

# PRODUCT DECLARATION BY THE CONCRETE ASSOCIATION OF FINLAND

## TYPE 5B - EC 2 FASTENING ITEM

number  
**105**

Representative of the fastening item in Finland:

PEIKKO FINLAND OY  
P.O. Box 104 (visiting address Voimakatu 3)  
15101 LAHTI, Finland

Manufacturer of the fastening item:

PEIKKO GROUP OY

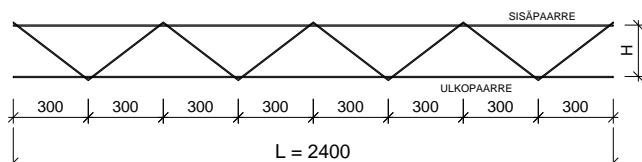
Type and identification of the fastening item:

PD Diagonal Ties and PPA Beam Ties

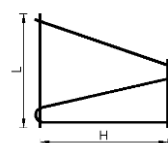
PD Diagonal Ties:							PPA Beam Ties:					
PD 100	PD 150	PD 200	PD 240	PD 300	PD 360	PD 420	PPA 150	PPA 200	PPA 240	PPA 300	PPA 360	PPA 420
PD 120	PD 160	PD 210	PD 260	PD 320	PD 380	PD 440	PPA 160	PPA 210	PPA 260	PPA 320	PPA 380	PPA 440
PD 140	PD 180	PD 220	PD 280	PD 340	PD 400	PD 450	PPA 180	PPA 220	PPA 280	PPA 340	PPA 400	PPA 450

### Figure of the fastening item:

PD diagonal ties:



PPA beam ties:



Function principle of the fastening item:

The Ties are welded wire connectors which are used for connecting concrete layers of precast sandwich panels.

### DECISION OF SUOMEN BETONIYHDISTYS R.Y. (THE CONCRETE ASSOCIATION OF FINLAND)

The Concrete Association of Finland has processed this product declaration and has approved it based on the documentation. The declaration provides sufficient explanation of the properties and matters related to the usage of the fastening item, which is intended for concrete structures, providing that planning is based on Eurocode standards and relevant national annexes.

When the fastening item is used, the product declaration should be taken into account along with the following matters:

1. A valid product declaration for the fastening item, as granted by the Concrete Association of Finland, must be available on the manufacturing site.
2. A product declaration for the fastening item, as granted by the Concrete Association of Finland, must be available on the construction site, along with the product's user manual.
3. Usage areas for the fastening item

This approval is in valid until 16.6.2025, unless before that time there is found a sound reason for revoking this decision. List of valid approvals can be seen on Internet [www.betoniyhdistys.fi](http://www.betoniyhdistys.fi) > Released approvals > Approvals > Approval list.

Two original copies of the approval have been made where one is stored in the Finnish Concrete Association office.

Helsinki June 29<sup>th</sup>, 2020

SUOMEN BETONIYHDISTYS R.Y. (THE CONCRETE ASSOCIATION OF FINLAND)

Matti Pentti  
Chairman

Tarja Merikallio  
Managing Director

*The Concrete Association of Finland (BY) is an independent techno-scientific association that promotes the correct use of concrete. The Association members are active in an extensive range of concrete construction areas. The Association publishes technical instructions, maintains certification systems for people working in the field of concrete, organizes training and events for members, initiates and steers development projects and provides consultancy for bodies such as the Ministry of the Environment.*

*The applications for Approvals by Concrete Association of Finland (BY) are handled by the divisions of the Association where independent experts are nominated by the board of the Association. This product declaration is intended for responsible professionals in the construction sector who are able to appropriately apply the guidance provided in the product declaration on construction sites and who can understand the restrictions related to product usage while taking responsibility for applying them to their own work.*

## INFORMATION GIVEN BY THE PART PRODUCER OR REPRESENTATIVE:

### 1. Operation of the fastening item

The ties are designed to join sandwich panel concrete layers together to transfer the loads of the weight of the external panel into the internal panel. The external panel of the element stiffens the internal panel by using cooperation of PD Diagonal Ties and PPA Beam Ties. By using Diagonal Ties to connect layers to each other the compression capacity increases.

