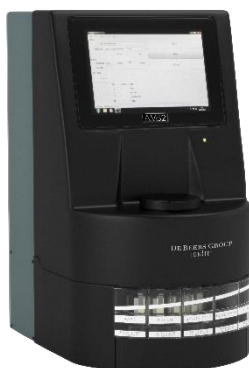


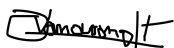
PROJECT ASSURE
DIAMOND VERIFICATION INSTRUMENT STANDARD
TEST RESULTS

Assessment Report for: De Beers Group Ignite / Automated Melee Screening 2 (AMS2)



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Testing ID Number: 2022-06
Report Date: February 20th, 2023
Approved by:



Quinten Van Avondt
Lab Manager

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DIAMOND VERIFICATION INSTRUMENT

Manufacturer's Name:	De Beers Group Ignite
Instrument Model:	Automated Melee Screening 2 (AMS2)
Serial Number:	366
Software Version:	1.14.8243.12333
Lab Manager:	Quinten Van Avondt
Testing Manager:	Cindy De Plukker

Manufacturer stated diamond verification instrument description and features:

- Automatic stone feed
- Automatic stone classification
- Automatic stone sorting

Manufacturer stated diamond verification instrument limitations:

- Loose stones
- Round Brilliant stone shape
- Fancy Cuts (not tested by ASSURE)
- Stone size of 1.0 mm – 3.8 mm (0.004 ct -0.20 ct)
- Stone color from colorless to near-colorless
- Difference in stone diameter within a test parcel for round brilliant stones may not exceed 0.5 mm (for stones above 2 pts) and may not exceed 0.2mm (for stones below 2 pts)

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 diamonds 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:

Note:

The AMS2 has an upper stone size limit of 3.8 mm for round brilliant stones. Stones with greater diameter than 3.8 mm (30 out of 500) were removed from the PRIMARY Sample set prior to conducting performance testing.

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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 Simulant Accuracy	<i>Diamond Simulant</i> test stones correctly classified as <i>Diamond simulant</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>
Simulant Referral Rate	<i>Diamond simulant</i> test stones classified as <i>Referral</i>
Diamond False Positive Rate	<i>Synthetic Diamonds / Diamond Simulants</i> incorrectly classified as <i>Diamond</i>
Synthetic Diamond False Positive Rate	<i>Diamonds / Diamond Simulants</i> incorrectly classified as <i>Synthetic Diamond</i>
Diamond Simulant False Positive Rate	<i>Diamonds / Synthetic Diamonds</i> incorrectly classified as <i>Diamond Simulant</i>
Diamond False Negative Rate	<i>Diamonds</i> incorrectly classified as <i>Synthetic Diamond</i> or <i>Diamond Simulant</i>
Synthetic Diamond False Negative Rate	<i>Synthetic Diamonds</i> incorrectly classified as <i>Diamond</i> or <i>Diamond simulant</i>
Diamond Simulant False Negative Rate	<i>Diamond simulants</i> incorrectly classified as <i>Diamond</i> or <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. Does not include set-up time.

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TEST STONE SETS USED FOR EVALUATION

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

Notes:

In Primary loose sample set, stones greater than 3.8 mm were excluded from testing due to upper size limit for this instrument. This instrument cannot test mounted jewelry.

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	19°C
Humidity (%)	50 to 65%	52%

RESULTS OF INSTRUMENT PERFORMANCE ASSESSMENT - LOOSE STONES

Test Property	Primary^[1]	Uncertainty^[2]	Smalls	Uncertainty^[2]
Diamond accuracy (%)	99.3	0.1	98.6	0.2
Synthetic diamond accuracy (%)	68.7	4.3	80.3	3.7
Diamond simulant accuracy (%)	100.0	0.0	100.0	0.0
Diamond referral rate (%)	0.7	0.1	0.6	0.0
Synthetic diamond referral rate (%)	31.3	4.3	19.3	3.3
Diamond simulant referral rate (%)	0.0	0.0	0.0	0.0
Diamond false positive rate (%)	0.0	0.0	0.0	0.0
Synthetic Diamond false positive rate (%)	0.0	0.0	0.0	0.0
Diamond simulant false positive rate (%)	0.0	0.0	0.7	0.2
Diamond False negative rate (%)	0.0	0.0	0.9	0.3
Synthetic diamond false negative rate (%)	0.0	0.0	0.3	0.3
Diamond simulant false negative rate (%)	0.0	0.0	0.0	0.0

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Date:	Feb 20 th , 2023	Testing ID:	2022-06
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- Notes:
- [1] primary stone set deviates from the standard as a reduced number of stones were analyzed: the standard calls for 500 mixed stones to be tested, 470 stones were tested
 - [2] 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 samples.

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.

- Operating speed is the number of stones that can be analyzed per hour while the diamond verification instrument is operating in steady state.

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

Category	Stones per hour	Uncertainty (stones/hr)
Testing Speed	1847	56
Operating Speed ^[1]	2300	87

Notes: [1] Operating speed is based on testing a mix of loose stones from the Smalls sample set with a diameter between 1.1 mm and 1.3 mm.

ADDITIONAL FINDINGS

None

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

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