

The Color of Art Pigment Database: Pigment Green, PG

Artist's Paint and Pigments Reference: Color Index Names, Color index Number and Pigment Chemical Composition

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Where applicable, you can click on the artist paint or pigment [company code](#) found in the "Common Historic and Marketing Name Column" next to the pigments name. The links will take off site where you can find more specific paint, binder, and pigment properties, including MSDS sheets or a retailer that stocks that brand of paint or pigment. Just hit your back button to return. See the [Key](#) at the bottom of any page for the artist media or binder [company codes](#) and links to the brands websites. NOTE: *d* in italics indicates a discontinued paint or pigment, all other medium or binder codes in *italics* mean the pigment/paint is in the student grade, not the "artist's" professional premium paint. See the [Key](#) (at the bottom of the page) for artist media and [binder codes](#).


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Historic Green Pigments and Mineral Pigments without Color Index Names

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Color Index Generic Name	CI Common or Historical Name	Common, Historic and Marketing Names	C.I. Constitution Number	Chemical Composition	Color Description † = Long Term Effects of Light	Opacity 1 = opaque 4 = trans.	Light Fastness I = excell. IV=Fugitive	Oil Absorption g/100g		Side Notes
N/A	Aegirine	Aegirine [KP.p] ;	N/A	WebMineral.com (Ref at webmineral.com);	Dark green to greenish	2-4*	I	-	B**	

		Acmite; PG23 Pigment Green 23; see Pigment Green 23		Mindat.org (Ref at mindat.org); Wikipedia (Ref at wikipedia); Chemical formula: NaFeSi ₂ O ₆ "Aegirine is an iron containing silicate which forms elongated crystals. The particles are dark green and very hard." (Ref: Details from Kremer Pigments); A Sodium Silicate in which iron is present as Fe ³⁺ (Ref: at wikipedia).	black, reddish brown, black				MSDS	*transparency depends on source, crystal structure and impurities. **Inhalation danger
N/A Group^ Page^	Amazonite	Amazonite; Amazonite HAKUSUI-MATSU [KP.p]; Amazonite Genuine [DS.o.w]; Amazon Jade; Amazon stone	N/A	Green variety of microcline feldspar, a potassium aluminum silicate (Mineral Ref); Amazonite (Ref at Boston Fine Arts CAMEO Materials Database); Color thought to be from copper, iron or lead salts (Ref Mineral Zone), (Ref).	Light green to Blue green	-	I	-	A	-
N/A	Atacamite	Atacamit; Atacamite; Atacamita; Atakamitis; Bronze Disease; Copper Oxychloride; Flour Patina; Malignant Patina; Mehlpatina; Peste du Bronze; Rogna; Wild Patina;	N/A	Copper oxychloride; Cupric oxychloride; Copper hydroxychloride; Basic copper chloride; "Copper oxychloride, better called copper hydroxychloride or basic copper chloride, Cu(OH,Cl) ₂ , is generally made by neutralizing a strong solution of copper chloride", Recipe for a synthetic form at Usenet archive (Ref: Tim Williams post on usenet, rec.pyro) Atacamite (Ref at Boston Fine Arts CAMEO Materials Database); CAS 1332-65-6	Pale green to bright deep green to blackish green	-	-	-	B MSDS	-
N/A Group^ Page^	Barium Manganate	Barium Manganate; Barium Manganate Green; Bottger's Green; Cassel Green; C.I. Pigment Blue 33; Manganese Blue; Manganese Green; Rosenstiehl's Green	77110	Barium manganate; A green pigment made by heating manganese dioxide with barium carbonate or barium nitrate, also produced by precipitating manganate with barium chloride (Ref Color index 3rd Ed., V.4. Inorganic colorants CI 77110) CAS 7787-35-1	-	-	-	-	C MSDS	-
N/A	Celadonite	Celadonite [KP.p NP.p]; Green Earth; Pigment Green 23; Seladonite;	N/A	Celadonite (Ref webmineral); (Ref Google Images); (Ref Mindat.org Gallery) A phyllosilicate of potassium, iron in both oxidation states, aluminium and hydroxide (Ref wikipedia); "Celadonite is a primary component of so-called green earth, which has been extensively used as a	Green to olive green	-	-	-	A MSDS	-

				pigment* (Ref Pigment Compendium p.95)						
N/A Group^ Page^	Conichalcite	Conichalcite [KP.p];	N/A	Natural mineral, Copper arsenic carbonate, on average 24,5 % copper and 28 % arsenic MSDS , (Ref: at webmineral.com); (Ref: Handbook of Mineralogy, Conichalcite.PDF); (Handbook of Mineralogy.org home site here);	-	-	-	-	D MSDS	-
N/A	Copper Green	Copper Green; Copper Green Spinel;	N/A	Copper Green CuO on SiO ₂ is produced by high temperature calcination of a mixture of oxides of copper and silicon in varying amounts to Form a crystalline matrix. (Ref Color Index 4th edition); CAS 95046-49-4	-	-	-	-	-	-
N/A Group^ Page^	Copper Resinate	Copper Green; Copper Resinate [KP.p]; Transparent Copper Green;	N/A	copper salts of resin acids, made by combining balsams or other resins with Verdigris (Ref) Method of making Copper Resinate at webexhibits.org ;	yellowish green	4	I	-	B	May be a myth? (Ref: innovations-report.com); (Ref. M.H. van Eikema Hommes, 'Interpreting historical sources on painting materials and techniques: The myth of copper resinate and the reconstruction of indigo oil paints', in: M. Clarke, J. Townsend, and A. Stijnman (eds.), Art of the past: sources and reconstructions, London 2005, pp. 16-23.); (Ref: Understanding historical recipes for the modification of linseed oil, by Indra Kneepkens ©2012, p.29 . UvA-DARE, Digital Academic Repository of the University of Amsterdam - PDF)
N/A Group^ Page^	Chromium Phosphate	Arnaudon's Green; Arnaudon's Chrome; Arnaudon's Chrome Green; Chromium Phosphate; Dingler's Green; Mathieu-Plessy's green; Plessy's Green; Schitzer's Green; Vert Arnaudon;	77298	Chromium phosphate; chromium (III) phosphate; phosphoric acid chromium (III) salt; Chromic Phosphate (Ref at Boston Fine Arts CAMEO Art Materials Databass); basic hydrated chromium phosphate of variable composition "Several chromium phosphates can be formed, notably the various hydrated forms (CrPO ₄ .xH ₂ O)." Manufacturing variants traditionally are known as Arnaudon's chrome green, Dingler's green, Plessy's green. and Schnitzer's green., Arnaudon's green: calcining ammonium phosphate with potassium dichromate.	-	-	-	-	B MSDS	-

				<p>Dingler's green: formed from an intimate mixture or co-precipitate of calcium and chromium phosphates.</p> <p>Plessy's green: 'The Plessy process consists in treating a solution of bichromate with calcium biphosphate and sugar as reducing agent' (Ref: A Treatise on Colour Manufacture: A Guide to the Preparation, Examination ... By Georg Zerr, Robert Rübencamp. 1908. p 240-244);</p> <p>Schnitzer's green: Treat an aqueous solution of potassium dichromate with sodium phosphate and tartaric acid." (Ref: Pigment Compendium.2004. p.108);</p> <p>CAS 7789-04-0</p>						
N/A	Dioptase	Achrite; Copper Emerald; Chrysocolia; Dioptase Dioptase Copper Silicate [KP.p]; Dioptase (fine grade) ¹ [NP.p];	N/A	Natural Mineral Copper Silicate	Fine grade: Light Bluish Green; Coarse Grade: Dark Bluish Green	3	I	-	B MSDS ¹	Pigment particle size effects color
N/A Group^ Page^	Diopside	Diopside Genuine* [DS.w]; Russian Emerald	N/A	Calcium Magnesium Silicate (Ref: mindat.org)	Rich Green with brown undertones	4	I	-	A	*more info on the Dan Smith PrimaTek™ artist paints and other mineral pigments at the watercolor Handprint.com site.
N/A	Egyptian Green	C.I. Pigment Blue 31; Egyptian Blue; Egyptian Green, copper glass [KP.p]; <i>see Egyptian Blue</i>	77437	Copper Calcium Silicate; Green variety of Egyptian Blue containing more silica than the blue form; (Ref: Pigment Compendium. pp.154-155);	light blueish green	4	1	22	B	-
N/A Group^ Page^	Fuchsite	Fuchsite [KP.p]; Fuchsite Genuine* [DS.w]; Chrome-mica; Chromian Muscovite; Chrommuscovite; Gaebhardtite; Green Muscovite	N/A	Greenish variety of muscovite (Ref: Mineral Data mindat.org); (Ref geology.neab.net); Phyllosilicate Chrome-muscovite	Green to iridescent green; Iridescent Reddish	4	I	-	A	*more info on the Dan Smith PrimaTek™ artist paints and other mineral pigments at the watercolor site Handprint.com .
N/A	Green Apatite	Apatite; Blue Apatite Genuine* [DS.w] Green Apatite; Green Apatite Genuine* [DS.w]	N/A	Calcium Fluoro Phosphate, Calcium Chloro Phosphate, Calcium Hydroxyl Phosphate. (Ref: Minerral Galleries @ galleries.com); (Ref: wikipedia).	Dark blue to dark olive green	3	I	-	A	*more info on the Dan Smith PrimaTek™ artist paints and other mineral pigments at the watercolor Handprint.com site
N/A Group^ Page^	Green Bice	Bremen green; British Verdigris; C.I. Pigment Blue 30; C.I. Pigment Green 39; Copper Green; English Verdigris;	77492	Synthetic Basic Copper Carbonate (Ref: Recipe at Pigments Thru The Ages. Curated by Michael Douma); (Ref: Malachite, Pigments: Historical.	Bluish Green	-	I	22	B MSDS MSDS MSDS	Carbonate can be effected by acids

		French Green; Green Verditer; Green Bice [NP.p]; Malachite synthetic [KP.p]; Pigment Blue 30; Pigment Green 39; <i>See Copper Carbonate Hydroxide PG39 and Malachite</i>		Chemical and Artistic Importance of Coloring Pigments. Courtesy of John Rose Sparks ; (Ref Malachite at Natural Pigments) ;						
N/A	Jadeite	Jade; Jadeite; Jadeite Genuine [DS.w]; Jade, medium [KP.p];	N/A	Silicates Containing Aluminum and other Metals (Ref: mindat.org).	Deep Green	3	I	-	A	-
N/A Group^ Page^	Malachite	Berggrün; Block Green; Bremen Green; Basic Copper Carbonate; Berggrün (Deut.); C.I. Pigment Blue 30; C.I. Pigment Green 39; Chrysocolla; Copper Green; Genuine Malachite Green [SI.p]; Green Bice; Green hydrous copper carbonate; Green Verditer; Hungarian Green; Iris Green; Malachit (Deut.); Malachite [KP.p]; Malchite, Arabian [KP.p]; Malachite Fibres [KP.p]; Malachite (fine grade) [NP.p]; Malachite Genuine [DS.o.w]; Malachite Green; Malachite MATSUBA-ROKUSYOU [KP.p]; Malachite natural [KP.p]; Malachite MP [KP.p]; Malachito (It.); Malaquita (Esp.); Mineral Green; Molochites; Mountain Green; Olympian Green; Pigment Blue 30; Pigment Green 39; Pin Lu; Verde Azzuro; Verdetto Della Magna; Verde Minerale; Verditer; Vert de Montagne <i>See Copper Carbonate Hydroxide PG39 and Green Bice</i>	77492	Natural Basic copper(II) carbonate; (Ref: webexhibits.org, Pigments Through the ages, Malachite) ; (Ref: Basic copper carbonate at CAMEO Materials Database, Boston Museum of Fine arts) ; as pigment; (Ref: webmineral.com) ; (Ref: mindat.org) ; as mineral. Cupric carbonate; (Ref: CAMEO Materials Database at Boston Museum of Fine Arts) (Ref) Malachite at Natural Pigments. Making pigments: Malachite at webexhibits.org ; Basic copper carbonates: CuCO ₃ .Cu(OH), - Malachite, 2CuCO ₃ .Cu(OH), - Azurite; CAS 12069-69-1 Malachite green chloride: CAS 569-64-2; Malachite green oxalate: CAS 2437-29-8 Copper Carbonate Hydroxide CAS 12069-69-1	Bright green	2-3	I	-	B MSDS MSDS MSDS	Can be effected by acids
N/A Group^ Page^	Phosphorescent Green	Phosphorescent [TA.a.af]; Phosphorescent Green [GO.a]; Glow in the Dark Green;	N/A	Copper Doped Zinc Sulfide; Patent No. US5998525	light yellow body color with bright yellowish green afterglow	2	-	?*	-	Raw pigment has a strong sulfuric odor, but it is usually masked when mixed into the medium.

