





PLEASE READ ALL THE INFORMATION AND INSTRUCTIONS IN THIS MANUAL CAREFULLY BEFORE USING ANY COMPONENT IN THE ELASTICO 10 SYSTEMS, COVERED BY INTERNATIONAL PATENT.

If you have any queries about the correct use of the components described in this manual, please contact B.S.Italia:

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B.S.Italia is ISO 9001 certified and the ELASTICO 10 systems CE certified, is designed and built in accordance with:





- · General parts: Eurocodes and state-of-the-art;
- Materials and surface treatment: ISO, EN, DIN and UNI standards;
- Material controls: ACCREDIA accredited labs
- Quality System: ISO 9001 through IGQ: IGQ is part of CISQ, which in turn is part of IQNet Reg. Nr. IT-0188.

Reference standards:

- Legislative decree 475 dated 04/12/92, implementation of EEC directive 89/686 "Personal protection equipment".
- UNI EN 353 2nd part "Personal protection equipment against falls from on high - Safety system against falls positioned ona fletible anchoring line".
- UNI EN 354 "Personal protective equipment against falls from a height lanyards".
- UNI EN 355 "Personal protective equipment against falls from a height energy absorbers".
- UNI EN 361 "Personal protective equipment against falls from a height full body harnesses".
- UNI EN 362 "Personal protective equipment against falls from a height connectors".
- UNI EN 363 "Personal protective equipment against falls from a height fall arrest system".
- UNI EN 364 "Personal protective equipment against falls from a height test methods".
- UNI EN 795 "Protection against falls from a height anchor device requirements and testing".



PRESENTATION OF THE SYSTEM

Advantages	4
Design	5
F	
ERECTION	
Positioning	7
Fixing the post	10
Formula for cable length	11
Cable tensioning	12
Optionals	
Lateral bracket	14
Fixing with fasteners	15
MAINTENANGE	
	16
INSPECTION CHECKLIST	18
Markings	19
WARNINGS	20
	01
00063	21
ILLUSTRATIONS	23





Application of ELASTICO 10 on beams



Erection of ELASTICO 10 on beams



S.

Integrated ELASTICO 10 shock absorber

ELASTICO 10 is a lifeline system for the safety in the building site. It consists of patented posts and a safety cable.

Safe use

- 10 m span between posts for ELASTICO 10
- Minimum dimensions maximum walking area without inclined cables
- Shock absorber with double function: cable tensioning and shock absorption during falls
- Fixing of post with a foolproof anchoring system

Erection

- Quick and easy to install
- Minimum number of items to erect
- Minimum weight and dimension with great post strength
- Easy to adjust to suit distances

Optional lateral plate for fixing the post beside the element - maximum surface for walking on the element

Certification

- Tested and certified as compliance with CE standards
- Markings on every element

Cost-effective

• Overall cost savings



Design



Description of the ELASTICO 10 lifeline system.

- ELASTICO 10 is a lifeline system that uses flexible horizontal lines (class C1) in compliance with UNI EN 795 normative.
- ELASTICO 10 is included in category III PPEs compliance with EEC Directive 89/686.
- ELASTICO 10 is designed for building sites, involving precast structures, where the protection is installed before the concrete elements can be erected.
- There are basically three elements making up the ELASTICO 10 system, two of which can be reused: the SAFELIFT that is inserted in the concrete (not reusable), the post and the lifeline (reusable elements).
- Max acceptable force applied to the anchorage at either end: 2.5 ton.
- The flexible horizontal lifeline is made from steel cables; the design of the ELASTICO 10 has also taken into account the need for quick easy installation, full safety along the entire length of the beam and the elasticity of the system.

LIST OR ESSENTIAL REQUIREMENTS Design principles

ELASTICO 10 is classed as category III PPEs; all their elements are designed and built to allow the user to carry out his tasks normally, in accordance with UNI EN 363 (point 5.1).

- In particular, the fitter is guaranteed max freedom of movement on the concrete elements being erected.
- Moreover, the CE certified SAFELIFT system has been adopted to guarantee the safety of the coupling of the post to the beam.

