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Understanding Permanent Cosmetic Pigments

Derma-Medical International pigments are made with iron oxides, a small amount of organic pigment, and only ethyl alcohol and a small amount of distilled water. European guidelines will not allow isopropyl alcohol, only ethyl alcohol.

When pigment is implanted into the skin, one ultimately wants only the pigment to remain and nothing else. Therefore, the vehicle to transport the pigment must evaporate somewhat quickly and leave only the pigment in the dermal layer.

It is best to use mostly inorganic (iron oxides) pigments in tattooing with a very little amount of organics, and then only in particular lip colors (bright lip colors do contain organic pigment.) We use organics in certain lip colors because one cannot get the bright reds, pinks or oranges without using organic pigment additives. It is believed organics - not iron oxides - are the pigments almost all allergic reactions are attributed to.

Iron oxides hold a very important place in the pigment market because of their **wide range of colors, stability, and non-toxic** nature.

By far the most common and stable element is iron. Usually, each iron atom has shed three of its outer electrons onto neighboring groups, but, by absorbing some visible light, it can temporarily take one from an oxygen atom of any silicate, carbonate or sulphate group which may be close by.

This transfer of electrons from oxygen to iron account for all the **ochres, rusts, browns and reds** in our rocks and sand.

Iron oxides are separated into four major classifications:
Reds, Yellows, Browns, and Blacks.

The Yellow, Brown and Black Iron Oxides that I use have the same OSHA regulations that apply to synthetic Red Iron Oxides (Section I-Ca-2.) **ALL** are **well below** the heavy metal limits established by the FDA.

Below are technical details on the four categories and how they are produced:

Synthetic **Red Iron Oxides** are produced by several manufacturing processes. The most common being:

1. Calcination of a ferrous sulfate (which is to change to an ashly powder by heat)
2. Precipitation (produced in an aqueous {water} medium) precipitation= substance separated from solution or suspension by chemical of physical change.
3. Calcination of yellow iron oxide
4. Calcination of black iron oxide

The synthetic red iron oxides are very uniform in particle size and much higher in chroma when compared to natural red iron oxides. Each process produces a typical particle shape. Each of

the processes can produce a range of colors from light to very dark. These processes produce products of different color properties and physical properties, including mass tone and tint hues, particle shape, and bulk density.

One of the earliest synthetic iron oxide developments along with copperas reds was precipitated black iron oxides. Several early patents describe methods to produce black iron oxide. P.Fireman., U.S.Patent 802.928 (1905) and J.W.Ayers.,U.S.Patent 2,133,267(1938) Black iron oxide was the first synthetic iron oxide to be produced by the precipitation process.

The basic process has been improved over the years and now can consistently produce many different grades having high chemical purity.

Synthetic black iron oxide pigments have good acid and alkali resistances. They are lightfast and easily dispersed. There are approximately 8-10 basic color grade blacks produced by precipitation. There are also grades of black available from a process called organic reduction.

The synthetic Yellow Iron Oxides have a narrow particle size distribution which enhances color purity. It is possible to produce over 10 distinct mass color or tint variations within the particle size limits. Because the synthetic yellows contain one chemically combined molecule of water of hydration, they are subject to temperature limitations. Although dependent on the time-temperature profile, yellow iron oxides start to lose their water or hydration around 350°F and turn brown initially, then eventually become red in color.

In actual practice, the manufacturer will divide this color range into about six to eight distinct products having colors from light to dark yellow.

Synthetic **Brown Iron Oxides** are produced by three methods:

1. Blends of red, yellow, and black.
2. Direct precipitation (remember from the reds?)
3. Controlled reduction of synthetic black or synthetic brown iron oxide. This form produces only browns at the lighter end of the brown color spectrum.

Be aware that some brown pigments are actually Zinc and Magnesium Ferrite pigments. Although they are technically not iron oxides, the ferrite pigments have characteristics and chemical compositions similar to synthetic iron oxides and thus can be included in the iron oxide family.

I have been personally dispersing iron oxides in my laboratory for 15 years, and have been using the same organic red and yellow with no problems whatsoever. Education and being informed is of the utmost importance. What I found 15 years ago, and what is still going on today, is that people will believe most anything they hear; believe grossly false information, and parrot this information without verifying its legitimacy.

Safe pigment manufacturers want to educate and help our health departments and other organizations to better understand what it is we do, and work with them accordingly to help ensure that the public at large is not at risk.

Be informed, stay informed.

Call us at any time. Derma-Medical International 800-654-9369