				Natural (Green Emitting) pigment; The first "glow in the dark" or phosphorescent pigment. Consists of fine crystals of Zinc sulfide. Copper is added to the zinc sulfide as an activator, referred to as copper doping. This allows the crystals to absorb light and slowly emit it over time. The slow emission is called phosphorescence. This material has a light yellow (natural) body color and a yellowish green afterglow. (Ref: Raw Materials Supply);						Zinc pigments are slightly soluble in water. The solubility level is so small that they can be stored as a water-based paint for years (Ref: Glowinc.com); Not considered very permanent
N/A	Serpentine	Serpentine; Serpentine Genuine* [DS.w]	N/A	Magnesium Iron Silicate Hydroxide (Ref: Galleries.com Mineral Gallery);	Dark olive green	3	I	-	A	*more info on the Dan Smith PrimaTek™ artist paints and other mineral pigments use for art at the watercolor Handprint.com site
N/A Group^ Page^	Tourmaline	Brazilian emerald; Emeraldite; Green Tourmaline; Tourmaline; Tourmaline DENKISEKI-MATSU [KP.p]; Verdelite; Verdilite	N/A	Tourmaline is a group of isomorphous minerals with the same crystal lattice (Ref: minerals.net); Mineral (Ref: mindat.org); The green variety is the most common and is called Verdelite. Verdelite's green color comes from bivalent iron and magnesium .	Blueish to yellowish Green*	4	I	-	-	*The semi precious gemstone Tourmaline comes in almost all colors (Ref: gemstone.org), Verdelite or Emeraldite is the green variety (Ref: gemstone.org)
N/A	Volkonskoite	Green Stone; Russian Green; Volkonskoite [KP.p; Sl.p];	N/A	Dichrome Trioxide Mineral (Ref: webmineral.com), (Ref: handbook of mineralogy.org);	-	-	I	-	-	-
N/A Group^ Page^	Zoisite	Zoisite; Zoisite Genuine [DS.w]; Tanzanite	N/A	Calcium Aluminum Hydroxy Sorosilicate (Ref: Handprint.com);	Dark, dull green; Blue; Lavender; Pink**	3	I	-	A	Used as a gemstone; * More info on the Dan Smith PrimaTek™ artist paints and other mineral pigments used for art at the watercolor Handprint.com site; **Many varieties of shades and colors.;



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[Jump To Natural Green:](#)

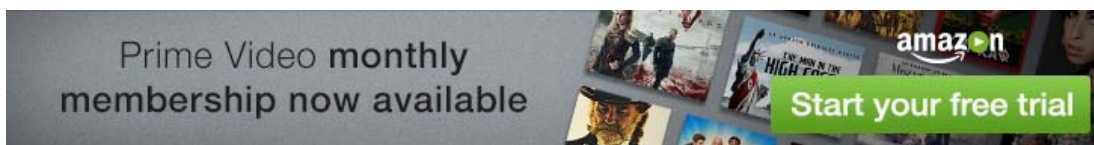
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■ Natural Green - Color Index Name: NV

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Color Index Generic Name	CI Common or Historical Name	Common, Historic and Marketing Names	C.I. Constitution Number	Chemical Composition	Color Description † = Long Term Effects of Light	Opacity 1 = opaque 4 = trans.	Light Fastness I = excell. IV=Fugitive	Oil Absorption g/100g		Side Notes
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NG1	Chinese Green	C.I. Natural Green 1; Charvin's Grun; Chinese Green; Lokao; Natural Green 1	-	Extract from the bark of Rhamnus tinctoria and R. dahurica, R. chlorophorm (globorus) and R. utilis treated with lime (Ref A dictionary of applied chemistry, Vol. 3, By Sir Thomas Edward Thorpe, 1912); "the juice of some Chinese species of buckthorn. The berries are pressed and the juice mixed with alum and dried." (Ref: - Dictionary of Chemicals and Raw Products Used in the Manufacture of Paints (1917))	Dark blueish green	-	IV	-	A	-
NG2	Sap Green	Archin; Bladder Green; Buckthorn Lake; C.I. Natural Green 2; Green Buckthorn Berries[KP.p]; Natural Green 2; Natural Yellow 13; Pasta Green; Persian Lake; Persian Berry Lake; Saftgrien; Saftgrün; Sap Green [KP.p]; Verde di Veschia; Vert de Vessie; Verde Vejiga; Verde Vessie; see Stil de grain NY13 also compare NG1 Chinese Green	75440 75700 75695	Laked extract of ripe Buckthorn berries (<i>Rhamnus catharticus</i>), Stil de Grain (NY13) is made from unripe berries; Coloring constitutes of Sap Green: Chlorophyll (green); Emodin or Frangulaemodin (red-orange powder); Xanthorhamnin, a glucoside extracted from Persian berries as a yellow crystalline powder, used as a dyestuff. (Ref dictionary.reference.com); According to The Organic Chemistry of Museum Objects by J.S. Mills: R. White, 1994 , the color of sap green is almost entirely due to chlorophyll. "Similar pigments, prepared from coffee-berries, and called Venetian and Emerald greens, are of a colder color, very fugitive, and equally defective as pigments" (Reference Field's Chromatography, by George Field, 1841, pg.238. Printed version @ Amazon.com, see also the Free Art Books page of this site); Chlorophyll : CAS 1406-65-1; Emodin : CAS 518-82-1; xanthorhamnin: CAS 1324-63-6	Deep dull yellow green	4	IV	-	A MSDS	Replaced by many modern pigment mixes in most modern artist paints



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Pigment Green - Color Index Name: PB

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Color	CI Common	Common, Historic and	C.I.	Chemical	Color	Opacity	Light	Oil		Side Notes
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Index Generic Name	or Historical Name	Marketing Names	Constitution Number	Composition	Description † = Long Term Effects of Light	1 = opaque 4 = trans.	Fastness I = excell. IV=Fugitive	Absorption g/100g		
PG1	Pigment Green 1	Brilliant Green; C.I. Pigment Green 1; Emerald Green (hue); Fanal Green D; Fanatone Bronze Green; Pigment Green 1	42040:1	Triphenylmethane Phosphotungstomolybdic acid salt; CAS 1325-75-3	Bright bluish green	-	III	-	-	-
PG2 Group^ Page^	Fast Green Lake	C.I. Pigment Green 2; Fast Green Lake; Permanent Green; Pigment Green 2	42040:1+ 42005:1	Phosphotungstomolybdic acid salt of Triphenylmethane and Thiazole; Intimate mixture of PG1 and PY18; CAS 1325-75-3; CAS 12213-69-3	Bright green	-	III	-	-	-
PG4	3606 Fast Green Lake	C.I. Pigment Green 4; Fanatone Green M; Fast Green Lake; Malachite Green (hue); Pigment Green 4	42000:2	Triphenylmethane Phosphotungstomolybdic acid salt; CAS 61725-50-6	Bright blue shade green	-	III	-	-	-
PG7 Group^ Page^	Phthalocyanine Green BS	Alizarin Green Lake; Antique Jasper Green [HO.w(ant)]; Armor Green [LB.av.o]; Aubusson Green; Brilliant Green; Brilliant Green Deep [MA.a.a]; Brilliant Green Light [MA.]; Blockx Green [BX.o.w]; Bright Aqua Green [LQ.a]; Chlorinated Copper Phthalocyanine; C.I. Pigment Green 7; Cupric Green Deep [MA.o.w]; Cyan Green; Cyanine Green [PE.w]; Dark Green Medium [DB.ag]; Emerald Green (hue) [SCH.a]; Emerald Green Substitute [SE.p]; Endurophthal Green B; Hazard Green [MA.o(Qiio)]; Heliogen® Green [KP.p]; Leaf Green; Monestial Green [DR]; Monestial Green (Phthalo) [DR]; Cinnabar Green (hue); Helio Green Bluish [SCH.g]; Helio Green Deep [SCH.o(Mus)]; Heliogen® Green K 8730; Hooker's Green Hue [UT.a]; Intense Green; Monastral Green [DR.o.t]; Mueller's Green Light[KP.p]; Mueller's Green Medium[KP.p]; Opaque. Viridian (hue) [HO.af];	74260	Polychlorinated Copper Phthalocyanine; LBNLPigment Database Spectral radiative properties ; Phthalo Green (i) ; Phthalo Green (ii) ; C ₃₂ H ₃ Cl ₁₃ CuN ₈ to C ₃₂ HCl ₁₅ CuN ₈ ; C ₃₂ H ₁₆ CuN ₈ Cl ₁₅ ; C ₃₂ Br ₆ Cl ₁₀ CuN ₈ (PG36) CAS 1328-53-6	Deep green blue shade †Darkens, Dulls	4	I BWS 8;8;8 (CR) BWS 8;8;8 (guerra paint)	22-62	A MSDS MSDS	Extremely strong in tints; Artist paint makers usually add fillers to help control this unusually strong color. Same pigment as Pigment Green 42? ?* The Dick Blick site has the Phthalocyanine Grumbacher Pre-Tested Oils , and other Grumbacher paints labeled "Phthalo", to my knowledge Grumbacher has always used the term "Thalo" in their line of Phthalocyanine colors.

		<p>Oriental Green [HO.a.o];</p> <p>Permanent Green Deep;</p> <p>Phthalo Emerald [PF.o];</p> <p>Phthalo Green [GEN AS CAS.k CL CR.a(o).ao.o DB.a.o.w DR.a.a.a(s3hb).a(s3mb).o.w DV.a.af.k.o.w GB.o.o GO.ab GR.w?* HO.wo JO.a KA.p KP.p MA.a.o.p.w MG.g.w MW.o RGH.o.p ROSS.o RT.o.w.wo SCH.o.p.w SQ.a TA.a.af UT.w WL.o.p WN.k];</p> <p>Phthalo Green Blue [GU RT.o];</p> <p>Phthalo Green (Blue Shade) [DS.a.i.o.w GO.a.ab.af.ag.ao GR.o.o.w.w.wo?* LQ.a MW.wo OH.a SCH.a SE.a UT.a.o WN.a.wo];</p> <p>Phthalo Green (BS) [DS.a.i.o.w];</p> <p>Phthalo Green B.S. [GO.a.ab.af.ag.ao];</p> <p>Phthalo Viridian [CH];</p> <p>Phthalo Green Cool [SE.o];</p> <p>Phthalo Green Dark [KP.p];</p> <p>Phthalo Green Deep [LA.a];</p> <p>Phthalo Green Lake [MH.o];</p> <p>Phthalocyanine Green [GEN DB.a KA.ad.o MG.a.o SE.p];</p> <p>Phthalocyanine Green BS [GEN];</p> <p>Phthalocyanine Green Lake;</p> <p>Pigment Green 7;</p> <p>Pigment Green 42;</p> <p>Scheveningen Green Deep [OH.o.w];</p> <p>Shiva Green [SV];</p> <p>Rembrandt Green [RT];</p> <p>Richeson Green [SQ.a];</p> <p>Sap Green (hue) [HO.o];</p> <p>Thalo Green [BR GR.w];</p> <p>Thalo Green (Blue Shade) [GR.o.o.w.w.wo];</p> <p>Transparent Green [HO.o];</p> <p>Transparent Phthalo Green BS [GO.ab];</p> <p>Transparent Phthalo Green Blue Shade [GO.ab];</p> <p>Viridian (hue) [CL MG.a MR.o SE.o.os SH.w];</p> <p>Viridian Green (hue) [HO.af DV.a MR.o];</p> <p>Viridian Hue [DB.o DR.o.w HO.o.w.wo MA.g UT.a WN.o.w];</p> <p>Viridian Hue Permanent [LQ.a];</p> <p>Winsor Green [WN.o.g];</p> <p>Winsor Green (Blue Shade) [WN.w.wp.wp(L)];</p>								
PG8	Nitroso Green 5.5px 11px	<p>C.I. Pigment Green 8;</p> <p>Green MC [EP.p];</p> <p>Green Pantelleria [MA.o(Med)];</p> <p>Green Sap [MR.o];</p> <p>Hooker's Green (hue*) [HO.a UT.w];</p> <p>Ichomine Olive Green;</p>	10006	<p>Azo;</p> <p>Ferrous complex of 1-nitroso-2-naphthol and 1- nitroso-2-naphthol-3-carboxylic acid (Ref: Paint Film Components. National Environmental)</p>	Slightly dull Yellowish to blueish dark green	4	I-III?*** BWS 5-6;4;2 (guerra paint)	43-76	B*** MSDS	<p>Affected by acids.;</p> <p>* Traditional pigment Hooker's green was a mixture of Prussian Blue and Gamboge;</p> <p>***"permanence and lightfastness of Hooker's Green (PG8) varies by brand" -Dick Blick</p>

