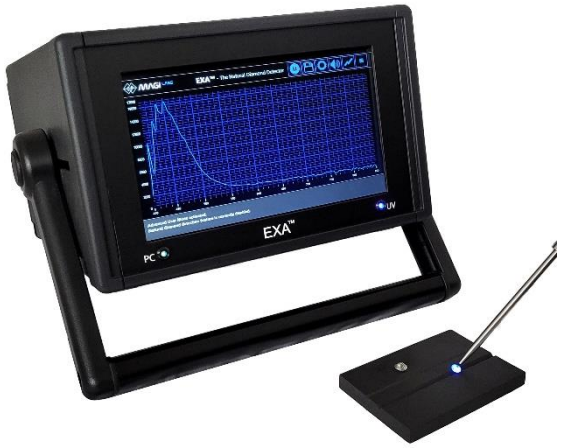
NATURAL DIAMOND COUNCIL

Universiteit Antwerpen

PROJECT ASSURE
DIAMOND VERIFICATION INSTRUMENT STANDARD
TEST RESULTS

Assessment Report for: Magilabs Oy / EXA



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Approved by:

Quinten Van Avondt
Lab Manager

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DIAMOND VERIFICATION INSTRUMENT

Manufacturer's Name: Magilabs Oy
Instrument Model: EXA
Serial Number: MAGF7324072SP
Software Version: 1.6.0.1 (a)
Lab Manager: Quinten Van Avondt
Analyst /Operator : Cindy De Plukker

Manufacturer stated diamond verification instrument description and features:

- Manual stone feed
- User interpretation (natural or refer) / automated test results possible but not tested
- Single stone testing
- Results: natural or refer
- Distinguishes natural diamonds from potentially diamonds and diamond simulants

Manufacturer stated diamond verification instrument limitations:

- Loose and mounted colorless stones
- Stone size of 0.005ct (1 mm) or greater
- Stone color of D to N
- Stone clarity – no limitation specified in the user manual
- Any cut shape polished diamond or rough diamond

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 (November 9, 2021)
- ☒ Diamond Verification Instrument Standard Part 2 – Diamond Verification Instrument for Screening Diamonds from Synthetic Diamonds and Diamond Simulants (November 9, 2021)
- ☐ Diamond Verification Instrument Standard Part 3 – Diamond Verification Instrument for Screening Diamonds, Synthetic Diamonds, and Diamond Simulants (November 9, 2021)

as referenced in sections 7.3 and 7.4 of the Diamond Verification Instrument Standard – General Requirements for Evaluation Diamond Verification Instruments (November 9, 2021). Any deviations from the Standard are noted below:

Closed-back jewellery (smalls set jewellery) and jewellery with foiled back glass (primary set jewellery) was excluded from testing

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DEFINITIONS:

Diamond Accuracy	*Diamond* test stones correctly classified as *Diamond*.
Synthetic Diamond Accuracy	*Synthetic Diamond* test stones correctly classified as *non-diamond* (*Synthetic Diamond / Diamond Simulant*).
Diamond Simulant Accuracy	*Diamond Simulant* test stones correctly classified as *non-diamond* (*Synthetic Diamond /Diamond Simulant)*
Diamond Referral Rate	*Diamond* test stones classified as *Referral*.
Synthetic Diamond Referral Rate	*Synthetic Diamond* test stones classified as *Referral*
Diamond Simulant Referral Rate	*Diamond* simulant test stones classified as *Referral*
Diamond False Positive Rate	Non-Diamond test stones (*Synthetic Diamond and/or Diamond Simulant*) incorrectly classified as *Diamond*.
Diamond False Negative Rate	*Diamond test stones* incorrectly classified as non-diamond *(Synthetic diamond/Diamond Simulant)*
Synthetic Diamond False Negative Rate	*Synthetic Diamonds* incorrectly classified as *Diamond.*
Diamond Simulant False Negative Rate	*Diamond Simulants* incorrectly classified as *Diamond.*
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.

NOTE: Diamond False Negative Rate is equivalent to the Synthetic Diamond / Diamond Simulant False Positive Rate for diamond verification instruments of Operation Category 2 (ASSURE Standard Part2, Section 12)

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Universiteit Antwerpen	Magilabs Oy EXA			
	Date:	February 19th 2024	Testing ID:	2024-01

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)	☒	☒	☒
Supplementary Smalls Sample Set (1.0-2.0 mm, D-J color)	☒	☒	☒
Mounted, Polished Stone Test Sets	**Diamond**	**Synthetic Diamond**	**Diamond Simulant**
Primary Sample Set (>2.0 mm, D-J color)	☒	☒	☒
Supplementary Smalls Sample Set (1.0-2.0 mm, D-J color)	☐	☐	

Notes: Jewellery pieces containing foiled back glass were not tested in the Primary Sample Set

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	20°C
Humidity (%)	50 to 65%	54 %

RESULTS OF INSTRUMENT PERFORMANCE ASSESSMENT – LOOSE STONES

Performance Metric	Primary	Uncertainty[1]	Smalls	Uncertainty[1]
Diamond accuracy (%)	94.8	1.1	89.9	1.0
Synthetic diamond accuracy (%)	n/a[2]	n/a	n/a[2]	n/a
Diamond simulant accuracy (%)	n/a[3]	n/a	n/a[3]	n/a
Diamond referral rate (%)	5.5	1.1	10.1	1.0
Synthetic diamond referral rate (%)	100.0[2]	0.0	100.0[2]	0.0
Diamond simulant referral rate (%)	100.0[3]	0.0	100.0[3]	0.0
Diamond false positive rate (%)	0.0	0.0	0.0	0.0
Non-Diamond False Positive Rate (%)	0.0	0.0	0.0	0.0
Diamond false negative rate (%)	0.0	0.0	0.0	0.0
Synthetic diamond false negative rate (%)	0.0	0.0	0.0	0.0
Diamond simulant false negative rate (%)	0.0	0.0	0.0	0.0

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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.
[2] All Synthetic Diamonds reported as referral for this instrument.
[3] All Diamond Simulants reported as referral for this instrument.

RESULTS OF INSTRUMENT PERFORMANCE ASSESSMENT – MOUNTED STONES

Performance metric	Primary[4]	Smalls [3]
Diamond accuracy (%)	89.8	n/a
Synthetic diamond accuracy (%)	n/a[1]	
Diamond simulant accuracy (%)	n/a[2]	
Diamond referral rate (%)	10.2	
Synthetic diamond referral rate (%)	100.0[1]	
Diamond simulant referral rate (%)	100.0[2]	
Diamond false positive rate (%)	0.0	
Non-Diamond False positive rate (%)	0.0	
Diamond false negative rate (%)	0.0	
Synthetic diamond false negative rate (%)	0.0	
Diamond simulant false negative rate (%)	0.0	

Notes:
[1] All Synthetic Diamonds are reported as referral for this instrument.
[2] All Diamond Simulants reported as referral for this instrument.
[3] Smalls set not tested (closed-back).
[4] Samples containing foiled-back glass were not tested.

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)	205	24
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

Speed test measurements for testing include time required for user interpretation.

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

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