

The Alchemy of Oils

The History, Composition and Working Properties of Oil Paint

ROYAL  TALENS
NORTH AMERICA

The Alchemy of Oil Painting – A transformation of matter.

Alchemy is defined as the medieval forerunner of chemistry, based on the supposed transformation of matter. It is in this, the idea of transformation, that oil painting most reflects this ancient pursuit. Also, the perception of oil painting as an intricate chemistry fit only for the advanced artist, has created a sense of mystery akin to that which surrounds alchemy.

It is true that in many ways, the practice of oil painting requires some basic understandings of the materials involved, but it is by no means out of reach to anyone willing to put in the time required to learn its secrets.

As for the mystery and magic, we don't know about turning lead into gold, but we certainly believe in the transformative powers of art both in its creation and interpretation.



Royal Talens



The history of Royal Talens goes back to 1899. In that year Marten Talens founded the "Dutch Factory for Paints, Lacquers and Inks" in the Dutch city of Apeldoorn. As a family business it concerned itself initially with the production of office supplies and inks.

Queen Wilhelmina was a great Talens fan. She used it on a daily basis. In addition to being queen, Wilhelmina was an artist who had passion for her hobby. In 1949 she made Talens Royal by honoring the company with this Royal designation, for producing and developing some of the world's best paint and artists' materials including well-known brands Rembrandt and Van Gogh, but also new innovations such as Cobra.

In 2015 Royal Talens North America was founded. Based in Northampton, Massachusetts, a small college town brimming with creative energy was the perfect location to open our North American Affiliate.



Contents

- In the Beginning
- Pigments
- What is a Binder
- Working Properties
- Auxiliaries
- Grounds
- Determining Quality
- Reading the Tube
- Features > Benefits
- Color Chart
- Resources



History

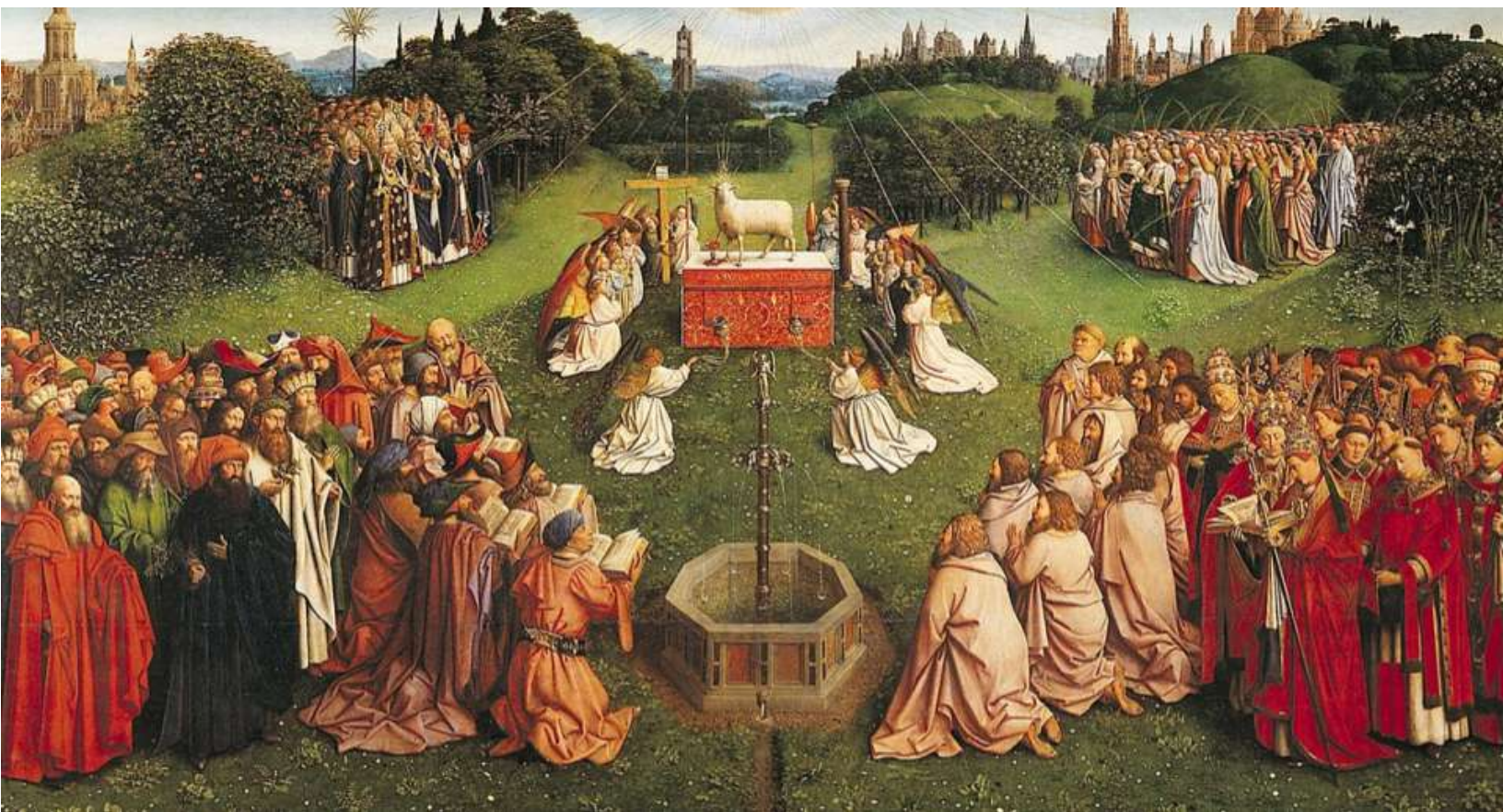
The Oldest known oil paintings were discovered in the Bamiyan region of Afghanistan in a series of caves in 2001. They were Buddhist murals using paints made with a combination of walnut & poppy-seed oil dating from 7th century AD.



