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TEST REPORT

Send To: C0091157
Mr. Edward Morassi
50 Bearfoot Road
Northborough, MA 01532

Facility: C0091157
Solmetex, LLC
50 Bearfoot Road
Northborough, MA 01532

Result: **PASS** Report Date: February 10, 2015

Customer Name:	Solmetex LLC
Tested To:	ISO 11143:2008
Description:	Hg5-001K with collection container series CC-1M
Test Type:	Efficiency and operation
Test Dates:	November 18, 19, & 20, 2014
Test Location:	NSF International Ann Arbor MI
Job Number:	J-00153078
Project Number:	9991779
Project Manager:	Sharon Steiner

Executive Summary: The Hg5-001K with collection container series CC-1M met the ISO 11143:2008 requirements for amalgam retention efficiency, operation and maintenance, and labeling. Testing was completed according to ISO 11143:2008.

Thank you for having your product tested by NSF International.

Please contact your Project Manager if you have any questions or concerns pertaining to this report.

Tests Performed By: Kristina Blott

Digitally signed by Ata Ciechanowski
DN: cn=Ata Ciechanowski, o=NSF International, ou=Engineering Laboratory, email=ciechanowski@nsf.org, c=US
Date: 2015.02.10 10:39:47 -05'00'

Report Authorization: _____

Ata Ciechanowski, Assistant Director – Engineering Laboratory

TEST REPORT

Test Sample

Manufacturer:	Solmetex, LLC
Designation:	Hg5-001K with collection container series CC-1M
Type Classification:	Type 2 - Sedimentation
Serial Number:	Hg5-K-45001
Maximum Flow Rate:	1 Liter per minute
Maximum Fillable Volume:	0.95 Liters
Total System Volume:	7.5 Liters
System Dimensions:	Height – 29 inches Length – 8 inches Width – 11 inches

Figure 1 – Hg5-001K with collection container series CC-1M

Vacuum collection system wastewater enters the Hg5-001K surge tank and then drops by gravity into the removable sedimentation vessel, where heavy particles can settle out. Wastewater flows from the sedimentation vessel through a flow control outlet device and back into the vacuum line. Suction from the vacuum system does not impact sedimentation as the flow path for air is separate from the flow path for liquid. Air exits the top of the surge tank to bypass the sedimentation vessel.

Test Standard

Testing was performed to determine compliance of the supplied sample to ISO 11143:2008 "*Dentistry – Amalgam separators*". ISO 11143 specifies requirements for amalgam separators, such as amalgam retention efficiency and instructions for use, operation and maintenance.

Amalgam Sample

Amalgam test samples were obtained from "bm becker messtechnik gmbH". Each sample consisted of 10 g dental amalgam as specified in ISO Standard 11143. The detailed reports on the test samples are included in Appendix A.

Particle Size Distribution:

- 3000 mg, < 100 µm
- 1000 mg, 100µm – 500 µm
- 6000 mg, 500µm – 3150 µm

Amalgam Sample Lot Numbers:

- Charge 100416-03/14

Test Procedure

The test procedure used to determine the efficiency of the separators is defined in ISO 11143 for Type 2 systems. Deviations from the standard test procedure are noted below.

- Effluent Collecting Vessel
    - Multiple 2-liter glass beakers were used. The standard specifies a single stainless steel vessel with a minimum volume of 45 liters.
- Filters
    - Diameter of filter membranes was 47 mm. The standard specifies 50 mm minimum.
    - Nominal pore size used was 1.2 microns. The standard specifies pore sizes of 12.0, 3.0, and 1.2 microns
    - A single filter was used for each replicate.
    - Separating gauze was used in between filter membranes.
    - Filtering was completed by vacuum instead of pressure.

Filters

One filter was used for each amalgam retention efficiency test:

1.) 1.2 micron nominal pore size, cellulose nitrate membrane filter, 47 mm diameter

All of the effluent was filtered through a single 1.2 micron filter.

