

cobra[®]

KRONENSICHERUNG
TREE CABLING SYSTEM
SYSTEM D'HAUBANAGE
SISTEMA DI CONSOLIDAMENTO PER ALBERI
CABLE DEL ÁRBOL
SYSTÉM ZAJIŠTĚNÍ STROMŮ



TREE CABLING HAS A NAME: COBRA — WORLDWIDE

Dear Tree Cabling Professional,

We are glad that you have decided to use **cobra tree cabling systems** to provide appropriate, modern tree care.

With pbs Baumsicherung, you're relying on an internationally renowned company: Since 1993, our range of **cobra** products has proven its worth more than 300,000 times—all over the world and certainly also near you.

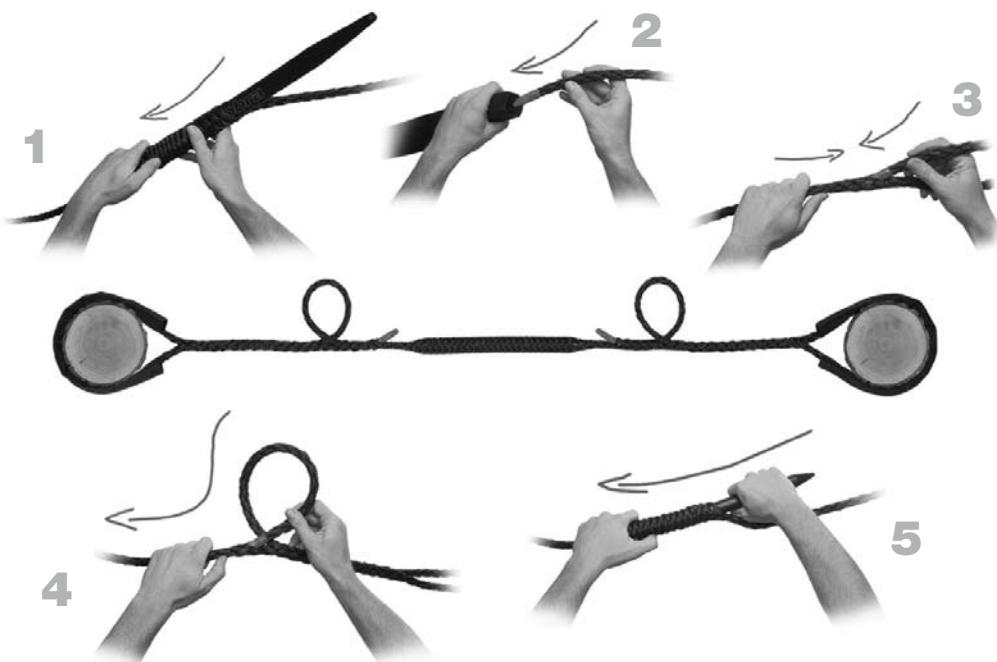
This handy brochure will help you with the proper installation of your cobra tree cabling systems. We want you to work well with—and like to use—our products. Our products help you reduce potential safety risk in the tree and bring trees in danger a longer life.

We wish you much success using cobra,

Peter Göhner
Managing Director

EASY INSTALLATION IN SIX STEPS

Installation is the same for all cobra systems: cobra standard, cobra plus 2 t, cobra plus 4 t, cobra 8 t, and cobra mini.



1. INSTALL EXPANSION INSERT

Choose the appropriate length (length of the expansion insert should be approximately the circumference of the stem/branch). At a distance of the stem/branch circumference plus 20 cm (8 inches) from the end of the rope, compress the rope and insert the expansion insert through a mesh into the rope.

2. MOUNT ANTI-ABRASION HOSE

Cut the anti-abrasion hose to length (minimum length = stem/branch circumference) and pull it over the rope in the section of the expansion insert.

