BRUGG LIFTING
Going up.

CTP®

COATED TRACTION PRODUCTS

LEADING ROPE TECHNOLOGY SINCE 1896

. . . the future starts now!

SERVICES

System Provider
We offer to you a wide assortment of elevator ropes, accessories and tools to meet all of your requirements. We supply you with complete solutions or individually combined components as individual or pre-assembled parts to suit your needs.

Customized
Our wide assortment of elevator ropes, accessories and tools provides nearly all products required for your applications. If none of the articles depicted in the catalog solves your problem, or if your elevator is to meet specific requirements, we will be glad to advise you and to develop customized solutions together with you.

Availability
Due to our three production facilities located in Switzerland, the USA and China, as well as due to our global network of warehouse locations, our products will be delivered to your factory or your construction site within a very short time. Please contact us if you have any questions regarding deadlines, individual deliveries and specific projects.

Express Service
In urgent cases we provide the required materials ex works within the hour and ship it to you as quickly as possible by courier all over the world.

International Standards
BRUGG LIFTING is certified according to ISO 9001:2008 and ISO 14001:2004.

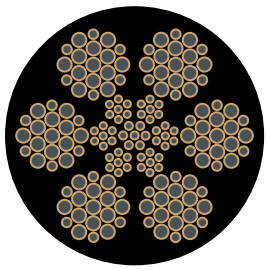
Training/Specialist Workshops
Our aim is to ensure that you will enjoy an optimal use and an increase service life of your elevator ropes. Make use of our offering of qualified and customized training units for your staff.

Developed as a world's first, CTP® combines technological innovations into a state of the art plastic coated rope specifically designed for the elevator industry.
Approved for traction sheaves with a diameter of only 115 mm, CTP® ropes have been already installed in 60,000 elevators all over the world.
Tested by means if simulation In the laboratory and under real-life conditions, CTP® meets highest demands on function and efficiency.

BRUGG LIFTING

CTP

COATED TRANSMISSION PRODUCTS

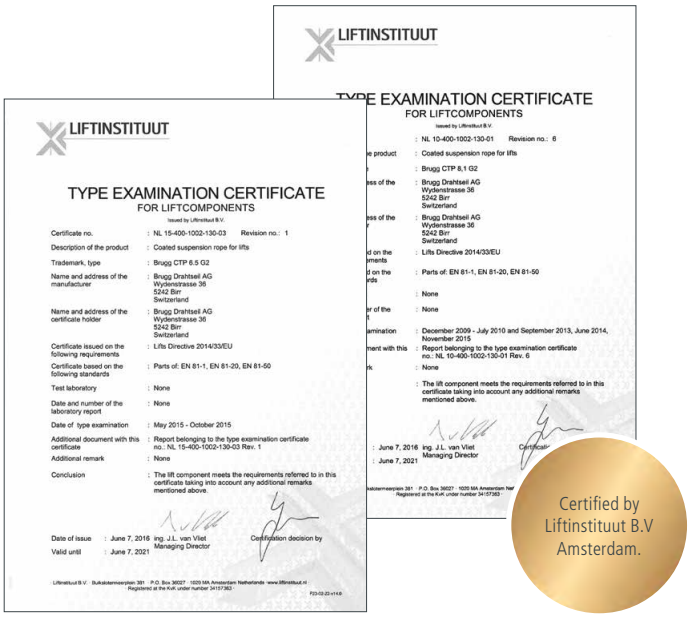


Steel core rope with coated transmission, 6 strands, separate lay
For highest demands on elongation, riding comfort and service life.

125.000 N/mm²	0,104 %	0,13 %	≤ 150 m
E-Module **	Elastic elongation	Permanent elongation	Lifting height *

item number	rope ø	breaking load min.	weight	construction
	mm	kN	kg/100 m	
10982	6.5	23.6	11.0	6x19 seal SES (IWRC)
73106	8.1	33.5	18.0	6x19W-IWRC 2600 sZ

* There is no limitation on lifting heights however experience to date is limited to installations below 150m. Certified and in Production. Available in Stock length and in cut lengths.
Rope diameter-tolerances according to ISO 2768-1 class m (middle).
** E-Module tested according to DIN 18800. The specified E-Module is tested with 30-40% of MBL.



LIFTINSTITUUT

TYPE EXAMINATION CERTIFICATE
FOR LIFTCOMPONENTS

Certified by Liftinstituut B.V Amsterdam.

