Centro Studi Materiali e Tecniche

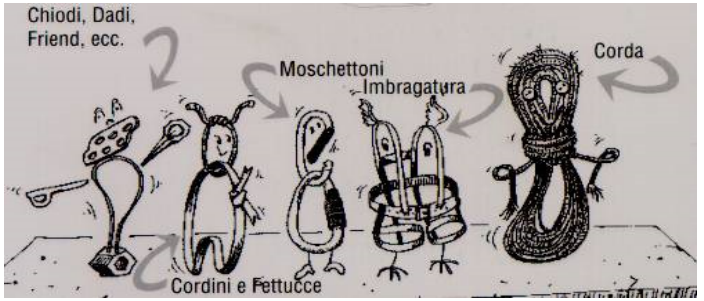
I materiali per l'alpinismo e l'arrampicata

===

Le norme relative

La *catena di assicurazione*

E' composta da tutti gli elementi che nel loro insieme concorrono alla sicurezza della cordata in caso si verifichi una caduta
Gli elementi essenziali della C.A. sono:

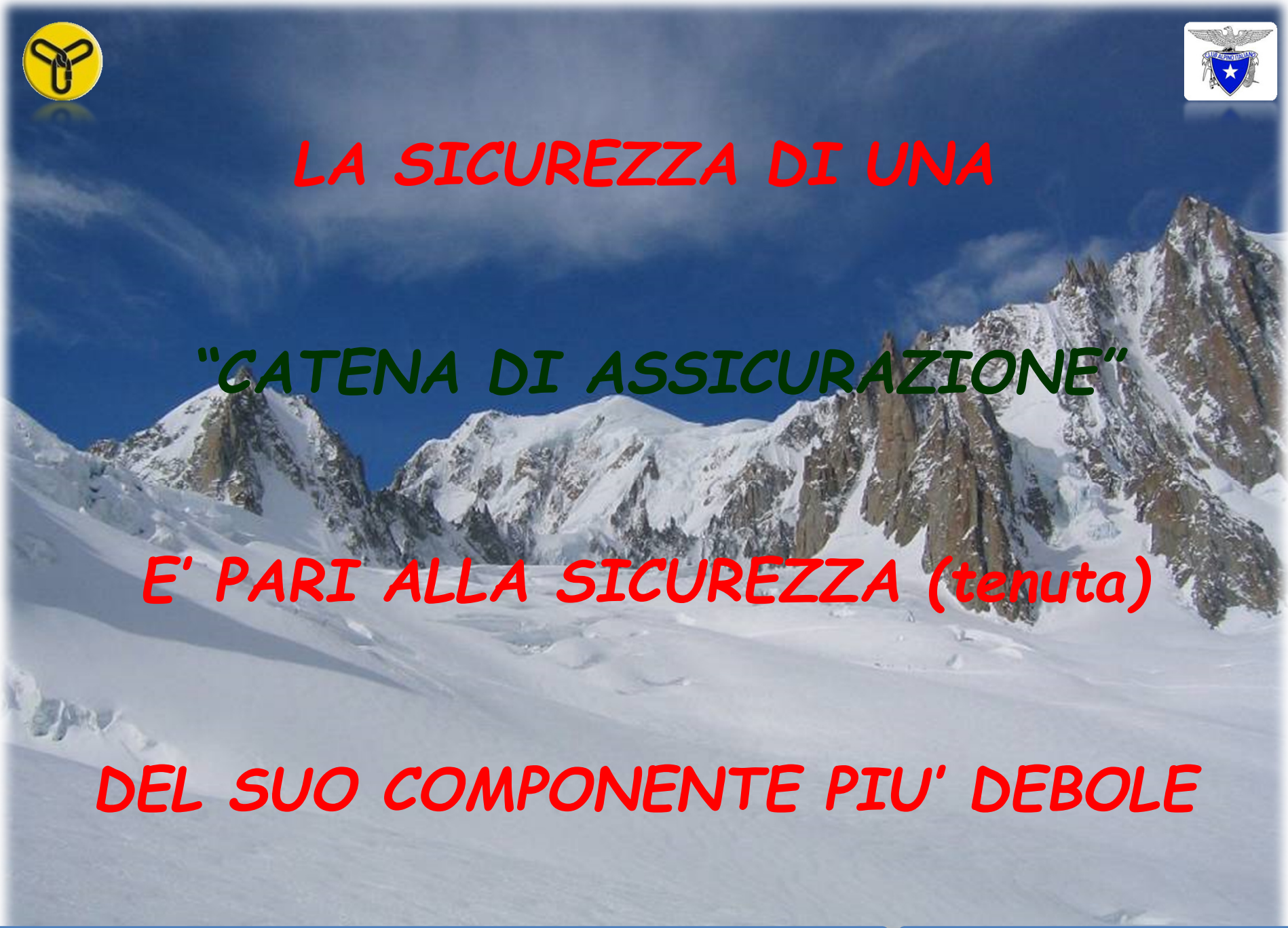


- *la corda*
- *i cordini e le fettucce*
- *i moschettoni (connettori)*
- *l'imbracatura*
- *i freni (mezzo barcaiolo, otto, piastrina, tuber, ecc.)*
- *gli ancoraggi naturali (spuntoni, clessidre, ecc.) e artificiali (chiodi, blocchi ad incastro, ecc.)*

Obiettivi della C. A.

ridurre al minimo i danni

- ***sia a chi assicura***
- ***sia a chi cade***



LA SICUREZZA DI UNA

"CATENA DI ASSICURAZIONE"

E' PARI ALLA SICUREZZA (tenuta)

DEL SUO COMPONENTE PIU' DEBOLE

Materiali

- Funzionalità per la progressione
- Sicurezza

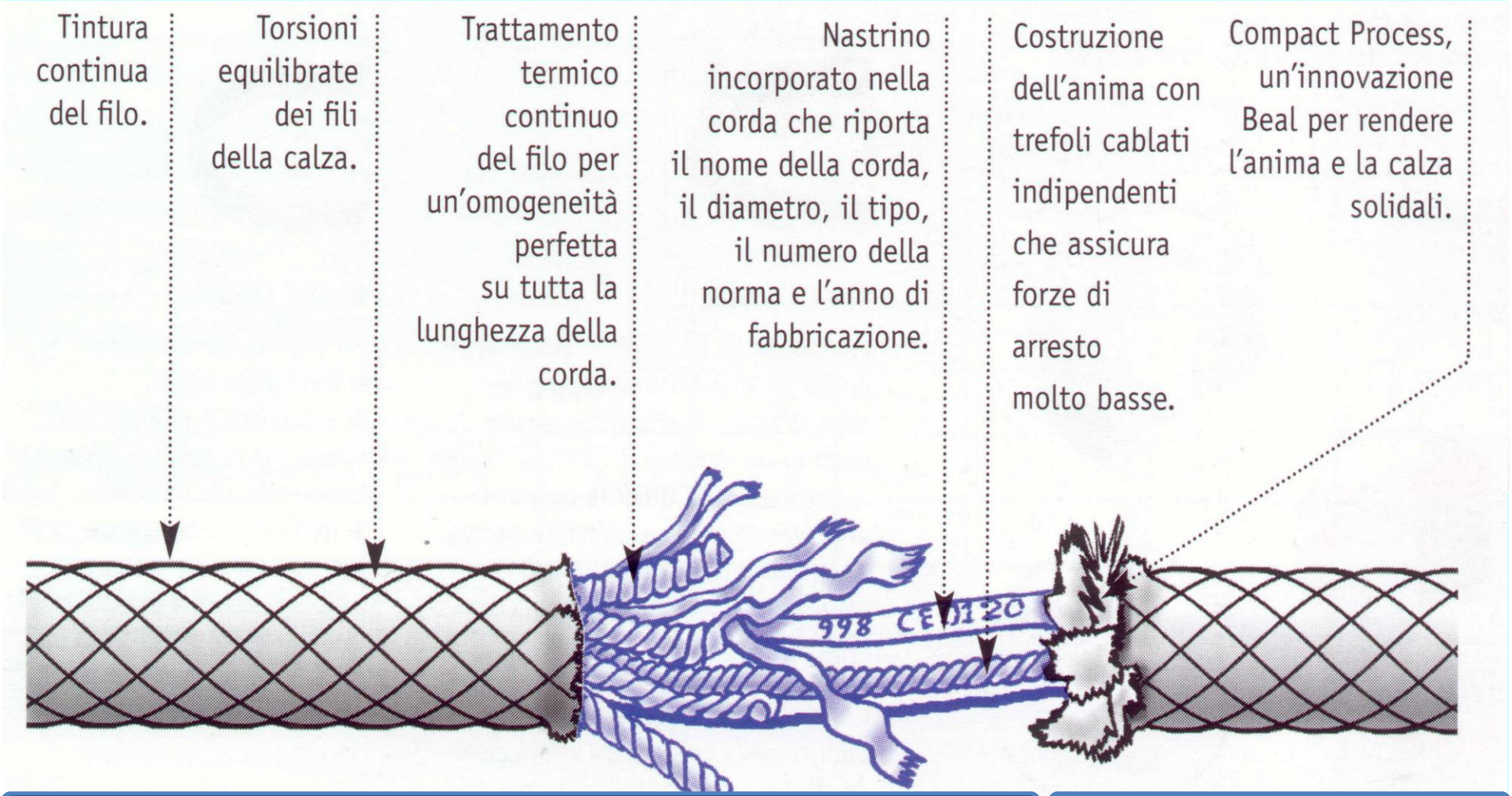
Principale causa di pericolo durante la progressione tecnica in montagna → **La caduta**

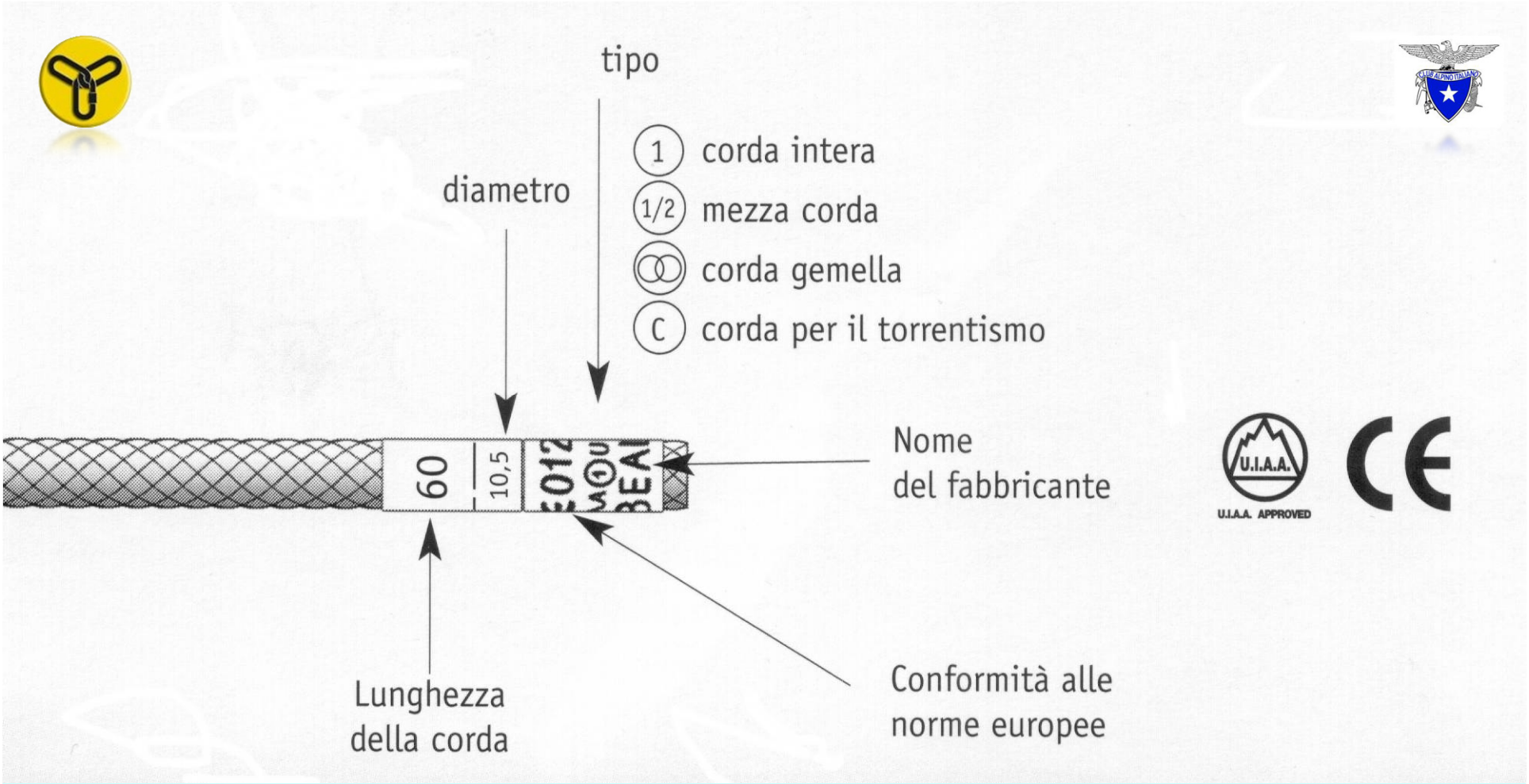
Corde

CE EN 892

Corda dinamica per alpinismo*:** corda in grado di arrestare la caduta libera di una persona ***-impegnata in una azione di alpinismo o in una scalata - con una forza di arresto limitata

caratteristiche costruttive di una corda “moderna”