		Nitroso Green ST; Olive Green [LB.o]; Pigment Green 8; Pigment Green B; Reset Green [MA.o(HD)]; Sap Green [MA.g MR.o PE.o.o RT.a];		Health Monographs by M van Alphen, 1998, p141); C ₃₀ H ₁₈ FeN ₃ O ₆ Na Ferrous beta naphthol; Nitroso Iron complex; CAS 16143-80-9						Ref. Many ***depends on manufacture, see Dick Blick Ref.
PG10 Group^ Page^	Nickel Azo Yellow	C.I. Pigment Green 10; Gold Bronze; Green Gold [WL.o WN.d]; Green Gold Bronze; Indian Yellow (Substitute); Nickel Azo [GU]; Nickel Azo Dark [GU]; Nickel Azo Xtra [GU]; Nickel Azo Yellow; Nickel Complex Azo; Nickel Monazo Yellow; Pale Gold Bronze; Pigment Green 10; Rich Gold Bronze	12775	Synthetic organic nickel Chelated Azo complex; Nickel complex of p-chloroaniline coupled with 2,4-quinolinediol; Powdered Nickel Chelated Azo; 68-92% copper; 6-31% zinc; 0.25-10% aluminum; CAS 51931-46-5	Dark to yellowish green	4	I BWS 8;8;8 (guerra paint)	14-47	A	-
PG13	Phthalochrome Green	Chromastral Green H-M; C.I. Pigment Green 13; Delta Phthalochrome Green D661; Mineral Green; Pigment Green 13	74200+ 77603	Inorganic; Phthalocyanine; CAS 148092-61-9	Yellowish green to middle green	1	I	-	B	-
PG14 Group^ Page^	Cadmium Green	Cadmium Green [GB.o.o HQ.o? RE.e.os? WL.o?]; Cadmium Green Dark [KP.p]; Cadmium Green Deep [HQ.o? OH.o.w?]; Cadmium Green Light [HQ.o? KP.p WL.o?]; Cadmium Green Pale [HQ.o.w? RE.e? WN.o?]; Cadmium Sulfide Chromoxyd; Cadmium Chrome Oxide; C.I. Pigment Green 14; Permanent Green; Pigment Green 14; Verde de cadmio (Esp.); Vert de cadmium (Fr.); Verde bario (It.); Verde de cádmio (Port.);	77199+ 77346	Inorganic; Intimate mixture* of varying composition According to the Color Index 3rd. ed. 1997: Pigment Green 14 is co-precipitated <i>Cadmium sulfide</i> CdS (Cadmium Yellow, PY37, PY35) and <i>Cobaltous aluminate</i> (Cobalt Blue, PB28, PB35, PG36, Cobalt Green PG26, PG50) of varying composition 4CoO·3Al ₂ O ₃ **(Ref: Colour Index Third Ed., published by SDC, AATCC, CII, 1997); "Cadmium green (PG14) is a chemically fused mixture of <i>cadmium yellow</i> (PY35) and <i>cobalt aluminum oxide</i> (PB28)", this color can be made in the studio by simply mixing the 2 components. (Ref Handprint.com, Cadmiums); "Cadmium Green" is a co-precipitated <i>hydrated oxide of chromium</i> (Viridian, PG18) with <i>cadmium sulfide</i> (PY37, PY35); (Ref Pigment Compendium, by Nicholas Eastaugh, Valentine Walsh, Tracey Chaplin and Ruth Siddall, Copyright © 2008, p.74) ; (Ref: Colour Index Third Ed., published by SDC, AATCC, CII, 1997) ;	Varied Greens depending on exact ratio of components	1	I	-	B	?* there appears to be a few different mixtures that can be historically considered "Cadmium Green", although the Color Index only lists one. Some artist oil paints that are labeled Cadmium Green are mixtures of PG18 (Viridian) and PY37 or PY35 (Cadmium Yellow), in those cases they could rightly be named "Cadmium Green" according to Heaton (1928) and Kittel (1953), but according to the Color Index, Pigment Green 14 (Cadmium Green) is a mixture of "Cadmium sulfide (Cadmium Yellow) and Cobaltous aluminate (Cobalt Blue) of "varied" composition". (Ref Pigment Compendium, by Nicholas Eastaugh, Valentine Walsh, Tracey Chaplin and Ruth Siddall, Copyright © 2008, p.74) ; (Ref: Colour Index Third Ed., published by SDC, AATCC, CII, 1997) ; **Many newer mixtures named "Cadmium Green" still use cadmium yellow as a base but substitute Phthalocyanine

				<p>Copyright © 2008, p.74;</p> <p>(Ref: Boston Fine Arts, CAMEO Materials Database);</p> <p>Cadmium Green: a pigment used in painting, consisting of a mixture of <i>hydrated oxide of chromium</i> with <i>cadmium sulfide</i>, and characterized by its strong green color and slow drying rate. (Ref: <i>Random House Unabridged Dictionary</i>, Copyright © 1997, by Random House, Inc.);</p> <p>CAS 1306-23-6</p>						Green PG7, Ultramarine blue PB29, or Prussian Blue PB27 instead of using Viridian or Cobalt Blue. It appears that Cadmium Green has become a generic term that means any green color made with cadmium yellow as the base.
PG15	Chrome Green	Bismark Green; Brunswick Green; Chrome Green; C.I. Pigment Green 15; Chromgrun; English Green; Green Cinnabar; Green Vermilion; Institutional Green; Mineral Green; Pigment Green 15; Prussian Green; Vert de Chrome; Victoria Green; Zinnober Green; Zinnobergrün;	77520+ 77601+ 77603	Inorganic; Prussian blue precipitated on chrome yellow base or an intimate mixture of Chrome yellow and Prussian blue; Potassium ferric ferrocyanide (PB27), Basic lead chromate (PY34), and Lead sulfochromates; CAS 12224-92-9; CAS 1344-37-2; CAS 25869-00-5	Yellowish green	1	II*	-	C	Contains lead; Used to paint walls in Insane asylums, prisons and hospitals for it's supposed "calming" effect. * good lightfastness, but in time the chromate decomposes the blue, rendering it 'unfit for fine art'. (Reference Field's Chromatography, by George Field, 1841, pg.238, Printed version, see also the Free Art Books page of this site);
PG16	Zinc Green	Bleu de Turnbull; C.I. Pigment Green 16; English Green; Milor Green; Pigment Blue 29; Pigment Green 16; Turnbull's Blue Ultramarine Green; Vert de Zinc; Zinc Green; Zinkgrum	77955 plus 77525 or 77007 70800? 77007? 77510?;	Mixture of PY36 (zinc yellow) and a blue pigment of varied composition (possibly one of the below pigments) Potassium Ferrocyanide PB27*; Complex of Sodium Aluminum Sulfo-silicates PB29* ; Copper phthalocyanine PB15 or PG7*; <i>Zerr, Rübencamp, 1908</i> , State that Zinc Green is "a mixture of Zinc chromate (PY36), Prussian Blue (PB27) and barytes (PW21) it is made on similar lines to the chrome greens, except that the character of the zinc chromate replacing lead chromate in the mixture requires a somewhat longer mechanical treatment of the mixture." (Reference A Treatise on Color Manufacture, p.251-253 By George Zerr, Robert Rübencamp, 1908) CAS 12769-96-9?; CAS 65505-26-2?;	-	II	-	-	A**	This pigment is listed in the Color Index as a mixture of PY36 and a blue component (Pigment Compendium p.413; p.415) the Color index 3rd Ed., V.4. Inorganic colorants (chemical constitution numbers) ; lists 77007 (PB29, Ultramarine), 77525 (Ferrous ferricyanide, Prussian blue), and 77955 (PY36, Zinc chromate) as "components" of C.I. Pigment Green 16. ** Slightly toxic if ingested in large amounts according to The Daniel Smith MSDS sheet .
PG17	Chrome Oxide	Acanthus Green [HQ.a] ;	77288	Inorganic;	Dull yellowish	1	I	12-43	A	The color of money-

Green	<p>Acqua Blue;</p> <p>Arnaudon's Green;</p> <p>Chrome Green [BX.w];</p> <p>Chrome Oxide [KP.p];</p> <p>Chrome Oxide Green [CH DB.a.o DV KA.o KP.p LA.a MA.a.a.o.artis o.p MW.o.wo SQ.a TA.a.af];</p> <p>Chrome Oxide Opaque;</p> <p>Chrome Sesquioxide;</p> <p>Chromia;</p> <p>Chromic Oxide;</p> <p>Chromium Green Black;</p> <p>Chromium Green Oxide [CAS.k CR.ao.o DS.a.o.p.w];</p> <p>Chromium Oxide [WL.o.p];</p> <p>Chromium Oxide Green [GEN DB.a.o.w DV.k.o.w GB.o.p GO.a.af.ag.ao GR.o.w.w.wo KA.p LB.av.o LQ.a NP.p OH.a.o.w RGH.o.p RT.a.o.o.w.wo SCH.g.o.p.w SE.o.os.p.w TA.a UT.a.o.w WN.a];</p> <p>Chromium Oxide Green Dark [GO.a.ao];</p> <p>Green Dragon (MA.o(HD));</p> <p>Chromium Oxide Green Deep [KA.p SCH.o(Mus) SV];</p> <p>Chromium Oxide Green (Opaque) [GR];</p> <p>Chromium Oxide Light [GU];</p> <p>Chromium Oxyd Green [CH];</p> <p>Chromium Oxyde Green [SE.a];</p> <p>Chromium Sesquioxide;</p> <p>C.I. Pigment Green 17;</p> <p>Dingler's Green;</p> <p>Eskolaite**;</p> <p>Green Oxide [CR.a(jo) JO.a];</p> <p>Green Rouge;</p> <p>Gruenes Chromoxyd;</p> <p>Institutional Green;</p> <p>Lamoriniere Green [BX.o];</p> <p>Leaf Green;</p> <p>Nicosia Green [EP.p];</p> <p>Oil Green;</p> <p>Olive Green [MA.w];</p> <p>Olivegrun;</p> <p>Opaque Oxide of Chromium [DR.a.o];</p> <p>Ossido di Cromo Verde;</p> <p>Oxide Chromium [HO.o MA.p];</p> <p>Oxide of Chromium [AS DR.a.o.w HO.o MA.o.artis p MH.o WN.g.k.o.w.wp];</p> <p>Oxide of Chromium Green [DR.a.a(s3hb) a(s3mb).w];</p> <p>Oxido de Cromo Verde;</p> <p>Oxyde vert de chrome;</p> <p>Permanent Green;</p> <p>Pigment Green 17;</p> <p>Plessy's Green;</p> <p>Salento Green [MA.o(MED)];</p> <p>Schnitzer's Green;</p> <p>Terre Verte (hue) [HO.a(gesso)];</p>	<p>Chromic Oxide</p> <p>(Ref: Chromic oxide at Boston Fine Arts CAMEO);</p> <p>Chromium(III) oxide (Ref Wikipedia);</p> <p>** Eskolaite is a natural mineral Cr2O3.</p> <p>Mixed Metal Oxide (MMO) (PCLmag Ref):</p> <p>Anhydrous Chromic oxide or Chromium sesquioxide;</p> <p>LBNLPigment Database Spectral radiative properties;</p> <p>Chrome Green;</p> <p>Chromium Oxide Green;</p> <p>Cr₂O₃</p> <p>CAS 1308-38-9;</p> <p>CAS 68909-79-5</p>	green to mid Green	<p>BWS 8;8;8 (CR)</p> <p>BWS 8;8;8 (guerra paint)</p>	<p>MSDS</p> <p>MSDS</p> <p>MSDS²</p> <p>MSDS</p> <p>ICSC</p>	<p>was used in ink on US Currency</p> <p>?* according to the Earth Pigments Site their Viridian is PG17 this may be a mistake Viridian is Hydrated Chrome Oxide PG18</p>
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		True Chrome Green; Ultramarine Green; Victoria Green ² [NP.o.p.w]; Viridian (hue) [EP.p?*];								
PG17 Blk	Chromium Green Black Hematite	Chromium Green Black; Chromium Green-Black Hematite; Chromium Iron Oxide Black; C.I. Pigment Green 17; Hematite Oxide Black Brown; Pigment Green 17; Shepherd Black 10C909	77288	inorganic; Chromium Green- Black Hematite Cr ₂ O ₃ is the reaction product of calcining at high temperature mostly chromium (III)oxide so that it creates a crystalline hematite. Its composition may include one or a mixture of Al ₂ O ₃ , Fe ₂ O ₃ , and/or Mn ₂ O ₃ as modifiers. (Ref IPConsortium); Mixed Metal Oxide (MMO) (PCImag Ref): Chromium Green- Black Hematite; CrOFe LBNLPigment Database Spectral radiative properties ; Chromium Green- Black Hematite ; Ferro Data Sheet ; CPMA 3-05-3 (4th ed. CMPA Classification and Chemical Description of the Complex Inorganic Color Pigments). CAS 68909-79-5	Greenish or Brownish Black	1	I	13	A MSDS ICSC	Used as a "cool" black pigment, when used for outside coatings it reflects the sun's warmth instead of absorbing it like most blacks. In paints and coatings this helps keep buildings/houses/etc. cooler and saves on cooling costs.
PG18	Viridian	Casali's Green; Chrome Green Lake; Chrome Oxide (Hydrated) Green; Chromium Hydrate Green; Chromium Oxide Green Brilliant [SCH.a.g.o.(Mus).p]; C.I. Pigment Green 18; Emerald Chromium Oxide; Emerald Green (hue*) [BX MA.o.o(artis).p SE.a.p SQ.a]; Emerald Oxide of Chromium; Emeraude Green (hue*); Feuriges Chromoxyd; French Veronese Green; Guignet Green; Guignet's Green; Hydrated Chrome Oxide Green; Hydrous Chromic Oxide; Leaf Green; Mittler's Green; Oxide of Chromium, Transparent; Oxyde Verte; Pannetier's Green; Permanent Green; Permanent Green Light [UT.w]; Pigment Green 18; Smaragd Green; Transparent Oxide of	77289	Inorganic; Hydrated chromium(III) oxide (Ref Wikipedia); Hydrated chromium sesquioxide; Chromium(III)-oxide dihydrate (Ref webexhibits.org); Making pigments: Viridian at webexhibits.org ; (Ref: Chromium oxide hydrate, CAMEO Materials Database MFA, Boston); (Ref: Viridian, CAMEO Materials Database MFA, Boston); CAS 12001-99-9	Dull or deep mid green to bluish green	4	I	90	A MSDS	* There is some justification of using Emerald Green as a name for Viridian. Some historical sources list the french term "Vert émeraude" as meaning a "transparent chromium oxide" otherwise known as Hydrated chromium oxide (Viridian). The literal translation of "Vert émeraude" is "Green Emerald" or Emerald Green. (Ref Pigment Compendium, 2008);