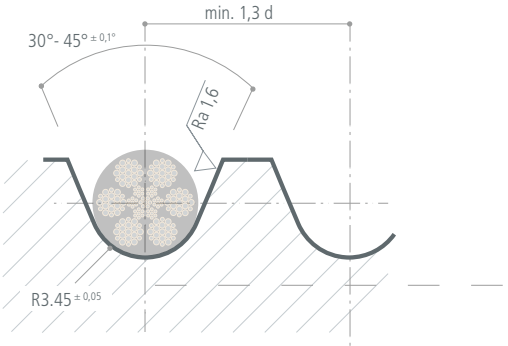
A world first, CTP® unites technological innovation for the highest demands.
This high-end rope is unbeatable in terms of function and efficiency.

Reduce your total cost by up to 40%.
A smaller rope diameter and a smaller drive allow for a reduction of capital and operating cost.

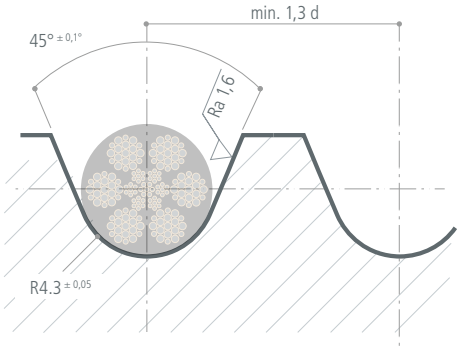
Reduce your maintenance cost by up to 100%.
CTP® is a self-contained system which requires neither lubrication and minimal maintenance.

Enjoy a clearly improved travelling comfort.
The polymer coating eliminates or strongly absorbs vibrations, which significantly contributes to a smooth running.

Increase the service life.
As there is negligible wear between the traction sheave and the rope, the frequency of rope replacement is much reduced.



