Technical Bulletin # 81
Silicone Pavement Sealant for Airfield Use

Silicone based pavement joint sealants have been used extensively in airfield applications for a number of years. The use of a 100% silicone based sealant in traffic applications was initially met with skepticism because of the difference in physical properties when compared to traditional joint sealing materials, i.e., rubberized asphalt, neoprene, urethane. These more traditional materials do indeed have greater abrasion resistance and ultimate tensile strength; however, recessing of the silicone-based sealant in the joint reduces exposure to abrasion and the need for high abrasion resistance. Furthermore, most traditional joint sealants exhibit a high modulus of elasticity, which somewhat limits the movement capability of the sealant. While traditional pavement joint sealant will resist heavy traffic because of inherent mechanical properties they may fall short in maintaining a seal in applications experiencing high movement. Silicone based materials possess the ultra-low modulus necessary when sealing applications experiencing high movement. Airfield pavements fall into this high movement category.

The five basic criteria a sealant must meet for airfield applications are:

- ✓ Resistance to ultra-violet light
- ✓ Wide service temperature range
- ✓ Cyclic movement capability
- ✓ Jet Fuel / oil resistance
- ✓ Jet blast resistance

ASTM D 5893 (*Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements*) provides thorough test criteria for silicone sealant use on concrete pavement but does not directly address airfield applications. Pecora has chosen to use ASTM D5893 along with selected Pecora test methods for jet fuel resistance and jet blast resistance to certify Pecora 300SL & 301NS silicone pavement sealants for use on airfield applications. In addition, the Pecora 322FC two-component silicone pavement sealant meets ASTM D5893 and jet fuel resistance requirements.

Being that no ASTM test method exists for jet fuel resistance for one & two component silicone based materials, Pecora has adopted a standard commonly used and accepted. The standard consists of laboratory testing which reproduces conditions created when a jet fuel spill occurs. Internal test results have shown Pecora 300SL, 301NS and 322FC silicone pavement sealants to perform within acceptable limits. Some swelling of sealant initially occurs with the swelling dissipating upon the drying of the jet fuel with no associated bond loss.

Test reports are available for ASTM D5893, SS-S-200E Jet Blast and Flame Resistance, and Pecora test method for jet-fuel resistance (Technical Bulletin #198). Pecora 300SL and 301NS comply with specifications as stated in FAA Engineering Brief No. 36.

JOINT DESIGN

Practical design of expansion joints should be carried out using a safety factor of 2 to 3. This would translate into joint designs requiring +/-25% movement. This safety factor is needed to compensate for variation in joint width and overall joint movement across multiple slabs. A minimum joint width of ¼” is acceptable with a minimum of 3/8“ being preferred. Refer to the table below for required sealant recess and dimensions. Consult Technical Service for joints >1.0” wide.

SEALANT COVERAGE CHART
RECESS GUIDELINES

Joint Width (inches)	Sealant Depth (inches)	Recess (inches)	Backer Rod Diameter (in)	Minimum Joint Depth (in)	Linear ft./gal
1/4	1/4	1/8	3/8	3/4	308
3/8	1/4	1/8	1/2	7/8	205
1/2	1/4	1/8	5/8	1-1/4	154
3/4	3/8	1/4	7/8	1-1/4	68
1.0	1/2	1/4	1-1/4	2	38

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