



## Wire Rope Lubrication



Vessel lubrication charts often list products suitable for general lubrication onboard a ship. One product frequently listed is a lubricant used to protect steel wire ropes.

### Steel wire rope construction

A steel wire rope is made of individual wires that are twisted together to form strands. The strands are wrapped around a core to create a final rope.

The core of a wire rope can be made of different types of material such as hemp, nylon, plastic, or another strand of wires. The selection of core material, number of wires per strand, number of strands, and the way the wires are twisted and strands are laid, depends on the rope's required strength, application, and cost.

### Working environment

Wire ropes are usually used in less than ideal conditions. There are some applications, such as on an engine room crane or an elevator, which are not considered severe. However, most wire ropes are used on deck where they are exposed to corrosive seawater and varying ambient and working temperatures.

When in use, wire rope is subject to heavy loads, high pressures, and surface wear. The rope is also exposed to changing loads and pressures that cause the strands to move within the rope and result in internal wear. These unfavorable conditions can cause premature failure if the rope is not properly relubricated.

### Lubrication requirements

Lubrication protects the wires of the rope against corrosion and minimizes external and internal wear. To provide this protection, a lubricant must have some very specific characteristics.

The basic requirements for lubricants are listed in the ISO 4346 standard Steel Wire Ropes for General Purposes – Lubricants – Basic Requirements.

To meet these requirements, a lubricant must:

- Have good covering properties
- Be water-repellent, water-resistant, and not emulsifiable
- Not be subject to significant embrittlement
- Not have grit, abrasives, water, chlorine, or similar impurities
- Not contain additives or compounds, which can form corrosive products caused by water contamination or additive degradation

In addition, the lubricant must be able to penetrate into the core of the wire rope.

### Relubrication practices

Wire ropes are initially lubricated during manufacturing. This lubrication protects the rope from corrosion during transportation and storage and reduces friction and wear during its initial use. However, the initial lubricant does not last. Relubrication is required because the lubricant works out of the rope or dries out after a certain period of use.

To obtain maximum service life, ropes should be relubricated at regular intervals. These intervals are dictated by various factors, such as the type of lubricant used, rope storage conditions, and method and frequency of use.

There are several techniques for relubrication; the most common are “painting” and “swabbing.” These techniques, however, rarely penetrate the lubricant down to the core of the rope. Using a high-pressure lubricator is preferred, because it provides good penetration of the lubricant into the rope. The degree of penetration achievable with any technique also depends on the type of lubricant used.

### Lubricant types

Several types of lubricants, using various methods of application, are available on the market.

“Asphaltic” products, the most commonly used lubricants, are manufactured from very high-viscosity residual lubricants. These products often contain a nonflammable solvent for easy application and better penetration into the wire rope. They can be applied by brush, swabs, or spray guns, but cannot be used in high-pressure lubricators. Asphaltic-type products that do not contain a diluent solvent require heating. The resulting tacky coating sometimes shows “dripping” problems in hot areas or becomes brittle under low-temperature conditions.

Another group of available lubricants is based on paraffin wax, with or without a solvent. Products without solvents must be melted before application. These products are generally applied by brush or swab.

Additionally, there are many types of greases on the market. Some of them are excellent at lubricating wire ropes, depending on composition and method of application.

### State-of-the-art relubrication

To sustain the life of wire rope, it is necessary to properly relubricate them at regular intervals. Rope tests show that the service life of a regularly relubricated wire rope is two to three times longer than that of a dry rope. Modern high-pressure lubricators, together with the latest technology lubricants, provide state-of-the-art relubrication and maintenance for wire ropes.

Before lubrication, a rope must be cleaned with wire brushes, a scraper, compressed air, or superheated steam. Old layers of lubricant and dirt may need to be removed from the rope by using a suitable solvent.

For wire rope relubrication, we recommend using **Ulti-Plex® Synthetic Grease EP** in high-pressure lubricators. This high-performance, multipurpose grease is manufactured from high-viscosity synthetic-based oils and a lithium-complex thickener with special rust and oxidation inhibitors and extreme pressure and tackiness additives.

The rust and corrosion inhibition and superior water wash-out resistance make this lubricant ideal for this application.

For application by brush or swab, **Rustproof Compound L** is recommended. This petrolatum-type product contains a nonflammable solvent for easy application. Detailed product information can be obtained from your Chevron marine sales representative. ■