### 2. Manufacturing of the fastening item

21 Components:

Type	Inner flange	Outer flange	Diagonal
PDM	Ø5mm B500A	Ø5mm B500A	Ø5mm 1.4301
PD		Ø5mm B600XB – 1.4301	
PDR	Ø5mm B600XB – 1.4301	Ø5mm B600XB – 1.4301	Ø5mm B600XB – 1.4301
PPA	Ø5mm B600XB – 1.4301	Ø5mm B600XB – 1.4301	

#### 22 Manufacturing method

Ties are produced by using automatic resistance welding and are cut mechanically to length.

#### 23 Welding

Resistance welding according to standard EN 10080.

### 3. Metal part dimensions, tolerances, and surface treatment

#### 31 Dimensions [mm] and weights [kg]

PD-Diagonal Tie dimensions are presented in Section 1.3. in the Technical Manual. The stock length of PD Diagonal Ties is 24000 mm. Ties can be manufactured to desired length in multiples of 300 mm. The tie width/height is stated in the product code and is measured in millimeters for the centre of the outer bar/flange to the center of the inner bar/flange.

#### 32 Tolerances

Tie length	±10mm
Tie width	±5mm
Diagonal distance	±5mm
Diagonal's straightness between bars	±2mm
Cross connector's straightness between bars	±2mm

#### 33 Surface treatment

No surface treatment.

### 4. Metal part material characteristics (standards, strength, composition, weldability)

Item	Material	Standard	Strength
Flange	B500A (A <sub>gt</sub> min. 3,5%)	SFS 1300	R <sub>eH</sub> ≥ 500N/mm <sup>2</sup>
Flange	B600XB – 1.4301	SFS 1259	R <sub>p0,2</sub> ≥ 600N/mm <sup>2</sup>
Diagonal	1.4301 (stainless steel)	SFS-EN 10088-2	R <sub>p0,2</sub> ≥ 500N/mm <sup>2</sup>

### 5. Metal part markings, packaging and storage

**Markings:** Each pile of ties is marked with the type of the product, manufacturer ID, week of manufacturing and Inspection Certification mark. PD Ties have yellow paint marks at both ends of outer stainless-steel bar/flange.

**Packaging:** Products are packed on standard pallets

**Storage:** Ties are stored outside / under a roof

## 6. Requirements for the concrete

### 61 Strength class and special characteristics of concrete and grouting mortar:

The anchoring of PD Ties in the concrete requires that the concrete must be at least grade C12/15 before lifting the element from the mold. Otherwise, the requirements of Eurocodes are to be applied.

Connecting reinforcement type	Anchoring depth ( $c_o, c_u$ ) [mm]	The minimum concrete grade
PD Diagonal Tie	$\geq 25/25$	$\geq C20/25$
PPA Beam Tie	$\geq 35/35$	$\geq C20/25$

### 62 Requirements for aggregates

The aggregate quality must be in accordance with the standard SFS-EN 12620 'Aggregates for concrete'.

### 63 Minimum requirements for edge and centre distances

The outermost tie's distance from the elements edge must be between 100-300mm. Tie's distance from elements bottom and top edge must be  $c_{min,dur} \leq V \leq 200mm$ , where  $c_{min,dur}$  is defined according to standard SFS-EN 1992-1-1. The smallest allowed distance c/c of the ties is 100mm.

