

PROJECT ASSURE  
DIAMOND VERIFICATION INSTRUMENT STANDARD REPORT

Summary Report for: Jubilee Diamond Instruments / BELIZE Combination  
Tester




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Approval By:

  
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Technical Manager CRS

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	Jubilee Diamond Instruments / BELIZE Combination Tester		
	<b>Date:</b>	December 29, 2020	<b>Testing ID:</b>

**Manufacturer's Name:** Jubilee Diamond Instruments  
**Instrument Model:** BELIZE Combination Tester  
**Serial Number:** GEM-0022-01  
**Software Version:** NA  
**Lab Manager:** Winson Wong  
**Analyst/Operator:** Julie Mason

### Overview

The stated instrument was evaluated to Diamond Verification Instrument Standard Part 3 – Diamond Verification Instrument for Screening Diamonds, Synthetic Diamonds, and Diamond Simulants (23 September 2020) as referenced by the Diamond Verification Instrument Standard – General Requirements for Evaluation Diamond Verification Instruments (23 September 2020).


### Manufacturer's Claims for Instrument Capability

Sample Composition	
Type of Stones	Diamonds, Synthetic Diamonds and Diamond Simulants
Stone Size Range	2.0 mm and above(0.02 ct. and above)
Stone Color Range	Stone Color D to J
Loose / Mounted	Loose and Mounted
Single / Batch Stone Testing	Single Stone Testing
Automated / Manual Feed	Manual Feed

### Summary of Assessment

The instrument has been verified to be able to screen loose and mounted, round, brilliant cut diamonds, synthetic diamonds and diamond simulants in the size range of 2.0 mm to 3.7 mm (0.02 ct. to 0.2 ct.) and D to J color range.

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**Results of Performance Testing to the Diamond Verification Instrument Standard**

**Test Stone Sets used to Assess Performance**

Loose, Polished Stone Test Sets	Diamond	Synthetic Diamond	Diamond Simulant
Primary Set (>2.00 mm, D-J colour) 747 diamonds, 150 synthetic diamonds and 148 diamond simulants	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Supp. Set A (>2.00 mm, D-J colour) 249 diamonds	<input checked="" type="checkbox"/>		
Supp. Set AB (>2.00 mm, D-J colour) 49 synthetic diamonds, 47 diamond simulants		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Supp. Set B (>2.00 mm, K-Z colour) 250 diamonds	<input type="checkbox"/>		
Supp. Set C (1.00-2.00 mm, D-J colour) 737 diamonds, 140 synthetic diamonds and 145 diamond simulants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supp. Set D (1.00-2.00 mm, D-J colour) 250 diamonds	<input type="checkbox"/>		
Supp. Set DE (1.00-2.00 mm, D-J colour) 51 synthetic diamonds, 47 diamond simulants		<input type="checkbox"/>	<input type="checkbox"/>
Supp. Set E (1.00-2.00 mm, K-Z colour) 250 diamonds	<input type="checkbox"/>		

**Results of instrument stone assessment testing of Primary and A&AB Combined**


Test Property	Results for Loose, Polished Stone Test Sets
	Primary and A&AB Combined
Diamond accuracy (%)	92.3
Synthetic diamond accuracy (%)	na <sup>[1]</sup>
Diamond simulant accuracy (%)	100.0
Diamond referral rate (%)	6.9
Synthetic diamond referral rate (%)	100.0 <sup>[2]</sup>
Diamond simulant referral rate (%)	0.0
Diamond false positive rate (%)	0.0
Synthetic diamond false positive rate (%)	0.0
Diamond simulant false positive rate (%)	0.7
Diamond false negative rate (%)	0.8
Synthetic diamond false negative rate (%)	0.0
Diamond simulant false negative rate (%)	0.0

Notes:

na Not applicable per instrument manufacturer

[1] This instrument does not cannot distinguish CVD/HPHT synthetics from Type IIa diamonds. Stones identified as CVD/HPHT/Type IIa are classified as refer.

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[2] This instrument classifies synthetic stones are refer.

