

The sun's ultraviolet rays will slowly degrade epoxy resin if it is exposed for long periods of time. The ultraviolet light stimulates the epoxy resin to oxidize. This oxidized resin powders and leaves the external fiberglass layers exposed, this is called "fiber bloom". Once bare glass is exposed, further exposure to ultraviolet light causes not additional deterioration, as the exposed glass and oxidized resin form a barrier preventing additional ultraviolet damage. Damage is limited to the outer 0.005 - 0.01 inch of the pipe.

Assuming the pipe was left unprotected in the sun for a long period of time, the following timetable will illustrate the effect of ultraviolet rays:

<u>Time Exposed</u>	<u>Pipe Condition</u>
6 months	Pipe color changes from green to tan, no effect on physical properties.
1 year	Pipe color becomes dull tan and shiny fibers. No effect on physical properties.
2 years	Approximately 50% of the pipe surface shows shiny fibers. No effect on physical properties
3 years	Approximately 90% of pipe surface shows exposed fibers. No effect on physical properties.
5 years	Pipe will be fuzzy with the entire outer layer of glass exposed. No further damage to pipe will occur. Pipe will operate at 100% of rating with no problems.

Fiberglass pipe may be protected from ultraviolet rays by painting with a heavily pigmented industrial coating or by coating with an ultraviolet absorbing agent. Either method is satisfactory for preventing the surfact effects that have been previously described.

Since Star tubulars have a 50% design safety factor built in, the surface effect of ultraviolet is minimal and does not reduce the long term performance of these products.

