



Beyond Conventional Fillers: Unlocking Powder Coating Performance

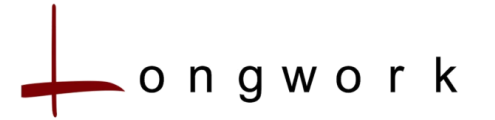
By

Francis Lee, LONGWORK Material Solutions

COTECH2026 ASEAN COATINGS NEW TECHNOLOGY SUMMIT

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| A Little About Myself



Francis Lee

Founder & Director, LONGWORK Mineral Solutions Sdn. Bhd.

Industry expert with more than 30 years of experience in chemicals and industrial minerals. Former CEO of Golcha-Chemintac (Thailand) and former Group Sales Director at Aihai Talc (China). Extensive technical and commercial experience with Nippon Paint, Dow Chemical, Sibelco, Sasol, and Luzenac Talc, specializing in business growth, market development, and mineral solutions.



Company Introduction

LONGWORK & Affiliated Companies

| About Us



Background

LONGWORK MATERIAL SOLUTIONS SDN BHD is a Malaysia-based company affiliated with **mSOL GROUP** in China, a growing organization specializing in the production, promotion, and distribution of minerals and materials for a wide range of industrial applications.

Commitment

We focus on the **promotion, marketing, and development** of functional fillers and industrial materials across diverse industries. Backed by strong strategic partnerships, industry expertise, and a commitment to quality and innovation, we strive to deliver reliable products and value-added solutions to our customers and business partners.

| Our Strategic Alliances



Est. 2015



Est. 2016



Est. 2016



MY - Est. 2024

SH - Est. 2025

GZ - Est. 2026

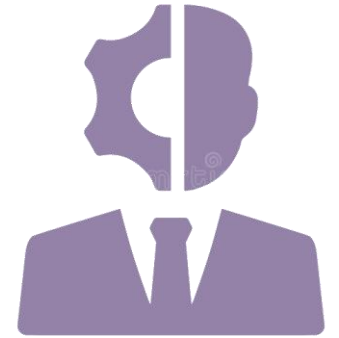
| Our Vision



*To become a **trusted** provider
of **innovative** and **sustainable**
industrial material solutions in
regional and international
markets.*



| Our Strategic Pillars



Expertise & Value Creation

We believe in quality and technical expertise as the foundation of sustainable growth. Every LONGWORK solution is developed with a strong commitment to performance, reliability, and value creation for our customers and business partners.

Innovation & Sustainability

We believe modern industrial solutions should go beyond performance. They should create long-term value. At LONGWORK, we combine technical expertise, quality materials, and innovative thinking to deliver reliable and sustainable solutions for evolving industry needs.

| Global Expansion



10+

Markets Penetrated

A Growing Footprint

With strategic partnerships and growing market presence, the Group is expanding its reach across Asia, Europe, and North America. We remain committed to delivering reliable, high-quality industrial material solutions while upholding our standards in innovation, performance, and customer value.

Paint & Coatings

Insulator Transformer

Adhesive

Friction

Foundry

Silicone Rubber

Fluoro-elastomer

SBR / NBR

PUR

UPR

PE / PP / PA

PVC

| Key Production: Anhui, China



- Commissioned in 2015.
- Area: 80,000 m²

Advanced Milling Technologies

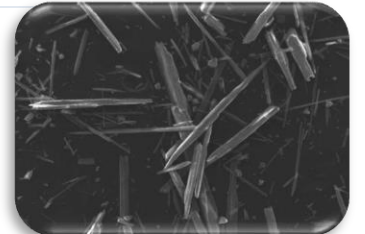
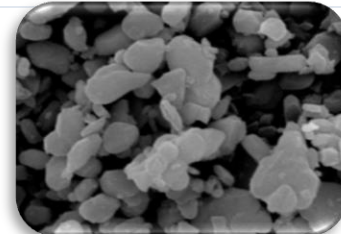
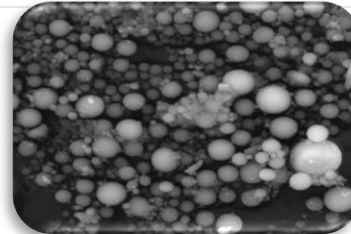
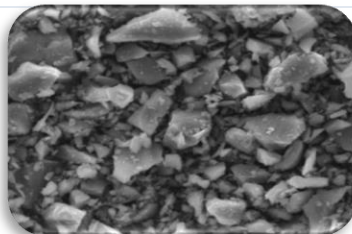
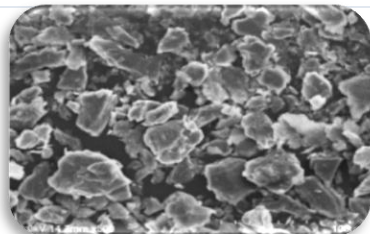
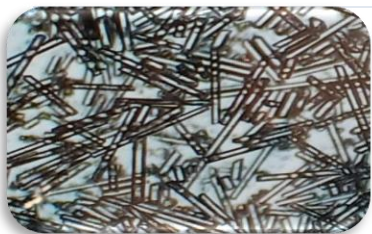
- Ball mill
- Impact mill
- Raymond mill
- Jet mill
- Surface-treated line



