



# Type approval of safety nets for protection against rockfall

Test Certificate No. S 08-22(2)

## System description

• <b>System designation</b>	<b>ROCCO RXI-300</b>		
• <b>Address of designer</b>	Geobruigg AG, Hofstrasse 55, 8590 Romanshorn		
• <b>System description</b>			
– Energy class		3000 kJ	
– Posts:	profile	HEB 200	
	length $a_l$	5.10 m	
	interval $a_s$	10 m	
– Support ropes:	type	6x36 W-Seale + SE, DIN 3064	
	diameter	22 mm	
– Net:	type	ROCCO ring net 16 windings	
	diameter	Ring diameter 350 mm, wire diameter 3 mm	
	mesh	-	
	height $h_v$	5.10 m	
– System drawings			
	Description	No.	Date
	System manual RXI-300	152-N-FO / 05	3.12.2008
	Technical documentation RXI-300	EKLS 03	3.12.2008
	Maintenance manual RXI-300	100-N-F0 / EKLS 02	12.9.2008

## Basic documentation

• <b>Field test</b>			
WSL test report	Date 15 November 2008	Report no. 08-22	
• <b>Overall assessment</b>			
Overall assessment of the EKLS (FECAR)	Date 3 March 2009	Report no. S08-22	

## Test results

• <b>Preliminary test of outer part</b>			
– Penetration of test body		yes <input type="checkbox"/> / no <input checked="" type="checkbox"/>	
– Additional observations		none	



• <b>Preliminary energy test (50%)</b>	1500kJ
– Penetration of test body	yes <input type="checkbox"/> / no <input checked="" type="checkbox"/>
– Braking time $t_s$	0.40 s
– Braking distance $b_s$	6.40 m
– Sum of the tensile forces in the 3 upper cables	366 kN
– Sum of the tensile forces in the 2 lower cables	260 kN
– Maximum of the tensile forces in a stay cable	178 kN
– List of damaged elements	No damage to load-bearing parts of the structure. 16 out of 55 braking components were deformed.
– Assessment of repairs	7 bearing ropes with all braking components, the net, 2 lateral guy ropes, 2 anchoring ropes und 2 retaining ropes were replaced. The work took 68 man hours in total. The repairs were assessed as normal in view of the size of the system.
• <b>Main energy test (100%)</b>	3000kJ
– Penetration of test body	yes <input type="checkbox"/> / no <input checked="" type="checkbox"/>
– Braking time $t_s$	0.46 s
– <i>Maximum permissible braking distance <math>b_s</math></i>	12 m
– Measured braking distance $b_s$	7.80 m
– <i>Minimum permissible residual braking height <math>h_n</math></i>	2.50 m
– Measured residual braking height $h_n$	3.20 m
– Sum of the tensile forces in the 3 upper cables	422 kN
– Sum of the tensile forces in the 2 lower cables	272 kN
– Maximum of the tensile forces in a stay cable	260 kN
– List of damaged elements	Individual instances of damage to load-bearing components. 2 ropes had tears exceeding 50%. A ground plate was torn. 23 braking components in the bearing ropes and 27 in the retaining ropes were deformed.
• <b>Assessment of special criteria</b>	
– Comments on assembly and on the assembly instructions	No particular difficulties were encountered with assembly.
– Comments on adaptability to the terrain	Adaptability to the terrain is normal.
– Comments on design complexity	The documentation enables safe, simple assembly.



– Comments on anticipated life cycle

The system components are supplied with corresponding corrosion protection in accordance with the customer's requirements and specifications in terms of service life.

**Overall assessment**

**Test passed**

**Test passed with reservations**

Examined based on 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.

**The certificate No. S 08-22 from the 5<sup>th</sup> march 2009 is invalid and is replaced by this certificate.**

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

**Date**

**Name, position**

**Signatures**

17.01.2011

**Andreas Götz, Vice Director**