Oils became popular in 15th century Europe and played a significant role in the Renaissance. Oils replaced tempera and fresco as the primary medium due to its tonal range, intense color and working drying time. Their popularity was also related to an interest in creating naturalistic detail. (below: *The Ghent Altarpiece, Central Panel, Jan and Hubert van Eyck, 1432. Bavo's Cathedral, Ghent, Belgium.*)



Paint Tubes were invented in 1841 by John Rand, an American artist. Many credit the invention with contributing to Impressionism and Plein Air painting.



What is a pigment?



A pigment, simply put, is a material that reflects light. Pigments selectively reflect and absorb certain wavelengths of visible light giving them a specific perceived color.

There are three categories of pigments based on origin. **Organic, Inorganic and Synthetic** (think animal, mineral, chemical.)

Organic pigments are carbon based, from plants or animals. Inorganic pigments are ground up minerals. Synthetic pigments begin as being either organic or inorganic and are then chemically altered by adding ingredients or heating.

Today pigments are standardized by ISO (International Organization for Standardization) with the use of the Color Index

(pictured right from top to bottom: cochineal beetle, lapis lazuli, oxidized lead coils)



What is a Binder?



In general, binders are liquid substances that harden through a chemical or physical process and bind the particles (in this case pigments). In oils, the most commonly used binder is linseed oil.

The primary functions of a binder are to suspend and adhere. **Suspension** being the term used when a non-dissolvable coloring agent is suspended within a binder. **Adhesion** referring to the ability of the binder to adhere to the ground or surface to which it is applied.

The primary working properties of a material are determined by the binder.



The Drying Oils

A drying oil is one that hardens (or dries) to a hard strong and durable film. The oil hardens through a chemical reaction referred to as oxidation. A drying process defined by the absorption of oxygen vs the evaporation of a solvent. Drying oils commonly found in the manufacture of oil paints include:



Linseed oil is pressed from the seeds of the flax plant. It dries relatively fast (in comparison to other drying oils), and forms a very strong and enduring paint film, but it can yellow over time.