3. CREATE QUICK SPLICE

After winding the rope around the stem/branch, feed the end of the rope through the inside of the rope. For the mini, standard, plus 2 t, and plus 4 t, the rope should be fed approximately 30 cm (12 inches) through the inside of the rope. For the 8 t, it should

be fed approximately 50 cm (20 inches). Then, lead the rope out again (the distance from the stem/branch should be approximately one-half the diameter of the stem/branch).

4. FORM COMPENSATION LOOP

Form a loop and feed the end of the rope again, this time about 10 cm (4 inches) for the mini, standard, plus 2 t, and plus 4 t, or about 15 cm (6 inches) for the 8 t through the inside. Then lead the end of the rope out again.

5. INSERT SHOCK ABSORBER

Compress the rope at a convenient place and insert the shock absorber (for cobra standard, slightly lubricate the tip of the shock absorber).

6. INSTALL THE COUNTER BEARING

Repeat steps 1 through 4 at the counter bearing.

DIFFERENCES AMONG THE INDIVIDUAL COBRA SYSTEMS

	INSTALLATION HEIGHT	FIELD OF APPLICATION	REMARKS
cobra standard	Installation position at two-thirds the height of the stem provides for optimal efficiency of the breaking/cabling system.	Manufacturer recommends dynamic breaking/cabling for a stem/branch base up to 30 cm (12 inches). Dynamic breaking/cabling for a stem/branch base up to 40 cm (16 inches).	Since 1993, cobra standard has successfully been used worldwide for dynamic breaking/cabling. cobra standard is suitable for use with a stem/branch base up to 30 cm (12 inches).
cobra plus 2 t	Installation position at two-thirds the height of the part of the tree to be secured provides optimal efficiency for dynamic breaking/cabling. When used as load/support cabling, the rope should be installed as vertically as possible.	Dynamic breaking/cabling for a stem/branch base up to 40 cm (16 inches). Load/support cabling for a stem/branch base up to 30 cm (12 inches).	According to ZTV Baumpflege 2006, the cobra plus 2 t tree cabling system has a minimum tensile strength of 2 tonnes (2,200 pounds).
cobra plus 4 t	Installation position at two-thirds the height of the part of the tree to be secured provides optimal efficiency for dynamic breaking/cabling. When used as load/support cabling, the rope should be installed as vertically as possible.	Dynamic breaking/cabling for a stem/branch base of 40 to 60 cm (16 to 24 inches). Static breaking/cabling and load/support cabling up to a stem/branch base of 40 cm (16 inches).	According to ZTV Baumpflege 2006, the cobra plus 4 t tree cabling system has a minimum tensile strength of 4 tonnes (4,400 pounds).
cobra 8 t	Installation position at two-thirds the height of the part of the tree to be secured provides optimal efficiency for dynamic breaking/cabling. When used as load/support cabling, the rope should be installed as vertically as possible.	Dynamic breaking/cabling for a stem/branch base of 60 to 80 cm (24 to 32 inches). Static breaking/cabling and load/support cabling for a stem/branch base of 40 to 60 cm (16 to 24 inches), with double installation for a stem/branch base of 60 to 80 cm (24 to 32 inches).	According to ZTV Baumpflege 2006, the cobra 8 t tree cabling system has a minimum tensile strength of 8 t (8,800 pounds).
cobra mini	Installation position for crown correction as respectively required.	Crown correction, cabling after planting, fruit farming	

COBRA ULTRASTATIC — EASY INSTALLATION IN FOUR STEPS

cobra ultrastatic was specifically developed for use in cases where there is a visible crack. Because of its very low rope extension (0.2% per tonne), it is extremely well suited for immobilizing such branches. The system is installed as follows.

1. PREPARE THE END OF THE ROPE

Trim the end of the cobra ultrastatic rope at a 15-degree angle along the filament run. Push the cobra ultrastatic end cap over the end of the rope and heat-shrink it.