Number of Tests Performed

Six tests were run on the sample separator provided by the manufacturer: Three tests were run on the separator when empty and three tests were run on the separator when filled to 95% of the maximum fillable volume.

The separator was filled to 95% of the maximum fillable volume with 70% glass beads 1 mm in size and 25% amalgam scrap ground to less than 300 micron. Table 1 shows the filling volumes for each material.

Table 1 – Loading of the Full Amalgam Separator

Model	Specified Maximum Filling Level (mL)	Volume of Scrap Amalgam Used (mL)	Volume of Glass Beads Used (mL)
Collection container series CC-1M	950	238	665

Test Data

The results from the efficiency tests are shown in Tables 2 and 3. The tare weight and final weight includes a stainless steel weighing dish. This helped to keep the residue in place during drying.

Table 2 – Empty Amalgam Separator Test Results

Empty Trial	Filter Size	Initial Filter Weight (g)	Final Filter Weight (g)	Un-separated Amalgam (g)	Weight of Challenge (g)	Efficiency
1	1.2 µm	8.82878	8.83109	0.00231	9.99884	99.977%
Trial 1 Total				0.00231		
2	1.2 µm	9.13720	9.13835	0.00115	9.99785	99.988%
Trial 2 Total				0.00115		
3	1.2 µm	9.12988	9.13049	0.00061	10.00326	99.994%
Trial 3 Total				0.00061		
Average						**99.986%**

Table 3 – Full Amalgam Separator Test Results

Full Trial	Filter Size	Initial Filter Weight (g)	Final Filter Weight (g)	Un-separated Amalgam (g)	Weight of Challenge (g)	Efficiency
1	1.2 µm	8.62321	8.63119	0.00798	9.99881	99.920
Trial 1 Total				0.00798		
2	1.2 µm	9.13838	9.13965	0.00127	9.99550	99.987
Trial 2 Total				0.00127		
3	1.2 µm	9.15271	9.15407	0.00136	9.99646	99.986
Trial 3 Total				0.00136		
Average						**99.965%**

Efficiency

The minimum efficiency required by ISO 11143 is 95% by mass.

Empty Amalgam Separator: Hg5-001K with collection container series CC-1M, η_1 = 99.986%

Full Amalgam Separator: Hg5-001K with collection container series CC-1M, η_2 = 99.965%

The lowest efficiency measured from the full and empty tests (η_1 or η_2) is the amalgam separator efficiency. Therefore, the overall efficiency for the sample is determined to be 99.965%.

Warning System (Type 2 System)

The Hg5-001K with collection container series CC-1M is provided with a fill line on the collection vessel. The fill line may be used to warn the user when the system is almost full or full.

Alarm System for Collecting Container (Type 2 System)

The Hg5-001K with collection container series CC-1M is provided with a fill line on the collection vessel. The fill line may be used to warn the user when the system is almost full or full. The manufacturer clearly defines procedures by which the proper function of the amalgam separator is ensured, giving controllable maintenance and recovery procedures in the owner's manual.

Alarm System for Malfunction

Not applicable to a Type 2 system.

Removal of Filled Collecting Container

The filled collecting container can be removed and sealed so that no spillage occurs during replacement and transfer of the container.

Maximum Fillable Volume

The manufacturer claimed maximum fillable volume of the collecting container is 950 mL. The mark on the collection vessel was found to be accurate during the filling process.

Hg5-001K with collection container series CC-1M: 950 mL

Electrical Safety

Hg5-001K with collection container series CC-1M does not incorporate any electrical components.