Harmlessness

All elements making up the ELASTICO 10 is designed to avoid the risk of causing harm.

- The materials used guarantee total safety on contact and max efficacy.
- Furthermore, to guarantee max harmlessness of the ELASTICO 10, the surfaces that the worker comes into contact with have no projecting parts, rough edges or sharp edges.



ELASTICO 10 is designed and built so that it can be used in total comfort.

- The foolproof SAFELIFT anchoring system, the absence of tie-rods needed to fix the post, the compact size and minimum distance from the edge of the beam all offer the worker max freedom of movement on the concrete elements.
- The flexible anchored lifeline that the fitter hooks himself to using clamps, ropes and slings (UNI EN 361, UNI EN 362 and UNI EN 354) is about 1 m above the walkway; people of all heights can therefore hook themselves to the lifeline at this height.
- High-performance materials have been used to construct the ELA-STICO 10 system, making it possible to:
 - reduce the overall size
 - keep weights down
 - guarantee the solidity of the PPE
- The components making up the ELASTICO 10 is designed for simultaneously use.

Extra requirements

PPEs with worker adjustable or detachable components

All the elements making up the PPE are designed to be easily adjustable and simple to fix or remove either by hand or with the aid of a torque wrench.

• PPEs can be coupled to another complementary device external to the PPE itself

ELASTICO10 has a flexible anchored lifeline; the fitter must hook himself up to this by energy absorber in compliance with the UNI EN 355 normative in accordance with the UNI EN 363 (point 4.4).

Extra specific requirements for risks to be avoided

• Prevention of falls from on high

This requirement has been satisfied after positive testing in accordance with UNI EN 795/02, as proved by the certificate issued by the Notified Body.



SIGN

Positioning





Rules for positioning the insert in the concrete. The following points must be observed during the design stage:

The following aspects must be taken into account when designing the reinforced concrete beams:

- The number and position of the SAFELIFT anchor tubes that need to be inserted, as is normally the case for any lifting system.
- The distance between any two posts must be \leq 10 m.
- We advise against placing the ELASTICO 10 along the axis of the beam: place it off-axis as shown in figure 1 to get a wider safe walkway.
- Due to the forces involved, no deviations are allowed in the lifeline; the lifeline must be interrupted near corners and then started again at 90°.
- Cable length: see calculation formula paragraph (page 11).
- The min distance from the ground for safe use of the ELASTI-CO 10 must be \geq 3 m.
- Only reinforced concrete with suitable caging should be used for the SAFELIFT insert; it must have a min strength of more than 300 kg/cm²) during use.
- See the SAFELIFT instruction manual for general criteria and specific requirements for positioning the SAFELIFT in the concrete elements (e.g.: reinforcement, concrete caging, minimum thickness, etc.).
- The choice of the insert type (TS, TL, TB, TM or TT) is free; the minimum load capacity of the inserts has to be at least 3 tons.





Instructions for use

• The SAFELIFT must be inserted in the fresh concrete in the positions shown (see fig. 3 and 4 for ELASTICO 10 and fig. 5 for ELA-STICO 25).

See the B.S.Italia SAFELIFT manual for details of any reinforcement required.

Fixing with fastener

A fastener can be used to anchor the post on the beam (see page 15).



- The ELASTICO 10 safety systems must be mounted on the ground: positioning and safe fixing of the post to the beam, clamping and tensioning of the cable.
- N.B.: no deviations are allowed in the lifeline. We recommend interrupting the lifeline near corners and then starting again at 90°.



FIXING THE POST





To couple the post to the beam and the post to the roofing element:

- 1. Move the pin in the foot of the post down into the bottom of the insert (fig. 6).
- 2. Turn the post to lock the safety flange into position.
- 3. Once the safety flange is locked, turn the post to face the direction of the line (N.B. the cable clamp plate must be on the outside of the line).
- 4. Now all you need to do is tighten the nut on the foot of the post for final coupling:
 - the post contains a rotating bush to avoid the risk of the SAFELIFT being in the wrong position (on turning this by a few degrees, or even 90°) and not as described here;
 - there's no risk of making a turning the post pin and this cannot be extracted;
 - in other words, the system has been designed to be failsafe.
 - The nut must be tightened on the foot with 10 Nm torque.
 - The post is pre-assembled with all necessary parts (only the cable needs to be added).



