Rockfall Protection Net / Product – Data Sheet

System name:	GEOBRUGG RXE-8000
Address of manufacturer:	Geobrugg AG, Aachstrasse 11, 8590 Romanshorn

Reference documents *(Sources 1, 2 and 3)*

BAFU (2018): Grundlagen zur Qualitätsbeurteilung von Steinschlagschutznetzen und deren Fundation - Anleitung für die Praxis

(1) **Quality assessment by:**	Report no.: 19-7	Date: 30.8.2019
Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Zürcherstrasse 111, 8903 Birmensdorf		

***(2)* EOTA technical report (ETA):**	Report no.: 12/0213		Date: 15.9.2017
Angle of block trajectory during European evaluation	90 Degree	Gradient Reference level	82 Degree

***(3)* Documentation Geobrugg AG:**	No.	Date
Technische Dokumentation GBE-8000 (inkl. Zeichnungen)	01/2011	3.11.2011
Systemhandbuch RXE-8000 mit Montageanleitung	Ausgabe 10	8.3.2019
Wartungshandbuch für RXE-, GBE- und ATT-Reihen	Ausgabe 10	1.1.2019
Berechnung der Ankerkräfte RXE-8000 (EnS-19-0995)	DTC	7.8.2019
Evaluation Report ETA-12/0213	EMPA	15.9.2017

System description *(Sources 2 and 3)*

Specifications:				*Source*
Energy absorption (MEL)		8’450 kJ	Level 8	*(2)*
Nominal height (MEL)		7.13 m		*(2)*
Residual height (MEL)		5.65 m	Class A	*(2)*
Posts:	Profile	RRW 400/400/12.5		*(3)*
	Steel quality	S355		*(3)*
	Length	7.5-11 m		*(3)*
	Spacing for test	10 m		*(3)*
Support rope:	Standard	Geobinex 1960 N/mm^2		*(3)*
	Diameter	22 mm		*(3)*
Stop rope:	Standard	Geobinex 1960 N/mm^2		*(3)*
	Diameter	22 mm		*(3)*
Net:	Type/name	Ringnet / ROCCO 19/3/300		*(3)*
	Number of windings	19		*(3)*
	Wire-, ring diameter	3 mm, 300 mm		*(3)*
	Tensile strength	1770 N/mm^2		*(3)*
Weight of heaviest inseparable component		1140 kg (Post 7.5 m)		*(3)*

Deceleration processes (SEL1, SEL2 und MEL) *(Source 1 and 2)*

Test	m (kg)	d (m)	v (m/s)	w (m)	t (s)	Ek (kJ)	Ew (kJ)	En (kJ)
SEL 1	7740	1.63	26.6	5.27	0.308	2738	400	3138
SEL 2	7740	1.63	26.3	2.97	0.180	2677	226	2902
MEL	19820	2.18	29.0	8.43	0.446	8334	1639	9973

Maximum forces in the ropes (SEL1, SEL2 und MEL) *(Source 1 and 3)*

Rope (s) Number of ropes	To 2	Sa 1	Tu 2	Fso 2	Fmo 2	Rhs 1a 1	Rhs 1b 1	Rhs 3 1
Cells no.	Z13	Z8	Z9	Z1	Z3	Z2	Z10	Z5
SEL 1 (kN)	239	375	324	237	255	202	203	209
SEL 2 (kN)	289	419	360	269	325	237	234	245
MEL (kN)	254	388	348	301	322	243	238	278

Anchor forces (MEL) *(Source 1 and 3)*

Anchors Number of Ropes	To 2	Sa 1	Tu 2	Fso 2	Fmo 2	Rhs 1a 1	Rhs 1b 1	Rhs 3 1
Test	SEL 2	SEL 2	SEL 2	MEL	SEL 2	MEL	MEL	MEL
Maximum force (kN)	289	419	360	301	325	243	238	278
Factor	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Substitute load (kN)	375	545	468	391	422	316	309	361

Points for assessment criteria *(Source 1)*

Criteria		maximum possible	minimum recommended	attained
A1:	Priority criteria	16	16	**16**
A2:	Assessment of the nets	10	8	**10**
A3.1:	Technical documentation	15	12	**15**
A3.2:	Assembly instructions (net with arresting ropes)	41	33	**41**
A3.3:	Maintenance manual	19	15	**17**
Total		101	84	**101**

Birmensdorf, 30 August 2019

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Designations for rockfall protection nets