Specified Groove Diagram for CTP® 6.5 mm

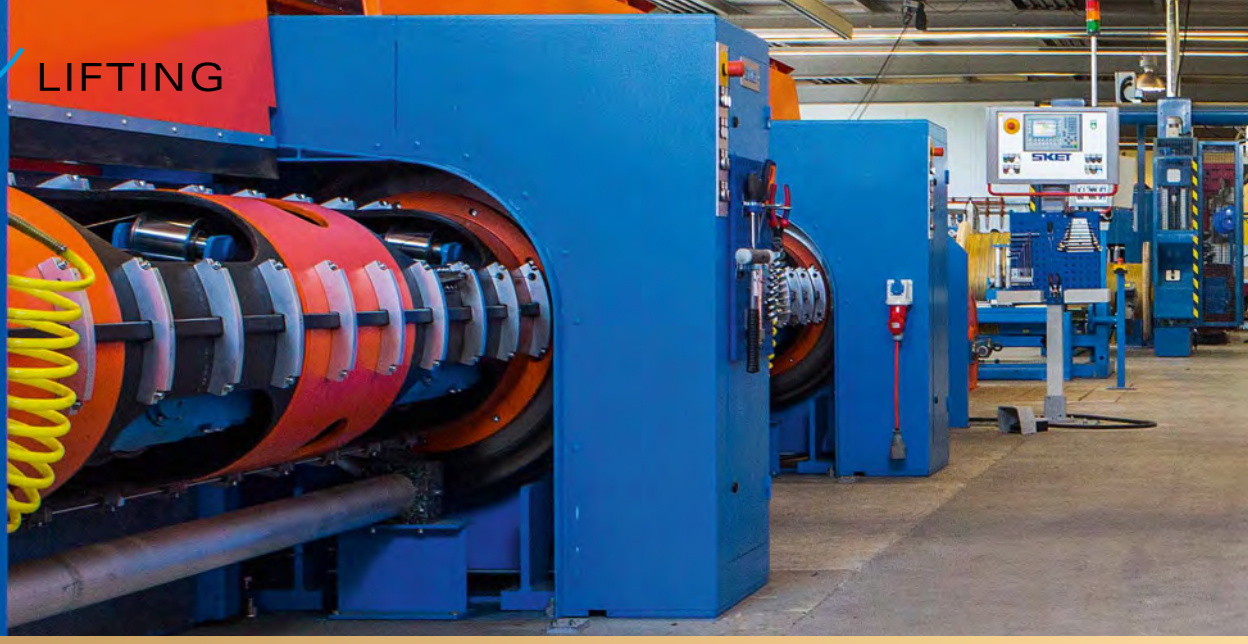


Specified Groove Diagram for CTP® 8.1 mm

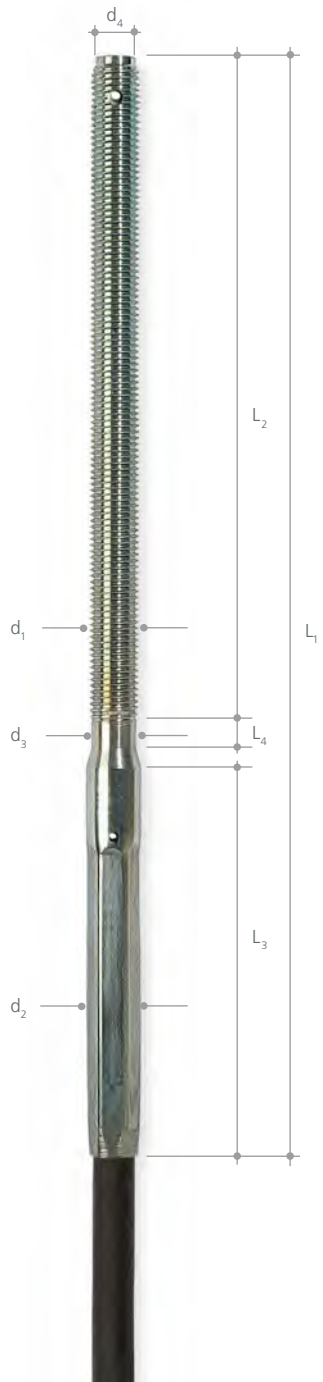
Main data of traction sheave / deflection

For item number	rope ø	Steel rope ø	Friction coefficient	Rope speed max.	Sheave dia.	Traction sheave material	Groove shape	Deflector sheave material
	mm	mm		m/s	mm		semicular ø mm	
10982	6.5	4,9	0,6 – 0,3	3,5*	≥ 115	C45, C45 hardened, 42 CrMo4	3,4 – 3,65	Steel, cast iron, PA, PU.
73106	8.1	6,2	0,6 – 0,3	3,5*	≥ 120	C45, C45 hardened, 42 CrMo4	4,3	Steel, cast iron, PA, PU.

* Higher speeds must be tested.
Tolerances according to ISO 2768-1 class m (middle).
The CTP® rope is only certified for usage on traction and deflector sheaves that meet the requirements outlined above.



APAG Threaded Swaged Sockets



Product Data

- APAG-end connections are TÜV tested and approved according to TRA/EN81.
- APAG-end connections transmits 80% of minimal breaking load of traction rope