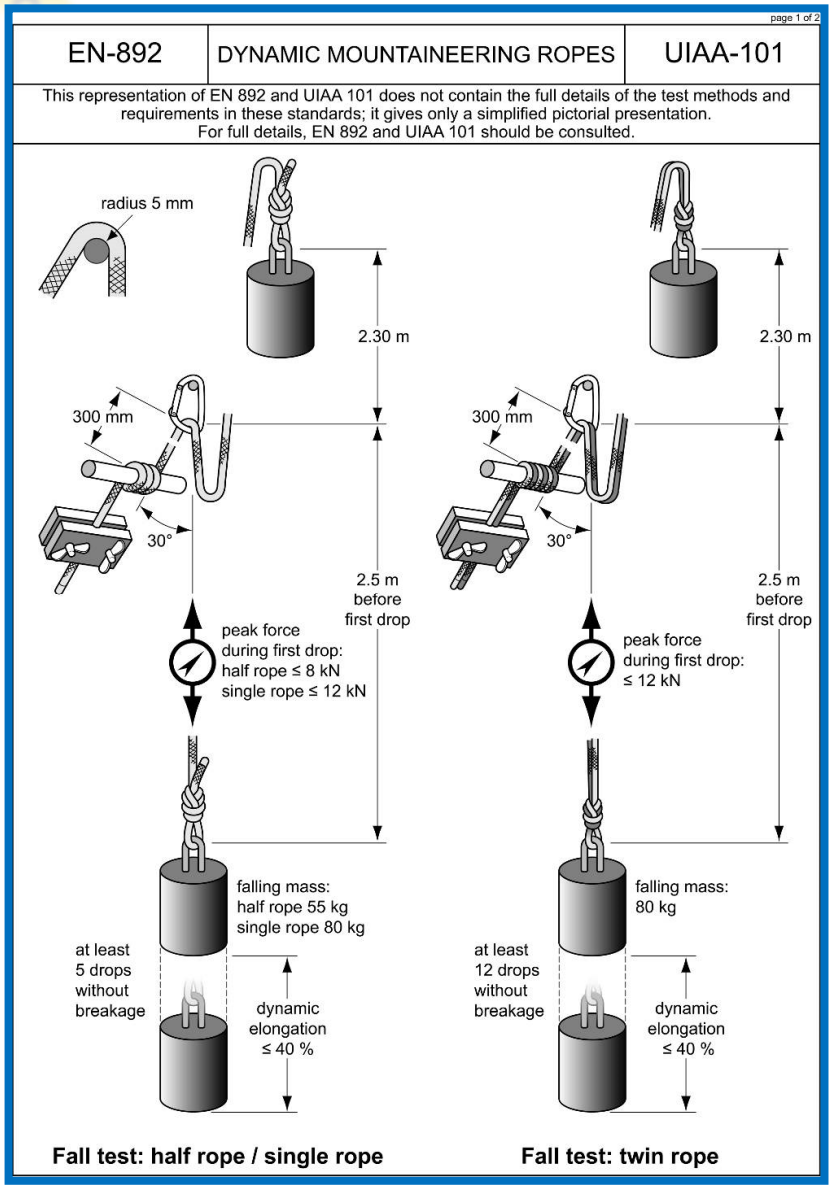


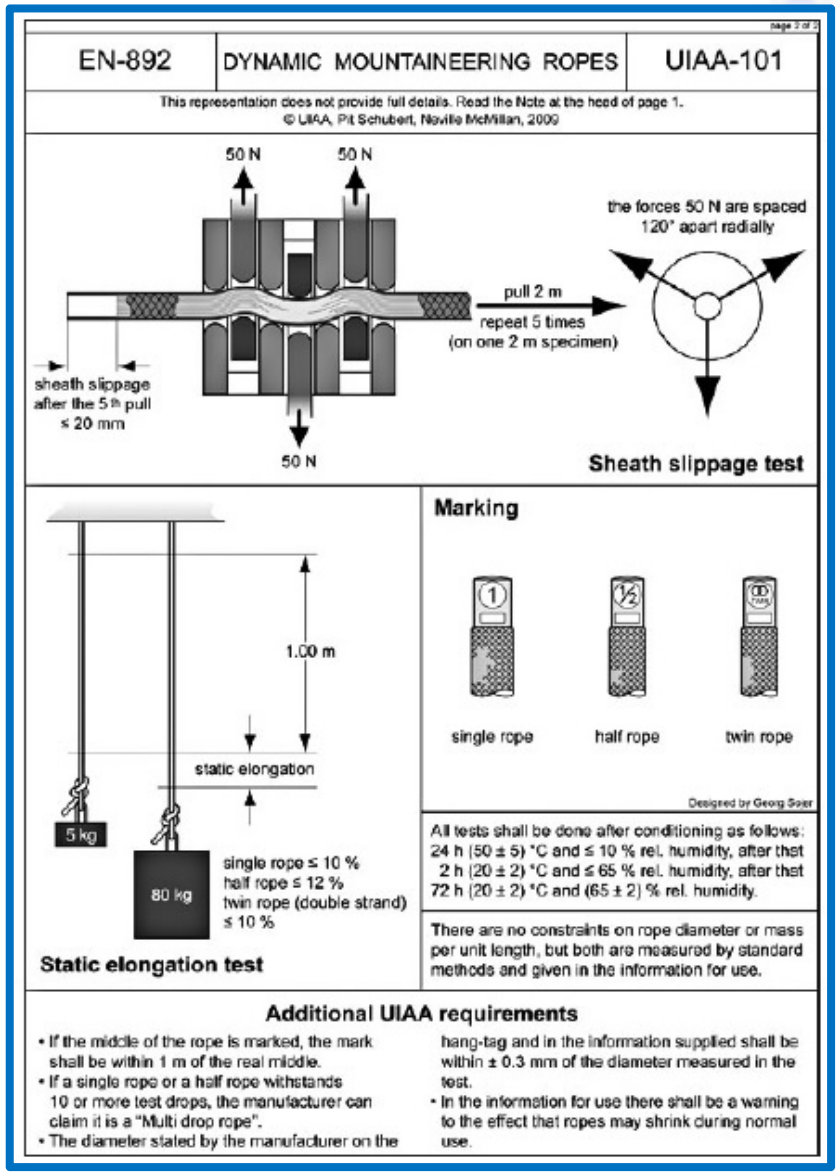


simboli, norme e certificazioni

corda intera, mezza corda, corda gemella = CORDA DINAMICA

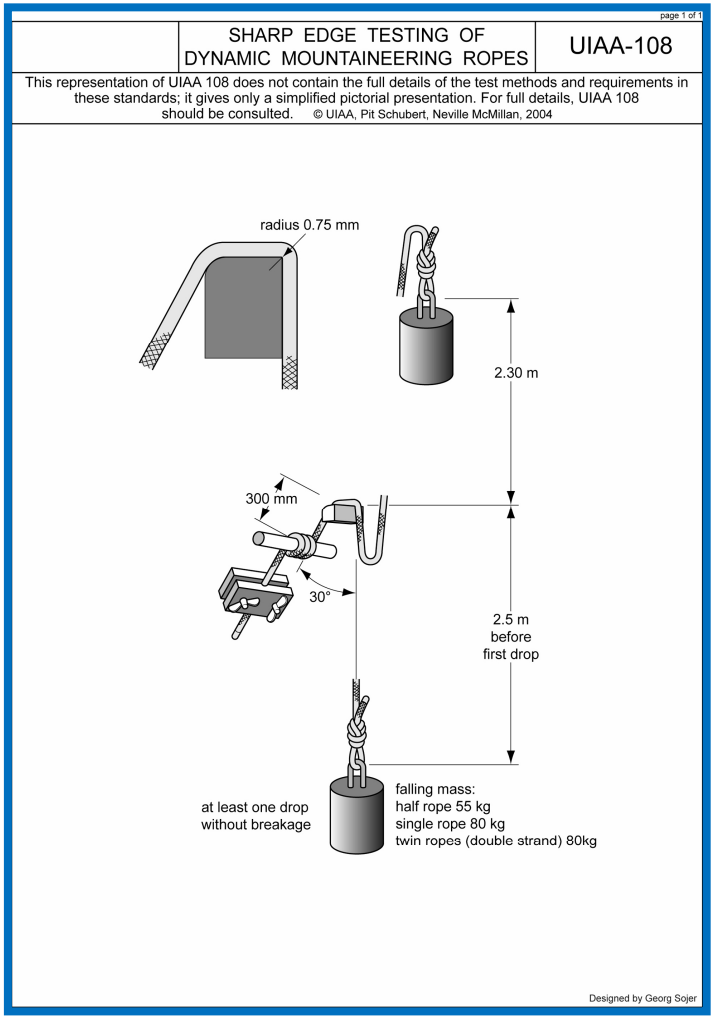
corda per torrentismo e speleologia = CORDA SEMISTATICA


page 1 of 2
EN-892
DYNAMIC MOUNTAINEERING ROPES
UIAA-101
This representation of EN 892 and UIAA 101 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation.
For full details, EN 892 and UIAA 101 should be consulted.
radius 5 mm
2.30 m
300 mm
30°
2.5 m before first drop
peak force during first drop: half rope ≤ 8 kN single rope ≤ 12 kN
falling mass: half rope 55 kg single rope 80 kg
at least 5 drops without breakage
dynamic elongation ≤ 40 %
Fall test: half rope / single rope
2.30 m
300 mm
30°
2.5 m before first drop
peak force during first drop: ≤ 12 kN
falling mass: 80 kg
at least 12 drops without breakage
dynamic elongation ≤ 40 %
Fall test: twin rope


page 2 of 2
EN-892
DYNAMIC MOUNTAINEERING ROPES
UIAA-101
This representation does not provide full details. Read the Note at the head of page 1.
© UIAA, Pit Schubert, Neville McMillan, 2009
50 N
50 N
pull 2 m
repeat 5 times (on one 2 m specimen)
the forces 50 N are spaced 120° apart radially
sheath slippage after the 5th pull ≤ 20 mm
50 N
Sheath slippage test
1.00 m
static elongation
5 kg
80 kg
single rope ≤ 10 %
half rope ≤ 12 %
twin rope (double strand) ≤ 10 %
Static elongation test
Marking
single rope
half rope
twin rope
Designed by Georg Soier
All tests shall be done after conditioning as follows:
24 h (50 ± 5) °C and ≤ 10 % rel. humidity, after that
2 h (20 ± 2) °C and ≤ 65 % rel. humidity, after that
72 h (20 ± 2) °C and (65 ± 2) % rel. humidity.
There are no constraints on rope diameter or mass per unit length, but both are measured by standard methods and given in the information for use.
Additional UIAA requirements
• If the middle of the rope is marked, the mark shall be within 1 m of the real middle.
• If a single rope or a half rope withstands 10 or more test drops, the manufacturer can claim it is a "Multi drop rope".
• The diameter stated by the manufacturer on the hang-tag and in the information supplied shall be within ± 0.3 mm of the diameter measured in the test.
• In the information for use there shall be a warning to the effect that ropes may shrink during normal use.

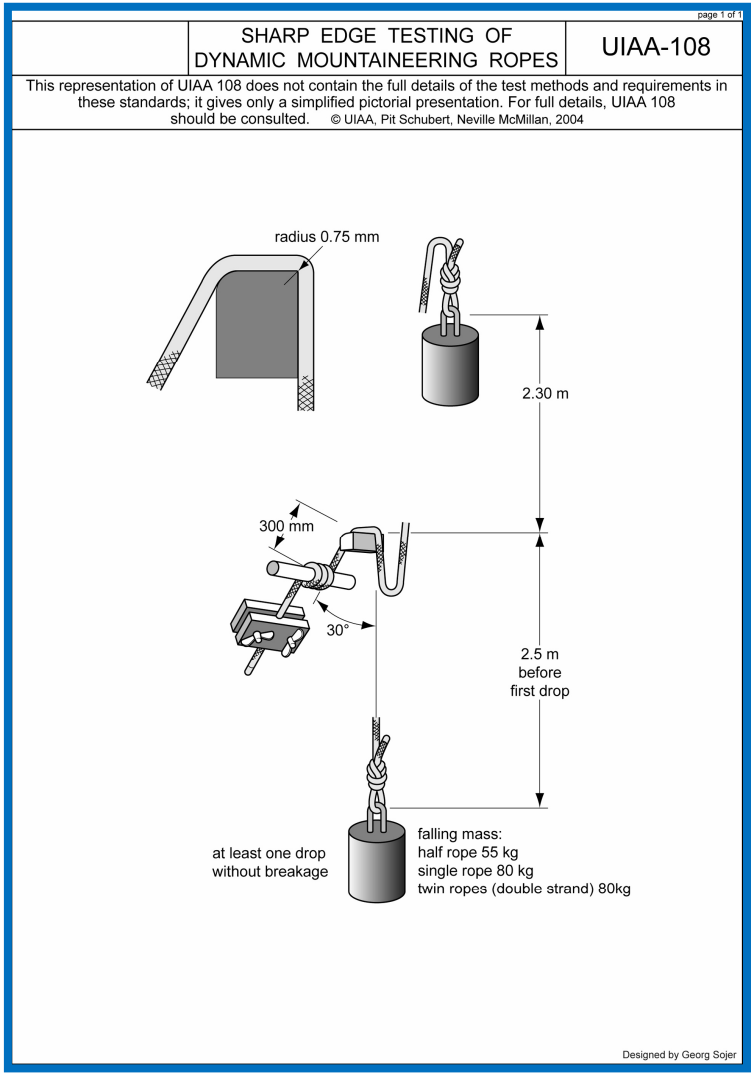
EFFETTO SPIGOLO SULLE CORDE

minimo
2
cadute



EFFETTO SPIGOLO SULLE CORDE

Questa norma è stata sospesa, in attesa della definizione e accettazione della norma proposta dal Centro Studi. Questa si basa sull'energia assorbita dalla corda fino al momento della rottura. Cambia anche il tipo di spigolo. Questo metodo di prova è stato approvato, a livello UIAA e CEN, ma si attendono i risultati dei confronti e delle esperienze di vari laboratori prima di una decisione definitiva.



CORDE: NORME UIAA-EN

- **Corde:**
  - **Singole**
  - **Mezze**
  - **Gemellari**

- **Prove "dinamiche" al Dodero:**

• Singole	80 kg	1200 daN	5 cadute
• Mezze	55 kg	800 daN	5 cadute
• Gemellari	80 kg	1200 daN	12 cadute

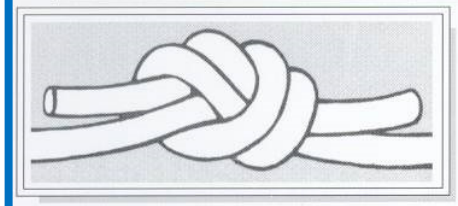
- **Altri test:**
  - **Allungamento (10% singole e gemellari, 12% mezze)**
  - **Scorrimento calza**
  - **Annodabilità**

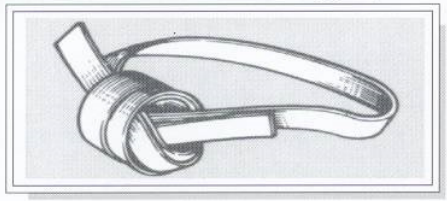
TABELLA RIASSUNTIVA

Tipo corda	Massa (kg)	Fa (kN)	Num. Cad.	All. Statico
Singola	80	12	5	10 %
Mezza	55	8	5	12 %
Gemellari	80	12	12	10 %

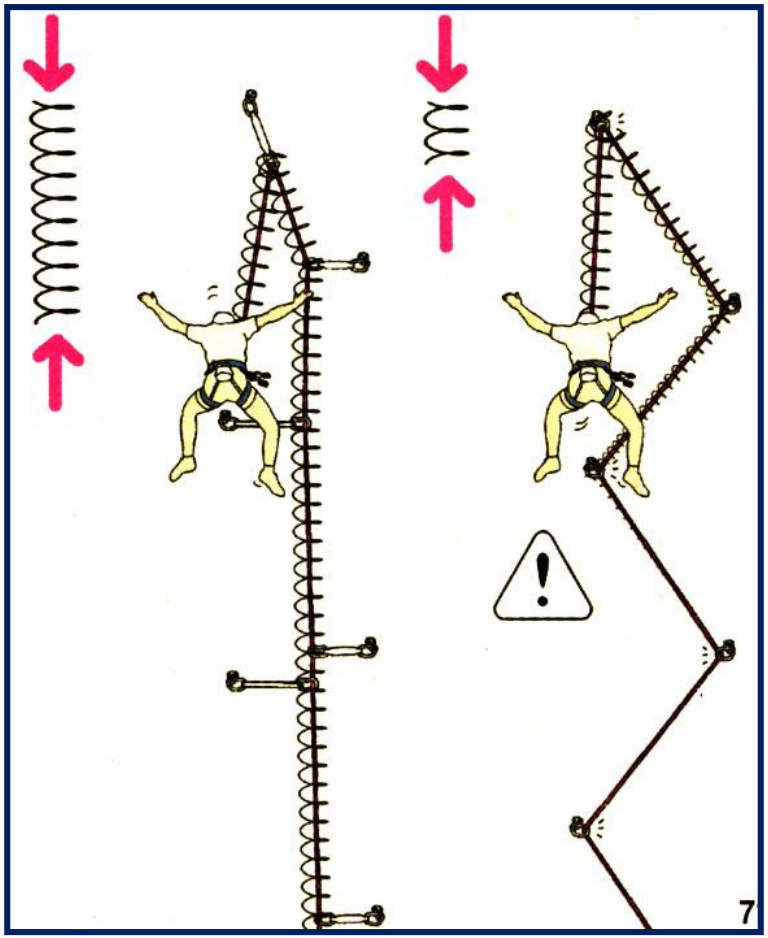
Cordini e fettucce

Elementi che hanno come scopo quello
di permettere un ottimale scorrimento della corda.
Non contribuiscono all'assorbimento di energia.



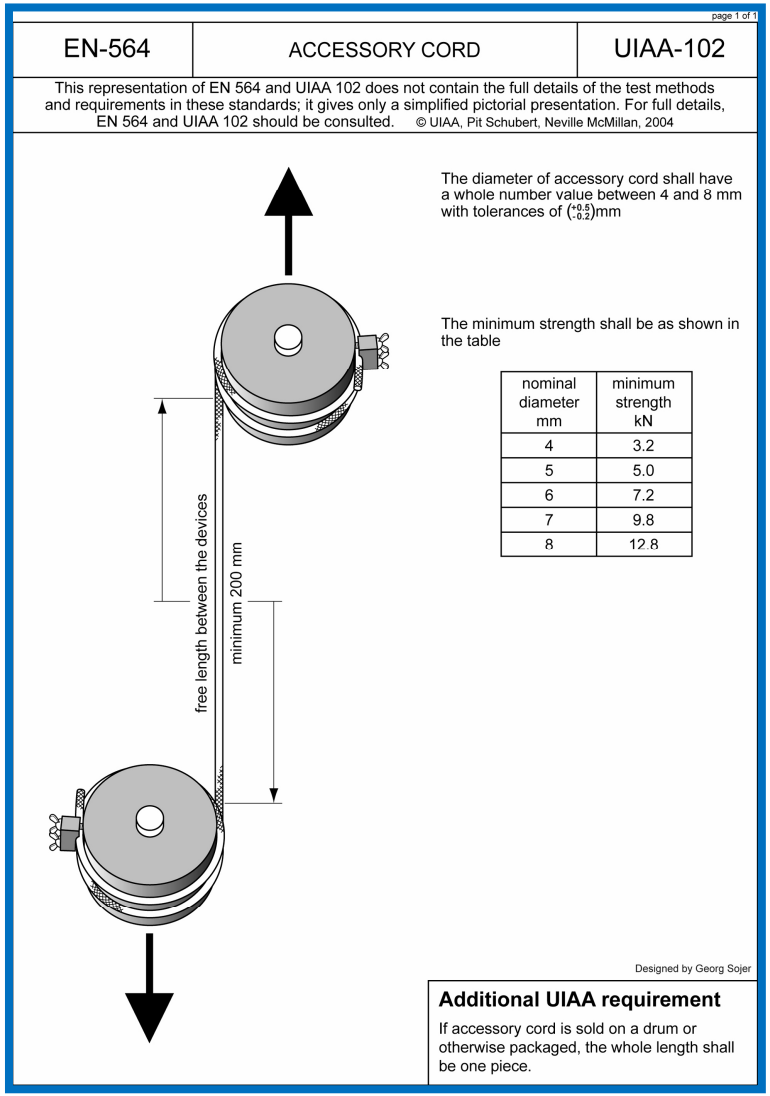


vengono caratterizzati mediante il loro carico di rottura statico



CORDINO

è costituito da un'anima rivestita da una guaina (diametro nominale tra 4 e 8 mm) - destinato a resistere a forze, ma non ad assorbire energia



CORDINO

! ATTENZIONE !

Le norme non contemplano materiali diversi dal Nylon e non tengono conto di eventuali effetti di intaglio

Diametro Nominale [mm]	Resistenza Minima [daN]
4	**320**
5	**500**
6	**720**
7	**980**
8	**1280**

Per il nylon

$$R_{min}\ [daN] = D\ [mm]^2 \times 20$$

CORDINO

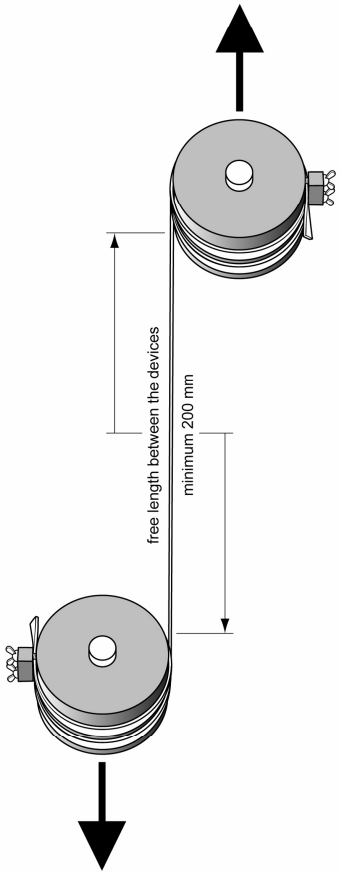
CARICO DI ROTTURA

	D	$R_{rott.}$
nylon asciutto	7	1360
nylon bagnato	7	1160
nylon asciutto	5	678
nylon asciutto	4	423
kevlar	5,5	1940
dyneema	5,5	1977

FETTUCCE

EN-565	TAPE	UIAA-103

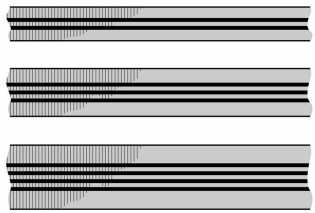
This representation of EN 565 and UIAA 103 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 565 and UIAA 103 should be consulted.



Any cross section of tape is possible.
The strength shall be marked with stripes on one side of the tape (see below) in accordance with the table

number of stripes	minimum strength kN
1	5.0
2	10.0
3	15.0
4	20.0

In general only the tape with 3 stripes is usual.



Marking with stripes
(on one side of the tape)

Designed by Georg Sojer

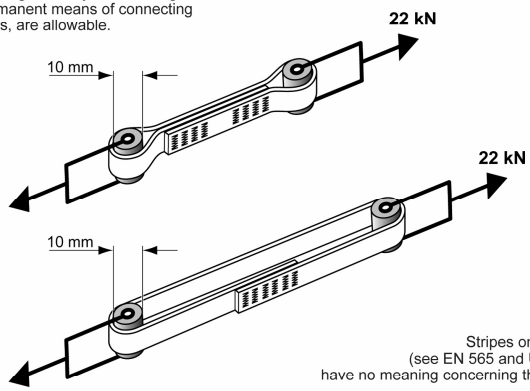
Additional UIAA requirement

If tape is sold on a drum or otherwise packaged, the whole length shall be one piece.

