

NEW TECHNOLOGIES AND INSTRUMENTATION

**THE IMPACT OF THE CHOICE OF ILLUMINATION IN THE WHOLESALE,
BUYING, SELLING AND GRADING OF GEMSTONES**

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Members of the gem community often demand very specific types of illumination, depending on the gem material they are dealing with and whether the application is related to buying, selling or grading. This study examines what a trade person at the wholesale level expects from a light source, in terms of colour/hue and overall appearance, when illuminating a gemstone. The testing involved 43 individuals and was conducted on-site at offices, trade fairs and auctions. The illumination consisted of a tabletop lamp with four different compact 18-watt fluorescent lamps and a 35-watt incandescent halogen lamp. The fluorescent lamps varied from 6500 to 3000 K in correlated color temperature (CCT), while the halogen lamps with enhanced CCT covered a range of 4700-3500 K. The color rendering index (CRI) of the light sources was between 90 and 98. The traders were asked to view their own gems in each of the five light sources and give their preferences.

While the main focus was on colored stones, cultured pearls and fancy-color diamonds were evaluated as well. Fluorescent lamps of 6500 K are in common today, and even fancy-color diamonds are typically illuminated by 5800-5400 K light. Only blue sapphires are presented in the 6500 K light traditionally used for diamonds, but very often in combination with 5800 K lamps. Rubies, on the other side of the color spectrum, are typically displayed with incandescent lamps of 3200-2800 K or fluorescent lighting of 5400-3200 K.

The results supported a well-known axiom of the colored stone trade: "The best light source is the one that gives you the best selling results." This often differs from the official recommendations of the CIE International Commission on Illumination, which specifies a color temperature for gem materials in the 6500-5500 K range. It also appears that the practical illumination of the trading environment is very different from the standardized grading used at gem laboratories. Now that LED and OLED technologies – with their specific characteristics, spectrum, color of light and CRI – have added to the available options, the evaluation of gem colors must be considered "in a new light."