

**BELTING CORD COMPARISON:  
KEVLAR® VS. VECTRAN®**

KEVLAR is family of aramid fibers having a unique combination of high strength, high modulus, toughness and thermal stability. These properties offer the means to increase strength and reduce the weight of reinforcement cord. VECTRAN is a high-performance multifilament yarn spun from VECTRA liquid crystal polymer (LCP). VECTRAN can also be characterized as a high strength, high modulus, and thermally stable cord with the additional benefit of excellent flexibility.

KEVLAR has been used as a reinforcing material since the late 60's. VECTRAN became commercially available in the early 90's. When comparing the physical properties of these two materials, one can see that the break strength and elongation are comparable. Therefore, both materials can be used in similar applications, but one cord might be better than the other when specific properties or cost considerations are a factor.

Within the standard operating temperature range of (-30 to 185°F) for urethane belting, both materials have no change in strength. If an application has operating temperatures above the practical range for urethane, silicone materials are an option. Silicone can be used in applications up to 400°F. This higher temperature range makes the cord selection critical. Above 200°F the mechanical properties of both materials change differently, so selecting the best cord for these higher temperatures is application specific.

Another factor when considering cord selection is raw material cost. In general, KEVLAR is less expensive than VECTRAN. Even though VECTRAN is more expensive, it typically can be used without increasing the belt cost beyond practical limits. The major difference between KEVLAR and VECTRAN is flexibility. VECTRAN is on the order of 8 to 14 times more flexible depending on the style of KEVLAR. This allows VECTRAN to be used in applications with small diameter pulleys and drive trains with multiple bends.

Listed below are some typical mechanical properties of Kevlar and Vectran:

| MATERIAL<br>(1) | TENSILE<br>STRENGTH<br>(grams/denier) | TENSILE<br>MODULOUS<br>(grams/denier) | ELONGATION<br>AT BREAK<br>(%) | MOISTURE<br>REGAIN<br>(%) |
|-----------------|---------------------------------------|---------------------------------------|-------------------------------|---------------------------|
| KEVLAR<br>(2)   | 23                                    | 565                                   | 3.60                          | 7.0 max.                  |
| VECTRAN<br>(3)  | 23                                    | 525                                   | 3.30                          | <0.1                      |

*Notes:*

- 1) Based on 1500 denier single ply cord.
- 2) ASTM 885 (tested at 1.1 Twist Multiplier)
- 3) ASTM 885 (tested at 1.3 Twist Multiplier)
- 4) Data presented is supplied by respective cord manufacturer.

When considering KEVLAR and VECTRAN as a reinforcing material in belting applications, both have excellent properties that lend themselves to many applications. Depending on the desired properties and cost constraints, one cord may be better suited than the other.

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