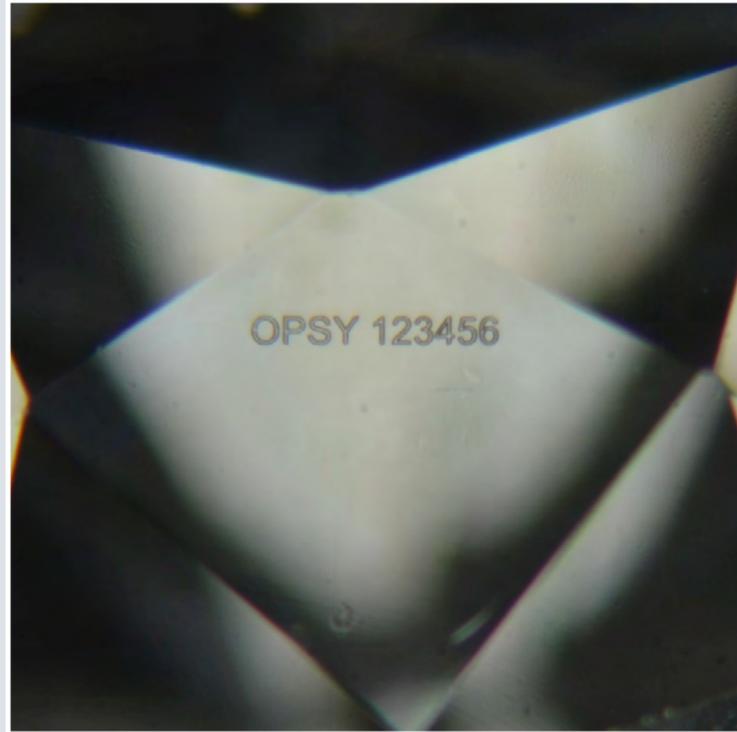


Opsydia serial number mark inside a diamond's crown facet. Opposite: Andrew Rimmer, CEO of Opsydia.



BELOW THE SURFACE

UK-based firm Opsydia has spent months perfecting an internal diamond mark that doesn't affect clarity grades, even in internally flawless stones.

BY SARAH JORDAN

When University of Oxford engineering specialists developed a new high-precision laser technology in 2017, it quickly became apparent that their methods would have commercial implications for the diamond sector. The technology could inscribe words, numbers or logos beneath the surface of a diamond without affecting its surface polish. Because the mark was inside the stone, it couldn't be polished away or removed without reducing the diamond's carat weight, making attempts to do so uneconomical.

UK-based company Opsydia was created to propel this sub-surface laser technique into the international market and provide manufacturers with devices capable of marking industrial quantities of stones. In more recent months, Opsydia has received confirmation from two leading grading laboratories that a new mark — its smallest and finest one to date — has no impact on the clarity grade of an internally flawless diamond submitted for testing. For Opsydia chief executive officer Andrew Rimmer, this is a step forward that makes sub-surface marks more appealing to the natural diamond industry.

How does Opsydia technology work, and what are its capabilities?

The Opsydia system uses a high-precision, ultrafast laser to engrave dots, lines or shapes as small as one micron in diameter, at a depth of up to 0.25 millimeters below the surface of a diamond. This laser is tightly focused only once it passes the surface of a diamond, therefore creating marks internally at a selected depth without affecting the surface condition or polish. It can be used below any part of a diamond's surface, such as the table or a specific facet.

Opsydia marks are highly configurable, meaning they can be loupe-visible or nanoscale — only visible with specialist equipment. Physically, the Opsydia system is 1 meter wide and can fit through a standard doorway. Our technology can also mark melee stones [of] just 0.5 millimeters in diameter. In fact, the challenge came not with the size of the stones we could engrave, but holding them securely in place.

Today, an Opsydia machine can mark 50,000 to 100,000 stones per year, and depending upon the complexity of the mark itself, an individual stone can be processed in one minute.

Opsydia found an early partner in De Beers Lightbox Jewelry. What does this partnership entail?

De Beers came to us early on to create an intentionally loupe-visible mark for its Lightbox Jewelry laboratory-grown diamonds. For this client, the Opsydia system places a mark of quality right in the center of the table to ensure maximum visibility for jewelers, dealers and the customer.

De Beers saw potential in Opsydia technology as a tool for securely distinguishing its Lightbox product from natural diamonds. We believe the need for accurate disclosure, genuine identification and authentication will continue to drive the market toward our technology.

How do you guarantee security?

Opsydia sub-surface marks can contain encoded security features such that they are impossible to replicate. Our marking therefore

secures a stone's identity, prevents unlawful substitution, and can provide a secure means of branding a stone. For example, a diamond can be engraved with its grading report number or blockchain ledger information to confirm its identity.

When our devices are sold to clients, such as diamond manufacturing facilities, they are pre-loaded with authorized marks and logos. These marks are stored in an encrypted way and can only be changed or altered by ourselves. Therefore, a device cannot be reconfigured to fraudulently use a different brand's mark.

How do you believe the diamond pipeline benefits from this technology?

Our technology provides a secure method of confirming a stone's identity. There are different motivations at all levels, like grading houses offering sub-surface report number engraving as a premium service for exceptional stones. For the volume market, marking of diamonds in the quarter-carat to 1-carat range can aid in transparency initiatives, reduce the risk of counterfeiting, and protect against laboratory-grown diamond substitution. Finally, while we don't expect the very smallest stones to be marked en masse, we envisage a future where a melee diamond may be marked as a branding and security feature before being placed in a valuable jewelry piece.

We certainly haven't ruled out the possibility of sub-surface marking rough material, which again would greatly assist in traceability and mine-to-market initiatives.

What can you tell us about your most recent marks? How are they different, and why are they an important milestone for Opsydia?

Secure marking technology has been a major research focus for the lifetime of Opsydia. In recent months, we have made great strides, resulting in our very smallest and faintest mark, which does not affect the clarity grade of a diamond, even for internally flawless stones. This has been confirmed by independent testing at the Swiss Gemmological Institute (SSEF) and a second leading grading laboratory.

We are now developing Opsydia viewing devices to allow these marks to be read in a grading lab or retail environment. I believe this is an important milestone because it means every stone, no matter the clarity or size, could be secured with an integrity feature. This opens the opportunity to support transparency initiatives across the whole industry.

opsydia.com ■



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