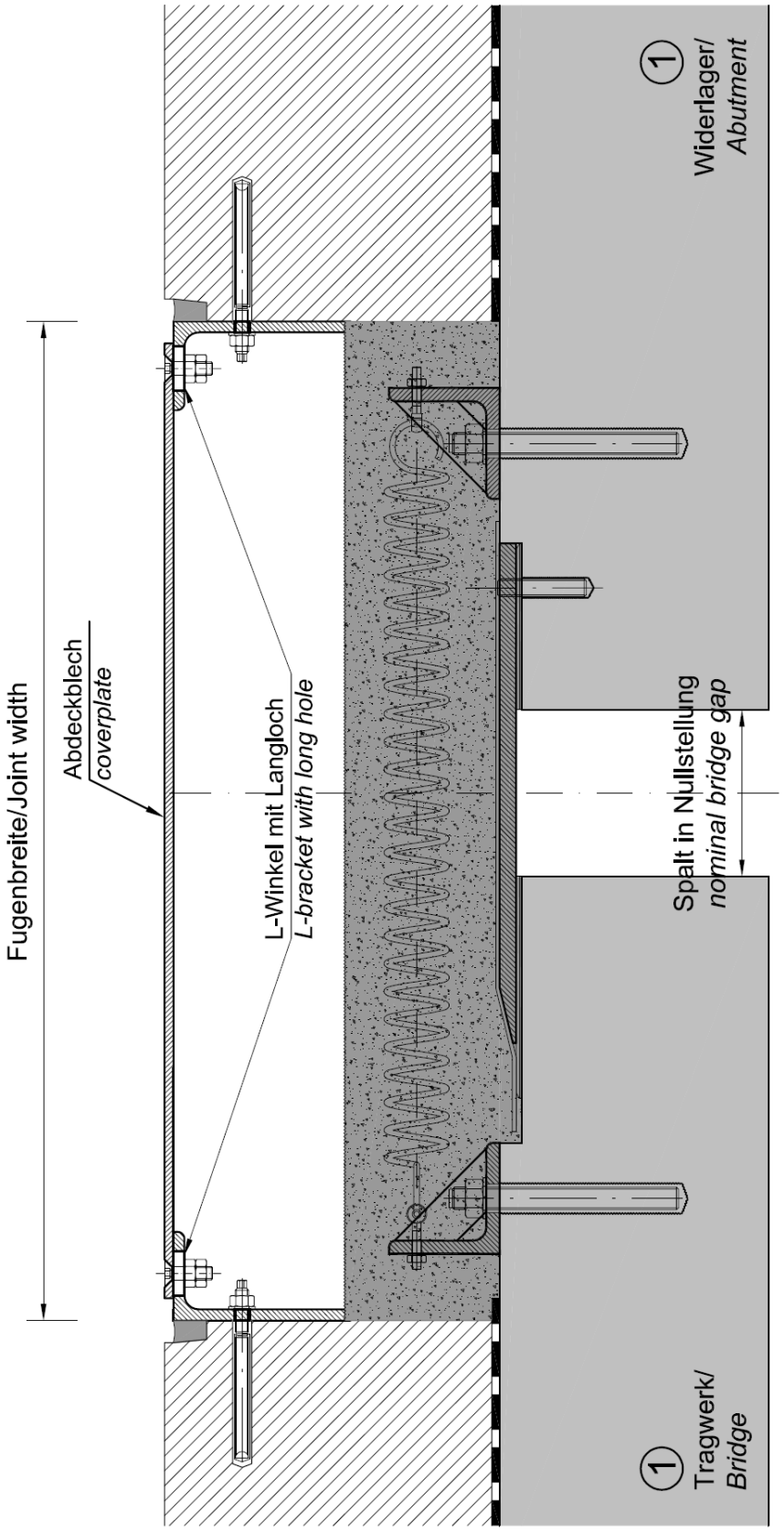



| RESA-JOINT®<br>SILENT-JOINT RESA FLEX® | **Annex 1.9** of European Technical Assessment ETA-16/0379<br>Standard cross-section SILENT-JOINT RESA FLEX® 1000(450-100/120) |
|---|---|

