

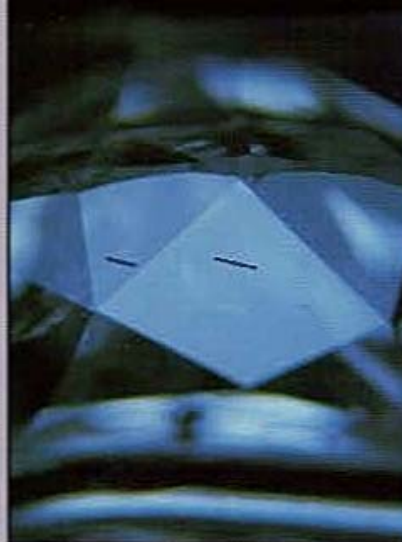
## LASER-DRILLING IN DIAMONDS: A New Technique

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The laser-drilling of diamonds has been performed since the 1970's. This process is used to create an access point in order for heated and pressurized acid to dissolve dark inclusions. The intent is not only to improve the clarity grade, but also the face-up appearance and thus salability. Diamonds treated in this manner are traded at a slight discount compared with untreated stones of similar grade.

Recently, several diamonds containing unusual and suspicious-looking internal features were submitted to our laboratory. After consulting two different laser-drilling professionals, along with senior members of the staff at GIA's Gem Trade Laboratory, we concluded that we were dealing with a new method of laser-drilling.

Instead of the traditional single-channel drill holes, there are a series of laser-drill "channels" in a single plane, producing a "fan-like" pattern. The opening at the surface is a thin, elongated, rectangular "trough" which can vary in length and is fairly consistent in width from stone to stone. This can be easily viewed with reflected light (see Figure 1). The "trough" itself tapers as it goes from the surface of the stone to the drilled inclusion (see Figures 2, 3 and 4).



*Figure 1: Two laser-drill "troughs" in reflected light*



*Figure 2: The same two laser-drill channels from figure 1, in transmitted light.*



*All photos by Elizabeth P. Quinn*

*Figure 3: It is possible to see here how the laser-drill "trough" tapers as it goes from the surface of the stone to the inclusion.*



*Figure 4: The two inclusions near the girdle have been treated by this new technique. They probably looked very similar to the two brown inclusions under the table before treatment.*