Results Obtained

Efficiency Pass/Fail Criteria:	Hg5-001K with collection container CC-1M, 99.965%	Pass
Warning System:	Hg5-001K with collection container CC-1M –	Pass
Alarm System for Collecting Container:	Hg5-001K with collection container CC-1M –	Pass
Removal of Filled Collecting Container:	Hg5-001K with collection container CC-1M –	Pass
Maximum Fillable Volume:	Hg5-001K with collection container CC-1M –	Pass

Appendix A
Test Sample Particle Size Distribution Reports

TECHNOLOGIE

Manufacturer Certificate for samples according ISO 11143

Production date: März 14
Charge 100416-03/14

ISO 11143
ISO amalgam sample
Fraction 1: 500 - 3150 µm
Fraction 2: 100 - 500 µm
Fraction 3: < 100 µm

Customer: NSF International
789 N. Dixboro Rd
ann Arbor, MI 48105

Sedigramm chart date: August 16, 2013

Order No: Email dated 14-July-2014, Order No. 108985

Delivery: 22.07.2014

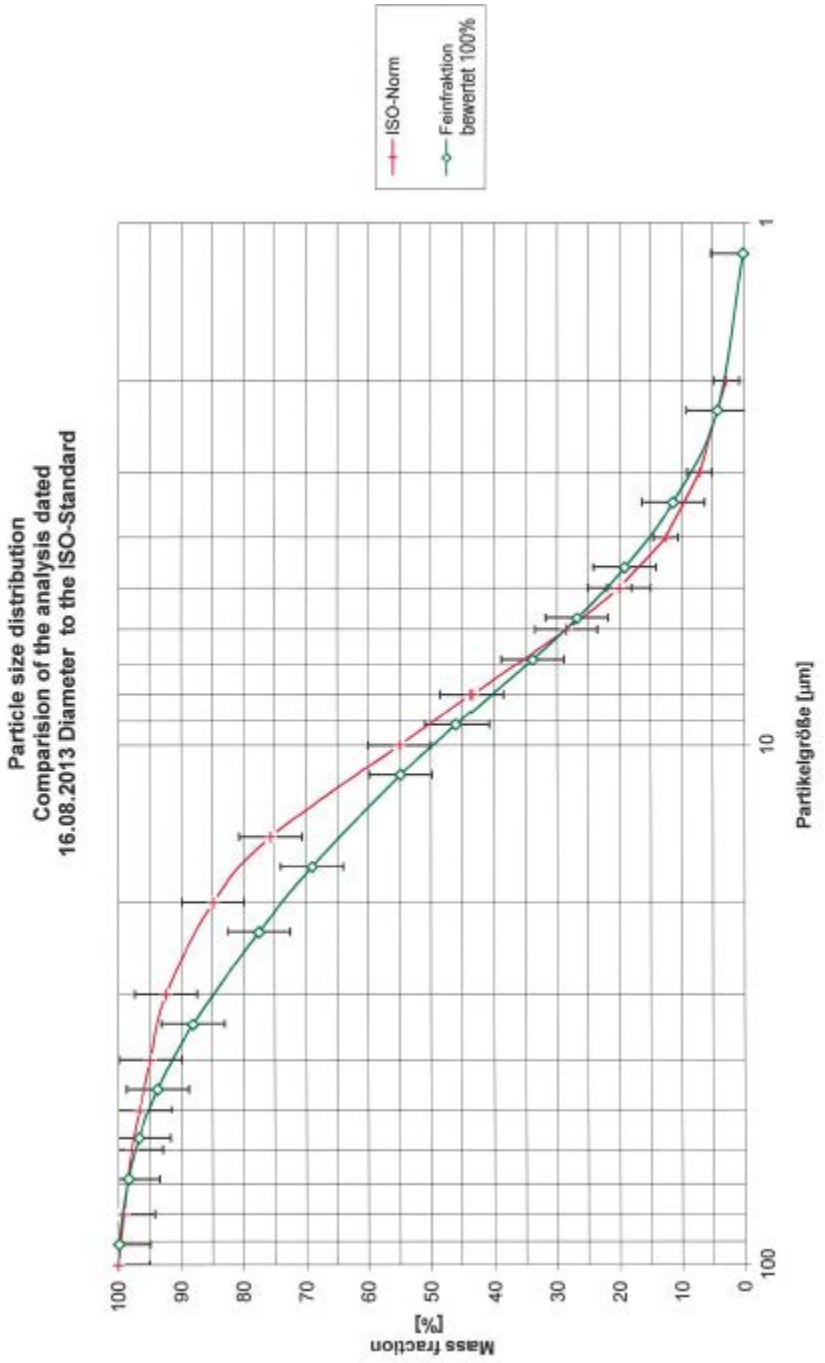
Fraction 1	500 - 3150µm	6g ± 10mg
Fraction 2	100 - 500µm	1g ± 5mg
Fraction 3	<100µm	3g ± 5mg
Total		**10g ± 5mg**

