WINSOR & NEWTON®

The World's Finest Artists' Materials

The Colour Specialist

The Oil Colour Book

A comprehensive resource for painters

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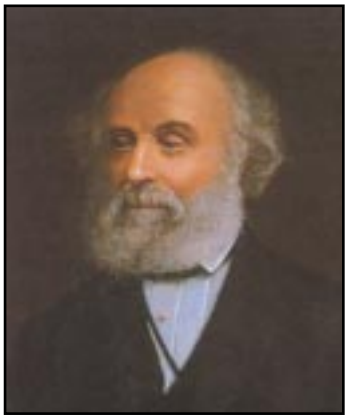
We Know Colour

William Winsor



Henry Newton

Winsor & Newton
The Colour Specialist

Since 1832, it has been our business to manufacture the finest colour that money can buy.

Early in the nineteenth century,
the reliability of artists' colours was inconsistent and questionable. Until Winsor & Newton.
The company was founded in a small shop at
38 Rathbone Place in London. Henry Newton was a dedicated painter, while William Winsor brought exceptional scientific knowledge to the partnership, knowledge that had been missing from the artists' colourmen trade.
To this day, that dedication to the marriage of superior chemistry with artistic experience remains a hallmark for Winsor & Newton.

Today, Winsor & Newton has more expertise with artists' materials than any other manufacturer in the world. Many of our employees are hired for their experience as artists as well as for their superior technical expertise. That modest partnership launched almost two centuries ago became the foundation for the world's most recognized name in artists' materials.

Winsor & Newton launched their enterprise in 1832 at 38 Rathbone Place, London.

The Winsor & Newton factory in 1909

Main entrance to the Winsor & Newton factory, Wealdstone, England, Present day.

Making any artists' colour requires astonishing skill. You don't simply add pigment to linseed oil and mix up a batch. Making truly fine colour requires extensive understanding of the different pigments, the drying oils and how the almost infinite number of variables affect the final product. Every pigment absorbs oil differently, requiring careful and individual milling processes to provide the artist with colour that offers optimal tinting strength, that remains in stable suspension in the tube, and that forms the most permanent paint film possible.

There's no substitute for the years, the decades, and the generations that are needed to understand colour. Winsor & Newton holds the collective experience and expertise to formulate each and every colour in exactly the

way it will best serve artists. There are qualities – such as brilliance of colour, or ease and consistency of application — that make a dramatic difference to the artists' success. And we know, through almost two centuries of experience, that our products do exactly that.

Oil colour milled on a traditional, triple-roll mill at the Winsor & Newton factory.

But making a great product isn't enough. In this rapidly changing culture, we also know that great information and world-class technical support are just as important as the quality of our colour. That's what this book is for: to provide you with direct, accessible information about how to make best use of the colour, ensuring that your carefully created image is held within a paint film that, under the right conditions, can last for many generations. We know that the quality of our materials will show up in the quality of your finished art.

THE BASICS OF OIL COLOUR

WHAT IS OIL COLOUR?

History. Oil colours have been used in various forms since the fourteenth century. Before then, pigment ground into an emulsion with egg was the medium of choice in most artists' studios. Oil colour, however, quickly surpassed egg tempera in popularity because of greater versatility, longer working time and more subtle rendering. The rounded, exquisitely modelled forms characteristic of the Renaissance would not have been possible without the qualities that come with oil colour.

The Winsor & Newton Colour Museum in Wealdstone, England includes pigments and materials used in the manufacture of fine colour. Some of the materials are unique and date back thousands of years.

Originally, the master painter's apprentices within the studio prepared oil colours. During the late eighteenth century, colourmens' shops appeared in Europe, offering colour that was pre-milled. In 1832, Winsor & Newton was founded in London.

While there is great romance in the history of oil colour, there is also no question that today's colours are vastly superior in quality to those made centuries, generations, and even just a few decades, ago. Why? New, more permanent materials, superior methods, as well as the accumulated experience and scientific expertise of the manufacturer have made a dramatic difference in the quality of colour available to today's artist.

Components. Today, traditional oil colour is made through essentially the same process employed in the fifteenth century. Pigment is milled with a vehicle of linseed oil (from the flax plant) and, in some cases, safflower oil (which is paler and dries more slowly). Instead of grinding each colour by hand, using a stone or glass muller, the best quality colour is produced today using a variety of milling methods. Decisions about how many passes are required through the triple roll mill, how much oil is used, as well as the kind of oil, are all determined based upon the individual characteristics of each pigment.

Vehicles and oils of the finest quality will remain stable in the tube for decades, and stable on the surface for generations. Above is a selection of mediums and oils dating back to the 1880's on display in the Winsor & Newton museum in Wealdstone, England.

Madder root is made into pigment for the colour, Rose Madder Genuine, using an exclusive process developed by colourman George Field in 1806. Winsor & Newton is the only manufacturer in the world of this historical colour.

The Rose Madder room at Wealdstone, England.

Characteristics. *The finest oils offer the following:*

- *Depth of colour.* When milled properly, linseed oil will support a high concentration of pigment. This translates into high tinting strength, true mixing, and the opportunity to take full advantage of the relative transparency or opacity of each pigment. In addition, the refractive qualities of the oil (how light passes through the vehicle) bring a richness and jewel-like depth to the colour that is still unmatched when compared to any other medium.
- *Extended working time.* Depending upon the pigment, Winsor & Newton oils become touch dry in 2-12 days, allowing for extended working, blending, and modelling. The variance in drying time is due to the reaction of each pigment when mixed with the oil.
- *Stability within the tube.* Expertly milled colour will remain in stable

suspension almost indefinitely. Colours milled with less skill have a tendency to separate, with oil rising to the top of the tube, and leaving bulk pigment at the bottom. In addition to being an annoyance for the painter, too much separation can result in colour that, when applied, is "underbound," and that doesn't include enough oil to create a stable paint film.

- *Permanence and stability on the painted surface.* The finest oil colour is an ideal mixture of pigment and vehicle, allowing for the oil to dry as it should, forming a stable film that, under the right conditions, will last for many generations.

Artists' Oil Colours are formulated and milled to the most exacting specifications, allowing artists to take full advantage of the unique characteristics of each individual pigment. Winton Oil Colours are formulated and milled to offer dependable working properties at an economical price.

A few words about drying and the stable paint film: Linseed oil dries by oxidation, a chemical process that occurs as atmospheric oxygen is added to the exposed oil film. In short, oil colours dry through a long, slow breathing process. The drying mechanism starts as oxygen is added to the oil molecule, launching a reaction that transforms the essentially linear structure of the fluid oil into a hardened, three-dimensional, lattice structure. When properly applied, the oil film can be highly stable and permanent. But anything that interferes with the drying or polymerisation process - whether it be through over-thinning, or the use of impure solvents – will produce a film that is less able to withstand the ravages of time.

In later sections, there are additional details regarding how to use the colour in a way that will prove as permanent as possible. That said, here are four important principles for a stable film:

- *Take care to avoid adding too much solvent to your colour mix.* Excessive solvent spreads the chemical structure too thin, preventing the linkages and the formation of the structural film.
- *Always use pure, artists' grade solvents.* Hardware/DIY grade solvents, or any solvent that hasn't been refined to the degree achieved with artists' grade solvents, often contain impurities that will interfere with the structural film formation.
- *Don't use old, or oxidized turpentine.* To keep turpentine fresh and usable, always store in full bottles and in the dark. Oxidized turpentine leaves a gummy residue that can prevent the colour from drying.
- *Observe the rules of "fat over lean," and "thick over thin."* (See the techniques section on page 75). These techniques ensure that successive layers of colour are increasingly flexible, and are less prone to cracking.

OTHER OIL DERIVED MEDIA

Alkyd colour. Following the introduction and subsequent popularity of acrylic colours, which dry in 10-20 minutes, oil painters began requesting a product which dried faster than traditional oils. Winsor & Newton responded in 1976 by developing a range of alkyd colours, which has today become Griffin Alkyd Fast Drying Oil Colour.

Alkyds are made from a naturally derived vegetable oil (most of the alkyd oils used in the art materials industry are soy-based). The oil is polymerized through a chemical reaction with an alcohol and an acid,

Griffin Alkyd Fast Drying Oil Colours are milled with an alkyd resin rather than traditional linseed oil. The colour offers working properties that are similar to those of a traditional oil colour, yet dry much more rapidly. Griffin is exceptionally well-suited for artists that employ lots of glazing or "alla prima" techniques.

("Polymer" means that the molecules link up into long chains.) It's like coupling a long train. The polymerized result is a resin-like product that - when mixed with a suitable, low-aromatic solvent - takes on many of the properties of traditional linseed oil. Just like traditional oils, alkyds dry by oxidation (a linkage achieved with the help of oxygen in the atmosphere), a process that happens much more rapidly for alkyds than for traditional oils. The film is touch dry in 18 to 24 hours.

The Griffin range includes 50 colours (51, USA), all of which are rated AA or A as permanent for artists' use. The colours remain workable for 4 to 8 hours, and are touch dry in 18 to 24. Faster drying means that the traditional oil techniques of both impasto and glazing can be done in considerably less time than when working in traditional oils. The colours are ideal for working outdoors. Consistent drying times across the range removes the usual restrictions that come with conventional oils, making it easier to overpaint, regardless of the colour upon the surface.

Because alkyd resin has physical properties that differ somewhat from those of traditional oils, the pigment load is somewhat different, as well. Experienced painters will notice slightly greater transparency compared to the Winsor & Newton Artists' Oil Colour range. Just remember that pigments vary in their transparency by nature, and Griffin colours are marked as "transparent or semi-transparent," or "opaque or semi-opaque" on the colour chart. The level of transparency of a colour is relative to other colours. And greater transparency means increased depth and clarity for glazes.

Permanence and stability of alkyd. As a paint vehicle, alkyds create a paint film that is comparable in stability to that of traditional oils. In fact, Dr. Marion Mecklenburg, Senior Research Scientist with the Smithsonian Institution in Washington DC, has been researching the stability of oil films since 1978, attempting to identify the factors that contribute to the most secure paint film possible. Winsor & Newton Alkyd Oil Colours have shown extraordinary stability and stretchability.

With few exceptions, tests on twenty-year old Winsor & Newton alkyds show the paint film remaining stretchable up to 10% before breaking. That's amazing, considering that traditional oil colours of the same age exhibit stretchability of only 1-2%.

In addition to their superb working characteristics, their superior qualities as a colour for underpainting and for glazing, Winsor & Newton alkyds are proving to be remarkably stable and durable.

Water mixable oil colour. Contrary to the old phrase that "oil and water don't mix," linseed oil can indeed be made to accept water as a solvent. The resulting mix is called an "emulsion," a balanced mixture of substances that don't normally combine. And it's been done for thousands of years with egg and water, wax and water, and, yes, oil and water. The mixture can be accomplished through mechanical means or by a chemical modification.

Artisan Water Mixable Oil Colours are formulated with linseed and safflower oils that have been modified to accept water as a solvent. Artisan works and dries like traditional oil colour without the use of turpentine or white spirit.

Winsor & Newton Artisan Water Mixable Oil Colour is a genuine oil colour made from modified linseed oil and modified safflower oil. A range of unique mediums have been formulated to allow the artist to achieve all the traditional oil colour techniques, without requiring turpentine or white spirits (mineral spirits).

The most successful water mixable oil creates the emulsion immediately upon adding water. This self-generating emulsion, used in the formulation of Artisan, yields the most traditional type of paint consistency and workability. The only chemical modification to the linseed oil vehicle is in preparing it to accept water as a solvent rather than spirits. The working

characteristics haven't been compromised, and are like those of traditional oil colours.

Solid stick oil colour. In the early 1980's, Oilbar was created by two American artists, who wanted the characteristics of oil colour in combination with the immediacy of pastels. Following the demand and success of Oilbar in America, Winsor & Newton launched Artists' Oilbar to the worldwide market in 1992.

Artists' Oilbar is oil colour combined with selected waxes to create a stick of colour well-suited for direct, dynamic application.

Oilbar is simply oil colour in stick/solid form. The artists' range of 35 colours is made through a combination of pigment and linseed oil or safflower oil with a blend of specially selected waxes. And the range includes a Colourless Blending Bar for a variety of painterly effects.

STUDENT VS. ARTISTS' GRADE COLOUR.

There are some fundamental differences between the very finest colour that money can buy, and colour intended for students and beginners. Artists' quality colours are:

- *Formulated with the ideal balance of pigment and vehicle.* Because the finest pigments are used, and there is greater concentration of those pigments within the vehicle, this often translates into higher cost for artists' colours.

- *Formulated to offer the best possible tinting, mixing, and covering characteristics.* Artists' colours are formulated to take full advantage of the unique characteristics that come with each individual pigment.
- *Offered in a wider range of colours.* Every colour included in Winsor & Newton artists' quality ranges (e.g., Artists' Oil Colours) has been selected based upon the criteria of permanence, its place within a broad, well-balanced total spectrum, relative opacity, and handling properties.

While colour made for students or beginners may not offer the standards that come with Artists' colours, there are qualities that are essential for an introductory range to fully meet the needs of a new artist. Here are the qualities that you can expect from a well-formulated colour for students or beginners:

- *Dependable quality at a lower cost.* The student range from Winsor & Newton (Winton Oil Colours) is lower in cost because it has been made from moderately priced pigments. Just because they cost less doesn't mean that they're not milled and dispersed with great attention to quality and performance. In fact, Winton is, in many respects, superior to the artist-grade products of some other manufacturers.
- *The ideal limited spectrum and clean colour mixing.* All Winsor & Newton student ranges are ideal for the artist learning the fundamentals. The student ranges have been made from pigments which offer as broad a palette as possible and that specifically relate to the Winsor & Newton artists' ranges. This provides clean colour mixing and helps artists to upgrade to the superior range of artists' colours when ready.

It's worth remembering that the oil vehicle used in milling both student grade and artists' grade colours is essentially the same, and the colours can be safely intermixed.

A word about pigment strength. There's a common misconception that pigment strength is the only benchmark for making good colour. But that's too simple. High pigment strength is important, but too much pigment can make the colour unworkable.

For example, packing a tube full of phthalocyanine pigment would make a colour with far too much tinting strength, overpowering any colour with

which it's mixed. On the other hand, some pigments are naturally weak in tinting strength. The formulation of our Terre Verte, for example, offers superior pigment load, (or concentration within the tube), yet because of the physical structure of the pigment, the colour is weak in tinting strength.

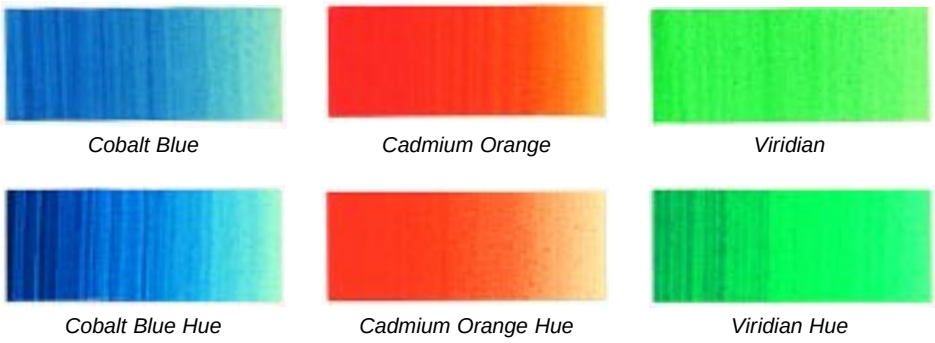
Colour ranges which boast of "nothing but pigment and oil" can be difficult to work with; stringy, sticky, lacking in brilliance, and are often unstable. Each of these characteristics makes it more difficult to construct a sound paint film.

Although Winsor & Newton Artists' Oil Colours are essentially "pigment and oil," it is the type and quality of each, the formulation and limited use of the correct additives, the machinery used, and the people with a lifetime of experience who can ensure that each pigment is developed into a stable, permanent colour. Winsor & Newton balances all the features - including pigment strength - needed to make colours that allow maximum artistic freedom and superb control. And, after taking into account all the variables, Winsor & Newton colours generally show the highest pigment strength.

Single pigment colours. As a governing principle, single pigments are used wherever possible in Winsor & Newton ranges. The quality of colours made from a single pigment is dramatically better than those made from mixed or multiple pigments. Combined with strength of colour, single pigments provide a wide colour range and offer cleaner, brighter mixtures with an infinite range of hues. This is particularly important for greens, violets, and oranges. Use of single pigments in formulating these secondary colours considerably broadens the artists' available spectrum. A total of 95 different pigments are used to produce the range of 114 Artists' Oil Colours.

"Hue" replacement colours. The biggest contributor to the price of the finest artists' colours is the expense of the pigment. Cadmiums, cobalts and cerulean, for example, are expensive colours to produce. And for the artist requiring the characteristics that only these pigments can offer, nothing else will do.

But for the artist who requires colours that mix cleanly and consistently, who needs a comprehensive (but not necessarily exhaustive) spectrum, and who desires dependable quality, a student range (such as Winton Oil Colours) may be the best solution.



Cobalt Blue *Cadmium Orange* *Viridian*

Cobalt Blue Hue *Cadmium Orange Hue* *Viridian Hue*

"Hue" colours have been formulated with alternative pigments in an effort to approximate the original colour at a lower cost. Because every pigment is unique, they will perform differently than the original colour, offering working characteristics that some artists may, in fact, prefer for specific applications.

The Winsor & Newton student ranges include colours labelled as "hues" (for example: Cadmium Red Hue, Cerulean Blue Hue, and Cobalt Blue Hue). These are colours that have been made from an alternative pigment to approximate the original colour at a lower cost; the real difference is in how they perform. When comparing the genuine Cadmium Red with its Hue counterpart, you'll see that they're both a bright red. Both are very permanent but the cadmium is opaque while the hue is transparent. The Hue shouldn't be dismissed as lower quality. Because of its natural transparency and mixing characteristics, some artists may prefer the hue colour! In artists' ranges the word "hue" is used to indicate where an alternative pigment has been used to replace an original pigment that, for whatever reason, is no longer available.

Transparency vs. opacity. The physical structure of pigment determines whether or not it will be opaque, semi-opaque, or transparent. For example, when viewed through a microscope, pure phthalocyanine pigments appear translucent, as if made from stained glass. This characteristic transparency makes the colour well-suited for glazing techniques and clean colour mixing.

