PFEIFER
ISOFER

Swiss
Hazard
Protection

05/2013

CE

The new ISOSTOP E/Ev Rockfall protection barriers 100 – 1000 kJ

ISOSTOP

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Tested in accordance with the latest standard of the ETAG 027 test guideline

Our ISOSTOP E systems have passed the suitability test in accordance with the ETAG 027 guideline with the best possible result. After testing with 100 % nominal energy, a residual height of more than 50 % of the original height was measured in the impact zone. This corresponds to performance category A.

In another test section, the barriers were loaded twice consecutively with 33 % nominal energy without the system having to be repaired. Here as well, the test block was successfully stopped and all other test conditions were also fulfilled.

The certification test for the ISOSTOP E series was performed at the swiss federal rockfall test facility in Walenstadt. The tests were carried out by the WSL. The product certification was accomplished by the independant and officially authorized construction building and testing and research Institute TSUS.

Tested under the strict conditions of test guideline ETAG 027 and certified by a state accreditation authority.

Product benefits of ISOSTOP E at a glance

- Tested in accordance with the latest test standard (ETAG 027)
- CE compliant
- Highest performance class A
- Patented system components
- Weight reduction by optimized interaction of system components
- Easy to install
- Simple maintenance due to modular composition

The components

Diagonal wire cable net

The net consists of high tensile wire cables that are fixed diagonally with cable-protecting cross clamps. The diagonal arrangement of the meshed cables allows optimum distribution of stone loading up to the load bearing cables of the ISOSTOP E systems.

FLEXNET wire rope net

Core element of the ISOSTOP low energy systems is the innovative new patented FLEXNET. It is characterized by its flexibility and has great reserves for a sequenz of rockfalls. The net is delivered in folded packages that allows an easy installlation.

Rope-loop-brake element

The approved ISOFER Rope-loop-break element performs in a straight line along the entire braking distance. It´s a robust and reliable component of our established barrier systems.

“DualSimplex” stepped brake

Our single or dual step brakes have been further developed especially for higher energy classes from 1000 kJ on. DualSimplex stepped brake is activated even at extremely low loads. At the same time, the stepped method of braking ensures that sufficient braking energy is available for 100 % loading.

ISODISC

The new modular concepted ISODISC is the latest evolution of brake elements. It is based on the principle of ripping-material bridges to anticipate the impact energy. The modular system is optimized for the interaction with the other ISOSTOP system components.

Support cable system

The newly developed support/guide cable system replaces heavy and cumbersome support cables. Thanks to the guiding cable, the net can slide past on the columns. If the guide cable bends in the event of overload, the net nevertheless remains fixed to the support cables at over 60 %.

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Net attachment

For cable-protecting sliding of the nets on support cables and faster installation, the diangular wire net of the ISOSTOP E series are fixed by shackles and only stitched around the columns.

Columns and base plates

HEA and RPH profiles are used in the column design of the ISOSTOP E series. The transport and installation weight is thus relatively low.

Cable anchoring

The cable can be anchored with bow anchors, our spiral cable anchors or with the standard GEWI tie rods. We have developed the ISOFER ear-anchor for these tie rods. The ear-anchor absorbs high transverse forces and is highly durable due to thick hot-dip galvanising. The tie rod remains protected against all external influences.

Alarm system

The alarm system consists of a control box with control elements. The alarm is triggered through an SMS Butler and it can be programmed with various messages. The power supply will be ensured by a solar panel and a battery.

The installation

Foundations

The anchoring points are measured and marked according to the installation plan. Foundations ar designed by project engineers.

Installation handbook

The installation handbook provides the installer with detailed 3D drawings and explains all steps to be taken to eract the barrier.

Set up of posts

The lightweight constructed posts of the ISOSTOP barriers can easely be placed by hand, with a crane or by helicopter.

Retention cables

All retention cables are firmly tensioned and clamped with wire rope clips.

Suspension cable

The stability of the side posts is supported by suspension cables that push the impact forces to the anchoring.

Bearing ropes

The next installation step is the assemblage of the bearing ropes along the line of posts and to the brake elements. Uper and lower cables are tensioned individually.

