

Summary of TSMC USA Inc
Analysis RE23032893

LOT: 202206_2

Mineral Analysis

Item	Average %	Standard Deviation	Method Used	Calculated Element Content (%)
Alumina, Al ₂ O ₃	12.420	0.311	ME-ICP06	Aluminum 6.573
Barium oxide, BaO	0.153	0.020	ME-ICP06	Barium 0.137
Calcium oxide, CaO	3.991	0.795	ME-ICP06	Calcium 2.852
Carbon, C	0.601	0.186	C-IR07	
Iron oxide, Fe ₂ O ₃	1.553	0.081	ME-ICP06	Iron 1.086
Magnesium oxide, MgO	0.854	0.087	ME-ICP06	Magnesium 0.515
Manganese oxide, MnO	0.069	0.003	ME-ICP06	Manganese 0.053
Phosphorus pentoxide, P ₂ O ₅	0.035	0.010	ME-ICP06	Phosphorus 0.015
Potassium oxide, K ₂ O	5.428	0.198	ME-ICP06	Potassium 4.506
Silicon dioxide, SiO ₂	66.430	1.408	ME-ICP06	Silicon 31.052
Sodium oxide, Na ₂ O	1.784	0.078	ME-ICP06	Sodium 1.324
Strontium oxide, SrO	0.028	0.004	ME-ICP06	Strontium 0.023
Titanium dioxide, TiO ₂	0.222	0.009	ME-ICP06	Titanium 0.133
Loss on Incineration	7.740	0.669	OA-GRA05	

Additional Element Analysis

Item	Average (ppm)	Standard Deviation	Method Used	Item	Average (ppm)	Standard Deviation	Method Used
Antimony, Sb	0.075	0.031	ME-MS41	Mercury, Hg	0.013	0.008	ME-MS41
Arsenic, As	1.335	1.723	ME-MS41	Molybdenum, Mo	1.741	0.114	ME-MS61L
Barium, Ba	402.564	127.149	ME-MS41	Neodymium, Nd	33.315	1.982	ME-MS81
Beryllium, Be	0.409	0.051	ME-MS41	Nickel, Ni	1.253	0.189	ME-MS41
Bismuth, Bi	0.150	0.017	ME-MS41	Niobium, Nb	0.133	0.023	ME-MS41
Boron, B	<10	<10	ME-MS41	Praseodymium, Pr	10.155	0.569	ME-MS81
Bromine, Br	0.511	0.314	ME-HAL01	Rhenium, Re	<0.001	<0.001	ME-MS41
Cadmium, Cd	0.037	0.009	ME-MS41	Rubidium, Rb	26.680	2.324	ME-MS41
Cerium, Ce	36.253	3.979	ME-MS41	Samarium, Sm	4.964	0.380	ME-MS81
Cesium, Cs	0.945	0.179	ME-MS41	Scandium, Sc	1.268	0.167	ME-MS41
Chlorine, Cl	163.175	86.024	ME-HAL01	Selenium, Se	0.200	0.000	ME-MS41
Chromium, Cr	2.650	0.864	ME-MS41	Silver, Ag	0.011	0.003	ME-MS41
Cobalt, Co	1.445	0.122	ME-MS41	Strontium, Sr	48.638	7.728	ME-MS41
Copper, Cu	2.178	0.483	ME-MS41	Sulphur, S	0.017	0.005	S-IR08
Dysprosium, Dy	2.885	0.273	ME-MS81	Tantalum, Ta	1.040	0.117	ME-MS81
Erbium, Er	1.723	0.166	ME-MS81	Tellurium, Te	0.010	0.000	ME-MS41
Europium, Eu	0.985	0.098	ME-MS81	Terbium, Tb	0.500	0.035	ME-MS81
Fluorine, F	51.990	10.258	ME-HAL01	Thallium, Tl	0.138	0.013	ME-MS41
Gadolinium, Gd	3.493	0.254	ME-MS81	Thorium, Th	6.395	0.665	ME-MS41
Gallium, Ga	2.422	0.263	ME-MS41	Thulium, Tm	0.256	0.023	ME-MS81
Germanium, Ge	0.081	0.009	ME-MS41	Tin, Sn	0.925	0.139	ME-MS41
Gold, Au	<0.02	<0.02	ME-MS41	Titanium, Ti	0.045	0.005	ME-MS41
Hafnium, Hf	0.506	0.051	ME-MS41	Tungsten, W	0.165	0.028	ME-MS41
Holmium, Ho	0.546	0.044	ME-MS81	Uranium, U	0.543	0.058	ME-MS41
Indium, In	0.019	0.002	ME-MS41	Vanadium, V	12.675	0.997	ME-MS41
Lanthanum, La	58.645	3.276	ME-MS81	Ytterbium, Yb	1.887	0.170	ME-MS81
Lead, Pb	7.928	1.021	ME-MS41	Yttrium, Y	5.699	0.863	ME-MS41
Lithium, Li	18.510	1.243	ME-MS41	Zinc, Zn	13.600	1.081	ME-MS41
Lutetium, Lu	0.295	0.032	ME-MS81	Zirconium, Zr	21.668	2.175	ME-MS41

Country of Origin: Colombia

Approval Date 2023.02.28