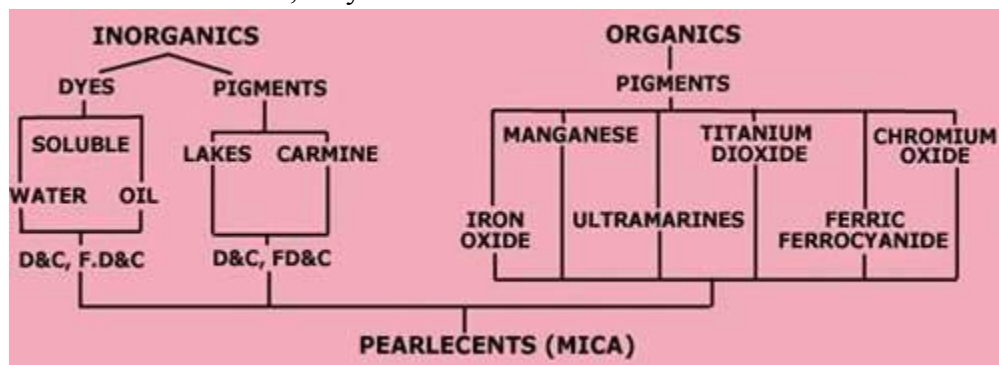


All About Cosmetic Grade Colorants!

FD&C, D&C, Lakes, Bismuth Oxochloride, Oxides, Mica, Dyes, Pigments, Nacreous Pigment,
Manganese, Ultramarines.....

...WHAT IS ALL THIS STUFF ANYWAY??

In a nutshell, they are **all** Cosmetic Grade Color Additives.



NOTE: The designations D&C and FD&C have currently been withdrawn. (See introduction to the 8th Edition of INCI Nomenclature) However, for the purposes of our discussion here, the prefixes **will** be used as this is how you have come to identify them.

Why Cosmetic Grade?

First, let's start off with the correct terminology: they are **Color Additives**.

The misused word "colorant" actually refers to the pigment used in plastics such as eyeshadow cases, which are also regulated.

Did you know: Color Additives are the only Cosmetic Ingredient regulated by the FDA?

It assures that these color additives are safe for use on humans and contain no heavy metals, like Lead, Cadmium and Hexavalent Chromium, (ala Erin Brokovitch). These are the color additives FDA approved for use: Drug and Cosmetic, or D&C, for use on the body and the Food, Drug and Cosmetic, FD&C, also approved for consumption. Certain Oxides, Ultramarines and Pearlescents are also approved for use.

- Note that these are all **synthetic**. There are few approved "natural" colors permitted on the market such as Annatto Seed. **There is no such thing as a "natural" color additive available.**

- Unless specifically approved, all natural color additives are banned by the FDA. Here is the link to the FDA Site which says so:

- The current FDA Summary can be viewed at: <http://vm.cfsan.fda.gov/~dms/opa-col2.html>

Cosmetic grade color additives fall into 2 broad categories: **Organics** and **Inorganics** which can be Dyes or Pigments. From there, they branch off into subcategories.

Organics

Organics are termed "Clean" colors or true brights and consist of the following categories:

Dyes

Dyes can be water soluble or oil soluble. There only a few oil soluble dyes available for cosmetic usage. Some water soluble dyes may present problems with "bleeding" if used in too high a concentration in your product. In transparent products, (such as Melt and Pour or Gels), dyes give a transparent color like food coloring.

Pigments

Pigments can be Organic or Inorganic. These are both water and oil insoluble and therefore do not dissolve but can be microscopically dispersed so they appear to be dissolved. Only dyes are soluble in a vehicle while pigments are insoluble compounds. Think of the difference between instant coffee and hot chocolate powder. The coffee dissolves but the powder is only dispersed and will fall to the bottom of your cup.

Nacreous Pigment

Nacreous (Nay-kree-us) are also known as Pearlescent Pigments, (mica). These may be composed of combinations of titanium dioxide and mica, bismuth oxychloride or guanine.