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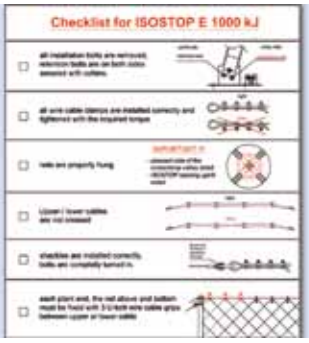
Net installation

All nets are either shaked to the bearing ropes or the ropes are run threw the net meshes directly.

Secondary Layer

Finally the secondary layer consisting of square mesh or hex-mesh is being installed on the up-slope side of the barrier.



Installation checklist

The installation checklist provides a basis for the final acceptance of the barrier.

Maintenance

The maintenance hand book includes a check list for the sequent servicing of the barrier to the maintain long terme performance.

The references

Swiss

System: ISOSTOP 1000 kJ
Protected object: street

Swiss

System: ISOSTOP 1000 kJ
Protected object: railway and street

Swiss

System: ISOSTOP 2000 kJ
Protected object: infrastructure

Scotland

System: DEBRIS STOP 200-HM
Protected object: street

Italy

System: ISOSTOP 1000 kJ
Protected object: street

Norway

System: ISOSTOP 3000 kJ
Protected objekt: street and infrastructures

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Turkey

System: ISOSTOP 3000 kJ
Protected object: tunnel entrances, hydroelectric power station

Spain / Andorra

System: ISOSTOP 3000 kJ
Protected object: street and infrastructures

Hong Kong

System: ISOSTOP 3000 kJ
Protected object: buildings and infrastructures

Japan

System: ISOSTOP 2000 kJ
Protected object: street

Technical Data of ISOSTOP 100 E*v* / ISOSTOP 250 E

	Type	**ISOSTOP 100 E*v***	**ISOSTOP 250 E**
Product	Energy class	0 (100 kJ)	1 (250 kJ)
	System height	2 – 2,5 m	2,5 – 3 m
Support structure	Type of post	RHP 160, zinc coated EN ISO 1461	RHP 120, zinc coated EN ISO 1461
	Ground plate	Type Looseground/Rock, zinc coated EN ISO 1461	Type Looseground/Rock, zinc coated EN ISO 1461
Interception structure	Net	FLEXNET	FLEXNET
	Mesh	250 x 250 mm	250 x 250 mm
	Mesh-rope	8 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B	8 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Additional layer	Diagonal wire mesh	Diagonal wire mesh
	Mesh	50 x 50 mm	50 x 50 mm
	Mesh-wire (Ø)	2,5 mm, zinc coated 10244-2 Kl. A	2,5 mm, zinc coated 10244-2 Kl. A
Brakes	Type of brake	Rope brake	ISODISC 50
	Braking cable (Ø)	18 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B	-
	Braking distance	750 mm	1250 mm
Ropes	Main cable (Ø)	16 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B	18 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Lateral cable (Ø)	12 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B	12 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Retention cable (Ø)	-	12 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
Connection components	Shackle	EN 13889, zinc coated	EN 13889, zinc coated
	Bow cable clip	EN 13411-5, zinc coated	EN 13411-5, zinc coated
	Seamy joint (Ø)	-	-
Anchoring	Post anchor (Ø)	GEWI bar D = 32 mm, M24 thread bar (in rock)	GEWI bar D = 25 mm, M24 thread bar (in rock)
	Lateral anchor (Ø)	GEWI bar D = 25 mm, Spiral cable anchor D = 16 mm	GEWI bar D = 25 mm, Spiral cable anchor D = 16 mm
	Retention anchor (Ø)	-	GEWI bar D = 25 mm, Spiral cable anchor D = 14 mm
Product certification	Test standard	ETA Guideline 027	ETA Guideline 027
	Produkt classification	Category A	Category A
	Approval-ETA No.	ETA-12/0600	-
	CE-No.	-	-