Conversely, a cadmium pigment is quite dense and opaque, allowing the transmission of little or no light. Naturally opaque colours are best suited for applications requiring maximum covering power. With experience, the painter can learn to take advantage of the relative natural opacity or transparency of fine colours, exploiting those qualities to achieve an almost unlimited range of hues, and the cleanest, brightest mixtures possible.

Every Winsor & Newton colour is rated for transparency on the colour chart.

Series numbers. The relative price of each colour is indicated by the series number upon the tube or within the range literature. Each series is determined mainly by the cost of the pigment, with Series 1 being the least expensive and Series 6 the most costly.

Series numbers do not indicate the quality of the colour, only the relative cost of the pigment and production. Depending upon how the painter is working, a Series 1 colour may be the best possible choice.

HEALTH & SAFETY INFORMATION

As the world's largest manufacturer of premium quality artists' materials, Winsor & Newton bring as much care and attention to the labelling and safe use of products as to the quality of their performance. Winsor & Newton products should not present a risk to health if handled appropriately, as detailed upon the product labels and within our literature.

Prolonged contact with the skin and ingestion (or swallowing) of the product should be avoided. This includes avoiding practices such as applying colour with the fingers or pointing brushes in the mouth.

Detailed below is information about health labelling, legislation, directives, and best practices in the EU and the USA:

EU legislation. These regulations were introduced in the 1960's. They cover all products available to industry or the general public in the EU. The basis of the system is the classification of dangerous substances into one of the following classifications: TOXIC, HARMFUL, CORROSIVE, IRRITANT, OXIDISING, EXPLOSIVE, FLAMMABLE or DANGEROUS FOR THE ENVIRONMENT.

There can be various levels within a classification, for example, Very Toxic or Extremely Flammable. Most levels of classification have accompanying symbols, for example, skull & cross bones for Toxic. In

addition, these classifications can be accompanied by “Risk Phrases” and/or “Safety Phrases”. Any artists' material, which falls into one of the above classifications, must be labelled accordingly. The three most common classifications in artists' materials are Harmful, Flammable, and Dangerous for the Environment. The seals for each are shown below.

EU harmful seal

EU Highly Flammable seal

EU Dangerous for the Environment seal

The risk and/or safety phrases will vary according to each product. For an example of the labelling required with each classification, English Distilled Turpentine would be labelled with Harmful and Dangerous for the Environment, and with the following risk phrases:

- Flammable
- Harmful by inhalation, in contact with skin and if swallowed
- Irritating to the eyes and skin
- May cause sensitization by skin contact
- Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment
- May cause lung damage if swallowed

And with the following safety phrases:

- Keep out of reach of children
- Wear suitable protective clothing and gloves
- Avoid release into the environment. Refer to safety data sheets.
- If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Health Labelling for the USA. All artists' colours should be used with care and respect. To ensure that essential health and safety information is, quite literally, in the hands of every artist using paints and colours, all products are labeled accordingly. Here is a brief outline of the labelling information that you can expect to find on artists' colours in the USA:

The US system labels all products whether a health warning is needed or not. The most common US labels are:

- "***AP***," indicating that the product has been tested by an independent toxicologist and is considered to be non-toxic.

In the US, if a potential risk exists with a product, the label will say so. The "***CL***" seal (replaced the "***HL***" seal in 2000) is used for products which are potentially hazardous, with appropriate phrases. For example, some cobalt colours may be labeled:

> **Warning:** May produce allergic reaction by skin contact. Contains cobalt. Avoid skin contact. Wash hands after use. Keep out of reach of children.

The labelling system came about through the combined efforts of a number of associations and groups. The American Society for Testing and Materials (ASTM) has prepared standards for the safe use of artists' materials. These have been published in a booklet entitled, "ASTM Standards for the Performance, Quality, and Health Labelling of Artists' Paints and Related Materials" (ISBN 0-8031-1838-4).

The address for ASTM is:

ASTM
100 Barr Harbor Drive
West Conshohocken, PA 19428-2959

The labelling standard for Chronic Health Hazards in Art materials (ASTM D-4236) was codified into US law as part of the Federal Hazardous Substances Act. The Art & Creative Materials Institute (ACMI) provides labelling certification, and works to promote the safe and informed use of art materials in North America.

Beginning in 2000, many art materials sold in the United States will include additional labelling for products containing cadmium and lead as a result of action surrounding California's Safe Drinking Water and Toxic Enforcement Act of 1986 (commonly known as Proposition 65). The new labels will reflect requirements resulting from Proposition 65, independent of labelling required by the Federal Hazardous Substances Act. For example, the labels for cadmium-containing products will read:

DO NOT SPRAY APPLY
This product contains cadmium, a chemical known to the State of California to cause cancer by means of inhalation.

NOTE: There is no direct relationship between the EU and USA systems of health labelling as the categories used have different levels and limits, eg., Flammable in the USA is not automatically considered as Flammable in the EU.

USA ONLY labels may appear on products in the EU as Winsor & Newton products are sold internationally. However, artists in the EU are advised to follow EU labelling.

Hazardous materials (correct at time of printing)

Winsor & Newton Products in EU with Hazard Warnings

Those containing solvents:

Artists' White Spirit
English Distilled Turpentine
Artists Painting Medium
Dammar Varnish
Wax Varnish
Japan Gold Size
Artists' Gloss Varnish
Artists' Matt Varnish
Artists' Picture Varnish
Artists' Retouching Varnish
Conserv-Art Gloss Varnish

Aerosols - Flammable warnings only

Those containing lead carbonate:

Artists Oil Colour Flake White No. 1
Artists Oil Colour Flake White No. 2
Artists Oil Colour Cremnitz White
Artists Oil Colour Foundation White

Those products with USA only warnings:

All those containing cadmium (including Vermilion Hue)
Those containing solvents (see EU List)
Liquin
Sansodor
Conserv-Art Matt Varnish
Blending & Glazing Medium
Those containing Lead (see EU List)
Those containing soluble Cobalt
In all ranges: Aureolin, Cobalt Violet, Cobalt Violet Dark, Cobalt Blue Deep, Artists' Oil Colour Cobalt Green Deep,
Those containing certain Dyes, some Drawing Inks, and, colours and mediums labeled for California Proposition 65

Studio clean up and safe use tips

Good working practice should be adopted with all artists' materials, whether potentially hazardous or not. Before you start, read the product labels.

Within your studio:

- *Ensure plenty of fresh air, ventilation and circulation.*
- *Do not sleep in your studio without first removing painting materials elsewhere and in particular, be sure to dispose of unused solvents and dirty rags in fireproof and solvent-proof containers.*
- *Store all materials, particularly solvents, tightly capped when not in use.*
- *Do not expose artists' materials to naked flames or excessive heat sources.*

While working:

- *Do not eat, drink or smoke when working due to the risk of ingestion* (swallowing).
- *Avoid excessive skin contact, particularly with solvents.*
- *Do not point your brushes in your mouth;* paints are not made for human consumption.
- *Refrain from applying colour directly with your fingers.* Use a barrier cream, like Winsor & Newton **Artguard** or surgical gloves when painting with your hands.
- *When airbrushing, wear an approved mask and work in adequate ventilation to avoid inhalation of airborne particles.* An exterior vented extraction system is recommended.
- *When using powdered pigment, wear an approved mask and work in adequate ventilation to avoid inhalation of airborne particles.* Anexterior vented extraction system is recommended.
- *Do not pour out more solvent than is necessary for your current painting session, it will only evaporate into the room.*
- *If paint or solvent is splashed into the eyes or on the skin, wash thoroughly with water.*
- *Avoid prolonged inhalation of solvent vapours.*
- *Clean up all spills.*
- *Keep artists' materials out of reach of children, animals and foodstuffs.* (NOTE: Winsor & Newton artists' materials are manufactured for use by adults, that is persons over the age of 14. Small children are exposed to greater risks than adults due to their smaller body size and lower weight. Artists' materials should be kept out of reach of children in order to prevent accidents from occurring.)

After painting:

- *Clear away all solvent and paint soaked rags and discarded palettes.* Dispose of them in an airtight, solvent-proof container or in an appropriate manner.
- *Wash hands thoroughly at the end of your painting session.*
- *Do not use excess solvent to wash colour from your hands.* Use a hand cleanser, like Winsor & Newton **Artgel**.

Travelling with oil colour

There's real pleasure to be had in packing a portable colour kit, and painting under an open sky or during holiday travel. Any of our oil colour products are suitable for outdoor use. Of all our ranges, however, the fastest drying and therefore the easiest to work and re-work over the course of a single painting session, is **Griffin Alkyd Fast Drying Oil Colour.**

Because of safety regulations with the airlines, we offer the following information regarding our colour products. Any product or material with a flash point below 61˚ Celsius is classified as dangerous goods, and those products cannot be included during airline travel. (NOTE: the flash point is the temperature at which a product will flame, therefore a higher flash point is better.) While a few of our products do have a flash point at or below the 61˚ mark, the flash points of a large number of our oil colour products are well above. Below is a comprehensive list that can be used (and shown to an airline official, if needed) to verify whether or not a product may be considered allowable for airline transport.

Products with flash points below 61˚ Celsius, that are considered Group II or Group III flammable materials should be considered unsuitable for airline travel:

- *Oil colour solvents* (except Sansodor, which has a flash point of 70˚ Celsius)
- *Oil colour mediums* (except Artisan Water Mixable Oil Mediums)
- *Oil colour varnishes*

Winsor & Newton products with flash points above 61 degrees Celsius, and which therefore classified as non-hazardous

	Flash point (closed cup)
Artists' Oil Colours	>230˚ C
Winton Oil Colours	>230˚ C
Refined Linseed Oil	>230˚ C
Linseed Stand Oil	>230˚ C
Thickened Linseed Oil	>230˚ C
Bleached Linseed Oil	>230˚ C
Cold Pressed Linseed Oil	>230˚ C
Oilbar	>230˚ C
Griffin Alkyd Fast Drying Oil Colours	70˚ C

	Flash point (closed cup)
Sansodor	70˚ C
Artisan Water Mixable Oil Colours	>100˚ C
Artisan Water Mixable Linseed Oil	>200˚ C
Artisan Water Mixable Stand Oil	>200˚ C
Artisan Water Mixable Painting Medium	70˚ C
Artisan Water Mixable Fast Drying Medium	>70˚ C
Artisan Water Mixable Impasto Medium	>70˚ C

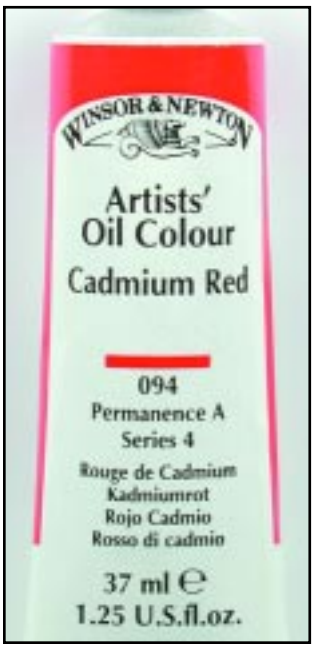
LABEL INFORMATION ON ALL WINSOR & NEWTON OIL COLOURS

Winsor & Newton lists the following information upon the labels of all oil colour products:

Every Winsor & Newton oil product includes label information about the colour, pigment, series, permanence and more.

Colour name This is the common name, eg., Cadmium Red

Colour code Each colour is given a code number that is uniform across all ranges. For example, Cadmium Red has the colour code 094 within each range in which the colour is offered.



Product code For ease of reference and cataloging, every Winsor & Newton colour product is labelled with a unique product number

Pigment content The chemical description of the pigment. For example: cadmium sulphoselenide is the pigment for Cadmium Red.

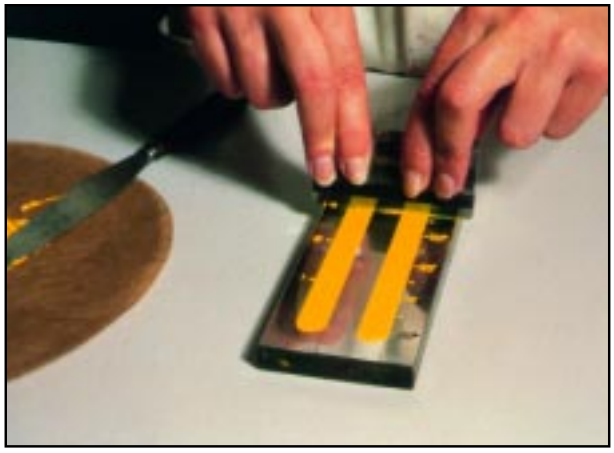
Vehicle used Identifies the specific vehicle used in formulating the colour

Permanence rating Rated as:
AA – Extremely permanent
A – Permanent
B – Moderately durable
C – Fugitive

(NOTE: for a complete discussion on permanence, testing, ratings, and standards, see the Permanence heading on page 57-59, within the "Technical Information - Colour" section.)

Series Number Each series is determined mainly by the cost of the pigment, with Series 1 being the least expensive and Series 6 the most costly.

Volume The volume quantity is in ml and US fl. oz.



Every Winsor & Newton oil colour is formulated to meet exacting standards, from viscosity to tinting strength to permanence and stability.

Attributes shared by all Winsor & Newton oil colours

All oil colour ranges made by Winsor & Newton are milled according to the following standards:

- **Only the best pigment available is used.** Each pigment is selected based upon standards of permanence and true pigment character. Each delivery of every pigment is tested, and we might reject up to 25% of all incoming pigments as being unsuitable for our products.

- **Only the best vehicle is employed.** The oils used in our ranges are proven to be the most stable available.

- **A well-balanced spectrum,** ensuring that the artist has the widest array of mixing options possible.

- **Single pigments,** *wherever possible.* The use of single pigments provides the widest colour range and offers cleaner, brighter mixtures.

- **Expert milling.** Each colour is milled to achieve the most stable suspension within the tube and to ensure, with proper application, the most permanent film possible. In addition, the colours are milled to maximize working characteristics.

Each of the various ranges of oil colour made by Winsor & Newton are outlined in the next section.

WINSOR & NEWTON OIL PRODUCTS

ARTISTS' OIL COLOURS

These colours are milled to the most exacting specifications, with the finest pigments and vehicles available, for artists that desire the worlds' finest colours. The Artists' Oil Colour range offers a balanced spectrum of 114 colours in 37ml tubes (except lead whites). Selected colours are available in 21ml, nineteen colours are available in 120ml and some whites are also supplied in 60ml tubes. (Lead whites are available in 60ml and l50ml tins in selected countries. USA: lead whites in tubes.)

Spectrum. The Artists' Oil Colour range offers the widest spectrum of all the Winsor & Newton oil ranges. The colours are chosen according to mass tone (the colour straight from tube), undertone (the "bias" of colour when in a thin film), strength and relative opacity.

Formulation. Every Winsor & Newton Artists' Oil Colour is individually formulated to enhance each pigment's natural characteristics and ensure stability of the colour.

Pigment load/tinting strength. The highest level of pigmentation in combination with the broadest handling properties is used in Artists' Oil Colour. Pigment strength provides covering power and tinting strength, ensuring that each colour can be used to its best advantage by the artist.

Viscosity/consistency. The thick, buttery consistency of Artists' Oil Colour, along with the aroma of linseed oil, are characteristics that have been loved by oil painters for centuries. Artists' Oil Colours are formulated with a "short" consistency, allowing the painter to retain any mark made by the brush or knife. The colour can also be thinned with a medium to produce a perfectly smooth glaze.

Surface sheen. While the Artists' Oil Colour range is formulated to provide as even a reflective surface as possible, it's important to note that the reflective quality of the oil film is affected by a wide variety of factors. Because each pigment requires differing volumes of oil in formulation, the surface sheen may differ from colour to colour. The addition of solvent, and the use of additive mediums will alter surface sheen, as well.

Permanence. Winsor & Newton have developed permanent alternatives for the less durable traditional colours, without compromising the handling properties of the oil colours. As a result, the permanence of the colour range as a whole has been improved beyond the dreams of past painters.

Of the 114 colours in the range, 111 are now classed as "permanent for artists' use" (AA or A ratings from Winsor & Newton) which aids the longevity of paintings. For a more thorough explanation of permanence and the individual rating of each colour see the Technical Information section (page 57-59).

Drying time. The long drying time of Artists' Oil Colour is also a key feature of oil painting. As the colour remains soft and wet for a few days, it allows the painter to make corrections from day to day.

All colours will become touch dry in 2-12 days. The different drying rates are due to the different reaction of each pigment when mixed with oil. Winsor & Newton formulate each colour individually to optimise its drying rate, helping artists to avoid the problems of slow drying underlayers. However, the following list is a guide to the likely variations:

Fast drying [around two days]: Aureolin, Permanent Mauve [manganese], Cobalt Blues, Prussian Blue, Raw Sienna, Umbers, Flake, Foundation and Cremnitz Whites [lead].

Medium drying [around five days]: Winsor Blues and Greens [phthalocyanines], Burnt Sienna, Cobalt Violets and Greens, Ultramarine Blues, Mars colours [synthetic iron oxides], Permanent Sap Green, Permanent Alizarin Crimson, Ochres, Cadmiums, Titanium White, Zinc White, Lamp Black, Ivory Black.

Slow drying [more than five days]: Winsor Yellows and Orange [arylamides], Quinacridones, Alizarin Crimson.

As with all oil paintings, to avoid yellowing of the oil, paintings should not be allowed to dry in continuous darkness or with high humidity.

Painting Whites. The eight whites in Artists' Oil Colour ensure that artists have the widest possible array of choices, just as in every other part of the spectrum. Because of its paler colour and lessened tendency toward yellowing, most of our whites are milled with Safflower oil.

Safflower Oil Whites

Titanium White; is the most popular modern white. It is the whitest, most opaque white, softer than Flake White No. 1.

***Flake White No. 1;** The traditional lead white in oil colour, Flake White is excellent for painting as a result of its flexibility, durability and speed of drying. The inclusion of zinc pigment improves its consistency. This is the stiffest white in the range.

***Flake White No. 2;** A variation of Flake White No. 1, with a more fluid consistency.

Zinc White; is the least opaque white, making it ideal for tints and glazing. It also has the shortest consistency.

***Cremnitz White;** also made from lead. The absence of zinc gives a stringy consistency. Some artists may prefer a pure lead colour in principle.