EN-566	SLINGS	UIAA-104

This representation of EN 566 and UIAA 104 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 566 and UIAA 104 should be consulted.

Any kind of sling, and any form of sling closure, and any permanent means of connecting the tape ends, are allowable.



Stripes on the tape
(see EN 565 and UIAA 103)
have no meaning concerning the strengh

Additional UIAA requirement

If slings are made from tape by stitching the tape, at least 50% of the visible area of stitching shall contrast with the tape in colour.

Designed by Georg Sojer

CE EN 12277

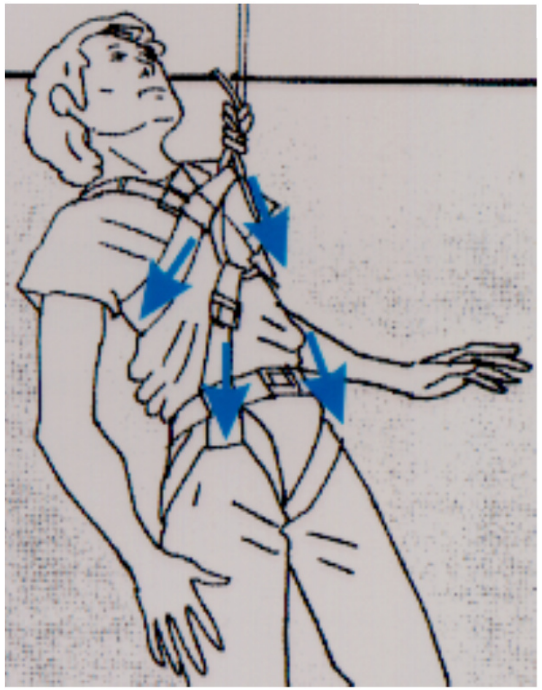
IMBRACATURE

Giuliano Bressan

l'imbracatura

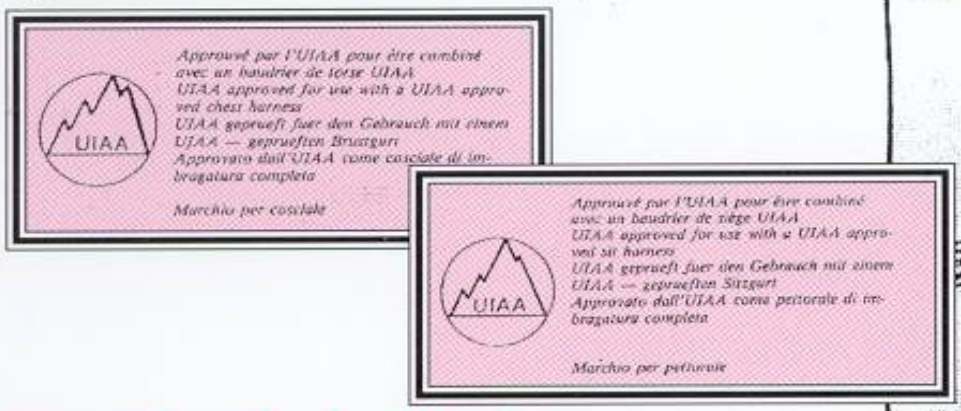
NON CONTRIBUISCE A RIDURRE LA DECELERAZIONE SUBITA

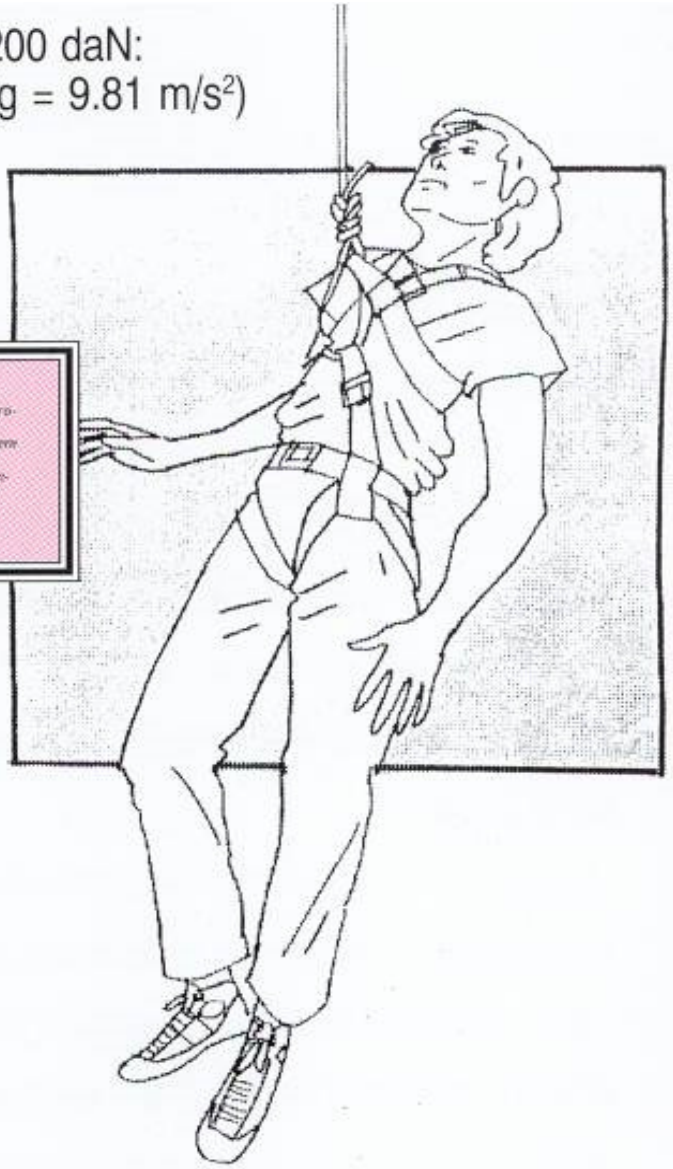
ma



- **mantiene la corretta posizione in fase di decelerazione**
- **ripartisce la *Forza d'Arresto* in modo razionale e non traumatico**

Lo sforzo massimo in gioco in una caduta è di 1200 daN: equivalente a 15 volte l'accelerazione di gravità (g = 9.81 m/s²) applicata ad una massa di 80 kg.





Funzioni richieste

1. Trasmissione della forza di arresto
2. Sospensione indolore del corpo
3. Forma imbragatura idonea:
   - alla corretta posizione nella caduta
   - al rispetto delle zone delicate del corpo
   - alla non fuoriuscita del corpo
   - alla libertà di movimento
   - all'indossabiltà e regolabilità

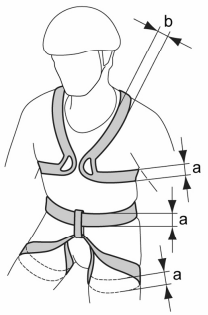
EN-12277	HARNESSES	UIAA-105

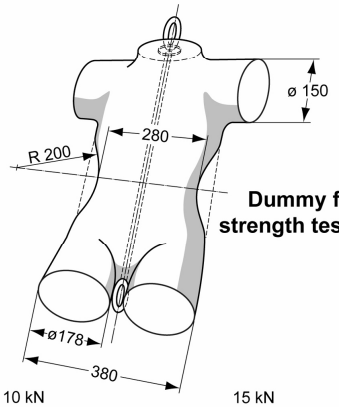
This representation of EN 12277 and UIAA 105 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 12277 and UIAA 105 should be consulted.

Minimum tape width
in contact with the body

Main parts
a = at least 43 mm (for small body version 33 mm)

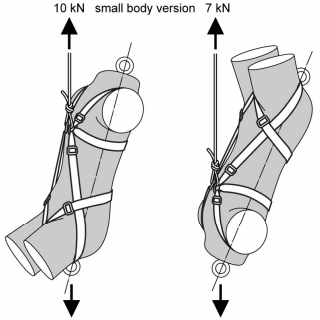
Shoulder straps
b = at least 28 mm (for small body version 23 mm)





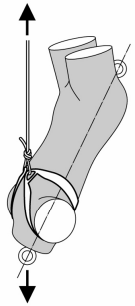
Dummy for strength tests

15 kN
10 kN small body version
10 kN
7 kN



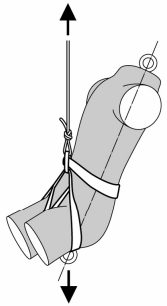
Strength test of full body harness

10 kN



Strength test of chest harness

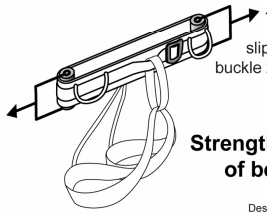
15 kN



Strength test of sit harness

All loops which are provided for abseiling (rapelling) shall withstand a load of at least 15 kN.

10 kN
slippage at the buckle 20 mm max.



Strength test of belt

Additional UIAA requirement

Where threads in load bearing parts are visible, at least 50% of the visible area of stitching shall contrast with the tape in colour.

Designed by Georg Sojer

imbracatura completa

Salewa

(norma EN = 1600 kg)

rottura cucitura anello = 1641 kg

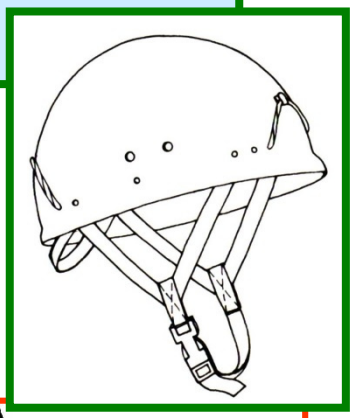
rottura cucitura anello = 1650 kg

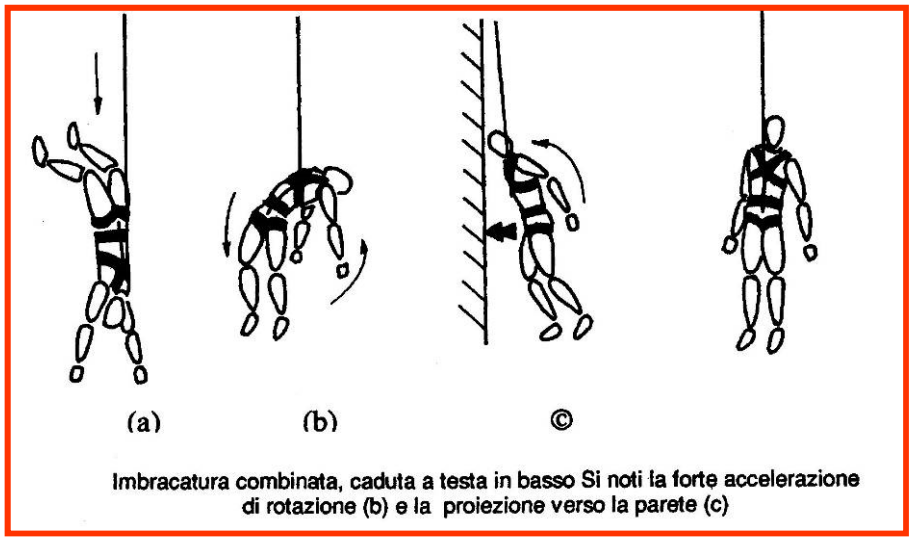
rottura fettuccia cosciale = 2500 kg

Il CASCO non serve solo per proteggerci dalla caduta di sassi od oggetti

perché

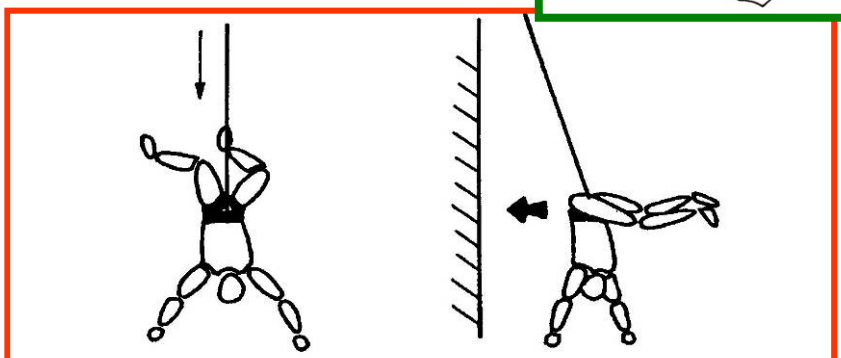
qualsiasi tipo di imbracatura si usi c'è sempre il rischio di urtare la testa contro la parete !!!





Imbracatura combinata, caduta a testa in basso Si noti la forte accelerazione di rotazione (b) e la proiezione verso la parete (c)

CE EN 1492

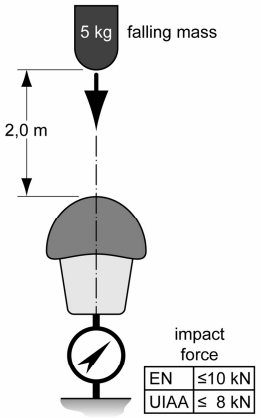


Caduta verticale con imbrago basso

EN-12492	HELMETS	UIAA-106

This representation of EN 12492 and UIAA 106 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 12492 and UIAA 106 should be consulted.

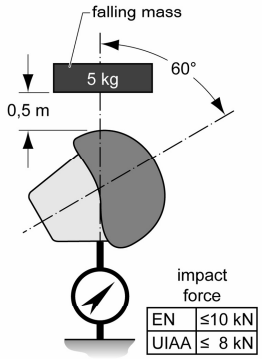
Energy absorption test vertical



impact force

EN	≤10 kN
UIAA	≤ 8 kN

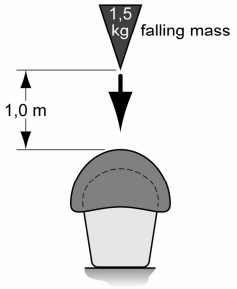
Energy absorption test frontal, lateral and dorsal



impact force

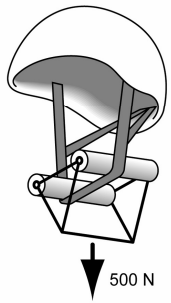
EN	≤10 kN
UIAA	≤ 8 kN

Penetration test



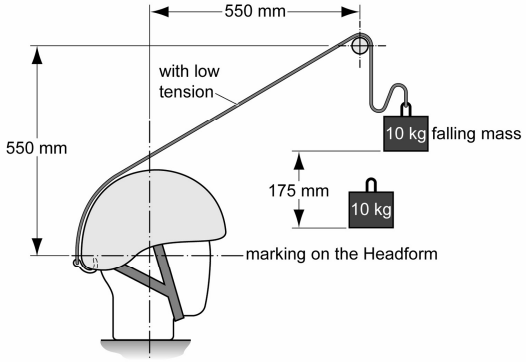
The peak of the cone shall not touch the head form

Strength test of chin strap



no breakage
extension ≤ 25 mm

Slippage test frontal and dorsal



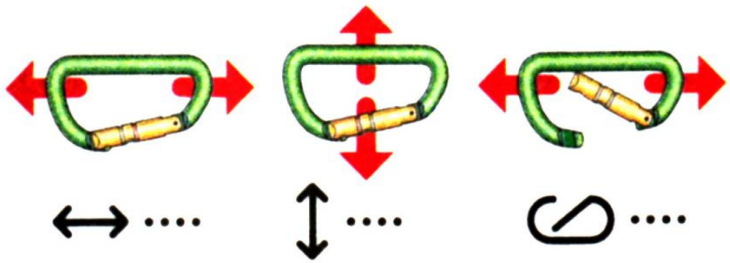
The helmet shall not leave the headform

Designed by Georg Sojer

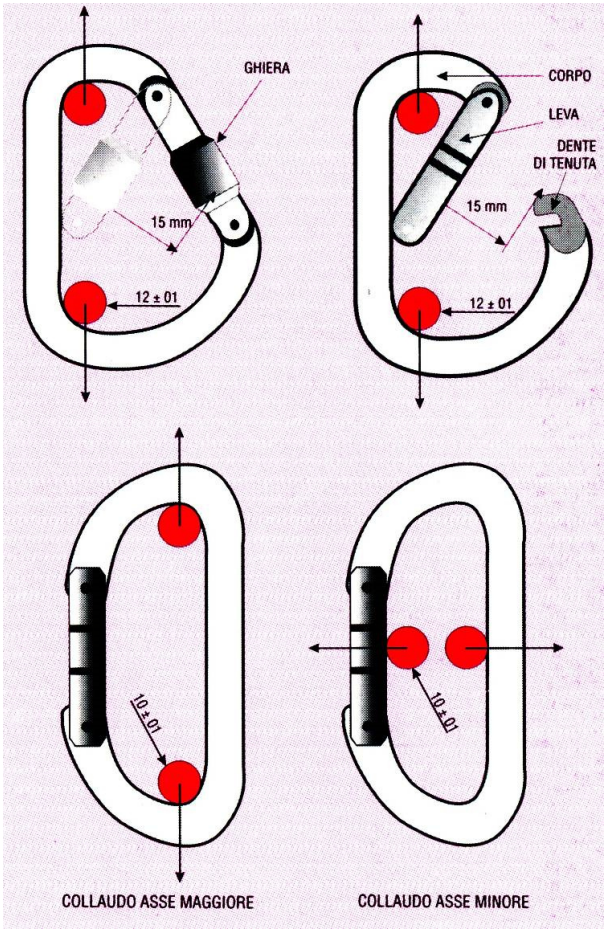
I moschettoni o connettori

Connettore è un dispositivo apribile che permette all'alpinista di collegarsi direttamente o indirettamente ad un ancoraggio

