

PLAKA - ISOTEC

Thermal break

REF 01.03.01 - Version V01 - 10/08/2020



Description

ISOTEC is a thermal break consisting of a thermal insulation panels pierced by horizontal and diagonal ribbed bars in stainless steel. The bars which go through the insulation horizontally are there to carry compression and tensile forces. The bars which go through the insulation panels diagonally carry the vertical shear loads. The length of the bars is defined according to the overlap bars of the Eurocode.

The assembly ensures an excellent rigidity and guarantees the stability of the ISOTEC-element.

Application fields

Enormous reduction of the thermal bridge between the inner structure and all cantilevered elements such as :

- balconies
- corbels
- walls
- canopies
- cornices

Elimination of the condensation and the resultant moisture problems (no mould formation, no moisture, etc.)

Properties

Insulation material – Mineral wool		
Thickness	80 mm or 120 mm (60 mm on request)	
Density	140 kg/m ³	
Thermal conductivity λ	0,040 W/mK	NBN EN 12667
EUROCLASS fire behaviour	A1	NBN EN 13501-1
Insulation material - PIR		
Thickness	80 mm or 120 mm (60 mm on request)	
Density	40 kg/m ³	EN ISO 845
Thermal conductivity λ		
<i>Initial value</i>	0,021 W/mK	NBN EN 12667
<i>Aged value (25 weeks at 70°C)</i>	0,028 W/mK	
EUROCLASS fire behaviour	D/D _L – s3,d0	NBN EN 13501-1
Horizontale tensin bars / Diagonals		
Diameter	6 mm, 8 mm, 10mm or 12 mm	
Density	±7860 kg/m ³	
Thermal conductivity λ	15,0 W/mK	
Steel grade (other alloys available on request)	Stainless steel 1.4301	Stainless steel 1.4362
Yield strength f_y	500 N/mm ²	500 N/mm ²
Tensile strength f_u	550 N/mm ²	550 N/mm ²

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Compression reinforcement - type 1: with nail head shaped ends		
For insulation thickness of 80 mm	Smooth bars Φ 12mm with nail head shaped ends of Φ 40 mm total length = 140mm	
For insulation thickness of 120 mm	Smooth bars Φ 12mm With nail head shaped ends of Φ 40 mm total length = 170mm	
For insulation thickness of 60 mm	Smooth bars Φ 12mm with nail head shaped ends of Φ 44 mm total length = 110mm	
Density	$\pm 7860 \text{ kg/m}^3$	
Thermal conductivity λ	15,0 W/mK	
Steel grade	Stainless steel 1.4301	
Yield strength f_y	$\geq 600 \text{ N/mm}^2$	
Compression reinforcement - type 2: with welded ends		
For insulation thickness of 80 mm	ribbed bars Φ 14mm with welded plates 40mm x 50mm x thickness 6mm or continuous strip 40mm x 1000mm x thickness 6mm on both bar ends total length = 140mm	
For insulation thickness of 120 mm	ribbed bars Φ 14mm or Φ 16mm with welded plates 40mm x 50mm x thickness 6mm or continuous strip 40mm x 1000mm x thickness 6mm on both bar ends total length = 170mm	
For insulation thickness of 60 mm	Ribbed bars Φ 14mm with welded plates 40mm x 50mm x thickness 6mm or continuous strip 40mm x 1000mm x thickness 6mm on both bar ends total length = 110mm	
Density	$\pm 7860 \text{ kg/m}^3$	
Thermal conductivity λ	15,0 W/mK	
Steel grade welded plates	Stainless steel 1.4301	Stainless steel 1.4362
Yield strength f_y	500 N/mm ²	500 N/mm ²
Steel grade continuous strips	Stainless steel 1.4301	Stainless steel 1.4404
Yield strength f_y	220 N/mm ²	240N/mm ²

The necessary type of compression-and tensile reinforcement and the necessary diameter is determined after a design study.

