

**PROJECT ASSURE  
DIAMOND VERIFICATION INSTRUMENT STANDARD REPORT**

**Summary Report for: Dharmanandan Research Centre's (DRC Techno) / J-Smart**

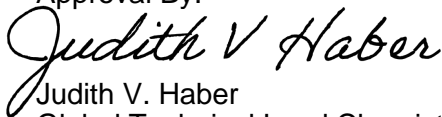


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Received Date: September 24, 2018  
Invid Number: 672201  
Assessment Dates: May 20, 2019 through May 28, 2019  
Testing ID Number: 1908525S-A\*  
Assessment Testing ID: 1908525  
Report Date: August 16, 2019

\*This report supersedes the test report dated May 29, 2019. The report was amended to correct the stone color to D-K and the stone size to 0.86mm+(0.003 ct.+).

Approval By:



Judith V. Haber  
Global Technical Lead Chemistry

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	DRC Techno, J-Smart		
	Date:	August 16, 2019	Testing ID:

**Manufacturer's Name:** DRC Techno  
**Instrument Model:** N/A  
**Serial Number:** J18028S04183  
**Software Version:** 1.0.0.6  
**Lab Manager:** Winson Wong  
**Analyst/Operator:** Joseph Tiburcio, Ramesh Pasupleti, Vignesh Kevadiya

**Overview**

The stated instrument was evaluated to Diamond Verification Instrument Standard Part 1 – Diamond Verification Instrument for Screening Diamonds from Synthetic Diamonds (30 January 2019) as referenced by the Diamond Verification Instrument Standard – General Requirements for Evaluation Diamond Verification Instruments (30 January 2019).


**Manufacturer's Claims for Instrument Capability**

Sample Composition	
Type of Stones	Diamonds and Synthetic diamonds
Stone Size Range	0.86 mm+ (0.0.003 ct.+)
Stone Color Range	Color Range D to K
Loose / Mounted	Loose and Mounted
Single / Batch Stone Testing	Batch 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 and synthetic diamonds that are loose in the size range of 0.86 to 3.7 mm (0.003 to 0.2 ct.) and D-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) 748 diamonds, 150 synthetic diamonds	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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		<input checked="" type="checkbox"/>	<input 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 and 140 synthetic diamonds	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Supp. Set D (1.00-2.00 mm, D-J colour) 250 diamonds	<input checked="" type="checkbox"/>		
Supp. Set DE (1.00-2.00 mm, D-J colour) 51 synthetic diamonds		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Supp. Set E (0.10-2.00 mm, K-Z colour) 250 diamonds	<input type="checkbox"/>		

### Results of instrument stone assessment testing Combined Stone Sets - Expert

Test Property	Results for Loose, Polished Stone Test Sets	
	Primary and A&AB Combined	C and D&DE Combined
Diamond accuracy (%)	88.0	96.8
Synthetic diamond accuracy (%)	89.4	95.3
Diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>
Synthetic diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>
Diamond false positive rate (%)	10.6	4.7
Synthetic diamond false positive rate (%)	12.0	3.2
Diamond false negative rate (%)	12.0	3.2
Synthetic diamond false negative rate (%)	10.6	4.7

Notes:

na Not applicable per instrument manufacturer

[1] This instrument does not classify stones as 'Refer'

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Results of instrument stone assessment testing Combined Stone Sets - Novice

Test Property	Results for Loose, Polished Stone Test Sets	
	Primary and A&AB Combined	C and D&DE Combined
Diamond accuracy (%)	91.1	95.9
Synthetic diamond accuracy (%)	84.4	95.8
Diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>
Synthetic diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>
Diamond false positive rate (%)	15.6	4.2
Synthetic diamond false positive rate (%)	8.9	4.1
Diamond false negative rate (%)	8.9	4.1
Synthetic diamond false negative rate (%)	15.6	4.2

Notes:

na Not applicable per instrument manufacturer

[1] This instrument does not classify stones as 'Refer'


Results of instrument testing speed assessment - Expert

Rate of Testing Speed Test Method	Average Test Result
<input type="checkbox"/> Test Method A: Fixed number of stones	1103 stones per hour
<input type="checkbox"/> Test Method B: Fixed time frame	
<input checked="" type="checkbox"/> Test Method C: Reduced number of stones	

Results of instrument testing speed assessment - Novice

Rate of Testing Speed Test Method	Average Test Result
<input type="checkbox"/> Test Method A: Fixed number of stones	713 stones per hour
<input type="checkbox"/> Test Method B: Fixed time frame	
<input checked="" type="checkbox"/> Test Method C: Reduced number of stones	

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Results of instrument stone assessment testing of individual stone sets - Expert

Test Property	Results for Loose, Polished Stone Test Sets					
	Primary	A & AB	B & AB	C	D & DE	E & DE
Diamond accuracy (%)	89.7	82.7	na	96.5	97.6	na
Synthetic diamond accuracy (%)	91.3	83.7	na	96.4	92.2	na
Diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>	na	na <sup>[1]</sup>	na <sup>[1]</sup>	na
Synthetic diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>	na	na <sup>[1]</sup>	na <sup>[1]</sup>	na
Diamond false positive rate (%)	8.7	16.3	na	3.6	7.8	na
Synthetic diamond false positive rate (%)	10.3	17.3	na	3.5	2.4	na
Diamond false negative rate (%)	10.3	17.3	na	3.5	2.4	na
Synthetic diamond false negative rate (%)	8.7	16.3	na	3.6	7.8	na

Notes:

na Not applicable per instrument manufacturer

[1] This instrument does not classify stones as 'Refer'

Results of instrument stone assessment testing of individual stone sets - Novice

Test Property	Results for Loose, Polished Stone Test Sets					
	Primary	A & AB	B & AB	C	D & DE	E & DE
Diamond accuracy (%)	95.2	78.7	na	94.7	99.6	na
Synthetic diamond accuracy (%)	84.0	85.7	na	97.1	92.2	na
Diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>	na	na <sup>[1]</sup>	na <sup>[1]</sup>	na
Synthetic diamond referral rate (%)	na <sup>[1]</sup>	na <sup>[1]</sup>	na	na <sup>[1]</sup>	na <sup>[1]</sup>	na
Diamond false positive rate (%)	16.0	14.3	na	2.9	7.8	na
Synthetic diamond false positive rate (%)	4.8	21.3	na	5.3	0.4	na
Diamond false negative rate (%)	4.8	21.3	na	5.3	0.4	na
Synthetic diamond false negative rate (%)	16.0	14.3	na	2.9	7.8	na

Notes:

na Not applicable per instrument manufacturer

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**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 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>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 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>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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