

CLARIANT MINING SOLUTIONS

Flotation of Frequently Occurring Minerals

Clariant Mining Solutions specializes in developing customized flotation solutions for each mine.

When there is no time to customize a solution, Clariant Mining Solutions proposes the reagents in this table.

This table refers to the mineral to be floated. When the flowsheet calls for reverse flotation, use the table to look for the reagents to float the relevant gangue minerals.

ELEMENT	MINERAL	FORMULA	COLLECTOR	FROTHER	DEPRESSANT	ACTIVATOR	PH	
A	Argentite	Ag ₂ S	HOSTAFLOT™ LIB, HOSTAFLOT™ M 91, HOSTAFLOT™ 16786	FLOTANOL™ C 07, FLOTANOL™ D 25			8.0 - 9.0	
	Chlorargyrite (Cerargyrite)	AgCl	FLOTIGAM™ S	FLOTANOL™ M 28			9.0 - 12.0	
	Native silver	Ag	HOSTAFLOT™ LIB, HOSTAFLOT™ M 91, HOSTAFLOT™ 16786	FLOTANOL™ C 07, FLOTANOL™ D 25			8.0 - 9.0	
Al	Bauxite	Al ₂ O ₃ ·H ₂ O	FLOTIGAM™ 7100	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			8.0 - 9.0	
	Feldspar	(Na, K)(AlSi ₃ O ₈), CaAl ₂ Si ₂ O ₈	FLOTIGAM™ 7100, FLOTIGAM™ 2835-2L	FLOTANOL™ C 07, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ SIF ₆ , Na ₂ SiO ₃	HF, NaF	2.0 - 2.5	
	Kaolinite	Al ₂ Si ₂ O ₅ (OH) ₄	FLOTIGAM™ 18573	FLOTANOL™ M 28	Na ₂ SiO ₃	HF, NaF	2.0 - 2.5	
	Kyanite (Disthene)	Al ₂ SiO ₅	FLOTIGAM™ 18573	FLOTANOL™ M 28	Na ₂ SiO ₃	HF, NaF	2.0 - 2.5	
As	Arsenopyrite	FeAsS	HOSTAFLOT™ LIB, HOSTAFLOT™ M 91, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25		CuSO ₄	7.0 - 9.0	
	Realgar	As ₂ S ₃	HOSTAFLOT™ LIB, HOSTAFLOT™ 3403	FLOTANOL™ M 28	NaSH, FLOTICOR™ DP 17444		9.0 - 11.0	
Au	Calaverite	AuTe ₂	HOSTAFLOT™ M 91, HOSTAFLOT™ E 980, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	NaCN	CuSO ₄	10.0 - 12.0	
	Native gold	Au	HOSTAFLOT™ M 91, HOSTAFLOT™ E 980, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	NaCN	CuSO ₄	10.0 - 12.0	
B	Borax	Na ₂ [B ₄ O ₇ (OH) ₄]·8H ₂ O	FLOTIGAM™ 5806, FLOTINOR™ 17695, FLOTINOR™ 18099	FLOTANOL™ M 28	Starch, Dextrin, Quebracho	BaCl ₂ , Pb-salts	7.0	
Ba	Barite	BaSO ₄	FLOTINOR™ 7089		AlCl ₃ , FeCl ₃ , NaF	BaCl ₂	9.5 - 10.5	
Be	Beryl	Be ₃ Al ₂ Si ₆ O ₁₈	FLOTIGAM™ 18573, FLOTIGAM™ 7100		Na ₂ SiO ₃		7.0 - 8.0	
Bi	Bismuthinite	Bi ₂ S ₃	HOSTAFLOT™ M 91, HOSTAFLOT™ E 672	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ CO ₃ , NaSH	Pb(NO ₃) ₂	6.0	
C	Coal	C	MONTANOL™ 7625	MONTANOL™ 800, MONTANOL™ 508, MONTANOL™ 88			7.0	
	Graphite	C	MONTANOL™ 7625	MONTANOL™ 800, FLOTANOL™ D 25, MONTANOL™ 508, MONTANOL™ 88			7.0	
