

DE BEERS  
GROUP OF COMPANIES

**UNDISCLOSED SYNTHETICS**

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*What you need to know*

## INTEGRITY IS EVERYTHING

As consumer demand for diamonds is forecast to experience strong growth in the years ahead, the diamond industry continues to face potential challenges from misrepresented or undisclosed synthetics.

Diamonds stand alone in their distinctive appeal and hold a unique place in the hearts and minds of consumers. When a consumer buys a diamond, they expect to buy it in its natural state. That is why the integrity of diamonds and the diamond industry must not be undermined by improper trading, on even the smallest scale.

It is important to remember that all synthetics can be readily identified and distinguished from diamonds. Each business in the industry has a responsibility to ensure the consumer is never misled. Your reputation, as well as the reputation of the industry, is at stake.

**With a number of recent instances of undisclosed synthetics being identified in the diamond supply chain, this document provides an overview of what you need to know.**

## DIAMOND

The World Jewellery Confederation (CIBJO) and the Federal Trade Commission (FTC) define a diamond as:

*‘a natural mineral consisting essentially of pure carbon crystallized with a cubic structure in the isometric system’.*

A natural mineral is one formed completely by nature without human intervention. Diamonds were formed more than a billion years ago, deep within the earth’s mantle, and reached the earth’s surface through volcanic activity.

## **SYNTHETICS**

A synthetic is a product that has been crystallized by artificial or human intervention. Synthetics are not new and have been used effectively since the 1950s for industrial and technical purposes.

Unlike a diamond, this product does not exist naturally, but is grown in a laboratory in just a few days. This growth environment produces differences in the growth structure of the stone at an atomic level. Synthetics can easily be identified by examining growth structures.

## **HIGH PRESSURE HIGH TEMPERATURE (HPHT) SYNTHETICS**

HPHT synthetics are produced in a press which generates high temperatures and pressures. The low volumes available are predominantly in a variety of yellow colours. Limited numbers of pink, blue and colourless are available. Production quantities are currently very small. See Appendix 1 for detail on the detection of HPHT synthetics.

## **CVD SYNTHETICS**

Chemical Vapour Deposition (CVD) synthetics are produced from carbon containing gases at low pressures. The majority of stones that are currently available lie in the 0.4ct – 1ct size range although smaller melee sizes have been seen and identified more frequently recently. Colours are in the range of near-colourless to light brown/yellow. Production quantities of CVD synthetics are estimated to be limited but they appear to be increasing. See Appendix 2 for detail on the detection of CVD synthetics.

## WHAT DO YOU NEED TO DO?

Trading in misrepresented or undisclosed products, whether inadvertently or not, could cause irreparable damage to your business reputation and could be viewed as fraudulent. Furthermore, such irresponsible practices could undermine the integrity of the entire diamond supply chain, damaging both trade and consumer confidence in buying diamonds.

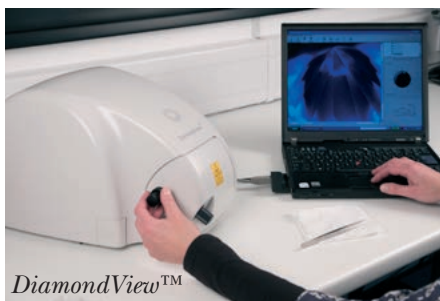
De Beers sells its own production from mines in Botswana, Namibia, South Africa and Canada and you can be sure that all of the diamonds you purchase from De Beers are natural. Risk areas do, however, exist for Sightholders and there are specific actions that you should take to ensure that you minimise these risks.

Your responsibilities as a Sightholder of the De Beers Group of Companies include the following:

- **Fully disclose what you are selling at all times.** Accurate descriptions and clear labelling are fundamentally important to consumer confidence and are a requirement of the Best Practice Principles. Always describe synthetics with one of the following terms: ‘synthetic’, ‘manmade’, ‘artificial’ or ‘lab-created’. Never use the word ‘diamond’ to describe or identify any object or product not meeting the definition. Full verbal disclosure should take place clearly, before and during sale. Full written disclosure of synthetics should be conspicuously included on each bill of sale, receipt, laboratory certificate or other document relating to the sale, in the relevant local language. All disclosure should be in accordance with applicable bourse and trade association requirements and guidelines, and of course should comply with relevant legal requirements.
- **Ensure you have access to effective detection equipment.** This is vital to protect you and your customers against unscrupulous attempts at misleading or fraudulent trading practice. A number of different detection machines and instruments are widely available on the market. The De Beers Group has designed and developed two machines, *DiamondSure*<sup>™</sup> and *DiamondView*<sup>™</sup>, to ensure that all synthetics are easily detected.



