

REFRACTIVE INDEX TABLES

Prepared by: HORIBA INSTRUMENTS - APPLICATIONS LAB

Material	Compound	Common Name	Symbol/Formula	R.I.	1.33	1.38	1.46
					Water	IPA	Mineral Oil
<u>Aluminum</u>			Al	Al			
	antimony boride, di-carbide		AlSb AlB AlB ₂	3.20 N/A N/A	2.41	2.32	2.19
	chloride		AlCl ₃ • 6H ₂ O (or) Al ₂ Cl ₆	1.56	1.17	1.13	1.07
	chloride, hexahydrate		AlCl ₃ • 6H ₂ O	1.60	1.20	1.16	1.10
	fluoride		AlF ₃	N/A			
	fluoride, monohydrate	natural fluellite	AlF ₃ • H ₂ O	1.49	1.12	1.08	1.02
	fluoride		AlF ₃ • 3½H ₂ O	N/A			
	fluosilicate	natural topaz	2AlFO • SiO ₂	1.62	1.22	1.17	1.11
	hydroxide	natural boehmite	AlO(OH)	1.66	1.25	1.20	1.14
	hydroxide	natural diaspore	AlO(OH)	1.72	1.29	1.25	1.18
	hydroxide	Gibbsite	Al(OH) ₃	1.57	1.18	1.14	1.08
	nitrate		Al(NO ₃) ₃ • 9H ₂ O	1.54	1.16	1.12	1.05
	nitride		AlN	N/A			
	orthophosphate		AlPO ₄	1.56	1.17	1.13	1.07
	oxalate		AlCl ₃ O ₆ • 6H ₂ O	N/A			
	<u>oxide</u>	Alumina	Al ₂ O ₃	<u>1.66</u>	<u>1.25</u>	1.20	1.14
	<u>oxide</u>	a-Alumina, natural corundum	Al ₂ O ₃	<u>1.77</u>	<u>1.33</u>	1.28	1.21
	<u>oxide</u>	g-Alumina	Al ₂ O ₃	<u>1.70</u>	<u>1.28</u>	1.23	1.16
	oxide, monohydrate		(Al ₂ O ₃ • H ₂ O)	1.62	1.22	1.18	1.11
	oxide, trihydrate	natural gibbsite, hydraargillite	(Al ₂ O ₃ • 3H ₂ O)	1.58	1.19	1.14	1.08
		natural bayerite		1.58	1.19	1.14	1.08
	salicylate		Al ₂ (C ₇ H ₅ O ₃) ₃	N/A			
	selenide		Al ₃ Se ₃	N/A			
	silicate	natural sillimanite, andalusite, cy	Al ₂ O ₃ • SiO ₂	1.66	1.25	1.20	1.14
	silicate	bentonite		1.64	1.23	1.19	1.12
	silicate	kaolin clay	3Al ₂ O ₃ • 2SiO ₂	1.65	1.24	1.20	1.13
	silicate	natural mullite	3Al ₂ O ₃ • 2SiO ₂	1.64	1.23	1.19	1.12
	sulfate		Al ₂ (SO ₄) ₃	1.47	1.11	1.07	1.01
	sulfate, hydrate	natural alunogenite	Al ₂ (SO ₄) ₃ • 18H ₂ O	1.47	1.11	1.07	1.01

