

## 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.

#### Standard panel dimensions

| Nominal mesh size | 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                        |

#### Knot: Tear resistance

|                          |      |
|--------------------------|------|
| Tear breaking force (kN) | 24.0 |
|--------------------------|------|

#### Steel ropes

##### Wrapping (Panel) rope

| Steel wire rope<br>(diameter and construction)<br>(EN 12385-2, EN 12385-4) | Diameter $\varnothing$ (mm) |          |
|----------------------------------------------------------------------------|-----------------------------|----------|
|                                                                            | 8                           | 10       |
|                                                                            | 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)     | $\geq 1770$       |

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

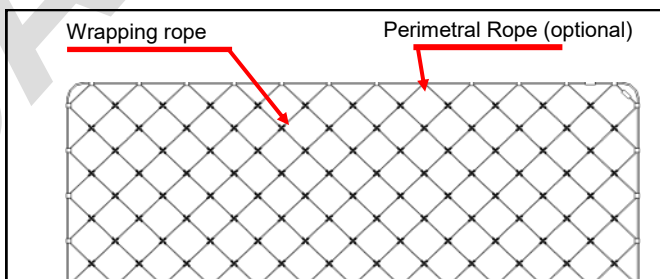
| Standard             | Plus                      |
|----------------------|---------------------------|
| Zinc coating         | GalMac® (Zn-Al5%) coating |
| Class B (EN 10264-2) | Class A (EN 10264-2)      |



Application



Lacing knot detail



Example of HEA panel structure

#### Quantity request

When a quotation is required, please specify:

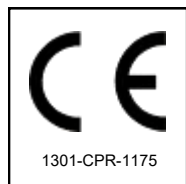
- Panel size (widthxlength in m)
- Mesh size (in mm)
- Panel rope diameter (in mm)
- Perimeter rope diameter, if any (in mm)
- Zinc or GalMac® coating on the ropes (Class A or B)

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.

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