

SILICA SUBSTITUTES

Abrasive Type	Price*	Special Equipment	Properties	Applications	Advantages	Limitations
Aluminum Oxide	\$422-2,500/ton	None required Usually used in cabinets or rooms with recycling equipment	Closely sized Very hard (MOH 8.5-9)	Cleaning hard metals (e.g. titanium) Removing metal Etch glass Carve granite	Recyclable	Must be reclaimed and reused for economy
Baking Soda	\$800-900/ton	Yes, meters less product/minute and dries air	Natural (flow and rinse agents added) Water soluble Non sparking Non flammable	General paint removal Stripping aircraft skins Cleaning surfaces in food processing plants Removing paint from glass	Less material used Less cleanup Low nozzle pressures (35-90 PSI) Non sparking Water soluble	May damage soft brick
Coal Slag	\$50-400/ton	None required	Hard (MOH 6-7) Angular Uniform density Low friability	General paint, rust and scale removal from steel Paint removal from wood Exposure of aggregates	Less than 1% free silica Inert Fast cutting Creates anchor profile	Tendency to embed in mild steel May contain toxic metals
Copper Slag	Market price may vary	None required	Hard (MOH 7-8) Blocky Sharp Edged	General paint, rust and scale removal from steel Paint removal from wood	Rapid cutting	Tendency to embed in mild steel May contain toxic chemicals
Corn Cob Granules	\$520-560/ton	Special ventilation may be required in enclosed areas to control combustion	Medium hardness (MOH 4.5) Non sparking	De-burring Paint and rust removal from wood and metal	Low consumption Low dust levels Bio-degradable	Does not create an anchor pattern
Dry Ice (CO₂)	\$560/ton	Dry air required	Natural gas in solid state	Cleaning aircraft parts Cleaning exotic metals	No residue remains Minimal cleanup	
Garnet	\$61-480/ton	None required Additional components required in order to recycle media	Very hard (MOH 8) Very heavy (SG 4.1) Sub angular	General paint, rust and scale removal from steel	Lower nozzle pressures (60-70 PSI) Low dust levels Fast cleaning rates Can be recycled 6-7 times Low free silica	
Glass Beads	\$600-800/ton	None required Usually used in blast cabinets with recycling equipment	Manufactured of soda lime glass	Cleaning Polishing De-burring	Uniform size and shape Recyclable Provides high luster polished surface	Does not create an anchor profile
Nickel Slag	Market price may vary	None required	Very hard (MOH 7-8) Blocky Sharp edged	General paint, rust and scale removal from steel	Rapid cutting	Tendency to embed in mild steel Poor visibility May react w/corrosion inhibitors used in wet blasting May contain toxic metals
Nut Shells	\$560-1,020/ton	Special ventilation may be required in enclosed areas to control combustion	Soft Non sparking	Cleaning soft materials (e.g. aluminum, plastic, wood) Cleaning surfaces in the petroleum industry	High removal speed Non sparking Low consumption	Non-etching Potential fire hazard
Olivine	Market price may vary	None required	Natural mineral Hard (MOH 6.5-7) High specific gravity Angular	Clean light mill scale and rust from steel 2.5MIL profile and finer	Low chloride ion level Low conductivity	
Plastic Media	\$3,500/ton	None required Additional components required in order to recycle media	Soft Non abrasive Polyester, urea, melamine varieties	Cleaning soft metals and composites Cleaning metal fabric screens	Inert Recyclable Does not damage metal surfaces Low nozzle pressures (20-40 PSI)	Anchor profile limited to soft substrates (e.g. aluminum and plastic)
Staurolite	\$560/ton	None required Additional components required in order to recycle media	Rounded grains Hard (MOH 6.5-7) Irregular shape	Cleaning corroded, pitted, weathered steel Creating anchor profile on new steel	Does not embed Good feathering Low dust levels Recyclable 3-4 times	May contain up to 5% free silica
Steel Grit and Shot	\$456-1,000/ton	None required Additional components required in order to recycle media	Uniform size Uniform hardness Can be manufactured to various specifications	Paint, rust and scale removal from steel Surface preparation of structural steel in centrifugal wheel units	Can be recycled 100-200 times Low dust levels Superior visibility Portable blast rooms available Creates anchor profile	
Silicon Carbide	\$600-2,400/ton	None required Additional components required in order to recycle media	Very hard (MOH 13) Originally produced by a high temperature electro-chemical reaction of sand and carbon	Glass engraving Stone etching	Can be recycled 60-100 times Low density High strength Low thermal expansion	Must be reclaimed and reused for economy

*Prices will vary by distributor.

STOP SILICOSIS IN SANDBLASTERS USE SILICA SUBSTITUTES

There are a number of materials available that are suitable substitutes for silica sand. The major substitute materials are listed inside this bulletin along with some information about each. Additional information regarding particular applications should be obtained from the distributors of the various substitute materials.

Note that the cost per ton is misleading when compared to silica sand because many of the listed substitutes are recyclable and can therefore be reused. A more useful index of actual cost is price per square foot. A formula used in the industry to calculate the cost per square foot is presented below. The real cost will vary depending on the particular application and factors associated with each job. When compared to silica sand in this manner, you will find that the costs of some silica substitutes are competitive.

COST PER SQUARE FOOT

A FORMULA FOR CALCULATING THE COST OF ABRASIVE BLASTING PER SQUARE FOOT OF SURFACE AREA:

$$[(A*B) + C + D]/X + E =$$

WHERE:

- A = delivered cost of abrasive media (\$/ton)
- B = consumption rate (tons/hour)
- C = labor cost (\$/hour)
- D = equipment cost (\$/hour)
- X = productivity (square feet/hour)
- E = miscellaneous (e.g. disposal costs) (\$/square foot)

Silica Substitutes For Abrasive Blasting



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