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Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil
	oxide, tri-	natural arsenolite	As ₂ O ₃ (or) As ₄ O ₆	1.76	1.32	1.28	1.21
	oxide, tri	natural claudetite	As ₂ O ₃ (or) As ₄ O ₆	1.92	1.44	1.39	1.32
Asphalt				1.63	1.23	1.18	1.12
Aspartame				1.45	1.09	1.05	0.99
Barium			Ba	N/T			
	acetate		Ba(C ₂ H ₃ O ₂) ₂	N/A			
	acetate, hydrate		Ba(C ₂ H ₃ O ₂) ₂ • H ₂ O	1.53	1.15	1.11	1.04
	azide		Ba(N ₃) ₂	N/A			
	cadmium bromide		BaCdBr ₄	1.70	1.28	1.23	1.16
	cadmium chloride		BaCdCl ₄	1.65	1.24	1.20	1.13
	calcium propionate		BaCa ₂ (C ₃ H ₅ O ₂) ₆	1.45	1.09	1.05	0.99
	carbonate	natural witherite	BaCO ₃	1.60	1.20	1.16	1.10
	chloride (a)		BaCl ₂	1.74	1.31	1.26	1.19
	chromate	barium yellow	BaCrO ₄	1.63	1.23	1.18	1.12
	citrate		Ba ₃ (C ₄ H ₅ O ₇) ₂ • 7H ₂ O	N/A			
	dithionate		Ba(SO ₃) ₂ • 2H ₂ O	1.59	1.19	1.15	1.09
	fluochloride		BaC ₁₂ • BaF ₂	1.64	1.23	1.19	1.12
	fluoride		BaF ₂	1.47	1.11	1.07	1.01
	formate		Ba(CHO ₂) ₂	1.60	1.20	1.16	1.09
	gluconate		Ba(C ₆ H ₁₁ O ₇) ₂ • 3H ₂ O	N/A			
	hydroxide		Ba(OH) ₂ • 8H ₂ O	1.47	1.11	1.07	1.01
	meta silicate		BaSiO ₈	1.67	1.26	1.21	1.14
	molybdate		BaMoO ₄	N/A			
	myristate		Ba(C ₁₄ H ₂₇ O ₂) ₂	N/A			
	nitrate	nitrobarite	Ba(NO ₃) ₂	1.57	1.18	1.14	1.08
	nitride		Ba ₃ N ₂	N/A			
	oxide		BaO	1.98	1.49	1.43	1.36
	phosphate		BaHPO ₄	1.62	1.22	1.17	1.11
	propionate			1.52	1.14	1.10	1.04
	salicylate		Ba(C ₇ H ₉ O ₃)	N/A			
	selenate		BaSeO ₄	N/A			
	selenide		BaSe	2.27	1.71	1.64	1.55

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Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil
	sulfate	natural barite	BaSO ₄	1.62	1.22	1.17	1.11
	sulfide		BaS	2.16	1.62	1.57	1.48
	titanate, mono		BaTiO ₃	2.40	1.80	1.74	1.64
	tungstate		BaWO ₄	N/A			
	BCR Quartz on LA-910			1.54	1.16	1.12	1.05
	BCR Quartz on LA-900			1.64	1.23	1.19	1.12
	Bentonite			1.64	1.23	1.19	1.12
	Beryllium		Be	N/T			
	aluminate			1.75	1.32	1.27	1.20
	aluminum silicate	natural beryl	Be ₃ Al ₂ (SiO ₃) ₆	1.58	1.19	1.14	1.08
	benzene sulfonate		Be(C ₆ H ₅ O ₃ S) ₂	N/A			
	carbide		Be ₂ C	N/A			
	carbonate, basic		BeCO ₃ + Be(OH) ₂	N/A			
	nitride		BeN ₂	N/A			
	oxide	natural bromellite	BeO	1.73	1.30	1.25	1.18
			Bi	N/T			
	Boric Acid		2Bi ₂ O ₃ • 3SiO ₂	1.62	1.22	1.17	1.11
	dichromate, basic		(BiO) ₂ • Cr ₂ O ₇	N/A			
	ortho Boracic acid		H ₃ BO ₃ (col.)	1.34	1.01	0.97	0.92
	ortho Boracic acid		(trig.)	1.46	1.10	1.06	1.00
	oxide, tri-		Bi ₂ O ₃	1.90	1.43	1.38	1.30
	silicate	natural eulytite		2.05	1.54	1.49	1.40
			B	1.56	1.17	1.13	1.07
	carbide		B ₄ C	2.66	2.00	1.93	1.82
	nitride		BN	1.74	1.31	1.26	1.19
	oxide		BO ₃	1.63	1.23	1.18	1.12
	Bromine (liquid)		Br ₂	1.66	1.25	1.20	1.14
	Cadmium (liquid, solid)		Cd	.82, 1.13			
	aluminate			1.71	1.29	1.24	1.17
	ammonium chloride		CdCl ₂ •4NH ₄ Cl	1.60	1.20	1.16	1.10
	borate			1.60	1.20	1.16	1.10
	carbonate		CdCO ₃	N/A			

