



DOERR DALLAS  
VALUATIONS



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# H FOR HPHT LAB-GROWN DIAMONDS

## What is HPHT?

HPHT stands for high pressure, high temperature and is one of the primary methods used to grow diamonds in a lab.



HPHT laboratory

This diamond growth process subjects carbon to extreme temperatures and pressures and is meant to replicate the extreme heat and pressure conditions deep within the earth where natural diamonds form.

This pressure is what makes the difference between:

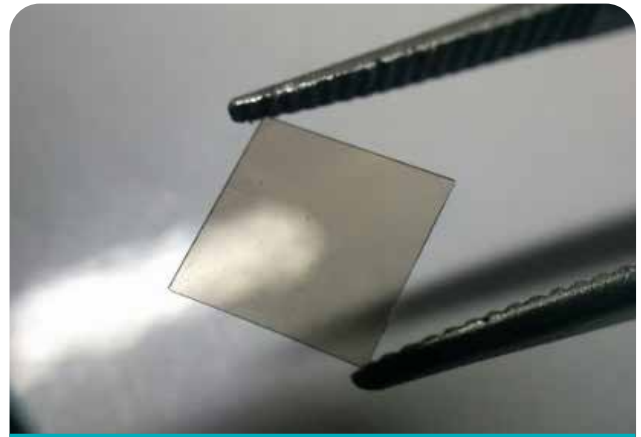


And this:



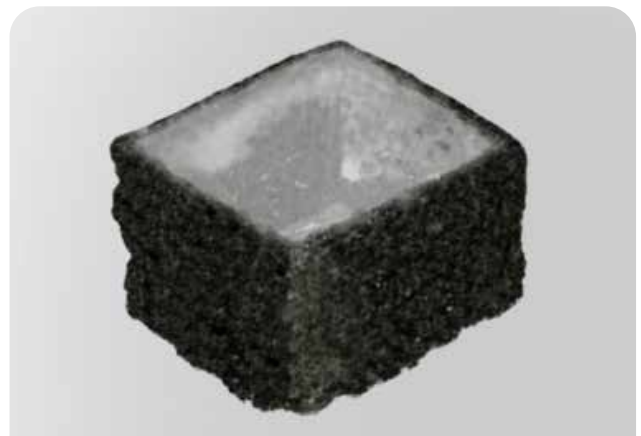
Scientists first grew diamonds in a laboratory in the mid-1950s. These diamonds were too small for jewellery, however. Production of larger, gem-quality crystals began in the mid-1990s for both jewellery and industrial purposes.

The newer method, chemical vapor deposition (CVD), involves filling a vacuum chamber with carbon-containing gas that crystallizes on a synthetic diamond seed. This method uses lower temperatures and pressures than HPHT.



A diamond seed

Turns into:



CVD-grown diamond

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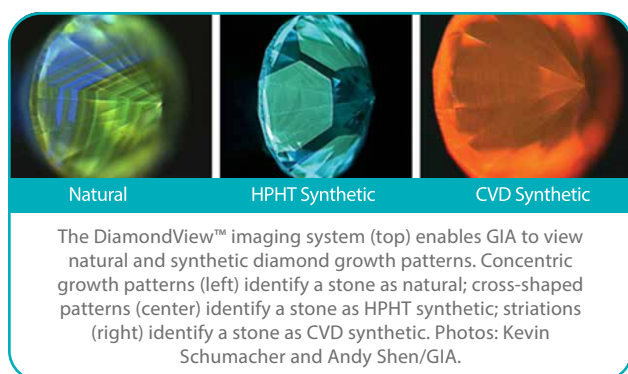
Coring to remove the outer layer is needed once the process is finished, about 6-10 weeks later.

CVD is best at producing 1-3 carat diamonds in the range J-G colour. They are often treated with HPHT to improve their colour. Whether they are subsequently treated or not, these are synthetic diamonds.

Some people might refer to lab-grown diamonds as imitations or simulants, but this is incorrect. Actual imitations like cubic zirconia or synthetic moissanite only look like diamonds and have very different chemical and physical properties that allow trained gemmologists to identify them easily. However, lab-grown diamonds are more challenging to detect.

There are some characteristics which help gemmologists in laboratories identify if a diamond is synthetic and, if so, to understand which method had been used to grow the diamond.

Some synthetic diamonds might glow for a minute or more after an ultraviolet lamp is turned off. This is called phosphorescence and is typically only seen in synthetic diamonds.



