

# MAC.RO™ SYSTEM - HEA PANEL

## HIGH ENERGY ABSORPTION CABLE PANELS

HEA Panels (High Energy Absorption) are used within rockfall protection works where high strength and puncture resistance at very low strain, is required.

The panel is woven from one continuous length of high tensile steel wire rope (grade  $\geq 1770$ ) and joined at the crossing points with the patented HEA 'double knot', to form a durable and reliable connection. An aluminium ferrule connects the two ends of the steel wire rope together, in accordance with EN 13411-3.



Application

**Standard panel dimensions**

Nominal mesh size (mm)	Panel rope diameter (mm)	Panel width (m)	Panel length (m)
250x250	8	Up to 5	Up to 10
300x300			
400x400			
250x250	10		
300x300			
400x400			

External panel size is nominal (tolerance  $\pm 5\%$ )

Mesh size is nominal (tolerance  $\pm 10\%$ )

\* Other dimensions of panel are available upon request

**Knot : Lacing/binding wires**

**Double knot of two pairs of wires**

Steel wire coated with GalMac®	EN 10244-2, Class A
Diameter (mm)	$\varnothing = 3$ (UNI EN 10218)
Tensile strength of the wire used for the bars (N/mm <sup>2</sup> )	350 - 550



Lacing knot detail

**Knot: Tear resistance**

Tear breaking force (kN)	24.0
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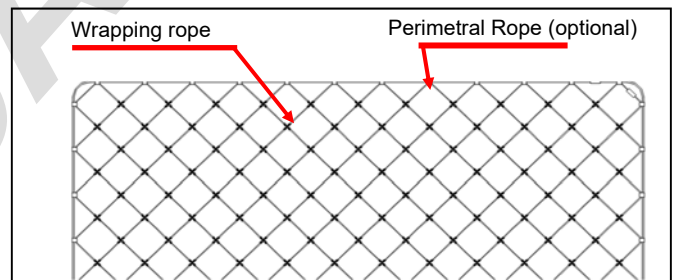
**Steel ropes**

**Wrapping (Panel) rope**

Steel wire rope (diameter and construction) (EN 12385-2, EN 12385-4)	Diameter $\varnothing$ (mm)	
		8
	6x7+WSC	6x19+WSC
Rope grade (EN 12385-2)	$\geq 1770$	

**Perimeter rope (optional)**

Diameter $\varnothing$ (mm)	10 - 12 - 14 - 16
Construction (EN 12385-2)	6x19+WSC
Rope grade (EN 12385-2)	$\geq 1770$



Example of HEA panel structure

**Coating of (panel and perimeter) ropes**

Standard	Advanced	Plus
Zinc coating	Zinc coating	Galmac (Zn-Al5%) coating
Class B (EN 10264-2)	Class A (EN 10264-2)	Classe A (EN 10264-2)

**Quantity request**

When a quotation is required, please specify:

- Panel size (widthxlength in m)
- Mesh size (in mm)
- Panel rope diameter (in mm)
- Perimeter rope diameter, if any (in mm)
- Zinc or GalMac® coating on the ropes (Class A or B)

Example 1:

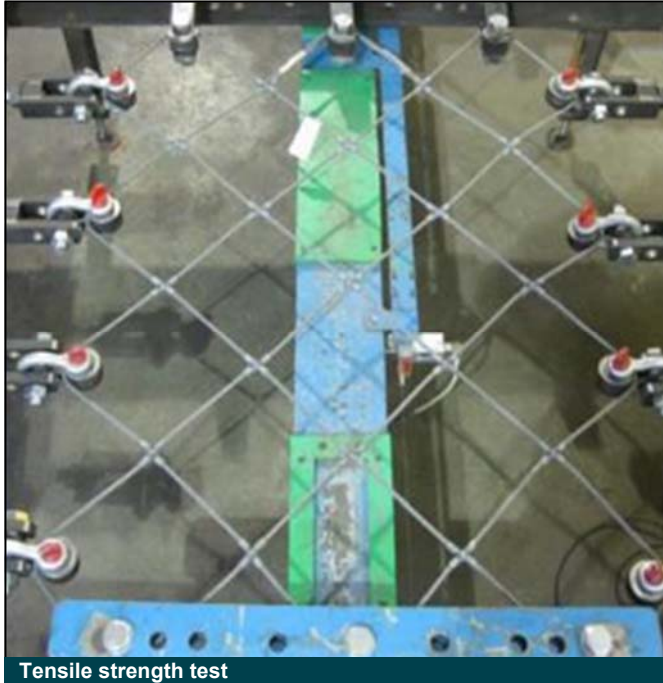
30 No. HEA Standard Panels, 6x3 m, 300x300 mm, panel rope 8 mm, perimeter rope 12 mm, Zinc Class B

Example 2:

60 No. HEA Plus Panels 5x4 m, 400x400 mm, panel rope 10 mm, no perimeter rope, GalMac® Class A



ETA n. 16/0164



Tensile strength test

### Tensile strength (UNI 11437) (ISO 17746)

Nominal mesh (mm)	Panel rope diameter (mm)	Minimum tensile strength (kN/m)
250x250	8	170 ± 17
250x250	10	350 ± 35
300x300	8	160 ± 17
300x300	10	255 ± 15
400x400	8	125 ± 10
400x400	10	185 ± 15

### Punching resistance (UNI 11437) (ISO 17746)

Nominal mesh (mm)	Panel rope diameter (mm)	Minimum Ultimate punching load (kN)	Ultimate punching displacement (mm)
250x250	8	260 ± 15	240 ± 20
250x250	10	410 ± 25	300 ± 30
300x300	8	250 ± 15	280 ± 30
300x300	10	400 ± 25	310 ± 30
400x400	8	200 ± 15	260 ± 30
400x400	10	300 ± 20	310 ± 30

It is possible to request HEA panels made of Stainless Steel ropes, to withstand very aggressive environmental conditions. The resistance parameters will vary accordingly.



Punching resistance test

WARNING: Install the product in accordance with National Security Requirements! If the job is done with suspension or security ropes, personal protective equipment against fall risk must be connected with anchor points in agreement with EN 795.