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Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil
	thiosulfate		CaS_2O_3	1.56	1.17	1.13	1.07
Canadian Balsam				1.52	1.14	1.10	1.04
Carbon			C	1.92	1.44	1.39	1.32
	black (pure)			1.46	1.10	1.06	1.00
	black / mixed with SiO_2			1.85	1.39	1.34	1.27
	black / polymers			1.64	1.23	1.19	1.12
	carbon, amorphous			2.00	1.50	1.45	1.37
	carbon, diamond			2.42	1.82	1.75	1.66
	carbon, graphite			2.00	1.50	1.45	1.37
Celite				1.98	1.49	1.43	1.36
Cellulose (only)		as in wood, flax, cotton		1.63	1.23	1.18	1.12
Cellulose Gum				1.51	1.14	1.09	1.03
Cerium			Ce	N/T			
	(III) acetate		$\text{Ce}(\text{C}_2\text{H}_3\text{O}_2)_3$	N/A			
	(III) molybdate		$\text{Ce}_2(\text{MoO}_4)_3$	2.02	1.52	1.46	1.38
	(III) orthophosphate	natural monoazite	CePO_4	1.80	1.35	1.30	1.23
	(IV) fluoride		$\text{CeF}_4 \cdot \text{H}_2\text{O}$	1.61	1.21	1.17	1.11
	carbonate, fluoride	natural bastnaesite	CeFCO_3	1.72	1.29	1.24	1.18
	dithionate		$\text{Ce}_2(\text{S}_2\text{O}_6)_3$	1.51	1.14	1.09	1.03
	oxide		CeO_2	2.20	(1.65	1.59	1.51)
Cesium			Cs	N/T			
	aluminum sulfate		$\text{CsAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$	1.46	1.10	1.06	1.00
	borohydride		CsBH_4	1.50	1.13	1.09	1.03
	bromide		CsBr	1.70	1.28	1.23	1.16
	iodide		CsI	1.79	1.35	1.30	1.23
	iron(II) sulfate		$\text{Cs}_2\text{SO}_4\text{FeSO}_2 \cdot 6\text{H}_2\text{O}$	1.51	1.13	1.09	1.03
	mono-chloride		CsCl	1.64	1.23	1.19	1.12
	nitrate		CsNO_3	1.56	1.17	1.13	1.07
	oxide		Cs_2O	N/A			
	perchlorate		CsClO_4	1.48	1.11	1.07	1.01
	selenate		Cs_2SeO_4	1.60	1.20	1.16	1.09
	sulfate		Cs_2SO_4	1.56	1.18	1.13	1.07
	thallium chloride		$\text{Cs}_2\text{Tl}_2\text{Cl}_9$	1.77	1.33	1.28	1.21

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Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil
Dysprosium			Dy	N/T			
	oxide		Dy ₂ O ₃	2.20	1.65	1.59	1.51
Ebonite				1.66	1.25	1.20	1.14
Egg White				1.36	1.02	0.98	0.93
Emerald Green				1.97	1.48	1.43	1.35
Erbium			Er	N/T			
	Erbia		ErO ₂	2.61	1.96	1.89	1.79
Europium			Eu	N/T			
Fats							
	Butterfat			1.46	1.10	1.06	1.00
	Chicken fat			1.46	1.10	1.06	1.00
	Cocoa butter			1.45 - 1.46			
	Deer fat						
	Dolphin			1.47	1.11	1.07	1.01
	Goat butter			1.45-1.46			
	Goose fat			1.46	1.10	1.06	1.00
	Horse fat			1.47	1.11	1.07	1.01
	Human fat			1.46	1.10	1.06	1.00
	Rabbit fat			1.46	1.10	1.06	1.00
	Seal fat			1.47 - 1.48			
	Wool fat			1.48	1.11	1.07	1.01
Feldspar		orthoclase		1.46	1.10	1.06	1.00
Fly Ash, sintered			Fe₃O₄, other oxides?	1.53	1.12	1.08	1.02
Fused Silica or Quartz				1.46	1.15	1.11	1.05
French Chalk		Talc	3MgO • 4SiO₂ • H₂O	2.00	1.10	1.06	1.00
Gadolinium			Gd	N/T	1.50	1.45	1.37
	oxide		Gd ₂ O ₃	2.20	1.65	1.59	1.51
Gallium			Ga	N/T			
	antimonide		GaSb	3.80	2.86	2.75	2.60
	arsenide		GaAs	3.40	2.56	2.46	2.33
	oxide, sesqui-(a)		Ga ₂ O ₃	1.92	1.44	1.39	1.32
	phosphide		GaP	3.20	2.41	2.32	2.19
Garnet				1.81	1.36	1.31	1.24
Germanium			Ge	4.10	3.08	2.97	2.81
	bromide, tetra-		GeBr ₄	1.63	1.22	1.18	1.11