Advantages

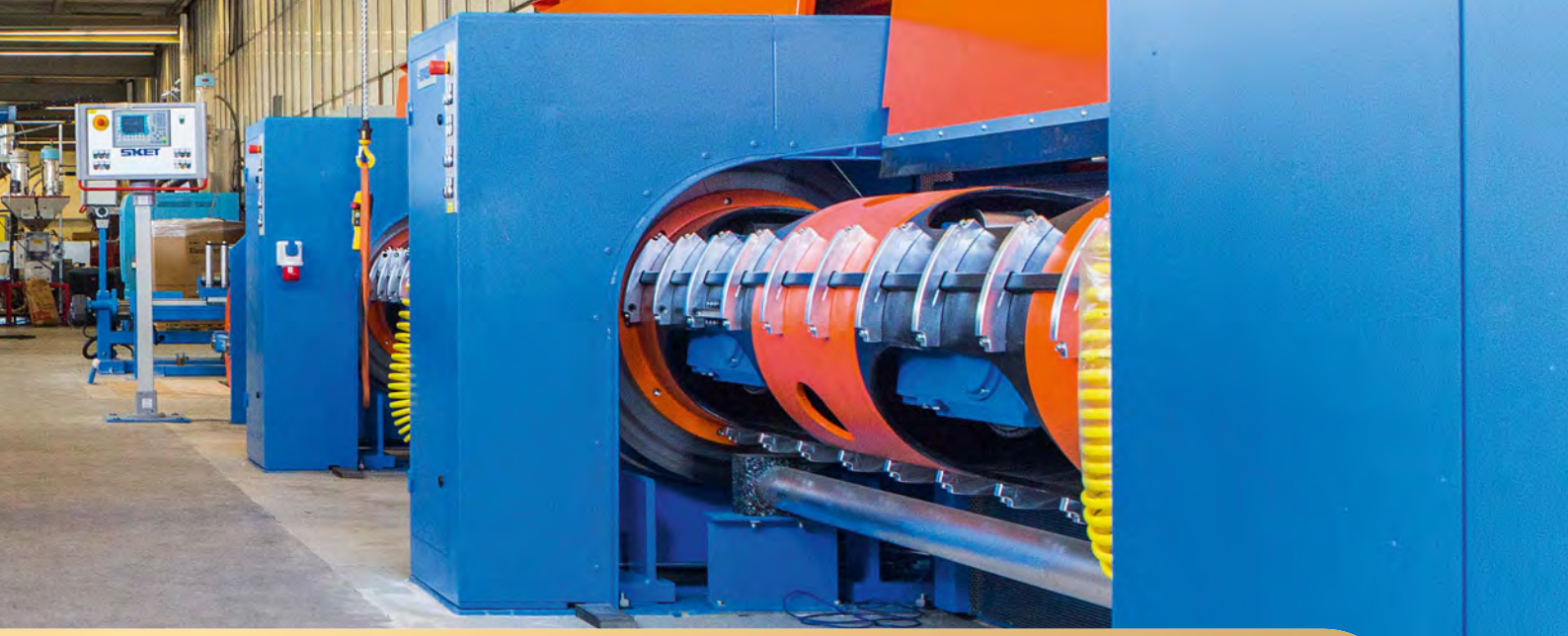
- simple, fast and safe end terminations
- shortened installation time, since no mounting of end connections by customers
- no special tools required
- the compact type enables a very tight arrangement of ropes and parallel running ropes
- simple securing against rotation
- position of pilot hole for rope end
- quiet operation because there are no individual parts

For use with CTP® 6.5 mm

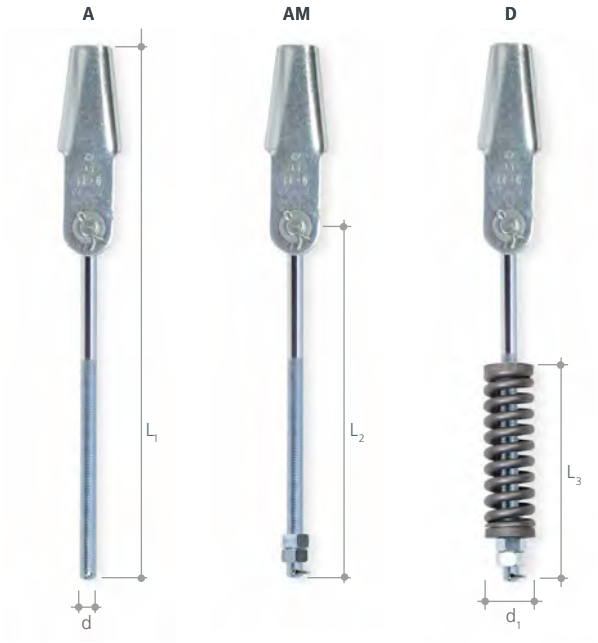
item number	d_1	d_2	d_3	d_4	L_1	L_2	L_3	L_4
	dimensions in mm							
10209	M 10	13	9	7	240	150	66.0	16.6

For use with CTP® 8.1 mm

item number	d_1	d_2	d_3	d_4	L_1	L_2	L_3	L_4
	dimensions in mm							
10113	M 10	13	9	7	240	150	71.5	11.1



WEDGE SOCKET Symmetrical [EN 13411-7]



Product Data

- wedge socket welded, steel zinc-plated
- incl. wedge, bolt and safety pins pre-assembled
- wedge socket transmits 80% of minimal breaking load of traction rope or governor rope
- eylet bolt welded, steel zinc-plated
- in connection with the wedge socket the eyelet bolt transmits 80% of the minimal breaking load of the elevator rope
- for mounting and operation the explanations in appendix B of the norm EN 13411-7 are valid

Advantages

- can be assembled safely and simply on-site
- springs, buffers and other accessories can be mounted individually

For use with CTP® 6.5 mm

item number		rope ø	d	d_1	L_1	L_2	L_3
		mm					
64109	A	5,0 - 6,5	M10		265	180	
64140	AM	5,0 - 6,5	M10		265	180	
64115	D	5,0 - 6,5	M10	23	265	180	85,5

Other sizes available upon request.
You will find the item numbers for all combination possibilities in general rope catalogue.