- Bismuth Oxychloride is a soft metal - it is the "frost" in nailpolish.
- Guanine is derived from herring scales. Its primary use in the cosmetics industry is in nail polishes.
- Various organics and inorganic pigments may be combined with the titanated micas to create unique dual color pearls.

Lakes

Lakes are Inorganic pigments and do not usually bleed or leach color.

There are 4 types of Lakes:

1. Calcium Salt
2. Barium Salt
3. Aluminum Salt
4. Sodium Salt

The color from the dye is placed onto one of these salts as an insoluble base to hold the color onto. Which salt is used is determined by the color desired as the salts impact on the resulting tone. Some Lakes are also Rosinated. Rosin is derived from tree sap and gives a blue tone to reds.

Inorganics

Inorganics are termed "Dirty" colors as they will never result in a true clean bright color, but don't misunderstand - you can achieve gorgeous earthy tones with Inorganics. Here are the categories:

Oxides

Oxides have been referred to as the "natural" pigments. However they are in fact synthetically manufactured. This "myth" could be attributed to the misconception that they are obtained from rust or mineral sources - they are not.

For example, chrome oxide green does not occur anywhere in nature. It may also be that their tone is more earthy than the D&C and FD&C dyes and pigments. It may also be because they fall into the Inorganic category.

There are three oxide values

- FEO
- FE203
- FE304
- The red oxide gives a russet value, the black oxide a black value and the yellow an ochre value.

Ferric Ammonium Ferrocyanide

This is **not in any way related to the poison cyanide** but contains this term as it is a triple bond carbon-nitrogen group.

- It is more commonly known as Iron Blue or Prussian Blue.
- It is not stable in an alkaline solution so it fades out in soap.
- Most pearlescents that are of a blue or purple tone contain this.
- Not allowed for use in lip products.

Manganese Violet

- Unstable in alkaline media. Do not use in soap!
- Gives a deep purple to mauve tone in acid media such as lotions.
- Not for use in lip products!

Ultramarines

Ultramarines are unstable in acid media and therefore must be used in an alkaline media above Ph of 7.2, (which soap is), or it will release hydrogen sulfide, a noxious odor and poisonous chemical.

If you have ever mixed it with water or put it in lotion you will know what I mean - it smells worse than rotten eggs!! Other than the smell don't worry about it because it will take more than that used in coloring a product to be dangerous. **Pink, rose, violet and blue.**

Black Oxide & Titanium Dioxide

Black Oxide and Titanium Dioxide are used to darken or lighten, (tone or tint) other pigments. **Only very small quantities are required.** Titanium Dioxide is the primary ingredient in white house paint and has the highest opacity of any pigment. It is either water or oil dispersible.

Pearlescents

Pearlescents are in a class of their own. These have been referred to and nicknamed as Mica.

Their effects are achieved by **simultaneous light reflection, refraction and transmission** as it encounters translucent or transparent substances of high refractive indexes. Basically the white light is broken up similar to light through a prism creating a play of color.

To manufacture pearlescents there are several steps required, hence the higher cost. A **substrate of mica**, (a quartz like substance that microscopically looks like tiny plates and resembles talc in appearance), is used and several color sources can be applied to achieve the desired color or effect.

The **particle size**, which the thickness of the particle is primary, is **measured in microns** - typically between <15 and <150 microns and dictates the effect of the light bending and reflecting off the substrate. This effect is referred to as **Luster**.

- **Low luster** from a **low size of micron** substrate gives the effect of a pearl with a **smooth sheen**.
- A **medium size of micron** substrate will give a **silk or satiny effect**.
- The **larger particle substrate** gives a **High Luster or Sparkle**.
- The **larger the substrate**, the "**sparklier**" the effects, although they are all shiny.

As the particle size increases the opacity in your product decreases. At the **low end** your bar will look **more opaque** and at the **high end** your bar will still have **transparency**. Remember as well, as you add more of any pigment to your soap the opacity or transparency of your bar will decrease.

The **higher the particle size the more likely it is to sink** in soap if the soap is poured at too high a temperature. Same for thin lotions or room sprays. Cooler soap is thicker and suspends the particles better.