CE EN 12275



20 KN 7 KN 7 KN



CONNETTORI = MOSCHETTONI

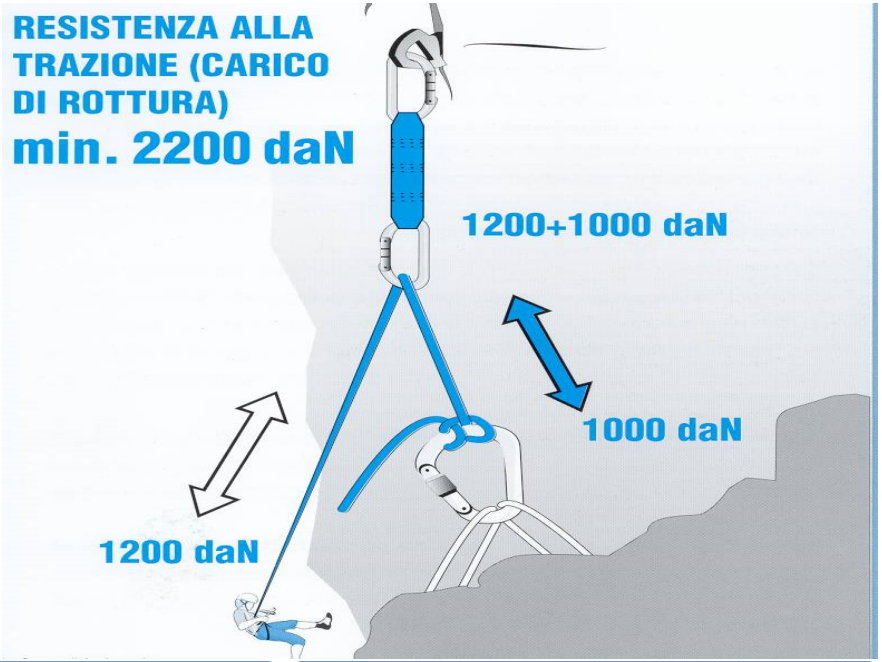
leghe di alluminio allo zinco-rame-magnesio

il valore della resistenza a rottura

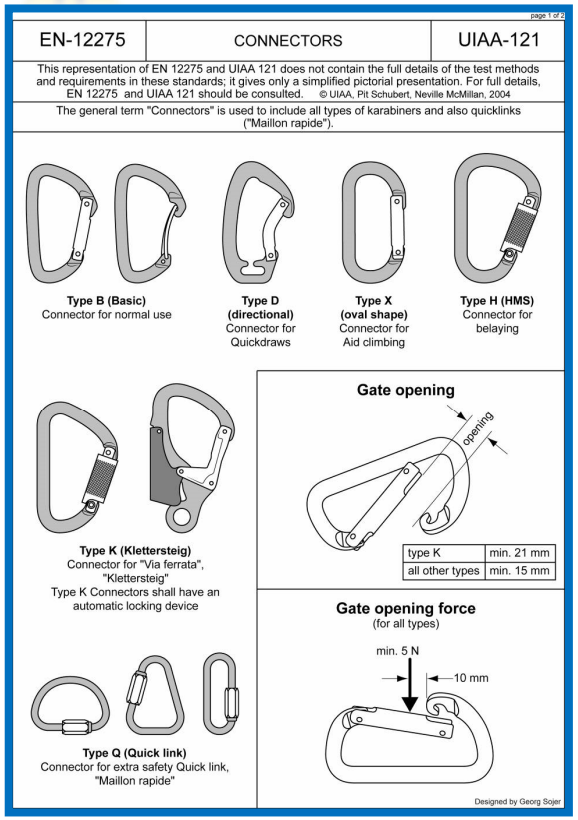
rappresenta il *carico a rottura* applicato al rinvio - in caso di caduta - ed è ricavato dalla sommatoria di due contributi:

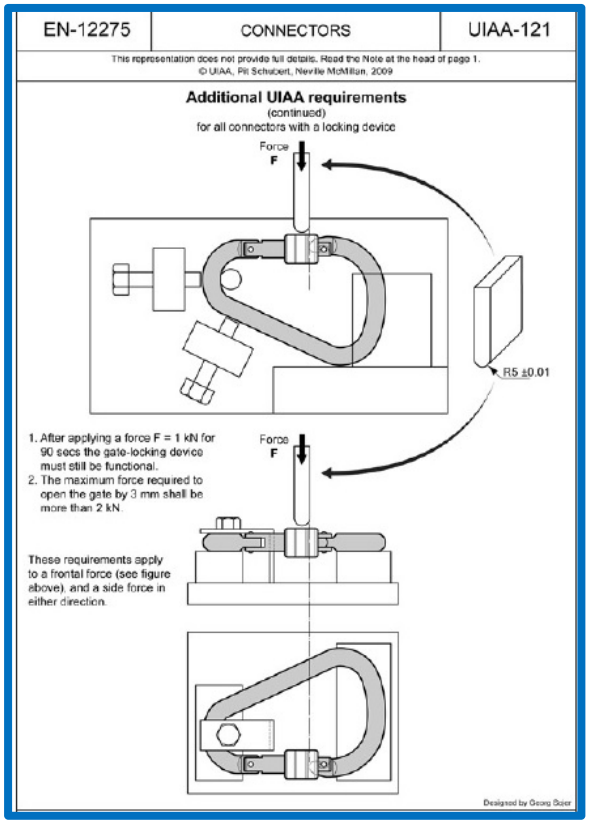
- **forza di arresto restituita dal ramo di corda collegato all'alpinista = con corda EN a 1200 daN max**
- **forza di arresto restituita dal ramo di corda che dal rinvio torna alla sosta (1200 daN) = valore ridotto a 1000 daN causa dei fenomeni di attrito dovuti allo scorrimento (15%)**

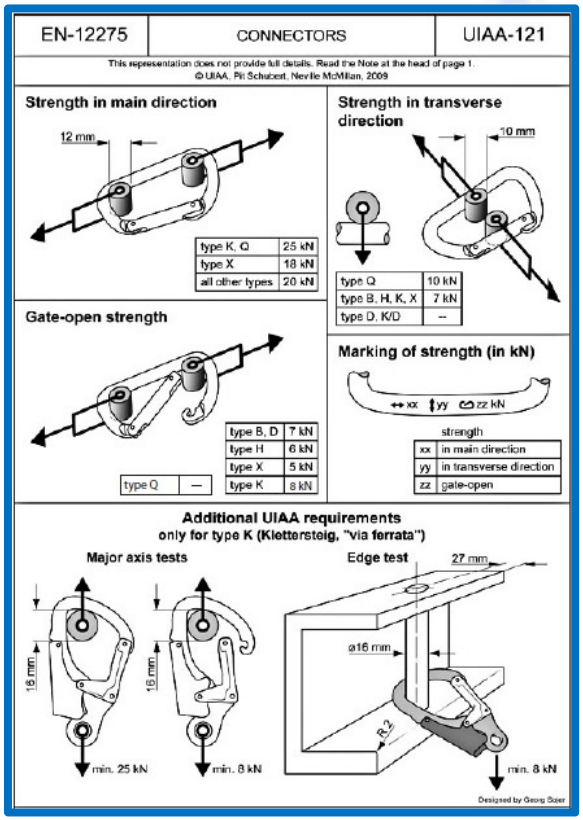
2200 daN



Connettori... Pittogrammi

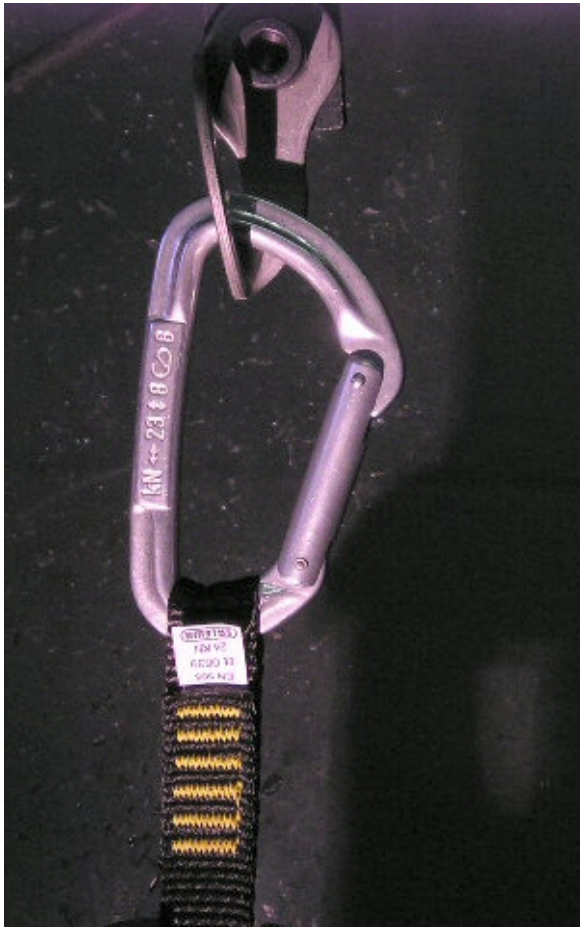






Rottura Connettori

(corrispondente al test Salewa)



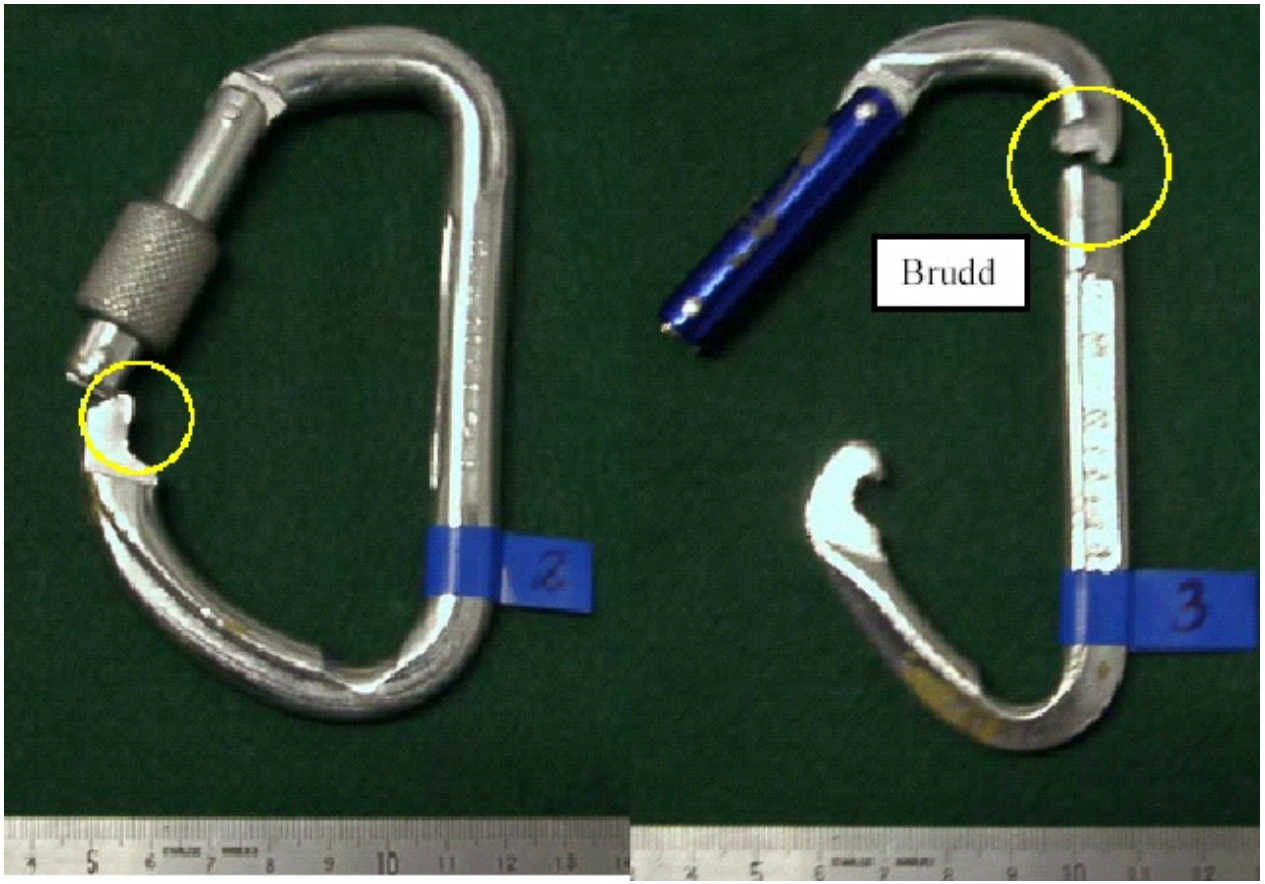
2241 daN

804 daN

226 daN

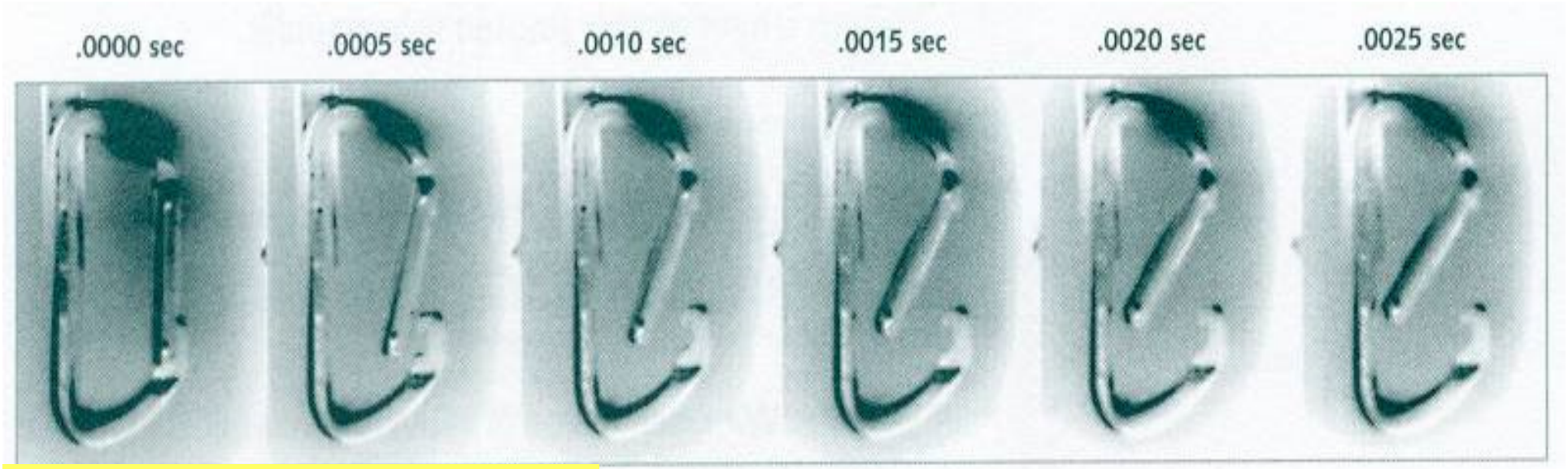
Rottura Connettori

Worn-down carabiners from indoor gym tested to failure



- 2,9 mm
- 41 kN

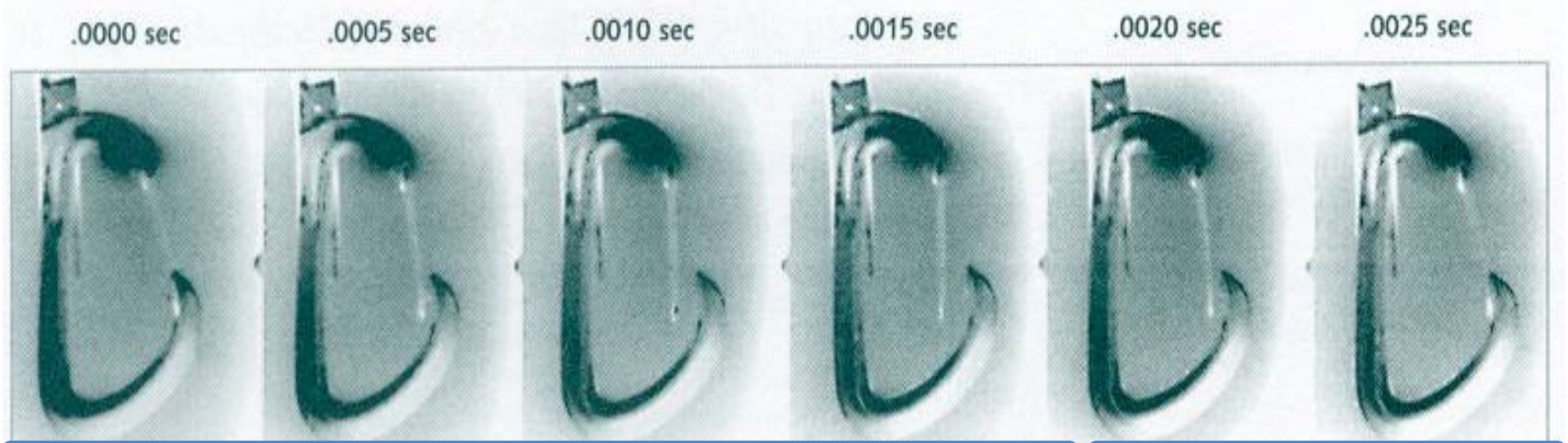
- 2,3 mm
- 27 kN



moschettone standard

l'effetto *whisplash*

moschettone "wiregate"



1 corda inserita in modo errato nel moschettone rispetto alla direzione di chi arrampica
(in caso di volo la corda può fuoriuscire)

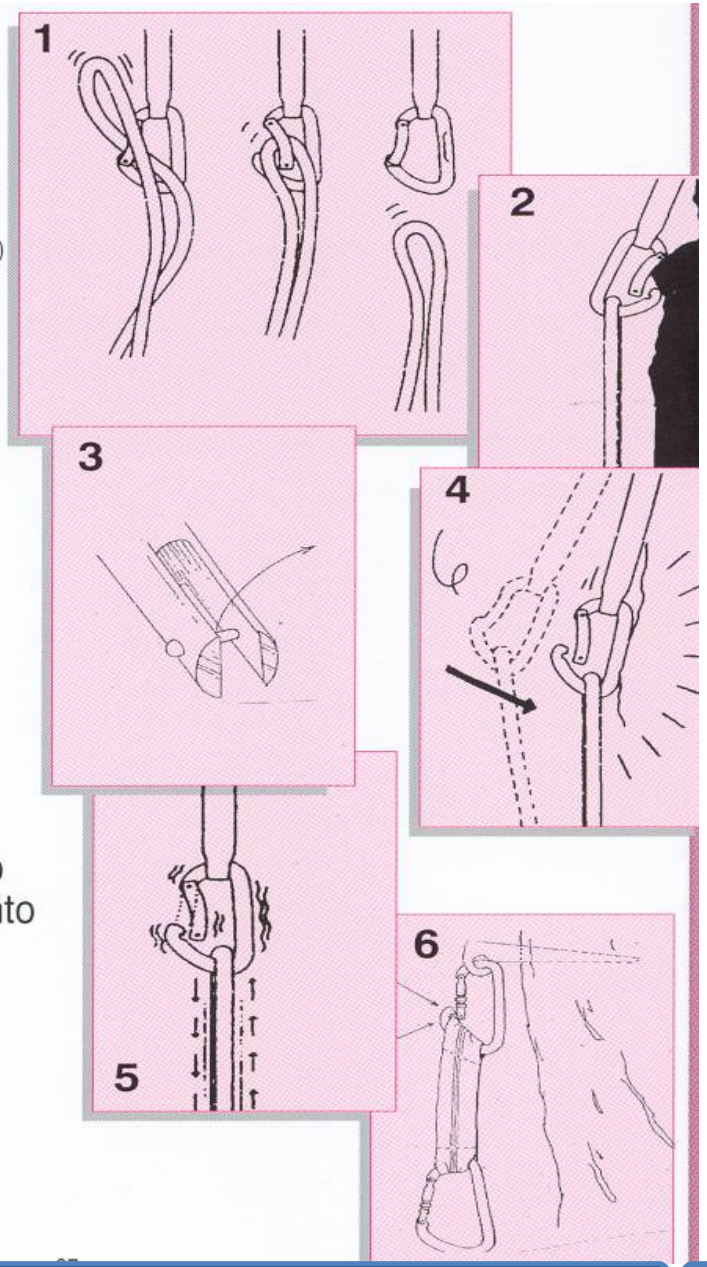
2 moschettone inserito in modo errato rispetto la parete rocciosa

