

# Material Characteristics

MATERIAL	DENSITY (LB/FT3)	ANGLE OF REPOSE (DEG)	RECOM-MENDED MAXIMUM INCLINATION (DEG)	MATERIAL	DENSITY (LB/FT3)	ANGLE OF REPOSE (DEG)	RECOM-MENDED MAXIMUM INCLINATION (DEG)
Alfalfa, Ground	16	45°		Corn, Shelled	45	25°	10
Alum, Lumpy	50 - 60	35°		Corn Sugar	30	35°	
Alum, Pulverized	45 - 50	35°		Corn Grits	40 - 45	35°	
Alumina	60	30°	10-12	Commeal	32- 40	35°	22
Aluminum Oxide	70 - 120	30°		Cottonseed, Dry, De-Linted	35	35°	16
Ammonium Sulphate	45 - 60	45°		Cottonseed, Dry, Not De-Linted	18- 25	45°	19
Asbestos, Shredded	20 - 25	45°		Cottonseed, Cake, Lumpy	40- 45	35°	
Ashes, Dry	35 - 40	45°		Cottonseed, Hulls	12	45°	
Ashes, Wet	45 - 50	45°		Cottonseed, Meal	35- 40	35°	22
Ashes, Soft Coal	35 - 45	40°		Cottonseed, Meats	40	35°	
Asphalt, Crushed	45	35°		Cryolite	90-110	35°	
Bagasse	7.50	45°		Cullet	80-120	35°	20
Bakelite, Powder	30 - 40	45°		Diatomaceous Earth	11- 14	35°	
Baking Powder	40 - 50	35°		Dolomite, Lumpy	90-100	35°	22
Bark, Wood Refuse	10 - 20	45°	27	Dolomite, Pulverized	46	40°	
Barley	38	25°	10-15	Earth, Dry	70- 80	35°	20
Basalt	80 - 120	25°		Earth, Moist	75-110	40°	23
Bauxite, Crushed	75 - 85	35°	20	Earth, Fullers Dry	30- 35	23°	20
Beans, Castor, Whole	30 - 45	25°	8-10	Emery	225	25°	
Beans, Cocoa	30 - 45	35°		Epsom Salt	40- 50	35°	
Beans, Navy	50	25°		Feldspar, Lumps	70-100	35°	17
Beans, Whole	45	45°		Feldspar, Dust	80-100	40°	
Bentonite, Crude	35 - 40	45°		Fish, Meal	35- 40	40°	
Bentonite, Fine	50 - 60	45°		Fish, Scrap	40- 50	0°	
Bones, Pulverized	50 - 60	45°		Flaxseed, Whole	45	25°	12
Borax, Fine	50 - 55	35°		Flaxseed, Meal	25	35°	
Borax Coarse	60 - 70	35°		Flour, Wheat	35- 40	45°	21
Bran	16	35°		Flue Dust, Dry	30- 40	20°	
Brewers Grain, Dry	25 - 35	45°		Fluorspar, Dust	85- 95	45°	
Brewers Grain, Wet	55 - 60	45°		Fluorspar, Lumps	80-110	45°	
Buck Wheat	40	25°	11-13	Foundry Refuse	60- 80	35°	
Calcium, Carbide	70 - 80	35°		Foundry Sand, Loose	80- 90	35°	
Carbon Black, Pellets	25	25°		Foundry Sand, Rammed	100-110	0°	
Carbon Black, Powder	5	35°		Galena	250	35°	
Cast Iron Chips	100 -120	45°		Garbage, Average	30	25°	
Cement, Clinker	75 - 90	35°		Glass, Batch Fiber	45 - 55	10°	
Cement, Portland	80 -100	35°	20-23	Glass, Batch Wool	80-100	35°	20-22
Chalk, Fine	65 - 75	45°		Glass, Broken	80-100	10°	
Chalk, Lumpy	80 - 95	45°		Glue, Animal, Flaked	35	25°	
Charcoal, Wood	15 - 30	35°	20-25	Glue, Vegetable, Powdered	40	35°	