*DiamondSure™*



*DiamondView™*

These machines are in use at the major gemmological laboratories and can be ordered via the International Institute of Diamond Grading and Research website [www.iidgr.com](http://www.iidgr.com).

De Beers has also recently developed an *Automated Melee Screening instrument (AMS)* to manage the screening of larger parcels of melee stones. Going forward, orders for this instrument will also be handled via [www.iidgr.com](http://www.iidgr.com). We have carried out successful testing of the *AMS* device internally and we are currently in the process of carrying out comprehensive field trials; these trials are expected to be completed in the near future. We anticipate that the *AMS* will be ready for deployment with Sightholders in the first half of 2014. Please see Appendix 3 for further technical and leasing details on the *AMS*. Ahead of the deployment of the *AMS* instrument, we recommend that Sightholders dealing in melee undertake batch testing of these goods on the *DiamondSure™* machine.

- **Only buy from suppliers you trust and know where you can get stock tested if necessary.** Purchases from primary source manufacturers should come with assurances that the diamonds are natural and were manufactured directly from rough. However, the longer the pipeline the bigger the risk. Purchases from secondary sources (i.e. not the polisher of the goods), increases the opportunities for synthetics to be substituted for natural diamonds or spread across parcels sold to unsuspecting clients. Testing these goods yourself, or sending them to a reputable gemmological laboratory with effective detection equipment for testing, will provide you with greater confidence in what you are buying.

- **Ensure adequate factory controls are in place.** Once assured or tested and in your possession, your diamond stock is vulnerable to “switching” on the factory floor. Effective security and monitoring processes will protect the value and integrity of your stock.
- **Provide your own customers with assurance.** As a Sightholder of the De Beers Group of Companies, it is vital for your customers to have confidence in their business dealings with you. As long as you adhere to the guidance above, you will be able to strengthen your own reputation by providing your customers with the assurance that they are not purchasing undisclosed synthetics from your business.
- **Be proactive.** If you have been sold undisclosed synthetics, you should take action to report it to relevant organisations, including bourses, trade associations and potentially law enforcement agencies. If it becomes apparent to you that you have inadvertently supplied a customer with undisclosed synthetics, you should inform the BPP team immediately.

Consumer confidence is of paramount importance to all elements of the diamond industry. One of the benefits of being a Sightholder of the De Beers Group of Companies is that we will support you in upholding your business reputation and in maintaining the confidence of consumers.

We will continue to provide you with key information and to invest in industry-leading research and development. With these benefits comes responsibility, however, and it is imperative that Sightholders employ effective systems of the type outlined above to manage risks in relation to undisclosed synthetics.

## **WHAT OTHER STEPS CAN BE TAKEN TO MAINTAIN CONSUMER CONFIDENCE?**

As the issue of undisclosed synthetics has increased in prominence in recent months, De Beers intends to amend the Best Practice Principles (BPPs) to better reflect the current challenges in this area. We anticipate that new requirements in relation to this will be in place for the 2015 BPP cycle.

While the Sightholder community represents a large percentage of the diamond business, an issue such as this affects the entire supply chain and as such an industry-wide response will also be required.

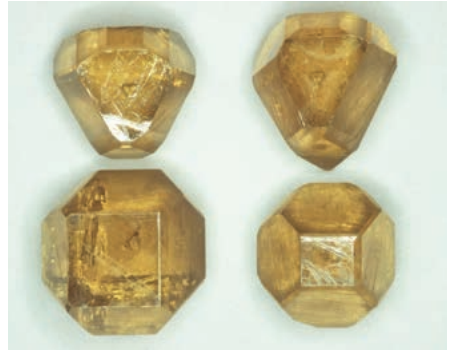
De Beers therefore intends to engage with a variety of key industry stakeholders to investigate other ways in which the trading of undisclosed synthetics can be prevented. As part of this, we will be engaging with Sightholders in the near future to gather your opinions on how we can address this issue.