General Rule

Total cable length for all cases:

X + 2L + (n° x H)

Х	= distance between centres of first and last SAFELIFT
L	= 1,64 m fixed coefficient for each end post
N°	= number of intermediate posts
Н	= 0,52 m cable coefficient for each intermediate post

Formula for cable length

This formula is used to calculate the total cable length (see fig. 7)

<u>Cable expansion</u> = X + 2L + (0,520 m x n° intermediate posts)

- $\label{eq:control} \begin{minipage}{0.5 cm} \textbf{X} = \mbox{distance between centres of first and last} \\ \begin{minipage}{0.5 cm} \textbf{SAFELIFT} \end{minipage}$
- L = 1,64 m = fixed coefficient for end post





CABLE TENSIONING



Follow the steps below to ensure the tension of the cable is correct:

- 1. Tighten the central screw on top of all the posts in the system to preload the spring at level 25 mm (minimum) or 30 mm (maximum); see figure 9.
- 2. Unwind the cable (this must be longer or equal to the required cable length calculated beforehand).
- 3. Fix one end of the cable to the side of the post <u>with tighte-</u> <u>ning torque 100 Nm.</u>



A = 0 (spring relieved) Min tension (= 25 mm) $\leq B \leq$ max level (= 30 mm)

Max spring pre-loading = 30 mm Min spring pre-loading = 25 mm 0 (spring relieved)



CABLE TENSIONING



- 4. Thread the end of the cable between the rollers on the top of the post, run it down the inside of the post so that it passes under the central wheel, then bring it back up the outside of the posts and finally pull the cable until it reaches the next post (50 kg). Make sure that the cable doesn't drop more than 4 cm below the horizontal between the posts.
- 5. On reaching the final post, anchor the end of the cable is shown in fig. 10 (ELASTICO 10) and fig. 11 (ELASTICO 25); <u>tightening tor-</u> <u>que 100 Nm.</u>
- 6. Loosen the central screw on all posts in the system so that the spring tensions the cable (relieving this of the pre-loading).







The lateral bracket is an optional with the ELASTICO 10 and allows for anchorage of the system on the outside of the concrete element itself, thus exploiting all the walkway space available on the beam.

- Just one, easy-to-use accessory is needed for external positioning on the post (suitable for use on either the left or the right of the lifeline).
- No special measures are needed during the design of the concrete elements when the lateral bracket is used: in fact, the SAFELIFT inserted in the beam is still used to position the post.

Fixing the lateral bracket to the concrete elements and then fixing the post to the bracket

Follow the instructions given above (pages 7 - 9: fixing the post to the concrete elements) to fix the bracket to the concrete elements and the post to the bracket.

The post is made safe when the following conditions are met:

- the bracket is securely anchored to the concrete element;
- the base of the post must be in contact along its full length with the surface of the lateral bracket;
- the nut on the foot of the posts must be tightened at 100 Nm;
- the cable can be tensioned after the above steps and all checks.





NB: the lateral bracket can only be used when the SAFELIFT is positioned at least 8 cm from the edge of the beam.





An expanding fastener can be used if the SAFELIFT system cannot be used to fix the ELASTICO 10 lifeline directly to the concrete elements. The insert normally needed is a 3 ton SAFELIFT and the ELASTICO 10 posts are then connected to this using an M20 threaded foot.

- As a result, the threaded expanding fastener to be used must have the same diameter and a suitable load capacity with safety factor to guarantee the exact same coupling conditions between the ELASTICO post and the concrete elements (conditions based on the threading).
- The B.S.Italia **thicknening plate** (code 9960-00.F) must also be used in order to guarantee safe coupling and to make up for the lack of an insert to attach the centre of the base of the post to.