		Chromium; Verde Esmeralda; Verde Smeraldo; Vert Emeraude***; Viridian [GEN AS BX.o.w BR DB.ag.o.w DR.o.w.t DS.o.p.w DV.k.o.w GB.o.p GR.o.w.wo GU HQ.g.o.w KA.o.p MA.o.o(artis).p.w MG.g.o MH.o MV.o.wo LB.o RGH.o.p RT.o.w SCH.g SE.o.t SV UT.o.w WL.o.p WN.g.k.o.wo.w.wp.wp(L)]; Viridian Green [DV.k.o.w KP.p ROSS.o]; Viridian Green Deep [QH.o];								
PG19 Group^ Page^	Cobalt Green	C.I. Pigment Green 19; Cobalt Green [GEN BX BR CL GB.o GR.o HQ.a.o RGH.o.p RT.w UT.o]; Cobalt Green bluish A [KP.p]; Cobalt Green Deep [HQ.o.wo MA.o(artis).p SE.p]; Cobalt Green Light [DB.o HQ.wo MA.p SCH.g.p SE.o.p]; Cobalt Green Pale [HQ.o DS.o.w]; Cobalt Green Pure [SCH.w UT.o]; Cobalt Green Turquoise [QH.o.w]; Cobalt Green Turquoise Light; Cobalt Turquoise Deep [MH.o]; Cobalt Zinc Oxide; Cobalt Zincate; Gellert Green; Oriental Green [SCH.a.o(Mus)]; Pigment Green 19; Rinmann's Green; Zinc Green	77335	Inorganic; Cobalt Zinc Oxide: isomorphous mixture of cobalt zincate and zinc oxide heated at high temperatures which cannot be chemically separated. Paler tints requiring greater amounts of zinc oxide. (Ref Color index 3rd Ed., V.4. Inorganic colorants CI 77335); How Cobalt green is made from webexhibits.org CAS 8011-87-8	Dull yellowish to bluish green	1	I	20	B MSDS	-
PG20	Verdigris	Aeruca; Aerugo; C.I. Pigment Green 20; Copper Acetate; Copper Green; Crystallized Verdigris; Distilled Verdigris; French Verdigris; German Verdigris; Green of Greece; Grünspan; Neutral Verdigris; Pigment Green 20; Swedish Verdigris; Synthetic Verdigris; Verdigris [KP.p]; Verdete; Viride Aeris; Viride Graecum; Viride Hispanicum; Viride Rothomagense; Viride Salsum; See Ploss Blue	77408	Made by the action of acetic acid on copper to cause corrosion and depending on the creation process contains varying amounts of the compounds: Basic copper acetate and Blue Verdigris together with smaller amounts of Green Verdigris and Neutral Verdigris. The color varies from bluish green to deep emerald green; Synthetic basic copper acetate (Ref); Loosely defined as "corrosion products formed from copper and copper alloys" (Ref Pigment Compendium) Making pigments: Verdigris at webexhibits.org ; CAS 6046-93-1	Bluish green to deep emerald green	-	-	-	B	-

PG21	Emerald Green	African Green; Arseniate of Copper; Arsenic Green; Basel Green; Beautiful Green; Braconnot's green; Brunswick green; Casslergrün; Cenere Verde; C.I. Pigment Green 21; Copper Acetate Arsenite Green; Eisenach Green; Eisleben Green; Emerald Green; Emerald Oxide; Emperor Green; French Green; Haystack Green; Imperial Green; Jasmine Green; Jasniger Green; King's Green; Kirchberg Green; May Green; Meadow Green; Mineral Green; Mitis Green; Moss Green; Mountian Green; New Green; Original Green; Paint Green; Paris Green; Parrot Green; Patent Green, Pigment Green 21; Powder Green; Saalfeldergrün; Schweinfurt green; Scheele's Green; Smargdgrun; Smaragdinus; Swedish Green; Urania Green; Vienna Green; Veronese green; Vert Cendre; Vert Emeraude; Vert Paul Veronese; Verde Ceniza; Wuerzberg Green; Würzburg Green; Zwickau Green	77410	Copper acetoarsenite; (Ref) (webexhibits.org Ref), Paris Green (Ref at Wikipedia); Method of making Emerald Green at webexhibits.org ; CAS 12002-03-8	Vivid Bright Green	2	II*	-	D	EXTREMELY TOXIC AND POSINIOUS. If impure it can emit deadly arsenic gas. May be affected by atmospheric sulfides (Ref wikipedia); Said to be more permanent in oils and with resin based mediums (Ref webexhibits.org). Interesting historical information on the green pigment Emerald Green at the " Jane Austen's World " Blog (Reference) .; "Of all known mineral colors scarcely one can be compared in beauty and brightness with the brilliant shade of emerald green. Whilst nearly all shades of the known mineral colors can be imitated by means of coal-tar colors, none of the green lakes obtained from organic coloring matters is bright enough to bear comparison with emerald green. Unfortunately, however, emerald green, on account of its high content of arsenic, is one of the most poisonous colors known, if not the most poisonous of all." (Reference: A Treatise on Colour Manufacture By Gorge Zerr, Robert Rübencamp, 1908) * light fast but should not be mixed with sulfur containing colors.
PG22	Copper Arsenite	C.I. Pigment Green 22; Brunswick Green; Copper Arsenite; Green Verditer; Lime Green *; Patent Green *; Pigment Green 22; Scheele's Green	77412	Copper Arsenite; "The composition of the commercial products varies, the more alkali used in the manufacture the more copper oxide in the product" (Ref Colorindex 3rd Ed., V.4. Inorganic colourants CI 77412).	-	-	-	-	D	* Lime Green and Patent Green are copper arsenite precipitated with calcium sulfate (Ref Colorindex 3rd Ed., V.4. Inorganic colorants CI 77412).