# Appendix 1:

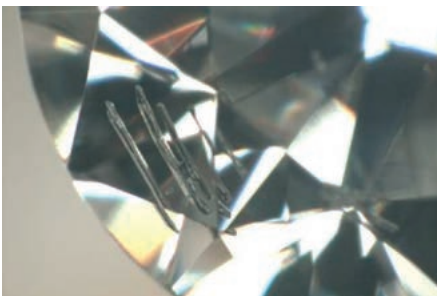
## DETECTING HPHT SYNTHETICS:

Firstly, it is important to note that pre-polished HPHT synthetics look very different from natural diamonds:

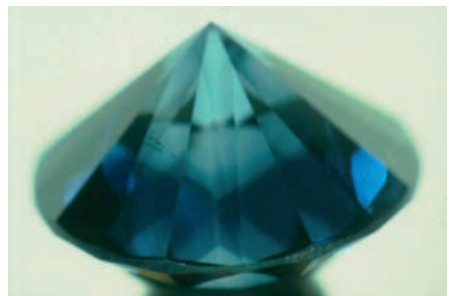


*As-grown HPHT synthetics*

Early identification of HPHT synthetics used to rely heavily upon careful observation of the stones under a microscope. This sought to identify metallic inclusions or colour zoning in the case of fancy colours.



*Metallic inclusions*



*Colour Zoning*



However, as growth processes have improved these indicators have become less common. Detection equipment has therefore focused on different approaches.

Colour in HPHT synthetics is determined by the atomic impurities that are present:

- Yellows: single nitrogen
- Blues: boron
- Pinks: nitrogen-vacancy centres

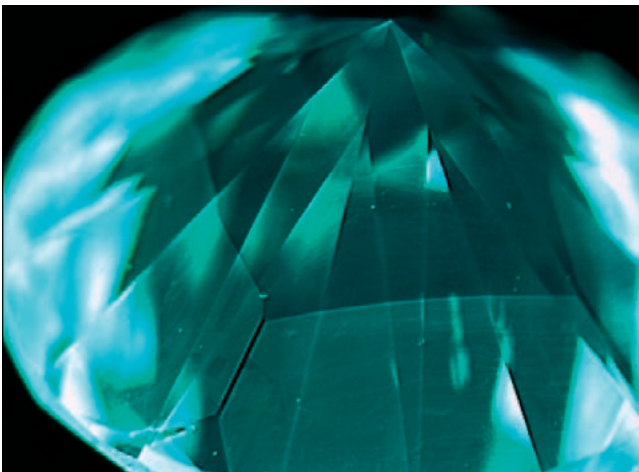
The absorption produced by these impurities imparts the colour and can be accurately detected using a spectrometer.

Careful measurement of this absorption can allow the categories of diamond that could possibly be synthetic to be separated from natural diamond categories that can't be produced by synthesis.

Such an absorption measurement forms the basis of the *DiamondSure*<sup>TM</sup> instrument.

Natural diamonds also grow in a completely different environment from synthetics and this results in very clear differences in *DiamondView*<sup>TM</sup> images.

HPHT synthetics will exhibit growth sectors on *DiamondView*<sup>TM</sup>:

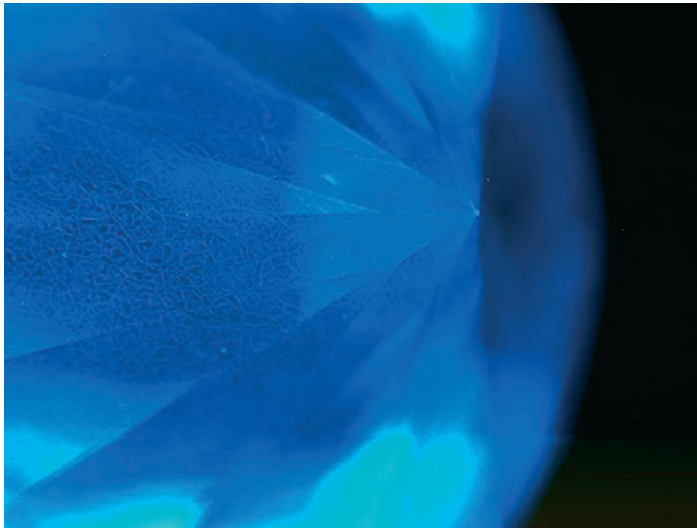


*DiamondView*<sup>TM</sup>  
image of growth  
sectors in polished  
type IIa HPHT  
synthetic

Natural type IIa diamonds usually show *DiamondView*<sup>TM</sup> images such as the one below:

- Overall blue fluorescence
- Inert background with blue networks

Background colour can vary and in some rare cases is orange, but still with the dislocation networks.