Iridescent White; A mica based pigment which makes a pearlescent white. It is effective when mixed with transparent colours.

A note about whites used for underpainting and priming: Safflower whites are not recommended for extensive underpainting or as a primer. When oil colours dry, the paint film undergoes a number of dimensional changes, increasing and decreasing in weight as different chemical reactions occur. Semi-drying oils, such as safflower and poppy oil, undergo greater dimensional changes than linseed oil. While a safflower oil based white is perfectly appropriate for use in normal applications and mixing, it is not suitable for use with underpainting. The movement of the film can lead to cracking in the layers applied above. Hence for priming and underpainting, we recommend the following Linseed Oil Whites:

Underpainting White; titanium pigment ground in linseed oil which is recommended for underpainting or extensive layering with white.

***Foundation White;** lead pigment ground in linseed oil which is recommended for underpainting or extensive layering with a lead white. Both Underpainting and Foundation White may be used throughout the painting if so wished.

*Lead whites in tins; for reasons of toxicity these colours are available only in tins in the EU.

Winton Oil Colour

Winton is a traditional range of colours, made from moderately priced pigments, and formulated for amateur artists or more accomplished painters requiring large volumes of colour at an economical price.

Spectrum. Winton Oil Colours have been made from pigments which offer as broad a palette as possible at an economical price. The spectrum has been selected to ensure that the largest number of colours can be mixed from the range. In addition, the Winton spectrum relates specifically to Artists' Oil Colours, providing clean colour mixing and helping artists upgrade to the superior range of Artists' Oils when ready.

Formulation. As with Artists' Oil Colour, every colour in the Winton range is individually formulated to take advantage of the natural characteristics of each pigment and to ensure stability of the colour.

Pigment load/tinting strength. A high level of pigmentation provides good covering power and tinting strength. While it can't match the superior pigment load of Artists' Oil Colours, the Winton range is stronger than many other artists' quality ranges. The economical cost has been achieved through the use of moderately priced pigments rather than through lessening the pigment load to an unacceptable level. Winsor & Newton formulation, manufacture and quality control ensure a product of absolute excellence.

Viscosity/consistency. The Winton range has a more uniform consistency than Artists' and is a slightly stiffer product. It offers excellent retention of brush and palette knife strokes.

Surface sheen. As with the Artists' Oil Colour range, the surface sheen of Winton is largely due to the pigment used. The level of gloss will therefore vary.

Permanence. Wherever possible, the most permanent pigments have been selected for use with the Winton range. The Winsor & Newton formulation and manufacture ensure that the product will remain stable within the tube as well as offer the most permanent paint film possible (when applied appropriately). To be sure of the permanence of any colour, please refer to the ratings on the colour chart or tube labels.

Drying time. All colours will become touch dry in 2-12 days. The different drying rates are due to the different reaction of each pigment when mixed with oil. Winsor & Newton formulate the colours to optimise drying rates, helping artists to avoid the problems of slow drying underlayers. However, the following list is a guide to the likely variations:

Fast drying [around two days]: Prussian Blue, Raw Sienna, Umbers, Flake White [lead].

Medium drying [around five days]: Phthalo Blue and Viridian Hue [phthalocyanines], Burnt Sienna, Ultramarine Blues, Synthetic iron oxides, Ochres, Titanium White, Zinc White, Lamp Black, Ivory Black.

Slow drying [more than five days]: Cadmium Hues [arylamides], Permanent Rose [quinacridone], Alizarin Crimson Hue.

As with all oil paintings, to avoid yellowing of the oil, paintings should not be allowed to dry in continuous darkness or with high humidity.

Painting Whites. White is the most used colour. The four whites in Winton Oil Colour offer different working characteristics to the painter.

Titanium White; The most popular modern white. It is the whitest, most opaque white.

Flake White; The traditional lead white in oil colour, Flake White is excellent for painting as a result of its flexibility, durability and speed of drying. The inclusion of zinc pigment improves its consistency.

Zinc White; The least opaque white, making it ideal for tints and glazing.

Soft Mixing White; A titanium based white with the softest consistency. It has lower tinting strength than Titanium White.

Winton whites are ground in safflower oil, which produces the whitest whites. These colours are not recommended for extensive underpainting or priming. The slow drying nature of the oil may cause subsequent layers to crack. Artists' Oil Colour Underpainting White or Foundation White are recommended for underpainting or extensive modelling with white. (NB. Flake White is toxic. Please ask your retailer for availability and read the information supplied with the product.)

Griffin Alkyd Fast Drying Oil Colour

There are excellent advantages that come with Griffin Alkyd Fast Drying Oil Colour. Faster drying means that the traditional oil techniques of both impasto and glazing can be done in considerably less time than when working in traditional oils. The colours are ideal for working outdoors, and greater transparency means increased depth and clarity for glazes. Consistent drying times across the range removes the usual restrictions that come with conventional oils, making it easier to overpaint, regardless of the colour upon the surface.

Spectrum. The Griffin Alkyd range includes 50 colours (51 in USA), each of which has been selected for its colour strength and relative opacity. The spectrum is designed to ensure that the largest number of colours may be mixed from the range.

Formulation. As with all Winsor & Newton colour products, every colour in the Griffin Alkyd range is individually formulated to take advantage of the natural characteristics of each pigment and to ensure stability of the colour.

Pigment load/tinting strength. Because alkyd resin has physical properties that differ slightly from those of traditional oils, the pigment load is somewhat different, as well. Experienced painters will notice slightly greater transparency compared to the Artists' Oil range. The colour has been formulated to offer the greatest degree of tinting strength possible, and to take full advantage of the true characteristics of each pigment.

Transparency. Not all colours in the Griffin Alkyd range are transparent. Pigments vary in their transparency by nature, and Griffin colours are marked as "transparent or semi-transparent," or "opaque or semi-opaque" on the colour chart. Remember that the level of transparency of a colour is relative to other colours.

Viscosity/consistency. Griffin Alkyd Fast Drying Oil Colour offers a slightly more fluid consistency than traditional oils.

Drying time. All colours in the Griffin Alkyd range remain workable on the palette for 4 to 8 hours, and touch dry on the canvas in 18 to 24 hours. Thorough drying prior to varnishing is essential, and should be a minimum of one month in thin films of colour. Longer periods are necessary for thicker films.

Surface sheen. Alkyd colours dry to a more even reflective surface than traditional oils.

Permanence. The highest quality raw materials and superior manufacturing standards are employed in formulating the Griffin Alkyd Fast Drying Oil range. The result is that, provided that the artist uses sound painting techniques, oils and alkyds should share similar life spans.

Using with traditional oil colour, including underpainting & glazing. Griffin Alkyd colours can be either mixed or used underneath oil colour. Because the alkyd film is slightly less flexible and faster drying than traditional oil, applying Griffin alkyd films over oil colour or over Oilbar layers is not recommended. Griffin colours are particularly popular for making a quick underpainting, followed by Artists' or Winton Oil Colour for overpainting. Griffin Alkyd is not intermixable with acrylics.

ARTISTS' OILBAR

Oilbar represents the exciting possibility of drawing directly on the canvas with wet colour. The high level of pigmentation provides strength and depth of colour, superior in every way to oil pastels or crayons. Oilbar also has the physical advantage of producing a dry film, as opposed to oil pastels, whose binder cannot be fixed, leaving colours to smudge or pick up extra dirt. Working with Oilbar is expressive and immediate; nothing comes between the artist and the surface. Not even a brush.

Winsor & Newton
The Colour Specialist

Spectrum. The 35 colours, including a colourless blender, are an excellent spectrum for using Oilbar by itself or in combination with other oil colours.

Formulation. The Oilbar range is formulated with pigment, linseed oil, or safflower oil with a blend of specially selected waxes. As with all Winsor & Newton colour products, every colour in the Oilbar range is individually formulated to take advantage of the natural characteristics of each pigment and to ensure stability of the colour.

Viscosity/consistency. Artists' Oilbar has a consistency all its own, making for truly unique, dynamic applications. When an oil medium is added, Oilbar handles comparably to a tube oil colour.

Surface sheen. As each pigment requires differing volumes of oil in formulation, the surface sheen of Oilbar may differ slightly from colour to colour. The addition of solvent, as well as the use of additive mediums will alter surface sheen, as well.

Permanence. Artists' Oilbar has the same ratings as other Winsor & Newton artists' quality ranges. AA and A rated colours are recommended as permanent for artists' use. Please refer to the permanence ratings provided on the printed colour chart and the tube labels.

Drying time. Once on canvas, the colours will become touch dry in 2 to 7 days. Thorough drying prior to any varnishing is essential, and should be a minimum of six months in thin films of colour. Longer periods are necessary for thicker films.

Colourless Oilbar. The Colourless Oilbar is the equivalent of linseed oil in tube colour, and is used mostly for blending and glazing colours directly on the canvas. It serves as a medium in solid form.

Using with traditional oil colour. Oilbar can be used with both traditional oil colour and Griffin Fast Drying Oil Colour. Due to the wax content, thick Oilbar films are not recommended underneath thin oil films. Doing so would contravene the "fat over lean" rule. Oilbar is also compatible with all Winsor & Newton oil mediums.

Protection of finished work. Finished artwork made with Oilbar requires protection from dirt and grime. Ideally, pictures created with Oilbar should be framed behind glass, as the wax content can affect varnishing.

Monoprinting. There are a wide variety of applications for which Oilbar is well suited, and the product has proven to be particularly popular with printmakers for monoprinting. Oilbar can be used directly on a glass plate, with or without medium, for direct transfer to the paper.

Artisan Water Mixable Oil Colours

Artisan is a genuine oil colour, made from linseed and safflower oils that have been modified to create a stable, workable emulsion when water is added. With Artisan, the artist can thin the colour and clean up with water rather than solvents such as turpentine or white spirit (mineral spirits). The colour has been formulated to appear and work just like conventional oil colour. The depth of colour, buttery consistency, lightfastness, opacity/transparency, performance and drying times are all comparable to conventional oils, allowing the artist to cultivate all of the fundamental qualities that come with working with conventional oils.

Artisan is an oil colour, and should not be thought of otherwise. The modified linseed and safflower oils accept water as a solvent. With that exception, the modified oil vehicles function like a conventional oil, accepting water as a diluent in much the same way as linseed oil accepts white (mineral) spirit, and then forming a stable film through oxidation.

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The Colour Specialist

Spectrum. The Artisan range offers a balanced spectrum of 40 colours, each of which has been selected for its colour strength and relative opacity. The spectrum is designed to ensure that the largest number of colours may be mixed from the range.

Formulation, and the use of water. There is no water within the formulation of Artisan. The linseed and safflower oil vehicles have been modified

to allow the colour to accept water, creating a stable emulsion, while retaining the working and optical characteristics of conventional oil colour. The range has also been formulated with a high proportion of single pigments for brilliance of colour and clean colour mixing. And the most suitable oils and methods for dispersion have been selected to bring out the individual characteristics, from opacity to natural transparency, of each pigment in the Artisan range.

Pigment load/tinting strength. A wide variety of pigments are used in Artisan to provide all the characteristics expected from a Winsor & Newton colour. Including high pigment strength, to ensure covering power and tinting strength.

Viscosity/consistency. Straight from the tube, Artisan Water Mixable Oil Colours have a thick, stiff consistency, similar to conventional oils, making it suitable for impasto applications. The colour offers excellent retention of brush and knife strokes. The consistency of Artisan can be easily adjusted through the addition of Artisan mediums, each of which are formulated to allow the artist to adjust the flow and working characteristics of the colour, while still allowing for easy mixability and clean-up with water.

Drying time. When Artisan is thinned with water, the water evaporates from the paint film fairly rapidly, leaving behind a conventional oil film that dries by means of oxidation. The different drying rates of Artisan colours are due to the different reaction of each pigment when mixed with oil. Winsor & Newton formulate each colour individually to optimise its drying rate, helping artists to avoid the problems of slow drying underlayers. However, the following list is a guide to the likely variations:

Fast drying [around two days]: Prussian Blue, Umbers,

Medium drying [around five days]: Cadmium Hues, Phthalo Blue (red shade) and Phthalo Greens, Siennas, French Ultramarine, Synthetic iron oxides, Ochres, Titanium White, Zinc White, Lamp Black, Ivory Black.

Slow drying [more than five days]: Cadmiums, Permanent Rose [quinacridone], Permanent Alizarin Crimson.

As with all oil paintings, to avoid yellowing of the oil, paintings should not be allowed to dry in continuous darkness or with high humidity.

Surface sheen. The reflective quality of the Artisan film is affected by a wide variety of factors. Because each pigment requires differing volumes of oil in formulation, the surface sheen may differ slightly from colour to colour. The addition of water as a solvent, as well as the use of additive mediums will alter surface sheen as well.

Permanence. Recent developments in pigment chemistry have led to continued improvements in the lightfastness of artists' colours. Winsor & Newton have taken full advantage of these improvements in the formulation of the Artisan range. All Artisan colours are rated AA or A, and are recommended as permanent for artists' use. Permanence is discussed more fully in the technical section. (pages 57-59)

Using with traditional oil colour. Artisan colours and mediums can be mixed with conventional oil colours and mediums. As more conventional colour is added, however, the resulting mixture will be progressively less water mixable. Maintaining rules like "fat over lean" also become more difficult when mixing traditional oils with Artisan. For these reasons, we recommend using Artisan colour and mediums exclusively in order to benefit from the use of water instead of solvents.

Using with water mixable mediums. Artisan mediums allow you to alter the characteristics and working properties of your tube colour, enabling you to enjoy all the traditional techniques that come with oils. The mediums specifically formulated for use with Artisan Water Mixable Oils include: Linseed Oil, Stand Oil, Painting Medium, Fast Drying Medium and Impasto Medium.

Remember that mediums are additives and, as such, should be used in modest proportions. Too much Artisan Linseed Oil or Stand Oil will lead to wrinkling of the surface, just as it would with conventional oils. A complete description and discussion of Artisan mediums can be found in the "Mediums" section of this book on page 66.

Use with water as a solvent. As with any oil colour, the addition of too much solvent can result in an underbound paint film. The same is true when using water with the Artisan range. For this reason, we strongly recommend that the working characteristics of the colour be adjusted through the use of the appropriate medium in addition to water. When adding water, do so gradually, a little bit at a time, while mixing continuously with a brush or palette knife. Doing so will allow the water and oil emulsion to form evenly.

The use of water as a solvent will also alter the refractive quality of the colour, resulting in a slight value shift to a lighter tint as the water is added. As water evaporates from the mix, there is a subsequent reversion back to the original colour.

Suitable varnishes. Any varnish suitable for conventional oils will be suitable for use with Artisan. Appropriate varnishes will protect your painting from atmospheric dust and dirt, as well as be fully removable, enabling the picture to be cleaned if and when necessary. Varnishes should not be used as mediums for adding to the colour. Artisan paintings should not be varnished until thoroughly dry (at least six months). Winsor & Newton makes a complete range of varnishes suitable for use with oil colour (see the “Varnishes” section in this book on page 67).

Using synthetic or natural hair brushes. During long painting sessions, natural hog bristle brushes may soften from prolonged contact with water. The Artisan brush range is made from synthetic filaments specifically for use with Artisan Water Mixable Oil Colour. The stiff filament mimics natural bristle very closely and will not soften in water. Other synthetic brushes, for example, the long handled Winsor & Newton Galeria, (and University and Monarch in the USA) will maintain their rigidity, and can be used as well.

As a guideline, if using tube colour or impasto techniques (thickly applied), bristle or Artisan brushes are most suitable. For subtle blending, glazing and fine detail, a soft hair brush, such as Winsor & Newton Cirrus or Sceptre Gold, is recommended.

Studio clean up. Artisan does not require any solvents for cleaning up after painting. After use, just wipe excess oil colour from the brush, and use soap and water to clean. There is no need to use turpentine or white (mineral) spirits. To keep your brushes in good condition, it is advisable to clean up on the day of your painting session.

TECHNICAL INFORMATION - COLOUR

All pigments used in the Winsor & Newton ranges have been selected based upon the following criteria:

True pigment characteristics

Every pigment is unique. Some are naturally opaque while others are transparent. Others offer very different qualities when applied in a thin film than when applied straight from the tube. Some offer dramatic tinting strength while others mix with great subtlety. We evaluate all pigments based upon the following qualities: **mass tone** (the colour straight from the tube), **undertone** (the bias of a colour when applied in a thin film), **colour strength,** and **relative opacity.** From the cadmiums, (which offer rich colour, great opacity and covering power) to the phthalocyanines (which are characterized by high key colour, jewel-like natural transparency and tremendous tinting strength), Winsor & Newton uses only pigments that best represent the finest characteristics of a specific colour.

Winsor & Newton
The Colour Specialist

Permanence

The 20th century saw remarkable developments in the quality of pigments. While this has been accomplished largely as a result of innovations in other industries (automotive, ceramics and plastics, for example), the exponential increase in available hues and the dramatic increase in permanence have proven to be of tremendous benefit to fine artists. Winsor & Newton is now able to offer a balanced spectrum of traditional and modern colours that are notable for a level of permanence never before imagined by artists just a few decades ago. Ninety-eight percent of Winsor & Newton Artists' Oil Colour is now rated as "Permanent for Artists' Use." This assumes the thinnest of washes or the palest of tints, as well as full strength colour.

Contribution to a balanced spectrum

The best possible spectrum in any range is one that allows the artist to mix the widest possible array of colours. Winsor & Newton selects pigments based, not just upon individual characteristics, but upon how those characteristics contribute to the overall mixing and expressive opportunities within the entire spectrum. All Winsor & Newton ranges can be used to explore the full range of colour mixing qualities, from warm to cool, from high to low chroma, and everything else in between.

In 1892, Winsor & Newton was the first manufacturer to publish comprehensive technical information about pigments and colours.

THE FUNCTION OF PIGMENTS.

Pigments, in addition to having unique optical properties, have different physical characteristics. Some are jagged and irregular; others are smooth and round. Some absorb a great deal of oil during milling; others absorb but a small amount. In short, every pigment requires different procedures, skills, and details during the milling process.

Here's a working definition for pigment: **Pigments are compounds that remain as discrete particles, and can be ground into suspension, within a vehicle.** By contrast, a dye is a compound that goes into solution within its solvent, and that bleeds into surrounding materials. There's a common misconception that all pigments are lightfast and dyes are not. Not so. Lightfastness has little or nothing to do with whether or not a compound works as a dye or as a pigment.

