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SSEIF® Biofiller

SSEIF®
SuStainable, Eco-friendly and Innovative Filler

BENEFITS OF SSEIF

- PROVEN TECHNOLOGY
- LIGHTWEIGHT
- PRICE COMPETITIVENESS
- ECO-FRIENDLY
- VERSATILE APPLICATIONS

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Lignum produces high-performing
bioplastic materials

Lignum

Lignum | Global Leader in Biomass Conversion Technology

01 VISION & MISSION

Lignum produces high-performing bioplastic materials

Our Vision

The global leader in biomass conversion technology

Our Mission

Reducing GHG emission in plastic production

02 SOCIAL IMPACT

How does Lignum contribute to UN's SDGs?

・Lignum technology contributes to the UN's sustainable development goals.

SDG 2 We produce SSEIF® Biofiller from non-food biomass.

SDG 11 Our innovative technology makes biorefinery industry commercially viable, creating job opportunities.

SDG 13 We do not emit greenhouse gas because our feedstock is produced by photosynthesis.

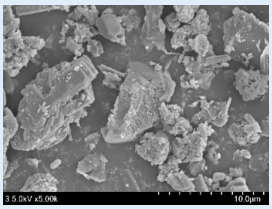
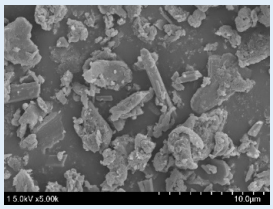
SDG 14,15 Our eco-friendly technology contributes to making our planet clean by converting lignocellulosic biomass into biodegradable products.

PRODUCTS

SSEIF®

SSEIF® Biofiller was designed to enable manufacturers to make lightweight plastics. SSEIF® Biofiller shows excellent dispersion, MI, and surface properties in the processes of extrusion, injection and blowing.

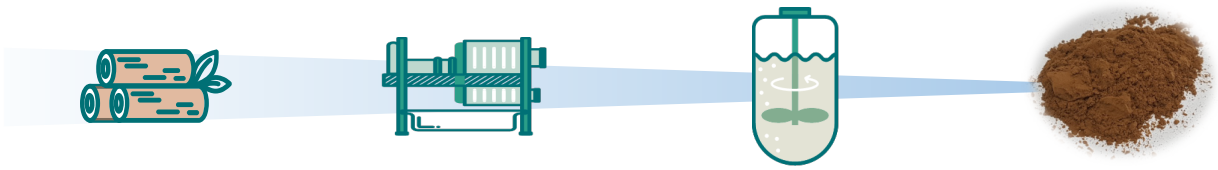
USDA CERTIFIED BIOBASED PRODUCT
PRODUCT 96%

PROPERTIES		UNITS	SSEIF®_L	SSEIF®_B
SPECIFIC GRAVITY		g/cm^3	1.3	1.3
BULK DENSITY		g/cm^3	0.3~0.4	0.2
PARTICLE SIZE	Dv (10)	μm	3.5	1.4
	Dv (50)		19	4.7
	Dv (90)		50	11
MOISTURE CONTENT		wt%	<5	<5
BIOCARBON CONTENT*		%	96±3	96±3
-OH NUMBER		KOH/mg	60-70	60-70
pH		-	6.0~8.0	6.0~8.0
SEM IMAGE		-		

* Analyzed by Beta Analytic Testing Lab., conforming to ASTM D6866-16

PROCESS

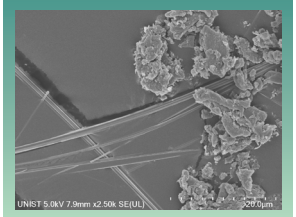
Our innovative technology converts lignocellulosic biomass into SSEIF® Biofiller by two core processes. The physical treatment makes our product more uniform in particle shape. Our product becomes more compatible with traditional plastics by chemical conversion.



