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European Technical Assessment

ETA-24-0582 Of 19-07-2024

General Part

Technical Assessment Body issuing the European Technical Assessment:
Kiwa Nederland B.V.

Trade name of the construction product

Terwa Precast Connector “TPC”

Product family to which the construction product belongs

Fixings

Manufacturer

Terwa B.V.
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Manufacturing plant

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This European Technical Assessment contains

8 pages

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

EAD 332001-00-0602, edition June 2018
Clamping System for Connection of Precast Concrete Members

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Specific parts

1. Technical description of the product

Terwa Precast Connector "TPC" is a connection system for precast concrete elements, such as walls and shafts. The clamping system consists of a turnbuckle with corresponding M16 or M20 screws and serrated washers.

The turnbuckle is fixed to the concrete element via a cast-in anchor with internal threaded socket. The assessment of the connection to the concrete element is not covered by the ETA.

Specifications of turnbuckle - Precast Connector TPC:

- TPC M16: 102 mm x 84 mm x 55 mm (A x B x C)
- TPC M20: 124 mm x 100 mm x 71 mm (A x B x C)
- Steel: S355J2

Specifications of serrated washer:

- Ø17 mm (TPC M16): 35 mm x 35 mm x 5 mm (h x w x t)
- Ø20 mm (TPC M20): 45 mm x 45 mm x 5 mm (h x w x t)
- Steel S355J2

Specification of screw:

- M16, required thread engagement $l_r \geq 24$ mm
- M20, required thread engagement $l_r \geq 30$ mm
- Strength classification 8.8 or 10.9

More details incl. drawings are given in Annex A.

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

2.1. Intended use

The clamping system is fastened to anchors embedded in concrete elements. The clamping system is used for connecting either two or three concrete elements. The connection can be made between precast to precast structures, precast to situ concrete structures or between precast to already existing structures. This European Technical Assessment (ETA) applies to the use in structures that are subjected to dry, internal conditions or to internal conditions with usual humidity.

2.2. Assumed working life

The provisions made in this ETA are based on the assumed working life of the clamping system for the intended use of 50 years when installed in the works. These provisions are based upon the current state of the art and the available knowledge and experience.

When assessing the product, the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works.

The real working life of a product incorporated in a specific works depends on the actual environmental conditions, as well as on the particular conditions of the design, execution, use and maintenance of that works.

Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

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

The methods of verification and characteristics of Terwa Precast Connector “TPC” evaluated in this ETA are given in Table 1.

Table 1 Essential characteristics, assessment methods and performances of Terwa Precast Connector “TPC”

No.	Essential characteristic	Product performance
Basic Works Requirement 1: Mechanical resistance and stability		
1.	Characteristic tensile strength $F_{u,5\%}$	TPC M16: 115.0 kN TPC M20: 157.5 kN
2.	Characteristic shear strength $F_{u,5\%}$	Opening is directed forwards TPC M16: 69.9 kN TPC M20: 87.3 kN
		Opening is directed upwards TPC M16: 83.2 kN TPC M20: 137.6 kN
3.	Characteristic strength of T-connection	NPA
4.	Durability against corrosion	Steel quality: <ul style="list-style-type: none"> • S355J2 (turnbuckle and serrated washer) • 8.8 or 10.9 (M16 and M20 screw)
		Thickness of zinc coating: <ul style="list-style-type: none"> • $\geq 50 \mu\text{m}$ (turnbuckle and serrated washer) • $\geq 50 \mu\text{m}$ (M16 and M20 screws - internal conditions with usual humidity) • $\geq 5 \mu\text{m}$ (M16 and M20 screws - internal dry conditions)
Basic Works Requirement 2: Safety in case of fire		
5.	Reaction to fire	Class A1

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

In accordance with the European assessment document EAD 332001-00-0602 the applicable European legal act is: Decision 98/214/EC. The system of assessment and verification of constancy of performance to be applied to the Terwa Precast Connector “TPC” is System 2+.

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

This ETA is issued for Terwa Precast Connector “TPC” on the basis of data/information deposited at Kiwa Nederland B.V. which identifies the product that has been assessed. Changes to the product/production process, which could result in this deposited data/information being incorrect, should be notified to the approval body before the changes are introduced. Kiwa Nederland B.V. will decide whether such changes affect the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

Technical details necessary for the implementation of the AVCP system are laid down in the control plan, in accordance with Section 3.2 of EAD 332001-00-0602. The control plan shall be handed over by the manufacturer to the notified body (bodies) involved in the assessment and verification of constancy of performance.

Issued in Rijswijk on 19-07-2024 by

A handwritten signature in black ink, appearing to read 'Ron Scheepers', written over a light grey circular stamp.