Instructions for use

The minimum requirements when using expanding fasteners instead of the SAFELIFT are:

- remove the foot of the post;
- place the thickness plate under the post;
- fix the post using an expanding fastener with M20 threading (e.g. Bossong M20 NWG20-270, code 708708 or equivalent), installed to a depth of 13 cm;
- obviously, responsibility for the lowered capacity and installation method lies with the fastener manufacturer (provided his instructions are followed) and with the installer with regard to its correct installation.

See figure 14 for further details of how to use the ELASTICO 10 with a threaded fastener.



Maintenance



Servicing and routine checks by the user

The ELASTICO system does not require special servicing. Routine servicing of the ELASTICO 10 and system is, however, required of the user and especially the safety manager.





Maintenance

Before using the ELASTICO 10 system, B. S. Italia recommends that you always check:

- the efficiency and integrity of the entire system;
- that there are no foreign bodies inside the SAFELIFT that may hinder the positioning of the pin and the foot of the post or the lateral bracket (ELASTICO 10) during anchoring; see correct working of the rollers, various movements, etc. That the threading used to adjust the position of the feet is not ruined, that there are no foreign bodies inside and that everything runs smoothly. The integrity of the feet (these should not be bent);
- the entire ELASTICO 10 system must be replaced after five years of use, as all the elements are subject to fatigue.
 For this reason, all the main parts are marked in an unmistakable manner with the consecutive number of production, the material casting and the year of manufacture;
- we also recommend cleaning the entire system carefully after each use and storing it in a dry place. If there is a fall from a concrete element, the entire system must be replaced (post + cable + lateral bracket for ELASTICO 10);
- the user and especially the safety manager must make a note in a special register of the date that each element making up the ELA-STICO 10 system is first used and make sure that it is replaced before the end of the five year period; details of each efficiency control and dimension check carried out on the ELASTICO 10 system must also be noted in this register.
- dimensional checks must be carried out at regular intervals (min frequency: once every six months).

Check the following too: • state of welding • state of painting and galvanising • various movements (rollers and spring)

The **table** on page 18 lists the elements making up the ELASTICO 10 system, the necessary checks and the measures to take.



Element to check	Check required or non-conformity met	Non-conformity action
Cable tensioning screw (spring pre-loading)	Check states of threading	Replace post
Overall structure of the post	State of welds and dimensional stability	Replace post
Pin in the foot of the post	Check straightness of the pin	Replace pin*
Pin in the foot of the lateral bracket	Check straightness of the pin	Replace pin*
Base of post and lateral bracket	Check levelness of surfaces	Replaced post. Replace lateral bracket
Screws in the pins and relative nuts	Check state of threading and straightness	Replace pin*
Cable	° Check nominal diameter of the cable (- 0,2%)	Replace cable
	° Breaks at any point in one or more wires	Replace cable
	° Zones where cable is worn	Replace cable
	° Obvious rusting	Replace cable
Upper rollers and central cable guide wheel	Obstructed due to dirt, improper use or other causes	Replace post
Cable clamping plate	Excessive wear in the knurled area in the cable passage hole	Replaced cable clamping plate*
Painting and galvanising (painting > 60 micron) (galvanising > 8 micron)	All painted or galvanised areas must not show signs of rust, as the steel could lose its mechanical properties	Replace post, cable or general screws*
Nuts, bolts and washers	State of galvanising	Replaced nuts, bolts and washers (spare parts)*

- * Replacements must be done by B.S.Italia: return the entire post.
- ° See page 16 for further details on servicing and the areas to check.







The various components making up the ELASTICO 10 system are identified as follows:

Safety post and lateral brackets

Engraved on each safety post and lateral bracket :

- BS Italia trademark;
- CE Mark;
- number of recognised control body;
- year of manufacture/letter indicating material casting/consecutive production n°.

Cables

The small size of the cables means these cannot be identified like the posts; if with a symbol, this is marked with the following data: the diameter, load capacity, year of manufacture and manufacturer (B.S.Italia).