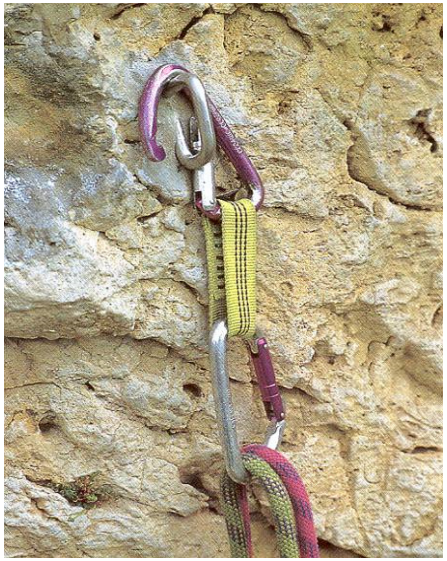
3 perdita del perno per usura

4 effetto dinamico in seguito a caduta

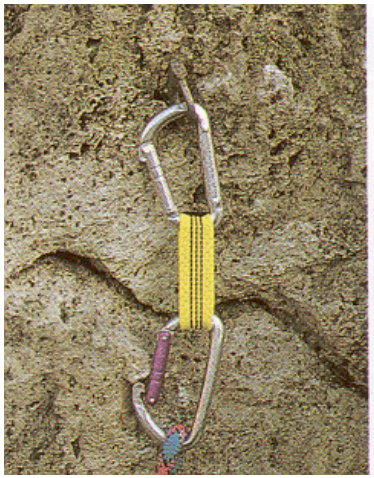
5 molla troppo debole: colpo accidentale subito dalla leva o disassamento della stessa a causa di sforzi laterali

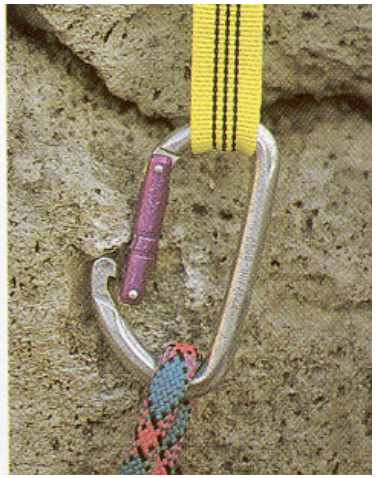
6 fettuccia mal collegata





Attenzione al posizionamento dei preparati !!!





Ancoraggi…

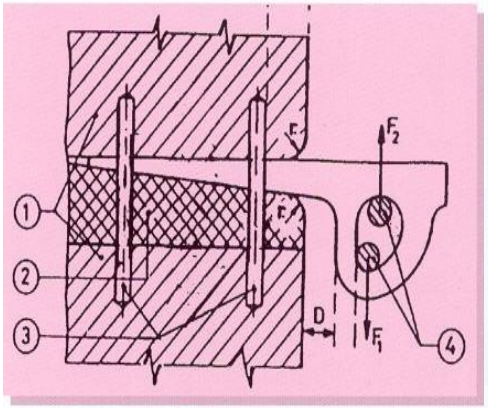
CHIODI da ROCCIA

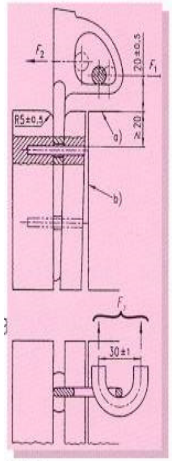
MARCHIATURA

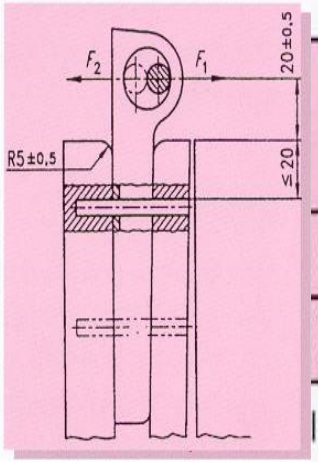
I chiodi devono riportare sulla testa e in modo indelebile le seguenti iscrizioni:

CHIODO DI SICUREZZA
presenta un alto carico di rottura ed è lungo almeno 90 mm
EN 569 (norme europee - vedi pag. 5)
NOME O MARCHIO o fabbricante, o fornitore, o importatore
LUNGHEZZA del chiodo espressa in cm, arrotondata per difetto.
Ⓢ simbolo "chiodo di sicurezza"

CHIODO DI PROGRESSIONE
con minori prestazioni, soddisfa comunque i requisiti di resistenza esposti
EN 569 (norme europee - vedi pag. 5)
NOME O MARCHIO o fabbricante, o fornitore, o importatore
LUNGHEZZA del chiodo espressa in cm, arrotondata per difetto.







VALORI MINIMI DI CARICO DI ROTTURA

Tipo		Direzione		
		F1	F2	F3
Chiodi di sicurezza	kN	25	10	15
Chiodi di progressione	kN	12,5	5	7,5

Velocità di trazione: 35 ± 15 mm/min.

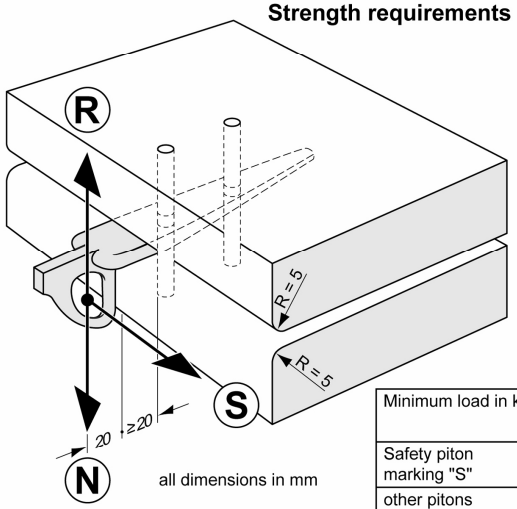
F1 = direzione normale
F2 = direzione inversa
F3 = direzione trasversale

Il carico di rottura è il valore minimo raggiunto durante la prova su 3 chiodi (3 campioni di chiodo per ogni tipo di trazione)

EN-569	PITONS	UIAA-122

This representation of EN 569 and UIAA 122 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 569 and UIAA 122 should be consulted.

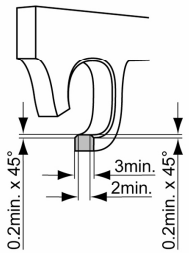
Strength requirements

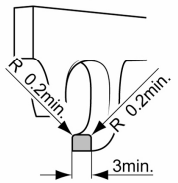


all dimensions in mm

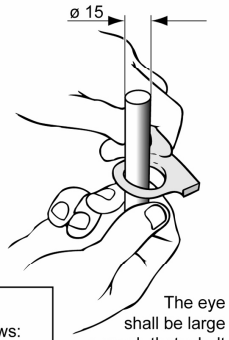
Minimum load in kN in the three directions as shown	N	R	S
Safety piton marking "S"	25,0	10,0	15,0
other pitons (without marking)	12,5	5,0	7,5

Design requirements





all dimensions in mm



The eye shall be large enough that a bolt as shown can be inserted

Additional UIAA design requirement

Two types of pitons concerning their hardness and marking are as follows:

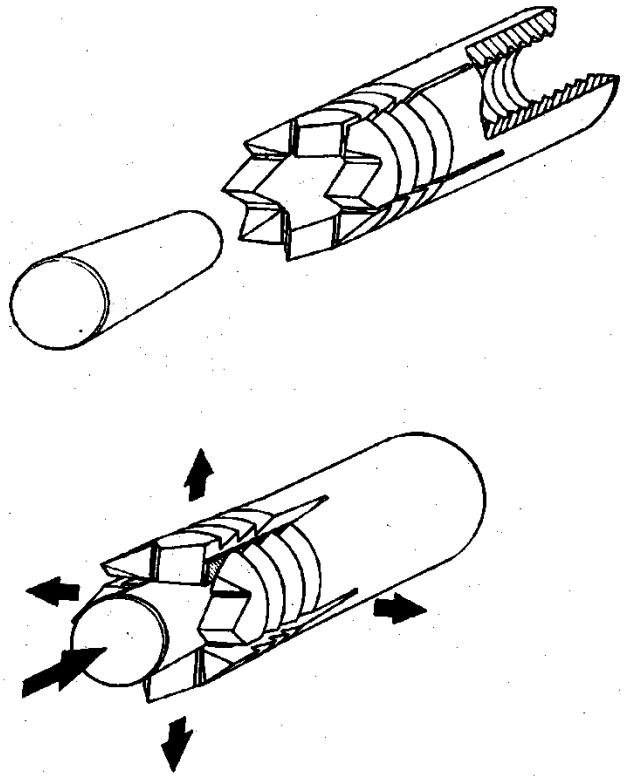
Hard steel pitons shall have a hardness of at least HRC = 28 (or HB_{30} = 270) marking: black or dark colour
The hardness of soft steel pitons shall not exceed HRC = 22 (or HB_{30} = 240) marking: any colour which is not black or dark

Designed by Georg Sojer

Chiodi a perforazione (tasselli)

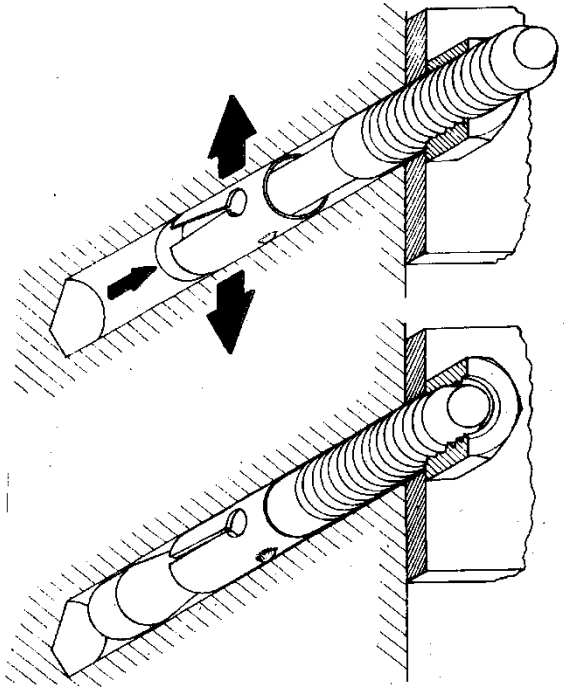
SPIT ROC MF8

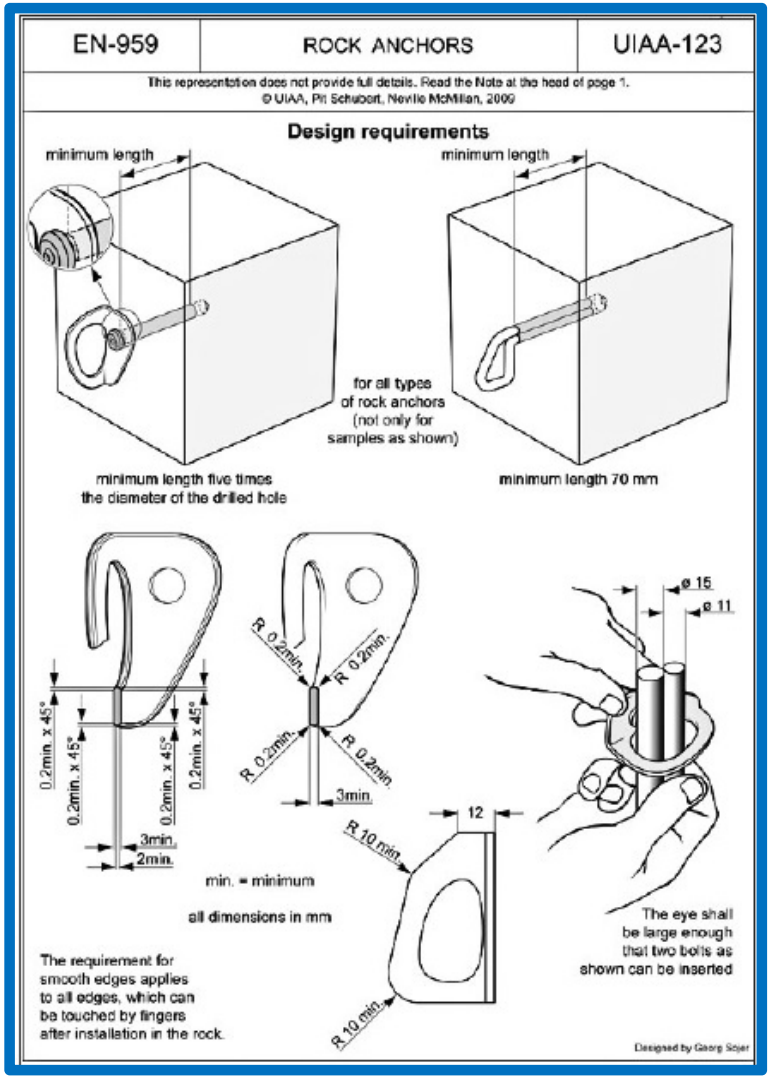
foro = prof. 30 mm - diam. 12 mm

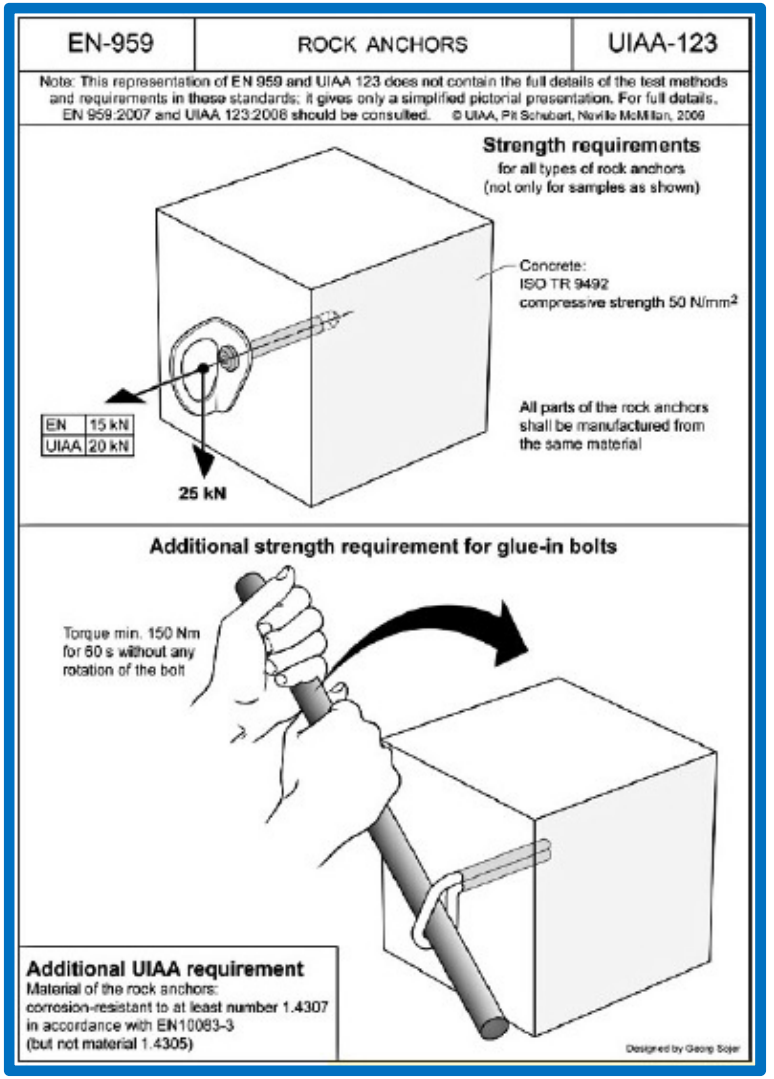


SPIT FIX M8

foro = diametro 8 mm




EN-959
ROCK ANCHORS
UIAA-123
This representation does not provide full details. Read the Note at the head of page 1.
© UIAA, Pit Schubert, Neville McMillan, 2009
Design requirements
minimum length
minimum length
for all types of rock anchors (not only for samples as shown)
minimum length five times the diameter of the drilled hole
minimum length 70 mm
0.2min. x 45°
3min.
2min.
R 0.2min.
3min.
R 10 min.
12
ø 15
ø 11
min. = minimum
all dimensions in mm
The requirement for smooth edges applies to all edges, which can be touched by fingers after installation in the rock.
The eye shall be large enough that two bolts as shown can be inserted
Designed by Georg Sojer

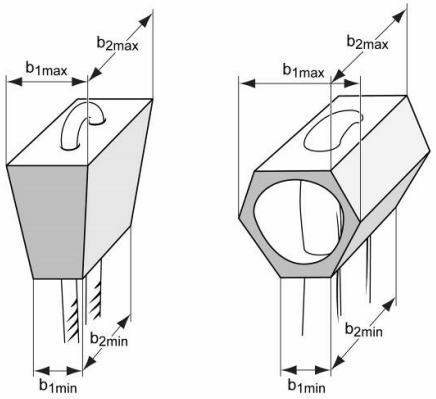

EN-959
ROCK ANCHORS
UIAA-123
Note: This representation of EN 959 and UIAA 123 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 959:2007 and UIAA 123:2008 should be consulted. © UIAA, Pit Schubert, Neville McMillan, 2009
Strength requirements
for all types of rock anchors
(not only for samples as shown)
Concrete:
ISO TR 9492
compressive strength 50 N/mm²
EN 15 kN
UIAA 20 kN
25 kN
All parts of the rock anchors shall be manufactured from the same material
Additional strength requirement for glue-in bolts
Torque min. 150 Nm for 60 s without any rotation of the bolt
Additional UIAA requirement
Material of the rock anchors:
corrosion-resistant to at least number 1.4307 in accordance with EN10088-3
(but not material 1.4305)
Designed by Georg Sojer

BLOCCHI ad INCASTRO

nut e friend

EN-12270	CHOCKS	UIAA-124

This representation of EN 12270 and UIAA 124 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 12270 and UIAA 124 should be consulted.