For use with CTP® 8.1 mm

item number		rope ø	d	d_1	L_1	L_2	L_3
		mm					
64110	A	6,0 - 8,0	M12		450	320	
64141	AM	6,0 - 8,0	M12		450	320	
64116	D	6,0 - 8,0	M12	44	450	320	167,0

Other sizes available upon request.
You will find the item numbers for all combination possibilities in general rope catalogue.

INSPECTION MANUAL CTP®

This document shall serve as practical guidance for CTP® rope inspections out in the field. It covers the official discard criteria of the CTP® rope as well as specific fields of inspection in a running elevator system which are most critical to rope life.

1. Discard criteria of the CTP® rope

Brugg Lifting is applying a simple replacement criteria that limits the use of the CTP® rope after a defined number of cycles or trips[1]. This method of appraisal is therefore based on the level of usage.

This discard criterion forms part of all CTP® rope certifications, which have been issued by LIFTINSTITUUT: The calculation of maximum allowed trips is described under chapter "conditions" as follows:

- The defined maximum number of trips shall be divided by the number of pulleys which are passed most often by the bended rope.

Intact ropes in elevator shaft. Note that there is no color change of coating during the entire rope life. The rope remains dark black.

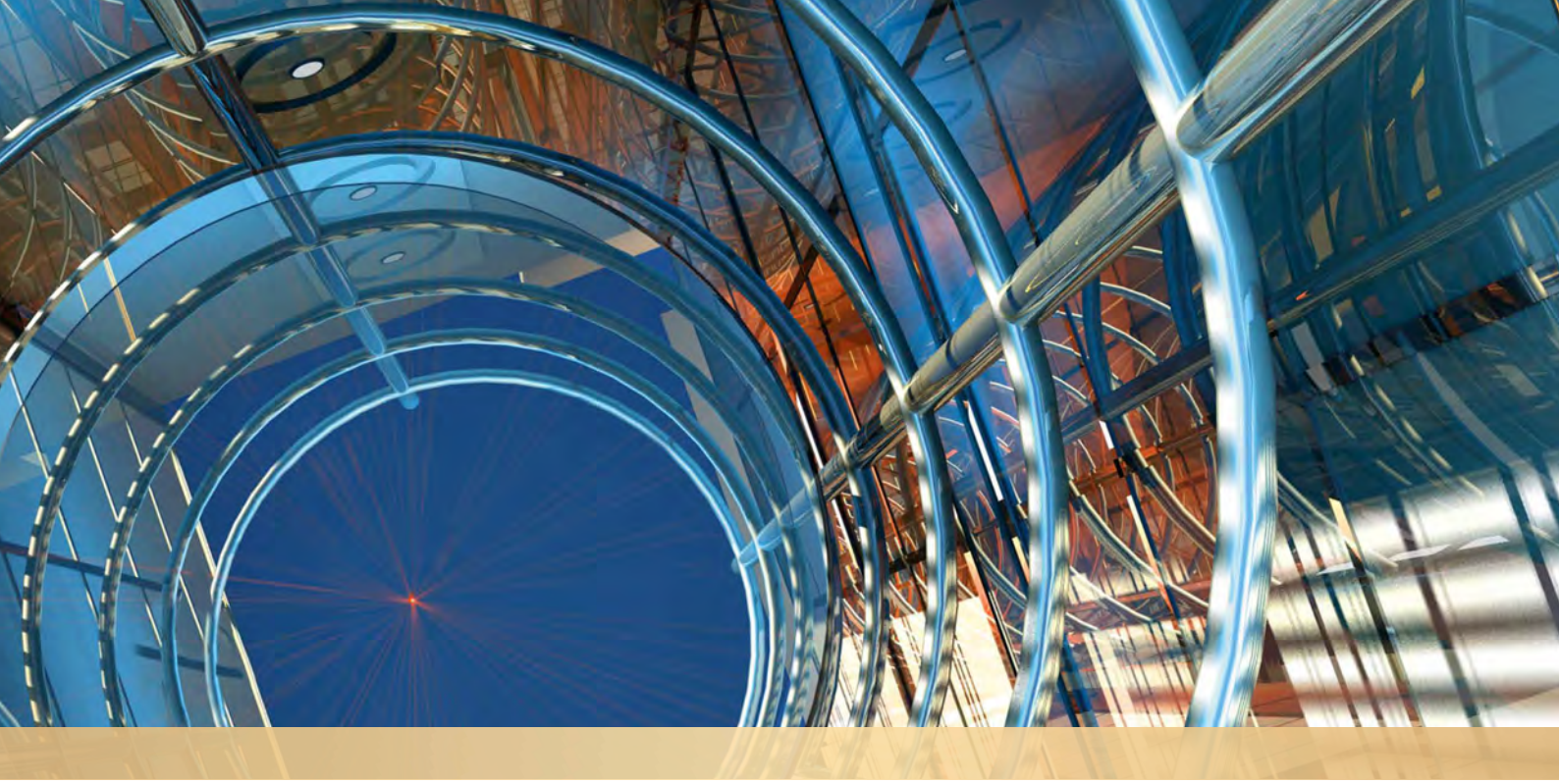
During inspection the condition of the ropes should always be checked for any abnormal wear or damage[2]. Following is the table showing the five typical rope issues which can occur in an elevator system and the according actions, which must be taken by the elevator maintenance company in such a case.