Here's another interesting fact: a dye can be chemically "adjusted" to think it's a pigment - and to act like one, as well - when it's attached or precipitated onto an inert base like aluminum hydrate. Doing so produces something called a "lake" pigment. Genuine Rose Madder and Carmine are examples of lake pigments.

Organic vs. inorganic. These are terms used in describing chemicals comprised of specific elements. And the designation works when describing pigments, as well. Inorganic compounds are made from elements like metals (cadmium, cobalt, and iron, for example) while organic compounds are made from molecules that contain carbon in combination with hydrogen, and often with oxygen or nitrogen. Organic compounds are made from the same basic building blocks that make life. But definitions aren't always hard and fast, and metal compounds are often constituents in organic pigments. Copper, for example, is present in copper phthalocyanine.

Inorganic earth pigments (like yellow ochre and raw umber) have been used since pre- historic times. Inorganic pigments became common in the nineteenth century when the industrial revolution and developments in chemistry made it possible to combine metals like cadmium, or cobalt with other compounds. The results were products, like cadmium sulfide (which could be "adjusted" by adding varying degrees of selenium to make oranges and reds), that were highly stable, far less prone to fading, and that could be ground into a suspension within a vehicle like linseed oil for oil paint.

The first organic pigments were found in nature. Plant compounds, like woad, were used to produce indigo dye for cloth. It didn't take long to work out that indigo could also be made into a pigment. Indian yellow was an organic pigment made from the urine of cattle that had been fed Mango leaves at Monghyr in Bengal. The pigment was also known by the colourful name, "Indian Puree." Both of these organic colours were derived from environmental sources, and are different from modern, laboratory-synthesized pigment.

The very first, fully synthesized pigment was the result of an accident. Around 1704, a colourman named Diesbach was preparing a Florentine lake colour. By mistake, he used potash that had been inadvertently

contaminated with an animal oil. Instead of the red lake that was his aim, he got a much paler hue. While trying to adjust the colour further, he got a purple and then a deep blue. Prussian blue, in fact; the first laboratory synthesized pigment.

There's no question that there have been more advances in pigment and colour chemistry in the last fifty years than during the previous two millennia. The current revolution in organic pigments began early in the twentieth century, when the Germans synthesized arylamide yellow. Arylamides have continued to evolve in permanence and variety of hue, and are still used today. Winsor & Newton use the pigment in the production of Winsor yellows and cadmium hues.

In addition to setting a standard for modern laboratory synthesis, arylamide became the standard bearer for pigment nomenclature, as well, with the names of organic pigments becoming increasingly polysyllabic. Anthraquinones, dioxazines, pyrroles, phthalocyanines, and benzimidazalones are all products of 20th century pigment chemistry.

Working with organic and inorganic colours. Not only are there generalities that apply to the production of organic pigments (synthesized from carbon-based compounds in the laboratory), and inorganic colours (usually made from metallic elements), there are generalities that apply to how they function upon the palette, as well. Before outlining some of these characteristics, it's worth reminding the reader that these are not "rules." As said at the beginning of this section, every pigment is unique. And, sometimes, there are "organic-like" qualities that show up in inorganic colours and vice-versa. That said, here are three general principles:

When mixed, inorganic colours tend to more closely replicate the tonalities of the natural world. Because of the nature of reflected light and shadow, we live in a world of pure colours that combine into rich shades of grey. The physical and optical properties of inorganic colours, quite often, more closely capture those qualities of natural light and shadowed colour.

Organic colours are brighter, and tend to make brighter mixes. Because of their purity, natural translucency, and tinting strength, organic pigments produce mixed secondary and tertiary colour that tend to remain closer to the high chroma of their "parent" primaries.

The two can intermix quite happily. Try adding a small amount of an organic colour to an inorganic mix that has gone too grey or dull. You'll find that you can often bring surprising "punch" to mixes that are made largely from inorganic pigments, without losing their natural character.

Below are comments and descriptions about pigments that are commonly used in milling fine colour:

Whites

The first whites, used as colourant since pre-historic times, were from chalks taken from the earth. Illustrating that tonal opposites can come from identical sources, it's interesting to note that, very early in the history of colour, bones were used for making white as well as black pigments. Calcining (incinerating) the bones of animals produced a grey-white ash that was still in use through the middle ages on paper or parchment to create a gritty surface. If those same bones are charred within a sealed environment, the resulting product is black; bone black, in fact.

Chinese White, the first semi-opaque permanent white was invented by Winsor & Newton in 1834.

The whites available today offer a wide array of characteristics, in differing degrees of opacity, and are well suited for mixing or covering, depending upon the unique needs of the artist.

Chinese White. Invented by Winsor & Newton in 1834. The first semi-opaque permanent white. Made from Zinc White.

Cremnitz White. Pure lead white, ground in safflower oil, as prefered by some artists' using traditional techniques.

Flake White. Basic lead carbonate, with a small addition of zinc, which improves its colour and consistency. Flake White No. 1 is formulated to a thicker consistency than Flake White No. 2.

Foundation White. Flake White ground in linseed oil for extensive underpainting or modelling.

Iridescent White. A mica-based pigment available in Artists' Oil Colour for pearlescent white effects. It is lightfast, and can be intermixed.

Soft Mixing White. Available in Winton. Made from Titanium pigment. A soft consistency, excellent for strong tints and avoiding chalkiness.

Titanium White. The most opaque, highest tinting white. First made in 1870, introduced as an artists' colour in the 1920's. Now the most popular white.

Zinc White. The most transparent white with the lowest tinting strength. First made in the 18th century, entered common usage by the 1840's.

Blacks and Greys

The very first pre-historic black pigments are still in popular use today. Bone black (described, on page 45, as related to bone white) is offered under the name "Ivory Black." And Lamp Black is common in all media. Both are, technically, the very first organic colours, having been produced from animal sources. Both are highly stable forms of dense, elemental carbon. And there's nothing more permanent than elemental carbon, whether in the form of these simple pigments, or as layered graphite, or pressed into that most-valued of all crystal-lattice structures: the diamond. Even after all the breathtaking expertise and sophistication that has characterized pigment chemistry over the last century, there's still nothing that surpasses the versatility, the workability, and the permanence of these first carbon pigments first recognized by men and women sitting around the fire some 40,000 years ago.

Squid ink sacks, used historically in the production of Sepia. Sepia is made today from a mixture of umber and black.

Chinese Ink sticks are traditionally made from carbon black (or lamp black) and fish or animal oils.

Blue Black. In oil colour, this is a mixture of Ivory Black and Ultramarine.

Charcoal Grey. In oil colour, this is ground charcoal.

Davy's Gray. Originally a special variety of slate, now strengthened by the addition of other colours. Excellent for toning down mixtures without blackening them.

Ivory Black. Calcined bones, not using ivory.

Lamp Black. The oldest pigment made by man, made by collecting soot from burning oils.

Payne's Gray. A blue grey made from a mixture of crimson, blue and black. William Payne, a water colourist from Devon (active 1776-1830) is thought to be the source of the colour's name.

Sepia. Originally the ink from the bags of the cuttle fish. Now made from a mixture of umber and black.

Earths

Along with the prehistoric carbon blacks and whites, the earth colours made up the majority of the artists' palette until the Middle Ages. The jewel-like transparency (due to the presence of aluminium silicate within the pigment) and the rich tonality that comes with the very highest quality sienna earths were defining colours for artists from Rembrandt to Wyeth. Sadly, at the turn of the 21st century, the finest Sienna earths are becoming increasingly difficult to obtain, forcing manufacturers that insist upon using the natural pigment to produce a lesser quality colour. Winsor & Newton has, in many cases, chosen to make use of recently developed synthetic earth pigments rather than the remaining natural earths. Even though laboratory-derived, the new synthetic iron oxides are of a physical structure that offers many of qualities that made the original earth colours so extraordinary.

Cologne Earth or Van Dyke Brown is made from organic substances similar to lignite or brown coal.

Over the centuries, pigments have come from a variety of "colourful" sources, and one of the most interesting (and undeniably gruesome) was "Mummy Brown." First documented in the 16th century, mummies from Egypt were, in fact, ground into pigment. The characteristic colour was the result of asphaltum, a bituminous solid or semi-solid earth found in regions of oil deposits, and used in the embalming of Egyptian mummies. Its use ceased in the 19th Century.

Burnt Sienna. Originally calcined Raw Sienna. Winsor & Newton generally use a synthetic iron oxide to match the brilliance and transparency of their original.

Burnt Umber. Calcined Raw Umber.

Gold Ochre. Originally a variety of natural earth. Superseded by synthetic iron oxide.

Indian Red. Originally a variety of natural earth. Superseded by synthetic iron oxide.

Light Red. Originally calcined yellow ochre. Superseded by synthetic iron oxides.

Mars colours. Red, brown and yellow earths made from synthetic iron oxides. Usually opaque.

Raw Sienna. Natural yellow earth. From Winsor & Newton, the colour is bright, transparent, and has a low tinting strength. In some cases, synthetic iron oxide is substituted.

Raw Umber. Natural iron oxide.

Terra Rosa. Originally a variety of natural earth. Superseded by synthetic iron oxide.

Vandyke Brown. Originally bituminous earth, generally replaced by umber. Winsor & Newton tests do not show this pigment fading in oil colour.

Venetian Red. Originally a variety of natural earth. Superseded by synthetic iron oxides.

Yellow Ochre. Natural iron oxide.

Reds and Oranges

The most dynamic, fiery red - until the introduction of Cadmium red in the early 20th century - was Vermilion. Originally produced as crushed pigment from the mineral "cinnabar," the colour is a form of mercuric sulphide (HgS). Cinnabar was used by the Greeks and Romans, and transformed into the purer form of Vermilion, most likely, by the Chinese. The resulting rich, remarkably clear hue was unmatched by any other pigment. Because of toxic hazards present during the manufacturing process, Vermilion is no longer available. Luckily, by the time the colour was being phased out of production, the cadmiums had become available as replacement.

Cinnabar is the principal ore of Mercury, and the naturally occurring mineral form of Vermilion.

Over the last few decades, there has been explosive growth in the availability of reds and oranges made from organic, synthetic sources. Will one of those eventually supplant cadmium, as cadmium did Vermilion? Although perylene, pyrrole, quinacridone, and naphthol reds have their own, unique and quite wonderful qualities, there is still no red pigment that matches cadmium in the purity and "temperature" of hue, opacity, and that matches its mixing characteristics.

Alizarin Crimson. Introduced in 1868 and was a mainstay of the artists' palette until the 1980's. Superceded by Permanent Alizarin Crimson.

Benzimidazalone colours. Orange and maroon varieties first introduced in the 1980's. Good lightfastness, used under various names in different ranges.

Bright Red. Arylamide reds of good lightfastness, first used by Winsor & Newton in the late 1970's.

Brown Madder. Originally an alizarin lake, now made from quinacridone or benzimidazalone for greater lightfastness.

Cadmiums. Includes shades of yellows and oranges as well as reds with unrivalled opacity. Winsor & Newton do not use the lower quality cadmium-bariums. Yellows introduced in 1846, reds after 1910.

Carmine. A lake prepared from the female cochineal beetle. Fugitive. Only available in Artists' Oil Colour and in pigment form. First used in the 16th century.

Magenta. Made from a mixture of violet pigments. Winsor & Newton oil colour magentas are permanent.

Naphthol reds. A large group of red organic pigments, first introduced circa 1920. Winsor & Newton choose the most lightfast naphthol pigments available for use in their ranges.

Perinone Orange. A lightfast orange. Dye form discovered in 1920's.

Quinacridones. Violets and browns as well as reds. Highly transparent and lightfast. First introduced by Winsor & Newton in 1958 as Permanent Rose and Permanent Magenta.

Rose Dore. A beautiful, translucent pink. Made from rose madder in oil colour.

Rose Madder Genuine/Deep. Lake pigments made exclusively by Winsor & Newton from an original recipe developed in 1806 by master colourman George Field. Exquisite transparent pinks.

Scarlet Lake. Originally a lake pigment, Scarlet Lake is now made with a yellow shade naphthol red.

Vermilion. The bright, passionate red of Vermeer. Made from mercuric sulphide, and no longer available for health and safety reasons. Substitutes are offered based upon cadmium and a variety of other mixtures.

Yellows

The earliest yellows were the earth colours, many of which are still in use today. Indian yellow is among the most storied of pigments (see below), in part because of its origin, but also out of sheer wonder that anyone would even think to make intentional use of the raw material.

Genuine Gamboge is made from a tree resin, first imported from Cambodia to Europe in 1615.

Arylamide yellows. A group of synthetic organic yellows of good permanence. One of the earliest groups of laboratory derived organic pigments. First made circa 1909. The more recent arylamides have greater permanence and are used for Winsor Yellows and Cadmium hues.

Aureolin. Cobalt yellow. Originally introduced by William Winsor, circa 1862.

Azo condensation yellows. Introduced in the 1980's. Used in Transparent Yellow.

Chromes. Reds and oranges as well as yellows of good opacity and low cost. No longer used for health and safety reasons.

Indian Yellow. Originally made exclusively from the urine of cows that had been fed exclusively on mango leaves in Monghyr at Bengal. The original pigment was only moderately durable. Now made in an alternative form by Winsor & Newton as a permanent colour.

Jaune Brillant. A reddish variety of Naples Yellow available in Artists' Oil Colour.

Lemon Yellow. Originally barium chromate. Now substituted by either arylamide yellows or nickel titanate. The latter is a closer match to the original.

Naples Yellow. Originally lead antimoniate. Now supplied using a variety of pigments depending upon the range.

Nickel Titanate. Introduced by Winsor & Newton as a substitute for the original lemon yellow. Excellent low key semi-opaque yellow. First known in the 1960's.

Greens

The greens, as much as any other colour, have benefited from the recent growth in pigment chemistry. Prior to the development of synthetic organic pigments, there were virtually no options for artists desiring a green of bright tonality in combination with strong tinting strength, good permanence, and low toxicity. Thanks to modern chemistry, new greens are available that offer all of those characteristics, while older green pigments have been made more stable while retaining much of their original historical character.

Terre Verte is a green earth pigment used on Roman wall paintings at Pompeii. It is still used today.

Cobalt Green. See under “Blues.”

Emerald Green. Originally made from arsenic, now made from phthalocyanine and others, depending upon the range.

Hooker’s Green. Originally a mixture of Gamboge and Prussian Blue. Later made from organic lakes. Now made from quinacridones and phthalocyanines.

Olive Green. Originally made from fugitive lakes, Olive Green is made from a variety of pigments, depending upon the range.

Oxide of Chromium. An extremely opaque, earthy green. Known as early as 1809. Listed by Winsor & Newton in the late 1840’s.

Phthalocyanine: See under “blues.”

Sap Green. Originally made from buckthorn berries, later made form organic lakes of moderate durability. Superseded by Permanent Sap Green.

Terre Verte. A natural earth, strengthened by oxide of chromium.

Viridian. A transparent blue green of lower tinting strength than phthalocyanine, and so preferred by many artists. First made in 1838, introduced in England in 1862.

Blues

Over the last two millennia, there have been blues available to the artist that offer rich hue, good tinting strength and covering power. But they’ve come at a high price, both in terms of cost and in effort to produce. From “smalt,” the first-ever compound of cobalt, used by the Egyptians in a ground glass form, to “Lapis lazuli,” the natural form of ultramarine dug from mines in present-day Afghanistan. Blues were considered a symbol of high status, not only for the painter that could afford to use them, but for the patron that could afford to own a painting that included the colour. Beginning in 1704, with the synthesis of Prussian Blue, and then in 1806, with the development of Cobalt Blue, and finally, in 1826, with the introduction of

a laboratory-produced ultramarine that was identical to the natural lapis, blues became more affordable. And now, the availability of blues has grown exponentially with the introduction of phthalocyanine.

Lapis Lazuli is a semi-precious stone used as the original pigment for Ultramarine blue. Artificial Ultramarine (French Ultramarine) pigment has been made since 1826, and is identical in chemical structure to the original stone.

Antwerp Blue. A weaker variety of the very first laboratory synthesized (albeit accidentally) organic pigment, Prussian Blue.

Cerulean Blue. A type of cobalt. Introduced as early as 1805. Indispensable, semi-opaque, light blue of low tinting strength.

Cobalts. Blues, but also greens, violets, and yellows. Semi-transparent inorganic colours, excellent for tonal mixtures. Blue discovered by Thénard in 1804, redder variety (PB73) introduced by Winsor & Newton in the 1990's. Violet introduced in 1860, green discovered in 1780, and yellow in 1862.

French Ultramarine. Invented by Guimet in France in 1826 in a competition to replace genuine lapis lazuli. It is chemically identical to the natural pigment. Winsor & Newton French Ultramarine has a red undertone.

Indanthrene Blue. A dark blue which is redder than phthalocyanine. Dye form discovered in 1901. Makes excellent darks mixed with umbers.

Indigo. Originally derived from the woad plant, Indigo was made synthetically in the 19th century but was not permanent. Now made from a mixture of ultramarine, phthalocyanine and black.

Manganese Blue. Now unavailable, a substitute is supplied made from phthalocyanine.

Phthalocyanines. Winsor Blues and Winsor Greens. First introduced in 1938. Lightfast and very high in tinting strength.

Prussian Blue. Marks the beginning of new synthetic organic pigments for modern painting. Discovered by Diesbach in 1704. Masstone is bronzy. Peculiar characteristic of fading in the light and recovering in the dark.

Ultramarine (Green shade). A greener shade of Ultramarine.

Violets

Another notable pigment is Tyrian purple, a colour demanded by Roman Emperors and that was squeezed from a cyst on the body of a whelk (a kind of mollusc). 12,000 molluscs were required to extract about 1.5 grams of colourant, boosting the cost of the colour into the astronomical range. But there was no other source for a rich, true purple, a situation that continued to some degree until the nineteenth century. Until the introduction of dioxazine in the1960's, purples and violets either had to be mixed, or they were notorious for fading.

Caput Mortuum. A maroon Mars violet. Name originates from the 18th century.

Dioxazine. Deep violet supplied under its chemical name and Winsor Violet. Winsor & Newton tests show this colour to be permanent in oil, acrylic, and water colour. Introduced in the 1960's.

Mauve. Made from a mixture of violet pigments.