Walnut oil is also a fast-drying oil, and it is non-yellowing. It has good endurance and can be used in place of a solvent for mixing and cleaning brushes. It can rot over time and should be refrigerated.



Safflower oil is a non-yellowing oil and is often used in the manufacture of whites. It has a longer drying time and is less durable than linseed or walnut oil.



Poppy-seed oil has the benefit of non-yellowing and is used in whites and varnishes. It does dry much slower than linseed and creates a less durable paint film.



Working Properties of Oils

Drying

Oil paints dry through a process known as oxidation. A slow chemical process that can take days to months to complete. It's recommended to wait six months before varnishing an oil painting.



Pigmentation

Linseed oil, the binder for oil paint, is very absorbent and can hold more pigment than many other paint binders. Depending upon the pigment, some oil paints can hold more than 50% pigment loads.

Paint Film

When dry, the paint film created by linseed oil can be very strong, but as it ages, it can become brittle and requires a stable and sturdy support.

Mass Shift

The process of oxidation does not affect the surface mass of the paint film. This means any mark you make with the paint will remain after it is dry. Mediums are needed to create a more fluid self-leveling surface.

Color Shift

Linseed oil does not change color during the process of oxidation. It can yellow over long periods of time or if left out of the light.

Mixed-Media

Oils can be used over dry media like charcoal, or oil-based materials like paint sticks and oil pastels. They can also be mixed with wax. They cannot be mixed with any water based or water-soluble materials. Oils can be painted over dry acrylics.

Solvents

Solvents like turpentine and white spirits are needed to act as a medium to thin the paint and to clean up after. These are known carcinogens and require special handling and disposal.



Auxiliaries

Auxiliaries are used to **adapt the consistency, transparency, drying time and finish** of your painting. You can mix them directly with the paint on your palette or dip your brush into them as you go. Moderation is key to success!

They include:

- Oils
- Alkyds
- Wax
- Driers
- Solvents



Auxiliaries: Oils

Bleached Linseed Oil can be used to make your own paint and painting mediums. Adding it to your paint will increase the gloss and the drying time of the paint film. It exhibits less yellowing than Purified linseed oil. It can be thinned with white spirit or turpentine.

Purified Linseed Oil can be used to create your own paint and painting mediums. It increases the gloss and the drying time of the paint film. It can be thinned with white spirit or turpentine. May yellow over time.



Boiled Linseed Oil can be used to create your own painting mediums. It also increases the gloss and reduces the drying time of the paint film. It is fatter than Bleached Linseed oil and should not be used in the lower layers of the painting. It can be thinned with white spirit or turpentine. It is darker in color than the other linseed oils, and this can affect lighter pigments like whites.

Stand Oil is used by artists to create their own glazing mediums and as an ingredient for some paint formulas. It significantly increases the gloss and the drying time. It is slightly yellowing (between poppy seed and linseed oil) and can be thinned with white spirit or turpentine. It is a traditional glazing medium that makes the paint fatter and should be used in the final stages of the painting.

Cold Pressed Linseed Oil is the purest grade of natural oil and is paler in color and less yellowing than hot pressed or solvent extracted oils. It also makes a stronger film. It dries slightly more quickly than refined linseed oil and increases gloss and transparency. It reduces consistency and brushstrokes (leveling effect on the paint) and is often used in grinding pigments.



Auxiliaries: Alkyds, Waxes & Driers

Alkyd Mediums are popular because they decrease the drying time of oil colors. Thin layers of oil colors mixed with alkyd resin painting medium will dry in 24 hours and make very tough, yet flexible paint film. Alkyd-based painting mediums can also add gloss and transparency to the paint. They are good for layering and can be used for very intricate glazing applications.