Probe No	Anteil [g]: Fraction 1	Fraction 2	Fraction 3	Total
7	5,997	1,000	3,002	9,999
8	6,005	1,000	2,999	10,004
9	6,001	1,001	2,999	10,001
10	5,997	1,004	3,002	10,003
11	5,998	1,004	3,002	10,004
12	6,001	0,997	3,000	9,998
13	6,004	0,999	3,001	10,004
14	6,004	0,999	2,999	10,002
15	6,001	1,003	2,997	10,001
16	6,003	0,998	2,999	10,000
17	6,005	0,997	2,999	10,001
18	6,004	1,000	2,998	10,002
19	6,003	1,002	2,997	10,002
20	6,002	0,999	3,002	10,003
21	5,998	1,000	3,002	10,000
22	5,999	1,001	3,002	10,002
23	5,998	1,001	3,002	10,001
24	6,003	1,001	2,996	10,000
25	5,998	1,002	3,000	10,000
26	6,000	1,001	3,002	10,003
27	6,000	1,001	3,000	10,001
28	6,001	1,001	3,001	10,003
29	5,999	0,999	3,000	9,998
30	6,003	0,997	3,002	10,002

Attachments: Particle size distribution for d < 100µm
Report of the x-ray sedigraphical test on August 08, 2013

Eschborn, January 21st, 2014 Stamp/Signature

Becker Technologies GmbH, Kölner Str. 6, 65760 Eschborn, Germany



Kornverteilung

Kornanalyse: **Micromeritics** **16.08.2013**

Sample Density:	ρ_s=	11,9950 [kg/m³]
Liquid Density:	ρ_L=	1,1728 [kg/m³]
Sample-Density ISO-Norm:	$\rho_{s,N}$=	9,5000 [kg/m³]

Umrechnung Partikelgröße auf "Normdichte":

$$d_2 = d_1 \bullet \sqrt{\frac{\rho_s - \rho_L}{\rho_{s,N} - \rho_L}}$$

Werte von Low Diameter — Mass Finer Wert interpoliert

Messwerte		Messwerte berechnet		EBe 08.02.95	ISO-Norm
Partikel-Größe d_1	Feinfraktion Durchgang	norm. Partikel-Größe d_2	Feinfraktion bewertet 100%	Feinfraktion Soll	Feinfraktion Soll
[µm]	[%]	[µm]	[%]	[%]	[%]
300	94,3	342,0			
250	94,3	285,0			
150	94,5	171,0			
100	94,1	114,0	100,0	100,00	100,00
80	94,0	91,2	99,9	98,75	99,15
60	92,6	68,4	98,4	97,50	97,89
50	91,0	57,0	96,7	96,25	96,58
40	88,2	45,6	93,7	93,75	94,87
30	82,9	34,2	88,1	90,00	92,40
20	73,0	22,8	77,6	82,50	84,90
15	65,0	17,1	69,1	75,00	75,70
10	51,6	11,4	54,8	58,75	55,00
8	43,2	9,1	45,9	46,25	43,53
6	31,9	6,8	33,9	31,25	28,50
5	25,2	5,7	26,8	22,50	20,00
4	18,0	4,6	19,1	15,00	12,54
3	10,7	3,4	11,4	8,13	7,14
2	4,0	2,3	4,3	2,50	2,85
1	0,2	1,1	0,2		