

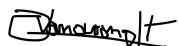
PROJECT ASSURE
DIAMOND VERIFICATION INSTRUMENT STANDARD
TEST RESULTS

Assessment Report for: De Beers Group Ignite / DiamondView




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

Received Date: October 18th 2021 /March 22nd 2022
Assessment Dates: October 12th -November 15th 2022
Testing ID Number: 2022-05
Report Date: November 29, 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: | DiamondView |
| Serial Number: | 548 |
| Software Version: | Version 1.1.0.4. |
| Lab Manager: | Quinten Van Avondt |
| Testing Manager: | Cindy De Plukker |

Manufacturer stated diamond verification instrument description and features:

- Manual stone feed
- Single stone testing
- Requires user interpretation (training is required)
- Results: Natural or Synthetic

Manufacturer stated diamond verification instrument limitations:

- May be used with a wide variety of loose and some mounted stones
- Size range 0.05 cts – 10 cts (for standard magnification)

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.

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.

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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:

Notes:

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DEFINITIONS:

| | |
|--|---|
| Diamond Accuracy | <i>Diamond</i> test stones correctly classified as <i>Diamond</i> . |
| Synthetic Diamond Accuracy | <i>Synthetic Diamond</i> test stones correctly classified as <i>Synthetic Diamond</i> . |
| Diamond Referral Rate | <i>Diamond</i> test stones classified as <i>Referral</i> . |
| Synthetic Diamond Referral Rate | <i>Synthetic Diamond</i> test stones classified as <i>Referral</i> . |
| Diamond False Positive Rate | <i>Synthetic Diamond</i> test stones incorrectly classified as <i>Diamond</i> . |
| Synthetic Diamond False Positive Rate | <i>Diamond</i> test stones incorrectly classified as <i>Synthetic Diamond</i> . |
| Testing Speed | The average speed at which the diamond verification instrument evaluates the stones in the PRIMARY loose sample set, including set-up time (if any) |
| Operating Speed | 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

| Loose, Polished Stone Test Sets | Diamond | Synthetic Diamond | Diamond Simulant |
|---|-------------------------------------|-------------------------------------|--------------------------|
| Primary Sample Set (>2.0 mm, D-J color) | <input checked="" type="checkbox"/> | <input checked="" 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"/> |
| Mounted, Polished Stone Test Sets | Diamond | Synthetic Diamond | Diamond Simulant |
| 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 some mounted stones in simple settings can be tested with the DiamondView however this was not tested as the DiamondView is not promoted as a jewellery testing device.

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.

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LABORATORY CONDITIONS AT TIME OF ASSESSMENT

| Condition | Requirement | Actual |
|------------------|-------------|--------|
| Temperature (°C) | 18 to 25°C | 20°C |
| Humidity (%) | 50 to 65% | 56% |

RESULTS OF INSTRUMENT PERFORMANCE ASSESSMENT – LOOSE STONES

| Performance Metric | Primary | Uncertainty ^[1] |
|---|---------|----------------------------|
| Diamond accuracy (%) | 99.6 | 0.3 |
| Synthetic diamond accuracy (%) | 100.0 | 0.0 |
| Diamond referral rate (%) | 0.0 | 0.0 |
| Synthetic diamond referral rate (%) | 0.0 | 0.0 |
| Diamond false positive rate (%) | 0.0 | 0.0 |
| Synthetic diamond false positive rate (%) | 0.4 | 0.3 |

Notes: ^[1] 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.

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.

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.

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SPEED TEST RESULTS (PRIMARY LOOSE SAMPLE)

| Category | Stones per hour | Uncertainty |
|--|--------------------|--------------------|
| Testing Speed (all devices) | 94 | 11 |
| Operating Speed (auto-loading devices) | n/a ^[1] | n/a ^[1] |

Notes: ^[1] not applicable for this device since the device has manual feed.

ADDITIONAL FINDINGS

The user needs some experience to use the instrument. This is provided by De Beers to new customers. Training is supplanted by the manual and training videos.

A reference library of reference images is provided within the software. The colour of fluorescence and fluorescence/growth patterns allow the user to determine whether a diamond is natural or laboratory grown.

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

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