2. CONNECT ROPE AND LOOP

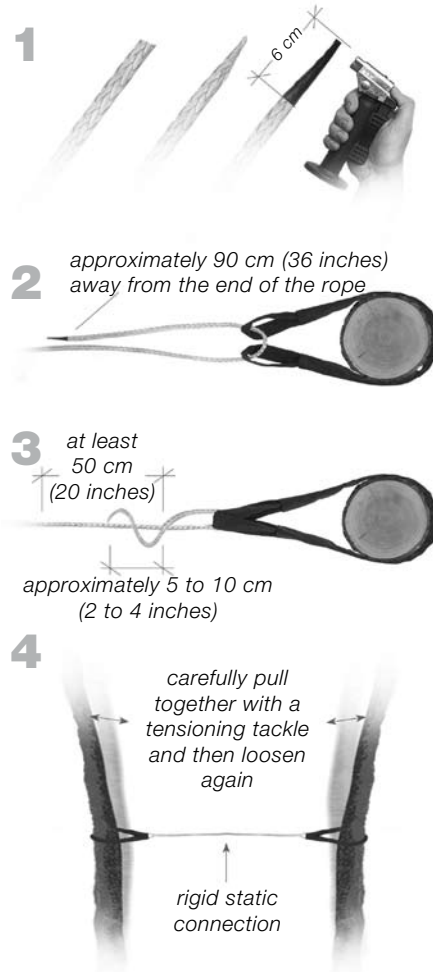
Sling the cobra ultrastatic loop around the stem and thread the end of the rope through both end loops.

3. CREATE A QUICK SPLICE

At a distance of about 90 cm (36 inches) from the end of the rope, pass the rope two times completely through the rope. Then open the mesh with your finger and feed the tip of the rope through that opening at least 50 cm (20 inches) through the inside of the rope. Do not lead it out again. Smoothen the quick splice and tension it.

4. CONNECT STEMS

Using a tensioning tackle, carefully pull together the stems to be secured. Cut cobra ultrastatic to the length as described in steps 1 through 3. Install the cobra ultrastatic on the second stem. Install the rope as tightly as possible. Then carefully loosen the tackle. The cobra ultrastatic rope is tensioned even more and connects the two stems statically.



INSTALLATION HEIGHT

According to ZTV Baumpflege 2006 (the German tree care standard), the rope should be installed at two-thirds the height of the crown part to be secured.

USE OF COBRA PLUS 2 T / 4 T AND COBRA 8 T IN ACCORDANCE WITH ZTV BAUMPFLEGE 2006

The 2006 revision of ZTV Baumpflege focuses on tree cabling. This brochure explains what that standard means to you, as a user, and shows how you can use cobra in accordance with the standard. The 2006 revision of the standard includes the following changes.

- It states that tree cabling material must have a service life of at least eight years.
- It distinguishes between the two types of tree cabling (breaking/cabling and load/support cabling).
- It specifies the minimum tensile strength of the system throughout its stated service life.
- It provides dimensioning tables for breaking/cabling and load/support cabling systems.

PRINCIPLES

With the use of cobra tree cabling systems, it is possible in many cases to avoid pruning and therefore maintain leaf volume, which is necessary for the development of wood cells. Choose the most suitable cobra tree cabling system for supporting the structurally weak spot in the tree. ZTV Baumpflege distinguishes between dynamic breaking/cabling, static breaking/cabling, and load/support cabling.

NOTE:

Even with pruning and/or cabling, it is not possible to guarantee against tree breakage or crown failure.

TECHNICAL FEATURES

cobra plus 2 t / 4 t and cobra 8 t meet the technical requirements for cabling systems as set forth in ZTV Baumpflege.

cobra can be installed without damaging the tree.

cobra is made of durable polypropylene monofilaments and, with a strength loss of less than 2% per year, has a service life of up to 15 years.

cobra can be individually adapted to the particular features and needs of a tree by using different component sizes.

cobra's integrated shock absorber and rope extension provide elasticity that is independent of length, which allows for additional play for movement in gentle breezes (the low-load swinging range).

cobra's expansion inserts and anti-abrasion hoses prevent damage to rope and tree from cutting in and abrasion.

cobra's adjustable reserve loop enables the system to increase its length as the tree grows.

because it is black, cobra is visually unobtrusive.