PG23	Green Earth	<p>Aegirine² [KP.p];</p> <p>Ancient Green Earth [EP.p];</p> <p>Antica (Prun) Green Earth¹ [NP.p];</p> <p>Antique Green Earth [HQ];</p> <p>Antique Green Earth from Verona [MA.o.p];</p> <p>Appianum;</p> <p>Armenian Green Earth [KA.p];</p> <p>Bavarian Green Earth [KP.p];</p> <p>Belgian Earth;</p> <p>Bluish Green Earth [KP.p];</p> <p>Bohemian Earth;</p> <p>Bohemian Green Earth [DS.w KP.p SCH.p WL.o];</p> <p>Brimisvellir Green [KP.p];</p> <p>Burnt Green Earth;</p> <p>Calcined Green Earth;</p> <p>Ceder Green;</p> <p>Celadon Green;</p> <p>Celadonite [KP.p NP.p];</p> <p>Chrysocolla [KP.p];</p> <p>C.I. Pigment Green 23;</p> <p>Creta Viridis;</p> <p>Cyprian Earth;</p> <p>Cyprus Cold Green Earth¹ [NP.p];</p> <p>Cyprus Green Earth¹ [NP.p];</p> <p>Epidot* [KP.p];</p> <p>Epidote*;</p> <p>Florentine Green [KP.p];</p> <p>Giotto Green Earth [KA.p];</p> <p>Glauconite¹ [NP.p];</p> <p>Green Bice;</p> <p>Green Chalk**;</p> <p>Green Earth¹ [GEN BX.o.w DB.o KP.p MA.o.p OH.a.o.w RT.w SE.o.p];</p> <p>Green Earth from France [KP.p];</p> <p>Green Earth from Verona [KP.p MA.o];</p> <p>Green Earth, German [KP.p];</p> <p>Green Earth (natural form);</p> <p>Green Earth (terra verte) [GU]</p> <p>Green Earth Verona [MA.o];</p> <p>Green Jaspar⁴[KP.p];</p> <p>Green Ocher***;</p> <p>Green Porphyry;</p> <p>Green Quartz [KP.p];</p> <p>Green Stone;</p> <p>Green Umber Earth from Armenia [SI.p];</p> <p>Grünerde;</p> <p>Hessian Earth;</p> <p>Holly Green;</p> <p>Holy Green;</p> <p>Hungarian Green;</p> <p>Italian Terra Verte [WL.o(SF).p];</p> <p>Natural Bohemian Green Earth [SCH.o(Mus)***];</p> <p>Nero Bernino³ [KP.p];</p> <p>Nicosia Green;</p> <p>Nicosia Green Earth (natural</p>	77009	<p>Natural green or mineral earths colored by Iron-II-silicates, copper silicates, Aluminum, Iron Oxides, Magnesium, Potassium, Hydrated Iron Potassium Silicate or calcium iron/aluminium silicates;</p> <p>Al-, K-, Mg-, Ca- and Fe-Silicate;</p> <p>Composition of what can be called "Green Earth" can vary widely being a product of a multitude of weathered greenish minerals or combination of bluish and yellowish minerals and natural earths. The most common are the natural green clay minerals Glauconite and Celadonite****(Ref Pigment Compendium).;</p> <p>"As Green Earth a decomposition product of augite and hornblende in the Mendip Hills and in France, Bohemia, Cyprus, etc.</p> <p>Terre verte (defined as natural earth containing both ferric and ferrous oxides) mined at Monte Baldo near Verona, owes its colour to glauconite, a hydrated silicate of iron, aluminium and potassium. Widely distributed in Germany, etc. as Green Sand and Green Stone" (Ref Colorindex 3rd Ed., V.4. Inorganic colourants CI 77009);</p> <p>Green earths could also include many other weathered mineral deposits, and mixtures of clays ochres and others, conceivably containing alone or in mixtures of any of the following: Adamite, Aegirine, Amazonite, Amphiboles, Azurite, Celadonite, Chlorite, Chrysocolla, Conicalcrite, Cronstedtite, Copper ore and it's naturally occurring salts, Copper Carbonate etc., Cuprorivaite, Diopase, Diopside, Epidote, Eskolaite, Feldspar, Fuchsite, Glauconite, Green Apatite, Greenschist, Illite, Jade, Jaspar, Kaolinite, Iron oxides & Hydrated Iron oxides, limonite, Malachite, Montmorillonite, Olivinite, Quartz, Saponite, Serpentine, Verdelite, Volkonskoite, Yellow Ochre and umbers</p>	Wide variety of dull to bright, dark blueish to light yellow greens	2-4	I	<p>BWS 8;8;8 (guerra paint)</p>	20-30	<p>A*****</p> <p>MSDS¹</p> <p>MSDS²</p> <p>MSDS³</p> <p>MSDS⁴</p> <p>Additional info on green earths: (kremerpigments.com Ref);</p> <p>* Epidote/Pistacite is a specific mineral complex of calcium iron/aluminium silicates and can be found as pure crystals (Ref), (Ref).</p> <p>**Green Chalk (Ref Pigment Compendium);</p> <p>*** Green Ocher is also known to be used as a name for an artificial green earth made from yellow ocher (p.180 The Manufacture of Earth Colours Ref)</p> <p>**** Schmincke list their 'Natural Bohemian Green Earth' as PBr7 in their color charts, however if it is indeed 'Natural Bohemian Green Earth' it could also be considered PG23</p> <p>***** "Transparent Brown" is calcined green earth according to The Artist's Handbook of Materials and Techniques by Mayer, 1991</p> <p>***** Because of the wide variety of earths that can be labeled PG23, there are varying degrees of toxicity. Those colored by copper may be a slight hazard if ingested. Those colored by the arsenates are certainly poisonous, but rare and not usually used as pigments. Some earths may also have trace amounts of lead, arsenic or other toxic minerals but not usually in dangerous levels.</p>
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		<p>mineral glauconite)¹ [NP.p]; Pigment Green 23; Pure Green Earth, bluish from Cyprus [SI.p]; Pure Pale Green Earth from Cyprus [SI.p]; Rare Green Earth [DS.w]; Rhenish Earth; Russian Green Earth [KP.p]; Saxon Earth; SF Italian Terra Verte [WL.o(SF)]; Stone Green; Terra di Verona; Terre Vert; Terre Verte [GEN BX HO.o.o MH.o SE.w UT.w WL.o]; Terre Verte Verona [HO.o]; Terre Verte (Yellow Shade) [WN.w.wp]; Terra Verdi; Theodoteion; Transparent Brown****; Tyrolean Earth; Tyrolian Green Earth; VerdeTerra; Verdetera; Verdetta; Verdetto; Verona Brown; Verona Green Earth [KP.p NP.p¹]; Verona Green Earth, standard [KP.p]; Verona Green, very fine [KP.p]; Veronese Green; Veronese Green Earth [KP.p]; Volkonskoite [KP.p; SI.p]; <i>Wide variety of names based on source and/or location of manufacture, etc.</i></p>		<p>and Zoisite along with other inert or colorless minerals. More green minerals at webminerals.com, the blues, the yellows, colorless, white minerals and trace constitutes.</p> <p>How Green earth is made and more green earth pigment information at webexhibits.org; CAS 1344-98-5</p>						
PG24	Ultramarine Green	<p>C.I. Pigment Green 24; Pigment Green 24; Ultramarine Green [RT.o]; Ultramarine Green, genuine [KP.p];</p>	77013	<p>Sodium-aluminium-sulfo-silicate; "A double silicate of aluminium and sodium containing sulfur, constitution unknown". Ultramarine Green is the "first product of ignition in the manufacture of Ultramarine blue by the indirect process" (Ref Color Index 3rd Ed., V.4, Inorganic colourants, CI 77013); CAS 57455-37-5; CAS 101357-30-6</p>	Slightly dull, deep bluish green	4	I	-	A	Manufactured 1828 to 1960
PG26	Cobalt Chromite Green	<p>Camouflage Green No.179; C.I. Pigment Green 26; Chromium Cobalt Green; Chromium Cobalt Green Spinel; Cobalt Chromite Dark [GU]; Cobalt Chromite Green [WN.o]; Cobalt Chromite Green</p>	77344	<p>Inorganic; Cobalt Chromite Green Spinel (CoCr2O4) is obtained by calcining, at high temperature, a mixture of Cobalt (II) Oxide and Chromium (III) Oxide in varied amounts that creates a spinel</p>	Somewhat dull bluish green to brighter pale green	3	I	16-20	B	MSDS
	Group^ Page^									

		<p>Spinel; Cobalt Green [GEN GO.a.ag.ao RT.o SQ.a TA.a.af]; Cobalt Green Blue [GU]; Cobalt Green Dark [SCH.w]; Cobalt Green Deep [DS.a.o OH.w SCH.g.p SE.a.o WN.a]; Cobalt Oxide Green; Cobalt Turquoise; Cyprus Green [HO.a]; Daipyroxide Green 9430; Fragonard Chrome Green [PE.o]; Military Green; Pigment Green 26; Turkish Green; Turmaline Green [SCH.a.o(Mus)]</p>		<p>form crystalline matrix. It may include one or more of the modifiers Al₂O₃, B₂O₃, CaO, MgO, PbO, SiO₂, TiO₂, ZnO, and/or ZrO₂. (Ref Color Index 4th edition); Mixed Metal Oxide (MMO) (PCImag Ref): Cobalt Chromite; Oxides of Cobalt and Chromium; Cobalt Chromite Green Spinel; LBNLPigment Database Spectral radiative properties; CPMA 13-30-3; CAS 68187-49-5</p>						
PG36	Phthalocyanine Green YS	<p>Bamboo Green [HO.w]; Bocour Green; C.I. Pigment Green 36; Cinnabar Green; Cupric Green [MA]; Cupric Green Light [MA.o.w]; Cyan Green; English Green Deep [SE.p]; Emerald Green (hue) [RT.w SE.w]; Phthalo Emerald (Green Yellow Shade) (hue) [GB.o]; Helio Green [SCH.w]; Helio Green Light [SCH.o(Mus)]; Helio Green Yellowish [SCH.g]; Heliogen® Green; Intense Green; Light Green [LB.av]; Lonocyanine Green; Monastral Green; Permanent Green Deep [OH.w?]; Phthalo Armor Green [LB.o]; Phthalo Green [BX.o KP.p SQ.a WN.w]; Phthalo Green Light [SCH.p]; Phthalo Green Warm [SE.o]; Phthalo Green Yellowish [KP.p WL.o.p]; Phthalo Green Yellow [GU RT.o]; Phthalo Green Yellow Shade [CAS.k DS.a.i.o.w DV.w GO.a.af.ag GR.o.wo? HO.wo LQ.a MG.w MH.o OH.a IA.a.af SCH.a SE.a WN.a.k.wo]; Phthalo Green YS [DS.a.i.o.w GO.a.af.ag]; Phthalocyanine Green; Phthalocyanine Green Yellow Shade; Phthalocyanine Green YS; Pigment Green 36; Rembrandt Green; Sap Green (hue) [DB.o SE.o]; Scheveningen Green [OH.o.w];</p>	74265	<p>Inorganic; Bromated and Chlorinated Copper Phthalocyanine; A Polyhalogeno derivative of Phthalocyanine; (Ref: KEMI Swedish Chemical Agency): C₃₂Br₆Cl₁₀CuN₈ CAS 14302-13-7</p>	Green to Yellowish green	4	I BWS 8;8;8 (guerra paint)	24	A MSDS	<p>Extremely strong tint strength; may need fillers added. ?* Old Holland Permanent Green Deep is labeled with only PG36 on the website color chart, but under "Pigment classification" it has "Chlorinated phthalocyanine-Arylamide- Synthetic ultramarine-Zinc oxide", indicating a mixture of 4 pigments? ?* The Dick Blick site has the Phthalocyanine Grumbacher Pre-Tested Oils and other Grumbacher paints labeled "Phthalo", to my knowledge Grumbacher has always used the term "Thalo" in their line of Phthalocyanine colors.</p>

		Thalo Green; Thalo Green (Yellow Shade) [GR.o.wo]; Thalo Green YS [GR.o.wo]; XSL Phthalo Green, yellowish [KP.p]; Winsor Green (Yellow Shade) [WN.o.w.wp]; Zulu Green								
PG38 Group^ Page^	Phthalocyanine Green YS?*	C.I. Pigment Green 36; C.I. Pigment Green 38; Pigment Green 36?*; Pigment Green 38; Pigment Green 41?* <i>see PG36 above</i>	<i>see PG36 above</i>	Same as pigment green 36 and 41?*; (CAMEO chemicals.noaa.gov Ref) ; (chemblink.com Ref) ; (chemicalbook Ref) ; CAS 14302-13-7; <i>see PG36 above</i>	<i>see PG36 above</i>	-	-	-	A MSDS	?* alternate name for PG36 and PG41? (AMIEN.org Thread Ref); Note: sometimes chemicals can be described as being the same or as Synonyms when manufacturing processes or small crystalline or other chemical properties may vary.
PG39	Copper Carbonate Hydroxide	Berggruen; Block Green; Bremen Green; Chrysocolla; C.I. Pigment Green 39; Copper Green; Cupric Green; Cupric Carbonate; Green Bice ² [NP.p]; Green Copper Carbonate; Green Verditer; Hungarian Green; Iris Green; Malachite [KP.p]; Malchite, Arabian [KP.p]; Malachite Fibres [KP.p]; Malachite (fine grade) [NP.p]; Malachite Genuine [DS.o.w]; Malachite Green; Malachite MATSUBA-ROKUSYOU [KP.p]; Malachite natural [KP.p]; Malachite (Natural Mineral) [NP.p]; Malachite MP [KP.p]; Malachitgruen; Mineral Green; Mountain Green; Olympian Green; Pigment Blue 30; Pigment Green 39; Pin Lu; Refiner's Verditer; Verde Azuro; Verde Minerale; Verditer; Vert de Montagne; Vert mineral; <i>See Green Bice and Malachite</i>	77492	A basic carbonate of copper: Basic copper(II) carbonate; Copper Carbonate Hydroxide or Natural Mineral Malachite (Ref) Malachite at Natural Pigments. Making pigments: Malachite at webexhibits.org ; CAS 12069-69-1	Bluish green	4	I*	L	B MSDS MSDS²	Becomes lighter and duller the finer it is ground *light fast but may darken due to atmospheric sulfides
PG41 Group^ Page^	Phthalocyanine Green YS?*	C.I. Pigment Green 41; Pigment Green 36?*; Pigment Green 38?*; Pigment Green 41;	<i>see PG36 above</i>	Same as pigment green 36 and 38?*; (CAMEO chemicals.noaa.gov Ref) ;	-	-	-	-	A MSDS	?* alternate name for PG36 and PG38? Note: sometimes chemicals can be described as the