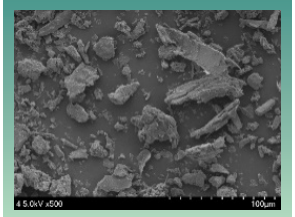
1 Biomass

2 Physico-Chemical Reaction

3 Holocellulose Hydrolysis

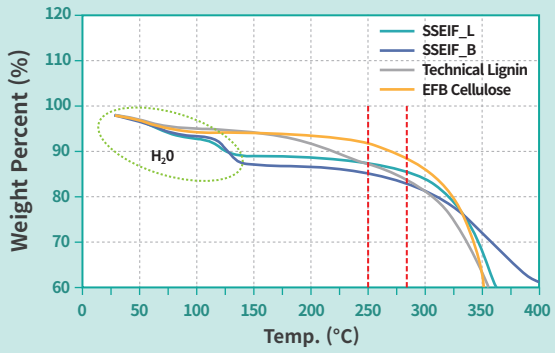


4 SSEIF®

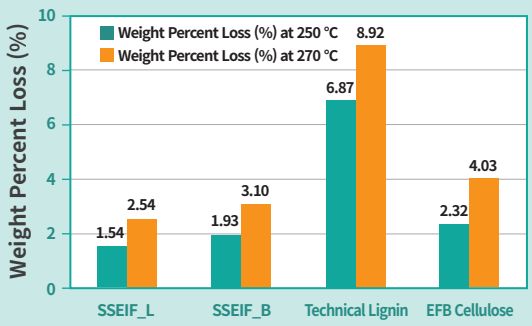


PROPERTIES

Thermogravimetric Analysis (TGA) of SSEIF®

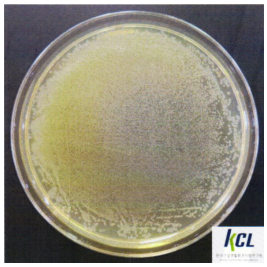


Thermal Decomposition of SSEIF®

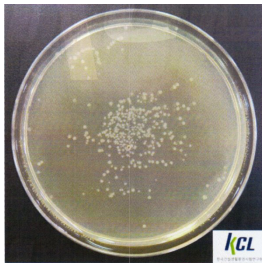


Antibacterial Property of SSEIF®

Test specimen



Blank (24hr)

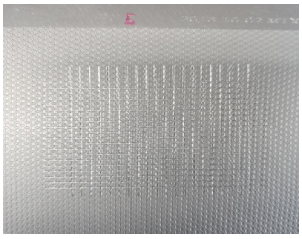
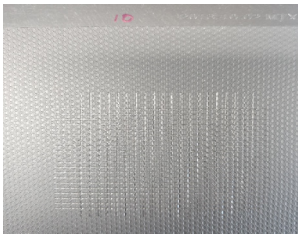
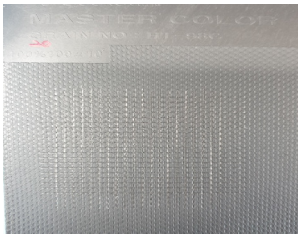


SSEIF®(24hr)

Test Strain		Test Method	Test Results			Test Condition
			Initial Conc. (CFU/ml)	After 24hr (CFU/ml)	Decrease (%)	
E.coli ATCC 8739	Blank	KCL-FIR-1003:2018	$3.3X10^5$	$9.9X10^9$	-	37°C
	+ SSEIF®		$3.3X10^5$	$3.5X10^4$	99.6	

KCL Test number : CT20-110052K

Scratch Resistance of SSEIF®

PP-TALC10-POE10-SSEIF® 5	PP-TALC10-POE10-SSEIF® 10	PP-TALC10-POE10-SSEIF® 20
		
ΔL : 1.7 (Min-1.09)	ΔL : 1.7 (Min-0.73)	ΔL : 1.7 (Min-0.68)

Grain No : HT-98C / Condition : MS210-05 4.9.1, Erichsen 430P, BYK 6836, 23°C±2, 48 Hr Aging

UV Test of PP- SSEIF® Composite

Test Method: GMW14162

- SK BX-3920 20~25%
- SK BX-3500 25~30%
- SK Solumer 875(POE) 20%
- SSEIF 5~20%

Lignum

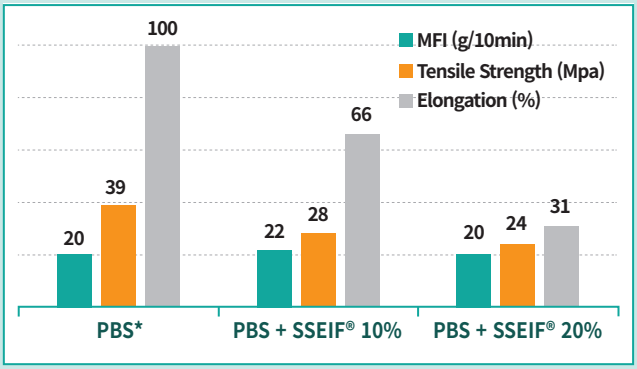
APPLICATION_EPDM-SSEIF® COMPOSITE

EPDM
+
10% SSEIF

Property		Result	comment
SSEIF-L content (%)		9.2	
Mooney (125 °C)	Mv	39.6	
	T5	20:01	
MDR (170 °C*10min)	T_{max}	8.5	
	T_{min}	1.5	
	tc10	2:12	
	tc90	5:06	
170 °C @ 10 min press cured			
Test		Result	
Physical Property	Hs (Shore-A)	53	
	Tensile Strength (kg/cm²)	143	
	Elongation (%)	735	
	Density (g/cm²)	1.044	
Compression set (70 °C* 22hrs*25%)		24	170 °C*20min press cured
Resilience (%)		56	

