

## GreenThinking® PF81- Nano Reinforcing Filler



POWERFLEX \_ **Enterprising Efficient Win-Win**

GreenThinking® PF81 is removing hydroxyl surface activation treatment of nanometer reinforcing filler, which is from the high whiteness of natural mineral raw material. The strict internal quality control process makes the product have uniform chemical purity and stability of the particle size distribution. Most of the particle size distribution is in the nanoscale. Through the surface activation treatment, it has high reinforcement and whiteness, good dispersion, insulation and resilience etc. It widely used in the rubber and plastic industries.

### Excellent performance of rubber products

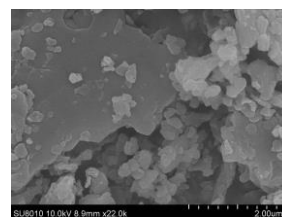
1. Good reinforcing effect, slightly stronger than N660
2. Improving wear and oil resistance and thermal aging performance
3. Excellent insulation and low compression set
4. High whiteness

### Good performance of mixing rubber processing

1. Good dispersion in the rubber
2. Good fluidity, dimension stability, and easy to extrude
3. Extend the burning time and shorten the vulcanizing time curing time
4. High filling rate

### Key Features

1. Lamellar structure and high porosity
2. High specific surface area, no hydroxyl group
3. Light weight, soft body and reasonable particle size distribution
4. Low impurity content, non-toxic, tasteless



### Physical Properties Comparison of Competitor

Physical and Chemical Properties			
Screen Percentage %		Conventional Whiteness GEM	94
%+325 Mesh (>45 um)	<0.4	PH ( Aqueous Solution ) AFS 113-87-S	6-7
Fine Particle Analysis	<0.3	Water Content AFS C-566	<0.3
Median Size (nm) SEDIGRAPH	800	<b>Chemical Analysis</b>	
LOI	<0.3	SiO2	55%
Specific Gravity	2.53	Al2O3	42%
Oil Absorption ( g/100g ) ASTM D-281	60-70	TiO2	1%

Product	PF81	Am Competitor 1	Local Competitor 2	Ger Competitor 3	Ger Competitor 4
8550C	100	100	100	100	100
BC1031	130	130	130	130	130
Functional Filler	65	65	65	65	65
Sanepar 916	65	65	65	65	65
ZnO	5	5	5	5	5
STA	1	1	1	1	1
S-80	1.5	1.5	1.5	1.5	1.5
EG-3	3	3	3	3	3
Total	370.5	370.5	370.5	370.5	370.5

### Performance comparison in Formula

Product	Unit	Standard	PF81	Am Competitor 1	Local Competitor 2	Ger Competitor 3	Ger Competitor 4
<b>Vulcanization Character 180°C*5min</b>							
TS2	m:s		0:44	0:44	0:47	0:44	0:47
T90	m:s		2:55	3:01	3:03	3:13	3:18
TC10	m:s		0:38	0:38	0:39	0:36	0:36
ML	dN.m		0.79	1.15	1.20	1.17	1.35
MH	dN.m		10.26	10.62	10.75	10.66	10.44
Shore A	Point	ASTM D2240	78	80	81	80	82
Tensile Strength	Mpa	ASTM D412	11.96	11.87	11.69	11.9	12.18
Elongation at Break	%	ASTM D412	310	277	275	289	224
100% Constant Modulus	Mpa	ASTM D412	4.99	6.20	5.93	5.60	7.43
Specific Gravity	g/cm3	GB/T 533	1.261	1.271	1.274	1.265	1.274
<b>Hot-air Ageing 100°C*70h</b>							
Shore A	Point	ASTM D573	81	85	85	85	86
Tensile Strength	%		12.85	12.22	12.32	12.66	12.33
Elongation at Break	%		209	172	175	182	132
Compression Set 100°C*22h	%		44.2	47.2	46.9	43.5	46.6

### Test Conclusion

1. From the comprehensive performance, both the initial (strength, elongation) and aging performance are superior.
2. The products have good elasticity and the pressure data is relatively best.
3. TC90 is the shortest material, which provides the production efficiency, and the surface of the products is smooth.

### Industry Application

GreenThinking® PF81 is the broad-spectrum functional filler, widely used in synthetic rubber, natural rubber, PVC, CPE and other plastics and cellulose resin products, as a functional reinforcement.

### Common-usage Level

Substitute various filling materials (silica, kaolin, light calcium, etc.) in the rubber. The product dosage is 30~150phr, and generally 8-10phr hardness can be increased by one Shore A hardness.

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