Draka

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Compensating cable

TECH TIP 1

Compensating cable is a very flexible product that quietly provides compensation for the elevator car's suspension ropes. When properly installed and maintained, the cable can easily last the life of the elevator.

Installation

Before installing compensating cable, there are typically two requirements that have to be considered to ensure compliance with your regional or local safety codes:

Rated speed - Safety codes such as ASME A17.1 and EN81.1 require that ropes and a tie-down or anti-rebound device be used on elevators that have a rated speed greater than 3.56 m/s • 700 fpm. Therefore, compensating cable can be used on elevator installations up to a maximum rated speed of 3.56 m/s • 700 fpm.

Hang length - Safety codes also require a 5:1 safety factor for elevator compensation means (e.g. ropes or cables with their support hardware). When using compensating cable, ensure your hang length does not exceed published maximum hang lengths (see Table 1).

Selection of Support Hardware

It is imperative that installation hardware be specifically designed and tested for use with compensating cables. Installation hardware should be tested by the supplier to ensure it can withstand forces incurred during the elevator's operation. Since these operational forces can be severe (especially during the operation of safeties), using non-approved components to support compensating cable could seriously jeopardize the safety of the installation. For this reason, all support hardware utilized should have a 5:1 minimum safety factor at the specified hang length.

The installation of compensating cables should begin at the support point under the counterweight and end at the car-side support point (where adjustments to the compensating cable can be made).

Before marking the mounting location of the support hardware, consider the cable's loop diameter (see Table 1). Once the mounting locations have been determined, mounting holes can be drilled.

Loop diameters

Compensating cables such as our Whisper-Flex® have a natural loop diameter between 540 mm • 22 inches and 690 mm • 27 inches that varies depending on the weight and outer diameter of the cable (see Table 1 for typical measurements). It is important to ensure the natural loop diameter is taken into account when installing the cable.

Table 1 - Maximum hang lengths for Whisper-Flex

Product Code	Cable Weight lb/ft • kg/m	Loop Diameter in • mm	Max. Hanging Length* ft • m
WF075	0.75 • 1.1	22 • 540	600 • 183
WF10	1.0 • 1.5	24 • 610	600 • 183
WF15	1.5 • 2.2	24 • 610	600 • 183
WF20	2.0 • 3.0	26 • 660	520 • 158
WF25	2.5 • 3.7	26 • 660	600 • 183
WF30	3.0 • 4.5	26 • 660	505 • 154
WF35	3.5 • 5.2	27 • 690	600 • 183
WF40	4.0 • 6.0	27 • 690	530 • 162

*Max. hanging lengths are based on a 5:1 safety factor per ASME

Installations with hang lengths of over 122 m • 400 ft and side counterweights can benefit from a cable with a wider natural loop that permits the car attachment point to be more toward the center of the car. Draka's Steadi-Flex® cables offer that wider loop:

Table 2 - Maximum hang lengths for Steadi-Flex

Product Code	Cable Weight lb/ft • kg/m	Loop Diameter in • m	Max. Hanging Length ft • m
SFC15	1.5 • 2.2	46 • 1.17	600 • 183
SFC20	2.0 • 3.0	47 • 1.20	520 • 158
SFC25	2.5 • 3.7	48 • 1.22	600 • 183
SFC30	3.0 • 4.5	49 • 1.25	505 • 154
SFC35	3.5 • 5.2	50 • 1.27	600 • 183
SFC40	4.0 • 6.0	50 • 1.27	530 • 162

If the compensating cable does not hang freely and vertically at its natural loop diameter, excessive cable sway could develop during the elevator's operation. See our Tech Tip #8 for more information.

Cable stripping

The next step involves stripping the compensating cable. More than two decades have transpired since the "coated" compensating cable's introduction and different theories still exist as to the best way to strip the cable. One of the safest methods has been found to use the Whisper-Flex Strip Kit, which includes all the tools needed for efficient stripping.

The compensating cable can also be ordered pre-stripped at one end to further speed its installation.