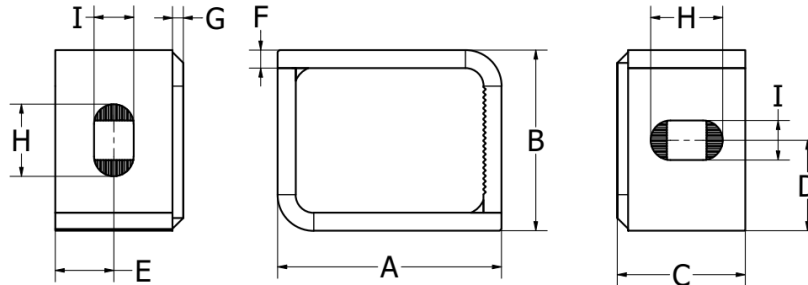
Ron Scheepers

Kiwa Nederland B.V.

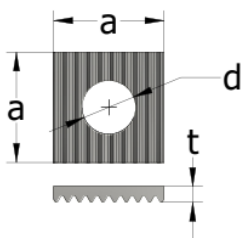
Annex A Details of the product

Drawings and specifications in this annex are taken from the technical documentation V16.5.01.T.EN (extract) issued in January 2024 by Terwa.

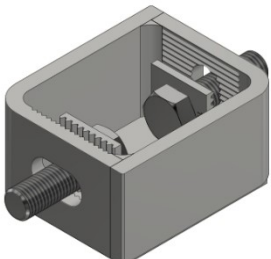
TPC Geometry



TPC	Article no.	A	B	C	D	E	F	G	H	I
Dimensions		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
TPC M16	65749	102	84	55	42	25	8	5	32	18
TPC M20	65750	124	100	71	50	32.5	10	6	40	22



Serrated washer	Article no.	Dimensions		
		a [mm]	t [mm]	d [mm]
Serrated washer Ø17	67155	35	5	17
Serrated washer Ø21	67158	45	5	21

TERWA TPC - KIT							
	The TPC KIT consists of a Precast Connector TPC, two corresponding serrated washers and two screws.	Designation	Article no.	Components	Article no.		
		TPC-M16 KIT	68214	TPC-M16			65749
				Serrated washer Ø17			67155
				Screw ISO 4017 M16-50_8.8			26310
		TPC-M20 KIT	68215	TPC-M20			65750
				Serrated washer Ø21			67158
Screw ISO 4017 M20-65_8.8					26312		

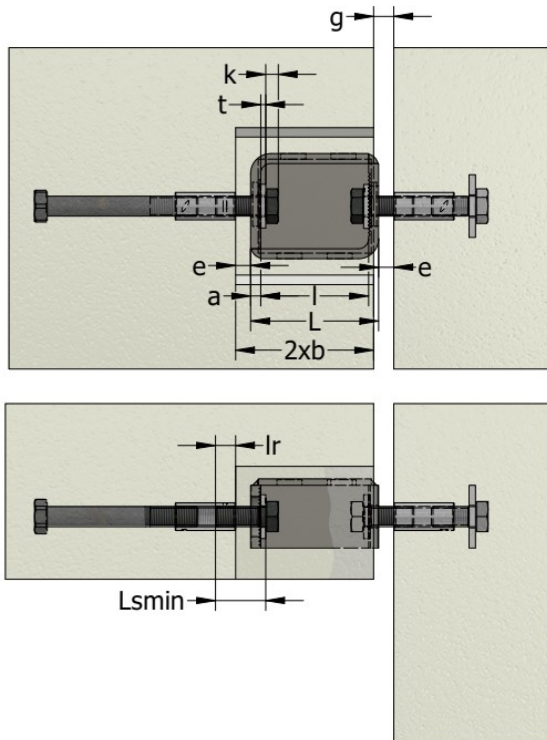
TPC is placed in a cavity made in the concrete element around the anchor head. This recess is filled with fine concrete after mounting the TPC. For installing the fixing, two pair of screws ISO 4017 class 8.8 or 10.9 and two serrated washers are required.

During the TPC installation, the concrete element must be aligned, and the screws must be tightened parallel and crosswise until the desired joint width has been reached.