Purple Lake/Madder. Originally synthesized alizarins. Now supplied using other lightfast pigments.

Other Pigments

"Permanent" Colours. Organic pigments which replaced the first organics used in the 1920's.

Winsor Colours. Transparent organic colours across the spectrum which have good lightfastness.

Permanence

The stability of colour is more than just the inclusion of lightfast pigment. Permanence is also the stability of the paint film. At Winsor & Newton, we rate the permanence of our colours upon both factors: the lightfastness of the constituent pigment, as well as the proven stability of the overall formulation, including the vehicle.

Definition

The formal definition of the permanence of an artists' colour is "its durability when laid with a brush on paper or canvas, graded appropriately and displayed under a glass frame, in a dry room, freely exposed to ordinary daylight and an ordinary town atmosphere." This definition reflects the manner in which we expect to find paintings displayed.

Methodology

For testing purposes, we are able to use accelerated tests for lightfastness and binder stability, in addition to the information issued by our pigment suppliers. Our ratings, therefore, are a combination of the natural passage of time, accelerated tests, and pigment manufacturers' testing and development. Combined, these make up the most stringent tests in the industry.

Ratings **(Our permanence ratings are as follows:)**

AA – Extremely permanent
A – Permanent
B – Moderately durable
C – Fugitive

For further information on some colours the rating may include one or more of the following additions:

(i) "A" rated in full strength, may fade in thin washes.
(ii) Cannot be relied upon to withstand damp.
(iii) Bleached by acids, acidic atmospheres.

(iv) Fluctuating colour; fades in light, recovers in dark.
(v) Should not be prepared in pale tints with Flake White, as these will fade.
(vi) "A" rated with a coating of fixative.

It is worth noting that there are only three out of the 114 colours in the Artists' Oil Colour range that have a permanence rating of less than A. Winsor & Newton continues to produce these colours because of their unique character, and because of continuing demand by artists. These colours are:

Graded B	**Alternative if a permanent colour is required**
Alizarin Crimson	Permanent Alizarin Crimson
Sap Green	Permanent Sap Green

Graded C	**Alternative if a permanent colour is required**
Carmine	Permanent Alizarin Crimson

ASTM

The American Society for Testing and Materials (ASTM) has set standards for the performance of art materials, include standards regarding lightfastness of colours.

To measure lightfastness using this system, colours are reduced to a level of 40% reflectance by the addition of Titanium White. "Reflectance" is defined by the amount of light reflected from the colour swatch. The swatches are then subjected to testing in both sunlight and artificially accelerated conditions.

The results allow each colour to be rated on a scale of I-V, depending upon the medium. In this system, I is the highest lightfastness available, though both ratings I and II are considered permanent for artists' use. Where no ASTM rating is given for a Winsor & Newton colour, this usually indicates that the pigment or the type of range has not yet been tested by the ASTM. It does not automatically indicate a lack of lightfastness. In these cases, it is recommended that the Winsor & Newton permanence rating (listed upon the tube and within the colour literature) be used as an indication of the colour's resistance to fading.

The effect of artists' techniques on permanence

The artist can do a great deal to ensure the permanence of a material by using it with appropriate methods. The use of a poor quality ground, an unsuitable medium, or no final protection from dirt can lead to irreversible deterioration of an otherwise permanent material. Unreasonable expectations or unsound techniques can also lead to detrimental results. For example, using oil colours in very thick layers will result in a film that may well wrinkle or crack; or overthinning of colours with solvent can leave them underbound on the support, susceptible to damage and unsafe to varnish. It is a shocking fact that almost all problems relating to permanence or premature degradation of paintings stem from inappropriate technique, or the use of materials which are not manufactured specifically for the needs of artists and long-term durability. For further information on sound painting techniques, please refer to the section entitled "Applications, Techniques & Tips" on page 73-78 in this book, or to the Winsor & Newton product information leaflets, or visit our website on the internet, at **www.winsornewton.com.**

BINDER SELECTION

Just as rigorous standards are required in selecting pigments that will best meet the needs of the artist, so too, are binders and vehicles subjected to comprehensive testing before being selected for use in Winsor & Newton ranges.

Functions of binders.

The binder, or vehicle, for the colour serves three purposes:

- *First, to carry and coat the pigment.* For pigment to function effectively, it must be securely enveloped within the vehicle. This means that the pigment must be evenly dispersed and suspended, and that there must be little or no additional impurities.
- *Second, to impart working characteristics.* It's the vehicle and binder that carry the colour across the surface, and a fine vehicle offers specific working properties. It should allow the painter to manipulate the colour consistently. It should offer some resistance, although not enough as to be difficult to use. It should mix evenly with additive mediums, allowing the painter to adjust the consistency of colour in innumerable ways.

- *Third, to secure the colour to the surface in as stable and permanent a manner as possible.* On page 10, within the section entitled, "a few words about drying and the stable paint film," is a brief description of the drying mechanism of oil. The best quality binder will oxidize and form a stable, permanent film in a uniform manner. As long as it's applied with conscientious technique, colour that's well milled, with a quality oil vehicle, will dry without wrinkling, cracking, or buckling.

Below is a listing of the binders and vehicles used in milling Winsor & Newton oil colours:

Linseed oil. Derived from the flax plant, linseed oil is the predominant vegetable oil used in Winsor & Newton colours. It produces a tough, stable paint film.

Safflower oil. Because of its paler colour, Safflower oil is used for the milling of many whites. Safflower oil dries more slowly, but may be intermixed safely with linseed oil.

Alkyd resin. Alkyds are made from a naturally derived oil and polymerized through a chemical reaction with an alcohol and an acid. The result is a resin-like substance that can be used as a vehicle for paint, or as an additive medium. As with linseed oil, alkyds dry by oxidation, as opposed to evaporation of the solvent (like acrylics).

Water mixable oil. For use as the vehicle with Artisan Water Mixable Oils, linseed oil and safflower oils have been chemically modified to accept water as a solvent. With that exception, the modified oil vehicles function as do a conventional oil, accepting water as a diluent agent in much the same way that linseed oil does with white (mineral) spirit, and then forming a stable film through oxidation.

Other additives. Whilst it is the goal of Winsor & Newton to create all colours within our ranges in the purest form possible, there are instances in which a superior colour can be produced through the inclusion of specific additives. For example, a particular pigment, when mixed with oil, may make a sticky, unusable paste. This stickiness can be alleviated, and a smooth, workable colour can be produced, by adding an appropriate wetting agent or stabilizer.

MILLING

Producing the finest colour possible is more than creating an assemblage of rough ingredients. Just as every pigment and vehicle is unique, each requires unique milling methods. The best way to understand the milling process is to follow it, step by step, through the mill…

Milling colour is an exacting process, requiring that every ingredient be carefully selected and balanced to ensure the best possible working characteristics.

Step one – Selection of the finest materials. This includes selection of pigments and binders according to the standards outlined in earlier sections.

Step two – Formulation. Every pigment accepts oil differently. Individual formulations are developed by expert chemists. Before milling begins, a clear understanding of the physical properties of the raw materials, and how to bring out the true qualities of the pigment are essential.

Step three – Mixing, the precursor to milling. Using an industrial mixer, pigment and oil are mixed together in readiness for actual milling.

Step four – Milling. Since the 19th century, a machine called a triple roll mill has been most commonly used for dispersing the pigment into an even suspension. As the name implies, the colour mixture passes between three large, heavy rollers (sometimes made of steel, sometimes of granite,

depending upon the properties of the pigment), physically forcing the oil to "wet" the particles of pigment. The process is different for each pigment, often many passes through the mill are required to achieve complete dispersion.

Winsor & Newton mill its conventional oil colours to a fairly stiff viscosity to ensure complete retention of brush and knife strokes, and a surface free of levelling. There is also real advantage in offering stiff colour that can be easily adjusted by the artist to a more fluid, "juicy" viscosity through the addition of mediums. Conversely, it's virtually impossible to bring colour that's been milled to a soft viscosity safely back to a state of uniform stiff consistency.

Step five – Once the milling is complete, the colour must be evaluated in quality control. At Winsor & Newton, every batch is compared to previous batches. Each is tested for mass tone, undertone, viscosity and dispersion, to name but a few of the qualities that are evaluated. Through this method, we are able to ensure that our colours exhibit the optical and physical qualities that have been most desired by artists since the mid-nineteenth century. We also are able to ensure that recent improvements to the colour are added with consistency and uniformity.

This is the milling and testing procedure employed at Winsor & Newton. Only after the colour has been milled and tested to rigorous standards does it find its way into tubes or tins, and ultimately to the artists' palette.

Solvents, Oils, Mediums & Varnishes

Artists' colours are the basic ingredients for the painter. However, the range of oils, mediums, varnishes, solvents and primers are additional ingredients from which an infinite variety of adjustments can be made to the colour, all to suit the individual creative vision of the artist.

Solvents

Solvents are used to dilute the oil colour, as well as for cleaning brushes and palettes after the painting session. Solvents made for use by artists are intended to be fully volatile, meaning that upon evaporation from the paint mixture, they leave no residual matter behind. "Hardware/DIY grade" solvents, though

lower in cost, are not refined to the degree required by artists, and will often leave a tacky painting surface where used, and a paint film that won't fully dry.

English Distilled Turpentine All solvents vary in strength and in their capacity to "loosen up" the body of the colour. The artists' grade solvent with the greatest power is English Distilled Turpentine, the only artists' grade solvent capable of easily dissolving Dammar resin. Turpentine makes a viscous mixture, evaporates slowly, is the most hazardous and strongest smelling solvent commonly used by artists.

Artists' White Spirit (mineral spirit) makes a watery mixture, evaporates quickly, is less hazardous, less costly, and does not deteriorate on storage.

Sansodor makes a viscous mixture, evaporates slowly, is the least hazardous, costs approximately the same as turpentine, does not deteriorate on storage, and has minimal odour.

Sansodor is a very low aromatic solvent, well-suited for use by artists that prefer to avoid exposure to turpentine.

Solvents have become generally recognized as potential health hazards. Used sensibly, however, they do not present dangers to most users. For suggestions on the appropriate use of solvents, see the tips on health and safety on page 18-23.

Over the last few years, safer solvents have come to market. The new solvents have far lower aromatic content (the portion of the solvent that can be harmful). For painters that exhibit sensitivity to Turpentine, we

recommend Sansodor, a very low aromatic, hydrocarbon solvent.
The threshold limit value (TLV) is a measurement of how much solvent is safe within your immediate environment over a given period. The higher the number (in parts per million), the safer the product. The TLV for Sansodor is 300ppm. By contrast, the TLV for turpentine is 100ppm.

If preferring to avoid solvents altogether, Artisan Water Mixable Oils offer a genuine oil colour alternative, free from conventional solvents.

Drying oils and semi-drying oils

Drying oils and semi-drying oils are the vegetable oils used to make the colour, namely linseed, poppy and safflower. Different methods of processing produce oils with different drying rates, consistencies and colour. Drying oils are often used to modify the consistency and drying of colour in much the same way as prepared mediums.

Cold-Pressed Linseed Oil can be added to colour to reduce the consistency, improve flow, and increase gloss and transparency.

Refined Linseed Oil offers many of the same qualities as the Cold-Pressed variety, while slowing drying. It is the most popular oil.

Linseed Stand Oil improves the flow and levelling of colour. It's well suited for glazing and for fine detail and is resistant to yellowing while increasing the durability of the film. It slows drying and is the best oil to choose as an additive medium.

Bleached Linseed Oil speeds drying, improves flow and because of its pale hue, is particularly well suited for use with light colours.

Thickened Linseed Oil speeds drying even more than Bleached Linseed Oil, improves flow and gloss and increases the durability of the film.

Drying Linseed Oil promotes the fastest drying rate of all drying oils while increasing gloss.

Drying Poppy Oil speeds drying, is resistant to yellowing and is well suited for use with light colours.

Liquin is an alkyd-based medium that speeds the drying of oil colours, improves flow, and is ideal for glazing techniques.

MEDIUMS

Mediums are prepared additives that alter or enhance the characteristics of the colour. They are used to change the rate of drying, increase gloss, improve flow, provide texture, etc. Mediums are prepared using the same binders and vehicles used in milling the colour: linseed oil, alkyd resin, and modified oils for water mixability. Traditional oil based mediums are made from a combination of oil and solvents, while the alkyd based mediums combine synthetic alkyd resins and solvents.

Winsor & Newton
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All mediums should be used in moderation; they are intended only as an additive to the colour. In addition, the artist should avoid adding multiple mediums to the colour. The most stable film is likely to contain a single medium.

Because the alkyd resin functions in much the same way as a linseed oil, **alkyd mediums** may be added to conventional oils. Alkyd resin mediums offer dramatic advantages through accelerating the speed of drying, as well as adding a unique, natural translucency.

Liquin. Of all alkyd mediums, the most popular, world-wide, is Liquin. It speeds drying, improves flow, increases gloss, is resistant to yellowing, and is ideal for glazing.

Wingel speeds drying and improves flow and gloss while maintaining a slightly stiffer consistency than Liquin.

Oleopasto speeds drying and is ideally suited for impasto techniques.

Artists' Painting Medium is a prepared medium that thins the colour consistency, improves flow, slows drying, increases the durability of the film and is resistant to yellowing. Artists' Painting Medium is well suited for **"oiling out",** an application of medium to a painting which has sunk, or has lost its oil to the layer below (for a complete discussion of "oiling out", see the "Applications, Techniques & Tips" section, on page 77.). The most common cause for sinking is through the use of a ground that is too absorbent. Winsor & Newton gessoes should always be used as a ground rather than any household primer.

Mediums for Artisan Water Mixable Oil Colours

Mediums for Artisan Water Mixable Oil Colours should be confined to use with Artisan. The mediums are made from the same modified linseed oil used in the formulation of the colour, and will offer the same characteristics as mediums by the same name intended for conventional oils. When using these mediums, always shake the bottle well before use and mix the medium thoroughly into the colour, gradually adding small amounts of water only if needed.

Artisan Water Mixable Linseed Oil reduces the consistency and improves the flow of Artisan colours. It also increases gloss and transparency.

Artisan Water Mixable Stand Oil serves to improve flow and levelling of the colour. It is excellent for glazing and producing detail as it smoothes brushwork. It is slow drying.

Artisan Water Mixable Fast Drying Medium improves the flow of colour while it speeds the drying. As it smoothes brushwork, increases gloss and transparency, it is ideally suited for glazing applications. It is resistant to yellowing.

Artisan Water Mixable Painting Medium thins the consistency of Artisan colour and aids fine detail work. It also improves flow while drying slowly. The medium is well suited to "oiling out." (For a complete discussion of "oiling out", see the "Applications, Techniques & Tips" section, on page 77.)

Artisan Water Mixable Impasto Medium is a texturing medium for use with Artisan. Always mix thoroughly into the colour. For thick impasto, build the texture in layers, allowing each layer to dry before applying another. This medium speeds drying.

For specific attributes of each Winsor & Newton oil medium, drying oil, and solvent, see the tables on page 80-85.

VARNISHES

Varnishes are essential for the protection of finished oil paintings, and they fall into two basic categories: retouch and final.

Retouching varnish may be used as a temporary varnish and to provide temporary protection for recently finished oil paintings. Paintings should be allowed to dry as long as possible (at least one month) before applying the retouching varnish. The retouching varnish does not require removal before a final varnish is applied. Paintings upon which retouching varnish has been used still require an appropriate drying period before application of the final varnish (minimum of six months for thin films, longer for thick films).

Final Varnish

In general, the ideal final varnish should:

- *Be clear and resistant to yellowing*
- *Provide protection against dirt and dust*
- *Bring an even sheen to the surface of the painting, and;*
- *Be easily removable, or reversible, should the painting beneath need any attention, repair, restoration, or removal of dirty varnish*

Oil paintings should be allowed to dry thoroughly before applying a final varnish. A painting with thin colour will dry in six months, while an impasto painting will require longer. If paintings are varnished too early, one or more of the following problems may occur:

- *The varnish will turn tacky and not dry*
- *The varnish may sink into the paint film and turn the colour sensitive to solvent.* Any subsequent attempt to clean in the future may well remove the painting itself
- *Matt varnishes may sink, leaving the matting agent as a white deposit upon the painting surface*
- *The varnish film may crack*

To determine if your painting is ready to varnish, apply a small amount of white spirit (mineral spirits) to a clean cloth. Gently rub a corner of the painting surface with the solvent-carrying rag. If no colour comes free, the painting is ready for varnishing. If colour continues to come free following an appropriate drying period, it may mean that the oil vehicle has sunk because of a ground that's too absorbent, or that the colour was overthinned with solvent, and is subsequently underbound. The painting should be oiled out, and allowed to dry (see page 77). It will then be suitable for varnishing.

Application Methods. Varnishes may be applied by brush or by aerosol spray. For a satisfactory surface finish and to minimize exposure to any solvents within the mixture, Winsor & Newton does not recommend the application of varnish by hand and rag. For convenience, Winsor & Newton offers a selection of aerosol varnishes.

Winsor & Newton makes a wide range of varnishes. Below is a listing of the qualities that can be expected from each:

Dammar Varnish is the traditional high-gloss varnish. It requires a strong solvent, like turpentine for dilution, so appropriate care is required in handling.

Artists' Gloss Varnish & Artists' Picture Varnish are high gloss and water white. They serve as a modern replacement for Dammar.

Conserv-Art Gloss Varnish & Conserv-Art Matt Varnish (UK: renamed Artists' Matt Varnish) represent the very latest in varnish chemistry. The gloss variety offers the lowest gloss finish, they are water white and readily removable for over 100 years.

Wax Varnish offers the lowest, most matt finish and remains readily removable.

Aerosol Varnishes are a range including a series that are formulated for great clarity, as well as being non-yellowing and removable. The available aerosol varnishes are:

- *Artists' Picture Varnish (in Gloss, Satin, and Matt)*

- *Dammar Varnish (High Gloss)*
- *Artists' Retouching Varnish (Gloss)*

These products offer the quality and benefits of Winsor & Newton artists' quality varnishes for oils, alkyds and acrylics, but with the added convenience of an aerosol spray.

In addition, the aerosol range includes non-removable *All-Purpose Varnish (Gloss and Matt)* for use with acrylics and craft applications. There is also an excellent quality *Artists' Fixative* for use with pastels, graphite, and charcoal.