Member of EOTA

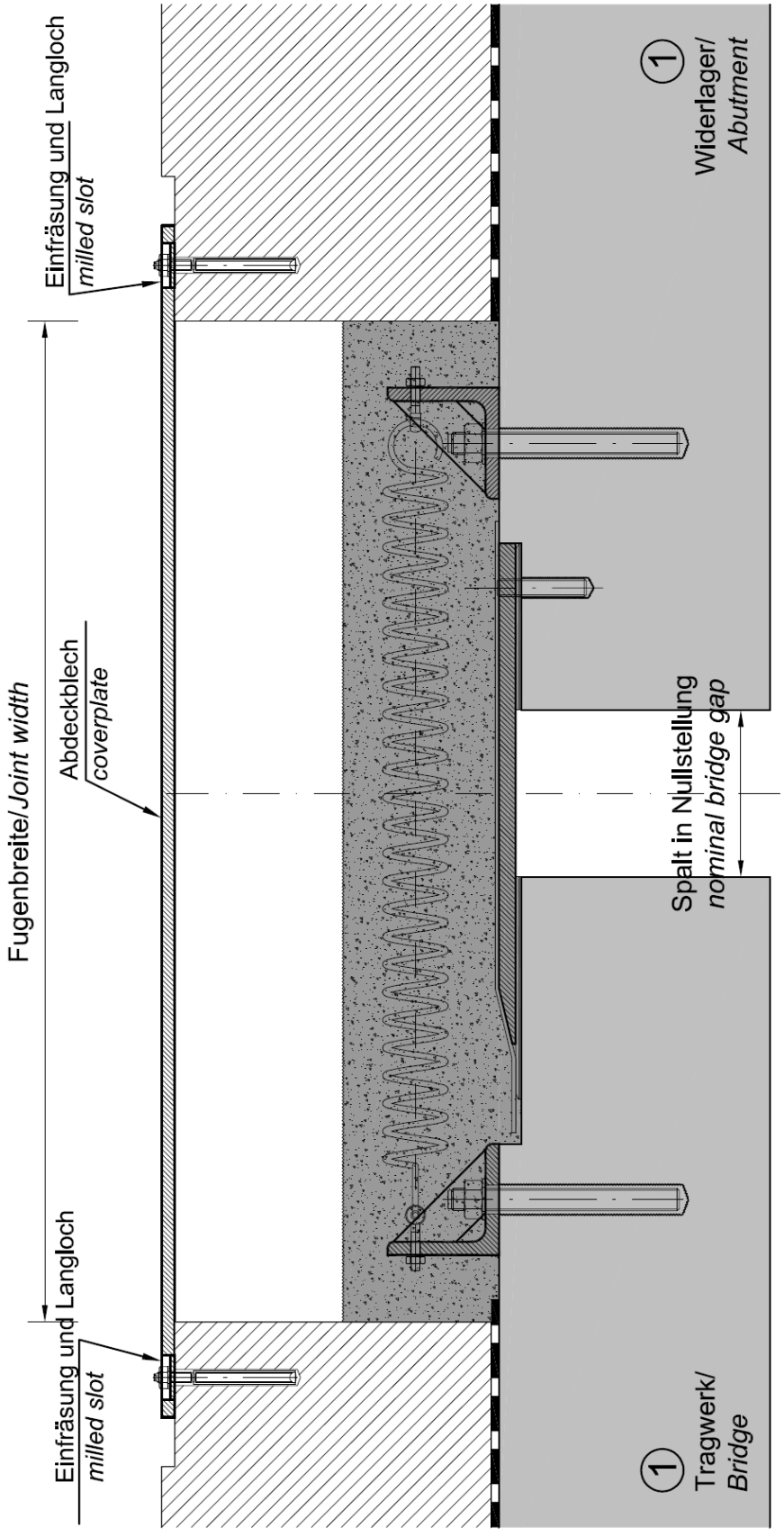


Mögl. Randstreifenausb. mit Schleifblech bei nachträglicher Herstellung
*Possible layout of footway with coverplate when assembled subsequently*