Definition of width

b_{max} = largest width as shown
b_{min} = smallest width as shown

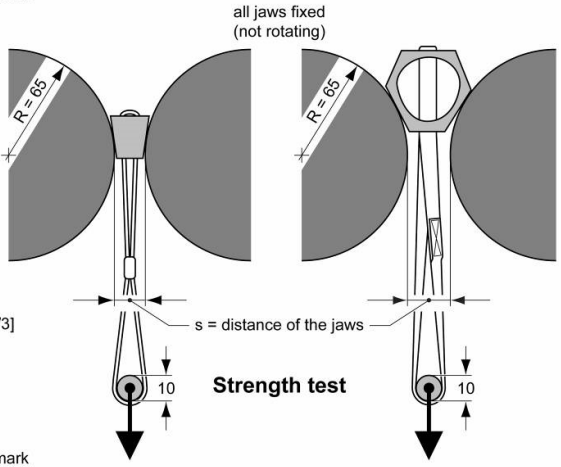
Design requirements

The sling for clipping in a karabiner shall be large enough to insert a pin of 15mm diameter.

Strength requirement

for all types and sizes
at least 2 kN

If a Chock can be placed in different positions all positions shall be tested.



Calculation of the distance of the jaws

$s = b_{min} + [(b_{max} - b_{min})\ 1/3]$

The manufacturer has to mark on the Chock the minimum load in kN, he guarantees.

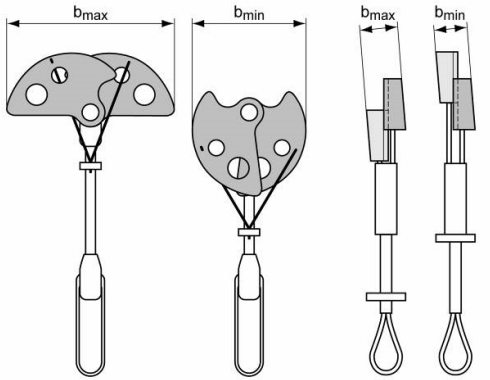
all dimensions in mm

Designed by Georg Sojer

EN-12276	FRICTIONAL ANCHORS	UIAA-125

This representation of EN 12276 and UIAA 125 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 12276 and UIAA 125 should be consulted.

The general term "Frictional Anchors" is used to include all types as "Friends", "Sliders" etc.



Measurement of the range

b_{max} = largest width
b_{min} = smallest width

Design requirements

The sling or the eye for clipping in a karabiner shall be large enough to insert a pin of 15mm diameter.

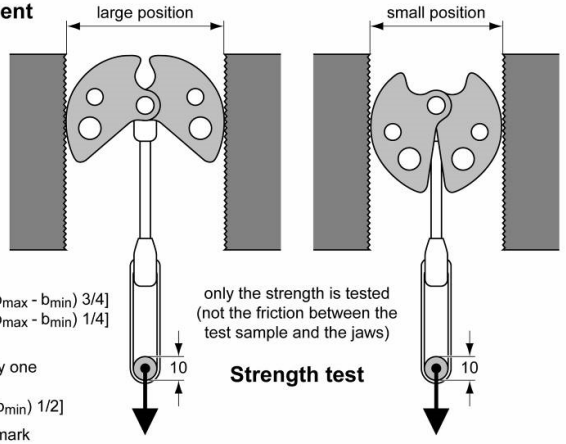
Additional UIAA requirement

If there is a textile means of attachment, whose strength is dependent on the integrity of the stitching, then at least 50% of the visible area of the stitching shall contrast with the background in colour.

Strength requirement

for all types and all sizes
at least 5 kN

Each Frictional Anchor shall be tested in two different positions, large and small, as shown.



Calculation of the two positions

large position = $b_{min} + [(b_{max} - b_{min})\ 3/4]$
small position = $b_{min} + [(b_{max} - b_{min})\ 1/4]$

If the difference between b_{max} and b_{min} < 5mm, only one position shall be tested:
position = $b_{min} + [(b_{max} - b_{min})\ 1/2]$

only the strength is tested (not the friction between the test sample and the jaws)

The manufacturer has to mark on the Frictional Anchor the minimum load in kN, he guarantees.

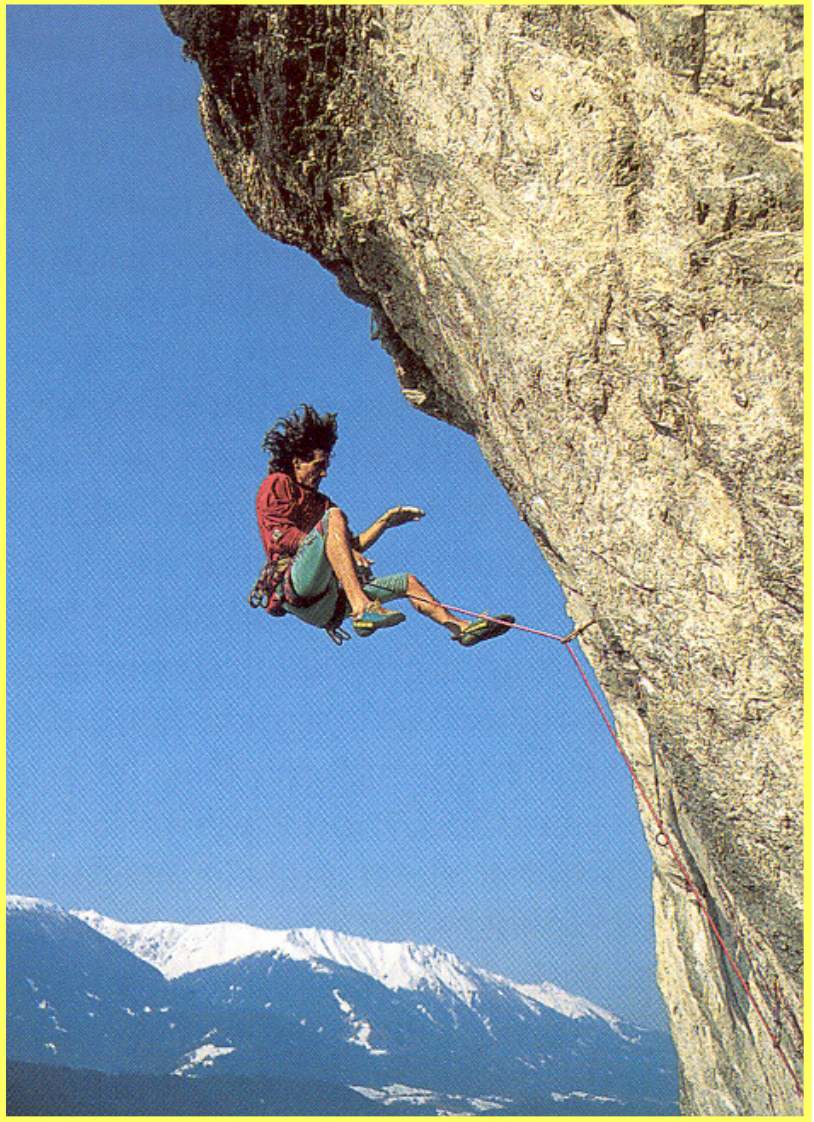
all dimensions in mm

Designed by Georg Sojer

La tenuta degli ancoraggi - in ambiente - dipende esclusivamente dal loro posizionamento!!!

Le norme mi garantiscono solo la buona costruzione!!!

Nessuna norma può sostituire l'esperienza e il buon senso nel loro posizionamento e nella valutazione sulla loro tenuta!!!



Dispositivi di frenatura

Questi attrezzi sono regolamentati dalla norma **UNI EN 15151-1 e UNI EN 15151-2** (corrispondente alla **UIAA-129**), che gli ha suddivisi, differenziandoli, in due gruppi:

a) il gruppo dei **MANUAL ASSISTED LOCKING DEVICES** (categoria comprendente il GriGri, il Chinch, l'Eddy, il Sum, ecc...), rappresenta **"Attrezzi Bloccanti Assistiti Manualmente"**, con sicura "semistatica". Si tratta quindi di un Assicuratore con frenata manuale assistita e sicura semistatica.

b) il gruppo dei **MANUAL BRAKING DEVICES** (categoria comprendente l'Otto, il Secchiello, Click Up ecc...), rappresenta **"Attrezzi Frenanti Manuali"**, con sicura "dinamica". Si tratta quindi di un Assicuratore con frenata manuale e sicura dinamica.

Dispositivi di frenatura

Vari tipi di freni

Dispositivi di frenatura manuale

Tipo 1: dispositivi per discesa senza funzione atta a modificare l'attrito;

Tipo 2: dispositivi per assicurazione e discesa senza funzione atta a modificare l'attrito;

Tipo 3: dispositivi per discesa con una funzione atta a modificare l'attrito;

Tipo 4: dispositivi per assicurazione e discesa con una funzione atta a modificare l'attrito.

Dispositivi di frenatura con bloccaggio manuale assistito

Tipo 5: dispositivi per discesa senza elemento di blocco di sicurezza;

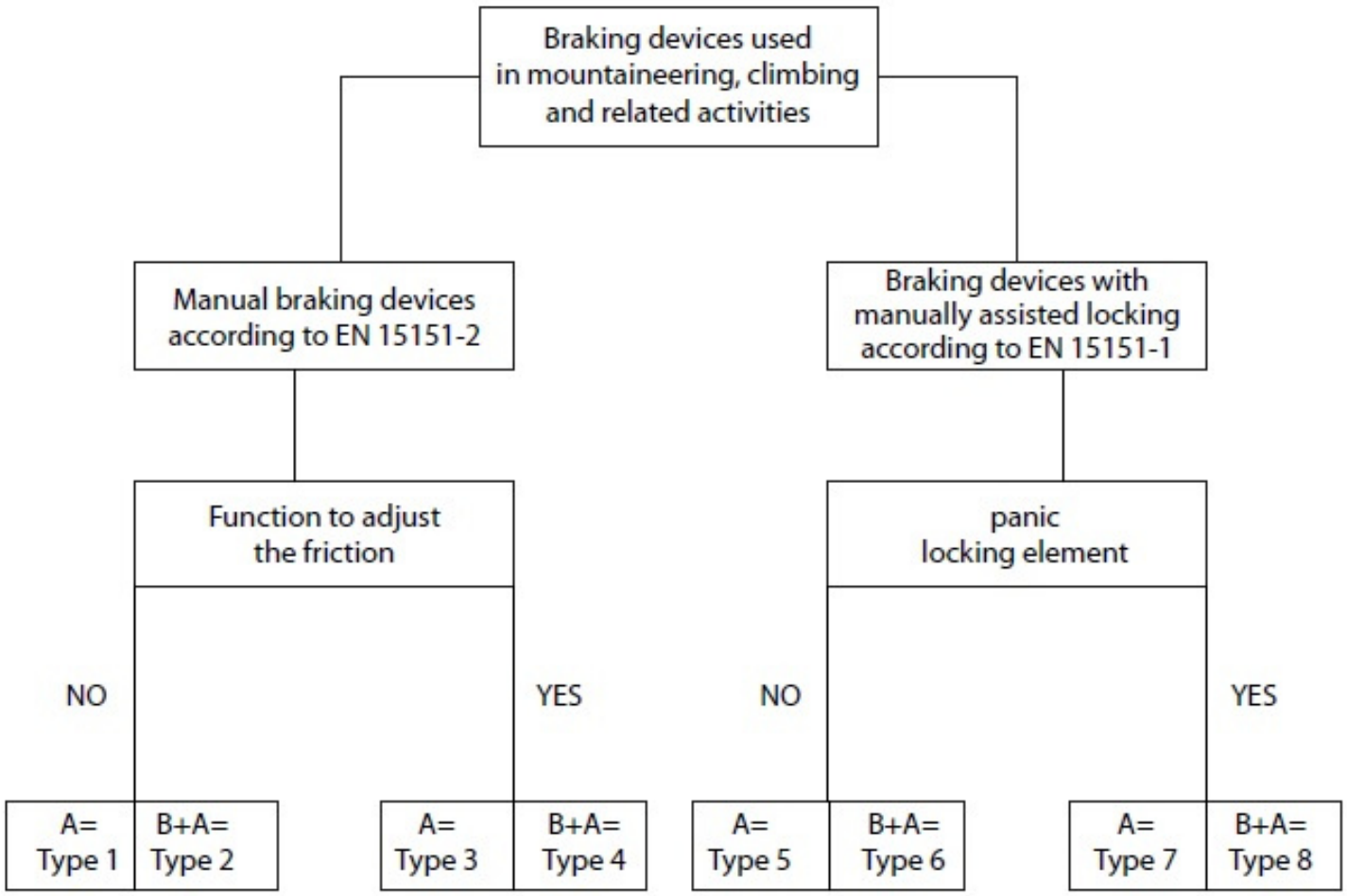
Tipo 6: dispositivi per assicurazione e discesa senza elemento di blocco di sicurezza;

Tipo 7: dispositivi per discesa con elemento di blocco di sicurezza;

Tipo 8: dispositivi per assicurazione e discesa senza elemento di blocco di sicurezza.

Vari tipi di attrezzi multiuso

Dispositivi di frenatura



A = uso per discesa in corda doppia

B = uso per assicurazione

Dispositivi di frenatura

Specifiche	Diametro corda/Tipo corda	Tipo 5	Tipo 6	Tipo 7	Tipo 8
Carico di bloccaggio	Minimo/massimo EN 892 e/o EN 1891	x	x	x	x
Tenuta statica	Minimo/massimo EN 892	x	x	x	x
Prestazioni dinamiche nella assicurazione	Minimo/massimo EN 892	-	x	-	x

Tabella A Specifiche collegate ai dispositivi di frenatura con bloccaggio manuale assistito

Specifica	Diametro corda/Tipo corda	Tipo 1	Tipo 2	Tipo 3	Tipo 4
Tenuta statica	Minimo/massimo EN 892 e/o EN 1891	x	x	x	x

Tabella B Specifiche collegate ai dispositivi frenatura manuale

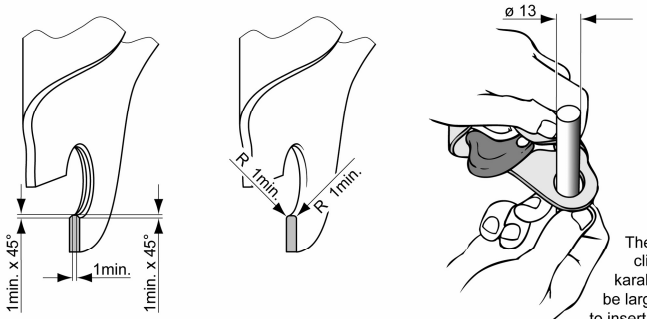
Bloccanti

page 1 of 1

EN-567	ROPE CLAMPS	UIAA-126

This representation of EN 567 and UIAA 126 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 567 and UIAA 126 should be consulted.

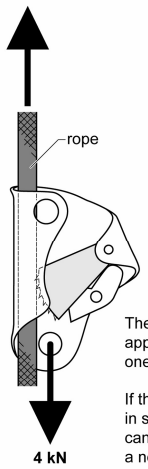
Design requirements



The holes for clipping in a karabiner shall be large enough to insert a pin with diameter of 13 mm.

all dimensions in mm

Strength requirements

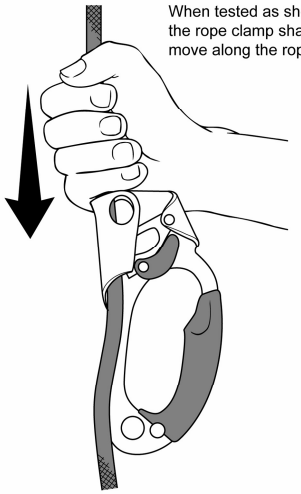


The load shall be applied five times, one after the other.

If the rope is damaged in such a way, that it can not be used any longer, a new rope shall be used.

Additional UIAA requirement

When tested as shown, the rope clamp shall not move along the rope



Designed by Georg Sojer

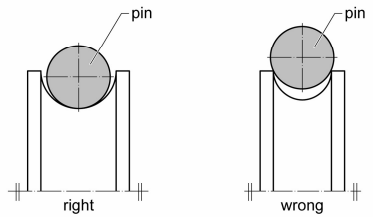
Pulegge

page 1 of 1

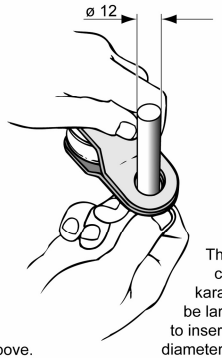
EN-12278	PULLEYS	UIAA-127

This representation of EN 12278 and UIAA 127 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 12278 and UIAA 127 should be consulted.

Design requirements



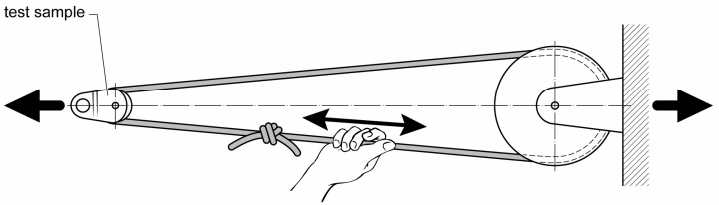
The pulley shall be large enough to accomodate a pin of the largest diameter plus 1 mm, for which the pulley is intended to be used; this pin shall touch the bottom of the groove (not the edges) as shown above.



The holes for clipping in a karabiner shall be large enough to insert a pin with diameter of 12 mm.

Strength requirements

Under a static load of 2 kN the pulley shall move in both directions as shown and no deformations shall appear, which can impair its function.



After the test as above the load is increased up to the required strength as shown in the table.