Wax and wax mediums can be used to make oil colors thicker and more matte. They are non-yellowing and can strengthen paint against shrinkage and cracking. Recommended use is 1:3 wax medium with oil color for brush painting and 1:1 wax medium with oil color for palette knife techniques.



Driers reduce drying times by attracting oxygen more quickly to the paint film. Traditional driers include Cobalt, a thick purple fluid made by cooking cobalt salts in linseed oil. It should be used sparingly (no more than 5%) and may alter colors slightly. In the nineteenth century, Japan Driers often were made with lead and manganese in a base of linseed oil, turpentine and natural resin. Today, most Japan driers consist of manganese in a base of linseed oil and mineral spirits.

Solvents

Turpentine and mineral spirits are often called "solvents". You can't paint with them directly because they will not form the necessary film. A solvent is a liquid, solid, or gas that dissolves another solid, liquid, or gas. So, the terms "solvent" and "oil" derive their meaning from how they are used. In other words, an oil can be a thinner/solvent.

Gum Spirits of Turpentine is an organic solvent used for thinning oil-based paints, and for producing varnishes. It is the only solvent in oil painting that can be used with Damar, a resin common in some glazes and varnishes. Its vapor can irritate the skin and eyes, damage the lungs and respiratory system, as well as the central nervous system when inhaled, and can cause renal failure when ingested, among other things. Being combustible, it also poses a fire hazard.

White Spirits are used for thinning oil color and cleaning brushes and other artists materials. It is a very pure solvent which evaporates completely from the paint film. It is used to make oil paint leaner (used in lower layers) and is suitable for removing (dry) varnish coats or for dissolving synthetic resins. It is often used for thinning mediums and varnishes for oil paints.

Odorless Mineral Spirits can be substituted for turpentine in all painting functions which do not include dammar. It is a good alternative for thinning your paint and general clean-up. It also requires adequate ventilation. Odorless mineral spirits are petrochemicals, with the toxic odor fractions removed, making them less toxic than turpentine or white spirits. They are slower evaporating than turpentine, so less vapor is released while painting. This factor may be more important than the lower toxicity itself.



Grounds

The ground is the layer that physically separates the oil paints from the support. In oil painting, the quality of the ground preparation goes a long way in determining the eventual durability of the artwork.

Preparing your ground properly will...

- Protects the support from the oil. Oils can rot canvas and wood over time
- Provides a porous surface that the oil can adhere to
- Provides a surface that allows the paint to dry correctly

Many surfaces can be used as a support for oil painting including paper, wood, cotton, and linen, but none without prior treatment.

What is Sizing?

In accordance with the traditional method of preparation, the support is first treated or “sized”. Historically this was achieved by applying an animal or collagen glue. Modern equivalents include PVA (or poly vinyl acetate) or an acrylic binder. This “sizing” as it is referred to protects the ground from the absorption of oil and in the case of canvas, provides good tension as well.

What is Gesso?

Gesso is the term commonly used for the next layer after sizing. The word gesso is Italian for plaster and some of the earliest recorded formulas are from the studios of Italian artists, including that of Cennino Cennini who authored *Il libro dell'arte* around the turn of the 15th century. Many traditional formulae are still available, including types of animal glues mixed with chalk and white pigment, or oil paint itself extended with chalk and pigment. The modern replacement for these historic methods is acrylic gesso. Acrylic gessesos also contain a mixture of chalk and white pigment, but in place of oil or animal glues, an acrylic resin is used.



Determining Quality

What do the terms “student grade” and “artists grade” mean to you?

Artist grade paints can have as much as 50% more **pigment** than a student grade paint.

During the manufacture of the paint, an artist grade paint will be **milled** 3-5 more times than a student grade paint, creating a finer pigment that is more thoroughly dispersed in the binder.

Artist grade paints will have **lightfast** ratings of excellent or good, while students grade colors can include fair or poor lightfast coloring agents.

Artist grade paints will include **exclusive** colors like cadmiums and cobalt.

Artist grade paints will have a broader **color range** to choose from. Rembrandt offers 120 colors.