		see PG36 above		(chemblink.com Ref) (chemicalbook Ref); CAS 14302-13-7; see PG36 above						same or as Synonyms when manufacturing processes or small crystalline or other chemical properties may vary.
PG42	Phthalocyanine Green G	C.I. Pigment Green 42; Copper Phthalocyanine; Non-flocculating Green G; Phthalo green; Phthalocyanine Green (yellow shade); Pigment Green 7?*; Pigment Green 42; Polychloro copper phthalocyanine; Rembrandt green	74260	Polychloro copper phthalocyanine; CAS 85256-45-7	Deep bluish Green	4	I	25-35	A	?* Apparently the same pigment as PG7 ? Note: sometimes chemicals can be described as the same or similar pigment although manufacturing processes and/or modifiers used in production and other chemical properties may vary.
PG45	Copper Ferrocyanide	C.I. Pigment Green 45; Copper Ferrocyanide; Pigment Green 45;	-	Triphenylmethane Copper ferrocyanide complex	Deep mid-shade green	-	-	-	-	-
PG48	Chromocyanine Green	Bus Green; Chromocyanine Green; Chrome Fast Green; C.I. Pigment Green 48; Mint Green; Pigment Green 48	77600 + 77603 and 74160 + 74260	Synthetic inorganic; Intimate pigment mixture, a combination of chrome yellow (PY34 Lead Chromate) and phthalocyanine green (PG7) or/and phthalocyanine blue (PB15)	yellow green to blue green*	3	II	20-25	A	*depends on ratios of the mixed pigments
PG50	Cobalt Titanate Green	Australian Turquoise [AS]; C.I. Pigment Green 50; Cobalt Bottle Green [KP.p]; Cobalt Blue Turquoise Light [OH.a.o.w]; Cobalt Green [BX.w CR.ao.o DS.a.w KP.p LQ.a MG.w OH.a.o.w SQ.a WN.a.w.wp]; Cobalt Green Deep [MA.o.o(artis).w MH.o]; Cobalt Green Yellow 5Y [GU]; Cobalt Green (Yellow Shade) [HO.w]; Cobalt Green Light [BX.o KA.p MA.o.w]; Cobalt Green Pale; Cobalt Green Xtra Deep [KA.p]; Cobalt Nickel Green [GU LA.a]; Cobalt Nickel Titanate Green [GU]; Cobalt Oxide Green Blue [KP.p]; Cobalt Teal [GO.a LQ.a SE.a SQ.a TA.a.af UT.w WL.o.p]; Cobalt Teal Blue [DS.a.o.w]; Cobalt Teal Pure [UT.w]; Cobalt Titanate Green [GO.a GR.o]; Cobalt Titanate Green Spinel; Cobalt Titanite Green Spinel; Cobalt Titanium Green; Cobalt Titanium Green Spinel; Cobalt Turquoise	77377	Inorganic; Cobalt Titanate Green Spinel (Co)2TiO4 is light green powder produced by high temperature calcination of a mixture of Cobalt (II) Oxide and Titanium (IV) Oxide in varied ratios creating a crystalline matrix of inverse spinel. It may include any one or more of the modifiers Al2O3, CaO, Cr2O3, Fe2O3, Li2O3, MgO, NiO, Sb2O5, and/or ZnO. (Ref Color Index 4th edition); Mixed Metal Oxide (MMO) (PCLmag Ref); Cobalt Titanate; Cobalt Titanate Green Spinel; Oxides of nickel, Cobalt and Titanium; LBNLPigment Database Spectral radiative properties; Cobalt Teal; Cobalt Titanate Green Spinel (i); Cobalt Titanate Green Spinel (ii); Co2TiO4 CPMA 13-31-3;	Dull Olive green to bright mid green	2	I BWS 8;8;8 (CR) BWS 8;8;8 (guerra paint)	16-20	B* MSDS MSDS MSDS	*Cobalt Green is toxic. Do not breathe its dust, or wear a NIOSH certified dusk mask and gloves when working with the dry pigment (Ref: Dick Blick pigment info).

		<p>[SCH.o.o(Mus).p.w] RGH.p UT.o]; Cobalt Turquoise Green [RT.o]; Cobalt Turquoise Light [CR.ao.o] RGH.o WN.a.g.o.w.wp]; Cobalt Turquoise Pure [UT.o]; Emerald Green No.186; Daipyroxide Green 9320; Fragonard Turquoise Blue [PE.o]; Greek Green [MA.o(Ren)]; Jade Green; Light Green Oxide [MA.p]; Pigment Green 50; Turquoise [SCH.a]; Turquoise Green; Turquoise Light [DB.o] SE.o]; Shamrock Green; Sherwood Green;</p>		CAS 68186-85-6						
PG51	Victoria Green Garnet	<p>Chrome Garnet; C.I. Pigment Green 51; Emerald Green (hue); Garnet; Ouvarovite; Pigment Green 51; Uvarovite; Uwarowite; Uwarowite Garnet; Victoria Green [NP.p]; Victoria Green Garnet</p>	77300	<p>Victoria Green Garnet $3\text{CaO}\cdot\text{Cr}_2\text{O}_3\cdot 3\text{SiO}_2$ is produced by high temperature calcinating a mixture of calcium oxide, chromium oxide and silicon oxides in varied ratios to form a crystalline garnet matrix. It may include Al_2O_3, B_2O_3, CaF_2, CoO, PbO or ZrO_2 as modifiers. (Ref Color Index 4th edition); Calcium Chromium Silicate; Uwarowite, Uvarovite or Ouvarovite are the natural forms (google images Ref); (mindat.org Ref); CPMA 4-07-3 (4th ed. CMPA Classification and Chemical Description of the Complex Inorganic Color Pigments)); CAS 68553-01-5</p>	Green	4	I	25	A	-
PG55	Ultramarine Green	<p>C.I. Pigment Green 55; Pigment Green 55; Ultramarine Green; Ultramarine Green HPL</p>	77007	<p>Polysulfide of sodium, potassium, lithium or silver alumino-silicate</p>	Blue Green	4	I	-	A	
	Group^ Page^									
PG56	Nickel Green Olivine	<p>Nickel Green Olivine; Nickel Olivine Green; Nickel Silicate Green Olivine; Olivine, Nickel Green;</p>	777850	<p>Nickel Silicate Green Olivine CPMA 5-45-3 (4th ed. CMPA Classification and Chemical Description of the Complex Inorganic Color Pigments)); CAS 68515-84-4</p>	Green*	-	-	-	B** MSDS	<p>* The samples made from industrial wastes show a stronger and darker green (Reference: Use of industrial wastes in the formulation of olivine green pigments, 2010).;</p> <p>** Should use a dust mask when handling the dry pigment. Ingested there is only low toxicity, may have a cumulative effects in the case of long term exposure. See the MSDS.</p>



PAINT AND PIGMENT REFERENCE TABLE KEY: [Page Top^](#)

Jump to : [Supplier/Manufacturer Codes](#) | [Binder/Medium Codes](#)

Color Index Generic Name	CI Common or Historical Name	Common, Historic and Marketing Names	C.I. Constitution Number	Chemical Composition	Color Description † = Long Term Effects of Light	Opacity 1 = opaque 4 = trans.	Light Fastness I = excel. IV=Fugitive	Oil Absorption g/100g	 Toxicity & Hazard Info	Side Notes
		Supplier codes								
		Binder Codes								

Color Index Generic Name: [Key Top ^](#) [Page Top^](#)

This is the C.I. Generic Name (abbreviated) given by the ASTM and Colour Index International (CII) for that pigment. The first 2 or 3 letters describe the general pigment color and the number is the individual pigment identifier. N/A (not applicable) means that pigment has not been given a color index name or number.

Natural Dye and Solvent Pigments

These are naturally occurring organic pigments and dyes. With a few exceptions, most are plant or animal extracts or dyes that need to be fixed to a substrate to become pigments (i.e. Madder Lake). A few are organic natural earths such as Cassel earth (Van Dyke Brown). They are designated with C.I. Generic name of which consists of the usage class "Natural" and basic hue, followed by the CI serial number (i.e. Natural Brown 8). Natural pigment CI generic names are often abbreviated with the usage class N + the hue abbreviation + the serial number. (i.e. NBr 8)

NY = Natural Yellow;
 NO = Natural Orange;
 NR = Natural Red;
 NV = Natural Violet;
 NB = Natural Blue;
 NG = Natural Green;
 NBr = Natural Brown;
 NBK = Natural Black;
 NW = Natural White;

Pigment

Pigments can be organic or Inorganic. Most modern pigments are given this usage designation by the Color Index. They can be completely synthetic, naturally occurring minerals, or lakes based on the synthetic derivatives of natural dyes. Pigments are designated with C.I. Generic name which consists of the usage class "Pigment" and the basic hue followed by the CI serial number (i.e. Pigment Red 106, Cadmium Red). The pigment CI generic names are often abbreviated with the usage class P + the hue abbreviation + the serial number. (i.e. PR83 for Pigment Red 83)

PY = Pigment Yellow;
 PO = Pigment Orange;
 PR = Pigment Red;
 PV = Pigment Violet;
 PB = Pigment Blue;
 PG = Pigment Green;
 PBr = Pigment Brown;
 PBK = Pigment Black;
 PW = Pigment White;
 PM = Pigment Metal

The CI (Color Index) Common Pigment Name: [Key Top ^](#) [Page Top^](#)

In this database the common name is the name given in the Color Index (third edition, 1997) by the [Color Index International](#) published by the [Society of Dyers and Colourists](#) and the [American Association of Textile Chemists and Colorists](#), and are also used by the [ASTM International](#), American Society for Testing and Materials.

When the Colour Index (3rd edition) has not specified a name, I have used the name that the first manufacturer, inventor or original patent holder has given that pigment. In the case of ancient pigments, historic pigments, minerals or other odd pigments, I have used the most commonly used traditional historic, mineral or chemical name as determined by my research.

Common, Historic and Marketing Names: [Key Top ^](#) [Page Top^](#)

These are the various names that have been used for that pigment **whether or not it is the correct usage**. This is NOT an endorsement of any particular name, but merely a collection of names that are in common usage or *have been used in the past* according to historic pigment books & references, paint sales literature, and pigment manufacturers references. They have been collected (in order of importance) from

- 1.) Paint manufacturers, pigment manufacturers and/or other pigment supplier literature;
- 2.) Various web sites in particular [AMIEN.org](#), [Dick Blick Artist Supply](#), [Handprint.com](#), [Kremer Pigments](#), [Natural Pigments](#), [Kama Pigments](#), [Sinopia Pigments](#), [PCImag.com](#) and along with internet forums on art and painting, web sites of paint manufacturers, paint

suppliers, chemical manufactures and pigment manufacturers;

- 3.) The Color Index, Third edition (published by the Colour Index International, 1997);
- 4.) Historical books on pigments, oil painting, watercolor painting and other art forms ([see Free Art e-Books](#));
- 5.) Artist manuals and handbooks (see the bottom of the [Pigment Database's main page for a complete list of reference works](#));
- 6.) Various dictionaries and encyclopedias (both historic and contemporary).

(hue):

When a manufacturer has used a common historical name for a pigment that is *not* the accepted traditional historic pigment name and has not clearly indicated it to be a hue or substitute, I have indicated it with the "(hue)" in parenthesis. For example calling\naming a paint made with Phthalocyanine Blue as "Azure", "Smalt" or "Cobalt Blue".

*In order to stay within ASTM specification D 4302-05, manufactures are encouraged to use the word "hue" when the paint or pigment marketing name is not the real name of a paint or a pigment. Substitute and tone could be also considered acceptable means of indicating a hue substitute for the actual color. However, the ASTM specifications are usually voluntary and there is little means to enforce them. Also because of language differences, changes in the paint or pigments common identification because of contemporary usage (often perpetrated by manufacturer's incorrect color marketing names), and last but not least - the sheer multitude of historically used paint names for any given paint\npigment, it's nearly impossible to prove or say a manufacturer of art materials is being purposely deceptive.

C.I. Constitution Number or Colour Index Constitution Number (chemical composition): [Key Top ^](#)

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These are the chemical constitution numbers given that pigment by the [Color Index International](#) published by the [Society of Dyers and Colourists](#) and the [American Association of Textile Chemists and Colorists](#), and are also used by the [ASTM International](#), [American Society for Testing and Materials](#). Each of the numbers in the "Colour Index Constitution Number" has a specific chemical or compositional meaning; for more information [see the Colour Index Number Chart](#) or go to the [Color Index International](#) and [ASTM, American Society for Testing and Materials](#) web sites (these links open in a new window)..

Chemical Composition: [Key Top ^](#) [Page Top ^](#)

These are the basic chemical names, or mineral names along with chemical composition. I have also included CAS numbers, when I can find them. Sometimes multiple names are given because chemical names can be stated in different ways and can also give an indication of the manufacture method. Very often a pigment can be a group of related compounds rather than one specific chemical. I have not included detailed chemical descriptions or analyses, but only basic information that should help you to find further information. I have included references designated with "(Ref)" where further information can be attained.

Adulterants, extenders and other additives may be added to artistic paints to improve the paint rheology, transparency, and/or drying time. Often inert pigments, extenders and fillers are added to the color pigments in student grade paints or to modify paint pigments with overly strong tinting strength, i.e. the Phthalocyanine Blues and Greens. These extra ingredients are rarely listed of the label.

Color Description: [Key Top ^](#) [Page Top ^](#)

This is a general attempt to explain the hue in plain English. The perception of color is as individual as the the people viewing it and any such description can not be completely accurate, but merely give a general idea of the what color looks like to the average person. Many pigments have a range of shades and hues. This range in hues can be due to many things such as different manufacturing processes, exact chemical composition and crystal shape. In most cases, i have not used any of the attempted means of standardizing color descriptions for this (such as the [Munsell system](#)), but where the pigment is included in the [Color Index International Pigments and Solvent Dyes](#) (The Society of Dyers and Colourists, third edition 1997), I have used that description, when there is no color hue description in the Color Index, I have used other reference sources in particularly manufacturer or supplier literature.

† = Effects of long term light exposure are given when known, this may allow an artist to anticipate color changes and possibly use them as an advantage. These effects are all relative to the pigments inherent light fastness and *may take decades or even centuries in museum conditions to be visible*.