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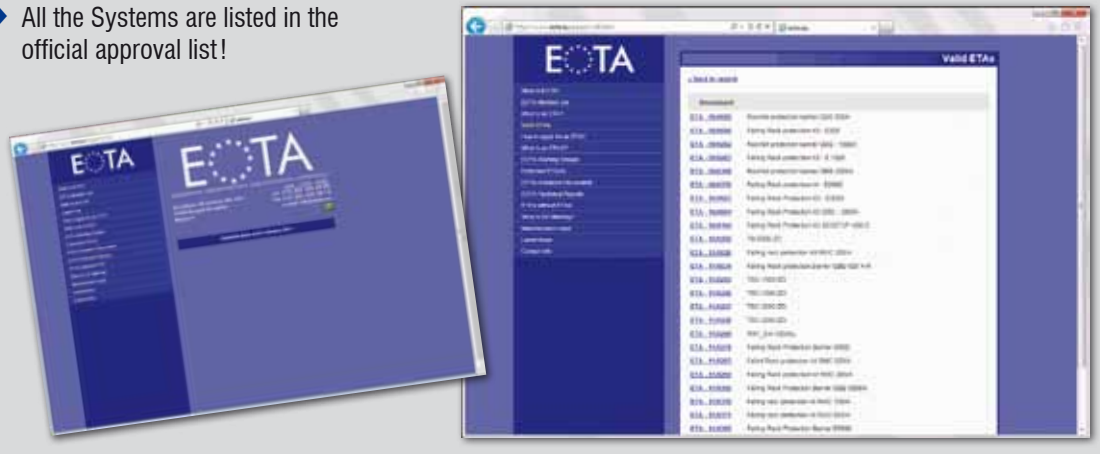
➜ All the Systems are listed in the official approval list!



Technical Data of ISOSTOP 500 E

	Type	ISOSTOP 500 E
Product	Energy class	2 (500 kJ)
	System height	3 – 3,5 m
Support structure	Type of post	HEA 100, zinc coated EN ISO 1461
	Ground plate	Type Looseground / Rock, zinc coated EN ISO 1461
Interception structure	Net	Diagonal wire rope net
	Mesh	300 x 300 mm
	Mesh-rope	8 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Additional layer	Diagonal wire mesh
	Mesh	50 x 50 mm
	Mesh-wire (Ø)	2,5 mm, zinc coated 10244-2 Kl. A
Brakes	Type of brake	Rope brake
	Braking cable (Ø)	18 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Braking distance	1500 mm
Ropes	Main cable (Ø)	18 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Lateral cable (Ø)	12 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Retention cable (Ø)	12 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
Connection components	Shackle	EN 13889, zinc coated
	Bow cable clip	EN 13411-5, zinc coated
	Seamy joint (Ø)	10 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
Anchoring	Post anchor (Ø)	GEWI bar D = 25 mm, M24 thread bar (in rock)
	Lateral anchor (Ø)	GEWI bar D = 25 mm, Spiral cable anchor D = 16 mm
	Retention anchor (Ø)	GEWI bar D = 25 mm, Spiral cable anchor D = 14 mm
Product certification	Test standard	ETA Guideline 027
	Produkt classification	Category A
	Approval-ETA No.	ETA-10 / 0194
	CE-No.	1301-CPD-0646

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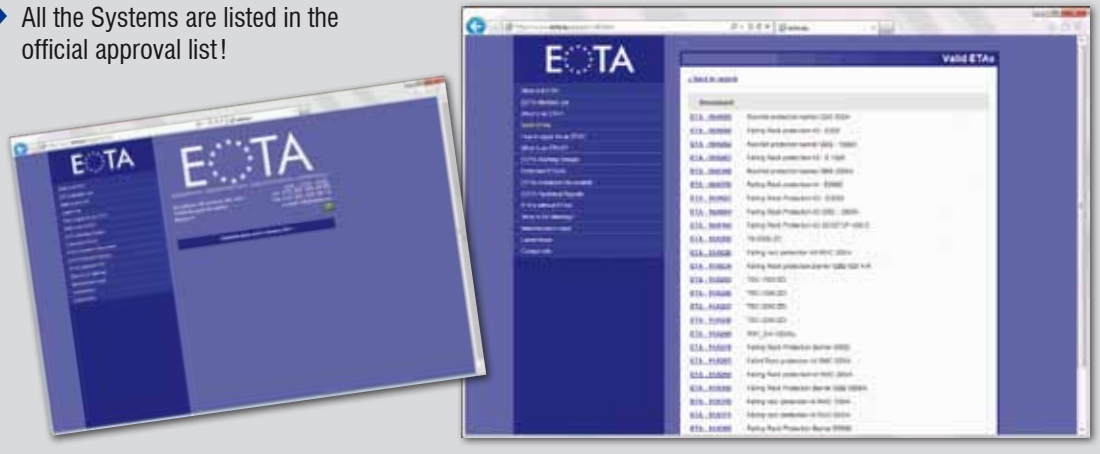