WARNINGS

Damaged or worn parts

Lifeline equipment that is properly used and maintained must still be checked and replaced if damaged or worn. The frequency of inspections will depend upon the amount of use and the conditions of use and storage. The user shall be responsible for scheduling inspections and getting damaged or worn parts replaced.

Welding or modifying

The welding or modifying of any ELASTICO 10 product is not permitted as this may cause a decrease in the design capacity or embrittlement of the material, causing unsafe working conditions. B.S.Italia cannot be held liable for any damage or injury as the result of modifications to its products or individual components.

Replacing or exchanging components

The products that B.S.Italia manufactures and supplies are designed as a system. Non original spare-parts are not allowed.

Safety recommendations

- Avoid all contact with the cables used to lift the concrete elements; any bashi, even if accidental, could affect the efficiency of the system.
- Never tamper with the ELASTICO 10 system or use for any purposes other than those for which it is designed and built.
- The ELASTICO 10 is a personal protection equipment and so must only be used by one person at a time.
- The fitter must wear a sling with a double clamp if working on a lifeline with more than two posts.
- The ELASTICO 10 system must only be used with suitable lifeline equipment fitted energy absorbers, certified and marked with CE markings.
- \bullet The minimum distance of the beam from the ground for the ELA-STICO 10 must be > 3 m.
- ELASTICO 10 is a safety systems: never drop the post or elements from any height after use.

Calculations

Follow the instructions in this manual carefully. In accordance with local regulations, and individual must be appointed for each product to be responsible for the safety of the workplace. A detailed erection plan must be issued an followed. This manual must be present and available on site and handed to the relevant managers: production, storage and site.



Codes

Name	Code	Pack
Post	9900-00.V	2 items
15 m cable - 6 mm Ø	9900-06.F	1 item
30 m cable - 6 mm Ø	9901-06.F	1 item

Accessories / Spare parts





Accessories / Spare-parts for ELASTICO 10

Name	Code	Pack
Plate under the post	9960-00.F	2 items
3 ton foot for post	9940-3.0F	2 items
3 ton foot for post	9940-6.0F	2 items









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ILLUSTRATION TABLES FOR CORRECT USE AND ASSEMBLY OF THE ELASTICO 10 SYSTEM

Positioning of the SAFELIFT

26

POSITIONING VARIANTS

Exchanging the post foot (six ton optional foot, B.S.Italia code 9940-06.F)	29
Fixing with expanding fasteners	30
Fixing on steel structures	31
Erection with lateral brackets	32
Adjusting the post	33

ERECTION OF THE SYSTEM

Erection sequence of post on the elements	
Cable positioning and tensioning	35
Erection sequence	37
Dismantling sequence	38
General rules for safe work	39
Typical elements	40
Typical examples of application	41

ERECTION SEQUENCES: typical precast structures

43
44
45
49
51
53
55





Dimensions for vertical falls	
Distance between ELASTICO 10 posts (m)	Vertical lengthening of safety cable A
10 m	1,34 m
9 m	1,21 m
8 m	1,07 m
7 m	0,94 m
6 m	0,80 m
5 m	0,67 m

Min height: 3 m below the ELASTICO 10 system







SAFELIFTPOSITIONING











Exchanging the post foot for the SAFELIFT insert from 3 to 6 tons

The ELASTICO 10 lifeline system can be easily combined with a 3 ton foot (fitted as standard) and a 6 ton foot so they can be fixed to the appropriate 3 ton or 4 - 5 - 6 ton SAFELIFT.





IXINGWITHEXPANDINGFASTENERS



The ELASTICO 10 lifeline system can be fixed directly the concrete element using an **expansion fastener** (Bossong M20 NWG20-270, code 708708 or equivalent). The appropriate B.S.Italia thicknening plate must be used (code 9960-00.F).