**Results of instrument testing speed assessment**

Rate of Testing Speed Test Method	Average Test Result
<input type="checkbox"/> Test Method A: Fixed number of stones	195 stones per hour
<input checked="" type="checkbox"/> Test Method B: Fixed time frame	
<input type="checkbox"/> Test Method C: Reduced number of stones	

**Results of instrument stone assessment testing of individual stone sets**

Test Property	Results for Loose, Polished Stone Test Sets					
	Primary <sup>[1]</sup>	A & AB	B & AB	C	D & DE	E & DE
Diamond accuracy (%)	92.2	92.4	na	na	na	na
Synthetic diamond accuracy (%)	na <sup>[2]</sup>	na <sup>[2]</sup>	na	na	na	na
Diamond simulant accuracy (%)	100.0	100.0	na	na	na	na
Diamond referral rate (%)	6.7	7.6	na	na	na	na
Synthetic diamond referral rate (%)	100.0 <sup>[3]</sup>	100.0 <sup>[3]</sup>	na	na	na	na
Diamond simulant referral rate (%)	0.0	0.0	na	na	na	na
Diamond false positive rate (%)	0.0	0.0	na	na	na	na
Synthetic diamond false positive rate (%)	0.0	0.0	na	na	na	na
Diamond simulant false positive rate (%)	0.9	0.0	na	na	na	na
Diamond false negative rate (%)	1.1	0.0	na	na	na	na
Synthetic diamond false negative rate (%)	0.0	0.0	na	na	na	na
Diamond simulant false negative rate (%)	0.0	0.0	na	na	na	na

Notes:

na Not applicable per instrument manufacturer

[1] Primary Stone set deviates from the standard as a reduced number of stones were analyzed; Primary set deviation – the standard call for 748 diamonds to be tested, only 747 diamonds were tested.

[2] This instrument does not distinguish CVD/HPHT synthetics from Type IIa diamonds. Stones identified as CVD/HPHT/Type IIa are classified as refer.


[3] This instrument classifies synthetic stones are refer.

**Additional Notes from Assessment Findings**

Below is a summary of an additional findings from assessment:

- No additional comments

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**Definitions**

<b>Diamond Accuracy</b>	Defined as the fraction of test stones correctly classified by the specific diamond verification instrument as diamond.
<b>Synthetic Diamond Accuracy</b>	Defined as the fraction of test stones correctly classified by the specific diamond verification instrument as synthetic diamond.
<b>Diamond Simulant Accuracy</b>	Defined as the fraction of test stones correctly classified by the specific diamond verification instrument as diamond simulant.
<b>Diamond Referral Rate</b>	Defined as the fraction of diamonds that could not be classified by the specific diamond verification instrument and requires further.
<b>Synthetic Diamond Referral Rate</b>	Defined as the fraction of synthetic diamonds that could not be classified by the specific diamond verification instrument and requires further testing.
<b>Simulant Referral Rate</b>	Defined as the fraction of diamond simulants that could not be classified by the specific diamond verification instrument and requires further testing.
<b>Diamond False Positive Rate</b>	Defined as the fraction of synthetic diamonds and/or diamond simulants incorrectly classified as diamond by the specific diamond verification instrument.
<b>Synthetic Diamond False Positive Rate</b>	Defined as the fraction of diamonds and/or diamond simulants incorrectly classified as synthetic diamonds by the specific diamond verification instrument.
<b>Diamond Simulant False Positive Rate</b>	Defined as the fraction diamond and/or synthetic diamonds incorrectly classified as diamond simulants by the specific diamond verification instrument.
<b>Diamond False Negative Rate</b>	Defined as the fraction of diamonds incorrectly classified as synthetic diamond and/or diamond simulant by the specific diamond verification instrument.
<b>Synthetic Diamond False Negative Rate</b>	Defined as the fraction of synthetic diamonds incorrectly classified as diamond and/or diamond simulant by the specific diamond verification instrument.
<b>Diamond Simulant False Negative Rate</b>	Defined as the fraction of diamond simulants incorrectly classified as diamond and/or synthetic diamond by the specific diamond verification instrument.
<b>Rate of Testing Speed</b>	Defined as the average speed at which the diamond verification instrument evaluates unknown stones.

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

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