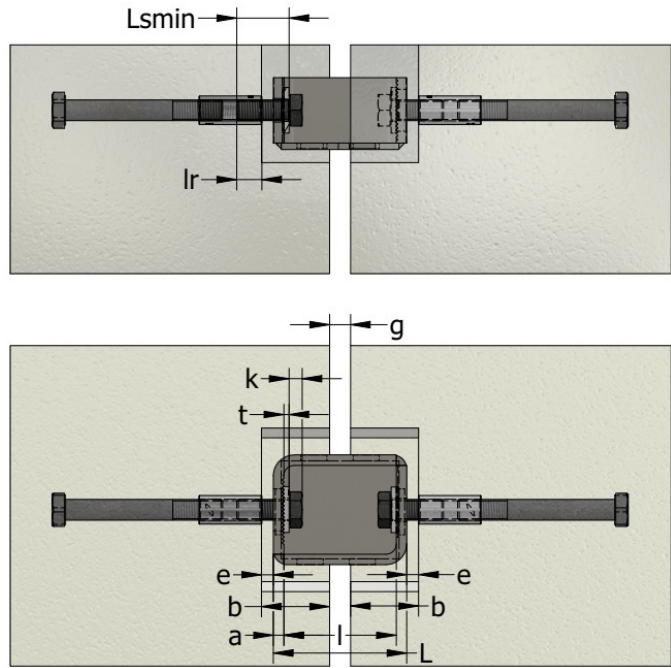
TPC Material specifications

Specification	Dry conditions	Internal conditions with usual humidity
	Material types and surface protection required for use in structures subject to dry internal conditions except for usual humidity	Material types and surface protection required for use in structures subject to internal conditions with usual humidity
TPC Precast Connector M16	Steel S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm	Steel S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm
Serrated washer Ø17	Steel S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm	S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm
Hexagon headed screw M16-50*	Steel with mechanical properties class 8.8 or 10.9 EN ISO 898-1 Electrolytical galvanized ≥ 5 µm	Steel with mechanical properties class 8.8 or 10.9 EN ISO 898-1 Hot dip galvanized ≥ 50 µm
* The screw length depends on the minimum thread engagement of 1.5 times the bolt diameter, gap between precast elements, TPC dimensions		
TPC Precast Connector M20	S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm	S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm
Serrated washer Ø21	S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm	S355J2 EN 10025 Hot dip galvanized according to EN ISO 1461 ≥ 50 µm
Hexagon headed screw M20-65*	Steel with mechanical properties class 8.8 or 10.9 EN ISO 898-1 Electrolytical galvanized ≥ 5 µm	Steel with mechanical properties class 8.8 or 10.9 EN ISO 898-1 Hot dip galvanized ≥ 50 µm
* The screw length depends on the minimum thread engagement of 1.5 times the bolt diameter, gap between precast elements, TPC dimensions		

CORNER APPLICATION

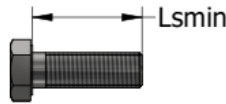


WALL – WALL APPLICATION



$$L_{smin} = l_r + e + a + t$$

$$e = (2 \times b + g - L) / 2$$



L_{smin} – Minimum screw length
 g – Gap between the precast elements
 a and L – TPC dimensions
 t – Washer thickness
 b – Recess former width

TPC	L_{smin}	l_r	e	g	a	L	t
	mm	mm	mm	mm	mm	mm	mm
TPC M16	50	24	14	16	8	102	4
TPC M16	50	24	11	10	8	102	4
TPC M16	45	24	9	6	8	102	4
TPC M16	45	24	6	0	8	102	4

TPC	L_{smin}	l_r	e	g	a	L	t
	mm	mm	mm	mm	mm	mm	mm
TPC M20	65	30	18	16	10	124	4
TPC M20	60	30	15	10	10	124	4
TPC M20	60	30	13	6	10	124	4
TPC M20	55	30	10	0	10	124	4

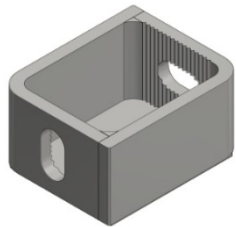
Screw length

The bolt should be of sufficient length to ensure a minimum thread engagement of 1.5 times the bolt diameter.

Thread	Required thread engagement. l_r mm
M16	24
M20	30

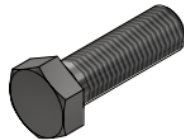
The screw length depends on the fixing anchor used and its minimum thread engagement.

Terwa Precast Connector sets for construction site



65749 - TPC-M16

2 x

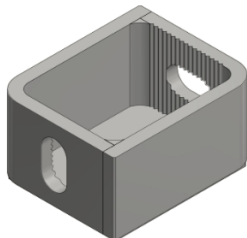


SCREW ISO 4017 M16 x L



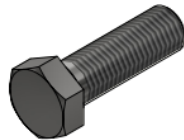
2 x

SERRATED WASHER Ø17



65750 - TPC-M20

2 x



SCREW ISO 4017 M20 x L



2 x

SERRATED WASHER Ø21