Ca	Calcite	CaCO ₃	FLOTINOR™ 1682, FLOTINOR™ 10214, FLOTINOR™ V 2711	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ SiO ₃ , Starch		5.5 - 8.0	
	Diopside	CaMgSi ₂ O ₆	FLOTIGAM™ 7676	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			7.0 - 8.0	
	Dolomite	CaMg(CO ₃) ₂	FLOTINOR™ 1682, FLOTINOR™ 10214, FLOTINOR™ V 2711	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			5.5 - 8.0	
	Gypsum	CaSO ₄ ·2H ₂ O	FLOTINOR™ 1682, FLOTINOR™ 7011, FLOTINOR™ 17695	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			7.0 - 8.0	
	Wollastonite	CaSiO ₃	FLOTIGAM™ 7034, FLOTIGAM™ 7676	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			7.0 - 8.0	
Ce	Monazite	(Ce, La, Nd, Th)(PO ₄) ₃	FLOTINOR™ 2875, FLOTINOR™ 1682, FLOTINOR™ 10214, FLOTINOR™ 18080	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ SiO ₃		7.0 - 9.0	
Co	Carrollite	CuCo ₂ S ₂	HOSTAFLOT™ LIB, HOSTAFLOT™ M 91, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			7.0 - 9.0	
	Cobaltite	CoAsS	HOSTAFLOT™ LIB, HOSTAFLOT™ M 91, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			7.0 - 9.0	
Cr	Chromite	FeCr ₂ O ₄	FLOTINOR™ V 2711, FLOTINOR™ 1682, FLOTINOR™ 17695	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ SiO ₃		5.0 - 9.0	
Cu	Azurite	Cu ₃ (CO ₃) ₂ (OH) ₂	Option 1) HOSTAFLOT™ LIB Option 2) FLOTIGAM™ 5806, FLOTINOR™ 1682, FLOTINOR™ 18099	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ CO ₃ , Na ₂ SiO ₃ , Na ₂ S	Option 1) Polysulfides	Option 1) 10.0 - 12.0 Option 2) 8.0 - 10.0	
	Bornite	Cu ₅ FeS ₄	HOSTAFLOT™ 7863, HOSTAFLOT™ 7257, HOSTAFLOT™ 10366	FLOTANOL™ 9937, FLOTANOL™ 7858, FLOTANOL™ H 70	NaCN		9.0 - 12.0	
	Chalcocite	Cu ₂ S	HOSTAFLOT™ 7863, HOSTAFLOT™ 7257, HOSTAFLOT™ 10366	FLOTANOL™ 9937, FLOTANOL™ 7858, FLOTANOL™ H 70	NaCN		9.0 - 12.0	
	Chalcocite	Cu ₂ S	HOSTAFLOT™ 7863, HOSTAFLOT™ 7257, HOSTAFLOT™ 10366	FLOTANOL™ 9937, FLOTANOL™ 7858, FLOTANOL™ H 70	NaCN, Na ₂ S ₂ O ₃		9.0 - 12.0	
	Chrysocolla	(Cu, Al) ₂ H ₂ Si ₂ O ₇ (OH) ₂ ·n(H ₂ O)	Option 1) FLOTIGAM™ 7100 Option 2) FLOTIGAM™ 5806, FLOTINOR™ 18099	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			Option 1) 9.0 - 12.0 Option 2) 3.0 - 7.0	
	Covellite	CuS	HOSTAFLOT™ 7863, HOSTAFLOT™ 7257, HOSTAFLOT™ 10366	FLOTANOL™ 9937, FLOTANOL™ 7858, FLOTANOL™ H 70	NaCN		9.0 - 12.0	
	Cuprite	Cu ₂ O	Option 1) HOSTAFLOT™ LIB Option 2) FLOTIGAM™ 5806, FLOTINOR™ 1682, FLOTINOR™ 18099	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ CO ₃ , Na ₂ SiO ₃ , Na ₂ S	Option 1) Polysulfides	Option 1) 10.0 - 12.0 Option 2) 8.0 - 10.0	
