



PROJECT ASSURE DIAMOND VERIFICATION INSTRUMENT STANDARD REPORT

Summary Report for: HRD Antwerp M-Screen+ Diamond Tester



Prepared For: Lisa Levinson
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Hoveniersstraat 22
Antwerp, 2018
Belgium

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Preliminary Testing ID: 1817238S-D*
Assessment Testing ID: 1817238
Report Issue Date: March 1, 2019

*This report supersedes test report dated February 28, 2019. The report has been amended to include the definitions of all categories per the DPA's request.


Approval By:

A handwritten signature in black ink that reads "Judith V. Haber".

Judith V. Haber
Global Technical Lead Chemistry

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	HRD Antwerp, M-Screen+ Diamond Tester		
	Date:	March 1, 2019	Testing ID:

Manufacturer's Name: HRD Antwerp
Instrument Model: HRD/M-Screen Plus
Serial Number: MS18-003
Software Version: 2.1.0(Rev_May 9 2017_Plus)
Lab Manager: Winson Wong
Analyst/Operator: Lawrence D. Scialdone

Overview

The stated instrument was evaluated to Diamond Verification Instrument Standard Part 2 – Diamond Verification Instrument for Screening Diamonds from Synthetic Diamonds and Diamond Simulants (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, Synthetic diamonds and Diamond simulants
Stone Size Range	1.0 to 3.7 mm (0.005 to 0.20 ct.)
Stone Color Range	Stone color D to J
Loose / Mounted	Loose
Single / Batch Stone Testing	Batch Stone Testing
Automated / Manual Feed	Automated Feed

Summary of Assessment

The instrument has been verified to be able to screen loose, round, brilliant cut diamonds, synthetic diamonds and diamond simulants in the range of 1.0 to 3.7 mm (0.005 to 0.20 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) 748 diamonds, 150 synthetic diamonds and 148 diamond simulants	☒	☒	☒
Supp. Set A (>2.00 mm, D-J colour) 249 diamonds	☒		
Supp. Set AB (>2.00 mm, D-J colour) 50 synthetic diamonds, 47 diamond simulants		☒	☒

Results of instrument stone assessment testing of Primary and A4AB Combined

Test Property	Results for Loose, Polished Stone Test Sets
	Primary and A&AB Combined
Diamond accuracy (%)	95.9
Synthetic diamond accuracy (%)	na ^[1]
Diamond simulant accuracy (%)	na ^[2]
Diamond referral rate (%)	4.1
Synthetic diamond referral rate (%)	100 ^[1]
Diamond simulant referral rate (%)	100 ^[2]
Diamond false positive rate (%)	0.0
Synthetic diamond false positive rate (%)	0.0 ^[1]
Diamond simulant false positive rate (%)	0.0 ^[2]
Diamond false negative rate (%)	0.0 ^{[1][2]}
Synthetic diamond false negative rate (%)	0.0 ^[3]
Diamond simulant false negative rate (%)	0.0

Notes:

na Not applicable per instrument manufacturer


[1] Does not apply because this instrument does not classify stones as 'Synthetic diamond'

[2] This instrument is designed to classify Simulant Diamonds and Out of Spec natural diamonds in the same bin.

[3] This instrument does not distinguish between synthetic diamond being "Out of Spec" or classified as "Diamond Simulant"

[4] C Stone set, and DE Stone set deviates from the standard as a reduced number of stones were analyzed; Set C deviation – the standard calls for 1048 mixed stones to be tested, 1022 stones were tested; Set DE deviation – the standard calls for 99 synthetic/simulants to be tested, 98 stones were tested.

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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	12317 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	A & AB	B & AB	C	D & DE	E & DE
Diamond accuracy (%)	96.0	95.6	na	90.4	92.4	na
Synthetic diamond accuracy (%)	na ^[1]	na ^[1]	na	na ^[1]	na ^[1]	na
Diamond simulant accuracy (%)	na ^[2]	na ^[2]	na	na ^[2]	na ^[2]	na
Diamond referral rate (%)	4.0	4.4	na	9.6	7.6	na
Synthetic diamond referral rate (%)	100 ^[1]	100.0 ^[1]	na	100.0 ^[1]	100.0 ^[1]	na
Diamond simulant referral rate (%)	100 ^[2]	100 ^[2]	na	100.0 ^[2]	100.0 ^[2]	na
Diamond false positive rate (%)	0.0	0.0	na	0.0	0.0	na
Synthetic diamond false positive rate (%)	0.0 ^[1]	0.0 ^[1]	na	0.0 ^[1]	0.0 ^[1]	na
Diamond simulant false positive rate (%)	0.0 ^[2]	0.0 ^[2]	na	0.0 ^[2]	0.0 ^[2]	na
Diamond false negative rate (%)	0.0 ^{[1][2]}	0.0 ^{[1][2]}	na	0.0 ^{[1][2]}	0.0 ^{[1][2]}	na
Synthetic diamond false negative rate (%)	0.0 ^[3]	0.0 ^[3]	na	0.0 ^[3]	0.0 ^[3]	na
Diamond simulant false negative rate (%)	0.0	0.0	na	0.0	0.0	na

Notes:

na Not applicable per instrument manufacturer

[1] Does not apply because this instrument does not classify stones as ‘Synthetic diamond’

[2] This instrument is designed to classify Simulant Diamonds and Out of Spec natural diamonds in the same bin.

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[4] C Stone set, and DE Stone set deviates from the standard as a reduced number of stones were analyzed; Set C deviation – the standard calls for 1048 mixed stones to be tested, 1022 stones were tested; Set DE deviation – the standard calls for 99 synthetic/simulants to be tested, 98 stones were tested.

Additional Notes from Assessment Findings

Below is a summary of an additional findings from assessment:

- None

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Definitions

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

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

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