[1] Every change of direction will be counted as a trip or cycle by the lift controller. Important: "trip" or "cycle" should NOT be confused with "starts".

[2] The abnormal wear or damages presented below could be caused by overloading, unequal rope tension, severe shock, loading, torsional unbalance, bad rope alignment, etc. The maximum number of broken wires defined in the instructions is based on standards (UNE-EN, ISO, DIN) as well as on verification by testing samples.

Discard Criteria

	A	B	C	D
Problem	Plastic coating damage	Breakage of wire	Massive breaking of wires	Breakage of strand	Rope out of groove
Description	Plastic coating has won down such that metallic wire rope core can be seen.	More that 10 wires protruding from the TPU sheath in 1 m.	More that 3 wires protruding from the plastic coating within 30 mm of the rope. Specific phenomenon located over a short run of the rope.	specific rope breakage	Rope has fallen out from its initial grove, or jumped to the adjacent groove.
Corrective Action	Record an report to Brugg Lifting. Replace ALL ropes.	Record an report to Brugg Lifting. Replace ALL ropes.	Record an report to Brugg Lifting. Stop the elevator and replace all ropes.	Record an report to Brugg Lifting. Stop the elevator and replace all ropes.	Record an report to Brugg Lifting. Stop the elevator and replace all ropes.
Time scale	< 2 months	< 2 months	immediate	immediate	immediate



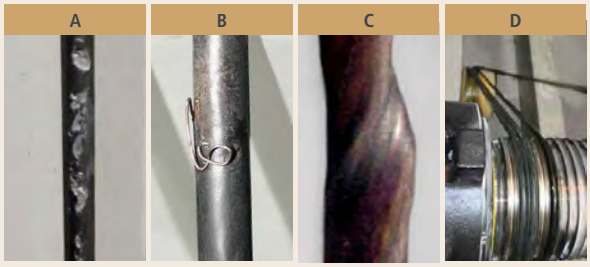
2. Elevator specifications

Only with the help of specific elevator data are we able to analyze the rope regarding traction capabilities, bending fatigue performance, etc. Therefore in case of support please contact your Brugg Lifting representative.

Safety Instructions

Most of these inspections must be performed on a running elevator (in maintenance mode)! Do never perform below listed measurements without trained an authorized elevator personnel. Be sure to be secured at all times when standing on top of the lift car.

CTP® ropes should not be operated if oil or water is on the surface of the rope. If water or oil is on the surface of the rope and then comes into contact with the traction sheave, it will reduce traction capability and cause slippage.



In case of abnormal rope wear or damage Brugg Lifting suggests the maintenance or installation company to perform further inspection as described below insteps 2 to 6 in order to determine possible root causes.

3. Visual inspection

In addition external factors that could have a negative impact on the rope shall be evaluated. Before doing detailed measurements we recommend to first visually check the outside appearance of the rope. Particular attention must be paid to the rope coating:

- Broken wires piercing out of the coating material
- Irregularities regarding rope coating surface (bumps, dents, or similar)
- Scratches, tear or fractures on the rope coating
- Abrasion of the coating (TPU dust on the rope or on the sheaves)
- Dust, oil, water etc. on the rope coating
- Rope kinks

The following points should also be evaluated:

- Rope touching elevator parts or shaft
- Ropes touching each other due to electro-static charge
- Rope vibration during operation
- Insufficient alignment of traction sheave and/or diverting pulley

Whenever possible pictures of the rope should be taken during inspection (also in the case of intact ropes). Also traction sheave, diverting pulley and end terminations should be photographed.