Products & Capacities

Mineral Type	Capacity, TPA
Natural silica	200,000
Wollastonite	20,000
Aluminosilicate	20,000
Barite	20,000
Kaolin	20,000
Surface treated series	5,000

Mineral Type	Capacity, TPA
Alumina & ATH	20,000
Milled fiberglass	10,000
Hollow glass	10,000
Carbon black	6,000
Mica	5,000
Others to come...	





Fused Aluminosilicate

The Innovative Functional Filler for
High-Performance Powder Coating

| What is Fused Aluminosilicate?

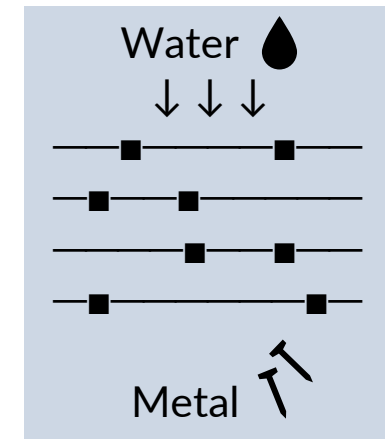
- Produced by **high-temperature fusion** of aluminosilicate minerals.
- Composed mainly of **Silica** (SiO_2), **Alumina** (Al_2O_3), and **Calcium Oxide** (CaO).
- Very low moisture content and ultra-low LOI.
- **Chemically stable** and **inert** in coating formulations.
- Lower density than barium sulfate, providing higher **volume efficiency**.
- Creates a **very effective moisture barrier** within the coating film.
- Improves **boiling water resistance**, **gloss retention**, and **corrosion protection**..

In Summary:

An **engineered mineral filler** designed to improve moisture resistance, corrosion protection, and overall coating durability.

How It Improves Moisture Barrier Performance?

- **Dense, low-porosity particles** reduce water penetration.
- **Efficient particle packing** minimizes voids and creates a tighter coating film.
- **Improved barrier effect** slows moisture diffusion through the coating.
- Very low LOI reduces internal defects and moisture-sensitive sites.
- Low water absorption limits moisture uptake during service.
- Stable inorganic structure withstands hot and humid environments.
- Good **filler-resin compatibility** helps reduce micro-voids.
- High volume efficiency enhances barrier performance at lower loading levels.



SGP Series: Chemical & Physical Properties



	%
SiO ₂	60.13
Al ₂ O ₃	13.00
K ₂ O	0.42
Na ₂ O	0.55
CaO	21.68
MgO	3.18
Fe ₂ O ₃	0.38
TiO ₂	0.23
LOI	0.05

		SGP-10	SGP-6	SGP-3	SGP-2	SGP-1
Particle Size D50 (μ m)	Malvern 2000	10.08	6.42	3.37	3.01	1.89
Particle Size D90 (μ m)		28.1	15.97	8.43	7	2.77
BET (m ² /g)	ASTM C-204	0.5	0.62	0.79	1.1	1.5
Oil Adsorption (g/100g)	ISO 787-5 : 1980	21	28	32	36	48
pH (20% slurry)	ISO 787-9 : 1981	8.8	8.8	8.8	8.8	8.8
Whiteness	R457	85	85	86	86	87
Bulk density (g/cm ³)		0.8	0.7	0.6	0.5	0.3
Hardness	Mohs			5		
Density (g/cm ³)	ASTM C-128			2.38		
Moisture (%)	ASTM C-566		0.15Max			0.3Max



Experiment

SGP Series Performance in the Water Boiling Resistance Test for
Powder Coatings

Test Design

- This study evaluated and compared **Pure PB** (precipitated barium sulfate) vs. a **Blended PB + SGP-10 system** in the **Water Boiling Resistance Test**.