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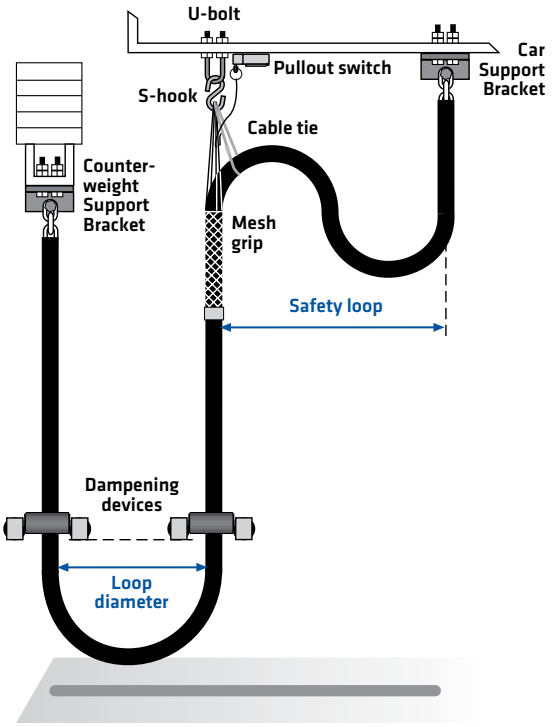
Safety/Adjustment loop

It is recommended that a safety/adjustment loop be placed as part of the compensating cable's installation. This requires two (2) connection points under the car (see Figure 1).

Figure 1



One connection location is the car support bracket used to terminate the cable to the car and the other is for locating an S-hook that provides a "mechanical fuse" for the cable.

Length adjustment

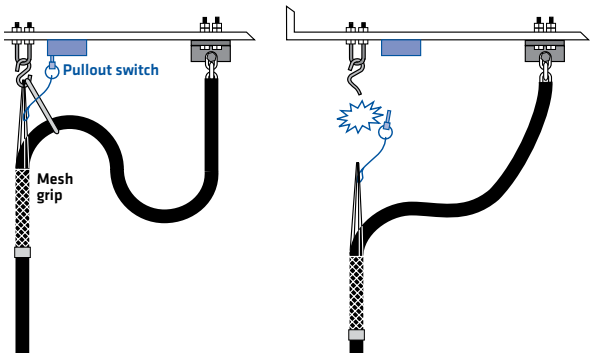
Since the suspension ropes stretch as they wear, the compensating cable should be frequently inspected (based on the age of the suspension ropes) and adjusted as required. The length of the compensating cable may have to be adjusted occasionally to account for changes in the suspension ropes' length.

Safety loop

The "safety" portion of the safety/adjustment loop is an S-hook which acts as a mechanical fuse; it's designed to yield if the compensating cable is overloaded. As such, the S-hook (with a typical 2:1 safety factor at the maximum hang length) prevents the compensating cable from becoming damaged, potentially severing, and/or falling down the hoistway. In the unlikely event that the compensating cable becomes entangled with pit equipment (such as a buffer or a support bracket), the S-hook would break, causing the excess cable in the safety loop to slacken and oscillate the entire length of the compensating cable. This would allow the cable to then become untangled (see Figure 2).

A system containing a mechanical fuse to prevent the compensating cable from being damaged is recommended. If an elevator would continue to operate after the S-hook has yielded, the slack in the cable could actually cause another entanglement that could permanently damage the cable. Therefore, an electrical switch should be used to signal the controller in the event the S-hook has yielded. The car could then be directed to shut down immediately or stop at the nearest floor. This can be accomplished by mounting a pullout switch (see Figure 2) near the S-hook.

Figure 2



If a compensating cable becomes entangled, contact Draka for details on inspecting the installation for damage.

Damping devices

It is recommended that damping devices be used with the compensating cable if the elevator's rated speed is between 1.78 to 3.56 m/s • 350 to 700 fpm. The damping devices should be installed at least 1 m • 3 feet above the bottom of the cable's loop on the vertical cable legs under the car and the counterweight. Installing the damping devices at this height maximizes their ability to dampen sway and oscillation during operation. Technical Tip # 12 covers dampening device installation in detail, including recommendations for shallow pits and other problem installations.

Maintenance

Minimal maintenance is required for the compensating cable and the maintenance tasks can be completed in conjunction with routine pit sweeping/cleaning, counterweight runby inspections, and before no-load tests. More frequent inspections of the compensating cables' pit floor clearance may be needed if there are new suspension ropes on the elevator due to the rope's constructional stretch. Always ensure the compensating cable loops have at least a minimum pit floor clearance of 15 cm • 6 inches.

Part of your routine compensating cable maintenance inspection should include inspecting the support hardware for any wear and tear. Excessive cable sway or twisting of the cable will cause wear patterns to develop on the support hardware. Fasteners and the support hardware should be replaced if worn.

If static damping devices are being used with your compensating cables, then these devices may need occasional maintenance as well. Refer to the static damping device's installation instructions or contact Draka for maintenance details.

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