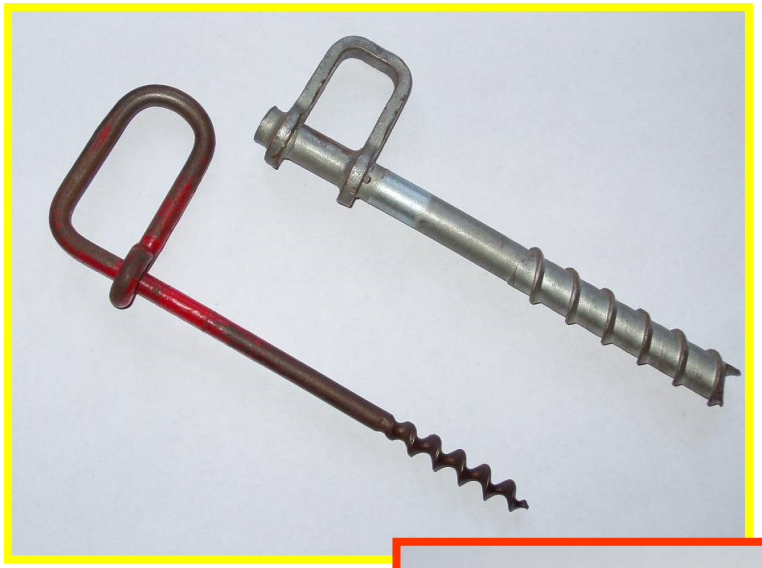
minimum strength

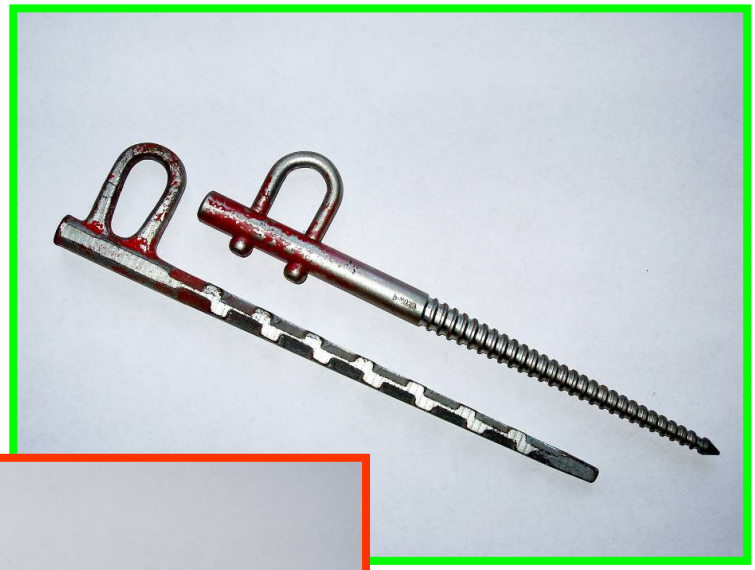
EN	12 kN
UIAA	15 kN

Designed by Georg Sojer

ANCORAGGI da GHIACCIO

Ieri…



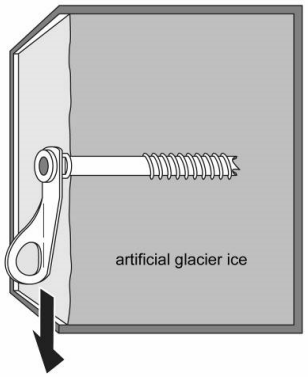


Oggi…

EN-568	ICE ANCHORS	UIAA-151

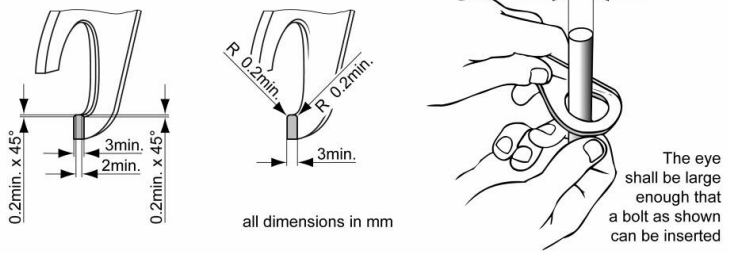
This representation of EN 568 and UIAA 151 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 568 and UIAA 151 should be consulted.

Strength requirement



Norm	ice screws	ice pitons
	at least	
EN	10kN	10kN
UIAA	15kN	10kN

Design requirements

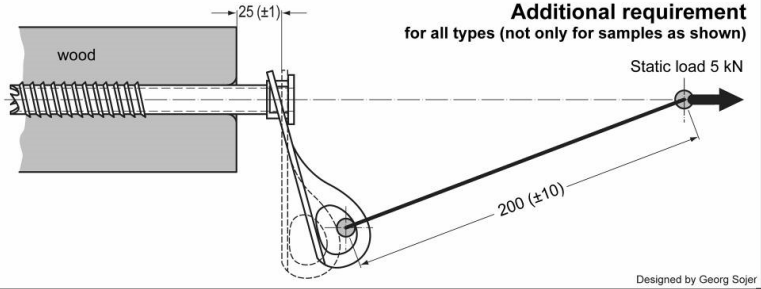


all dimensions in mm

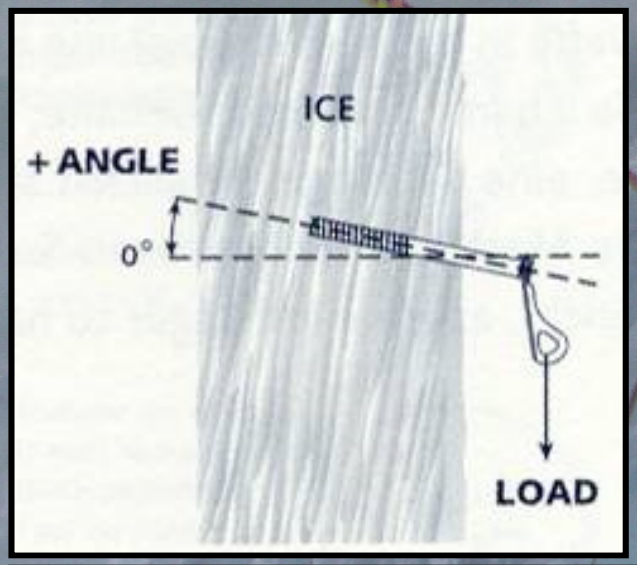
The eye shall be large enough that a bolt as shown can be inserted

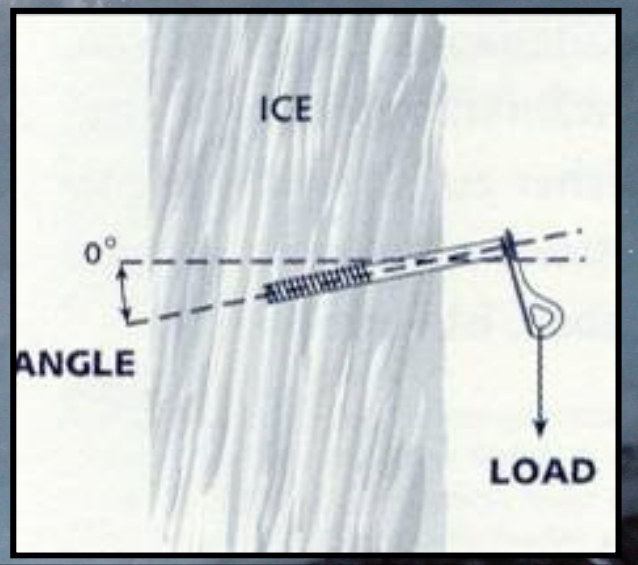
Additional requirement

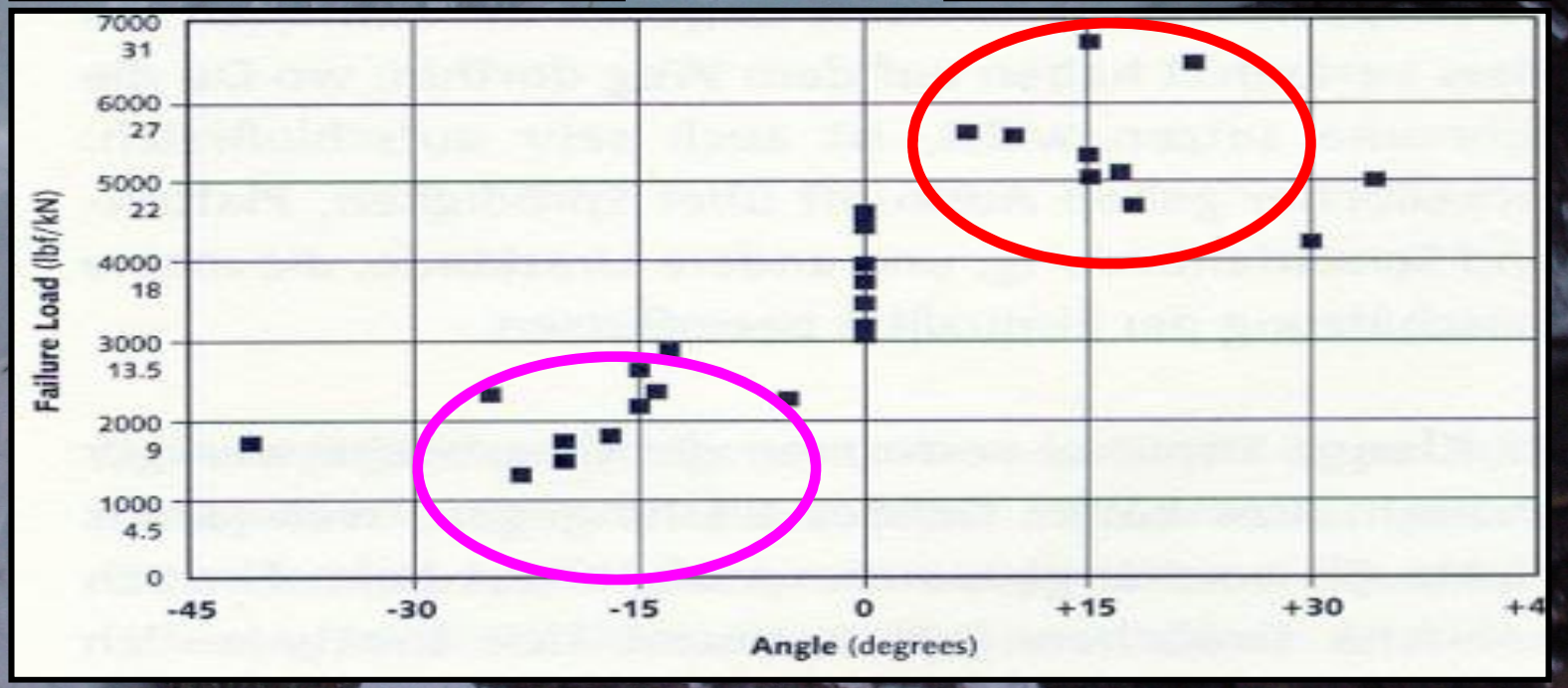
for all types (not only for samples as shown)



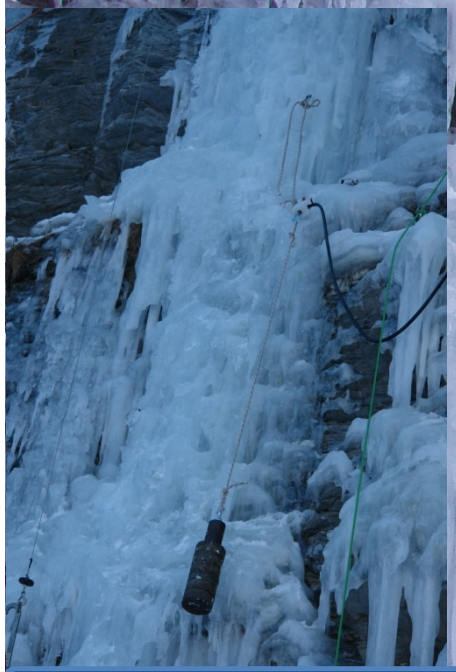
Designed by Georg Sojer


ICE
+ ANGLE
0°
LOAD


ICE
0°
ANGLE
LOAD


Failure Load (lbf/kN)
7000
31
6000
27
5000
22
4000
18
3000
13.5
2000
9
1000
4.5
0
-45
-30
-15
0
+15
+30
Angle (degrees)

Test estrazione dinamica Viti Ghiaccio
Val Varaita gennaio / febbraio 2008



Giuliano Bressan

Test estrazione dinamica Viti Ghiaccio - Val Varaita gen. e feb. 2008

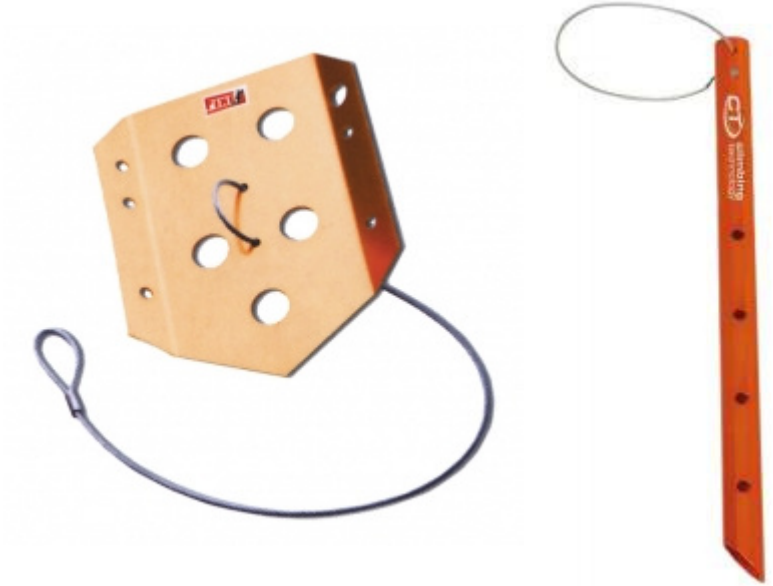
tipo vite	lunghezza vite cm	tipologia di avvitamento	carico Kg F
Grivel	12	- 20°	465,51
Grivel	12	- 20°	494,17
Grivel	12	- 20°	494,99
Grivel	12	0°	* 1067,63
Grivel	12	0°	763,49
Grivel	12	0°	561,51
Grivel	12	20°	1073,35
Grivel	12	20°	774,37
Grivel	12	20°	* 1232,12
Grivel	12	20°	1055,06
Black Diamond	13	- 20°	531,06
Black Diamond	13	- 20°	695,87
Black Diamond	13	- 20°	570,66
Black Diamond	13	0°	1000
Black Diamond	13	0°	1029,24
Black Diamond	13	0°	736,39
Black Diamond	13	20°	1050
Black Diamond	13	20°	760
Black Diamond	13	20°	* 1321,88

* = Vite non estratta (in tutti gli altri casi la vite è fuoriuscita dalla sua sede)

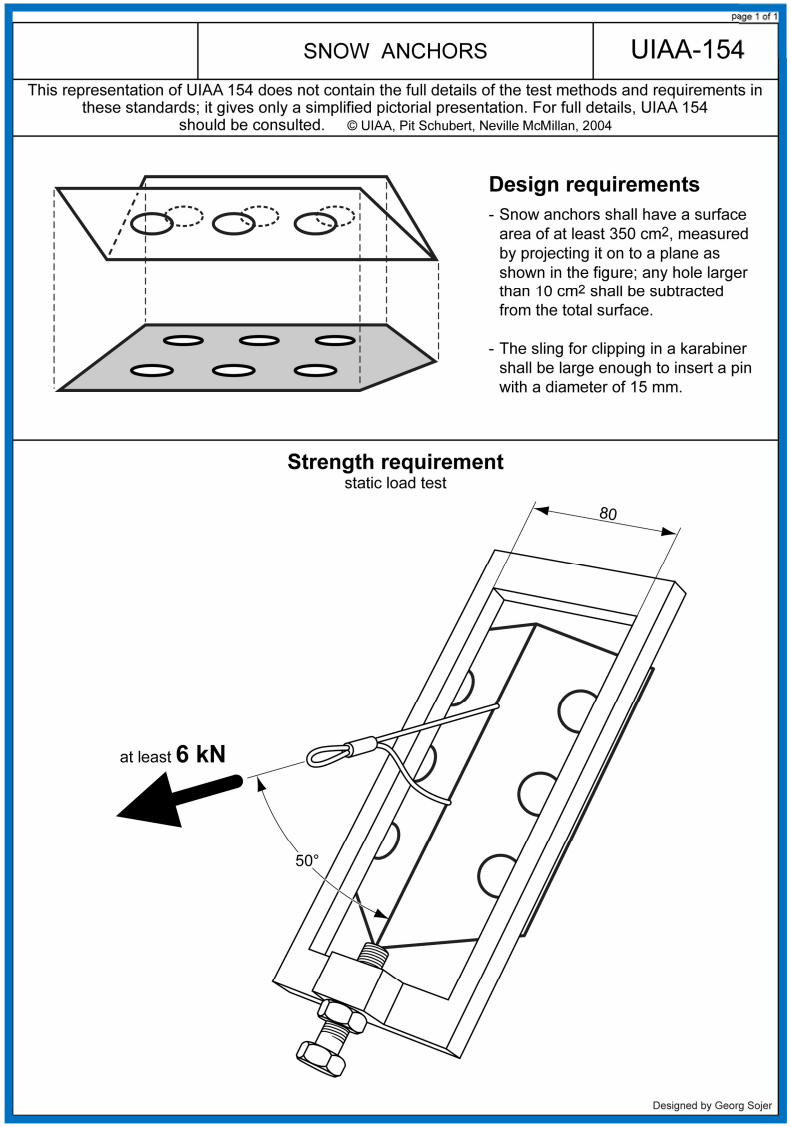
tipo vite	lunghezza vite cm	tipologia di avvitamento	carico Kg F
Grivel	12	- 20°	1002,49
Grivel	12	- 20°	956,54
Grivel	12	- 20°	627,72
Grivel	12	0°	1080,80
Grivel	12	0°	960,48
Grivel	12	0°	985,73
Grivel	12	20°	* 1113,42
Grivel	12	20°	874,10
Grivel	12	20°	1319,61
Grivel	12	20°	745,66
Black Diamond	13	- 20°	749,17
Black Diamond	13	- 20°	967,14
Black Diamond	13	- 20°	1055,87
Black Diamond	13	0°	1102,52
Black Diamond	13	0°	875,58
Black Diamond	13	0°	834,45
Black Diamond	13	20°	994,69
Black Diamond	13	20°	861,38

* = Vite non estratta (in tutti gli altri casi la vite è fuoriuscita dalla sua sede)

ANCORAGGI da NEVE



La disposizione del cavetto metallico è tale per cui, quando sollecitato, tende ad affossare ulteriormente l'attrezzo nella neve aumentandone la tenuta.



page 1 of 1

	SNOW ANCHORS	UIAA-154

This representation of UIAA 154 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, UIAA 154 should be consulted. © UIAA, Pit Schubert, Neville McMillan, 2004

Design requirements

- Snow anchors shall have a surface area of at least 350 cm², measured by projecting it on to a plane as shown in the figure; any hole larger than 10 cm² shall be subtracted from the total surface.
- The sling for clipping in a karabiner shall be large enough to insert a pin with a diameter of 15 mm.

