



TOROWHITE

ENGINEERED FUNCTIONAL ADDITIVES

PRODUCT DATA SHEET

FIL 04

POLYMER & BIOPOLYMER

FUNCTIONAL ADDITIVE

CALCIUM SULFATE **ANHYDRITE**

HIGHLIGHTS

- Ideal filler for food packaging with resistance to acidic foods
- Prevents migration acting as a functional filler
- Produced from food & pharma grade natural gypsum
- High Purity > 98% CaSO₄
- Good whiteness
- Improved UV resistance
- Good impact properties
- Easy to process due to low Mohs hardness
- High thermal stability
- Good tensile strength and flexural strength
- Significant cost reduction for the polymer matrix
- Optimized for production and improvement of functionalities of PLA and other biopolymers
- Odourless
- Does not conduct electricity

FIELDS OF APPLICATION: Automotive, engineering appliances, packaging, paints, biomedical, paper, special additives and adhesives, materials, rigid PVC, others.

TOROWHITE FIL 04 is a Calcium Sulfate Anhydrite (All) functional additive with very high purity & good whiteness. FIL 04 is produced from specially selected Food & Pharma Grade natural gypsum. Narrow particle size distribution enables high performance in terms of thermal and mechanical characteristics, dimensional stability, optical properties and processability. Made by controlled dehydration of Calcium Sulfate Dihydrate at high temperature it is known as «insoluble» Anhydrite II due to its very low absorption of water.

BIOPOLYMERS AND COMPOSITES FOR DURABLE APPLICATIONS

TOROWHITE FIL 04 as a functional additive increases the thermal and mechanical properties of the biopolymer matrix in conjunction with other additives while decreasing the costs substantially.

In biodegradable plastics such as polylactide (PLA) optimum results with improved functionalities are obtained at 20-40% FIL 04 levels in the respective composites.

In highly filled PLA composites containing 40% of FIL 04, the co-addition of up to 10% impact modifier can significantly improve impact properties, leading to 2-3 times increase in impact strength.

TOROWHITE FIL 04 can also be used to significantly improve the flame retardant property of polylactide (PLA) based polymers utilized in conjunction with other additives.

PLA composites containing FIL 04 with other as flame retardant without halogens are classified "VO" (in the case of 25% FIL 04) and "V2" (in the case of 40% FIL 04).*

*Source: Materia Nova R&D Center

FIL 04 displays excellent dispersion properties in compounds with PLA based polymers.



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TECHNICAL DATA

Physical properties

Tap Density (g/cm ³) ⁽¹⁾	0.9
Pycnometer Density (g/cm ³) ⁽²⁾	2.8 - 3.0
Mohs hardness ⁽³⁾	2.0 - 3.0
Refractive index ⁽³⁾	1.55 - 1.60
Whiteness (CIE L value) ⁽⁴⁾	L* > 93
Medium particle size D50 (microns) ⁽⁵⁾	3.80 - 4.70
Maximum particle size D98 (microns)	16 - 20
Oil Absorption-DOP (g/100g) ⁽⁶⁾	26.76
BET Surface Area (m ² /g) ⁽⁷⁾	8.76
pH (10% slurry)	10.0 – 11.0
Purity	> 98% CaSO ₄
Crystal shape	orthorhombic
Water content	max. 1.0% (TGA method)

- (1) According to the standard ASTM B527
(2) Quantachrome Ultrapyc-1200e
(3) Literature data (R. Rothon, Fillers for Polymer Applications, Springer 2017)
(4) Datacolor ELREPHO
(5) Malvern Mastersizer 3000
(6) ASTM D1483
(7) Quantachrome NOVAtouch

Typical Chemical Analysis

Chemical name	Calcium Sulfate Anhydrite
Molecular formula	CaSO ₄
CAS number	7778-18-9

Food & Pharma Grade raw material with the following results for FIL 04

Assay	>99%
Flame Test	Red Flame Calcium present
Sulphate Test	Present
Solubility in Water	Slightly Soluble
Solubility in Ethanol	Insoluble
Fluoride (Anion IC)	<30.0 mg/kg
Selenium (F5202)	<10.0 mg/kg
Arsenic (F5202)	< 1.0 mg/kg
Lead (F5202)	< 1.0 mg/kg
Mercury (F5202)	< 0.5 mg/kg

This information is given to the best of our knowledge. Although all statements and results shown in this document are believed to be accurate and reliable, they are presented for guidance and as information only. Because of the multitude of formulations and processing conditions, the above-mentioned statements must be adapted by user to the requirements of application.