	Malachite	Cu ₂ CO ₃ (OH) ₂	Option 1) HOSTAFLOT™ LIB Option 2) FLOTIGAM™ 5806, FLOTINOR™ 1682, FLOTINOR™ 18099	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ CO ₃ , Na ₂ SiO ₃ , Na ₂ S	Option 1) Polysulfides	Option 1) 10.0 - 12.0 Option 2) 8.0 - 10.0	
	F	Fluorspar	CaF ₂	FLOTINOR™ 7243, FLOTINOR™ 17695, FLOTINOR™ 18080, FLOTIGAM™ 5806, FLOTINOR™ 18099				
		Fe	Goethite	FeO(OH)	FLOTINOR™ 1682, FLOTINOR™ 7580, FLOTINOR™ 17370		Na ₂ SiO ₃	
Hematite			Fe ₂ O ₃	FLOTINOR™ 1682, FLOTINOR™ 7580, FLOTINOR™ 17370		Na ₂ SiO ₃		3.0 - 6.0
Jarosite			KFe ₃ (SO ₄) ₂ (OH) ₆	FLOTINOR™ 1682, FLOTINOR™ 17744, FLOTINOR™ 7089				3.0 - 6.0
Magnetite			Fe ₃ O ₄	FLOTINOR™ 1682, FLOTINOR™ 7580, FLOTINOR™ 17370		Na ₂ SiO ₃		3.0 - 6.0
Marcasite			FeS ₂	HOSTAFLOT™ 7819, HOSTAFLOT™ 7863, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Lime	CuSO ₄	7.5 - 8.0
Pyrite			FeS ₂	HOSTAFLOT™ 7819, HOSTAFLOT™ 7863, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Lime	CuSO ₄	7.5 - 8.0
Pyrrhotite			Fe ₇ S ₈	HOSTAFLOT™ 7819, HOSTAFLOT™ 7863, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Lime	CuSO ₄	7.5 - 8.0
Siderite			FeCO ₃	FLOTINOR™ 1682, FLOTINOR™ 7580, FLOTINOR™ 17370				8.0 - 10.0
Sylvite			KCl	FLOTIGAM™ S, FLOTIGAM™ T, FLOTIGAM™ 8122	FLOTANOL™ M 28, FLOTANOL™ C 07		Guar Gum	6.0 - 8.0
LI	Lepidolite		K(Li,Al) ₃ (AlSi ₃ Rb) ₂ O ₁₀ (F,OH) ₂	FLOTIGAM™ 7100, FLOTIGAM™ 2835-2L, FLOTIGAM™ 7676	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			2.0 - 4.0
	Petalite	LiAlSi ₄ O ₁₀	FLOTIGAM™ 7100, FLOTIGAM™ 2835-2L, FLOTIGAM™ 7676	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			2.0 - 4.0	
	Spodumene	LiAlSi ₂ O ₆	FLOTINOR™ 17695, FLOTINOR™ 18912, FLOTIGAM™ 5806, FLOTINOR™ 18099	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25			7.5 - 8.5	
Mg	Kieserite	MgSO ₄ ·H ₂ O	FLOTINOR™ 7011, FLOTIGAM™ 5806, FLOTINOR™ 18099	MONTANOL™ 800, FLOTANOL™ D 25			6.0 - 8.0	
	Magnesite	MgCO ₃	FLOTIGAM™ 5806, FLOTINOR™ 17695, FLOTINOR™ 1682, FLOTINOR™ 18099	MONTANOL™ 800, FLOTANOL™ D 25	Tannic Acid, Caustic Starch, Na ₂ SiO ₃		9.0 - 10.5	
	Talc	Mg ₃ Si ₂ O ₅ (OH) ₂	FLOTIGAM™ 7034	FLOTANOL™ M 28, MONTANOL™ 800, MONTANOL™ 88	Caustic Starch		6.0 - 6.5	
Mn	Pyrolusite	MnO ₂	FLOTIGAM™ 18573	MONTANOL™ 88	Caustic Starch		8.0 - 10.5	