Fades = Becomes more Transparent

Lightens = Loses chroma but maintains relative transparency or opaque character;

Whitens = Becomes lighter towards white and more opaque;

Darkens = Becomes darker but retains hue;

Dulls = Loses chroma towards neutral but maintains the relative tone;

Blackens = Turns very dark or black losing chroma;

Hue shift = Changes hue towards a different color

Opacity - Transparency: [Key Top ^](#) [Page Top ^](#)

This designation is only a general reference to the most common encountered opacity or transparency inherit to the pigment. In paints, the transparency of a pigment can change due to what is used as the painting medium or binder (i.e., oil color, watercolor, encaustic, acrylic, etc.). There are many pigments that are opaque in watercolor but transparent or semi-transparent in oil paints. The transparency of a paint or pigment can often be manipulated by the manufacturing process for a particular purpose. The addition of inert pigments or other modifiers can also change the perceived transparency of a paint formulation or pigment.

When available, i have used the Color index's designation or manufacturers literature to arrive at this figure. When the Color Index

description is unavailable i have arrived at a general figure by manufacturer literature or personal experience. A general designation such as given will not always be the case in any particular formulation.

- 1 = Opaque,
- 2 = Semi-Opaque,
- 3 = Semi-Transparent,
- 4 = Transparent

Light Fastness Rating: [Key Top ^](#) [Page Top^](#)

The light fastness rating can only be a general guide, when available, i have used the ASTM rating or manufacturers literature to arrive at this figure. The ASTM has not rated all pigments, and I believe will no longer be rating pigments. For that reason the rating in this database will not always be the ASTM rating but a rating culled from other sources, most importantly manufactures literature. The ASTM ratings have a 5 increment scale and the blue-wool scale is 8, in this database lightfastness ratings have been condensed or averaged to a less specific 4 designations. Very often, pigments in tints are less light fast and this should be taken into account when determining if a pigment or paint will meet your needs. I can not cover every possible paint, binder, or pigment formulation in this chart as it would take too much time and space. In particular the quality of the actual pigment manufacture has much influence on a pigments fastness to light, heat and other chemicals. Additives, binder, and many other factors all have a influence on light fastness or fastness to other environmental influences. Whether a paint is watercolor, oil color, tempera, etc. has an effect on light fastness. Varnishes and other treatments to the painting surface or support can have an influence too. The only way to be sure, is to make your own tests on the paint or pigment you have. Reference the following: ([ASTM D4303 - 10, Standard Test Methods for Lightfastness of Colorants Used in Artists' Materials](#), or [ASTM D01.57, the Subcommittee on Artists' Materials doc here](#), opens new window); or this ([AMIEN.org Thread](#) - opens new window). Blue Wool Scale will be given when known, but be aware that these may be from tests on a single formulation, and may not be the same for all brands or binders.

- I = Excellent,
- II = Good,
- III = Poor (may last many years in museum conditions, but should be used with caution for permanent works of art)
- IV = Fugitive/Very Poor

BWS = Blue wool scale

- 7-8 = Excellent,
- 6 = Very Good,
- 4-5 = Fair (Impermanent),
- 2-3 Poor (fugitive),
- 1 = Very Poor (fugitive)*

*When known, blue wool scale ratings will be given for tints in the following format: Full;1/2 tint;1/4 tint (i.e. Cadmium Red would be 8;8;8 with excellent light fastness in all tints). Note: these may from tests on a single formulation or pigment brand, and may not be valid for other brands or binders.

Oil Absorption: is given in g/100g or grams of oil per 100 grams of pigment [Key Top ^](#) [Page Top^](#)
or as H, M, L (see below)

The oil absorption figure has been arrived at from the pigment manufacturer's literature or artist reference sources (see the bottom of the [Pigment Database's main page for a complete list of reference works](#)). The higher the oil absorption, generally, the longer it will take to dry when used in oil painting. The addition of driers, siccatives, retardants and other additives can effect the drying time of any specific formulation, or they can be added by the artist to speed up or slow down the drying of oil paints. In some literature the oil absorption rate is given as ml/100g, although not technically the same as g/100g, for the purposes of this database they are close enough.

Depending on the specifications i have available I may also use the following designations:

- H = High; - These pigments absorb a lot of oil.
- M = Medium; - Average drying or cure rate
- L = Low; - Usually very fast driers

Toxicity: [Key Top ^](#) [Page Top^](#)

Under this heading will be a general designation of a possible hazard. It is assumed intelligent people will use at least ordinary care when handling all paints or pigments. The designation has been arrived at from, in most cases, the manufacturer's literature, art books and art reference works (see the bottom of the [Pigment Database's main page for a complete list of reference works](#)), MSDS sheets, the EPA manual: [Environmental Health & Safety in the Arts: A Guide for K-12 Schools, Colleges and Artisans \(full PDF here\)](#), [The Art & Creative Materials Institute, Inc. \(ACMI\)](#), The [Health and the Arts Program](#) - Great Lakes Centers at the University of Illinois at Chicago School of Public Health (UIC SPH), [The American Institute for Conservation of Historic & Artistic Works](#) has a collection of articles on art safety, The Consumer Product Safety Commission's [Art and Craft Safety Guide \(PDF, 250 KB\)](#) and [Art Materials Business Guidance](#)

All paints and especially dry pigments can be hazardous if carelessly handled, but, if handled properly with common sense all but the most dangerous pigments can be used safely. Very few pigments used in the arts are edible, and even so called "Food Colors" are not meant to be used in large quantities and may have unknown side effects or allergic reactions.

WARNING: Always use a dust mask when working with any dry pigments. Work in a separate area of your studio away from children,

pets or other living things. Do not smoke, eat or drink around any art materials. Dispose of all waste materials in an environmentally safe way.

A = Low hazard, but do not handle carelessly;

B = Possible hazard if carelessly handled, ingested in large amounts or over long periods of time;

C = Hazardous, use appropriate precautions for handling toxic substances;

D = Extremely Toxic, only attempt working with these pigments (especially the dry form) in laboratory like conditions with proper safety equipment (see "[Prudent practices in the laboratory: handling and disposal of chemicals](#)" at [google books](#) opens new window); or the [PDF - Booklet Safe Handling of Colour Pigments](#) Copyright © 1995: BCMA, EPSOM, ETAD, VdMI - [link from VdMI](#)

The Side Notes Column: [Key Top ^](#) [Page Top ^](#)

These are typically interesting things I have read, or information collected on a pigment that may be worth further study. Please remember that they are *NOT* statements of absolute fact. Many pigment qualities are rumors, old wife's tales and misconceptions repeated over and over until they accepted as fact without any scientific proof. References (Ref) may be provided for further info.

Miscellaneous:

(hue) = When the word "hue" in in parenthesis (hue), it refers to a hue color not designated on the label, when the word "hue" is *not* in parenthesis *is* part of the pigment name as per ASTM guidelines.

(Ref) = A link to a reference source. This may be the reference source of the information that I have given, or just a link to more detailed information.

? = a question mark next to a name, note, or data code indicates that it may or may not be correct information due to conflicting information, questionable references, possible typo or other discrepancies in the manufacturer or other reference documentation. Further study is needed to clarify.

Paint or Pigment Manufacturer Code & Art Medium:***** [Key Top ^](#) [Page Top ^](#)

Paint/Pigment Manufacturer Code:

The manufacturer code is to indicate companies that make or supply paints or pigments using the particular pigment. Only those products that are single pigments will be indicated in this database. In a few cases, the Color Index International has listed a mixture of pigments or chemicals under a single color index pigment name or code, and these will also be designated as if they were a single pigment. The codes next to the pigments in above Color of Art Database may take you off sight where you can find more info or even purchase, if you so desire. These codes are not part of any standard, but were made up by me for this database, with purpose of making them as short as possible.

The links below next to the manufacturer code below are to the official manufacturer web site and will open in a new window.

AS = Art Spectrum	DG = Daniel Green (discontinued?)	LB = Lefranc & Bourgeois	MW = Martin/F. Weber Co.	SE = Sennelier. ENG
BR = Blueridge	EP = Earth Pigments	LA = Lascaux	NP = Natural Pigments	SI = Sinopia
BX = Blockx	GB = Gamblin	LQ = Liquitex	OH = Old Holland	SCH = Schmincke
CAS = C.A.S AlkydPro	GEN = Common Generic term	LK = Lukas EU Lukas US	PF = Pebeo Fragonard	SQ = Steven Quiller
CH = Charvin	GO = Golden	MA = Maimeri	RF = R&F Handmade Paint	TA = Tri-Art
CL = Classic. Triangle Coatings	GR = Grumbacher	MT = Matisse	RGH = RGH Artists' Oil Paints	UT = Utrecht
CR = Chroma	GU = Guerra Paint & Pigment	MG = M. Graham	ROSS = Bob Ross	VI = Vasari
DS = Daniel Smith	HO = Holbien	MH = Michael Harding	RT = Royal Talens	WL = Williamsburg
DR = Daler-Rowney	JO = Jo Sonja	MR = MIR. Jaurena Art.	SH = Shinhan KO Shinhan EN	WN = Windsor & Newton
DV = Da Vinci	KA = Kama Pigments		SV = Shiva	YK = Yarka / St.Petersburg
DB = Dick-Blick	KP = Kremer Pigmente (USA site)			

Paint medium or binder code: [Key Top ^](#) [Page Top ^](#)

Clicking on the paint or pigment manufacturer code next to the pigment name will take you off site where more information can be found. The link will most often take you to an art supplier where you can find more specific art medium or paint binder info, purchasing source, pigment properties, pigment history, MSDS sheets, and whether it is the artist premium or student economy grade. *If you find this site helpful you can help support this site by purchasing through these links.*

d in *italics* next to the pigment manufacturer or art supplier code indicates a discontinued pigment or paint.

All other art medium or binder codes in *italics* mean the pigment under that name is in the "student" or economy grade, not the "artist's" grade paint.

a = Acrylic Paint, heavy body;

ab = Acrylic Airbrush colors;

ad = Aqueous pigment dispersions;

af = Fluid Acrylics;
ag = Matte Acrylic or Acrylic Gouache;
ao = open acrylics or slow drying
k = Alkyd paints;
c = Casein or milk paint;
d = Discontinued
e = Encaustic paints;
g = Traditional water color Gouache;
i = Ink (printing ink or pigmented drawing inks);
o = Oil Paint;
p = Dry Pigment;
t = Artist Professional Tempera or Egg Tempera;
w = Watercolor Paint in tubes;
wp = Watercolor Pan; wp = 1/2 pan, wp(f) = full pan, wp(L) = large pan
wo = Water mixable oil paint or water soluble oil paint.

am = Acrylic medium, may have a wide variety of ingredients or uses

om = Oil painting Medium, may have a wide variety of ingredients or uses

wm = Watercolor Medium, may have a wide variety of ingredients or uses

GEN = Where there is a generally accepted common historic name associated with a pigment, I have used "GEN" to denote the generic or common historical name of a particular pigment.

Other than gouache, only single pigment paints and pigments are included. Gouache is designated distinct from watercolors because it is often mixed with white or additives to make it matte and/or opaque and that is not usually indicated on the paint manufactures literature. Other art material or medium forms such as pastel, oil pastels, oil bars, dyes and ceramic glazes will not be designated with a artists medium or binder code, but may still be listed under the pigment name with a company code.



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Artist Reference Resources:

Historical Artist and Pigment Reference Sources:

This is just a partial list, for a more complete listing of Historical Pigment References see the [Free Art Books Page](#).