Artist grade paints will have several **series**, reflecting the exclusivity of the pigments. Whereas student grade paints will only have one or two series.



Reading the Tube

- Brand
- Color Name
- Color Number
- Opacity
- Lightfastness
- Color Index
- Approved product Seal (ACMI = The Art and Creative Materials Institute)
- Other symbols can include CA Prop 65 for cadmiums and cobalt

opacity

- = transparent (25 colours)
- ▨ = semi-transparent (20 colours)
- ▦ = semi-opaque (35 colours)
- = opaque (40 colours)

degree of lightfastness

- +++ = at least 100 years lightfast under museum conditions) (all 120 colours)
 - ++ = 25 - 100 years lightfast under museum conditions
 - +
 - 0
- = 0 - 10 years lightfast under museum conditions



REMBRANDT OIL



40ml – 120 colors – 5 price series

150ml – 30 colors – 5 price series

6 Sets

Features



Benefits

Superior pigment to binder ratio



Excellent tinting strength for better color mixing

Extra fine grind on triple roll mill



Full pigment dispersion for more brilliant and true color

Highest light fastness ratings



Excellent degree of light fastness for true archival quality (+++ = up to 100 years)

Opaque and transparent colors



Complete palette for a variety of techniques and color combinations with 32 mono-pigmented colors

Exclusive colors



Includes 10 art material exclusive pigments such as cobalt and cadmium

Formulated for consistency and ease of use



The direct painters paint with a uniform degree of gloss and thickness, no additional mediums needed to adjust color or finish

4 of the 6 whites use safflower oil as the binder



While linseed oil produces a strong film, it yellows over time. Safflower oil is non yellowing and excellent for the final layers of your painting

Permanent Madders



Original madders were only moderately lightfast, by using a combination of modern pigments replacing the traditional lacquered pigments; this color has become very lightfast

Transparent Iron Oxides



The Rembrandt line includes a broad range of transparent earth tones for traditional glazing techniques