INSPECTION MANUAL CTP®

4. Inspection of fleet angle

The allowable fleet angle is 0.5°. For the CTP® 8.1 this angle can be increased up to a maximum of 1.0° as long as the number of trips is reduced/limited to 2'400'000 and divided by the number of pulleys passing the most bended part of the rope (this does NOT apply for the CTP® 6.5). Fleet angle allowed (in accordance with our certificate) is 0.5°. If the fleet angle is too big it will induce torsion into the rope. This effect also applies to conventional ropes but is even more pronounced in the CTP® rope.

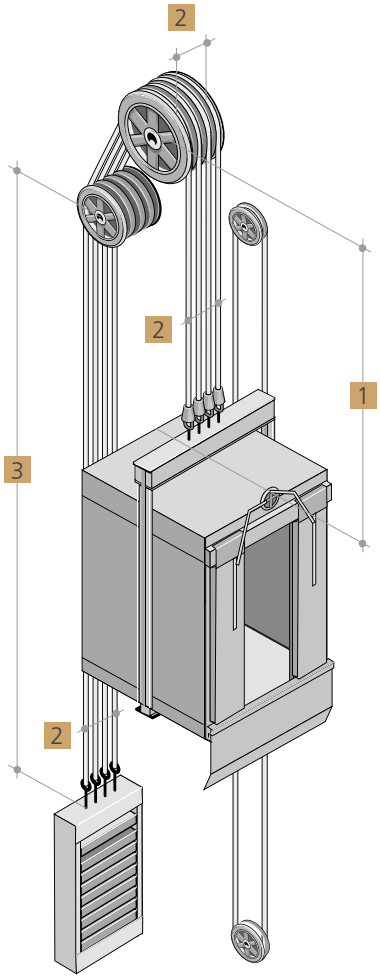
The most critical positions are when the cabin is at the top floor (maximum fleet angle between cabin and tractions sheave/deflecting pulley) and when the cabin is at the lowest floor (maximum fleet angle between counter weight and traction sheave/deflecting pulley). It is fairly difficult to directly measure the fleet angle between rope and sheave. For this reason we recommend an indirect more practical way of measuring the fleet angle (please see below).

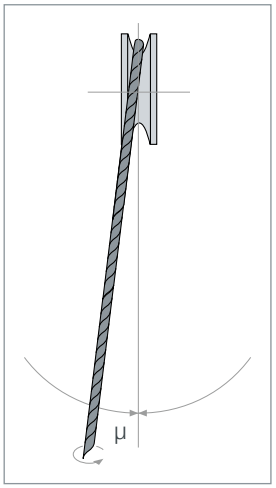
To get a rough estimate on the fleet angle measure following points (illustrated on an elevator with 1:1 suspension):

1 Distance from traction sheave to end termination on lift car (when cabin is at the very top)

2 Distance from rope to rope at rope termination on elevator cabin and on traction sheave. Distance from rope to rope on traction sheave (groove to-groove distance) and on rope termination on counter weight

3 Distance from traction sheave to end termination on counter weight (when cabin is at the very bottom)





Fleet angle between sheave and rope.

5. Inspection of groove shape (traction sheave and diverting pulley)

Even if traction sheave and diverting pulley grooves are manufactured according to drawing (radius for CTP® 6.5: 3.4 – 3.65 mm, radius for CTP® 8.1: 4.3mm), we strongly recommend to check the shape with the specially designed Brugg groove gauge. Brugg Lifting provides a custom made gauge which includes the 45° (30°–45° for CTP® 6.5) opening angle as specified in our CTP® certificate.

Furthermore check the groove surface for following defects:

- Rust or abrasion of rope coating on or around sheave
- Wet surface (water, oil, etc.)

Finally check, if the bearings of the diverting pulleys still run smoothly, if possible.

Brugg groove gauge.

6. Rope tension

Even though rope tension is often measured by hand (by plucking the rope and judging by "feeling") this method is far from accurate. Comparing spring buffers with each other is more precise – to a certain extent but not all elevators are equipped with such springs. The most reliable way of measuring rope tension is by measuring the tension on the rope itself. There are various tools for measuring tension commercially available. Brugg Lifting recommend our own specialist tool the Brugg RPM.

Rope tension device Brugg RPM.

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