Formulation System	PB Dosage	SGP-10 Dosage	TiO ₂	Characterization
Pure PB (Blank High)	19.7%	0%	18.0%	Low overall filler density, pigmented with TiO ₂
Pure PB (Blank Low)	37.2%	0%	-	High overall filler density, unpigmented (clear/neutral)
Low SGP-10 Blend (13%)	6.7%	13.0%	18.0%	Composite blend strategy, pigmented with TiO ₂
High SGP-10 Blend (30%)	7.2%	30.0%	-	High composite blend strategy, unpigmented

| Boiling Water Resistance Test

- One of the **most demanding tests** for powder coatings because it simulates long-term exposure to hot water, moisture, and steam in a very short time.
- It indicates moisture barrier performance. When a coating is immersed in boiling water, water molecules rapidly penetrate the coating film.



Gloss Difference

- SGP-10 drastically enhances boiled-water gloss retention while stabilizing raw color change.

System Specification	Initial Gloss	1h Gloss Ret.	2h Gloss Ret.	2h ΔE^*	vs. PB Baseline	Rating
Pure PB (Blank High)	79.1	23.6%	21.6%	5.96	Baseline	Standard
Pure PB (Blank Low)	84.8	24.4%	21.5%	6.53	Baseline	Standard
High SGP-10 Blend (30%)	57.2	40.2%	37.4%	4.29	↑ 73%	Good
Low SGP-10 Blend (13%)	70.2	44.6%	37.9%	2.96	↑ 75%	Good

| Blistering Sign

- Water boiling blister tendencies remain entirely absent across pure standard systems and controlled SGP-10 13% addition.

Pure PB (Blank)

Zero risk observed after 2h.

Low SGP-10 Blend (13%)

Fully stable and secure.

High SGP-10 Blend (30%)

Some blisters emerged at
2h

Why SGP-10 Improves Water Resistance?

- The **Al-O-Si network** is highly stable and not easily hydrolyzed.
- **Low porosity** limits water penetration.
- **Low surface reactivity** reduces water uptake.
- **Dense particles** increase the tortuosity of diffusion pathways through the coating film.



| Suggestion



SGP-10 at 13% loading, blended with PB, for optimum performances

- This formulation offers a balance among key properties: high water boil survival, low color variation, and a zero-blistering profile.
- PB helps chemically; whilst SGP-10 helps structurally

Loading Guideline: Keep blending dosage moderately at about 13%

- At higher dosage, initial gloss could drop drastically, color variation worsens and might introduce critical risk of film blistering.