### 64 Nominal concrete cover

Tie's concrete cover is selected by capacity (see section 7)

## 7. Capacities (table)

The welding joints between diagonal and flanges:

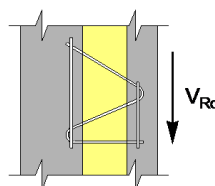
Characteristic value of tensile capacity	$N_{Rk}$	7,0kN
Design value of tensile capacity	$N_{Rd}$	5,6kN

The anchorage resistance of the diagonal into concrete:

The minimum concrete grade	C20/25	C20/25
The anchor depth of bars	15mm (+5)	25mm ( $\pm 5$ )
Characteristic value of tensile capacity	$N_{Rk}$	4,7kN
Design value of tensile capacity	$N_{Rd}$	3,8kN
		5,6kN

PPA Beam Tie:

Shear capacity  $V_{Rd} = 1,1 \text{ kN}$



## 8. Metal part installation

The Ties are installed into fresh concrete in turns with the insulation panels. This is to ensure the proper anchoring of the Tie to the lower concrete panel. It is not allowed to press the Ties through the insulation. It's not mandatory to fix or tie the Ties with the reinforcement mesh of the wall. Designed anchoring depth (usually minimum 25mm) of the ties must stay above the insulation. The insulation panel is installed tightly against the ties so that there is no air gap around the tie or cold bridge between the insulation panels. If ties are installed against the mesh, the dimensional variance of 10mm is to be taken into account.

The stainless-steel bar is meant for the external or outer layer of the sandwich panel.

PPA beam ties can be used in low structures e.g. door or window beams and also in low socle elements.

Installation instructions (Technical Manual, attachment 1).

## 9. Special requirements for correct connection

The applicable standards related to specific precast element type must be followed in precast element production. On construction site the assembling must follow standard SFS-EN 13670 'Execution of concrete structures' and the complementary standard SFS 5975 as well as standard SFS-EN 1992-1-1 'Eurocode 2: Design of concrete structures' and the requirements in the National Annex of Finland. Manufacturing and properties of concrete needs to follow the standard SFS-EN 206.

## 10. Structural static calculations (Annex number, name and date of calculation)

Strength calculations have been made according to Eurocodes using limit state analysis.

Annex 3 Peikko PPA Beam Ties static calculations 26.6.2015

## 11. Approval tests carried out to the Metal part: (Attachment number, institute or approval body, specification number and date)

Annex 4 PD-ansaiden kuormituskokeet: VTT-S-04851-09, 26.06.2009

Annex 5 Tensile and Shear tests PD Ties: VTT-S-04748-09, 23.07.2009

Annex 6 Load-carrying test of Beam Tie: Tampere University, Research report No. 1407, 6.6.2005

## 12. Manufacturer's and representative's user manual name and release date (Annex 1)

PD - Diagonal Ties, Connection parts for Sandwich elements, 09/2015

## 13. Quality control

The manufacturer has a valid agreement for Quality Control with an accredited Notified Body. The Notified Body delivers the Quality Control Reports to the Concrete Association of Finland.

This Product Declaration requires an initial inspection for each manufacturing unit.

## 14. Other information

## 15. Back-up material, non-public (Annex number, material name and date)

Annex 2 Manufacturing drawings and a list of drawings, 26.06.2015

Annex 3 Peikko PPA Beam Ties Static Calculations, 26.06.2015

Annex 4 PD-ansaiden kuormituskokeet, testiraportti VTT-S-04851-09, 26.06.2009

Annex 5 Tensile and Shear tests PD Ties: VTT-S-04748-09, 23.07.2009

Annex 6 Load-carrying test of Beam Tie: Tampere University, Research report No. 1407, 6.6.2005

Annex 7 List of manufacturing units

## 16. Annexes (Number, subject and release date)

Annex 1 PD - Diagonal Ties, Connection parts for Sandwich elements, 09/2015

We hereby declare that the information that we have provided is correct

Lahti 8<sup>th</sup> June 2020

Signature .....

Name (in print) Ilkka Kaipainen Peikko Finland Oy

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This product declaration can be withdrawn at the discretion of the Concrete Association of Finland. Reasons for withdrawal may include:

- The information provided when the application for the product declaration was made is shown to be erroneous
- An unreasonable decrease in quality or repeated minor decreases in quality are observed in the product subject to this product declaration