	Rhodochrosite	MnCO ₃	FLOTIGAM™ 5806, FLOTINOR™ 17695, FLOTINOR™ 1682, FLOTINOR™ 18099	MONTANOL™ 800, FLOTANOL™ D 25	Tannic Acid, Caustic Starch, Na ₂ SiO ₃		9.0 - 10.5	
Mo	Molybdenite	MoS ₂	HOSTAFLOT™ 9971, HOSTAFLOT™ 18842		FLOTICOR™ DP 17444		9.0 - 11.0	
N	Nb	Columbite	(Fe, Mn)Nb ₂ O ₆	FLOTIGAM™ 17531, FLOTIGAM™ 17532	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Caustic Starch	4.0 - 6.0	
		Pyrochlorite	(Na, Ca) ₂ (Nb, Ti, Ta) ₂ O ₇ (OH, F, O)	FLOTIGAM™ 18088, FLOTIGAM™ 3326	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Caustic Starch	4.0 - 6.0	
Ni	Millerite	NiS	HOSTAFLOT™ M 91, HOSTAFLOT™ 18772, HOSTAFLOT™ 17167	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25, FLOTANOL™ 7197	Lime	CuSO ₄	7.0 - 9.0	
	Nickeline	NiAs	HOSTAFLOT™ M 91, HOSTAFLOT™ 18772, HOSTAFLOT™ 17167	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25, FLOTANOL™ 7197	Lime	CuSO ₄	7.0 - 9.0	
	Pentlandite	(Fe,Ni) ₉ S ₈	HOSTAFLOT™ M 91, HOSTAFLOT™ 18772, HOSTAFLOT™ 17167	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25, FLOTANOL™ 7197	Lime	CuSO ₄	7.0 - 9.0	
P	Pb	Apatite	Ca ₅ (PO ₄) ₃ (F, OH, Cl)	FLOTIGAM™ 5806, FLOTINOR™ 17695, FLOTINOR™ 1682, FLOTINOR™ 18099	MONTANOL™ 800, FLOTANOL™ D 25	Caustic Starch, Na ₂ SiO ₃	9.0 - 10.0	
		Collophane	Ca ₅ (PO ₄) ₃ CO ₃ F	FLOTIGAM™ 5806, FLOTINOR™ 17695, FLOTINOR™ 1682, FLOTINOR™ 18099	MONTANOL™ 800, FLOTANOL™ D 25	Caustic Starch, Na ₂ SiO ₃	9.0 - 10.0	
Pt	Pt	Anglesite	PbSO ₄	FLOTINOR™ 7089	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25		8.0 - 11.0	
		Cerussite	PbCO ₃	FLOTINOR™ 1682	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25		8.0 - 11.0	
		Galena	PbS	HOSTAFLOT™ E 980	FLOTANOL™ M 28	NaCN		7.0 - 9.0
S	Sb	Native Platinum	Pt	HOSTAFLOT™ 18475, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25		8.0 - 10.0	
		Sperrylite	PtAs ₂	HOSTAFLOT™ 18475, HOSTAFLOT™ 3403	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	CuSO ₄	8.0 - 10.0	
		Stibnite	Sb ₂ S ₃	HOSTAFLOT™ 3403, HOSTAFLOT™ LIB	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	NaCN	Pb(NO ₃) ₂ , CuSO ₄	6.5 - 8.0
Si	Si	Biotite	K(Mg,Fe) ₃ (AlSi ₃ O ₁₀)(OH) ₂	Option 1) FLOTIGAM™ 5944, FLOTIGAM™ 17775, FLOTIGAM™ 7034, Option 2) FLOTINOR™ 1682, FLOTINOR™ 17370			Option 1) 6.0 - 8.0 Option 2) 3.0 - 4.0	
		Garnet	(Mg, Fe, Mn, Ca) ₃ (Al, Fe, Cr) ₂ (SiO ₃) ₅	Option 1) FLOTIGAM™ 17775, FLOTIGAM™ 7034, Option 2) FLOTINOR™ 1682, FLOTINOR™ 17370			Option 1) 6.0 - 8.0 Option 2) 3.0 - 4.0	