	Unit	Designation
d	[m]	Edge length of test body
m	[kg]	Weight of test body
v	[m/s]	Speed of test body at first net contact
w	[m]	Braking distance of test body in the net
t	[s]	Braking time of test body in the net
Ek	[kJ]	Kinetic energy of test body at first net contact
Ew	[kJ]	Potential energy of test body due to braking distance
En	[kJ]	Total energy relative to lowest position of test body
To, Tu	[kN]	Maximum force in upper or lower support rope
Fso, Fsu	[kN]	Maximum force in upper or lower stop rope
Fmo, Fmu	[kN]	Maximum force in middle stop rope (upper, lower)
Sa	[kN]	Maximum forces in lateral anchorage
Rhs	[kN]	Maximum forces in retaining ropes
Rhs_o	[kN]	Maximum sum of forces (Rhs) parallel to the installation line
Rhs_p	[kN]	Maximum sum of forces (Rhs) perpendicular to the installation line

SEL 1	Service Energy Level 1st Test
SEL 2	Service Energy Level 2nd Test
MEL	Maximum Energy Level

Diagram showing designations for braking processes
View in direction of installation (vertical system)

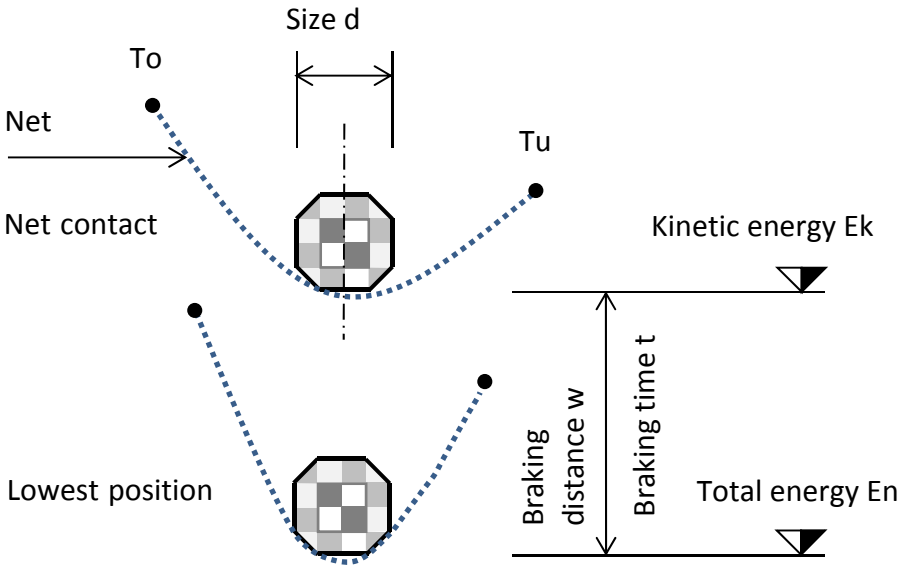
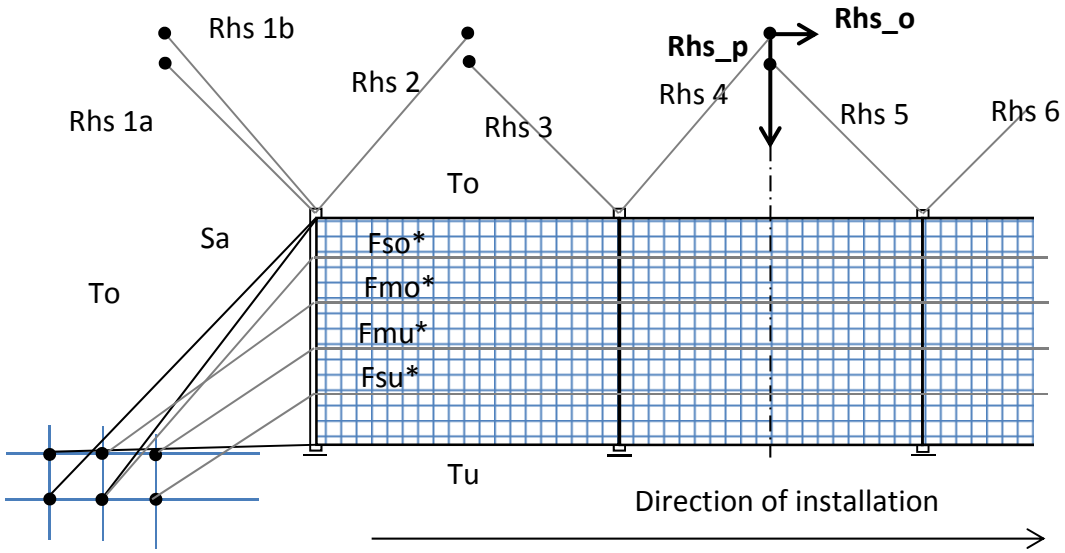


Diagram showing designations for anchor forces



* The net GEOBRUGG RXE 8000 contains four stop ropes (Fso, Fmo, Fmu, Fsu)