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## ***ETAG 27 approved and certified Rockfall Protection Systems Energy levels: 1000 – 2000 kJ***

### ***Text for invitation of tender***

### ***Rockfall protection systems TSV-1000-oA, TSV-2000-oA***

### ***Rockfall protection systems without retaining ropes***

#### **General information**

Energy level [kJ]:	e.g. 3, 4 or 5
Maximum energy level MEL [kJ]	e.g. 1000 or 2000
Nominal height [m]:	e.g. 4.0
Total length [m]:	e.g. 250
Number of rows:	e.g. 5
Average distance between posts [m]:	e.g. 10

The offered rockfall protection system must be tested, approved and certified in a 1:1 field test (1 x MEL, 2 x SEL) conforming to the specifications of the ETAG 27 guideline. The offered height of the rockfall protection system can be increased by 0.5 m maximally for tested systems with heights less than 4.0 m and by 1.0 m maximally for tested systems with heights bigger or equal 4.0 m. It must be verified that the residual height of the system at MEL-Test must be  $\geq 50\%$  of the nominal height (category A).

Moreover the rockfall protection system has to fulfil following criteria at MEL-Test:

- Openings after the impact of the net next to posts with diameters  $\geq 0.2$  m at level beneath the residual height, between lower bearing rope and net are not allowed.
- Openings of the net on side edges after the impact greater 10 % of nominal height are not allowed if the border fields are located within the hazardous area.
- Breakages of primary net, upper or lower bearing ropes or retaining ropes or of part cross-sections of ropes (a single litz) are not allowed. Breakages of single wires are allowed, if this is not a complete litz.
- Breakages at connections between primary net and bearing ropes e.g. using sewing ropes are not allowed.

The European technical approval ETA and the CE-certificate according to ETAG 27 as well as the list of the measured anchor forces of the MEL-Test has to be attached to the offer.

## Design of the Main Structure and Individual Components

The design of main structures and of single components must be such as described below (or equal / better). Individual components not cited herein must correspond to the appropriate technical standards (e.g. DIN) as well as to certified and approved system.

### Interception structure

- Primary net: Type: **Omega-Net**  
Corrosion protection: **Zinc coated class A acc. EN 10244-2**  
Maximum mesh size: **185 mm**  
Connection to bearing ropes: **threaded**
- Additional layer:  
(optionally) Typ: **Rectangular netting**  
Corrosion protection: **Zinc coated class A acc. EN 10244-2**  
Maximum mesh size: **50 mm**  
Minimum wire diameter: **2.5 mm**

### Support structure

- Post: Corrosion protection: **hot dip galvanized according to EN ISO 1461**  
Design: **fixed rotation at the base plate (without upslope retaining ropes)**
- Base plate: Corrosion protection: **hot dip galvanized according to EN ISO 1461**  
Connection to underground: **anchored installation**

### Connection components

- Bearing ropes: Type: **according to EN 12385-4**  
Corrosion protection: **hot dip galvanized**
- Middle ropes: Type: **according to EN 12385-4**  
Corrosion protection: **hot dip galvanized**
- Retaining ropes: Type: **according to EN 12385-4**  
Corrosion protection: **hot dip galvanized**

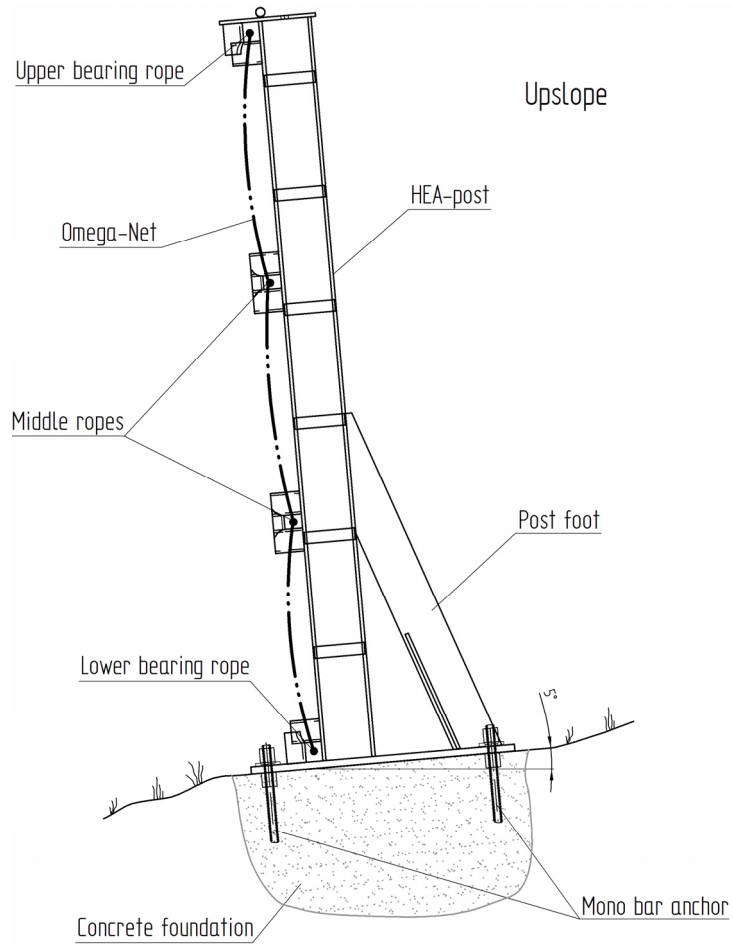
### Energy absorbing elements (brake elements)

- Operating mode: Energy dissipation: **plastic deformation**
- Position: **close to anchors, so that can be carried out without dismantling the fence**
- Corrosion protection: **hot dip galvanized according to EN ISO 1461**

### Anchoring

- of ropes: **using anchor bars and eyelet frames**
- of posts: **using anchor bars (TSV-1000-oA: 3 pieces per base plate, TSV-2000-oA: min. 2 pieces per base plate ); connection to concrete foundation or rock**
- of concrete foundation: **using anchor bars**

## Lateral view TSV-1000-oA



## Frontal view TSV-1000-oA

