

## Rockfall Protection Net / Product – Data Sheet

<b>System name:</b>	ISOSTOP – 5000 Ev
<b>Address of manufacturer:</b>	Pfeifer Isofer AG, Hasentalstrasse 8, 8934 Knonau

### 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.: 19-6 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.: 17/0494 Date: 26.6.2017

Angle of block trajectory during European evaluation	90 Degree	Gradient Reference level	90 Degree
--	-----------	--------------------------	-----------

**(3) Documentation Pfeifer Isofer AG:**

	No.	Date
--	-----	------

Evaluation Report (einzelne Seiten)	ETA 17/0494	26.6.2017
-------------------------------------	-------------	-----------

Technisches Produkthandbuch	Rev.3	21.8.2019
-----------------------------	-------	-----------

Montagehandbuch	V4.3 DEU	08/2019
-----------------	----------	---------

Wartungshandbuch	V4.01	08/2019
------------------	-------	---------

Berechnung der Ankerkräfte	Rev. 4	07/2019
----------------------------	--------	---------

### System description (Sources 2 and 3)

<b>Specifications:</b>			<i>Source</i>
Energy absorption (MEL)	5000 kJ	Level 8	(2)
Nominal height (MEL)	5.89 m		(2)
Residual height (MEL)	4.60 m	Class A	(2)
Posts:	Profile	RHP 260/180/8	(3)
	Steel quality	S355	(3)
	Length	6.4-9.4 m	(3)
	Spacing for test	10 m	(3)
Rope:	Standard	EN-12385-4	(3)
	Diameter	20 mm/24 mm	(3)
Net:	Type/name	Ring net	(3)
	Wire diameter / Windings	4 mm / 7 Windings	(3)
	Strength	1570 kN/mm <sup>2</sup>	(3)
	Ring diameter	350 mm	(3)
Weight of heaviest inseparable component	490 kg (Post 9.4 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	5002	1.36	25.5	6.81	0.41	1626	334	1960
SEL 2	5002	1.36	26.5	4.98	0.27	1756	244	2001
MEL	15660	1.96	25.3	8.54	0.59	5012	1312	6324

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

Rope (s)	To	Sa	Tu	Fso+ Fmo	Fsm	Fmu+ Fsu	Rhs 5	Rhs 6	Rhs 8
Number of ropes	2	1	2	2	2		1	1	1
Cells no.	Z..86	Z..04	Z..87	Z..92	Z..96		Z..93	Z..95	Z..94
SEL 1 (kN)	151	77	102	185	118		175	173	128
SEL 2 (kN)	160	53	118	193	168		268	225	180
MEL (kN)	221	109	204	115	223	141	282	315	212

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

Anker	To	Sa	Tu	Fso+ Fmo	Fsm	Fmu+ Fsu	Rhs 6
Anzahl Seile	2	1	2	2	1	2	1
Massgebende Kraft (kN)	221	109	204	115	223	141	315
Faktor	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Ersatzlast (kN)	287	142	265	240	290	183	410

Points for assessment criteria

(Source 1)

Criteria	maximum possible	minimum recommended	attained
A1: Priority criteria	16	16	<b>16</b>
A2: Assessment of the nets	10	8	<b>10</b>
A3.1: Technical documentation	15	12	<b>15</b>
A3.2: Assembly instructions	41	33	<b>41</b>
A3.3: Maintenance manual	19	15	<b>19</b>
<b>Total</b>	<b>101</b>	<b>84</b>	<b>101</b>

Birmensdorf, 6 September 2019

**Swiss Federal Institute for Forest, Snow and Landscape Research WSL**  
**Zürcherstrasse 111, 8903 Birmensdorf**

**Author**

Specialist of  
rockfall



Werner Gerber  
Dipl Bauing. FH

**Group leader**

Torrents and  
Mass Movements



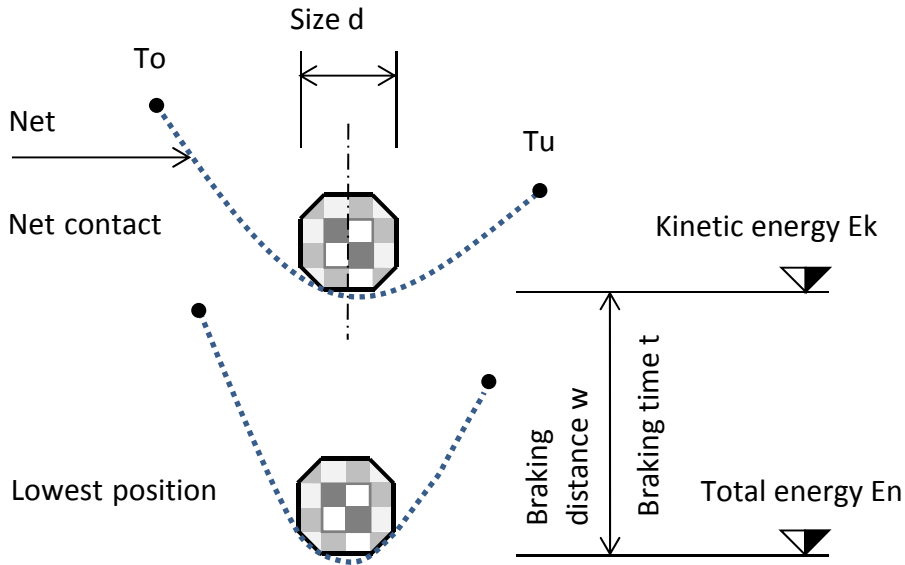
Dr. A. Badoux  
Dipl Natw. ETH

### 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
Fsm	[kN]	Maximum force in middle stop rope
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
<hr/>		
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**