WHICH COBRA SYSTEM FOR WHICH PURPOSE?

DYNAMIC BREAKING/CABLING

For preventing breakage caused by oscillation-induced overstretching, install cobra plus 2 t / 4 t and cobra 8 t with a shock absorber as a dynamic breaking/cabling system. That way, the oscillations of the crown are not impeded, yet load peaks from strong gusts are softly dampened. You should dimension the rope and shock absorber specifically for the particular tree's condition and situation. The higher the tensile strength of the rope and the lower the expandability of the rope and shock absorber, the more rigid the system is. As a result, the stronger the load peaks caused by shock-loading in case of strong swings.

STATIC BREAKING/CABLING

If damage is already present (i.e., formation of cracks), we recommend installing a cobra tree cabling system (cobra plus 4 t or cobra 8 t) without a shock absorber or using the low-expansion cobra ultrastatic system, specifically developed for this purpose, as a static breaking/cabling system. By immobilizing the critical spot, this type of cabling system prevents enlargement of the crack and helps prevent the branch from breaking off.

LOAD/SUPPORT CABLING

If, for reasons of traffic or pedestrian safety, you want to prevent a broken branch from falling to the ground, install static load/support cabling system. We recommend a cobra tree cabling system without a shock absorber or the cobra ultrastatic. Either system should be installed as vertically as possible. That way, if the secured branch breaks, it will hang in the rope. The only acceleration will be from the rope extension, and, therefore, there

will be little or no shock-loading. The rope and anchor point should be sufficiently strong to carry the weight of the branch.

INSTALLATION RULES ACCORDING TO ZTV BAUMPFLEGE

DYNAMIC BREAKING/CABLING

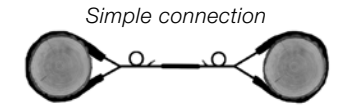
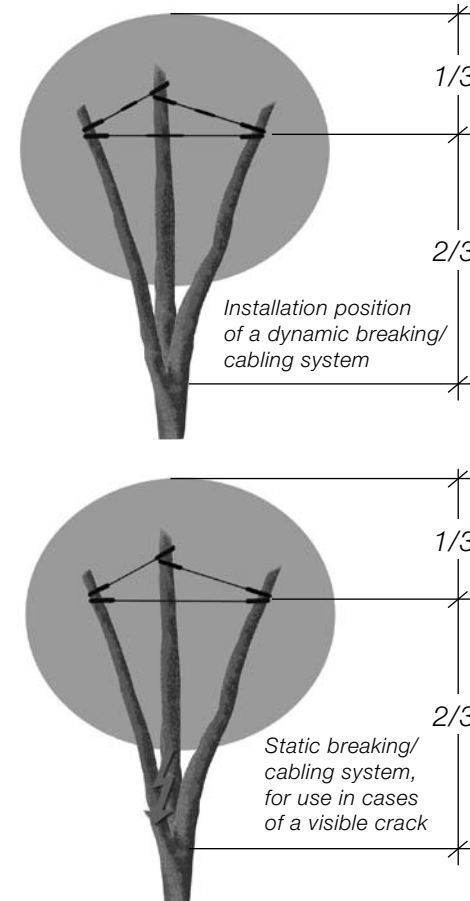
To optimally limit damage, install a dynamic cobra breaking/cabling system at a point at least two-thirds the length of the branch to be secured. Under wind load, that point is near the load center of the crown. This installation point keeps the leverage forces as low as possible and helps ensure a low loading of the rope. You can achieve optimal dynamic behaviour of the system with a low tensile strength of the rope (see tensile strength table on page 10), which will protect the secured parts of the crown from overload and breakage. A lower installation requires higher dimensioning. Install the cobra connections during summer without tension or slack. In winter, install cobra with a slight amount slack so as to avoid permanent load during summer.