colour chart Rembrandt oil colour

Zinc wh.(saffl.oil)	Zinc wh.(lins.oil)	Titanium wh.(saffl.oil)	Tit.white (lins.oil)	Mixed wh.(saffl.oil)	Transp.wh.(saffl.oil)	Cadm. yellow lemon	Perm.lemon yellow	Cadmium yellow L
+++ 104 ■ 1 ▯ PW4 Perm.yellow L	+++ 117 ■ 1 ▯ PV4 Cadmium yellow M	+++ 105 ■ 1 ▯ PW6/PW4 Perm.yellow M	+++ 118 ■ 1 ▯ PW6/PW4 Cadm.yellow D	+++ 103 ■ 1 ▯ PW6/PW4 Perm.yellow D	+++ 119 □ 1 PW6/PW4 Transp.yellow M	+++ 207 ■ 4 PY35 Stil de grain yellow	+++ 254 ■ 3 ▯ PY184 Aureoline	+++ 208 ■ 4 PY35 Transp. yellow green
+++ 283 ■ 3 PY154 Naples yellow green	+++ 271 ■ 4 PY35 Nick.titan.yellow L	+++ 284 ■ 3 ▯ PY154/PO43 Naples yellow L	+++ 210 ■ 4 PY35/PO20 Nick.titan.yellow D	+++ 285 ■ 3 PY154/PO43 Naples yellow D	+++ 272 □ 3 PY128 Yellow ochre L	+++ 251 □ 3 PY110 Naples yellow red	+++ 242 ■ 4 PY150 Cadmium orange	+++ 281 □ 3 PY129 Perm. orange
+++ 282 ■ 2 PW6/PY42/PG17 Vermilion	+++ 279 ■ 2 PW6/PY184 Cadmium red L	+++ 222 ■ 2 PW6/PY154/PB/24 Permanent red L	+++ 280 ■ 2 PW6/PY154/PB/24 Cadmium red M	+++ 223 ■ 2 PW6/PY154/PB/24 Transp.red M	+++ 228 ■ 1 PB/24 Permanent red M	+++ 224 ■ 2 PW6/PO43/PB/24 Scarlet	+++ 211 ■ 4 PO20/PY35 Cadmium red D	+++ 266 ■ 3 PO73/PY154 Permanent red D
+++ 311 ■ 3 ▯ PO73 Cadm.red purple	+++ 303 ■ 4 PR108/PO20 Perm.red purple	+++ 370 ■ 3 ▯ PR255/PO73 Perm.madder L	+++ 314 ■ 4 PR108 Perm.madder M	+++ 317 □ 3 PR207 Perm.madder D	+++ 377 ■ 3 ▯ PR255 Burnt carmine	+++ 334 ■ 3 PR149 Carmine	+++ 306 ■ 4 PR108 Quinacridone rose	+++ 371 ■ 3 PR254 Perm. red violet
+++ 309 ■ 4 PR108 Perm.violet M	+++ 348 ■ 3 PR264/PW6 Cobalt violet	+++ 321 ■ 3 PR254/PR264/PV19 Perm. blue violet	+++ 395 ■ 3 PR264/PV19 Ultramarine violet	+++ 342 ■ 3 ▯ PR264 Ultramarine L	+++ 323 ■ 3 PR264/PB29 Ultramarine D	+++ 318 ■ 3 PR176 Cobalt blue L	+++ 366 □ 3 PV19 Cobalt blue (ultram.)	+++ 567 ■ 3 PR202 Cobalt blue D
+++ 537 ■ 3 PV19 King's blue	+++ 539 ■ 5 PV14 Sèvres blue	+++ 568 ■ 3 ▯ PV16 Cerulean blue	+++ 507 □ 2 PV15 Mang. blue phthalo	+++ 505 □ 2 PB29 Phthalo blue red	+++ 506 □ 2 ▯ PB29 Phthalo blue green	+++ 513 ■ 5 PB28 Prussian blue	+++ 512 ■ 2 PB29/PB15 Indanthrene blue	+++ 515 ■ 5 PB74 Indigo
+++ 517 ■ 3 PB28/PW6 Ultramarine green	+++ 530 ■ 3 PB15/PW6 Cobalt turq.blue	+++ 534 ■ 5 PB35 Turquoise blue	+++ 582 ■ 3 PB15 Phthalo turq.blue	+++ 583 □ 3 PB15 Perm.yellow green	+++ 576 □ 3 ▯ PB15 Permanent green L	+++ 508 □ 2 ▯ PB27 Permanent green M	+++ 585 ■ 3 PB60 Emerald green	+++ 533 ■ 2 PB15/PB29/PBk9 Permanent green D
+++ 683 □ 3 PB29/PY129 Phthalo green yellow	+++ 586 ■ 5 PB36 Phthalo green blue	+++ 522 ■ 3 ▯ PB15/PG7/PW6 Viridian	+++ 565 □ 3 PB15/PG7 Sèvres green	+++ 633 ■ 3 PG7/PY154 Cobalt green	+++ 618 ■ 3 PG7/PY154 Cobalt turq.green	+++ 614 ■ 3 ▯ PG7/PY154 Cinnabar green D	+++ 615 ■ 2 PG36/PY154/PW6 Sap green	+++ 619 ■ 3 PG7/PY154 Cinnabar green M