1. [The Industrial and Artistic Technology of Paint and Varnish](#),
By Alvah Horton Sabin, Published by J. Wiley & Sons, 1904
2. [The Painters' Encyclopaedia](#),
By Franklin B. Gardner, Published by M.T. Richardson, 1887
3. [The Science of Painting](#),
By Jehan Georges Vibert, Published by P. Young, 1892
4. [A Treatise on Painting](#),
By Cennino Cennini, Giuseppe Tambroni, Mary Philadelphia Merrifield, Translated by Mary Philadelphia Merrifield, Published by Lumley, 1844
5. [A Treatise on Painting](#),
By Leonardo Da Vinci, John Francis Rigaud, Published by J.B. Nichols and Son 1835
6. [The Book of the Art of Cennino Cennini](#),
By Cennino Cennini, Cennini, Christiana Jane Powell Herringham, Translated by Christiana Jane Powell Herringham, Published by G. Allen & Unwin, Ltd., 1899
7. [The Chemistry of Paints and Painting](#),
By Arthur Herbert Church, Published by Seeley, 1901
8. [A Handbook for Painters and Art Students on the Character and Use of Colours](#),
By William J. Muckley, Published by Baillière, Tindall, and Cox, 1880
9. [The Household Cyclopaedia](#),
By Henry Hartshorne 1881
10. [The Chemistry of Pigments](#),
By Ernest John Parry, John Henry Coste, Published by Scott, Greenwood, 1902
11. [Facts about Processes, Pigments and Vehicles: A Manual for Art Student](#),
By Arthur Pillans Laurie, Published by Macmillan, 1895

12. [The Manufacture Of Earth Colours:](#)
By DR. JOSEF BERSCH, translated by CHARLES SALTER, SCOTT, GREENWOOD & SON , 1921 [Link](#)
13. [Materials for Permanent Painting,](#)
By Maximilian Toch 1911

Modern Pigment and Artist Reference Sources:

14. [The Artist's Handbook,](#)
by Pip Seymour, Arcturus Publishing (September 16, 2003)
15. [The Artist's Handbook, Revised Edition,](#)
Ray Smith; DK Publishing 2003
16. [The Artist's Handbook of Materials and Techniques,](#)
Third edition, by Ralph Mayer; Viking Press 1979
17. [Artists' Pigments: Volume 1: A Handbook of their History and Characteristics](#)
Edited by Robert L. Feller
18. [Artists' Pigments: Volume 2: A Handbook of their History and Characteristics](#)
Edited by Ashok Roy (Oct 2, 1993)
19. [Artists' Pigments: Volume 3: A Handbook of their History and Characteristics](#)
Edited by Elisabeth West Fitzhugh (Oct 1997)
20. [Artists' Pigments: Volume 4: A Handbook of their History and Characteristics](#)
Edited by Barbara Berrie (Jun 7, 2007)
21. [Collins Artist's Colour Manual,](#)
Simon Jennings; HarperCollins Publishers 2003
22. [Color Index International Pigments and Solvent Dyes,](#)
The Society of Dyers and colourists, third edition 1998
23. [A Dictionary of Art Terms and Techniques,](#)
Ralph Mayer, Harper and Row Publishers, New York, 1969
24. [The Materials and Techniques of Painting,](#)
by Jonathan Stephenson (May 1993)
25. [The Painter's Handbook,](#)
Mark David Gottsegen; Watson-Guption Publications 1993
26. [Painting Materials A Short Encyclopaedia,](#)
by Rutherford J. Gettens and George L. Stout; Dover Publications 1966
27. [Pigment Compendium,](#)
by Nicholas Eastaugh, Valentine Walsh, Tracey Chaplin, Ruth Siddall; Butterworth Heinemann 2004

Web Resources and Art Suppliers with Excellent Reference Materials:

28. [American Institute for Conservation of Historic and Artistic Works](#) (AIC):
National membership organization in the United States dedicated to the preservation of cultural material, establishes and upholds professional standards, promoting research and publications, educational opportunities, and fostering the exchange of knowledge among conservators, allied professionals, and the public.
29. [AMIEN:](#)
a resource for artists dedicated to providing the most comprehensive, up-to-date, accurate, and unbiased factual information about artists' materials
30. [Blick Art Materials:](#)
has done an extremely thorough job of indicating the pigments used in most of the paints they sell, making the Dick Blick art supply website much more than just a store to purchase paint and art supplies.
[Dick Blick also has the MSDS sheets](#)
for most of the products they sell, making the Blick site a valuable resource for toxicity info and the health and safety of artist materials.
31. [Coloria.net,](#)
a large and thorough site on pigments, in Finnish <http://www.coloria.net/index.htm>
32. [Conservation and Art Materials Encyclopedia Online](#) (CAMEO), [The Materials Database,](#)
developed at the Museum of Fine Arts, Boston (MFA), to be a more comprehensive and well-rounded encyclopedic resource for the art conservation and historic preservation fields. The MATERIALS database contains chemical, physical, visual, and analytical information on over 10,000 historic and contemporary materials used in the production and conservation of artistic, architectural, archaeological, and anthropological materials.
33. [Conservation OnLine](#) (CoOL):
A freely accessible platform to generate and disseminate vital resources for those working to preserve cultural heritage worldwide.
34. [The Handprint.com:](#)
site by Bruce MacEvoy has loads of excellent information on [watercolor pigments](#) and [Has a excellent color wheel](#) showing where the actual pigments are in color space. Truly an awesome site, the site is directed at watercolors, but is a good general reference for any paints or pigments.
35. [Webexhibits.org;](#)
Great pigment sight that even includes step by step instructions for making your own pigments.
36. [The Real Color Wheel;](#)
by Don Jusko is also a great color site.
37. [Studiomara:](#)
has a fantastic [pigment reference database](#) sorted by the marketing paint color name and brand.
38. [Health and Safety in the Arts;](#)
A Searchable Database of Health & Safety Information for Artists
39. [Household Products Database;](#)

- Health and safety information on household products from the US Department of Health and Human Services
40. [Natural Pigments:](#)
One of the best sources of rare natural and historical pigments and information.
 41. [Pigments and their Chemical and Artistic Properties:](#) by Julie C. Sparks, is part of [The Painted Word Site](#). Wonderful stuff.
 42. [Paintmaking.com:](#) By Tony Johansen, Great Paint making site with all types of useful pigment and binder information for the artist.
 43. [PCImag.com:](#) Paint & Coatings Industry
[2010 Additives Handbook](#) by Darlene Brezinski, Dr. Joseph V. Koleske, Robert Springate, June 4, 2010;
[A History of Pigment Use in Western Art Part 1:](#)
[A History of Pigment Use in Western Art Part 2:](#)
 44. [Dick Blick Artist Supply:](#)
Full Range of art supplies at discount prices and has pigment info on most paints they sell
 45. [Kremer Pigmente Europe / Kremer Pigments USA site:](#)
Has a huge amount of pigments and information.
 46. [Earth Pigments:](#)
Specializes in earth pigments.
 47. [Guerra Paint and Pigments:](#)
Many rare and out of production Pigments mostly in aqueous dispersions
 48. [Sinopia:](#)
Lots of Pigments & info

Health and Safety in the Arts References and Info:

49. [Art and Craft Safety Guide \(PDF, 250 KB\)](#)
Consumer Product Safety Commission
50. [Art Materials Business Guidance](#)
Consumer Product Safety Commission
51. [Art Safety](#)
Environmental Protection, Health & Safety, California State University at Monterey Bay
52. [Artist Safety](#)
Center for Research on Occupational and Environmental Toxicology, Oregon Health & Science University
53. [Environmental Health & Safety in the Arts: A Guide for K-12 Schools, Colleges and Artisans](#)
U. S. Environment Protection Agency
54. [Exposing Ourselves to Art \(PDF, 6.83 MB\)](#)
Scott Fields. Environmental Health Perspectives Volume 105, Number 3, March 1997
55. [Health & Safety Bibliographic Resources and Resource Guides in Art Conservation](#)
CoOL – Conservation Online, Stanford University Libraries
56. [Health and Safety Guides and Publications](#)
American Institute for Conservation of Historic and Artistic Work
57. [Art Safety](#)
Office of Environmental Health and Safety, Connecticut College
58. [Health and the Arts Program](#)
The Occupational Health Service Institute, University of Illinois at Chicago
59. [Online Health and Safety in the Arts Library](#)
The Occupational Health Service Institute, University of Illinois at Chicago
60. [Arts, Entertainment and Recreation](#)
New York Committee for Occupational Safety and Health
61. [Studio Safety](#)
Gamblin Artists Colors

*other ASTM specifications used the the labeling of artists materials are:

[D4236-94\(2011\) Standard Practice for Labeling Art Materials for Chronic Health Hazards](#)

[D4302-05\(2010\) Standard Specification for Artists' Oil, Resin-Oil, and Alkyd Paints](#)

[D4303-10 Standard Test Methods for Lightfastness of Colorants Used in Artists' Materials](#)

[D4838-88\(2010\) Standard Test Method for Determining the Relative Tinting Strength of Chromatic Paints](#)

[D4941-06\(2010\) Standard Practice for Preparing Drawdowns of Artists' Paste Paints](#)

[D5067-05\(2010\) Standard Specification for Artists' Watercolor Paints](#)

[D5098-05a\(2010\) Standard Specification for Artists' Acrylic Dispersion Paints](#)

[D5383-02\(2010\) Standard Practice for Visual Determination of the Lightfastness of Art Materials by Art Technologists](#)

[D5398-97\(2010\) Standard Practice for Visual Evaluation of the Lightfastness of Art Materials by the User](#)

[D5517-07 Standard Test Method for Determining Extractability of Metals from Art Materials](#)

See also [WK41263](#) proposed revision

[D5724-06\(2010\) Standard Specification for Gouache Paints](#)

[D6801-07 Standard Test Method for Measuring Maximum Spontaneous Heating Temperature of Art and Other Materials](#)

[D6901-06 Standard Specification for Artists' Colored Pencils](#)

See also [WK27266](#) proposed revision

[D7354-11 Standard Guide for Artists' Paint Waste Disposal in Private, Non-Commercial Settings](#)

[D7355-10 Standard Guide for Artists' Paint Waste Disposal in Smaller Commercial or Educational Settings](#)

[D7733-12 Standard Specification for Acrylic Dispersion Ground](#)

WK28388 New Specification for Traditional Artists Watercolor Paints

WK37409 New Test Method for Measuring Aspiration Potential of Aerosol Products

WK37916 New Specification for Standard Specification for Artists Pastels

I hope you you have found the Pigment Database useful info for oil painting and watercolor painting, acrylic painting or indeed any painting medium; I have tried to make this a good resource for the fine arts, that has the important information on toxicity of paint and art materials including the hazards of some craft materials used by decorators, interior designers, illustration and graphic designer;

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This page of the Color of Art Pigment Database was designed for C.I. Pigment Green.

CI Pigment Green is indicated with the pigment code "Pigment Green" followed by the color index international's pigment identification code number or pigment ID number. The full color index name or generic pigment name is usually shortened to the Color Index code which for pigment green is "PG" plus the color index # (after the "PG 18" pigment green code designation there is the Color index identifying number code for the specific pigment, i.e. "PG 23" or "PG 7"). All artist paints and pigments that are [ASTM International](#) (American Society for Testing and Materials) and [ASTM D4236 - 94*](#) compliant that are sold in the United States must have the pigment identification number or generic chemical names of the green pigments that were used to make the green paints or dry pigments (either powdered pigments or in the commonly found "pigment dispersions") and should be have the generic pigment name printed on the paint label. The "green oil paint" tube or "green oil color" paint label, along with the label on tubes of acrylic paints, and on the label on tubes of watercolor even when found as pans, half-pans or dry cakes and often sold as a complete color palette or "watercolor set", will have the pigment or pigments index name on the label, or printed directly on the paint tube.

This color database is a also a great pigment reference made for DIY artist's and artisans that make their own paints with raw pigments and grind or mull the pigments into homemade paints giving them complete control over the paints grind, texture, and color. Making your own paints (paint making) by mulling the pigment in with a binding medium can be a rewarding and fun creative experience. The artist is involved in the process of creation, from the beginning with only the raw dry pigments and proceeding on to grinding pigments with a binding media (usually shortened to "binder"). For making oil paints, linseed oil is the most common binder (or medium). Walnut oil is also common oil used in making oil colors in the art studio and is less yellowing than linseed oil, There are other less common drying oils and some new alkyd resins the are sometimes used in making oil colors in the studio. Making (or grinding) watercolor paint is also fun and easy. The most common formula for making homemade watercolors is mostly water with some dissolved gum arabic (the glue that holds the paint together when dry). Honey and glycerin are common additives used in varying proportions to adjust the drying time and re-wetability of the dried watercolor. See the Art is Creation [Recipe page](#) for more info and paint making or grinding medium recipes. Egg-oil tempera and other media can be made in the art studio by DIY artists and it is creative and fun to make your very own paints. It is a very rewarded creative experience to grinding (mulling) your own paints and then finally making a painting or work of art, all entirely created by the artist themselves from start to finish.

The Art is Creation, Color of Art Pigment Database Reference has the resources and info on pigments used for artist paint, student paints, Oil color including:

- Oil Paints
- Watercolors
- Acrylic Paint
- Pigments used in making paint
- Dry Pigments and Powders
- Aqueous Pigment Dispersions
- Fluid Acrylics
- Airbrush Paint
- Acrylic Gouache
- Matte Acrylic Paints
- Acrylic Vinyl
- Acyclic paint or Alkyd Oils
- Casein or Milk Paint
- Encaustic painting
- Gouache

- Printing Inks or Pigmented Drawing inks
- Oil sticks or Oil Bars
- Oil Base Pigment Stick
- Tempera or Egg Tempera
- Watercolor Sticks
- Watercolor Pigment Sticks or Bars
- Water mixable oil paint or water soluble oil paint