

AGATE INFORMATION

CHEMISTRY $C_{10}H_{16}O + H_2S$

CRYSTALLOGRAPHY Amorphous

REFRACTIVE INDEX 1.540 (+.005 -.001)

HARDNESS 2 - 2½

SPECIFIC GRAVITY 1.05 to 1.096, usually 1.08. (Air bubbles will lower SG.)

CLEAVAGE None

HEAT SENSITIVE Very.

WEARABILITY* Good.

SPECIAL CARE INSTRUCTIONS Avoid rough handling, heat and chemicals. Amber can be attacked, (partially dissolved,) by solvents, alcohol, etc.

ENHANCEMENTS Amber is darkened by heating. If done properly, this also creates the "star spangles" effects. Amber can also be dyed to darken the colour.

Amber has been in use by humans for thousands of years, possibly longer than any other gem material. It is fairly common, easy to work with and a constant wonder to the eyes.

Amber is an amorphous mixture of organic compounds, including hydrocarbons, resins, succinic acid, and oils. Amorphous means that it has no crystalline structure. Organic refers to having its origin in living things.

It is commonly referred to as fossilised resin of ancient conifers. However, it is not a fossil in the common sense. Most fossils begin by having an animal or plant buried in the earth. Over a period of millennia, the organic material is slowly replaced with elements from the mineral kingdom.

Amber, on the other hand, has not had its organic elements replaced. Instead, the resin has gone through a chemical transformation. Amber has become a polymer, a natural plastic.

This gem comes in many colours, with the most common being yellow, orange and brown. Rarely, you will find amber with a green, blue, or violet tint. This is due to extreme fluorescence.

There are several shades of these colours and several grades of transparency. Jewelry is made almost exclusively from the transparent material. The opaque material is carved into a variety of artistic ornaments and useful utensils. Amber is also burned as incense and used as an ingredient in perfumes.

Amber is known for its inclusions. They consist of insects, pollen and plant debris from the time the tree was living. This offers a remarkable view into the past. In some of the finer specimens, whole termite colonies are trapped. They have chambers created with webbing. Some of the "rooms" are clearly nurseries, complete with egg sacks. Besides the termites, a variety of beetles, spiders, mites, and other insects can be in a single specimen.

Since the movie, "Jurassic Park," the most popular insect inclusion is a mosquito. However, any clearly visible insect makes a piece highly valuable. Ancient plant material is of great interest to scientists, but of little value in the jewelry market. Most of it is in small pieces and not easily recognizable for what it is.

Another popular type of inclusion are "star spangles." These internal fractures radiate from a central point. While quite attractive, most are human induced. Hence, they do not have the high value of a good quality insect.

Amber is often confused with copal. These are very similar materials, with nearly identical origins. The difference is that amber is millions of years old, copal just a few hundred thousand years old. There is also pressed amber, or ambroid, that is created by fusing smaller bits of amber under heat. You can distinguish this with a microscope.

Ancient techniques for identifying amber are still useful today. Rubbed vigorously on a piece of wool, it will generate a static charge, enough to pick up a small piece of ash. When it is warm enough, it also gives off a distinctive odor. These techniques will not distinguish amber from copal, but they will separate it from plastic imitations. (They are also great for entertaining inquisitive children.)

To distinguish between amber and copal is difficult. They share the same refractive index, specific gravity, and most other properties. Copal will fluoresce whiter than amber. That is a judgment call based on having a sufficient number of samples to recognize the difference. If you are not able to make the distinction based on fluorescence, you will have to resort to a destructive test.*

On an inconspicuous area, place a drop of acetone. Let it sit for three seconds, then wipe it off. Copal will have the surface damaged by the acetone. Amber will show little or no change from the brief exposure.

The easiest way to separate amber from its plastic imitations is with a specific gravity solution. A handy testing liquid can be made by boiling water and adding as much salt as you can dissolve in it. This will have a density of about 1.13. Amber, with a SG of 1.10 will float in this solution. Most of its imitations will sink.

A few plastics are have a density as low as 1.05 and many can be lower than amber if they have air bubbles inside. So, if your sample sinks, you can be sure it is not amber. If it floats you, need to determine if it is plastic or amber.

The RI will distinguish plastic if it varies from amber's. However, since amber and plastic can both have an RI of 1.54, it will not tell you for certain if it is amber. Since they also share so many visual characteristics, you will probably have to use a hot point to distinguish them.

This is a destructive test, but with care, it can be done almost invisibly.* Find a place on your gem where a mark would be as unobtrusive as possible. This is usually on the bottom, an edge, or an area with existing scratches. Next, heat the tip of a needle until it glows red. Touch the selected spot just enough to release a tiny whiff of smoke.

Now for the hard part, smell the smoke. If it is amber, the smell is of fine incense. If it is chemical and offensive, it is plastic. This is another reason to make your test on as small a scale as possible!

* **Destructive tests.** Practice on your own material. Ask permission before using them on a customer's gem.

The information contained in these FREE sheets has been gathered from many different sources.

While the information contained here is offered freely, this information should only be used for general information.

*Sources.

Barrie & Jackie Wakeford (CrystalConnection) 2009. (Pictures and some text)

The International Gem Society. (Mainly text and characteristics of stones)