DURALOC

Stress Crack Resistance

To evaluate the resistance of the Duraloc to environmental stress cracking.

Typical test specimens five inches (127 mm) long, one-half inch (13 mm) thick were clamped to curved fixtures. The radius of the fixture induces a strain in the specimen. From the tensile modulus of the material, the corresponding stress was calculated as shown in Table 2. The reagents were then applied to the central portion of the fixture test specimen. At 24 hour intervals, the specimens were examined for evidence of attack and rated. Green indicates no visible effect caused by the reagent under the conditions listed, red indicates the material has experienced stress cracking, and gray indicates no data at that condition. The variables of importance in environmental stress cracking are temperature, stress level, time, and reagent. If a reagent causes stress cracking at a given time, temperature, and stress level, the following generalizations usually apply. At lower stress levels, cracking may not occur, if it does, longer exposure time will be required. Higher temperatures generally speed cracking. Diluting the reagent may or may not eliminate stress cracking depending upon the reagent.

Corresponding Stress	
Strain, %	Stress, psi (MPa)
	DURALOC
0.0	0 (0.0)
0.2	680 (4.7)
0.4	1360 (9.4)
0.6	2040 (14.1)
0.8	2720 (18.8)
1.0	3400 (23.4)
1.2	4080 (28.1)
1.4	4760 (32.8)

Conclusion

Tables 3 - 8 report the results of the environmental stress cracking testing for reagents used in medical applications, several high-performance greases, many of the common disinfectants, anti-spotting agents, and selected inorganic reagents and organic reagents. Duraloc provides the best resistance to environmental stress cracking of typical plastic polymers. Since each application has its unique performance requirements and design criteria, it is important that specialized testing be conducted by the design engineer to evaluate the resin under conditions that best simulate the function of the component or system in it intended use. For example, the resistance to aqueous caustic solutions has become increasingly important in the medical field as the use of strong solutions of sodium hydroxide has become one of the preferred methods for disinfection.