

Optical Gem Testers

by Raffi Katz

Each tester eliminates possibilities and opens up others. There is no tester that will light up with a magic number that identifies a stone.

Jeweller's Loupe

A jewellers loupe is the most valuable 'tester.' Go for 10x magnification. Quality varies with price. If you're a beginner, I'd recommend spending £20 to £25. Don't go for a cheap loupe, the lenses aren't good enough for gemstones. Hold the loupe very close to your eye, bring the object up to the lens, work under a good light.

Even a beginner knows that diamonds are hard, so when you see a stone covered in scratches you can impress your friends with your knowledge by telling them it's not diamond. After a few years' experience, or if you take a course in gemmology, you will be looking for many signs, mostly inclusions or flaws inside the stone, for example bubbles in glass.

Refractometer.

A refractometer is a narrow box with a test-plate under a hinged lid, and an eyepiece. This is the most important tester after a loupe. It measures refractive index, that is how much light is bent as it passes through the gemstone. This is the nearest to a 'magic machine' or science that we can get because it gives a number that you can look up on standard charts: it helps identify hundreds of stones.

Is it easy to use? Rest the flat polished surface of the stone on the test plate, and through the view finder you see a scale, part of which will be light and part of which will be dark. In between the light and dark is the 'shadow edge' that marks a reading on a scale. Not only do you get a reading, but often you will see two shadow edges, which, itself, is diagnostic, and advanced users can glean further information by rotating the stone to see if either or both of the shadow edges move. Getting a basic reading on the scale is quite easy. For advanced users, seeing which way two shadow edges move as you rotate the stone takes a lot of practice.

Chelsea Filter

The Chelsea filter is like a magnifier with a black lens which is the filter. Many stones appear to change colour when viewed through the filter. Originally designed for detecting synthetic emeralds, the Chelsea filter nowadays is used to help identify many gemstones.



Spectroscope.



Chelsea filter.



Polariscope.



10x20 loupe rk.

It can give an indication that you have an emerald or aquamarine, though not a guarantee. It gives a very clear and spectacular result on blue stones coloured with cobalt, a sure-sign that you have a man-made stone. Is it easy to use? Very easy. Shine a light on the stone, hold the filter close to your eye. You don't even have to hold the stone close to the filter, only the filter has to be close to your eye, so you can examine stones in museum showcases.

Spectroscope

A Spectroscope is a small tube. You look down one end and point the other at the gemstone. What you see is a spectrum of colour or rainbow interrupted with black or white lines. If you don't have a gemstone to hand point it at the sky and see the lines that correspond to hydrogen burning in the sun. Shine a torch through your finger and see the lines caused by iron in your blood. Get to recognise the patterns of lines that indicate chromium and iron, instantly identify synthetic stones and glass which are cobalt-blue, see the myriad of lines in some zircon caused by radioactive decay. Is it easy to use? It can be fiddly. Holding the stone as well as a light and the spectroscope, all at the correct angle to view the colour, and at the same time having to refer to examples of colour pictures in a book is not easy. But it's great fun, my children love it!

Polariscope

A Polariscope detects double refraction. Some gemstones are doubly refractive and some are singly refractive. Diamond is singly refractive. Most diamond simulants are doubly refractive, including Moissanite. So you could use this as an inexpensive tester to distinguish diamond from Moissanite though it won't distinguish Cubic Zirconia from diamond. Is it easy to use? It is slow but reasonably easy. At the top and bottom of a tube are two filters. Revolve the top filter until everything in the tube appears dark. Place the stone on the platform in the middle. Jewellery will need to be propped up with blu-tac. Now turn the item so that it revolves through 360°. If it appears to turn light-and-dark it is doubly refractive, if it remains dark it is singly refractive.

Every instrument needs a good light source, Quicktest have a finely-focused pen torch which is just perfect. My favourite book is *Gem Identification Made Easy*, the author goes through each gem tester telling you how to use it, what it will detect, and the theory behind each test. This article is a summary of the information by each gem tester for sale at Quicktest, for more information go to www.quicktest.co.uk



Refractometer.