

High-purity additives for high-quality food,  
beverage and pharmaceutical products



# Calcium Sulfate Fillers



Calcium sulfate products are used by the food, beverage and pharmaceutical industries as an economical and FDA-approved source of supplemental calcium. Calcium sulfate is also acceptable as an additive in pigments and colorants used in food containers.



## Calcium Sulfate Fillers

# Overview

Use of calcium sulfate in food and pharmaceutical applications is widespread and continues to expand. United States Gypsum Company offers two highly refined calcium sulfate products: USG® Terra Alba and SNOW WHITE® filler. Both fillers are food- and pharmaceutical-grade forms of calcium sulfate, a mineral that appears on the Food and Drug Administration's GRAS (Generally Recognized as Safe) list of additives approved for nutritional and functional use in food products.

## Calcium Sulfate Products

**USG Terra Alba (CaSO<sub>4</sub> • 2H<sub>2</sub>O)**, the dihydrate form of calcium sulfate, results from fine-grinding and air-separating a select, high-purity white gypsum that contains about 20 percent water of crystallization.

**SNOW WHITE filler (CaSO<sub>4</sub>)**, the anhydrous form of calcium sulfate, is produced by calcining and milling high-purity white gypsum.

		USG Terra Alba filler	SNOW WHITE filler	
<b>Typical Analyses</b>	Total calcium <sup>a</sup>	23.1%	29.2%	
	CaO	32.31%	40.92%	
	SO <sub>3</sub>	45.22%	57.46%	
	CaSO <sub>4</sub>	0.39%	97.68%	
	CaSO <sub>4</sub> • 2H <sub>2</sub> O	97.1%	—	
	CaCO <sub>3</sub> • MgCO <sub>3</sub>	1.52%	0.77%	
	SiO <sub>2</sub> and insolubles	0.24%	0.13%	
	Fe <sub>2</sub> O <sub>3</sub> • Al <sub>2</sub> O <sub>3</sub>	0.12%	0.12%	
	Water loss 250 °C	20.31%	0.33%	
	Brightness index (min.) <sup>b</sup>	84.4	97.1	
	Oil absorption <sup>c</sup>	23.5	26.5	
	Specific gravity	2.32	2.96	
	Bulk density (pcf)	Loose	42.0	44.0
		Compacted	70.0	80.0
	Bulking values	Lbs. per solid gal.	19.38	24.43
		Solid gals. per lb.	0.0518	0.0406
	Solubility (70 °F) per 100 cc of H <sub>2</sub> O	0.26 grams	0.26 grams	
pH (10% slurry)	7.3	10.4		
Refractive index	1.52	1.56		
Through 100 mesh (min.)	100%	100%		
Through 325 mesh (min.)	93%	97%		
Avg. particle size (microns)	12-15	7-9		

(a) Conversion of calcium content:  
Milligrams of calcium per lb. of USG Terra Alba filler computed as follows: 1 lb. = 454 grams = 454,000 mg 23% x 454,000 mg = 104,420 • 1 lb. of USG Terra Alba filler = 104,420 mg of calcium.

Milligrams of calcium per lb. of SNOW WHITE filler computed as follows: 1 lb. = 454,000 mg 29% of 454,000 mg = 131,600 mg • 1 lb. of SNOW WHITE filler = 131,600 mg of calcium.

(b) The brightness index was determined on a Beckman DU Spectrophotometer using magnesium oxide as the standard.

(c) Oil absorption is the amount of linseed oil, in cubic centimeters, required to wet 100 grams of filler.

# Applications

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USG Terra Alba and SNOW WHITE filler are used primarily in the food, beverage and pharmaceutical industries.

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**Commercial Baking Industry** In the commercial baking industry, the fillers are economical sources of supplemental calcium in enriched flour, cereals, baking powder, yeast, bread conditioners, baking powder, and cake icing. The gypsum products can also be found in canned vegetables and artificially sweetened jellies and preserves.

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**Brewing Industry** In the brewing industry, calcium sulfate promotes a smoother-tasting beer with improved stability and a longer shelf life.