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Dimensions

Anchoring length and overlap length			
Diameter [mm]	Anchoring length*	Overlap length	Basic anchoring length $L_b = (\varnothing/4) (f_{yd}/f_{bd})$
	L_b [mm]	L_s [mm]	
6	242	339	Concrete strength C25/30 (Eurocode II): $f_{ck} = 25 \text{ N/mm}^2$ $f_{bd} = 2,7 \text{ N/mm}^2$
8	322	450	
10	403	564	Strength of the reinforcement bars of rebar(EurocodeII): $f_{yk} = 500 \text{ N/mm}^2$ $f_{yd} = 434,78 \text{ N/mm}^2$
12	483	677	
14	564	790	
16	644	901	

Standard models type MV: design loads (Ultimate Limit State – (ULS))

Code []	Height [mm]	V_{Rd} [kN]	M_{Rd} [kNm]	Tension bars		Compression bars		Diagonals	
				Number []	Diameter [mm]	Number []	Diameter [mm]	Number []	Diameter [mm]
ACT08MV06	160	50,10	12,30	8	8	4	12	4	8
ACT08MV07	160	50,10	20,20	10	8	6	12	4	8
ACT08MV08	160	50,10	20,00	6	12	6	12	4	8
ACT08MV09	160	50,10	28,40	8	12	8	12	4	8
ACT08MV10	160	50,10	36,10	10	12	10	12	4	8
ACT08MV11	170	50,10	44,90	10	12	12	12	4	8
ACT08MV13	180	56,10	15,60	8	8	4	12	4	8
ACT08MV14	180	56,10	24,60	10	8	6	12	4	8
ACT08MV15	180	56,10	25,20	6	12	6	12	4	8
ACT08MV16	180	56,10	35,50	8	12	8	12	4	8
ACT08MV17	180	56,10	44,90	10	12	10	12	4	8
ACT08MV18	200	61,81	19,00	8	8	4	12	4	8
ACT08MV19	200	61,81	29,00	10	8	6	12	4	8
ACT08MV20	200	61,81	30,50	6	12	6	12	4	8
ACT08MV21	200	61,81	42,70	8	12	8	12	4	8
ACT08MV22	200	61,81	53,98	10	12	10	12	4	8
ACT08OV12	180	92,72	0	0	0	4	12	6	8

The above table does not give an exhaustive list of the ISOTEC-elements. The complete list is available on request.

The values apply to a standard length of 1 m and for insulation thickness of 80 mm.

On request it is possible to obtain the tables for insulation thickness of 60 mm and 120 mm.

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The fold models are just a few examples. The form of the bars can always be adjusted to the installation situation.

ISOTEC –models			
MV		DMV	
V - $\Phi = 6$ mm		DV - $\Phi = 6$ mm	
V - $\Phi > 6$ mm		DV - $\Phi > 6$ mm	
MV/SB		MV/SH	
MV/WB		MV/WH	
R		P	
KS		QS	

The insulation material is protected by plastic profiles at the top and bottom of the insulation panel. The label on the upper PVC profile indicates the direction of installation. The standard length of the ISOTEC elements is 1 m.

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Additional information

TESTS AND CALCULATION METHODS

The part of the reinforcement that goes through the insulation is calculated on the same way as a steel structure, since there is no concrete present in this zone. The stress consisting of a shear load and a bending moment is being absorbed by tension and compression forces into the reinforcement bars. When calculating the diameter of the bars, the buckle of the compression bar has to be taken into consideration.

Fire resistance of the ISOTEC :R120. Test report ref RS10.014 available on request.

PACKAGING

ISOTEC -elements are packaged in steel barrels which will improve their protection during the transport. The quantity of elements per barrel varies according to the model and the height of the element, in most cases, ranging from 12 pieces to 30 pieces per barrel.

