

Type approval of safety nets for protection against rockfall

Test Certificate No. S 13-1

| System descrip | otion | | | | |
|--|---------------|------------------|---------------------------------------|--------------------|--------------------------|
| System designati | ion | RXE | -1000 | | |
| Address of manufacturer | | Geol | brugg AG, Aachstras | sse 11, 8592 Ro | omanshorn |
| System description | on | | | | |
| Energy class | | | 1000 kJ | | |
| - Posts: | profile | | HEA 160 | | |
| | length a | | 4.46 m | | |
| | interval as | | 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 | | 22 mm | | |
| - Net: type ROCCO | | ROCCO 7/3/300 ri | CO 7/3/300 ring net (7 windings) | | |
| | diameter | | Ring diameter 300 | mm, wire diam | neter 3 mm |
| | mesh | | - | | |
| | height h_v | | 4 m | | |
| System drawing | S | | | | |
| Description | | | | No. | Date |
| System handbook RXE-1000 | | | | EKLS/01 | 28.03.2013 |
| Maintenance handbook RXE-1000 to Technical documentation RXE-1000 | | | | EKLS/01 EKLS/01 | 10.04.2013 03.09.2013 |
| | | | | 21(20,01 | 0010012010 |
| Basic documen | tation | | | | |
| Field test | | | | | |
| WSL test report | | Date | 02.04.2013 | | Report no. 13-07 |
| Overall assessme | ent | | | | |
| Overall assessment of the Date | | Date | 15.10.2013 | | Report no. S 13-1 |
| EKLS (FECAR) | | | | | |
| Test results | | | | | |
| Preliminary test of | of outer part | | | | |
| Penetration of test body | | | | | yes 🗌 / no 🖂 |
| Additional observations | | See | test 03-4 (same type | e) | , |
| | | | | | |



| Preliminary energy test (50%) | 500 kJ |
|---|--------------|
| Penetration of test body | yes 🗌 / no 🖂 |
| – Braking time t _s | 0.23 s |
| Braking distance b_s | 3.7 m |
| Sum of the tensile forces in the 4 upper cables | 330 kN |
| Sum of the tensile forces in the 3 lower cables | 230 kN |
| Maximum of the tensile forces in a stay cable | 85 kN |
| List of damaged elements | |
| - | |
| – Assessment of repairs | |

The net was completely replaced. The work took 90 man hours.

| Main energy test (100%) | 1000 kJ |
|--|--------------|
| Penetration of test body | yes 🗌 / no 🔀 |
| – Braking time t _s | 0.31 s |
| – Maximum permissible braking distance b _s | 8.0 m |
| Measured braking distance b_s | 5.3 m |
| – Minimum permissible residual braking height h _n | 2.0 m |
| Measured residual braking height h_n | 2.35 m |
| Sum of the tensile forces in the upper cables | 330 kN |
| Sum of the tensile forces in the lower cables | 210 kN |
| Maximum of the tensile forces in a stay cable | 150 kN |
| List of damaged elements | |

List of damaged elements

Assessment of special criteria

- Comments on assembly and on the assembly instructions

The assembly cost is standard for a system of this energy class.

- Comments on adaptability to the terrain

Adaptability to the terrain is normal.

- Comments on design complexity

The system has two stop ropes in addition to the support ropes. An intermediate retaining rope is required every 60 m in accordance with the regulations. 7 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.

Dr. Josef Hess, Vice-Director

Date

22.10.2013

Name, position

Signatures

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