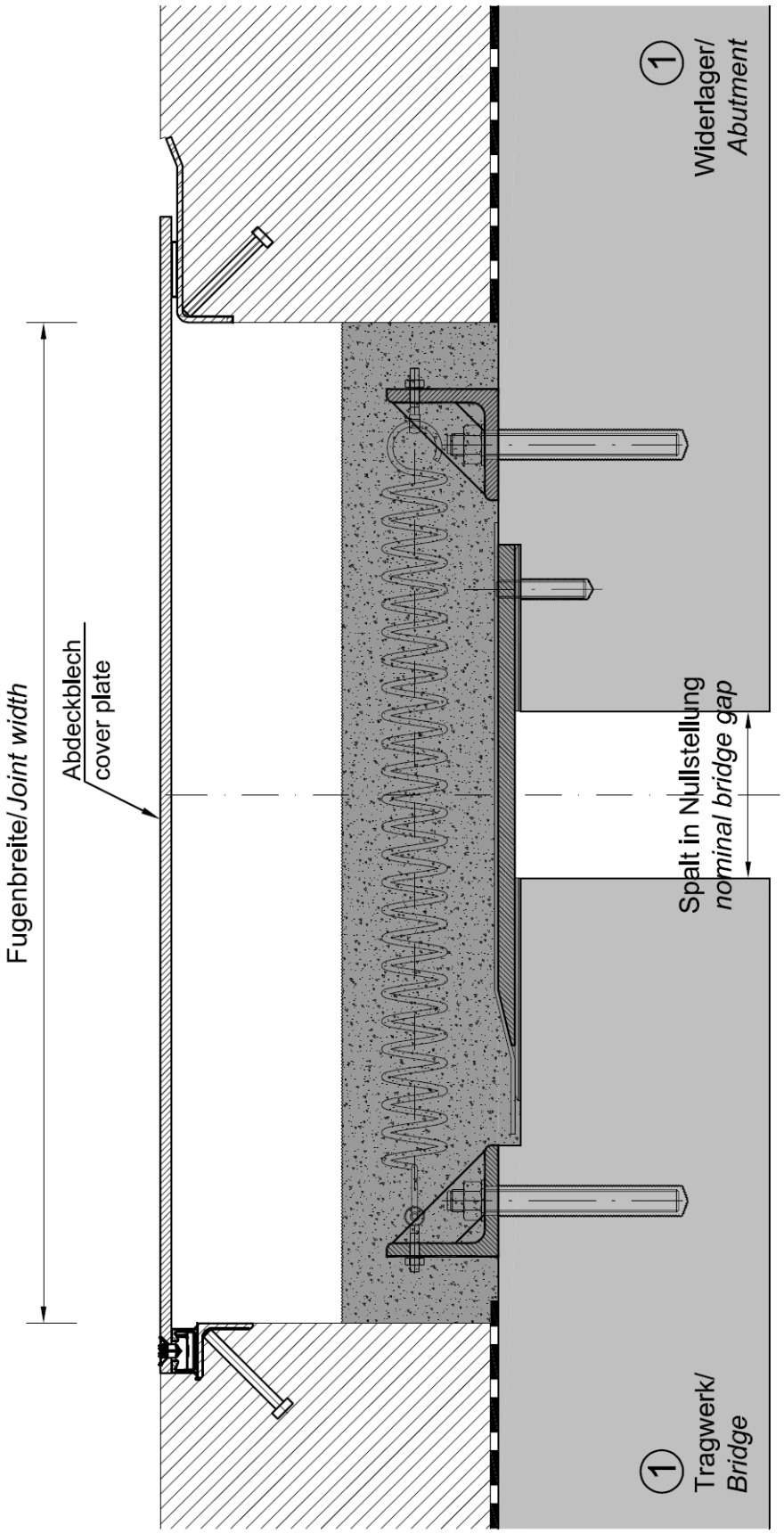



| | |
|---|---|
| **RESA-JOINT®**<br>**SILENT-JOINT$^{RESA}$FLEX®** | **Annex 2.1** of European Technical Assessment ETA-16/0379<br>Execution in sidewalk (Refurbishment of structures) |

