

PROJECT ASSURE  
DIAMOND VERIFICATION INSTRUMENT STANDARD  
TEST RESULTS

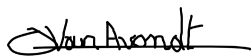
Assessment Report for: De Beers Group Ignite / DiamondSure




Prepared For: Luc Auer  
Natural Diamond Council Belgium VOF  
Hoveniersstraat 22  
2018 Antwerpen

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Testing ID Number: 2022-04  
Report Date: October 3<sup>rd</sup> 2022  
Approved by:

Quinten Van Avondt  
Lab Manager



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|   |                                   |                            |                    |
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## DIAMOND VERIFICATION INSTRUMENT

**Manufacturer's Name:** De Beers Group Ignite  
**Instrument Model:** DiamondSure  
**Serial Number:** 504  
**Software Version:** 3.01  
**Lab Manager:** Quinten Van Avondt  
**Testing Manager:** Cindy De Plukker

### Manufacturer stated diamond verification instrument description and features:

- Manual stone feed
- Single stone testing
- Automated results
- Results: Pass
  - Pass (check with thermal pen)
  - Refer for further tests
  - Refer for further tests (type Ib component)
  - Refer for further tests (type II)
  - Refer for further tests (possible type IaB)
  - Refer for further tests (test for Moissanite)

### Manufacturer stated diamond verification instrument limitations:

- Loose and mounted stones
- Colorless to near colorless stones
- Brilliant cut and most fancy cuts
- Size range 0.05 cts – 10 cts

## INSTRUMENT PERFORMANCE ASSESSMENT

### ASSESSMENT CRITERIA

The ASSURE testing methodology and performance metrics are dependent on the operational capabilities of the diamond verification instrument being tested. These are defined by the following three categories:

**Category 1- Screen diamonds from synthetic diamonds.** This category of device is intended for discrimination of diamonds from synthetic diamonds. It cannot distinguish diamonds from diamond simulants and therefore requires stones to be pre-screened to ensure no simulants are introduced into the device.

**Category 2 – Screen diamonds from synthetic diamonds and diamond simulants.** This category of device is intended for discrimination of diamonds from synthetic diamonds and diamond simulants. This device cannot distinguish synthetic diamonds from diamond simulants.

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Category 3 – Screen diamond from synthetic diamonds from diamond simulants. This category of device is intended for discrimination of diamonds, synthetic diamonds and diamond simulants from each other. This device can distinguish synthetic diamonds from diamond simulants.

Instrument performance for classifying the different kinds of stones was assessed against:

- Diamond Verification Instrument Standard Part 1 – Diamond Verification Instrument for Screening Diamonds from Synthetic Diamonds (09 11 2021)
- Diamond Verification Instrument Standard Part 2 – Diamond Verification Instrument for Screening Diamonds from Synthetic Diamonds and Diamond Simulants (09 11 2021)
- Diamond Verification Instrument Standard Part 3 – Diamond Verification Instrument for Screening Diamonds, Synthetic Diamonds, and Diamond Simulants (09 11 2021)

as referenced in sections 7.3 and 7.4 of the Diamond Verification Instrument Standard – General Requirements for Evaluation Diamond Verification Instruments (09 11 2021). Any deviations from the Standard are noted below:

None

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**DEFINITIONS:**

|  |   |
|--|---|
| <b>Diamond Accuracy</b>                      | <i>Diamond</i> test stones correctly classified as <i>Diamond</i> .   |
| <b>Synthetic Diamond Accuracy</b>            | <i>Synthetic Diamond</i> test stones correctly classified as non-diamond ( <i>Synthetic Diamond /Diamond simulant</i> ).  |
| <b>Diamond Simulant Accuracy</b>             | <i>Diamond Simulant</i> test stones correctly classified as non-diamond ( <i>Synthetic Diamond/Diamond Simulant</i> ).  |
| <b>Diamond Referral Rate</b>                 | <i>Diamond</i> test stones classified as <i>Referral</i> .  |
| <b>Synthetic Diamond Referral Rate</b>       | <i>Synthetic Diamond</i> test stones classified as <i>Referral</i> .  |
| <b>Simulant Referral Rate</b>                | <i>Diamond Simulant</i> test stones classified as <i>Referral</i> .   |
| <b>Diamond False Positive Rate</b>           | Non-diamond test stones ( <i>Synthetic Diamond / Diamond Simulant</i> ) incorrectly classified as <i>Diamond</i> .  |
| <b>Synthetic Diamond False Negative Rate</b> | <i>Synthetic Diamonds</i> incorrectly classified as <i>Diamond</i> .  |
| <b>Diamond Simulant False Negative Rate</b>  | <i>Diamond Simulants</i> incorrectly classified as <i>Diamond</i> .   |
| <b>Testing Speed</b>                         | The average speed at which the diamond verification instrument evaluates the stones in the PRIMARY loose sample set, including set-up time (if any).                                  |
| <b>Operating Speed</b>                       | For auto-loading diamond verification instruments only, the average speed at which stones are evaluated once the instrument achieves a steady-state. It does not include set-up time. |

