

Type approval of safety nets for protection against rockfall

Test Certificate No. S 03-4

System designationAddress of designer		ROCCO RXI-050 GEOBRUGG Fatzer AG Schutzsysteme, Hofstrasse 55, 8590 Romanshorn			
					System description
 Energy class 		500 kJ			
- Posts:	profile	HEB 120			
	length a	3.55 m			
	interval a _s	10 m			
 Support ropes: 	type	DIN 3064			
	diameter	20 mm			
– Net:	type	ROCCO ring net (7 windings)			
	diameter	Ring diameter 350 mm, wire diameter 3 mm			
	mesh	-			
	height h_v	3.06 m			
Description System handboo Maintenance ha Foot part of post Middle part of post Middle part of post Head of post HE Ground plate Universal joint Ground plate rop Hinge tube with GS-8002 (force	ndbook RXI-(t HEB 120 ost 3m ost 4m EB 120 oe guide tube pins		No. 112-N-FO/03 114-N-FO/02 GS-6054.1-2 GS-6055 GS-6056 GS-6057.1-2 GS-7035.1-3 GS-7036 GS-7037 GS-7038	Date 23.01.200 06.11.200 30.03.200 30.03.200 30.03.200 30.03.200 30.03.200 30.03.200 30.03.200	
Basic documen	tation				
 Field test 					
WSL test report		Date 30 October 2003	Rep	Report no. 03-4	
 Overall assessme 	ent				



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Test results

- Penetration of test bodyyes \Box / no \boxtimes - Additional observationsnone• Preliminary energy test (50%)250 kJ- Penetration of test bodyyes \Box / no \boxtimes - Braking time ts0.24 s- Braking distance bs4.18 m- Sum of the tensile forces in the 2 upper cables150 kN- Sum of the tensile forces in the 1 lower cables104 kN- Maximum of the tensile forces in a stay cable50 kN	Preliminary test of outer part	
• Preliminary energy test (50%) 250 kJ - Penetration of test bodyyes \Box / no \boxtimes - Braking time t _s 0.24 s - Braking distance b _s 4.18 m - Sum of the tensile forces in the 2 upper cables 150 kN - Sum of the tensile forces in the 1 lower cables 104 kN	 Penetration of test body 	yes 🗌 / no 🔀
- Penetration of test bodyyes \square / no \boxtimes - Braking time t_s0.24 s- Braking distance b_s4.18 m- Sum of the tensile forces in the 2 upper cables150 kN- Sum of the tensile forces in the 1 lower cables104 kN	 Additional observations 	none
- Penetration of test bodyyes \square / no \boxtimes - Braking time t_s0.24 s- Braking distance b_s4.18 m- Sum of the tensile forces in the 2 upper cables150 kN- Sum of the tensile forces in the 1 lower cables104 kN		
- Braking time t _s 0.24 s - Braking distance b _s 4.18 m - Sum of the tensile forces in the 2 upper cables 150 kN - Sum of the tensile forces in the 1 lower cables 104 kN	Preliminary energy test (50%)	250 kJ
- Braking distance bs 4.18 m - Sum of the tensile forces in the 2 upper cables 150 kN - Sum of the tensile forces in the 1 lower cables 104 kN	 Penetration of test body 	yes 🗌 / no 🔀
- Sum of the tensile forces in the 2 upper cables150 kN- Sum of the tensile forces in the 1 lower cables104 kN	– Braking time t _s	0.24 s
 Sum of the tensile forces in the 1 lower cables 104 kN 	 Braking distance b_s 	4.18 m
	 Sum of the tensile forces in the 2 upper cables 	150 kN
 Maximum of the tensile forces in a stay cable 50 kN 	 Sum of the tensile forces in the 1 lower cables 	104 kN
	 Maximum of the tensile forces in a stay cable 	50 kN

- List of damaged elements

No damage to load-bearing parts of the structure. Three of the 8 braking components were extended to almost half the maximum distance.

Assessment of repairs

The repairs necessary after the test were considered to be normal. This work took 11 manhours.

Main energy test (100%)	500 kJ
 Penetration of test body 	yes 🗌 / no 🔀
– Braking time t _s	0.30 s
– Maximum permissible braking distance b _s	6.0 m
 Measured braking distance b_s 	5.07 m
– Minimum permissible residual braking height h _n	1.5 m
 Measured residual braking height h_n 	1.82 m
 Sum of the tensile forces in the 2 upper cables 	155 kN
 Sum of the tensile forces in the 1 lower cables 	136 kN
 Maximum of the tensile forces in a stay cable 	59 kN

- List of damaged elements

No damage to load-bearing parts of the structure. Six of the 8 braking components were extended to more than half of the possible distance.

• Assessment of special criteria

- 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.



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- Comments on design complexity

The design is simple. Damaged components are easy to replace.

- Comments on anticipated life cycle

Poles, universal joint and ground plates are unaffected. Support ropes, guy ropes, anchoring ropes and the ring net are galvanised according to DIN 2078. The spiral anchor has an additional corrosion protection tube. To increase corrosion protection the manufacturer offers an aluminium-zinc alloy.

The anticipated service life is ascertained to be adequate.

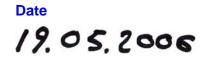
Overall assessment

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.

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



Name, position

Andreas Götz, Vice Director



Replaces the Certificate No. S 03-4 of 26 February 2004

Federal Office for the Environment FOEN Risk Prevention Division 3003 BERN http:// www.umwelt-schweiz.ch/typenpruefung