

STEEL REINFORCEMENTS

Steel Cord

Steel cord is used in belting where the properties of steel cord reinforcement are better able to satisfy the requirements of the service conditions. Steel cord is used to obtain high strength, excellent length stability, low bending stresses and, in some cases, to provide superior troughing characteristics. The wires, or filaments, used in conveyor belt steel cords are usually made of high carbon steel and have a surface finish to facilitate adhesion to the surrounding rubber, and provide protection against corrosion. Common constructions are 7 x 7, Figure 1-6, and 7 x 19, Figure 1-7, although many other constructions are possible.

Steel cords used in conveyor belts are specially manufactured from high carbon steel to meet the high strength requirements demanded of these belts. The cord is fabricated from strands of wires, or filaments, twisted together. This gives the cord good flexibility and fatigue resistance when subjected to cyclic loading and bending around pulleys. Two common constructions are illustrated in Figures 1-6 and 1-7.

In order to protect the steel from corrosion, zinc or brass coatings are applied to the wire before drawing it to the final filament size. Zinc is the most commonly used coating. Typically, the minimum zinc coating expressed in grams per square millimeter is 60 times the filament size in millimeters.

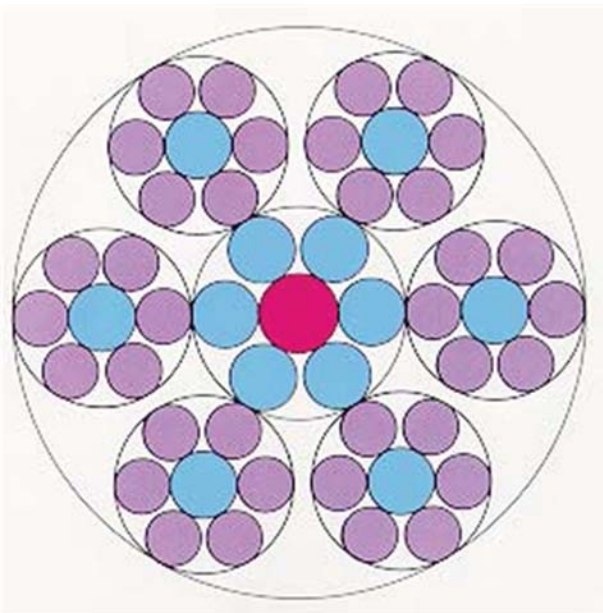


Figure 1-6. 7 x 7 Construction

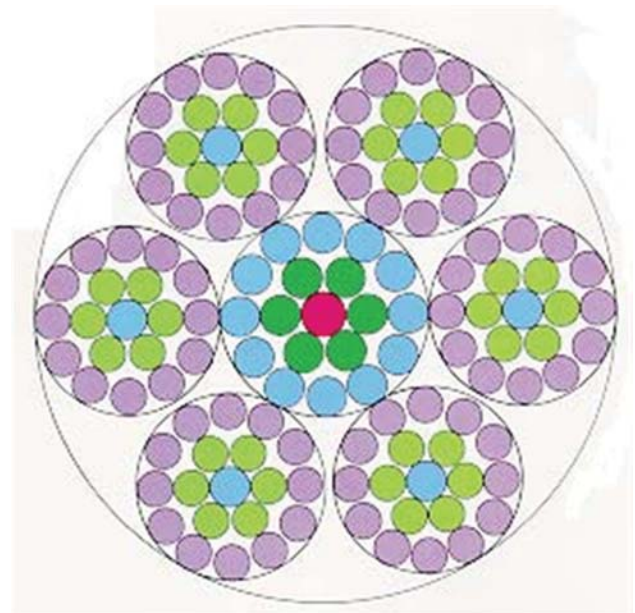


Figure 1-7. 7 x 19 Construction

During belt manufacture, the steel cord is encapsulated in a special core rubber that normally has properties different to the belt covers. It is important during manufacture that the core rubber penetrates right to the center of the steel cord as this stops adjacent filaments from contacting one another and fretting during bending and stretching of the cord in service. Once embedded in the core rubber, the cord strength increases by up to 5% and it becomes less likely to suffer from corrosion caused by water penetrating the cord. The effectiveness of the rubber penetration can be determined by a special test (AS 1333) which measures if there is any loss in air pressure along the cord when air is applied to one end of the cord at 14.5 psi (1 bar), and maintained for 1 minute on a 16 in long belt sample. 5% is the maximum acceptable pressure loss.

Core rubber to cord adhesion should be adequate to maintain the belt and its splices' integrity during its normal service life.

Due to the very specialized nature of this cord and the difficulties in manufacturing cord to achieve these properties, there are only a few manufacturers in the world producing steel cord for conveyor belts.

Other Wire Components

Several other forms of wire are used in belting for special purposes, such as rip resistance and transverse stiffness. A variety of wire structures are used, some of which include: (1) steel filling leno weave breakers, (2) straight warp steel fabrics.