



Type approval of safety nets for protection against rockfall

Test Certificate No. S 14-3

System description

- **System designation**

RXE-5000

- **Address of manufacturer**

Geobruigg AG, Aachstrasse 11, 8592 Romanshorn

- **System description**

– Energy class		5000 kJ
– Posts:	profile	HEA 200 / RRW 300/300/10 (outer posts)
	length a_l	6.28 m
	interval a_s	10 m
– Support ropes:	type	6x36 W-S + SE, 1770 N/mm ²
	diameter	22 mm
– Stop ropes:	type	6x36 W-S + SE, 1770 N/mm ²
	diameter	20 mm
– Net:	type	ROCCO 16/3/350 ring net (16 windings)
	diameter	Ring diameter 350 mm, wire diameter 3 mm
	mesh	-
	height h_v	6 m

- System drawings

Description	No.	Date
System handbook RXE-5000	EKLS/01	04.03.2014
Maintenance handbook RXE-1000 to RXE-8000	EKLS/01	10.04.2013
Technical documentation RXE-5000		05.03.2014

Basic documentation

- **Field test**

WSL test report (EOTA) Date 21.02.2011 Report no. 10-02

- **Overall assessment**

Overall assessment of the EKLS (FECAR) Date 28.08.2014 Report no. S 14-3

Test results

- **Preliminary test of outer part**

- Penetration of test body yes / no
- Additional observations See test S08-22 (same type)



• Preliminary energy test (50%)	2500 kJ
– Penetration of test body	yes <input type="checkbox"/> / no <input checked="" type="checkbox"/>
– Braking time t_s	0.39 s
– Braking distance b_s	6.1 m
– Sum of the tensile forces in the 4 upper cables	265 kN
– Sum of the tensile forces in the 4 lower cables	282 kN
– Sum of the tensile forces in the 2 retaining ropes	420 kN
– List of damaged elements	-
– Assessment of repairs	The net was completely replaced. The work took 145 man hours.
• Main energy test (100%)	5000 kJ
– Penetration of test body	yes <input type="checkbox"/> / no <input checked="" type="checkbox"/>
– Braking time t_s	0.45 s
– <i>Maximum permissible braking distance b_s</i>	15.0 m
– Measured braking distance b_s	7.9 m
– <i>Minimum permissible residual braking height h_n</i>	3.0 m
– Residual braking height h_n	4.4 m
– Sum of the tensile forces in the 4 upper cables	257 kN
– Sum of the tensile forces in the 4 lower cables	260 kN
– Sum of the tensile forces in the 2 stay cables	355 kN
– List of damaged elements	-
• Assessment of special criteria	
– Comments on assembly and on the assembly instructions	The assembly and material costs are high. 15 ropes must be installed longitudinally along the entire length of the system.
– Comments on adaptability to the terrain	Due to the larger number of ropes to be installed, adaptability to the terrain is limited.
– Comments on design complexity	The system has four stop ropes in addition to the support ropes. An intermediate retaining rope is required every 60 m in accordance with the regulations. 15 ropes must be anchored there.
– Comments on anticipated service life	The anticipated service life is ascertained as adequate.



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

20.10.2014

Name, position

Dr. Josef Hess, Vice-Director

Signatures

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