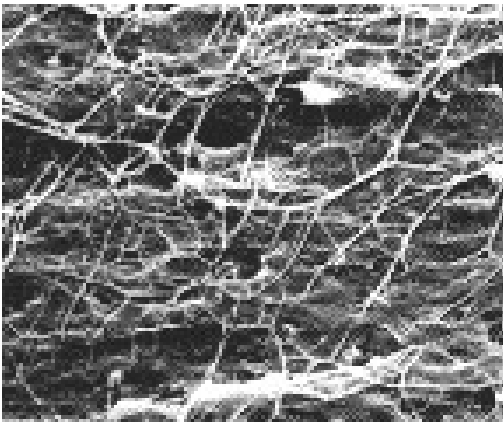




Fiber Technologies, LLC

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Fiber Technologies **AP 101** is a composition of Polytetrafluoroethylene (PTFE) and select minerals. **AP 101** mixed under the correct mixing guidelines creates a unique three dimensional intermeshing matrix of PTFE fibers coated with select surfactants and processing aids.



Structural reinforcement is created by the addition of **AP 101** fibers into the asphalt mix. In order to create the fiber network, **AP 101** needs a “carrier” into the liquid asphalt. The “carriers” of choice are called **ThermoPlastic Elastomers** or **TPE’s** for short.

The **AP 101** fiber network increases the physical properties performance of the TPE, thereby increasing the performance grade of the asphalt. Additionally, the fiber network in **AP 101** helps to evenly coat the liquid asphalt over the aggregate. Fewer air voids lead to increased durability of the road pavement.

Asphalt flow is the root cause of most asphalt failures. **AP 101** modified asphalt can make a dramatic difference in the performance due to its ability to create “memory” within the asphalt. This memory is imparted into the asphalt by the fiber formation created by the **AP 101** and TPE described above

COMPARISON OF FIBER TECHNOLOGIES MODIFIED TPE'S AND NEAT ASPHALT

DATA/RESULTS:

Ingredient		Trial #; Wt %				
		Specs	-01	-02	-03	
MAPLLC PG 64-22			97.0	97.0	97.0	
Kraton SBS, 1101			3.0	3.0	--	
Stereon 840A +AP 101			--	--	3.0	
AP 101			--	0.0006	---	
Properties: Original Blend						
Flash Pt., COC, °C		232 min	---	--	--	
Viscosity, 135°C, cps		135°C	3,000 max	1,370	1,517	1.517
Dynamic Shear (10 rad / sec)	G*/Sin *, kPa	64°C	1.0 min	5.298	7.027	10.373
	Phase Angle, °		# 75°	78.8	74.6	74.3
	G*/Sin *, kPa	70°C	1.0 min	2.394	3.376	4.921
	Phase Angle, °		# 75°	84.7	77.6	76.6
	G*/Sin *, kPa	76°C	1.0 min	1.175	1.701	2.390
	Phase Angle, °		# 75°	84.3	80.3	79.0
	G*/Sin *, kPa	82°C	1.0 min	0.648	0.929	1.278
	Phase Angle, °		# 75°	85.7	82.6	81.5
Softening Point, °F		Report	137.5	141.0	147.5	
Compatibility, 163°C/48 hrs, previous procedure, with straining if necessary - if straining required - so note						
Top 1/3: SP, °C		Report	107	65	66.7	
Bottom 1/3: SP, °C			58	63	67.4	
Difference, °C		2.0 max. ¹	49	2	0.7	
Top DSR, 70°C, G*/sin*, kPa		Report	4.838	4.639	6.659	
Bottom DSR 70°C, G*/sin*, kPa			2.387	3.556	5.542	
Elastic Recovery, % (to 10 cm @ 5 cm/min, cut, wait 1 hr.)		25°C	'60 min' ¹	61.2	66.3	62.9

DATA/RESULTS: continued

Ingredient			Trial #; Wt %			
			Specs	-01	-02	-03
MAPLLC PG 64-22				97.0	97.0	97.0
Kraton SBS, 1101				3.0	3.0	--
Chips (Stereon 840A + AP 101)				--	--	3.0
AP 101				---	0.06	--
RTFOT Residue						
Mass Loss, %			1.00 max ¹	0.085	0.087	0.086
Dynamic Shear (10 rad / sec)	G*/Sin *, kPa	64°C	2.20 min	10.945	12.067	18.475
	Phase Angle, °		# 75°	73.1	71.7	71.0
	G*/Sin *, kPa	70°C	2.20 min	5.031	5.833	8.668
	Phase Angle, °		# 75°	77.8	70.5	73.5
	G*/Sin *, kPa	76°C	2.20 min	2.496	2.996	4.236
	Phase Angle, °		# 75°	81.7	75.3	75.9
	G*/Sin *, kPa	82°C	2.20 min	1.273	1.573	2.148
	Phase Angle, °		# 75°	84.6	76.9	78.5
Elastic Recovery, % (to 10 cm @ 5 cm/min, cut, wait 1 hr.)		25°C	'50 min' ¹	62.3	69.0	63.0
PAV Residue (100°C, 20 hrs, 300 psi)						
Dynamic Shear, G*XSin*, kPa		25°C	5,000 max	5,187	5,202	5,611
Creep Stiffness, (60 sec)	Stiffness, MPa	-12°C	300 max	223	202	218
	m Value		0.300 min	0.304	0.310	0.306
	Stiffness, MPa	-18°C	300 max	436	363	370
	m Value		0.300 min	0.255	0.263	0.278
Direct Tension, (1.0 mm/min)	% Strain	-12°C	1.0 min ¹	0.700	0.671	0.468
	Stress, MPa		Report	3.39	3.94	3.32
	% Strain	-18°C	1.0 min ¹	0.389	0.448	0.267
	Stress, MPa		Report	4.39	4.95	3.35
Performance Grade, PG			R 29	76-22	76-22	76-22
'True' Performance Grade				77-22	81-23	83-23

BENEFITS OF FIBER TECHNOLOGY MODIFIED ASPHALT

- 100% recyclable road surface
- High performance road surface
- Cost effective
- Greater value per dollar over traditional road mix design
- Lower maintenance costs
- Greatly extended road life
- Fiber reinforcement
- Imparts memory (Shape Retention) into road surface
- Greater adhesion between binder and aggregate
- Decreases cracking, distortion & disintegration
- Easy to incorporate and use
- No special equipment needed
- Compatible with any lay down system
- Facilitates use of filler products like crumb rubber & plastic