Shot peening and stress corrosion

Stress corrosion creates cracks in a surface layer if tensile stress and corrosive medium act simultaneously. Depending on the material and adjacent medium, crack growth is intergranular or transgranular. Tensile stress may be induced by welding, heat treatment, machining or applied by external load.

Four conditions are necessary to create stress corrosion cracking:
- susceptible material to stress corrosion
- tensile stress at the surface to start reaction
- corrosive medium
- time to start reaction and crack growth

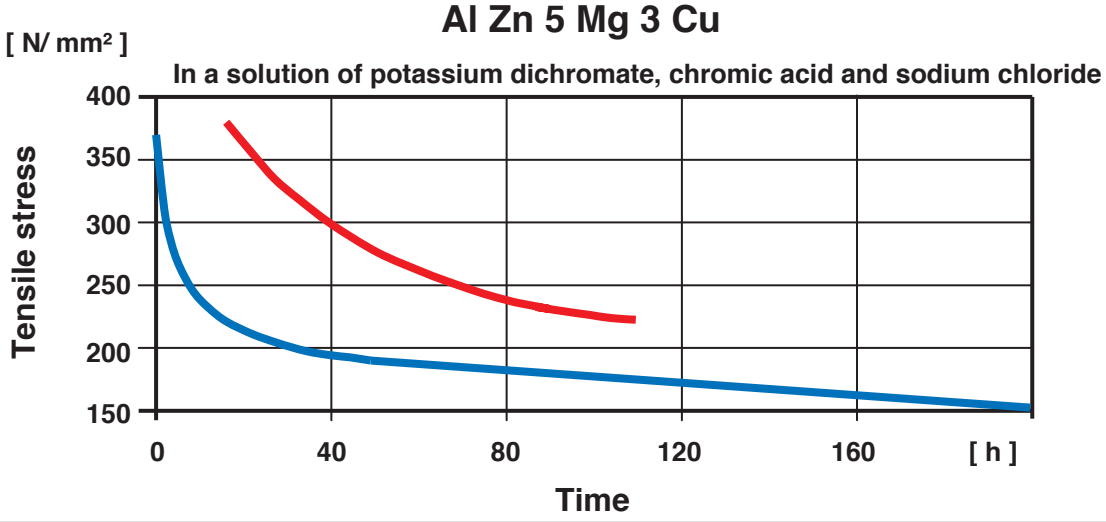
No stress corrosion will occur if one of these four conditions are not satisfied.

Shot peening induces high compressive residual stress in the surface layer, eliminate the tensile stress applied by external load or induced in the surface layer and consequently prevents stress corrosion cracking.

Shot peening and stress corrosion

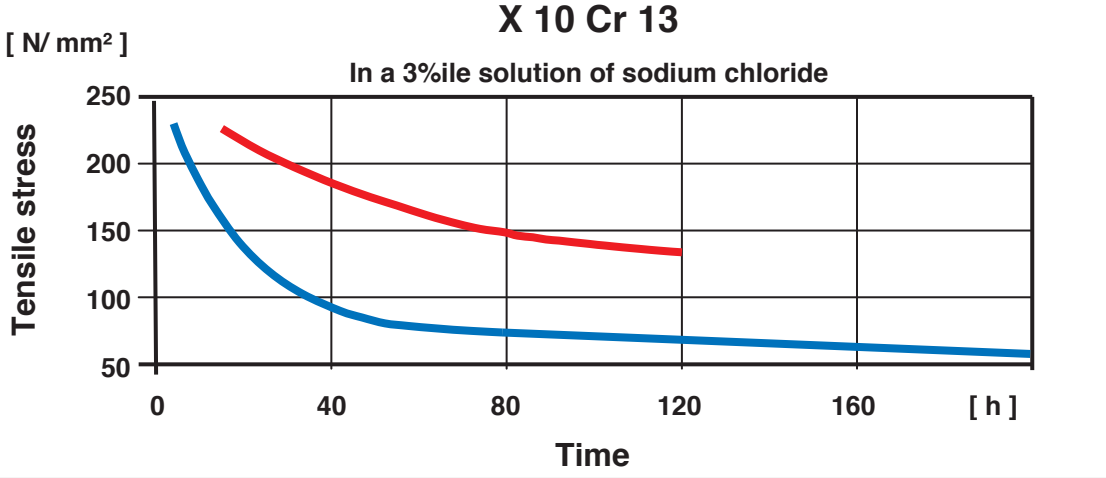
Al Zn 5 Mg 3 Cu

In a solution of potassium dichromate, chromic acid and sodium chloride



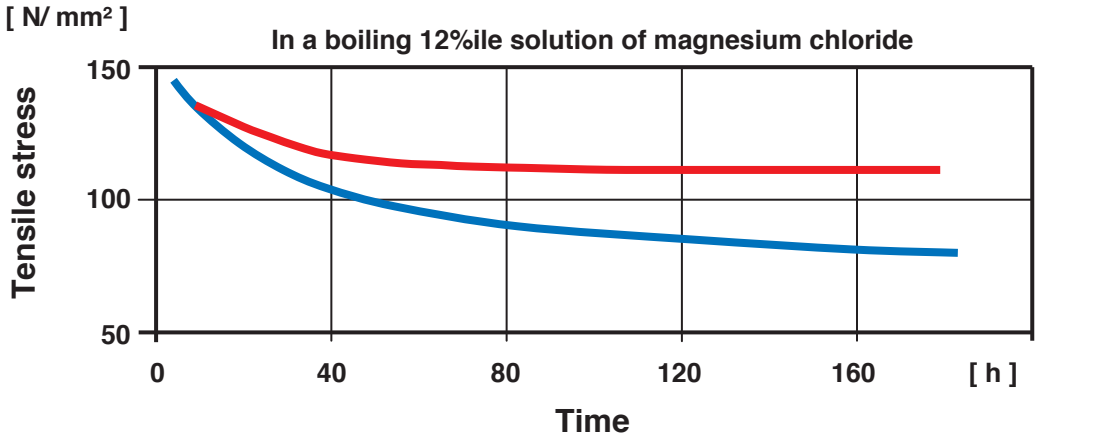
X 10 Cr 13

In a 3%ile solution of sodium chloride



X 5 Cr Ni Mo 18 10

In a boiling 12%ile solution of magnesium chloride



Specimen

	= not shot peened
	= shot peened with glass beads