Color is achieved by coating the mica substrate with various dyes and pigments. Some are titanium dioxide/mica coated with an additional layer of colored pigment resulting in a brilliant color effects.

- Iron Oxide/Titanium Dioxide gives a **gold pearl**
- Chromium Oxide/Titanium Dioxide a **green pearl**
- Carmine or D&C Red 30 a **red pearl**
- Iron Oxide alone produces metallic effects such as the **bronzes and coppers**

Others are coated with Iron Oxides, either red or black, and using a larger thickness of the mica substrate to give the effect of a **2 tone or Interference Color**.

Held one way it will look one color and turned it will give off another. Interference colors are two toned pigments that give their effects as a result of light absorption and light interference.

They result from coating the substrate with a color additive which absorbs light - also called a background color - which has a different tone than the reflective color of the interference pigment used over it.

- For a **red-yellow, (gold)**, the substrate is first coated with a background **red tone** and then a **yellow** as the interference applied over it.
- This causes the interference to reflect color and the red to absorb color, held straight in light you will see the red, turn it so the light now hits at an angle and you will see the yellow reflecting.

It is of importance that these nacreous pigments be **properly dispersed to ensure each particle is separate**. The effects of these pigments is also dependant on having the **particles lined up** in your product and not just have the pigment at random.

When they are at **random** you will have a **billowing effect** of color from the soap being poured. Although this has the effect of a billowing cloud which can be nice on its own, this also **decreases the ability of light** to create a play of color. One way to help achieve alignment is to pour your soap and then using a spatula or hair pick drag the pigments in one direction.

While pearlescents can have some spectacular results, keep in mind that they reflect better when they have what is known as a **background color**. **A red with a red background will look even better than on its own.**

Purchasing Cosmetic Grade Color Additives

Each manufacturer of color additives has their own charts. This can be confusing as Company 1 may name a product the same as Company 2, however the actual product will be different. Specific groups may also contain several shades under the same color number umbrella. Dyes and Lakes will be the same numbers as well.

Additionally, each batch of pigments manufactured will have slight color variations. To ensure you obtain consistent color results, it is up to your supplier not the manufacturer to color match each batch as it is replaced.

A Word of Caution

While all these color additives can be used "as is", keep in mind that they are "raw materials". The manufacturers never intended them to be used "as is". This is why there have been problems associated with their use, ie., dots or speckling, bleeding, inconsistent color results, funky colored lather and fading caused by light.

For optimum results they not only require further processing but a sound knowledge of the chemistry of the additives is mandatory for optimum results.

There really is more than meets the eye in regards to this ie., not all additives are soap stable or light stable and a knowledge of correct formulations are required. Artists color theory doesn't always work when mixing dyes and you can get some unexpected results. There can be many variables which can affect the resulting color i.e., yellow fragrance oils and base oils, pH, and for mandp'ers, not all soapbase is created the same. **Always do a small test with your soap first!**

While all these dyes and pigments are approved for use, a word of caution here, they are not by any means a "finished" product, these are still raw materials. There are varying maximum amounts allowed or permitted by the FDA and certain colors can **not be used around the eyes or mouth**, such as **oil soluble dyes**. There are even colors that are **banned** for any use like **Red 19**.

Although they are used extensively in our lives they are used "finished". In our case "finished" is in soap or other toiletries. Resist any temptation you may have to use any pigments on your skin straight especially in the lip and eye area unless properly preserved.

Even though pearlescents have made a comeback in retail eye makeup, they are not by any means properly preserved or formulated for use as is. Most of these eyeshadows may contain less than 10% pearlescent pigments - the rest is filler.

The eye area - more specifically the eyelashes - have a naturally occurring bacteria on them. If your product is not properly preserved and you contaminate your product, (and you expose and infect yourself to this bacteria, once growing uncontrolled in your product), **there is no cure for this infection** and you will go blind within 24-48 hours.

In other words, don't risk using any pearlescent or other color straight as eyeshadow.

- Jen Snider

edited by Kevin Young