BRUSHES

Fine brushes can make a remarkable difference, ensuring that the painter is able to get the most from the working properties of the colour.

Just as the quality of the colour will have a profound effect upon the quality of your finished art, so too, will the brushes you select make a very real difference in your painting process. Different brushes offer specific qualities that are better suited to different media and applications. Selection of the correct brush will go a long way in helping the artist explore a particular technique with success.

NATURAL HOG BRUSHES

Because of the thicker nature of the colour and the roughness of the canvas, natural hog brushes are ideal for oils. The best quality hog is uniform

in flexibility and has a tendency to “flag”, or split, at the end of the hair. Flagged ends are desirable in that they allow heavy colour to be moved about the surface with greater consistency and control. The very best hog brushes have been assembled to take advantage of the slight curl that comes with hog hair, cupping them so the bristles curve inward and naturally interlock. Interlocked bristles ensure that the brush holds its shape, and provide control that is dramatically superior to brushes made with lesser quality bristles. Hog bristles hold up well to solvent, but tend to soften and lose spring when immersed in water. Examples of natural hog bristle brushes are:

Artists’ Hog and Rathbone. Artists’ Hog brushes (USA named Rathbone) are made from the finest hog available. Each brush has a seamless nickel-plated ferrule and is long-handled. The brushes are assembled to ensure naturally interlocked bristles.

Winton Fine Hog Brushes have been specifically developed for use with Winton oils, but are well suited for any conventional oil or alkyd. Winton brushes are made with fine hog bristles and interlocked. These brushes combine excellent quality with economical pricing.

NATURAL SOFT HAIR BRUSHES

As colour is thinned to a fluid consistency, a softer brush becomes necessary. When glazing or working on fine detail, soft sable brushes are preferred. Smooth applications are possible without leaving any brushmarks. To avoid excess wear, colours can be mixed on the palette with hog brushes or a knife, and the softer sable brushes used for painting. An excellent soft natural hair brush for oils is:

Cirrus Long Handle Brushes are part of the Cirrus kolinsky sable range,brushes that have been developed to provide sable quality at an affordable price. The brushes are hand-made by our skilled brushmakers. They offer excellent spring and colour carrying capacity. The LH (long-handled) brushes are perfect for detail work and glazing when working with thinned oil, alkyd, or water mixable oil colours.

Synthetic brushes

The last two decades have seen remarkable developments in the production of synthetic filament brushes. Many synthetics offer performance equal, and in some cases, even superior to natural hair brushes. There are synthetics that are well suited to heavy body colour as well as for thinned, fluid paint, for example:

Artisan Brushes for water mixable oil have been specifically designed to offer the performance characteristics of hog bristle, yet maintain their shape and spring when in contact with water, particularly during prolonged painting sessions with water mixable oil colours.

Brush Information

Head shapes.

The hog shapes are as follows:

The round. For general use and application of detail.

The flat. For general use and for application of colour in broad strokes.

The short flat. Similar in shape to the flat but with potential for greater control due to the shorter, stiffer filament.

Winsor & Newton
The Colour Specialist

The filbert. Similar to the flat but with a rounded tip, providing smoother application of colour with superior control.

The fan. Intended for blending and softening of colour edges. Well suited to special effects such as foliage, hair, clouds and others.

Long or Short handles. Long handles are designed to allow the painter to stand back and work some distance away from the painting surface. Short handled brushes are intended for detail work, where the artists works closely to the painting.

Brush care. To ensure the best performance and long lasting quality of your brushes, follow these simple rules:

- *Always clean the brushes with plenty of soap and water, or with Winsor & Newton Artgel and water until all traces of colour have gone.*
- *Remove excess water and re-shape the head.*
- *Never leave brushes standing upon their heads.*
- *Store the brushes carefully, head uppermost.*

Artgel is a hygienic cleaner which quickly and effectively removes oil and alkyd colours from brushes and hands more safely than turpentine or white spirit. It also help to restore natural oils to the skin, and conditions your brushes, as well.

Artgel is an excellent cleaner for brushes and hands.

Applications, Techniques & Tips

The following are descriptions of a variety of applications and techniques that will help ensure your success with oil colours.

Surface preparation

The permanence of the painting begins with the surface upon which it's created. There are a number of surfaces that are of proven stability, but all have one thing in common: they allow the essential integrity of the paint film to remain undisturbed for generations. They are stable themselves, and because oil can become progressively more brittle as it ages, they impose a minimum of flex or shock upon the film. For long term adhesion, they present a moderate degree of tooth or texture as well as a suitable amount of absorbency. Too much absorbency leads to sinking and drawing of the oil vehicle away from the pigment, while too little means that the film may ultimately loosen and flake.

Here, then, are the primers and supports, along with suggestions for their appropriate preparation.

Primer types. Primers control the texture, absorbency and colour of your support. A high proportion of technical problems experienced by artists are due to a poor quality ground. Winsor & Newton primers and ready-made surfaces ensure good results by controlling texture, absorbency, and colour. There are two types of primer:

Acrylic. As a result of their formulation, Winsor & Newton acrylic primers are suitable for oil painting. They dry quickly and do not require any sizing underneath. Winsor & Newton **Acrylic Gesso Primer** has the highest covering power and is the best primer if using one coat only. **Galeria Gesso** provides a good quality gesso at an affordable price.

Clear Gesso Base is a unique product, which provides tooth and only a translucent film. Adding acrylic colour to Clear Gesso Base allows the creation of a coloured gesso.

Oil primer. Oil Painting Primer imparts a traditional base; the surface acquires a slightly increased degree of gloss and smoothness comparedto gesso. Oil primed canvases may slacken off less than acrylic primed canvases. A coat of warm glue size is required first. The primer should be left to dry overnight.

SUPPORTS

Through the preparation of your own surfaces, you can choose any dimension or shape that you like. Here are those that are used most commonly:

Wood has been used as painting support for centuries. In addition to their own permanence, hard woods offer a singular advantage in their rigidity, making for a support that minimizes any shock or flexing upon the paint film.

Fibreboard (MDF) and masonite (hardboard) offer stability and rigidity at a lower cost than hardwood panels, and are far more dimensionally stable.

Paper is popular for sketching in oil. It's attractive for its texture and drag. Using paper is acceptable with oils, as long as the sheet selected is a good quality, heavy water colour paper, and is thinly primed with Acrylic Gesso Primer.

Canvas, when stretched over an open frame, has been the most popular support for oils since the 17th century. The weave of cloth, combined with the spring of the stretched material, makes for a surface that can be quite rewarding and pleasurable upon which to work.

Canvas board has been commonly used for sketching outdoors. Boards take up less room and are less easily damaged than stretched canvases.

Winsor boards are made from a substantial substrate and high quality cloth, making them superior in quality to coated sketching boards.

Painting Rules

Fat over lean. This is the most often-repeated principle when referring to "building" the oil painting film. What it really implies is flexible over less flexible, for, when increasingly flexible layers are built one on top of another, the final paint film will have the greatest possible resiliency, and will be more resistant to cracking. Increasing flexibility is accomplished by adding more medium or oil (a "fatter" mixture) and less solvent to each layer of colour. Contrary to many publications, neither oil absorption, nor oil index information is required for observing this rule.

Thick over thin. Thicker layers of oil colour are best applied alone or over thinner underlayers, ensuring that the thick layers are able to dry.

Drying rates. The different drying rates of Winsor & Newton oil colours are due to the different reactions of each pigment when dispersed in oil. Some pigments serve as chemical catalysts, accelerating the drying process. Others affect it little, while others slow the process. Slow drying underlayers can cause cracking of any subsequent faster drying layers. A list of fast, medium and slow drying colours is included as part of the information regarding each oil colour range, beginning on page 27 of this book. Generally, the only requirement is to avoid thick, continuous layers of slow drying colour in any underpainting.

Underpainting (the first layer of colour upon the canvas is called the underpainting). Because of its paler colour, safflower oil is used in the formulation of most Winsor & Newton whites. For extensive underpainting and priming, however, safflower whites are not recommended. When oil colours dry, the paint film undergoes a number of dimensional changes, increasing and decreasing in weight as different chemical reactions occur. Semi-drying oils, such as safflower and poppy oil, undergo greater dimensional changes than linseed oil. While a safflower oil based white is perfectly appropriate for use in normal applications and mixing, it is not suitable for use with underpainting. The movement of the film can lead to cracking in the layers applied above. Hence for underpainting, we recommend *Underpainting White;* titanium

pigment ground in linseed oil, and ***Foundation White,*** a lead pigment, also ground in linseed oil.

TECHNIQUES

Colour mixing. The objective of colour mixing is to create the largest number of options from the minimum number of colours. All pigments used in the formulation of Winsor & Newton ranges are selected to create a balanced spectrum, allowing the artist to mix the colours desired, as efficiently as possible. To facilitate a better understanding of how different pigments can help in developing individual colour sensibilities, we have published a full-colour booklet entitled, "Hints, Tips & Techniques: Colour Mixing." Ask your retailer for a copy or visit our website at **www.winsornewton.com**.

Wet into wet is the process of adding fresh colour into existing, still wet layers. The technique can be used to bring great immediacy and interest to the image. It also can be used as a technique for blending, and can be accomplished with the colour in virtually any state of viscosity, from thick and stiff, to fluid.

Glazing is the build up of layers of transparent or semi-transparent colours over dry underlayers. The effect is one of great depth and spatial atmosphere. It is a lengthy technique, but the effects in oil are unmatched when compared to other media. Liquin, Stand Oil, or, if working in Artisan Water Mixable Oil; Artisan Fast Drying Medium, are all well suited for glazing techniques. Griffin Alkyd Fast-Drying Oil Colours are perfectly suited for building layers of brilliant, glazed colour.

Impasto is the technique of applying stiff, thick colour, leaving brush and knife marks as a central element in the painting. An impasto surface can be dynamic and powerful. For thick impasto, build the texture in several layers, allowing each to dry before applying the next. For use with conventional oil colours, Oleopasto is an alkyd-based medium that will safely maintain the stiffness of the paint, while accelerating drying. For use with Artisan Water Mixable Oils, use Artisan Impasto medium.

S'graffito is the technique of scraping into a wet oil film, usually with the handle end of a brush, or a painting knife. It's an expressive effect, and is also effective for defining outlines.

Scumbling. With a stiff brush, work a thin film of opaque or semi-opaque colour loosely over your painting, allowing colour from the layer below to show through. The effect is highly atmospheric.

Oiling out is the application of oil medium to a painting that has sunk, or lost oil to the layer below. Winsor & Newton *Artists' Painting Medium* should be sparingly rubbed into any sunken area with a soft cloth. Wipe off any residue, and leave the painting to dry for a day or two. If smaller dull areas remain, repeat the process until the painting has regained an even sheen. The most common cause for sinking is the use of a ground which is too absorbent, and often occurs if a household primer is used. Sinking can also result if the colour has been overthinned with solvent.

Murals. With appropriate preparation, oil colours can be an excellent choice for murals. Unless the wall is new, the surface should be stripped back to plaster and must not be "friable" (dusty or broken) or damp. If new, the plaster should be sized and then primed with Acrylic Gesso Primer or Oil Painting Primer. The finished work should be allowed to dry for a suitable period (at least six months for traditional oils; one month for Griffin Alkyd Colours), and then protected with a removable picture varnish (if indoors). Griffin Fast-Drying Oil Colour, because of its faster drying time and tough film, is well-suited as an oil colour for mural application.

Monoprinting. Artists' Oilbar has proven to be particularly popular with printmakers for monoprinting. Oilbar can be used directly on a glass plate, with or without medium, for direct transfer to the paper.

SUGGESTED COLOUR PALETTES FOR MIXING

The use of three primary colours alone is an outstanding exercise. It is necessary to choose the red, blue, and yellow which are the purest, eg. the red which is as close as possible to a mid-point between a blue shade and a yellow shade. This ensures the cleanest violets and the cleanest oranges when using but one red. In theory, the three primaries are magenta, cyan, and yellow. But remember that each artists' colour has a masstone and an undertone, and that artists require a colour that offers specific handling properties. Permanence is also critical. Therefore, the primaries recommended below offer the best combination of mixing properties, working characteristics, and permanence.

The three primary colours in each of the oil ranges are as follows:

Artists' Oil Colour: Transparent Yellow, Winsor Blue (Red Shade), and Permanent Rose.

Winton Oil Colour: Cadmium Lemon Hue, Phthalo Blue, and Permanent Rose.

Artisan Water Mixable Oil Colour: Lemon Yellow, Phthalo Blue (Red Shade), and Permanent Rose.

Griffin Alkyd Fast-Drying Oil Colour: Winsor Lemon, Phthalo Blue, and Permanent Rose.

Artists' Oilbar: Cadmium Lemon, French Ultramarine, Alizarin Crimson.

Six Colour Systems A broader spectrum can be mixed with six colours. As a learning exercise, the move from three colours to six also begin to introduce other variables, such as opacity, tinting strength and drying rate. Here are the recommended six colour palettes:

Artists' Oil Colour: Winsor Lemon, Winsor Yellow, French Ultramarine, Winsor Blue (Green Shade), Permanent Rose and Cadmium Red.

Winton Oil Colour: Cadmium Lemon Hue, Cadmium Yellow Hue, French Ultramarine, Phthalo Blue, Permanent Rose and Cadmium Red Hue.

Artisan Water Mixable Oil Colour: Lemon Yellow, Cadmium Yellow Hue, French Ultramarine, Phthalo Blue (Red Shade), Permanent Rose and Cadmium Red Hue.

Griffin Alkyd Fast-Drying Oil Colour: Winsor Lemon, Winsor Yellow, French Ultramarine, Phthalo Blue, Permanent Rose and Cadmium Red Medium.

Artists' Oilbar: Cadmium Lemon, Cadmium Yellow Pale, French Ultramarine, Manganese Blue Hue, Permanent Magenta and Cadmium Red.

For a detailed discussion on colour mixing, ask your local Winsor & Newton stockist for a copy of the booklet entitled, "Hints, Tips and Techniques: Colour Mixing." Or visit the Winsor & Newton website, at **www.winsornewton.com.** Tips for colour mixing can be found in the Hints, Tips, & Techniques section.

NOTES

Solvents & Cleaners	For Use With		Characteristics							Sizes Available			
Denotes relative speed of evaporation *X^2 → X^3 Faster*	Oils	Griffin Alkyd	Picture Cleaning	Varnish Removing	Diluting	Speed Of evaporation	Low Odor	Cleans Materials	Can Deteriorate	75ml	250ml	500ml	1 Litre
Artists' White Spirit	X	X	X	X	X	X^3		X		X			X
English Distilled Turpentine	X	X	X	X	X	X^2		X	X	X	X	X	X
Sansodor Low Odour Solvent	X	X			X	X^2	X	X		X	X	X	X

Drying Oils	For Use With			Characteristics										Sizes Available			
Denotes relative speed of drying *X^1 → X^3 Faster*	Oils	Griffin Alkyd	Artisan Water Mixable Oils	Speeds Drying	Slows Drying	Improves Flow	Increases Gloss	Increases Transparency	Reduces Consistency	Increases Durability of Film	Resistant to Yellowing	For Use with pale colour	For Preparing Mediums	75ml	250ml	500ml	1 Litre
Cold Pressed Linseed Oil	X	X				X	X	X	X					X			
Bleached Linseed Oil	X	X		X^1		X	X	X	X			X		X			
Thickened Linseed Oil	X	X		X^2		X	X	X	X	X			X	X			
Drying Linseed Oil	X	X		X^3			X	X	X					X			
Refined Linseed Oil	X	X			X		X	X	X					X			
Drying Poppy Oil	X	X		X^1			X	X	X		X	X		X	X	X	X
Stand Linseed Oil	X	X			X	X	X	X	X	X	X		X	X			
Artisan Water Mixable Linseed Oil			X				X	X	X					X	X		
Artisan Water Mixable Stand Oil			X		X	X	X	X	X					X	X		

Mediums	For Use With			Characteristics													Sizes Available						
	Oils	Griffin Alkyd	Artisan Water Mixable Oils	Speeds Drying	Slows Drying	Improves Flow	Controls Flow	Increases Gloss	Increases Transparency	Translucent	Reduces Consistency	Oils Out	Increases Durability of Film	Resistant to Yellowing	Impasto	Textures	37ml	60ml	75ml	200ml	250ml	500ml	1 Litre
Artists' Painting Medium	X	X			X	X		X	X		X	X	X	X					X		X	X	
Liquin	X	X		X		X	X		X		X			X					X		X	X	X
Oleopasto	X	X		X						X				X	X	X		X		X			
Wingel	X	X		X		X	X	X	X					X			X	X		X			
Artisan Water Mixable Painting Medium			X		X	X		X	X		X	X							X		X		
Artisan Water Mixable Fast Drying Medium			X	X			X	X	X		X			X					X		X		
Artisan Water Mixable Impasto Medium			X	X						X					X	X		X		X			

Varnishes	For Use With			Characteristics											Sizes Available				
A *Denotes degree of removability* X 1 → X 2 *Easier to remove* B *Denotes relative gloss levels* X 1 *High Gloss* → X 3 *Low Gloss* C *Denotes relative matt levels* X 1 *Most Matt* → X 2 *Less Matt*	Oils	Griffin Alkyd	Artisan Water Mixable Oils	A Removable	Temporary Protection	B Gloss	C Matt	Sheen Finish	Quick Drying	Increased Film Flexibility	Non Yellowing	Liable to Bloom or Crack	Superior optical properties	UV absorber	60ml	75ml	250ml	500ml	150ML Aerosol
Conserv–Art Gloss Art	X	X	X	X 2		X 3			X	X	X		X	X		X	X		
Conserv-Art Matt Varnish	**Renamed Artists' Matt Varnish (except in US)**																		
Artists' Gloss Varnish	X	X	X	X 1		X 2			X		X								
Artists' Matt Varnish	X	X	X	X 2			X 2		X	X	X		X	X		X	X	X	
Artists' Picture Varnish	X	X	X	X 1		X 2			X		X					X			
Artists' Retouching Varnish	X	X	X	X 1	X	X 3			X		X								X
Dammar Varnish	X	X	X	X 1		X 1			X			X				X	X	X	
Wax Varnish	X	X	X	X 1			X 1	X	X	X	X				X				

