NATURAL DIAMOND COUNCIL

Bonas Group
DIAMONDS & GEMSTONES

PROJECT ASSURE
DIAMOND VERIFICATION INSTRUMENT STANDARD
TEST RESULTS

Assessment Report for: JTR Reveal 2S

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2018 Antwerpen

Assessment Dates: 28/03/2025 – 07/04/2025
Testing ID Number: Category 1-6
Report Date: 21/05/2025
Approved by:

Didier Backaert
Lab Manager

DIAMOND VERIFICATION INSTRUMENT

Manufacturer's Name: JTR
Instrument Model: Reveal 2S
Serial Number: n/a
Software Version: 3.0

Lab Manager: Didier Backaert
Analyst/Operator : Violet

Manufacturer-stated diamond verification instrument description and features:

The Reveal 2S is a portable desktop diamond verification instrument capable of testing natural diamond, HPHT and CVD lab grown diamonds as well as cubic zirconia and moissanite. It features a large analysis area (60mm x 80mm), allowing it to detect various types of diamonds, synthetic diamonds and diamond simulants. It has the following features and benefits:

- Capable of identifying natural diamonds, CVD and HPHT synthetic diamonds
- Capable of identifying some diamond simulants such as zirconia and moissanite (not tested by ASSURE)
- It can be connected to Full HD monitor, whether via computer, tablet or mobile phone.
- Designed for brilliant round cuts as well as fancy cuts.
- Ability to save, access and review analysis from any device with the myJTR cloud service. Also provides capability to share and collaborate workflow from different locations.
- Capable of testing stones as small as 0.001ct
- Capable of testing bracelets up to 170mm in length.

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.

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

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☒ Diamond Verification Instrument Standard Part 1 – Diamond Verification Instrument for Screening Diamonds from Synthetic Diamonds (18 03 2024)

☐ Diamond Verification Instrument Standard Part 2 – Diamond Verification Instrument for Screening Diamonds from Synthetic Diamonds and Diamond Simulants (18 03 2024)

☐ Diamond Verification Instrument Standard Part 3 – Diamond Verification Instrument for Screening Diamonds, Synthetic Diamonds, and Diamond Simulants (18 03 2024)

as referenced in sections 7.3 and 7.4 of the Diamond Verification Instrument Standard – General Requirements for Evaluation Diamond Verification Instruments (18 03 2024). Any deviations from the Standard are noted below:

Notes: While JTR Reveal 2S can test some simulants (cubic zirconia and moissanite), it is not designed to test glass and sapphire stones. As such, the Reveal 2S was tested as a Category 1 device (natural and synthetic diamond screening device).

DEFINITIONS:

Diamond Accuracy	*Diamond* test stones correctly classified as *Diamond*.
Synthetic Diamond Accuracy	*Synthetic Diamond* test stones correctly classified as *Synthetic Diamond*.
Diamond Simulant Accuracy	*Diamond Simulant* test stones correctly classified as *Diamond Simulant*.
Diamond Referral Rate	*Diamond* test stones classified as *Referral*.
Synthetic Diamond Referral Rate	*Synthetic* diamond test stones classified as *Referral*
Simulant Referral Rate	*Diamond* simulant test stones classified as *Referral*
Diamond False Positive Rate	Synthetic Diamond / Diamond Simulant test stones incorrectly classified as *Diamond*.
Synthetic Diamond False Positive Rate	Diamond / Diamond Simulant test stones incorrectly classified as Synthetic Diamond.
Diamond Simulant False Positive Rate	Diamond / Synthetic Diamond test stones incorrectly classified as Diamond Simulants.
Diamond False Negative Rate	Diamond test stones incorrectly classified as Synthetic Diamonds or Diamond simulants.
Synthetic Diamond False Negative Rate	Synthetic Diamond test stones incorrectly classified as Diamonds or Diamond simulants
Diamond Simulant False Negative Rate	Diamond Simulant test stones incorrectly classified as Diamonds or Synthetic Diamonds
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.

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)	☒	☒	☐
Supplementary Ultra Smalls Sample Set (0.5-1.0mm 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: JTR claims the Reveal 2S is capable of testing ultra small sized diamonds, however this was not tested by ASSURE since the sample set is only used for devices with fully automated feed.

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	24 °C
Humidity (%)	50 to 65%	54 %

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RESULTS OF INSTRUMENT PERFORMANCE ASSESSMENT – LOOSE STONES

Performance Metric	Primary [1]	Uncertainty [2]	Smalls [3]	Uncertainty [2]	Ultra-Smalls [5]
Diamond accuracy (%)	94.4	1.4	93.8	2/1	n/a
Synthetic diamond accuracy (%) [4]	n/a	n/a	n/a	n/a	
Diamond referral rate (%)	5.6	1.4	6.2	2.1	
Synthetic diamond referral rate (%)	100.0	0.0	100.0	0.0	
Diamond false positive rate (%)	0.0	0.0	0.0	0.0	
Synthetic diamond false positive rate (%) [4]	n/a	n/a	n/a	n/a	
Diamond false negative rate (%)	n/a	n/a	n/a	n/a	
Synthetic diamond false negative rate (%)	0.0	0.0	0.0	0.0	

Notes:
[1] Primary set comprised of round brilliant loose stones with diameters of >2.0 mm D-J color.
[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 sample.
[3] Smalls set comprised of round brilliant loose stones with diameters of 1.0–2.0 mm D-J color.
[4] Stones categorized as synthetic are considered referrals.
[5] Ultra-Smalls (<1.0mm diameter) is only included for devices with fully automated feed.

RESULTS OF INSTRUMENT PERFORMANCE ASSESSMENT – MOUNTED STONES

Performance metric	Primary [1]	Smalls [2]
Diamond accuracy (%)	95.8	n/a
Synthetic diamond accuracy (%) [3]	n/a	
Diamond referral rate (%) [3]	4.2	
Synthetic diamond referral rate (%) [3]	100	
Diamond false positive rate (%)	0.0	
Synthetic diamond false positive rate (%) [3]	n/a	
Diamond false negative rate (%)	n/a	
Synthetic diamond false negative rate (%)	0.0	

Notes:
[1] Primary sample set has stones with diameters of >2.0 mm D-J color with open-back setting.
[2] Smalls sample set includes simulants and has stones from 1.0 – 2.0 mm in diameter D-J color with closed-back setting.

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.

SPEED TEST RESULTS (PRIMARY LOOSE SAMPLE)

Category	Stones per hour	Uncertainty
Testing Speed (all devices)	421	35
Operating Speed (auto-loading devices)	N/A	N/A

Notes:

ADDITIONAL FINDINGS

- The Reveal 2S has a comprehensive library of reference images for both natural and synthetic diamonds to assist the interpretation of results.

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