

RHEOLOGY BASED SPECIFICATION FOR ENFLEX

Material Grade	High Temperature	Intermediate Temperature		Low Temperature		Original 4°C Ductility	Aging
	Jnr, 80°C, 1/KPa (maximum)	G*, MPa (minimum)	δ, degrees (minimum)	G*, MPa (maximum)	δ, degrees (minimum)	cm (minimum)	G-R ratio (maximum)
ENFLEX	1.0, T _{HT} ≤ 64	0.10	42.0	100.0	30.0	30	5

High temperature stiffness – is assessed by Jnr at 3200Pa – this is a high stress test and we consider two requirements based on climatic area. This ensure that material will not deform excessively at the higher temperatures for a climatic zone.

Intermediate temperature – is calculated by calculation of the mean annual pavement temperature plus four degrees Celsius. Round closest temperature of 15, 17, 19, 22, 25, 27 or 29°C. We need a minimum stiffness and good relaxation to ensure full recovery. If stiffness is too low, the stresses due to thermal movements will relax and recovery will not occur as desired. The stiffness range as specified ensures that the material will behave close to VE solid in normal working temperatures.

Low temperature – is calculated from the LTPP bind software or equivalent plus 30° to give an equivalent temperature for testing at 10 radians/second. Round to closest of -, -4, 2, 8, 14, 20°C.

Aging – is expressed on the G-R ratio using 15°C and 10 radians / second. This is calculated from tests on ORIGINAL and PAV conditioned samples. Note – the RTFO step as with paving grade binders is not performed for these sealant binders.

$$G - R \text{ parameter} = \frac{G^* (\cos \delta)^2}{\sin \delta}$$

Testing for G* and δ shall be conducted using ASTM D7175 at the appropriate temperatures.

Analysis of data for some locations

Location	Low	Low + 30 rounded	Int. + 4	Int. (Rounded)	High	Sealant Grade ¹	Notes
Minneapolis	-27	2	14	15	53	58(15)-28	
Kansas City	-21	8	22	22	61	64(22)-22	
Dallas	-8	20	29-33	30	73	76(30)-10	
Los Angeles ²	-4 to -5	20	29-33	30	73	76(30)-10	Some of the higher areas get a little cooler – but very similar to Dallas

1. Sealant grade is using the basis as the PG grade system for binders. Use SG to reflect standard grade and PG to reflect Premium grade.
2. Locations close to LA in mountains have a considerably colder low temperature

Adhesion Performance Requirements

Adhesion in Peel to Mortar (ASTM C794)	Max Adhesion Force (lbs-force), minimum
ENFLEX	20

Rotational Viscosity Requirements

Brookfield Viscosity (ASTM D4402)	350°F Viscosity (cP), maximum	Recommended Application Temperature
ENFLEX	4000	355-375°F

Never allow sealant temperature to exceed 400°F, even momentarily