

### Technical Bulletin 14: Boron Exposure on Twin-Path® Extra Slings

Twin-Path Extra slings consist of K-Spec® core fiber as the tension member and the nylon Covermax® outer protective cover. Boron itself would not have a damaging effect on either the tension members or the cover, except in the possible case of a crystalline solid which could cause abrasion damage like any other similar material.

Boron in the form of boric acid is commonly encountered in nuclear reactors. Boric acid is a weak acid, and is normally used in relatively low concentrations. The K-Spec core fiber is highly resistant to most commonly encountered chemicals, including many strong acids. The nylon in the Covermax jacket is susceptible to attack from moderate to strong acids, so testing was performed to confirm its resistance to a boric acid solution that would be commonly encountered in a nuclear reactor. When soaked in a boric acid solution with a concentration of 2000 ppm boron at room temperature for 10, 100, and 1000 hours, the Covermax material lost no strength.

Boron as used in nuclear reactors for fuel rods has no effect on the strength of Twin-Path Extra slings.

Chemical	Resistance
<b>Hydrocarbons</b>	Excellent
Hydraulic Fluid	Excellent
Crude Oil	Excellent
Gasoline	Excellent
Kerosene	Excellent
Diesel Fuel	Excellent
Mineral Oil	Excellent
<b>Acids</b>	Excellent
Sulfuric Acid	Excellent
High Concentration Sulfuric Acid	Fair
Hydrochloric Acid	Excellent
Phosphoric Acid	Excellent
Boric Acid	Excellent

Chemical	Resistance
<b>Alkalis</b>	Excellent
Chlorine bleach	Poor
Sodium Hydroxide	Fair
High Concentration Sodium Hydroxide	Poor
<b>Other</b>	Excellent
Salt Water	Fair
Ammonia	Fair
<b>Most Solvents</b>	Excellent
Ethanol	Excellent
Methanol	Excellent
Toluene	Excellent
d-limonene	Poor

Excerpt from Twin-Path Sling User Manual