**TEST STONE SETS USED FOR EVALUATION**

| <b>Loose, Polished Stone Test Sets</b>                  | <b>Diamond</b>                      | <b>Synthetic Diamond</b>            | <b>Diamond Simulant</b>             |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| Primary Sample Set (>2.0 mm, D-J color)                 | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Supplementary Smalls Sample Set (1.0-2.0 mm, D-J color) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| <b>Mounted, Polished Stone Test Sets</b>                | <b>Diamond</b>                      | <b>Synthetic Diamond</b>            | <b>Diamond Simulant</b>             |
| Primary Sample Set (>2.0 mm, D-J color)                 | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |
| Supplementary Smalls Sample Set (1.0-2.0 mm, D-J color) | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            |


Notes:

The manual states that mounted stones can be tested with the DiamondSure however this was not tested as the DiamondSure is not promoted as a jewellery testing device.

Stones were tested from 0.03 ct although manual states that stones can be tested from 0.05 ct to 10 ct.

De Beers have confirmed that testing stones as small as 0.03 ct can be done, however this may result in a small increase in referral rate.

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### CLEANING PROCEDURE OF STONES PRIOR TO TESTING

Test stones sets are cleaned in an ultrasonic bath of isopropanol for 2 minutes and dried prior to testing to reduce grease and electrostatic charge, as per Section 8 of ASSURE Standard.

### LABORATORY CONDITIONS AT TIME OF ASSESSMENT

| Condition        | Requirement | Actual |
|------------------|-------------|--------|
| Temperature (°C) | 18 to 25°C  | 23°C   |
| Humidity (%)     | 50 to 65%   | 62%    |

### RESULTS OF INSTRUMENT PERFORMANCE ASSESSMENT – LOOSE STONES

| Performance Metric                        | Primary              | Uncertainty <sup>[1]</sup> |
|---|----------------------|----------------------------|
| Diamond accuracy (%)                      | 94.7                 | 0.4                        |
| Synthetic diamond accuracy (%)            | N/A <sup>[2]</sup>   | N/A                        |
| Diamond simulant accuracy (%)             | N/A <sup>[3]</sup>   | N/A                        |
| Diamond referral rate (%)                 | 5.3                  | 0.4                        |
| Synthetic diamond referral rate (%)       | 100.0 <sup>[2]</sup> | 0.0                        |
| Diamond simulant referral rate (%)        | 100.0 <sup>[3]</sup> | 0.0                        |
| Diamond false positive rate (%)           | 0.0                  | 0.0                        |
| Synthetic diamond false negative rate (%) | 0.0                  | 0.0                        |
| Diamond simulant false negative rate (%)  | 0.0                  | 0.0                        |

Notes: <sup>[1]</sup> Uncertainty is expressed as absolute +/- range and reflects the consistency of the instrument's classification of stones for each of the three trials performed with the ASSURE sample.

<sup>[2]</sup> All Synthetic Diamonds reported as referral for this instrument


<sup>[3]</sup> All Diamond Simulants reported as referral for this instrument

### INSTRUMENT TESTING SPEED ASSESSMENT

Testing Speed approximates the usage turnaround time that could be expected by a novice user of the diamond verification instrument and is determined by the time required to evaluate the performance of the diamond verification instrument on the Primary Loose stone test set:

- Testing Speed accounts for the time directly associated with stone assessment including loading stones, programming any applicable instrument measurement parameters, analyzing the stones, and segregating the analyzed stones into respective instrument classified groups.
- Testing Speed does not include the time to initially warm-up the diamond verification instrument (if applicable) nor the time to separate diamonds from synthetic diamonds for each of the instrument classified groups of analyzed stones.
- Testing Speed does not include time associated with interruptions to the testing process.

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Diamond verification instruments that continuously load and analyze stones (i.e., autoloading diamond verification instruments) shall also be assessed for a steady-state Instrument Operating Speed.

Testing speed, and instrument operating speed if applicable, are measured in triplicate. The mean value is reported in the Speed Test Results table below. The Uncertainty reflects the absolute +/- range of the results measured over the three trials.

### SPEED TEST RESULTS (PRIMARY LOOSE SAMPLE)

| Category                               | Stones per hour    | Uncertainty        |
|--|--------------------|--------------------|
| Testing Speed (all devices)            | 203                | 5                  |
| Operating Speed (auto-loading devices) | N/A <sup>[1]</sup> | N/A <sup>[1]</sup> |

Notes: <sup>[1]</sup> not applicable for this device , the device has manual feed

### ADDITIONAL FINDINGS

When result "PASS (check with thermal pen)" was obtained, these stones were tested with a thermal pen. Thermal pen used: Presidium Adamas Diamond and Moissanite Tester.

\*\*\*\*\* End of Report \*\*\*\*\*

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