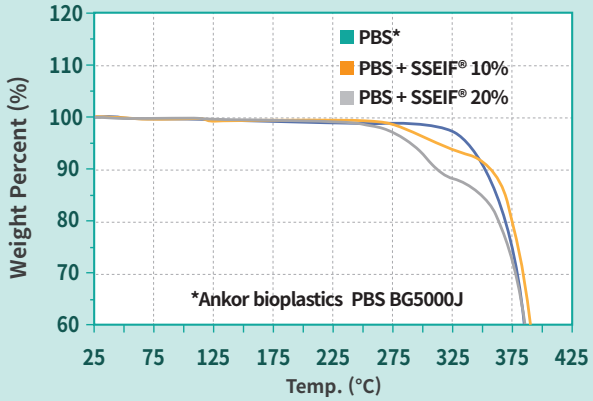
APPLICATION_PBS-SSEIF® COMPOSITE

PBS-SSEIF®Composite



*PBS: Poly Butylene-Succinate, Ankor Bioplastic BG5000J

Thermal Properties of PBS-SSEIF® Composite



OTHER APPLICATIONS


3D PRINTING FILAMENT


PACKAGING


ELECTRONICS


AGRICULTURE


CONSTRUCTION


ENGINEERING PLASTIC

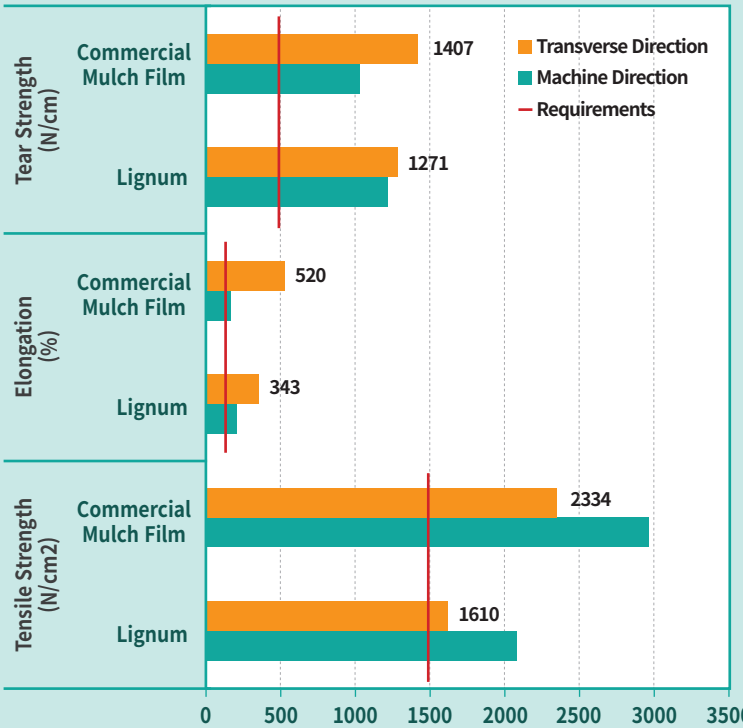
APPLICATION_ POLYPROPYLENE (PP)-SSEIF® COMPOSITE

・PP-SSEIF® Composites for Automotive Components

Properties	Methods	Units	PP - SSEIF® Composites (Replaced 5 wt% talc with 5 wt% SSEIF®_L)			
			Requirements	Results	Requirements	Results
			VOLKSWAGEN (TL-52388-E)		FORD (TPP40AE2, LyondellBasell)	
Density	ISO 1183	g/cm2	<1.02 ±0.02	0.99	1.28	1.19
Content of Filler (Talc)	ISO 3451	%	<16	10.5	40	35
Melt Index	ISO 1133	g/10min		22.1	7.5	10.3
Tensile Strength	ISO 527	MPa		17	30.5	34
Elongation at Break	ISO 527	%		163		
Flexural Strength	ISO 178	MPa		25		
Flexural Modulus	ISO 178	Mpa (23°C)	>1,200	1,373	3,400	3,850
		Mpa (-30°C)	>2,500	2,540		
Izod Notched Impact	ISO 180/1A	KJ/m2 (23°C)		28.5	2.8	3.8
		KJ/m2 (-30°C)		4.7	1.6	2
Charpy Notched Impact	ISO 179/1eA	KJ/m2 (23°C)	>25	25.7		
		KJ/m2 (-30°C)		4.1		
Rockwell Hardness	ISO 2039			54.4		
HDT (Flatwise-1.8 Mpa)	ISO 75/A	°C		93	89	92
HDT (Flatwise-10.45 Mpa)	ISO 75/B	°C			135	139
Melting Point	ISO 11357	°C	163.5	164.5		

APPLICATION_PBAT BASED MULCH FILM

PBAT Mulch Film vs. PBAT-SSEIF® Mulch Film



*PBAT + 10 wt % SSEIF® _B

Experimental Condition : KMS M 1010

PBAT-SSEIF® Mulch Film

☑ Higher biocarbon content than other commercial products

☑ Compostable

Lignum