STATIC BREAKING/CABLING

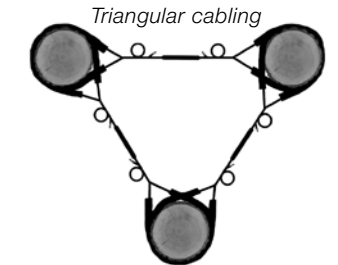
Install a static cobra breaking/cabling system at a point at least two-thirds the length of the part of the tree to be secured (branch or stem), for the same reasons that apply to a dynamic breaking/cabling system. In this type of tree cabling system, however, expandability is not desirable because a crack could be enlarged by movement. According to ZTV Baumpflege, you must therefore dimension a static tree cabling system at least two times higher than a dynamic tree cabling system (e.g., 4 tonnes instead of 2 tonnes).

TYPES OF BREAKING/CABLING SYSTEMS

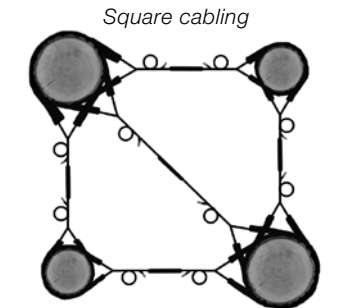
You can install cobra breaking/cabling systems in conformance with ZTV Baumpflege cabling specifications.



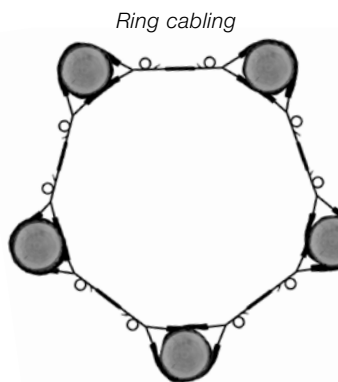
Simple connection



Triangular cabling



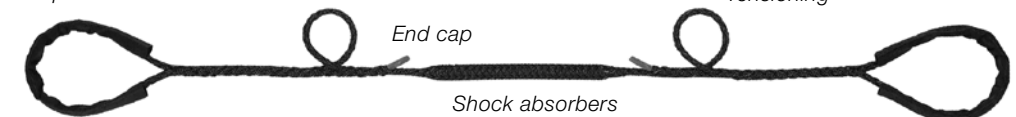
Square cabling



Ring cabling

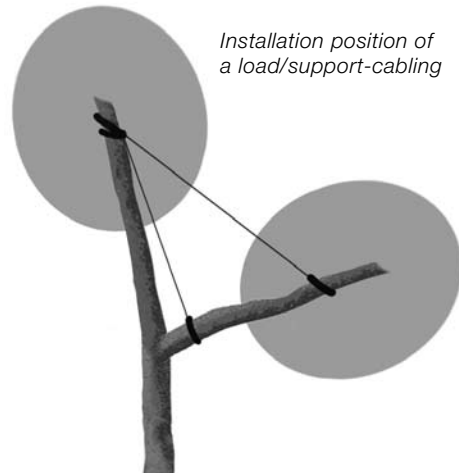
PRODUCT OVERVIEW

Expansion insert and loops anti-abrasion hose



LOAD/SUPPORT CABLING SYSTEMS

For load/support cabling systems, use a low-expansion rope and install it as vertically and tightly as possible in order to avoid shock-loading if the branch breaks, falls, and is caught by the rope. Shock-loading exposes the rope and the part of the crown that is secured to unnecessarily high stress, which could lead to breakage from overload. Therefore, the tensile strength of the cobra tree cabling system and the anchor point at the carrying part of the crown must be sufficient to carry the weight of the branch and exclude a sudden load. Tensile strength can be calculated with the tensile strength tables (shown below) in ZTV Baumpflege.