# Mögliche Randstreifenausbildung mit Schleifblech bei Neubau
# *Possible layout of footway with coverplate for new construction*



Mögliche Randstreifenausbildung mit Schleifblech bei Neubau
*Possible layout of footway with coverplate for new construction*




| | |
|---|---|
| **RESA-JOINT®**<br>**SILENT-JOINT$^{RESA}$FLEX®** | **Annex 2.3** of European Technical Assessment ETA-16/0379<br>Execution in sidewalk (New structures – Execution B) |

Table 6a: Characterisation of the joint filling material based on synthetic polymer, comp. A + B (without additional filling material, comp. C, rubber granules)

| Characterisation parameter | Assessment method | Result |
|---|---|---|
| Viscosity comp. A and B | EN ISO 3219 | Laid down in the technical documentation of the manufacturer deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik |
| Density comp. A and B | EN ISO 2811-1 | |
| Isocyanate content comp. B | EN 1242 | |
| IR- spectroscopy comp. A and B and hardened joint filling material | EN 1767, procedure 7.1 | |
| TGA of hardened joint filling material | EAD 120011-00-0107, A.1.5 | |
| DMA Temp Sweep of hardened joint filling material | EAD 120011-00-0107, A.1.6 | |

Table 6b: Characterisation of the additional filling material (comp. C, rubber granules)

| Characterisation parameter | Assessment method | Result |
|---|---|---|
| Type and grain size | EN 933-1 | Laid down in the technical documentation of the manufacturer deposited with the Technical Assessment Body Österreichisches Institut für Bautechnik |
| Moisture content | EN ISO 12570 | |

Table 6c: Bond strength of the joint filling mixture and mode of failure with related percentage area

| Mode of failure | Percentage area of failure | Bond strength [N/mm²] |
|---|---|---|
| Cohesive failure of support | 0 | 1,52 |
| Adhesive failure between support and filling mixture | 100 | |
| Cohesive failure in the filling mixture | 0 | |
| Combination of above-mentioned failure modes | 0 | |

## Reference documents

EAD 120011-00-0107 “Flexible plug expansion joints for road bridges with flexible filling based on a synthetic polymer as binder”, edition June 2016

EN 206:2013 “Concrete - Specification, performance, production and conformity”

EN 933-1:2012 “Tests for geometrical properties of aggregates - Part 1: Determination of particle size distribution - Sieving method”

EN 1242:2013 “Adhesives — Determination of isocyanate content”

EN 1767:1999 “Products and systems for the protection and repair of concrete structures - Test methods - Infrared analysis”

EN 1993-1-10:2005+AC:2009 “Eurocode 3 — Design of steel structures — Part 1-10: Material toughness and through-thickness properties (consolidated version)”

EN 10025-2:2004 “Hot rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels”

EN 13036-4:2011 “Road and airfield surface characteristics — Test methods — Part 4: Method for measurement of slip/skid resistance of a surface: The pendulum test”

EN ISO 1461:2009 “Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods”

EN ISO 2811-1:2011 “Paints and varnishes — Determination of density Part 1: Pyknometer method”

EN ISO 3219:1994 „Plastics - Polymers/resins in the liquid state or as emulsions or dispersions - Determination of viscosity using a rotational viscometer with defined shear rate (ISO 3219:1993)“

EN ISO 12570:2000+A1:2013 „Hygrothermal performance of building materials and products — Determination of moisture content by drying at elevated temperature”