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**Pharmaceutical** For pharmaceutical applications, calcium sulfate is extensively used as a diluent because it makes an excellent inert extender while also serving as a dietary calcium supplement.

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**FDA Regulations**  
**Title 21**  
**Food and Drugs**  
**Parts 1-199**

<b>Section</b>	<b>Uses</b>
133.111 (c) 2	With benzoyl peroxide in caciocavallo siciliano cheese
133.141 (c) 2	With benzoyl peroxide in gorgonzola cheese
133.165 (c) 2	With benzoyl peroxide in parmesan and reggiano cheese
133.181 (c) 3	With benzoyl peroxide in provolone and pasta filata cheese
133.183 (c) 2	With benzoyl peroxide in romano cheese
133.195 (c) 1	With benzoyl peroxide in swiss and emmenthaler cheese
136.115 (a) 2	Enriched bread, rolls and buns
137.105 (a) 5	Flour
137.165 (b)	Enriched flour
137.185 (b)	Enriched self-rising flour
137.235 (a) 3	Enriched corn grits
137.260 (a) 3	Enriched corn meals
137.305 (a) 3	Enriched farina
139.115 (a) 3	Enriched macaroni products
139.117 (b) 2	Enriched macaroni products with fortified protein
139.155 (a) 3	Enriched noodle products
150.141 (a) 5	Artificially sweetened fruit jelly
150.161 (a) 5	Artificially sweetened fruit preserves and jams
155.170 (a) 2 xi	Firming agent in canned peas
155.190 (a) 2 i	Firming agent in canned tomatoes
155.200 (c) 6	Firming agent in canned potatoes
155.200 (c) 6	Firming agent in canned green sweet peppers, red sweet peppers and lima beans
155.200 (c) 6	Firming agent in canned carrots
175.300 (xxvi)	Resinous and polymeric coatings (pigments and colorants)
178.3297	Colorants for polymers
182.90	Substances migrating to food from paper and paperboard products
184.1	GRAS
184.1230	Nutrient and/or dietary supplement

- (a) Product: calcium sulfate
- (b) Meets specifications of the Food Chemicals Codex
- (c) Anti-caking, coloring, drying, firming, leavening; adjunct, dough strengthener, formulation aid, nutrient supplement, pH control, processing aid, stabilizer and thickener, synergist, texturizer.
- (d) Conditions of use: This substance is generally recognized as safe when used in accordance with good manufacturing practices.
- (e) Waiver-prior sanctions

# Specification

USG Terra Alba and SNOW WHITE filler are manufactured only at USG's plant in Southard, Oklahoma. Both products are guaranteed to meet the specifications of the Food Chemicals Codex and the National Formulary, as listed below:

## Standards

	Food Chemicals Codex	National Formulary
Arsenic	3.0 ppm max.	3.0 ppm max.
Selenium	30.0 ppm max.	30.0 ppm max.
Fluorine	30.0 ppm max.	30.0 ppm max.
Heavy metals	—	10.0 ppm max.
Iron	—	100.0 ppm max.
Lead	2.0 ppm max.	—
Calcium assay	98.0% min.	98.0% min.

Upon request, USG will supply a continuing guarantee to customers using USG Terra Alba or SNOW WHITE filler. Each shipment is batch-coded to show the day, month and year of manufacture. Representative samples are kept for reference at the Southard plant for five years from the date of shipment.





**Technical Service**

800 487.4431

**Web Site**

[www.usg.com](http://www.usg.com)

**Samples/Literature**

888 874.2450

**Samples/Literature E-mail**

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**Samples/Literature Fax**

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**Customer Service**

800 950.3839

**Trademarks**

The following trademark used herein is owned by USG Corporation or its subsidiaries: USG. SNOW WHITE is a registered trademark of United States Gypsum Company.

**Notice**

We shall not be liable for incidental and consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

**Safety First!**

Follow good safety and industrial hygiene practices during handling and installation of all products and systems. Take necessary precautions and wear the appropriate personal protective equipment as needed. Read material safety data sheets and related literature on products before specification and/or installation.



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