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Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil	
Protein	sulfate, octahydrate		$\text{Pr}_2(\text{SO}_4)_3 \cdot 8\text{H}_2\text{O}$	1.54	1.16	1.12	1.05	
	human plasma (serum)			1.33 - 1.36				
	rabbit plasma (serum)			1.34 - 1.35				
Quartz		Rock Crystal	SiO_2	1.45	1.09	1.05	0.99	
Quartz - a			SiO_2	1.55	1.17	1.12	1.06	
Quinacridone				1.60	1.20	1.16	1.10	
Rhodium			Rh	2.12	1.59	1.54	1.45	
Rubidium	cesium sulfate			$\text{RhCs}(\text{SO}_4)_2$	1.51	1.14	1.09	1.03
				Rb	N/T			
	bromide			RbBr	1.55	1.17	1.12	1.06
	chloride			RbCl	1.49	1.12	1.08	1.02
	chromate			Rb_2CrO_4	1.71	1.29	1.24	1.17
	dithionate			$\text{Rb}_2\text{S}_7\text{O}_6$	1.46, 1.51			
	fluoride		RbF	1.40	1.05	1.01	0.96	
	iodide		RbI	1.65	1.24	1.20	1.13	
	perchlorate		RbClO_4	1.47	1.11	1.07	1.01	
	selenate		RbSeO_4	1.55	1.17	1.12	1.06	
Ruthenium			Ru	N/T				
	sodium nitrate		$\text{RuNa}_2(\text{NO}_2)_5$	1.59	1.20	1.15	1.09	
Sapphire				1.76	1.32	1.28	1.21	
Selenium			Se	3.00, 4.04				
	oxide		SeO_2	1.76	1.32	1.28	1.21	
Silane emulsions				1.41	1.06	1.02	0.97	
Silicon			Si	3.51	2.64	2.54	2.40	
	carbide		SiC	2.65	2.00	1.92	1.82	
	fused silica			1.46	1.10	1.06	1.00	
	nitride		Si_3N_4	2.20	1.65	1.59	1.51	
	oxide, di-	natural cristobalite	SiO_2	1.48	1.11	1.07	1.01	
	oxide, di-	natural lechatelierite	SiO_2	1.45	1.09	1.05	0.99	
	oxide, di-	natural opal	$\text{SiO}_2 \cdot \text{H}_2\text{O}$	1.46	1.10	1.06	1.00	
	oxide, di-	natural tridymite	SiO_2	1.47	1.10	1.06	1.01	
	oxide, di-	natural quartz	SiO_2	1.54	1.16	1.12	1.06	
	oxide, mono-		SiO	1.97	1.48	1.43	1.35	

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Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil
	Carnauba (#3, refined)			1.47	1.11	1.07	1.01
	Carnauba (yellow)			1.45	1.09	1.05	0.99
	Ceresine			1.43-1.44			
	Chinese insect			1.46	1.10	1.06	1.00
	Chinese vegetable tallow			1.45-1.46			
	Croton			1.47	1.11	1.07	1.01
	Douglas-fir bark			1.47	1.11	1.07	1.01
	Esparto			1.46	1.10	1.06	1.00
	Jojoba			1.47	1.11	1.07	1.01
	Microcrystalline (amber)			1.42-1.45			
	Microcrystalline (white)			1.44	1.08	1.04	0.99
	Mutton tallow			1.45 - 1.46			
	Orange peel			1.50	1.13	1.09	1.03
	Paraffin (American)			1.44-1.48			
	Rice bran (refined)			1.47	1.11	1.07	1.01
	Shellac						
	Sugarcane (refined)			1.51	1.14	1.09	1.03
	Spermaceti			1.44	1.08	1.04	0.99
	Wool			1.48	1.11	1.07	1.01
Wood (see cellulose)							
Ytterbium			Yb	N/T			
Yttrium			Y	N/T			
	oxide	Yttria	Y_2O_3	2.21	1.66	1.60	1.51
	sulfate, octahydrate		$Y_2(SO_4)_3 \cdot 8H_2O$	1.54	1.16	1.12	1.06
Zinc			Zn	2.38	1.79	1.72	1.63
	acetate, dihydrate		$Zn(C_2H_3O_2)_2 \cdot 2H_2O$ b	1.49	1.12	1.08	1.02
	ammonium selenate		$Zn(SeO_4) \cdot (NH_4)_2SeO_4$	1.53	1.15	1.11	1.05
	borate		$ZnBr_4$	1.58	1.19	1.14	1.08
	bromate		$Zn(BrO_3)_2 \cdot 6H_2O$	1.55	1.16	1.12	1.06
	cesium sulfate		$ZnCs_2(SO_4)_2$	1.50	1.13	1.09	1.03
	chloride		$ZnCl_2$	1.68	1.26	1.22	1.15
	chromate	yellow zinc	$ZnCrO_4$	1.87	1.41	1.36	1.28
	fluosilicate		$ZnSiF_6$	1.39	1.05	1.01	0.95
	meta silicate		$ZnSiO_3$	1.62	1.22	1.17	1.11
	orthophosphate, tetrahydrate	α -Hopeite	$Zn_3(PO_4)_2 \cdot 4H_2O$	1.57	1.18	1.14	1.08