Chromium Ore	125 - 140	35°		Gluten, Meal	39	35°	
Cinders, Coal	40	35°	20	Granite, Lumps	150 -170	25°	
Clay, Dry, Fine	100 - 120	35°	20-22	Graphite, Flakes	40	35°	
Clay, Dry, Lumpy	60 - 75	35°	18-20	Graphite, Powder	30	25°	
Coal, Anthracite, Coarse	60 - 70	35°	18	Graphite, Ore	65 - 75	35°	
Coal, Anthracite, Loose	50 - 60	30°	16	Grass Seed	10	35°	
Coal, Bituminous, Coarse	50 - 60	35°	18	Gravel, Dry	90-100	35°	15-17
Coal, Bituminous, Loose	45 - 50	35°	16	Gravel, Wet	100-120	35°	
Cocoa Nibs	35 - 40	35°		Gypsum, Lumps	90-100	35°	15
Coconut, Shredded	20 - 25	45°		Gypsum, Ground	75- 80	35°	21
Coffee, Fresh Beans	30 - 40	35°	10-15	Hay, Loose	5	0°	
Coffee, Roasted Beans	22 - 30	25°		Hay, Pressed	25	0°	
Coke, Loose	23 - 32	35°	18	Hominy	35- 50	35°	
Coke Pulverized	25 - 35	45°	20-22	Hops, Spent, Dry	25- 35	45°	
Coke, Petroleum Calcinated	35 - 45	35°	20	Hops, Spent, Wet	55- 60	45°	
Concrete, Cinder	112	0°	12-30	Ice, Crushed	35- 40	20°	
Concrete, Gravel & Sand	150	0°		Ilmenite Ore	140-160	35°	
Copper Ore	120 - 150	35°	20	Iron Ore	120-180	35°	18-20
Copper Sulfate	75 - 85	30°	17	Iron Ore, Pellets	120-140	35°	13-15
Cork, Ground	5 - 15	45°		Iron Sulphate	50- 75	35°	
Corn, On Cob	45	0°		Iron Sulfide	120-140	35°	

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Kaolin, Clay	60	35°	19	Rubber, Pellets	50 - 55	35°	22
Lactose	30	35°		Rubber, Ground Scrap	25 - 35	45°	18
Lead Ore, Crushed	180 - 270	30°		Rye	42 - 45	25°	8
Lead Oxides	60 - 150	40°		Rye Meal	35 - 40	20°	
Lead Sulfate	170 - 190	45°		Salt Cake	80 - 95	30°	21
Lead Sulfide	240 - 260	35°		Salt, Coarse"	45 - 55	35°	18-22
Lignite, Air Dried	45 - 55	35°		Salt, Fine"	70 - 80	35°	11
Lime, Ground	60 - 65	40°	23	Sand, Wet	110 - 130	45°	20-22
Lime, Hydrated	40	40°	21	Sand, Dry	90 - 110	35°	16-18
Lime, Pebble	30 - 40	40°	17	Sand, Loose, Foundry	80 - 100	35°	22
Limestone, Loose	80 - 100	35°	20	Sand, Foundry, Rammed	100 - 110	0°	24
Limestone, Pulverized	85 - 90	45°	18	Sandstone	80 - 90	35°	
Linseed, Whole	45 - 50	25°		Sawdust	10 - 25	30°	22
Linseed, Meal	30 - 40	35°	20	Scale, Rolling Mill	125 - 160	45°	
Magnesium Chloride	30 - 35	40°		Sewage Sludge, Dry	45 - 55	35°	
Magnesium Sulfate	40 - 60	35°		Sewage Sludge, Wet	50 - 60	35°	
Malt, Dry	25 - 30	30°		Shale, Broken	90 - 100	25°	
Malt, Wet	60 - 65	45°		Shale, Crushed	85 - 90	40°	22
Malt, Meal	35 - 40	35°		Silica Gel, Dry	45	35°	