Installation position of a load/support-cabling

COBRA ULTRASTATIC:

- Dyneema hollow rope with special braiding suitable for quick splice



- Large-surface loop with Dyneema core for low-expansion installation with high load-bearing capacity



TENSILE STRENGTH FOR DYNAMIC BREAKING/CABLING SYSTEMS

Basis Diameter Branch/Stem	Minimum Tensile Strength of the System*1
up to 40 cm (16 in.)	cobra plus 2 t
up to 60 cm (24 in.)	cobra plus 4 t
up to 80 cm*2 (32 in.)	cobra 8 t

*1 Minimum tensile strength of the system

For the warranted service life, installed at a point at least two-thirds the length of the branch/stem to be secured

TENSILE STRENGTH FOR LOAD/SUPPORT CABLING SYSTEMS

Basis Diameter Branch/Stem	Minimum Tensile Strength of the System*1
up to 30 cm (12 in.)	cobra plus 2 t
up to 40 cm (16 in.)	cobra plus 4 t
up to 60 cm (24 in.)	cobra 8 t
up to 80 cm*2 (32 in.)	cobra 8 t (double)

*2 Basis diameter of more than 80 cm (32 in.)

Trunk diameters of more than 80 cm (32 in.) are special situations to be decided on a case-to-case basis

COBRA OFFERS A WIDE RANGE OF PRODUCTS AND ADVANTAGES

- cobra tree cabling systems are convincing in every aspect
- dependable support systems for every cabling situation
- minimum system tensile strengths ranging from 0.4 to 8 tonnes
- the 2t, 4t and 8t systems are conform to ZTV Baumpflege, the german tree care standard
- visually unobtrusive
- soft shock damping for dynamics independent from the rope

- up to 17% rope extension (without shock absorber)
- quick-splice method provides for a tool-free, easy installation
- system length that grows with the tree and is adjustable
- all materials are environmentally compatible
- proven reliability from 300,000 systems installed worldwide since 1993
- affordable prices

cobra-system	mini	standard	plus 2 t	plus 4 t	8 t	ultrastatic
cable breakload	600 daN	2.080 daN	3.450 daN	6.150 daN	11.375 daN	9.000 daN
material	Polypropylene-hollow cable	Polypropylene-hollow cable	Polypropylene-hollow cable	Polypropylene-hollow cable	Polypropylene-hollow cable	Dyneema-hollow braid
cable diameter	8 mm	12 mm	14 mm	22 mm	28 mm	10 mm
ductile yield (cable)	17 %	17 %	17 %	17 %	17 %	2 %
durability	–	2,5–7 %	3–9 %	5–11,5 %	3–10 %	0,25–0,85 %
length of application	> 8 years	> 8 years	> 8 years	> 8 years	8 years	8 years
breakload (incl. shock absorber)	500 daN (0,5 t)	1.800 daN (1,8 t)	3.030 daN (3,0 t)	5.400 daN (5,4 t)	10.500 daN (10,5 t)	7.000 daN (7,0 t)
degradation per year	< 2 %	< 2 %	< 2 %	< 2 %	< 2 %	–
field of application	Crown correction, cabling after planting, fruit farming	Manufacturer recommends dynamic breaking/cabling for a stem/branch base up to 30 cm (12 inches).	Dynamic breaking/cabling for a stem/branch base up to 40 cm (16 inches). Load/support cabling for a stem/branch base up to 30 cm (12 inches).	Dynamic breaking/cabling for a stem/branch base of 40 to 60 cm (16 to 24 inches). Static breaking/cabling and load/support cabling up to a stem/branch base of 40 cm (16 inches).	Dynamic breaking/cabling for a stem/branch base of 60 to 80 cm (24 to 32 inches). Static breaking/cabling and load/support cabling for a stem/branch base of 40 to 60 cm (16 to 24 inches), with double installation for a stem/branch base of 60 to 80 cm (24 to 32 inches).	Static breaking/cabling and load/support cabling up to a stem/branch base of 40 cm (16 inches).
in accordance with	manufacturer information	manufacturer information	