GIA, one of the leading gem laboratories, use a fluorescence imaging instrument called a DiamondView™ to examine diamonds. This instrument reveals the growth patterns within diamond crystals.

| Growth Process                         | Typical Growth Morphology                             | Photo Example of Rough |
|--|---|------------------------|
| Natural                                | <p>Shape: Octahedron<br/>Growth: 8 directions</p>     |                        |
| High Pressure, High Temperature (HPHT) | <p>Shape: Cuboctahedron<br/>Growth: 14 directions</p> |                        |
| Chemical Vapor Deposition (CVD)        | <p>Shape: Cube<br/>Growth: 1 direction</p>            |                        |

GIA.edu

Diamond growth patterns

The real challenge comes with identifying tiny diamonds called melée (below), which make up a dramatic portion of the diamond trade.



### So why are these diamonds so popular?

Simply put, lab grown diamonds are more affordable than mined diamonds of comparable size and quality. They can sell for up to 75% less than mined diamonds, due to lower expenses, a shorter supply chain, and a more competitive market.

It does not mean that lab grown diamonds are “cheap”: the process of cutting, polishing, and certification also carries a similar cost whether they be mined or lab grown.

However, because the mined diamond industry’s supply is restricted and controlled, it leads to artificially inflated prices, which does not happen in the lab grown diamond industry.

### Ethical and eco-friendly

Approximately 10 square metres of earth is disturbed and almost 3,000 kgs of rock waste is generated for each carat of diamond that is unearthed.

It was highlighted in a report that **“lab grown diamonds are seven times less impactful to the environment than mined diamonds, use significantly fewer resources and emit a fraction of the air pollution.”**

Essentially, lab grown diamonds are the only ethical and eco-friendly diamonds, guaranteed to be conflict-free.

## Comparables:



A Tiffany & Co. yellow gold diamond eternity ring sells for £3,175, set with 0.34ct total diamonds



A lab grown diamond-set eternity ring with a total of 0.50ct diamonds sells for £792 in yellow gold – including VAT.



De Beers diamond single-stone ring set with a 4.05ct brilliant-cut diamond, VVS1, D colour sells for £452,500.

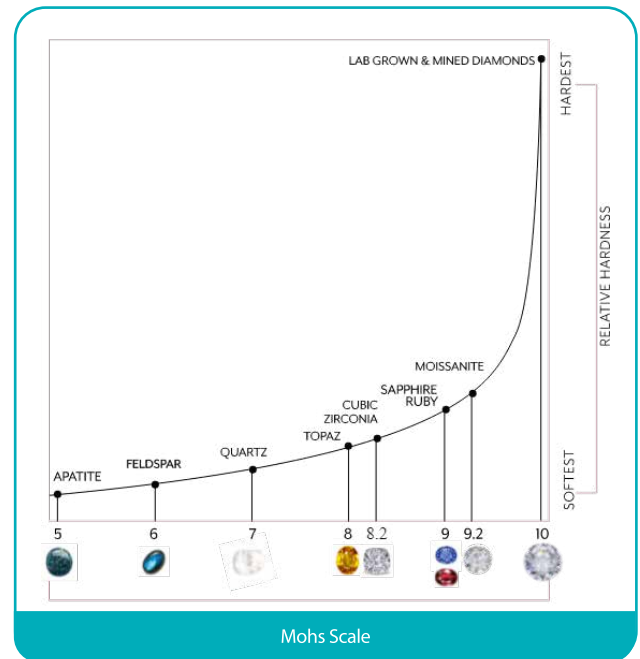


A similar lab grown diamond by Clean Origin, 4.58ct, VVS1,E colour sells for £34,093

Whichever diamond is chosen, lab grown or natural, they are always the best option for engagement rings and hard-wearing jewellery, being the strongest material known to science, rating 10 on the Mohs scale.

The Mohs scale of mineral hardness was created by Friedrich Mohs in 1822 and determines the scratch resistance of minerals when scratched by another mineral and is used to manufacture everyday objects: your mobile phone's screen glass is made of a material that scratches at level 6, some at level 7.

This differs from diamond simulants such as cubic zirconia and moissanite, where the quality is nowhere as close as that to diamonds allowing them to easily scratch, chip, and lose their shine as well as being heavier and therefore more uncomfortable to wear.



To be certain of the identity of the diamond you are buying, make sure you buy a diamond with a certificate from a reputable laboratory such as GIA who offer diamond grading reports or lab-grown diamond reports.