Aerosols	For Use With				Characteristics										Size	
	Oils	Griffin Alkyd	Artisan Water Mixable Oils	Arts & Crafts	Removable	Permanent Protection	Gloss	Satin	Matt	Quick Drying	Non Yellowing	UV Absorber	Water Resistant	Hard Film	150ML Aerosol*	400ML Aerosol
Artists' Picture Varnish Gloss	X	X	X		X	X	X				X	X			X	X
Artists' Picture Varnish Satin	X	X	X		X	X		X			X	X			X	X
Artists' Picture Varnish Matt	X	X	X		X	X			X		X	X			X	X
Dammar Varnish High Gloss	X	X	X		X	X	X								X	X
Artists' Retouching Varnish Gloss	X	X	X		X		X			X	X				X	X
All Purpose Varnish Gloss			X	X		X	X				X		X	X	X	X
All Purpose Varnish Matt			X	X		X			X		X		X	X	X	X

*Not available in USA

Primers & Undercoats	For Use With			Characteristics				Sizes Available											
Denotes relative speed of drying *$X^1 \longrightarrow X^4$ Faster*	Oils	Griffin Alkyd	Artisan Water Mixable Oils	Multi Surface	Fast Drying	Suitable for Paper	Size Required	21ml	37ml	60ml	75ml	120ml	150ml	237ml	250ml	474ml	500ml	1 Litre	2.5 Litre
Oil Painting Primer	X	X	X	X	X^3		X								X		X	X	
Acrylic Gesso Primer	X	X	X	X	X^4	X								X		X		X	
Clear Gesso Base	X	X	X	X	X^4	X								X		X		X	
Galeria Gesso Primer	X	X	X	X	X^4	X												X	X
Foundation White	X				X^1		X			X			X						
Underpainting White	X		X	X	X^2		X	X	X	X		X							
Lifting Preparation	X	X	X	X		X					X								

Artists' Oil Colour

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
004	Alizarin Crimson	1,2-dihydroxyanthraquinine lake	PR 83	58000	2	B	III	T
016	Aureolin	Potassium cobaltinitrite	PY 40	77357	5	A	II	T
034	Blue Black	Bone black, Complex sodium alumino - silicate containing sulphur	PBk 9 PB 29	77267 77007	1	AA	I	O
042	Bright Red	Naphthol carbamide	PR 170	12475	1	A	II	T
058	Bronze	Iron oxides/titanium dioxide coated mica	-	-	2	A	---	O
063	Brown Madder Alizarin	Anthraquinone Natural iron oxide	PR 177 PBr 7	65300 77491	1 1	A A	I I	T T
074	Burnt Sienna	Synthetic iron oxide	PR 101	77491	1	AA	I	T
076	Burnt Umber	Calcined natural earth	PBr 7	77491	1	AA	I	T
080	Cadmium Green	Cadmium zinc sulphide, Hydrated chromium oxide	PY 35 PG 18	77205 77289	4	A	I	O
084	Cadmium Green Pale	Cadmium zinc sulphide, Hydrated chromium oxide	PY 35 PG 18	77205 77289	4	A	I	O
086	Cadmium Lemon	Cadmium zinc sulphide	PY 35	77205	4	A	I	O
089	Cadmium Orange	Cadmium sulphoselenide	PO 20 PR 108	77199 77202	4	A	I	O
094	Cadmium Red	Cadmium sulphoselenide	PR 108	77202	4	A	I	O
097	Cadmium Red Deep	Cadmium sulphoselenide	PR 108	77202	4	A	I	O
106	Cadmium Scarlet	Cadmium sulphoselenide	PR 108	77202	4	A	I	O
108	Cadmium Yellow	Cadmium zinc sulphide	PY 35	77205	4	A	I	O
111	Cadmium Yellow Deep	Cadmium sulphoselenide, Cadmium zinc sulphide	PO 20 PY 35	77199 77205	4	A	I	O
118	Cadmium Yellow Pale	Cadmium zinc sulphide	PY 35	77205	4	A	I	O
127	Carmine	Cochineal lake	NR 4	75470	6	C	---	T
137	Cerulean Blue	Oxides of cobalt and tin	PB 35	77368	4	AA	I	O
142	Charcoal Grey	Ground charcoal	PBk 8	77268	1	AA	---	T
147	Chrome Green Deep Hue	Copper phthalocyanine, Chlorinated copper phthalocyanine, Synthetic iron oxide	PB 15 PG 7 PY 42	74160 74260 77492	1	A	I	O
149	Chrome Yellow Hue	Arylamide yellow, Benzimidazolone orange	PY 74 PO 62	11741	1	A	I	O
178	Cobalt Blue	Cobalt aluminium oxide	PB 28	77346	4	AA	I	T
180	Cobalt Blue Deep	Cobalt silicate	PB 73	77364	5	AA	---	T
184	Cobalt Green	Cobalt titanate Cobalt chromite	PG50 PG 26	77377 77344	6 6	AA AA	I I	O O
185	Cobalt Green Deep	Cobalt/zinc oxide	PG 19	77335	6	AA	I	O
190	Cobalt Turquoise	Cobalt / aluminium / chromium oxide	PB 36	77343	5	AA	I	T
192	Cobalt Violet	Cobalt phosphate	PV 14	77360	6	AA	I	T
193	Cobalt Violet Dark	Cobalt phosphate	PV 14	77360	6	AA	I	T
214	Copper	Iron oxides / titanium dioxide coated mica	-	-	2	A	---	O
201	Cremnitz White	Basic lead carbonate	PW 1	77597	1	A	I	O
217	Davy's Gray	Slate powder, Synthetic iron oxide, Carbon black	PBk 19 PY42 PBk 7	77017 77492 77262	2	AA	I	T
247	Flake White No. 2	Basic lead carbonate, Zinc oxide	PW 1 PW 4	77597 77947	1	A	I	O
246	Flake White No. 1	Basic lead carbonate, Zinc oxide	PW 1 PW 4	77597 77947	1	A	I	O
257	Flesh Tint	Zinc oxide, Synthetic iron oxide, Quinacridone	PW 4 PY 42 PV 19	77497 77492 46500	2	A	I	O
261	Foundation White	Basic lead carbonate, Zinc oxide	PW 1 PW 4	77597 77947	1	A	I	O
263	French Ultramarine	Complex sodium alumino-silicate containing sulphur	PB 29	77007	2	A(iii)	I	T
283	Gold	Iron oxides/titanium dioxide coated mica	-	-	2	A	---	O
285	Gold Ochre	Synthetic iron oxide	PY 42	77492	1	AA	I	O
321	Indanthrene Blue	Indanthrone	PB 60	69800	4	A	I	T
317	Indian Red	Synthetic iron oxide	PR 101	77491	2	AA	I	O
319	Indian Yellow	Diarylide yellow, Synthetic iron oxide	PY 83 PR 101	21108 77491	2	A	I	T
322	Indigo	Carbon black, Copper phthalocyanine Complex sodium alumino - silicate containing sulphur	PBk 7 PB 15 PB 29	77266 74160 77007	2	A	I	T
330	Iridescent White	Titanium dioxide coated mica	-	-	1	A	---	O
331	Ivory Black	Bone black	PBk 9	77267	1	AA	I	O
333	Jaune Brillant	BON arylamide (Naphthol AS), Synthetic iron oxide, Arylamide yellow, Zinc oxide	PR 188 PY 42 PY 3 PW 4	12467 77492 11710 77947	1	A	I	O
337	Lamp Black	Carbon black	PBk 6	77266	1	AA	I	O
347	Lemon Yellow Hue	Nickel titanate	PY 53	77788	4	AA	I	O
362	Light Red	Synthetic iron oxide	PR 101	77491	1	AA	I	O
380	Magenta	Dioxazine violet, Quinacridone red	PV 23 PR 122	51319 73915	2	A	I	T
379	Manganese Blue Hue	Copper phthalocyanine Chlorinated copper phthalocyanine	PB 15 PG 7	74160 74260	1	A	I	T
386	Mars Black	Synthetic iron oxide	PBk 11	77499	2	AA	I	O

Artists' Oil Colour (continued)

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
388	Mars Brown	Synthetic iron oxide	PR 101	77491	2	AA	I	O
390	Mars Orange	Synthetic iron oxides	PY 42	77492	2	AA	I	O
			PR 101	77491				
394	Mars Violet	Synthetic iron oxide	PR 101	77491	2	AA	I	O
395	Mars Violet Deep	Synthetic iron oxide	PR 101	77491	2	AA	I	O
396	Mars Yellow	Synthetic yellow iron oxide	PY 42	77492	2	AA	I	O
400	Mauve Blue Shade	Quinacridone, Dioxazine, Copper phthalocyanine	PV 19	46500	1	A	I	T
			PV 23	51319				
			PB 15	74160				
422	Naples Yellow	Zinc oxide, Chromium titanium oxide	PW 4	77947	1	A	---	O
			PBr 24	77310				
426	Naples Yellow Light	Azo condensation yellow, Benzimidaazolone orange, Zinc oxide	PY 128	-	1	A	---	O
			PO 62					
			PW 4	77947				
447	Olive Green	Quinacridone gold, Carbon black	PO 49	-	2	A	I	T
			PBk 7	77266				
459	Oxide of Chromium	Chromium oxide	PG 17	77288	4	AA	I	O
465	Payne's Gray	Complex sodium alumino-silicate containing sulphur, Carbon black	PB 29	77007	1	AA	I	T
			PBk 6	77266				
		Synthetic iron oxide, Powdered slate	PR 101	77491				
			PBk 19	77017				
468	Permanent Alizarin Crimson	Anthraquinone	PR 177	65300	4	A	---	T
481	Permanent Green	Arylamide yellow, Synthetic iron oxide, Chlorinated copper phthalocyanine	PY 3	11710	2	A	II	T
			PY 42	77492				
			PG 7	74260				
482	Permanent Green Deep	Chlorinated copper phthalocyanine Arylamide yellow	PG 7	74260	2	A	II	T
			PY 3	11710				
483	Permanent Green Light	Arylamide yellow, Titanium dioxide Chlorinated copper phthalocyanine	PY 1	11680	2	A	II	T
			PW 6	77891				
			PG 7	74260				
489	Permanent Magenta	Linear quinacridone	PV 19	46500	2	A	I	T
491	Permanent Mauve	Manganese phosphate	PV 16	77742	4	AA	I	T
502	Permanent Rose	Linear quinacridone	PV 19	46500	2	A	I	T
503	Permanent Sap Green	Arylamide yellow	PY1	11680	4	A	I	T
		Azomethine	PY129	48042	4	A	I	T
511	Pewter	Iron oxides/titanium dioxide coated mica	-	-	2	A	---	O
526	Phthalo Turquoise	Copper phthalocyanine, Chlorinated copper phthalocyanine	PB 15	74160	1	A	I	T
			PG 7	74260				
538	Prussian Blue	Alkali ferriferrocyanide	PB 27	77510	1	A	I	T
540	Prussian Green	Quinacridone gold, Copper phthalocyanine	PO 49	-	2	A	I	T
			PB 15	74160				
544	Purple Lake	Benzimidazolone	PBr25	12510	1	A	---	T
		Dioxazine	PV23	51319	1	A	---	T
546	Purple Madder Alizarin	Benzimidazolone maroon	PR 171	12512	2	A	---	T
552	Raw Sienna	Synthetic iron oxide	PY42	77492	1	AA	I	T
		Natural iron oxide	PY 43	77492	1	AA	I	T
554	Raw Umber	Natural iron oxide	PBr 7	77492	1	AA	I	T
573	Renaissance Gold	Iron oxides/titanium dioxide coated mica	-	-	2	A	---	O
576	Rose Doré	Lake of natural madder	NR 9	75330	5	A	II	T
585	Rose Madder Deep	Lake of natural madder	NR 9	75330	5	A	II	T
585	Rose Madder Genuine	Lake of natural madder	NR 9	75330	5	A	II	T
599	Sap Green	Ferrous nitrose-beta naphtha lake, Tartrazine lake	PG 12	10020:1	2	B	III	T
			PY 100	19140:1				
603	Scarlet Lake	BON arylamide	PR 188	12467	2	A	I	T
617	Silver	Aluminium flake	PM 1	77000	2	A	---	O
635	Terra Rosa	Natural iron oxide, Synthetic iron oxide	PBr 7	77492	1	AA	I	O
			PR 101	77491				
637	Terre Verte	Natural earth, Hydrated chromium oxide	PG 23	77009	1	AA	I	T
			PG 18	77289				
644	Titanium White	Titanium dioxide, Zinc oxide	PW 6	77891	1	AA	I	O
			PW 4	77947				
646	Transparent Gold Ochre	Synthetic iron oxide, Natural earth	PY 42	77492	2	A	I	T
			PY 43	77492				
			PBr 7	77492				
653	Transparent Yellow	Azo condensation	PY 128	-	4	A	---	T
672	Ultramarine Violet	Complex sodium alumino-silicate containing sulphur	PV 15	77007	2	A	I	T
667	Ultramarine (Green Shade)	Complex sodium alumino-silicate containing sulphur	PB 29	77007	1	A(iii)	I	T
674	Underpainting White	Titanium dioxide, Zinc oxide	PW 6	77891	1	AA	I	O
			PW 4	77947				
676	Vandyke Brown	Bituminous earth, Calcined natural iron oxide	NBr 8	-	1	A	---	T
			PBr 7	77491				
678	Venetian Red	Synthetic iron oxide	PR 101	77491	1	AA	I	O
683	Vermilion Hue	Cadmium sulphoselenide	PR 108	77202	1	A	I	O
		Titanium dioxide	PW 6	77891				
692	Viridian	Hydrated chromium oxide	PG 18	77289	3	AA	I	T
707	Winsor Blue (Green Shade)	Copper phthalocyanine	PB 15	74160	2	A	I	T
706	Winsor Blue (Red Shade)	Copper phthalocyanine	PB 15	74160	2	A	I	T
708	Winsor Emerald	Brominated copper phthalocyanine, Zinc oxide	PG 36	74265	2	A	I	O
			PW 4	77947				

Artists' Oil Colour (continued)

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
720	Winsor Green	Chlorinated copper phthalocyanine	PG 7	74260	2	A	I	T
721	Winsor Green (Yellow Shade)	Brominated copper phthalocyanine	PG 36	74265	2	A	I	T
722	Winsor Lemon	Arylamide yellow	PY 3	11710	2	A	II	T
724	Winsor Orange	Arylamide yellow,	PY 1	11680	2	A	I	T
		BON arylamide	PR 188	12467				
726	Winsor Red	BON arylamide	PR 188	12467	2	A	I	T
725	Winsor Red Deep	Perylene red	PR 149	71137	2	A	I	T
733	Winsor Violet (Dioxazine)	Carbazole dioxazine	PV 23	51319	2	A	I	T
730	Winsor Yellow	Arylamide yellow	PY 74	11741	2	A	I	T
731	Winsor Yellow Deep	Arylamide yellow RN	PY 65	11740	2	A	I	T
744	Yellow Ochre	Natural iron oxide	PY 43	77492	1	AA	I	T
746	Yellow Ochre Pale	Synthetic iron oxide	PY42	77492	1	AA	I	O
748	Zinc White	Zinc oxide	PW 4	77947	1	AA	I	O

Artists' Oilbar

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
004	Alizarin Crimson	1,2-dihydroxyanthraquinone lake	PR 83	58000	2	B	---	T
009	Antique White	Titanium dioxide	PW 6	77891	1	AA	---	O
060	Buff Titanium	Bone black, Titanium dioxide,	PBk 9, PW 6	77267, 77891				
		Synthetic iron oxide	PY 42	77492	1	AA	I	O
074	Burnt Sienna	Calcined natural iron oxide	PBr 7	77491	1	AA	I	T
076	Burnt Umber	Calcined natural iron oxide	PBr 7	77491	1	AA	I	T
082	Cadmium Green Deep	Chlorinated copper phthalocyanine	PG 7	74260				
		Cadmium zinc sulphide	PY 35	77205	3	A	I	O
080	Cadmium Green	Chlorinated copper phthalocyanine	PG 7	74260				
		Cadmium zinc sulphide	PY 35	77205	3	A	I	O
086	Cadmium Lemon	Cadmium zinc sulphide	PY 35	77205	3	A	I	O
089	Cadmium Orange	Cadmium sulphoselenide,	PR 108	77202				
		Cadmium sulphoselenide	PO 20	77199	3	A	I	O
097	Cadmium Red Deep	Cadmium sulphoselenide	PR 108	77202	3	A	I	O
094	Cadmium Red	Cadmium sulphoselenide	PR 108	77202	3	A	I	O
118	Cadmium Yellow Pale	Cadmium zinc sulphide	PY 35	77205	3	A	I	O
178	Cobalt Blue	Cobalt/Aluminium oxide	PB 28	77346	3	AA	I	T
196	Colourless		-	-	1	---	---	T
263	French Ultramarine	Complex sodium alumino-silicate						
		containing sulphur	PB 29	77007	1	A(iii)	I	T
283	Gold	Copper bronze	PM 2	77400	2	A	---	O
331	Ivory Black	Bone black	PBk 9	77267	1	AA	I	O
347	Lemon Yellow Hue	Nickel titanate	PY 53	77788	2	AA	I	O
382	Manganese Blue Hue	Cobalt/aluminium/chromium oxide,	PB 36	77343				
		Chlorinated copper phthalocyanine	PG 7	74260	3	A	I	T
392	Mars Red	Synthetic iron oxide	PR 101	77491	1	AA	I	O
394	Mars Violet	Synthetic iron oxide	PR 101	77491	1	AA	I	O
422	Naples Yellow	Zinc oxide, Titanium dioxide	PW 4, PW 6	77947, 77891				
		Natural iron oxide, Cadmium zinc	PY 43	77492				
		sulphide	PY 35	77205	1	A	I	O
459	Oxide of Chromium	Chromium oxide	PG 17	77288	2	AA	I	O
465	Payne's Gray	Titanium dioxide, Bone black	PW 6, PBk 9	77891, 77267,				
		Natural iron oxide, Complex solium	PY 43	77492,				
		alumino-silicate containing sulphur	PB 29	77007	1	A	I	T
489	Permanent Magenta	Quinacridone violet	PV 19	46500	2	A	I	T
491	Permanent Mauve	Manganese phosphate	PV 16	77742	2	AA	I	T
538	Prussian Blue	Alkali ferriferrocyanide	PB 27	77510	1	A	I	T
552	Raw Sienna	Natural iron oxide	PY 43	77492	1	AA	I	T
554	Raw Umber	Natural iron oxide	PBr 7	77492	1	AA	---	T
617	Silver	Aluminium	PM 1	77000	2	A	---	O
644	Titanium White	Titanium dioxide	PW 6	77891	1	AA	I	O
669	Ultramarine Pink	Complex sodium aluminium-silicate	PR 259	-				
		Complex sodium alumino-silicate	PB 29	77007	2	A(iii)	I	T
		containing sulphur						
671	Ultramarine Violet	Complex sodium alumino-silicate						
		containing sulphur	PV 15	77007	2	A(iii)	I	T
720	Winsor Green	Chlorinated copper phthalocyanine	PG 7	74260	2	A	I	T
744	Yellow Ochre	Natural iron oxide, Synthetic iron oxide	PY 43, PY 42	77492, 77492	1	AA	I	O