*DiamondView*<sup>TM</sup> image of natural diamond - type IIa colourless

## Appendix 2:

### DETECTING CVD SYNTHETICS:

Firstly, it should be noted that pre-polished CVD synthetics look very different from natural rough diamonds:



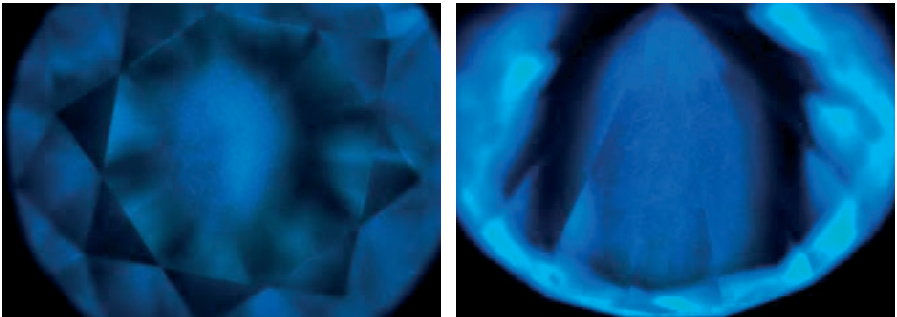
*Pre-polished CVD synthetics*

Once polished, CVD synthetics are readily identifiable using detection equipment such as that developed by De Beers.

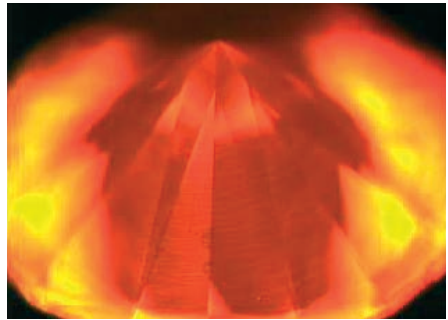
A De Beers *DiamondSure*<sup>™</sup> is a rapid and easy to use screening device that will refer all CVD synthetics for further testing. With a parcel of natural diamonds, a referral rate of around 2% should be expected.

Stones referred by *DiamondSure*<sup>™</sup> can then be tested on the De Beers *DiamondView*<sup>™</sup> machine to confirm whether they are of natural or synthetic origin.

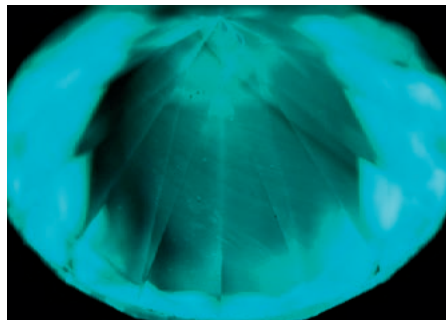
Natural type IIa diamonds (which will also be referred by *DiamondSure*<sup>™</sup>) generally show a blue fluorescence.



As-grown CVD synthetics will often exhibit orange fluorescence. Striations (a series of linear marks) are normally present and 'zoning' (concentrated areas of fluorescence) is sometimes observed as a result of the growth events when producing the synthetic stone):



For treated CVD synthetics this orange luminescence is replaced by green or greenish blue fluorescence. Phosphorescence is generated and the striations and zoning remain:



## *Appendix 3*

### **THE AUTOMATED MELEE SCREENING INSTRUMENT (AMS)**

#### **TECHNICAL SPECIFICATIONS:**

- The *AMS* instrument measures approximately 42cm deep; 26cm wide; 23cm high. It can be located in any type of environmentally controlled facility, and operates as a single machine or multiple units
- It screens near-colourless and colourless round brilliant diamonds from 0.20cts down to 0.01ct (roughly 1.4mm diameter) to determine whether they are natural or not. The *AMS* instrument does not screen for treated natural diamonds
- The instrument is fully automated and will take up to 500cts per unit at any one time. Larger parcels may be split across multiple units which can be operated by one or more people and they have overnight running capability
- Throughput of each unit is estimated at an average of 360 stones per hour
- A desktop or laptop PC is required to run each *AMS* instrument. Software is provided to operate the instrument and captures screening statistics for reconciliation purposes

#### **LEASE DETAILS:**

We anticipate that technical advances will be fast paced, so to ensure all *AMS* customers have the latest detection technology, we are offering *AMS* for leasing on a 3-year contract basis.

The lease fee is US\$25,000 per year per *AMS* instrument unit, totalling US\$75,000 per *AMS* instrument unit over the 3-year term.

We are now taking orders with deliveries starting end March 2014.



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