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Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil
	iodide		SnI_4	2.11	1.59	1.53	1.45
Titanium	lead solder	tin lead solder					
	boride, di-		Ti	Ti			
	chloride, tetra-		TiB_2	N/A			
	hydride		TiCl_4	1.61	1.21	1.17	1.10
	oxide, di-	natural brookite	TiH_2	2.40	1.80	1.74	1.64
	oxide, di-	natural anatase, octahedrite	TiO_2	2.53	1.90	1.83	1.73
	oxide, di-	natural rutile	TiO_2	2.50	1.88	1.81	1.71
Tungsten (Wolfram)			TiO_2	2.75	2.07	1.99	1.88
	carbide		W	W			
	oxide, di-		WC	N/A			
Ultramarine			WO_2	N/A			
Uranium				1.57	1.18	1.14	1.08
	hydride		U	1.74	1.31	1.26	1.19
	oxide		U_3Si	1.80	1.35	1.30	1.23
	potassium sulfate		UO_2	2.20	1.65	1.59	1.51
	silicide		UO_2SO_4	1.51, 1.53, 1.57			
Urea formaldehyde			U_3Si_2	1.70	1.28	1.23	1.16
Vanadium				1.43	1.08	1.04	0.98
	ammonium sulfate		V	V			
	oxide, pent-		$\text{VNH}_4(\text{SO}_4)_2$	1.48	1.11	1.07	1.01
			V_2O_5	1.46	1.10	1.06	1.00
Waxes							
	Bamboo leaf						
	Bayberry (laurel)			1.48	1.11	1.07	1.01
	Bayberry (myrtle)			1.44	1.08	1.04	0.99
	Beef tallow			1.45-1.46			
	Beeswax (original)			1.44 - 1.48			
	Beeswax (East Indian, Ghedda)			1.44	1.08	1.04	0.99
	Beeswax (USP white)			1.45-1.47			
	Candelilla			1.46	1.10	1.06	1.00
	Cape berry			1.45	1.09	1.05	0.99
	Carnauba (crude)			1.45	1.09	1.05	0.99

Material	Compound	Common Name	Symbol/Formula	R.I.	Water	IPA	Mineral Oil
	orthophosphate, tetrahydrate	b-Hopeite	$Zn_3(PO_4)_2 \cdot 4H_2O$	1.57	1.18	1.14	1.08
	oxide	natural zincite		2.01	1.51	1.46	1.38
	oxide	zinc flower	ZnO	2.00	1.50	1.45	1.37
	potassium cyanide		$ZnK_2(CN)_4$	1.41	1.06	1.02	0.97
	potassium selenate		$ZnK_2(SeO_4)_2$	1.52	1.14	1.10	1.04
	potassium sulfate		$ZnK_2(SO_4)_2$	1.48	1.11	1.07	1.01
	rubidium sulfate		$ZnRb_2(SO_4)_2$	1.48	1.11	1.07	1.01
	selenide		ZnSe	2.89	2.17	2.09	1.98
	silicate	natural hemimorphite	$2ZnO \cdot SiO_2 \cdot H_2O$	1.60	1.20	1.16	1.10
	sulfide, (a)	natural wurtzite	ZnS	2.37	1.78	1.72	1.62
	telluride		ZnTe	3.56	2.68	2.58	2.44
Zircon				1.97	1.48	1.43	1.35
Zirconium			Zr	2.00	1.50	1.45	1.37
	ammonium fluoride		$Zr(NH_4)F_7$	1.43	1.08	1.04	0.98
	bromide, di-		$ZrBr_2$	N/A			
	nitrate		$Zr(NO_3)_4 \cdot 5H_2O$	1.60	1.20	1.16	1.10
	orthosilicate	zircon	$ZrSiO_4$	1.92	1.44	1.39	1.32
	oxide	natural baddeleyite	ZrO_2	2.40	1.80	1.74	1.64
	silicate	fumed silica	$ZrSiO_2$	1.97	1.48	1.43	1.35
	stearate			1.48	1.11	1.07	1.01
	sulfate		$Zr(SO_4)_2 \cdot 4H_2O$	N/A			