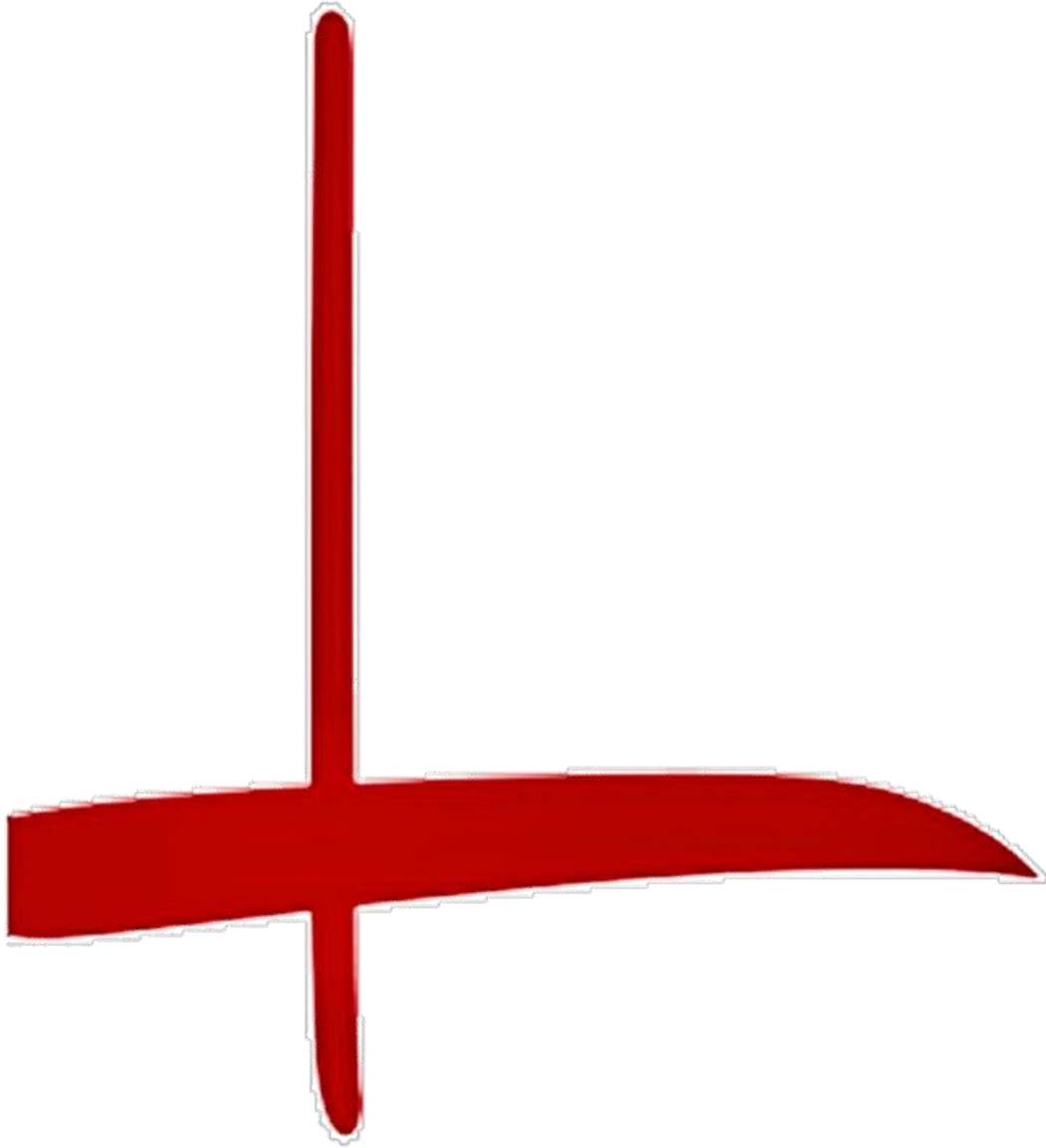
Other Mineral Options

We find ways to serve you, Whenever, Wherever.

LONGWORK Product List



Mineral	Products	Morphology	Chemistry	Key Application	Key Functionalities
Natural silica	CS Series	Angular	SiO ₂	P&C, E&E	Stable and low cost
Cristobalite	CB Series	Angular	SiO ₂	Eng-stone, rubber	High whiteness
Fused silica	FS Series	Angular	SiO ₂	E&E	Low-cte · low-dk-df
Spherical silica	FSS Series	Spherical	SiO ₂	E&E, plastics	Low-cte · low-dk-df, high loading
Diatomite	DE Series	Irregular	SiO ₂	P&C, rubber	Reinforcement, matting agent
Wollastonite LN	WL Series	Long acicular	CaSiO ₃	Eng-plastics	White reinforcement filler
Wollastonite SN	WS Series	Short acicular	CaSiO ₃	P&C, E&E	High loading reinforcement filler
Calcined alumina	FA Series	Small flake	Al ₂ O ₃	Adhesive+Abrasive	Thermal conduction, hardness
Fused alumina	FAP Series	Angular	Al ₂ O ₃	Adhesive+Abrasive	Thermal conduction, hardness
Spherical alumina	SAP Series	Spherical	Al ₂ O ₃	Adhesive+Abrasive	Thermal conduction, hardness
Alumina	ALU Series	Chain-like	Al ₂ O ₃	P&C	Anti-settling agent
ATH	AH Series	Hexagonal block	Al(OH) ₃	P&C, rubber	Flame retardant, thermal conduction
Glass	HL, HK Series	hollow spherical	CaO.Al ₂ O ₃ .SiO ₂	P&C,Eng-plastics	Lightweight
Glass	MF T series	Fibrous	CaO.Al ₂ O ₃ .SiO ₂	P&C,Eng-plastics	Reinforcement
Glass	SGB series	Solid spherical	Na ₂ O.CaO.Al ₂ O ₃ .SiO ₂	P&C, Adhesive	Proppant
Mica	GM series	Platy	KAl ₂ (AlSi ₃ O ₁₀)	P&C, Eng-plastics	reinforcement
Aluminum Silicate	SGP Series	Angular	CaO.MgO.Al ₂ O ₃ .SiO ₂	P&C, plastics films	matting agent, anti-block



Any Questions?

Building Tomorrow, Together.

For further information, please contact:

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