Technical Data of ISOSTOP 1000 E

	Type	ISOSTOP 1000 E
Product	Energy class	3 (1000 kJ)
	System height	4 – 5 m
Support structure	Type of post	HEA 120, zinc coated EN ISO 1461
	Ground plate	Type Looseground/Rock, zinc coated EN ISO 1461
Interception structure	Net	Diagonal wire rope net
	Mesh	250 x 250 mm
	Mesh-rope	9 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Additional layer	Diagonal wire mesh
	Mesh	50 x 50 mm
	Mesh-wire (Ø)	2,5 mm, zinc coated 10244-2 Kl. A
Brakes	Type of brake	Rope brake
	Braking cable (Ø)	18 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Braking distance	3000 mm
Ropes	Main cable (Ø)	18 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Lateral cable (Ø)	16 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
	Retention cable (Ø)	16 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
Connection components	Shackle	EN 13889, zinc coated
	Bow cable clip	EN 13411-5, zinc coated
	Seamy joint (Ø)	10 mm wire rope EN-12385-4, zinc coated EN 10264-2 Cl.B
Anchoring	Post anchor (Ø)	GEWI bar D = 25 mm, M24 thread bar (in rock)
	Lateral anchor (Ø)	GEWI bar D = 28 mm, Spiral cable anchor D = 18 mm
	Retention anchor (Ø)	GEWI bar D = 25 mm, Spiral cable anchor D = 16 mm
Product certification	Test standard	ETA Guideline 027
	Produkt classification	Category A
	Approval-ETA No.	ETA-12/0019
	CE-No.	1301-CPD-0754

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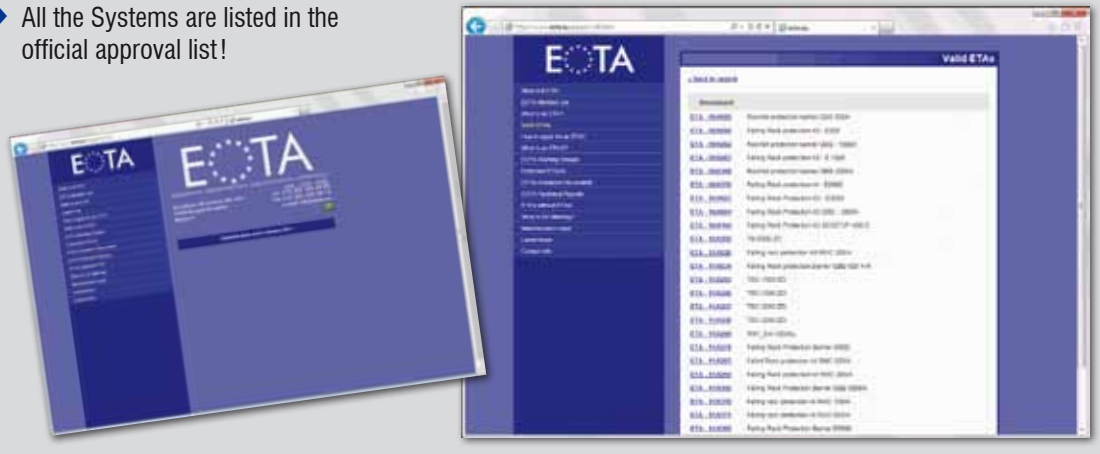

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