Griffin Alkyd Fast Drying Oil Colour

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
074	Burnt Sienna	Synthetic iron oxide	PR 101	77491	1	AA	I	T
076	Burnt Umber	Calcined natural iron oxide	PBr 7	77491	1	AA	I	T
086	Cadmium Lemon	Cadmium zinc sulphide	PY 35	77205	2	A	---	O
089	Cadmium Orange	Cadmium Sulphoselenides	PR 108, PO 20	77202, 77199	2	A	I	O
097	Cadmium Red Deep	Cadmium Sulphoselenide	PR 108	77202	2	A	I	O
100	Cadmium Red Light	Cadmium Sulphoselenide	PR 108	77202	2	A	I	O
099	Cadmium Red Medium	Cadmium Sulphoselenide	PR 108	77202	2	A	I	O
111	Cadmium Yellow Deep	Cadmium zinc sulphide,	PY 35	77205	2	A	---	O
		Cadmium Sulphoselenide	PO 20	77199				
113	Cadmium Yellow Light	Cadmium zinc sulphide	PY 35	77205	2	A	---	O
116	Cadmium Yellow Medium	Cadmium zinc sulphide	PY 35	77205	2	A	---	O
137	Cerulean Blue	Oxides of cobalt and tin	PB 35	77368	2	AA	---	O

Griffin Alkyd Fast Drying Oil Colour (continued)

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
139	Cerulean Blue Hue	Titanium dioxide, Chlorinated copper phthalocyanine, Copper phthalocyanine	PW 6 PG 7 PB 15	77891 74260 74160	1	A	I	O
178	Cobalt Blue	Oxides of cobalt/aluminium	PB 28	77346	2	AA	I	T
217	Davy's Gray	Slate powder, Synthetic iron oxide, Carbon black	PBk 19, PY 42 PBk 7	77017, 77492 77266	1 1	AA	--- ---	T
229	Dioxazine Purple	Dioxazine violet	PV 23	51319	1	A	I	T
245	Flake White (us only)	Basic lead carbonate	PW 1	77597	1	A	I	O
257	Flesh Tint	Synthetic iron oxide, Titanium dioxide, Quinacridone	PY 42, PW 6 PV 19	77492, 77891 46500	1	A	I	O
263	French Ultramarine	Complex silicate of sodium and aluminium with sulphur	PB 29	77007	1	A(iii)	I	T
317	Indian Red	Synthetic iron oxide	PR 101	77491	1	AA	I	O
319	Indian Yellow	Isoindoline yellow	PY 139	56298	1	A	---	T
331	Ivory Black	Amorphous carbon produced by charring animal bones	PBk 9	77267	1	AA	I	O
337	Lamp Black	Carbon black	PBk 6	77266	1	AA	I	O
362	Light Red	Synthetic iron oxide	PR 101	77491	1	AA	I	O
380	Magenta	Quinacridone, Copper phthalocyanine	PR 122, PB 15	73915, 74160	1	A	I	T
415	Mixing White	Titanium dioxide	PW 6	77891	1	AA	I	O
422	Naples Yellow Hue	Titanium dioxide, Synthetic iron oxides	PW 6, PR 101, PY 42	77891, 77491, 77492	1	AA	I	O
447	Olive Green	Azomethine copper complex, Carbon black	PY 129 PBk 7	48041 77266	1	A	---	T
459	Oxide of Chromium	Anhydrous chromium oxide	PG 17	77288	1	AA	---	O
465	Payne's Gray	Complex silicate of sodium and aluminium with sulphur, Carbon black	PB 29 PBk 6	77007 77266	1	A	I	O
468	Permanent Alizarin Crimson	Anthraquinone	PR 177	65300	2	A	---	T
480	Permanent Geranium Lake	Quinacridone red	PR 209	73902	1	A	---	T
501	Permanent Rose	Quinacridone violet	PV 19	46500	1	A	I	T
503	Permanent Sap Green	Chlorinated copper phthalocyanine, Azomethine copper complex, Thioindigo violet	PG 7 PY 129 PR 88	74260 48042 73312	2	A	---	T
514	Phthalo Blue	Copper phthalocyanine	PB 15	74160	1	A	I	T
521	Phthalo Green (Yellow Shade)	Brominated copper phthalocyanine	PG 36	74265	1	A	---	T
522	Phthalo Green	Chlorinated copper phthalocyanine	PG 7	74260	1	A	I	T
538	Prussian Blue	Alkali ferriferrocyanide	PB 27	77510	1	A	I	T
544	Purple Lake	Anthraquinone, Complex silicate of sodium and aluminium with sulphur	PR 177 PB 29	65300 77007	1	A	---	T
552	Raw Sienna	Natural iron oxide	PY 43	77492	1	AA	I	T
554	Raw Umber	Natural iron oxide, Synthetic iron oxide	PBr 7, PBk 11	77492, 77499	1	AA	I	T
603	Scarlet Lake	Naphthol AS	PR 188	12467	1	A	---	T
637	Terre Verte	Chlorinated copper phthalocyanine Natural earth	PG 7 PG 23	74260 77009	1	A	I	T
644	Titanium White	Titanium dioxide	PW 6	77891	1	AA	I	O
667	Ultramarine (Green Shade)	Complex silicate of sodium and aluminium with sulphur	PB 29	77007	1	A(iii)	I	T
676	Vandyke Brown	Calcined natural iron oxide, Carbon black	PBr 7 PBk 6	77491 77266	1	AA	I	O
680	Vermilion Hue	Naphthol carbamide, Benzimidazolone orange, Titanium dioxide	PR 170 PO 36 PW 6	12475 11780 77891	1	A	---	O
692	Viridian	Hydrated chromium oxide	PG 18	77289	2	AA	I	T
722	Winsor Lemon	Arylamide yellow	PY 3	11710	1	A	II	T
726	Winsor Red	Naphthol AS, Naphthol carbamide	PR 188, PR 170	12467, 12475	1	A	---	T
730	Winsor Yellow	Arylamide yellow	PY 74	11741	1	A	---	T
744	Yellow Ochre	Natural iron oxide	PY 43	77492	1	AA	I	O

Artisan Water Mixable Oil Colour

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
074	Burnt Sienna	Calcined natural iron oxide Synthetic iron oxide	PBr 7, PR 101	77492 77491	1	AA	---	T
076	Burnt Umber	Calcined natural iron oxide containing manganese	PBr 7	77492	1	AA	---	T
090	Cadmium Orange Hue	Perinone orange	PO 43	71105	1	A	---	T
104	Cadmium Red Dark	Cadmium sulphoselenide	PR 108	77202	2	A	---	O
098	Cadmium Red Deep Hue	Naphthol carbamide, Benzimidazolone	PR 179, PO 36	12475, 11780	1	A	---	T
095	Cadmium Red Hue	Naphthol AS, Naphthol carbamide	PR 188, PR 170	12467, 12475	1	A	---	T
100	Cadmium Red Light	Cadmium sulphoselenide	PR 108	77202	2	A	---	O
099	Cadmium Red Medium	Cadmium sulphoselenide	PR 108	77202	2	A	---	O
115	Cadmium Yellow Deep Hue	Arylide yellow, Perinone orange	PY 65, PO 43	11740, 71105	1	A	---	T
109	Cadmium Yellow Hue	Arylide Yellow	PY 65	11740	1	A	---	T
113	Cadmium Yellow Light	Cadmium zinc sulphide	PY 35	77205				
116	Cadmium Yellow Medium	Cadmium zinc sulphide, Cadmium sulphoselenide	PY 35, PO 20	77205, 77202	2 2	A A	--- ---	O O

Artisan Water Mixable Oil Colour (continued)

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
119	Cadmium Yellow Pale Hue	Arylide yellows	PY 65, PY 3	11740. 11710	1	A	---	T
137	Cerulean Blue	Oxides of cobalt and tin	PB 35	77368	2	AA	---	O
138	Cerulean Blue Hue	Oxides of cobalt and chromium, Zinc oxide	PB 36, PW 4	77343, 77947	1	AA	---	O
178	Cobalt Blue	Oxides of cobalt and aluminium	PB 28	77346	2	AA	---	T
179	Cobalt Blue Hue	Indanthrone, Complex silicate of sodium and aluminium with sulphur	PB 60, PB 29	69800, 77007	1	A	---	O
229	Dioxazine Purple	Carbazole dioxazine	PV 23	51319	1	A	---	T
263	French Ultramarine	Complex silicate of sodium and aluminium with sulphur	PB 29	77007	1	A(iii)	---	T
317	Indian Red	Synthetic iron oxide	PR 101	77491	1	AA	---	O
331	Ivory Black	Amorphous carbon produced by charring animal bones	PBk 9	77267	1	AA	---	O
337	Lamp Black	Amorphous carbon	PBk 6	77266	1	AA	---	O
346	Lemon Yellow	Arylide yellow	PY 3	11710	1	A	---	T
380	Magenta	Quinacridone	PR 122	73915	1	A	---	T
422	Naples Yellow Hue	Synthetic iron oxides, Titanium dioxide	PY 42, PR 101, PW 6	77492, 77491, 77891	1	AA	---	O
447	Olive Green	Quinacridone, Carbon black	PO 49, PBk 9	-, 77266	1	A	---	T
465	Payne's Gray	Complex silicate of sodium and aluminium with sulphur Amorphous carbon	PB 29, PBk 6	77007, 77266	1	A	---	O
468	Permanent Alizarin Crimson	Quinacridone pyrrolidone	-	-	1	A	---	T
502	Permanent Rose	Quinacridone red	PV 19	46500	1	A	---	T
503	Permanent Sap Green	Quinacridone, Brominated copper phthalocyanine	PO 49, PG 36	-, 74265	2	A	---	T
514	Phthalo Blue (Red Shade)	Copper phthalocyanine	PB 15	74160	1	A	---	T
522	Phthalo Green (Blue Shade)	Chlorinated copper phthalocyanine	PG 7	74260	1	A	---	T
521	Phthalo Green (Yellow Shade)	Chlorinated and brominated phthalocyanine	PG 36	74265	1	A	---	T
538	Prussian Blue	Alkali ferriferrocyanide	PB 27	77510	1	A	---	T
552	Raw Sienna	Natural iron oxide	PBr 7	77492	1	AA	---	T
554	Raw Umber	Natural iron oxide containing manganese	PBr 7	77492	1	AA	---	T
644	Titanium White	Titanium dioxide, Zinc oxide	PW 6, PW 4	77891, 77947	1	AA	---	O
692	Viridian	Hydrated chromium oxide	PG 18	77289	2	AA	---	T
744	Yellow Ochre	Synthetic iron oxide	PY 42	77492	1	AA	---	O
748	Zinc White (Mixing White)	Zinc oxide, Titanium dioxide	PW 4, PW6	77947, 77891	1	AA	---	O

Winton Oil Colour

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/0
468	Permanent Alizarin Crimson	Ferrous nitroso-beta naphthol lakeAnthraquinonoid	PG12	10020		A	I	T
478	Permanent Crimson Lake	Anthraquinonoid	PR177	65300		A	I	T
		Complex sodium alumino-silicate containing sulphur	PB29	77007		A	I	T
242	Flake White Hue	Zinc Oxide	PW4	77947		AA	I	O
		Titanium Dioxide	PW6	77891		AA	I	O
74	Burnt Sienna	Synthetic iron oxide	PR101	77491		AA	I	T
76	Burnt Umber	Calcined natural iron oxide	PBr7	77491		AA	I	O
87	Cadmium Lemon Hue	Arylamide yellow	PY3	11710		A	II	O
		Arylamide yellow	PY74	11741		A	II	O
90	Cadmium Orange Hue	Pyrrole Orange	PO73	561170		A		O
		Arylide yellow	PY65	11740		A		O
98	Cadmium Red Deep Hue	Benzimidazolone orange,	PO36,	11780		A	II	O
		BON arylamide red	PR170	12475		A	II	O
95	Cadmium Red Hue	BON arylamide (NaphtholAS)	PR188	12467		A	II	O
		BON arylamide red	PR170	12475		A	II	O
115	Cadmium Yellow Deep Hue	Pyrrol Orange	P073	561170		A	II	O
		Arylide yellow	PY65	11740		A	II	O
109	Cadmium Yellow Hue	Arylide yellow	PY65	11740		A	I	O
119	Cadmium Yellow Pale Hue	Arylide yellow	PY74	11741		A	I	O
138	Cerulean Blue Hue	Chlorinated copper phthalocyanine	PG7,	74260		A	I	O
		Zinc oxide	PW4	77947		A	I	O
		Copper phthalocyanine	PB15	74160		A	I	O
145	Chrome Green Hue	Titanium dioxide	PW6	77891		A	II	O
		Synthetic iron oxide	PY42	77492		A	II	O
		Arylamide yellow,	PY74,	11741		A	II	O
		Chlorinated copper phthalocyanine	PG7,	74260		A	II	O
149	Chrome Yellow Hue	Titanium dioxide	PW6	77891		A	I	O
		Arylide yellow	PY65	11740		A	I	O
		Arylide yellow	PY74	11741		A	I	O
179	Cobalt Blue Hue	Zinc oxide	PW4	77947		A(iii)	I	O
		Complex sodium alumino-silicate containing sulphur	PB29,	77007		A(iii)	I	O
		Copper phthalocyanine	PB15,	74160		A(iii)	I	O
194	Cobalt Violet Hue	Manganese phosphate	PV16,	77742		A	I	O
		Complex sodium-alumino silicate containing sulphur	PB29	77007		A	I	O
229	Dioxazine Purple	Dioxazine violet	PV23	51319		A	I	T
241	Emerald Green	Arylamide yellow	PY74	11741		A	II	O
		Chlorinated copper phthalocyanine,	PG7	74260		A	II	O

Winton Oil Colour (continued)

Code	Colour	Chemical Description	C.I. Name	C.I. No.	Series No.	Perm.	ASTM	T/O
257	Flesh Tint	Zinc oxide	PW4	77947		A	I	O
		Synthetic iron oxide	PY42	77492		A	I	O
		Quinacridone violet	PV19	46500		A	I	O
		Titanium dioxide,	PW6,	77891		A	I	O
263	French Ultramarine	Complex sodium alumino-silicate containing sulphur	PB29	77007		A(iii)	I	T
480	Permanent Geranium Lake	Quinacridone Red	PR209	73905		A	---	T
317	Indian Red	Synthetic iron oxide	PR101	77491		AA	I	O
331	Ivory Black	Bone black	PBk9	77267		AA	I	O
337	Lamp Black	Carbon black	PBk6	77266		AA	I	O
346	Lemon Yellow Hue	Arylamide yellow	PY3	11710		A	II	O
362	Light Red	Synthetic iron oxide	PR101	77491		AA	I	O
380	Magenta	Copper phthalocyanine	PB15	74160		A	I	T
		Quinacridone red	PR122,	73915		A	I	T
422	Naples Yellow Hue	Titanium dioxide,	PW6,	77891		A	I	O
		Synthetic iron oxide	PR101	77491		A	I	O
		Synthetic iron oxide	PY42	77492		A	I	O
459	Oxide of Chromium	Chromium oxide	PG17	77288		A	II	O
465	Payne's Gray	Powdered slate	PBk19	77017		A	---	O
		Carbon black	PBk6	77266		A	---	O
		Complex sodium alumino-silicate containing sulphur	PB29	77007		A	---	O
483	Permanent Green Light	Arylide yellow,	PY74	11741		A	I	O
		Copper phthalocyanine,	PB15,	74160		A	I	O
		Titanium dioxide	PW6	77891		A	I	O
502	Permanent Rose	Quinacridone violet	PV19	46500		A	I	T
516	Phthalo Blue	Copper phthalocyanine	PB15	74160		A	---	T
538	Prussian Blue	Alkali ferriferrocyanide	PB27	77510		A	I	T
552	Raw Sienna	Synthetic iron oxide,	PY42	77492		AA	I	T
		Natural iron oxide	PY43	77492		AA	I	T
554	Raw Umber	Natural iron oxide	PBr7	77492		AA	I	T
		Bone black	PBk9	77267		AA	I	T
599	Sap Green	Ferrous nitroso-beta naphthol lake,	PG12,	10020		B	---	T
		Tartrazine lake	PY100	19140				
603	Scarlet Lake	BON arylamide (Naphthol AS)	PR188	12467		A	I	O
637	Terre Verte	Chlorinated copper phthalocyanine,	PG7,	74260		A	I	T
		Natural earth,	PG23	77009		A	I	T
644	Titanium White	Zinc oxide	PW4	77947		AA	I	O
		Titanium dioxide	PW6	77891		AA	I	O
676	Vandyke Brown	Bituminous earth	NBr8,	-,		A	---	O
		Calcined natural iron oxide	PBr7	77491				O
682	Vermilion Hue	Naphthol carbamide	PR170	12475		A	---	O
		Benzimidazolone	PO36	11780				O
		Zinc oxide	PW4	77947				O
696	Viridian Hue	Chlorinated copper phthalocyanine	PG7	74260		A	I	T
744	Yellow Ochre	Synthetic iron oxide	PY42	77492		AA	I	O
748	Zinc White	Zinc Oxide	PW4	77947		AA	I	O

KEY TO TABLES:

Code: Winsor & Newton Colour Code

Colour: Common Colour Name

Chemical Description: Name of Chemical

C. I. Name: Colour Index Generic Name

C. I. No: Colour Index Number

Series No: Colour Series 1-5

Perm: Winsor & Newton Permanence Rating

ASTM: ASTM Lightfastness Rating

T/O: T - Transparent or Semi-transparent

O - Opaque or Semi Opaque

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