Dimensions in mm





RECTIONSEQUENCEOR FIXINGPOSTTO ELEMENT





N.B. 100 Nm tightening torque





Cable positioning and tensioning sequence

(this operation has to be done the first time a pair of posts is used)

- Tighten the central screw on the top of all posts in the system to compress the spring (25 mm - max 30 mm; see the marks on the post).
- Pix one end of the cable to the side of the post in the special fixing position (fig. a). Pull the cable into position (fig. b). Tighten the nut at 100 Nm.
- Thread the end of the cable between the rollers as shown, always making sure that the cable is taut (the tension curve of the cable must be < 4 cm).</p>





Positioning the post on the elements

Fix the other end of the cable to the side of the post in the special fixing position (figure 17). Pull the cable into position, as shown in fig 18. Tighten the nut at 100 Nm.



Loosen the screw on the edge of each the post so that the spring is relieved and so tensions the cable.



Preloaded spring - Cable slack





Relieved spray - Cable taut





Rapid dismantling sequence

The pair of erected posts, as described above, can be dismantled and repositioned quickly and easily without taking out the cable:

Tighten the central screw on the top of all the posts: the cable becomes slack.



2 Loosen the bolts on the base of the posts and then remove these.



The ELASTICO 10 system can be moved and installed on another element using a pair of pre-assembled post+cable to speed up the repositioning of the system.







General rules for safe erection

Positioning of the horizontal lifeline system on the ground before the element is moved to its final position.



Operator lifted to erected height of elements using safety equipment.



Connection to the horizontal lifeline and changing from one line to another using suitable safety slings with double connection.





Typical elements requiring use of the lifeline







TYPICAL CASES FOR PRECAST STRUCTURES

Erection of double T element on L beam



Erection on multilevel structure



Erection of double T element on I beam



Erection of double T element on inclined roof (with or without light openings



Erection of parabolic roof elements





RECTIONSEQUENCES

L and I beams with double T elements (pages 45 - 46)



Multilevel structure (pages 51 - 52)



Multilevel steel structure (pages 53 - 54)



High L beam with double T elements



Inclined roof beams with double T elements (pages 49 - 50)





L AND I BEAMSWITHDOUBLET ELEMENTS



Positioning on the ground of the ELASTICO 10 system on the beam



Positioning on the ground of the ELASTICO 10 system on the roof elements

Three lifelines are needed to erect a series of roof elements: one line for the border elements, one line for the elements just erected and one line for the elements to be erected (ELASTICO 10 always positioned on the ground).





Safety is guaranteed throughout the erection process thanks to the positioning on the ground of the ELASTICO 10 lifeline.



After erection, the external lifelines stay in position for the next stage.





The ELASTICO 10 system must be positioned on the beam while on the ground



Positioning on the ground of the ELASTICO 10 system on the roof elements

Three lifelines are needed to erect a series of roof elements: one line for the border elements, one line for the elements just erected and one line for the elements to be erected (ELASTICO 10 always positioned on the ground).





As erection progresses, the lifeline is removed from the beams, as these act as a parapet and so guarantee worker safety.



After erection only two lines remain at either end to close the open spans. The level is completely safe for walking and the next floor can now be erected. Safety is guaranteed on every level.









Positioning on the ground of the ELASTICO 10 system on the roof elements using the lateral bracket





Positioning on the ground of the ELASTICO 10 on the roof elements $\label{eq:elastic}$

The light openings in the elements must be suitably protected before the elements can be erected.

Use of the lateral bracket (see fig. 12, page 13)

The building is gradually erected, always having a lifeline around the edge of the roof elements. A perimeter lifeline remains after erection to guarantee level safety. The wall panels can now be erected.







Mutileveistructure





The roof elements are erected with the ELASTICO 10 system already in place.



Construction continues with the perimeter lifeline at all times.



On completing the level, the perimeter lifeline is retained: the level is therefore safe and work starts on the next floor.

Leaving the perimeter lifeline on all levels ensures safety during all subsequent stages.



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48.

The elements are erected with the ELASTICO 10 system already in place.

On completing the level, the perimeter lifeline is retained: the level is therefore safe and work starts on the next floor.

Roofelementswithinglinedwings

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