



Type approval of safety nets for protection against rockfall

Test Certificate No. S 06-18

System description

- **System designation**

ISOSTOP 3000 kJ

- **Address of manufacturer**

isofer ag, Industriequartier, 8934 Knonau

- **System description**

- Energy class

3000 kJ

- Posts:

profile HEB 200

length a_l 5.45 m

interval a_s 10 m

- Support ropes:

type 6 X 19 Seale+SE, DIN 3058

diameter 24 mm

- Net:

type Diagonal net

diameter 10 mm

mesh 140 x 140 mm

height h_v 5.23 m

- System drawings

Description	No.	Date
Safety net for protection against rockfall, energy class 8: 3000 kJ (general documentation)	-	August 2006

Basic documentation

- **Field test**

WSL test report

Date 31 October 2006

Report no. 06-18

- **Overall assessment**

Overall assessment of the EKLS

Date 14 November 2006

Report no. S 06-18

Test results

- **Preliminary test of outer part**

- Penetration of test body

yes / no

- Additional observations

none



• Preliminary energy test (50%)	1500 kJ
– Penetration of test body	yes <input type="checkbox"/> / no <input checked="" type="checkbox"/>
– Braking time t_s	0.37 s
– Braking distance b_s	5.0 m
– Sum of the tensile forces in the 3 upper cables	410 kN
– Sum of the tensile forces in the 3 lower cables	250 kN
– Maximum of the tensile forces in a stay cable	106 kN
– List of damaged elements	
No damage to load-bearing structural elements. 20 of the 22 braking elements were deformed.	
– Assessment of repairs	
16 braking elements were replaced. Some cables had to be tightened and the net repaired. Part of the seam cables were replaced. The time required to complete these tasks amounted to 48 man-hours. The extent of repairs necessary after the test was qualified as normal.	
• Main energy test (100%)	3000 kJ
– Penetration of test body	yes <input type="checkbox"/> / no <input checked="" type="checkbox"/>
– Braking time t_s	0.55 s
– <i>Maximum permissible braking distance b_s</i>	12 m
– Measured braking distance b_s	7.4m
– <i>Minimum permissible residual braking height h_n</i>	2.5 m
– Measured residual braking height h_n	2.57 m
– Sum of the tensile forces in the 3 upper cables	488 kN
– Sum of the tensile forces in the 3 lower cables	381 kN
– Maximum of the tensile forces in a stay cable	214 kN
– List of damaged elements	
No significant damage to any structural elements. 28 of the 30 braking elements were deformed.	
• Assessment of special criteria	
– Comments on assembly and on the assembly instructions	
The existing documentation is adequate to carry out the installation work and can be qualified as good. The time required for setting up the net lies in the normal range. The assembly does not present any particular difficulties.	
– Comments on adaptability to the terrain	
The adaptability to the terrain can be qualified as normal.	



– Comments on design complexity

The design can be qualified as good. The accompanying documentation allows for safe installation. Work in the field with cables of 24 mm in diameter generally proves to be difficult.

– Comments on anticipated life cycle

The posts are galvanised according to standard practice, as is the net. An alternative net with 95% Zn and 5% Al is also offered. Elements of different specifications can be supplied, depending on the longevity which is required of the installation.

Overall assessment

Test passed

Test passed with reservations

Tested according to the following guidelines: GERBER, W. 2001: Guideline for the approval of rockfall protection kits. Environment in practice. Swiss Agency for the Environment, Forests and Landscape (SAEFL), Swiss Federal Research Institute WSL. Berne, 39 pages. Revised June 2006.

RESERVATION: Should deficiencies arise following certification of the safety net, FOEN may revoke product release and delete it from the type approval list.

Date

15.12.06

Name, position

Andreas Götz, Vice Director

Signatures

Federal Office for the Environment FOEN
Risk Prevention Division
3003 BERNE
[http:// www.bafu.admin.ch/typenpruefung](http://www.bafu.admin.ch/typenpruefung)