+++ 681 □ 3 PG36 Cinnabar green L	+++ 680 □ 3 ▯ PG7 Olive green	+++ 616 ■ 3 ▯ PG18 Green earth	+++ 650 ■ 3 PG7/PW6 Chromium ox.green	+++ 610 ■ 5 PG26 Yellow ochre	+++ 682 ■ 5 PG50 Raw sienna	+++ 627 ■ 2 PG7/PY42/PR101 Gold ochre	+++ 623 □ 2 ▯ PG7/PY110 Orange ochre	+++ 625 ■ 2 PG7/PY154/PY42 Light oxide red
+++ 626 ■ 2 PG7/PY154/PY42 Venetian red	+++ 620 □ 2 ▯ PG7/PY110/PR264 Indian red	+++ 629 ■ 1 ▯ PY42/PB15 Caput mortuum violet	+++ 668 ■ 3 PG17 Brown ochre	+++ 227 ■ 1 ▯ PY42 Vandyke brown	+++ 234 ■ 1 ▯ PY42/PR101 Sepia	+++ 231 ■ 1 PY42 Transp.ox.yellow	+++ 232 ■ 1 PY42 Asphaltum	+++ 339 ■ 1 PR101 Transp.ox. orange
+++ 349 ■ 1 ▯ PR101 Burnt sienna	+++ 347 ■ 1 PR101 Perm.madder brown	+++ 344 ■ 1 PR101/PB29/PR264 Transp. oxide red	+++ 430 ■ 1 PR101/PBk11 Stil de grain brown	+++ 403 ■ 1 ▯ PR101/PBk11 Transp. ox.brown	+++ 416 ■ 1 PY42/PR101/PBk11 Burnt umber	+++ 265 □ 3 PY42 Raw umber	+++ 414 □ 1 PY110/PR264/PG7 Greenish umber	+++ 273 □ 3 PY42/PR101 Warm grey
+++ 411 ■ 1 ▯ PR101 Cold grey	+++ 324 ■ 3 PR264/PR101/PV19 Payne's grey	+++ 378 □ 3 PR101 Ivory black	+++ 418 □ 3 PY110/PR264/PG7 Lamp black	+++ 426 □ 3 PR101 Oxide black	+++ 409 ■ 1 ▯ PR101/PBk11 Silver	+++ 408 ■ 1 ▯ PY42/PR101/PBk11 Pewter	+++ 410 ■ 1 PY42/PBk11 Light gold	+++ 718 ■ 1 PBk9/PR101/PW6 Deep gold
+++ 717 ■ 1 PBk9/PW6 Bronze	+++ 708 ■ 1 PBk11/PB29/PV19 Copper	+++ 701 ■ 1 ▯ PBk9/PB29/PV19 Pearl white	+++ 702 ■ 1 PBk7	+++ 735 ■ 1 PBk11	+++ 800 ■ 3 PW6,15,20/PBk11	+++ 815 ■ 3 PW6,15,20/PR101/PBk11	+++ 802 ■ 3 PW6,20/PR101	+++ 803 ■ 3 PW6,20/PR101
+++ 811 ■ 3 PW20/PR101	+++ 805 ■ 3 PW20/PR101	+++ 817 □ 3 PW6,15,20						

Explanations of the signs
from left to right
Example:



Letter behind the colour name:
L = light, M = medium, D = deep

degree of lightfastness

+++ = at least 100 years lightfast under museum conditions (all 120 colours)
++ = 25 - 100 years lightfast under museum conditions
+ = 10 - 25 years lightfast under museum conditions
° = 0 - 10 years lightfast under museum conditions

The lightfastness of all these colours has been tested in accordance with ASTM Standards D4303.

opacity

□ = transparent (25 colours)
▯ = semi-transparent (20 colours)
■ = semi-opaque (35 colours)
■ = opaque (40 colours)

377 = colour number

3 = price series

▯ = also available in tube of 150 ml

PR255 = pigments used

Resources

Royal Talens

<https://www.royaltalens.com/en-gb/>

Royal Talens North America

<https://www.royaltalensnorthamerica.com>

Oil Painters of America

<http://oilpaintersofamerica.com/>

Paint Mediums and Additives

https://www.artcons.udel.edu/mitra/Documents/MITRA_Mediums_and_Additives.pdf

Pigment Color Index

http://www.artiscreation.com/Color_index_names.html

ACMI

<https://acmiart.org/>

ASTM

<https://www.astm.org/>