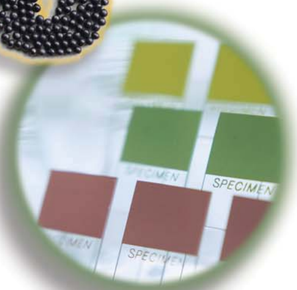
0.5 mm
Mill Mates Plus

1.0 mm
Mill Mates Plus

2.0 mm
Mill Mates Plus



Calculating the Correct Amount of Mill Mates Media

Horizontal Mill Size (Void Volume)	Mill Mates (1mm) for 85% Charge	
liters	lbs	kgs
15	110	50
20	148	67
45	333	151
100	740	336
200	1480	673

Nominal Size*	Range (mm)	Packing Density	
		kgs/L	lbs/L
.5 mm	.4 – .6 mm	3.777	8.33
.7 mm	.6 – .85 mm	3.906	8.61
1.0 mm	.85 – 1.18 mm	3.938	8.68
1.5 mm	1.4 – 1.7 mm	4.028	8.88
2.0 mm	1.7 – 2.3 mm	4.063	8.96

* Other sizes available upon request.

Mechanical Properties

Property	Units	Mill Mates Plus
Composition	- -	(Ce-TZP)
Density	g/cm^3	6.25
Hardness (HV)	GPa	11.3
Fracture Toughness, K_{1C}	$MPa*m^{1/2}$	11.0
Elongation	- -	0.96
Crush Strength	lbs. force	200
Wear Rate*		
Bead	%	0.1
Impeller	%	0.01
Surface	- -	Smooth, becoming highly polished with use
Color	- -	Dark Grey

*1 hour under Hydraulic Packing

Typical Properties Comparison

Media	Density g/cm3	Primary Material	Crushing Strength lbs/grain (a)
Mill Mates Plus	6.25	CeO_2 - ZrO_2	150 – 300
Zirbeads	5.5	MgO - ZrO_2	105 – 220
Zircon beads	3.7	ZrO_2 - SiO_2	105 – 160
Alumina beads	3.5	Al_2O_3	125 – 220
Glass beads	2.8	SiO_2	40 – 70

(a) ASTM D1213-54

Ready to Assist You

Need more help, or have a specialized need? Other custom size Mill Mates Plus are available. Our application engineers are ready to assist you with the selectection of the best Mill Mates Plus media for your particular application.

Zircoa

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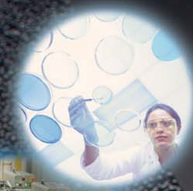
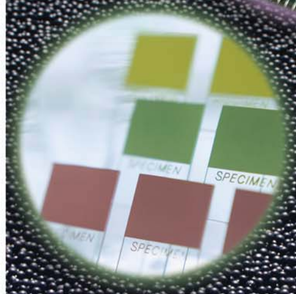
12/2011 - PDF only for Website

Zircoa®

Mill Mates® Plus™
Dispersion, Milling & Grinding Media





Engineered for Optimum Mill Performance and a Wide Range of Formulations

Evolution in mill design and production requirements across a range of viscosities and particle sizes demand a superior media.

Mill Mates Plus, from Zircoa, are engineered to satisfy these needs.

Formulations up to 50,000 cps and particle sizes less than 1µm are routinely processed and achieved with very low media and mill wear.

Highly Engineered Performance

Mill Mates Plus are based on Tetragonal Zirconia Polycrystals (TZP). The superior micro-structure makes possible a dispersion media with a higher fracture toughness, density and hardness.

Compared to the closest competing product(s), Mill Mates Plus last longer and require fewer re-charges. Using Mill Mates Plus will reduce mill wear and lessen downtime for maintenance, while it speeds processing time.

For a Wide Range of Formulations

Mill Mates Plus' highly engineered microstructure results in a bead that is fracture and wear resistant, extremely round, tough and dense. Mill Mates Plus become highly polished, resulting in very low friction and abrasive qualities.

Mill Mates Plus… the ultimate in Ceria Stabilized TZP technology. The best dispersion value for your most demanding needs.

Industries and Applications Served, Include:

- Automotive and Industrial Coatings
- Inks, Dyes and Pigments
- Frits, Glazes and Ceramics
- Minerals
- Magnetic Materials, Coatings and Dielectrics
- Foodstuffs, Pharmaceuticals and Cosmetics

Optimize Your Mill's Performance and Reduce Wear

Shear - Extensive testing confirms that shear is the predominant dispersion mechanism in fine media milling. Mill Mates Plus' tight size distribution and extremely uniform size facilitates and intensifies this effect, delivering more shear during processing.

Product Feed Rate - Dense, smooth, and round media, which are uniform in size, allow for increased feed rates. Mill Mates Plus deliver all these features, minimizing the risk of hydraulic packing.

Particle Size Reduction Rate - Mill Mates Plus uniform size distribution, results in superior dispersion (compared to higher-priced media) reducing the time required to achieve a given particle size.

Mill Component Wear Rate - Laboratory and case studies demonstrate that Mill Mates Plus' low friction coefficient (associated with its smooth surface) results in very low wear on the mill, screen and other components.

Property/ Characteristic	Units	Mg-PSZ	Ce-TZP Mill Mates Plus®	Y-TZP
Bead Wear Rate (1 hour under Hydraulic Packing)	%	8.4	0.1	0.04
Impeller Wear Rate	%	0.29	0.01	0.07

Features	Benefits
Tetragonal Zirconia Polycrystal (TZP)	Extremely wear resistant, low contamination
Controlled, consistent microstructure	Predictable media performance, favorable hardness and toughness combination
Excellent roundness and size distribution control	Maximum shear for increased efficiency in horizontal milling
Smooth surface	Low mill wear, easily washed between formulations
High density	Maximum throughput in recirculation grinding

0.5

0.5 mm Mill Mates Plus

1.0

1.0 mm Mill Mates Plus

2.0

2.0 mm Mill Mates Plus