		Hornblende	(Ca,Na) ₂₋₃ (Mg,Fe,Al) ₃₋₄ (Al,Si) ₇₋₈ O ₂₂ (OH,F) ₂	Option 1) FLOTIGAM™ 17775, FLOTIGAM™ 7034, Option 2) FLOTINOR™ 1682, FLOTINOR™ 17370			Option 1) 6.0 - 8.0 Option 2) 3.0 - 4.0	
		Mica	(K, Na, Ca) ₂ (Al, Mg, Fe) ₂₋₃ (Si, Al, Fe, Ti) ₃₋₄ O ₁₀ (OH, F) ₂	Option 1) FLOTIGAM™ 5944, FLOTIGAM™ 17775, FLOTIGAM™ 7034, Option 2) FLOTINOR™ 1682, FLOTINOR™ 17370			Option 1) 6.0 - 8.0 Option 2) 3.0 - 4.0	
		Muscovite	KAl ₃ (AlSi ₃ O ₁₀)(OH,F) ₂	Option 1) FLOTIGAM™ 5944, FLOTIGAM™ 17775, FLOTIGAM™ 7034, Option 2) FLOTINOR™ 1682, FLOTINOR™ 17370			Option 1) 6.0 - 8.0 Option 2) 3.0 - 4.0	
		Quartz	SiO ₂	FLOTIGAM™ 7100, FLOTIGAM™ 7500, FLOTIGAM™ 2835-2L, FLOTIGAM™ 7571	FLOTANOL™ 7538	Caustic Starch		8.0 - 10.5
		Cassiterite	SnO ₂	FLOTINOR™ 1682, FLOTINOR™ 10409, FLOTINOR™ 10229	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ SiO ₃	BaCl ₂ , Lime, Tannic Acid	4.0 - 5.0
Sr	Celestine	SrSO ₄	FLOTINOR™ 17695, FLOTINOR™ 1682	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Tannin		9.5 - 10.5	
	Stromiolite	SrCO ₃	FLOTINOR™ 17695, FLOTINOR™ 1682	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Tannin		7.0	
T	Ta	Tantalite	MnTa ₂ O ₆	FLOTIGAM™ 18088, FLOTIGAM™ ITU		Caustic Starch	5.0	
		Ilmenite	FeTiO ₃	FLOTINOR™ 1682, FLOTINOR™ 17695			4.0 - 6.0	
U	U	Rutile	TiO ₂	FLOTINOR™ 1682, FLOTINOR™ 17695			3.0 - 5.0	
		Carnotite	K ₂ (UO ₂) ₂ (VO ₄) ₂ ·3H ₂ O	FLOTINOR™ 17695			8.0 - 9.0	
V	Vanadinite	Pb ₅ (VO ₄) ₃ Cl	FLOTINOR™ 17695	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25		Na ₂ S, CuSO ₄	8.0 - 9.0	
W	W	Scheelite	CaWO ₄	FLOTINOR™ 17695, FLOTINOR™ 7011	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Caustic Starch, Na ₂ SiO ₃	8.0 - 11.0	
		Wolframite	(Fe,Mn)WO ₄	FLOTINOR™ 17695, FLOTINOR™ 7011	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Caustic Starch, Na ₂ SiO ₃	8.0 - 11.0	
Zn	Zn	Hemimorphite	Zn ₂ Si ₂ O ₇ (OH) ₂ ·H ₂ O	FLOTIGAM™ 2835-2L	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ S	11.0 - 12.0	
		Hydrozincite	Zn ₂ (CO ₃) ₂ (OH) ₂	FLOTIGAM™ 2835-2L	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ S	11.0 - 12.0	
		Smithsonite	ZnCO ₃	FLOTIGAM™ 2835-2L	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25	Na ₂ S	11.0 - 12.0	
		Sphalerite	(Zn, Fe)S	HOSTAFLOT™ E 980, HOSTAFLOT™ LIB	FLOTANOL™ M 28	NaCN, ZnSO ₄	CuSO ₄	7.0 - 9.0
		Willemite	Zn ₂ SiO ₄	FLOTIGAM™ 2835-2L	FLOTANOL™ M 28, FLOTANOL™ C 07, FLOTANOL™ D 25		Na ₂ S	11.0 - 12.0
		Zircon						