

ALUMINUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA1010-5	Al ₂ O ₃ 99+% Fused, Crushed	411183	-45 + 15 μm (-325 mesh + 15 μm)	EMS 56758 MSRR 9507/9 PWA 1310 DMR 33.080	Dense coatings. Good dielectric strength. Requires grinding. Resistance to abrasive wear, sliding wear, friction and oxidation.
HA1010	Al ₂ O ₃ 99.5% Fused, Crushed	411150	-28 + 2 μm	Standard Grade	
HA1010-1	Al ₂ O ₃ 99.5% Fused, Crushed	411153	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	
HA1010-2	Al ₂ O ₃ 99.5% Sintered, Irregular	411101	-45 + 5 μm (-325 mesh + 5 μm)	PWA 1310	
HA1010-025	Al ₂ O ₃ 99.9+% Ultra Pure, Spherical	411199	-75 + 10 μm (-200 mesh + 10 μm)	Standard Grade	
HA1114-1	Al ₂ O ₃ 3% TiO ₂ Fused, Crushed	411117	-30 + 5 μm	GE A50TF87 CL C PM 819-00	Coatings are smooth and dense. Good wear resistance. Good dielectric strength at room temperatures. Require grinding. Less brittle, lower dielectric strength than pure Al ₂ O ₃ coatings.
HA1114	Al ₂ O ₃ 3% TiO ₂ Fused, Crushed	411110-2	-45 + 15 μm (-325 mesh + 15 μm)	EMS 52432 TYPE XXV BMS 10-67, Type III GE A50TF87 CL A MSRR 9507/36 DMR 33.020 PM819-11	
HA1114-2	Al ₂ O ₃ 3% TiO ₂ Fused, Crushed	411110	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	
HA1114-3	Al ₂ O ₃ 3% TiO ₂ Fused, Crushed	411119	-45 + 20 μm (-325 mesh + 20 μm)	Standard Grade	
HA1114-4	Al ₂ O ₃ 3% TiO ₂ Fused, Crushed	411112	-50 + 20 μm	Standard Grade	
HA1112	Al ₂ O ₃ 3% TiO ₂ Fused, Crushed	411116	-53 (-270 mesh)	Standard Grade	
HA1112-2	Al ₂ O ₃ 3% TiO ₂ Sintered, Irregular	411419	-70 + 20 μm	GE A50TF87 CL B PWA 1311 PM 189-12 WIMS 650 MSRR 9507/50 GE A50A565 CPW 281GE	
HA1112-3	Al ₂ O ₃ 3% TiO ₂ Sintered, Irregular	411159	-106 + 45 μm (-140 + 325 mesh)	GE A50TF187 CL B PWA 1311 SENECMA DMR 33.013 CPW 281	
HA1188	Al ₂ O ₃ 13% TiO ₂ Sintered, Irregular	411188	-31 + 5 μm (-500 mesh + 5 μm)	Standard Grade	
HA1188-1	Al ₂ O ₃ 13% TiO ₂ Sintered, Irregular	411187	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	
HA1107-4	Al ₂ O ₃ 13% TiO ₂ Fused, Chemically Uniform	411103	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	Hard, dense, smooth coatings. Good abrasive wear resistance. Less brittle, lower dielectric strength than Al ₂ O ₃ + 3% TiO ₂ .
HA1120	Al ₂ O ₃ 30% TiO ₂ Fused, Crushed	411101	-25 + 5 μm	Standard Grade	
HA1119	Al ₂ O ₃ 40% TiO ₂ Fused, Chemically Uniform	411109	-30 + 5 μm (-500 mesh + 5 μm)	Standard Grade	Very dense, low porosity coatings with high bond strength. Can be used instead of Al ₂ O ₃ + 13% TiO ₂ when grindability is a factor. Grinds to low RMS, near friction free.
HA1119-1	Al ₂ O ₃ 40% TiO ₂ Fused, Chemically Uniform	411121	-45 + 5 μm (-325 mesh + 15 μm)	Standard Grade	
HA1119-2	Al ₂ O ₃ 40% TiO ₂ Fused, Irregular	411108	-45 + 15 μm (-325 mesh + 5 μm)	Standard Grade	
HA1170	Al ₂ O ₃ 28% MgO Spinel, Spherical	411170	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	Good abrasion and wear resistance.
HA1171	Al ₂ O ₃ 28% MgO Spinel, Spherical	411171	-75 + 10 μm (-200 mesh + 10 μm)	Standard Grade	

CHROMIUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA3179	Cr ₂ O ₃ 99% Reacted, Blocky	423179	-31 + 10 μm (-500 mesh + 10 μm)	Standard Grade	Hard, dense, wear resistant coatings. HA3106 is used predominately in the analog roll industry.
HA3179-4	Cr ₂ O ₃ 99% Fused, Crushed	423172	-45 + 20 μm (-200 + 325 mesh)	Standard Grade	
HA3179-1	Cr ₂ O ₃ 99% Reacted, Blocky	423131	-45 + 5 μm (-325 mesh + 5 μm)	BMS 10-67 Type 4	
HA3328	Cr ₂ O ₃ 99% Fused, Crushed	423328	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	
HA3179-3	Cr ₂ O ₃ 99% Reacted, Blocky	423167-1	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	
HA3324	Cr ₂ O ₃ 99% Reacted, Blocky	423324	-75 + 45 μm (-325 mesh + 20 μm)	Comp. F Type II, CL 1 EMS 52432 CL-V PWA 1325	
HA3106	Cr ₂ O ₃ 99% Reacted, Rounded, Metal Free	423030	-45 + 10 μm (-325 mesh + 10 μm)	Standard Grade	
HA3339	Cr ₂ O ₃ 3% SiO ₂ Fused, Crushed	423339	-45 + 15 μm (-325 mesh + 15 μm)	Standard Grade	Hard dense coatings. Excellent resistance to wear and corrosion.
HA3339-1	Cr ₂ O ₃ 3% SiO ₂ Fused, Crushed	423338	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	
HA3341	Cr ₂ O ₃ 5% SiO ₂ 3%TiO ₂ Fused, Crushed	423341	-45 + 15 μm (-325 mesh + 15 μm)	WIMS 648	Hard dense coatings. Excellent resistance to wear and corrosion. Good friction characteristics.
HA3192	Cr ₂ O ₃ 5% SiO ₂ 3%TiO ₂ Composite	423192	-53 + 10 μm (-270 mesh + 10 μm)	Standard Grade	
HA3341-1	Cr ₂ O ₃ 5% SiO ₂ 3%TiO ₂ Fused, Crushed	423340	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	
HA3301	Cr ₂ O ₃ 3% TiO ₂ Metal Free, Sintered	423301	-30 + 10 μm (-500 mesh + 10 μm)	Standard Grade	
HA3301-3	Cr ₂ O ₃ 3% TiO ₂ Metal Free, Sintered	423306	-45 + 15 μm (-325 mesh + 22 μm)	Standard Grade	Hard dense metal-free coatings. Good for wear resistance an laser engraving.
HA3301-2	Cr ₂ O ₃ 3% TiO ₂ Metal Free, Sintered	423307	-45 + 22 μm (-325 mesh + 15 μm)	Standard Grade	
HA3301-1	Cr ₂ O ₃ 3% TiO ₂ Metal Free, Sintered	423302	-75 + 45 μm (-200 + 325 mesh)	Standard Grade	

TITANIUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA4000	TiO ₂ 99% Fused, Crushed	420000	-25 + 5 μm (-425 mesh + 5 μm)	Standard Grade	Slightly conductive with moderate abrasive wear resistance.
HA4001	TiO ₂ 99% Fused, Crushed	420001	-63 + 10 μm (-230 mesh + 10 μm)	Standard Grade	

ZIRCONIUM OXIDE POWDERS

HA Name	Powder Type	Product ID	Particle Size	Specifications	Typical Properties
HA9235	ZrO ₂ 5% CaO Calcina Stabilized	439252	-45 + 15 μm (-325 mesh + 15 μm)	DMR 33.089B PWA 1312 MTS 1067 CPW 212	Thermal Barrier and erosion resistant coatings. Used for furnaces and casting ladles.
HA9235-1	ZrO ₂ 5% CaO Calcina Stabilized	439235	-75 + 45 μm (-200 + 325 mesh)	MSRR 9507/18 PM 819-26 EMS 56720 FT 5045 XIV	
HA9204	ZrO ₂ 8% Y ₂ O ₃ Ytria Stabilized, HOSP™	439204	-75 + 10 μm (-200 mesh + 10 μm)	EMS 57750 GE A50TF204 CL C GE A50TF278 CL ABC PWA 1375 MSRR 9507/46	For thermal barrier coatings Heat and thermal shock resistant, erosion resistant
HA9204-1	ZrO ₂ 8% Y ₂ O ₃ Ytria Stabilized, Spherical	439204-1	-100 + 44 μm (-140 + 325 mesh)	Standard Grade	
HA9113-1	ZrO ₂ 8% Y ₂ O ₃ Agglomerated, Semi-Spherical	439182	-106 + 45 μm (-140 + 325 mesh)	GE A50TF278 CL B EMS 57750 T1	
HA9484	ZrO ₂ 8% Y ₂ O ₃ Ytria Stabilized, Spherical	439484	-106 + 45 μm (-140 + 325 mesh)	GE A50TF278 CL B EMS 57750 Type I CL I PWA 1375	
HA9202	ZrO ₂ 20% Y ₂ O ₃ Ytria Stabilized, Spherical	439202	-100 + 20 μm (-140 mesh + 20 μm)	MSRR 9507/37 GE A50TF204 CL A PWA 36087	
HA9103	ZrO ₂ 22% MgO Fused, Irregular	439103	-75 + 10 μm (-200 mesh + 10 μm)	MSRR 9507/21 M3966 Type I PWA 1333	Thermal barrier coating. Resistant to molten metals and particle erosion. Heat and thermal shock resistant. Erosion resistant.
HA9103-1	ZrO ₂ 18-25% MgO Fused, Crushed	439233	-45 + 15 μm (-325 mesh + 15 μm)	GE A50TF155 CL A PWA 1333 MSRR 9507/21	
HA9222	ZrO ₂ 26% CeO ₂ Stabilized, Spherical	439222	-75 + 10 μm (-200 mesh + 10 μm)	Standard Grade	Offers greater high temperature corrosion resistance against sodium, sulfur, chlorine contaminants than 8% Ytria Zirconia coatings.