INSTALLATION INSTRUCTIONS

The installation instructions and the position of the elements have to be respected.
The label on the plastic protection profile of the insulation indicates the directions of installation:

<p>PLAKABETON NV - ISOTEC Industrielaan, 2 - 1740 Ternat - Belgium tel. : +32/(0)2 582.29.45 - fax : +32/(0)2 582.19.62 www.plakabeton.com - info@plakabeton.be</p> <p>Montage zie onze documentatie Mise en oeuvre selon documentation Assembling see our documentation</p>	<p>Boven ▲ Haut ▲ Up ▲</p> <p>extern intern ▼</p>
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<p>ISOTEC</p> <ul style="list-style-type: none"> • Prévoir la contreflèche appropriée lors du montage. • Vérifier le type d'Isotec selon le plan de repérage. • Ne pas apporter de modification sans notre accord. • Vérifier le sens de pose et pour la préfabrication, tenir compte que si l'élément béton est retourné, il doit en être de même pour l'Isotec. • Poser les barres de recouvrement et les éventuels aciers complémentaires. • Fixer l'Isotec pendant le bétonnage. • Etayer jusqu'à prise complète de béton. 	 PLAKAGROUP.COM	<p>ISOTEC</p> <ul style="list-style-type: none"> • Voorzie het geschikte tegenpeil bij de montage. • Controleer het type Isotec volgens het montageplan. • Zonder onze toestemming geen wijzigingen aanbrengen. • Verzeker u van de juiste inbouwpositie. Voor prefabricatie hou er rekening mee dat het element ondersteboven kan gegoten worden en in dat geval monteer ook de isotec ondersteboven. • Breng de overlappingswapening en de eventuele bijkomende wapening aan. • Bevestig de isotec tijdens het betonstorten. • Ondersteun tot volledig uitharding van het beton.
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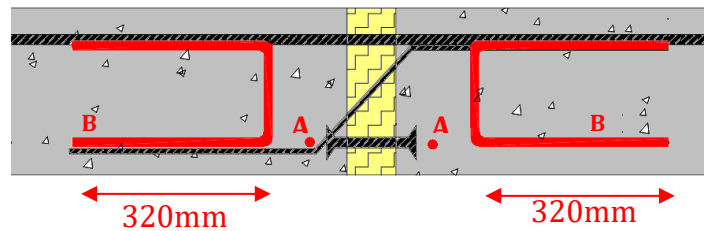
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ADDITIONAL REINFORCEMENT IS TO BE PROVIDED BY THE CONTRACTOR :



- (A): $\varnothing 6$ over the entire length
- (B): $\varnothing 8$ at each compression plate

The minimal concrete cover of the compression plates is 20 mm.

CALCULATION NOTE

The ISOTEC balcony connectors are calculated according to the Eurocode II.

The calculation note shall be seen as a proposal. The responsibility of the structure lies in the hands of the engineering office. The engineering office will check the calculation note and adjust the reinforcement of the internal and external structure due to the presence of the ISOTEC elements.

The concrete elements have to be reinforced to transfer the external forces transmitted by the ISOTEC.

Remarks :

- The ISOTEC-elements are generally not provided continuously, the elements should be spread over its entire width of the cantilever and the spaces in between will be filled with insulation. The reinforcement of the concrete structure must ensure that the weight loading takes place over the entire slab.
- In case of an anchoring in a downward or upward beam, the beam has to be capable to absorb the charges of the ISOTEC-elements. (The torsion in the beam must be checked).
- By an anchoring in the compression layer of precast concrete floor or floor slabs, the compression layer has to be capable to absorb the charges that need to include the ISOTEC-elements.
- Lateral masonry need to be absorbed by means of support corbels for masonry (e.g KORBO) to prevent cracking of the masonry due to the deformation of the balcony. No account has been taken of the inconvenience of the lateral masonry in the calculation of the ISOTEC-elements.
- The distance between the two extreme bars, contained in a cantilever slab, must be less than or equal to 6000 mm. From a fixed point this distance must be less than or equal to 3000 mm.

The formwork of the cantilevers that are cast on site or the prefabricated elements must be placed with an appropriate against level, so that by removing the braces (after having reached the necessary concrete strength) the cantilever inclined to the right direction and with the right slope.