Manganese Ore	125 - 140	40°		Slag, Blast Furnace	80 - 90	25°	10
Manganese Oxide	120	35°		Slag, Granular, Dry	60 - 65	25°	13-16
Manganese Sulfate	70	35°		Slag, Granular, Wet	90 - 100	45°	20-22
Manure	25	0°		Slate, Ground	80 - 90	30°	15
Marble, Crushed	80 - 95	35°		Slate, Lumps	85 - 95	0°	
Marl	80	35°		Snow, Compacted	15 - 50	0°	
Mica, Flakes	20	20°		Soap	10 - 25	35°	
Mica, Ground	15	35°	23	Soda Ash, Briquettes	50	20°	7
Milk, Dried, Flaked	5	35°		Soda Ash, Heavy	55 - 65	30°	19
Milk, Malted	25 - 35	45°		Soda Ash, Light	20 - 35	35°	22
Milk, Powdered	20 - 30	40°		Sodium Aluminum, Ground	72	35°	
Milo Maize	55 - 60	35°		sodium Nitrate, Ground	70 - 80	24°	11
Molybdenum Ore	100 - 110	40°		Sodium Phosphate	50 - 65	35°	
Mortar, Wet	150	0°		soybeans, Cracked	30 - 40	35°	15-18
Niacin	35	35°		soybeans, Whole"	45 - 50	25°	12-16
Nickel-Cobalt Sulfate Ore	80 - 150	35°		starch, Powdered	25 - 45	25°	12
Oats	25 - 35	25°	10	steel, Chips	100 - 150	35°	18
Oats, Rolled	20	35°		steel, Turnings	60 - 120	45°	
Oil Cake	50	45°		sugar, Cane, Raw	55 - 65	45°	
Oxalic Acid Crystals	60	35°		sugar, Granulated, Dry	50 - 55	35°	
Oyster Shells, Ground	50 - 60	35°		sugar, Granulated, Wet	55 - 65	40°	
Oyster Shells, Whole	80	35°		Sugar Cane, Knifed	15 - 18	45°	
Paper Pulp Stock	40 - 60	20°		Sulphur, Lumps	80 - 85	35°	
Peanuts, Shelled	35 - 45	35°		Sulphur, Dust	50 - 70	35°	
Peanuts, Not Shelled	15 - 20	35°		Saonite, Pellets	120 - 140	35°	13-15
Peas, Dried	45 - 50	0°		Salc, Granulated	50 - 70	20°	
Phosphate, Fertilizer	50 - 60	35°	30	Titanium Dioxide	140	35°	
Phosphate, Rock, Crushed	60 - 100	35°	25	Titanium Sponge	60 - 70	45°	
Potash	70 - 80	30°		Tobacco, Leaves	14	45°	
Potassium Chloride	120 - 130	35°		Tobacco, Scraps	15 - 25	45°	
Potassium Nitrate	75 - 80	25°		Tobacco, Stems	15	45°	
Potassium Sulfate	45	45°		Traprock, Crushed	95 - 110	35°	
Potatoes, White"	48	0°		Traprock, Lumps	100 - 110	35°	
Pumice, Ground	40 - 45	45°		Turf	20 - 30	0°	
Pyrites, Lumps	135 - 145	25°		Walnut, Shells	35 - 45	35°	
Pyrites, Pellets	120 - 130	35°		Wheat	48	25°	12
Quartz, Lumps	95 - 100	25°		Wheat, Cracked	40 - 45	35°	
Quartz, Sand	70 - 80	25°		Wheat Germ, Dry	20 - 30	25°	27
Rice, Hulled	45 - 50	20°	8	Wood Chips	10 - 30	45°	22
Rice, Rough	35	35°		Zinc Ore, Granular	160	35°	
Rice, Grits	40 - 45	35°		Zinc Oxide	10 - 35	45°	
Rock, Crushed	100 - 150	30°					