Strength requirement

static load test

Designed by Georg Sojer

ATTREZZI da GHIACCIO

EN-13089	ICE TOOLS (Axes and Hammers)	UIAA-152

This representation of EN 13089 and UIAA 152 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 13089 and UIAA 152 should be consulted.

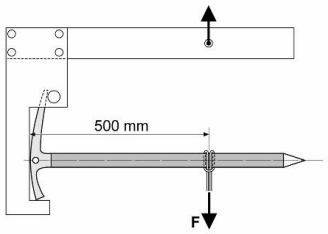
Concerning the strength two types of ice tools exist in accordance with these standards:

Type Ⓑ =Basic type, with lower strength, for use in general circumstances as on glacier, for snow hiking, for ski mountaineering etc.

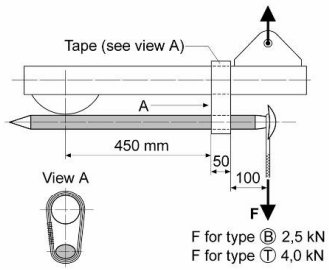
Type Ⓣ = Technical type, with higher strength, for use in all circumstances especially for ice climbing, dry tooling etc.

Shafts and picks shall both be marked with the symbol of the type in a circle as shown

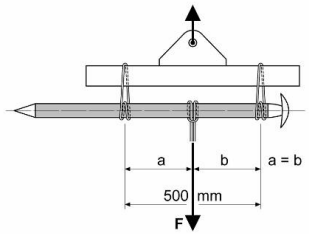
Static tests



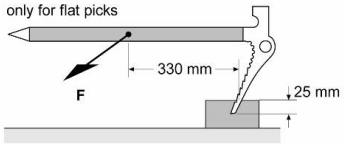
F for type Ⓑ 0,6 kN
F for type Ⓣ 0,9 kN

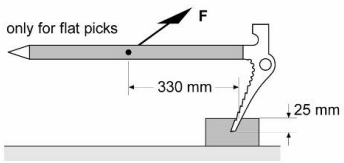


F for type Ⓑ 2,5 kN
F for type Ⓣ 4,0 kN



F for type Ⓑ 2,5 kN
F for type Ⓣ 3,5 kN





F for type Ⓑ 127 N
F for type Ⓣ 182 N

permanent deformation at the point of load after loading max. 70 mm

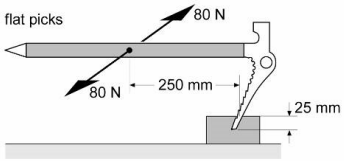
for all these tests see *) on page 2

Designed by Georg Sojer

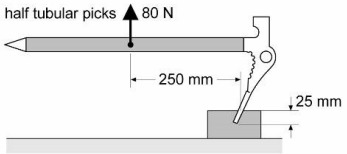
EN-13089	ICE TOOLS (Axes and Hammers)	UIAA-152

Fatigue tests

only for type Ⓣ



minimum 50,000 cycles between the values +80 N and -80 N, as shown



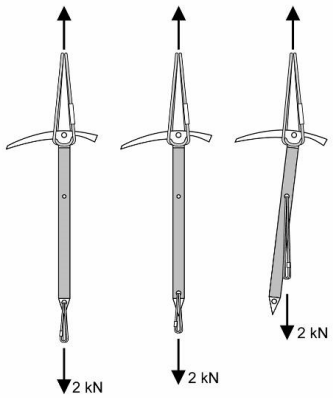
minimum 12,000 cycles between the values 0 and +80 N, as shown

*) For all these tests: If the shaft of the ice tool is not long enough for the distance as drawn, shorter distances can be used with corresponding increases in the applied loads, to generate the same bending moment.

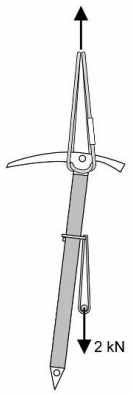
Additional UIAA requirements

Static tests

Longitudinal test for type Ⓑ and Ⓣ



If an ice tool has a hand loop, the hand loop shall be tested



Designed by Georg Sojer

! ATTENZIONE !

Vedi aggiornamento norma su: «I materiali per alpinismo e le relative norme»
Collana «I manuali del Club Alpino Italiano» n° 28 – 2ª edizione: novembre 2013

L'ultima edizione della norma (2007) ha classificato le piccozze come segue:

- **Piccozza di tipo 1**

Piccozza con una connessione manico-lama adatta all'utilizzo su neve/ghiaccio (progressione su ghiacciai, per escursionismo e/o alpinismo su neve/ghiaccio e per sci alpinismo).
Questo tipo di piccozza, che nella vecchia norma era indicato come "di base", non richiede marchiatura che ne definisca la categoria.

- **Piccozza di tipo 2**

Piccozza con una connessione manico-lama adatta all'utilizzo su roccia, oppure su neve/ghiaccio. E' adatta per progressione su terreni tecnicamente difficili quali ghiaccio ripido e "dry tooling".
Questo tipo di piccozza deve riportare (sia sul manico che sulla lama) un marchio, costituito da una "T" all'interno di un cerchio.

L'ultima edizione della norma (2007) ha classificato le piccozze come segue:

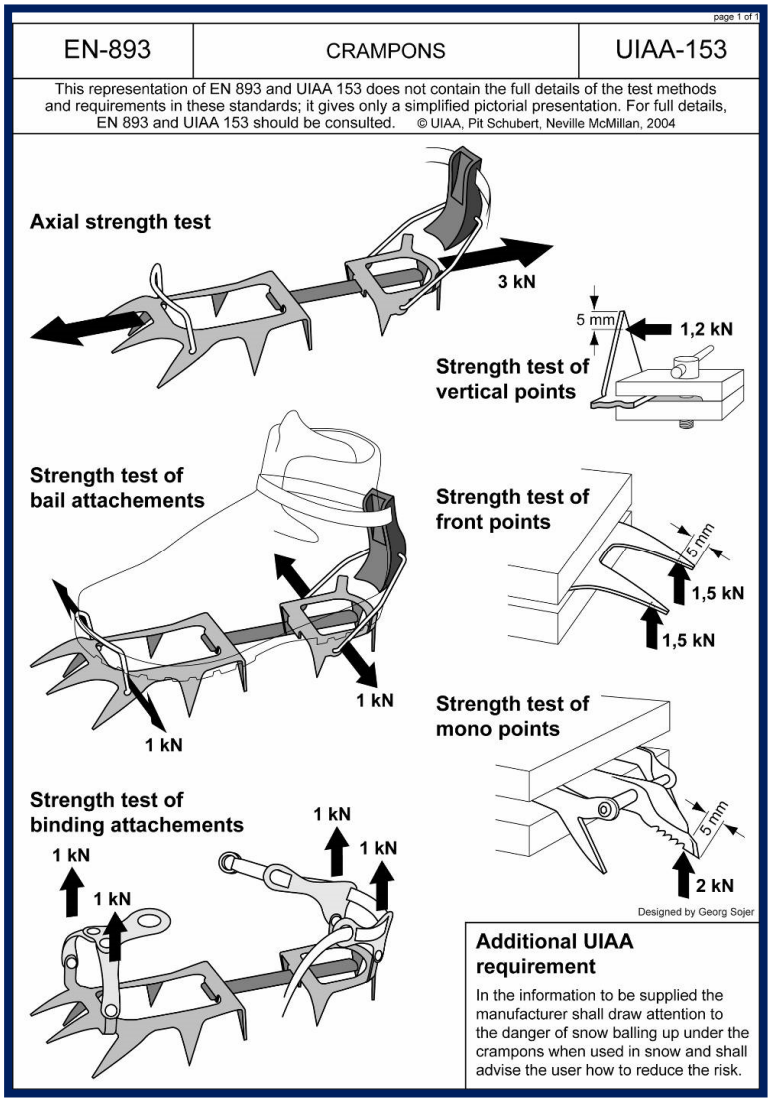
- **Lama di tipo 1**

Lama da utilizzare su neve/ghiaccio.

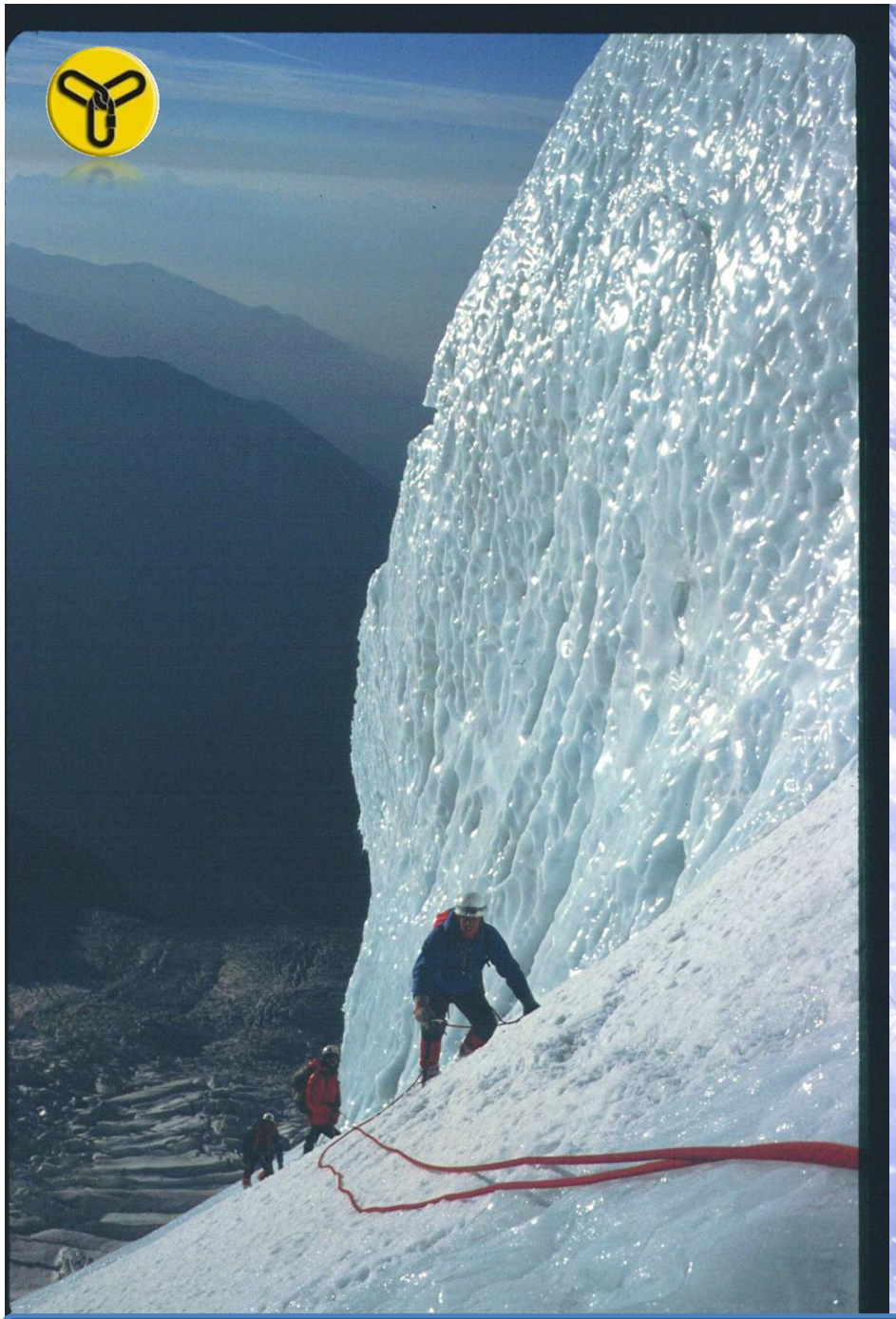
- **Lama di tipo 2**

Lama da utilizzare su roccia oppure su neve/ghiaccio.
La distinzione, anche se può apparire complessa, è dovuta alla differenziazione delle caratteristiche meccaniche richieste per le diverse parti, con particolare riguardo alla connessione manico-lama.

Va fatto rilevare che la piccozza, o il martello piccozza, possono essere utilizzati anche come ancoraggio su terreno nevoso; per questo motivo è richiesta una particolare resistenza del manico, che è la stessa per i tipi 1 e 2.


page 1 of 1
EN-893
CRAMPONS
UIAA-153
This representation of EN 893 and UIAA 153 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 893 and UIAA 153 should be consulted. © UIAA, Pit Schubert, Neville McMillan, 2004
Axial strength test
3 kN
5 mm
1,2 kN
Strength test of vertical points
Strength test of bail attachements
1 kN
1 kN
Strength test of front points
5 mm
1,5 kN
1,5 kN
Strength test of mono points
5 mm
2 kN
Strength test of binding attachements
1 kN
1 kN
1 kN
1 kN
Designed by Georg Sojer
Additional UIAA requirement
In the information to be supplied the manufacturer shall draw attention to the danger of snow balling up under the crampons when used in snow and shall advise the user how to reduce the risk.


GRIVEL



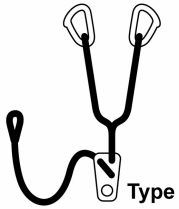
Materiali Alpinismo, Norme

Giuliano Bressan

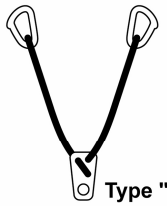
ASSORBITORI ENERGIA

EN-958	ENERGY ABSORBING SYSTEMS for "vie ferrate"	UIAA-128

This representation of EN 958 and UIAA 128 does not contain the full details of the test methods and requirements in these standards; it gives only a simplified pictorial presentation. For full details, EN 958 and UIAA 128 should be consulted.



Type "Y"

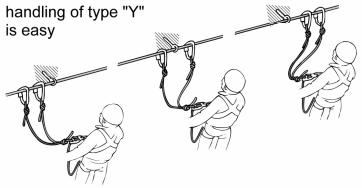


Type "V"

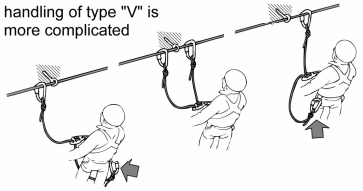
EN 958 - No requirements concerning the figures as shown
UIAA 128 - Only type "Y" is allowed

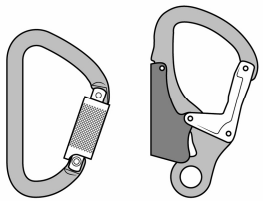
The two figures below show the different use of type "Y" and "V". - Type "V" is more difficult to understand and use correctly. Only one connector should be clipped to the wire cable, except when passing an anchor. If a fall occurs when both connectors are clipped to the wire cable, there will be no energy absorbing capability.

handling of type "Y" is easy



handling of type "V" is more complicated

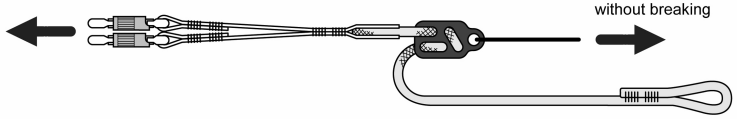




Type K (Klettersteig)
Connector for "Via ferrata", "Klettersteig"

If Energy absorbing systems (EAS) contain connectors (karabiners) when sold, the connectors shall be in accordance with EN 12275 and UIAA 121, Type "K" (K = Klettersteig), which means a higher strength according to EN 12275 and UIAA 121, and an additional minimum bending strength according to UIAA 121.

Static load test



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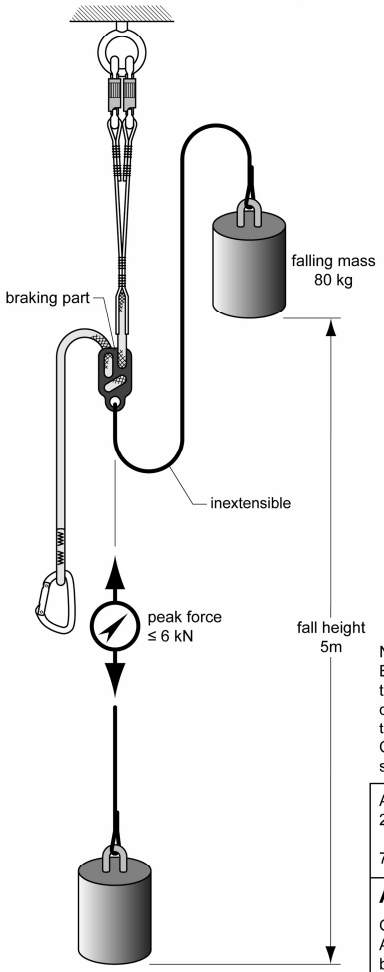
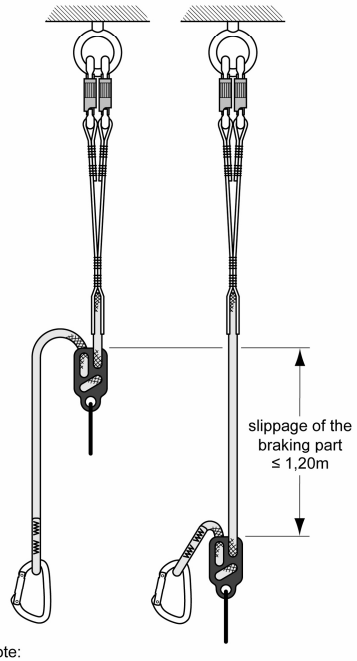
EN-958	ENERGY ABSORBING SYSTEMS for "vie ferrate"	UIAA-128

Dynamic load test





Note:
Because the performance of the EAS depends on the friction between the rope and the braking device, the system shall be supplied complete; the braking device shall not be supplied separately. Connectors that are not an integral part of the system may be supplied separately.

All tests shall be done after conditioning as follows:
24 h (50 ± 5) °C and ≤ 10 % rel. humidity, after that
2 h (20 ± 2) °C and ≤ 65 % rel. humidity, after that
72 h (20 ± 2) °C and (65 ± 2) % rel. humidity.

Additional UIAA requirement

Only Type "Y" is allowed (it is safer).
All load bearing connections shall be designed to be unalterable connections, hence knots are not allowed.

Designed by Georg Sojer


...buone scalate
...in sicurezza !!!