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TEST REPORT

Send To: C0091157
Mr. Edward Morassi
Solmetex LLC
50 Bearfoot Road
Northborough, MA 01523

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

Result: **PASS** Report Date: September 11, 2015

Customer Name:	SolmeteX, LLC
Tested To:	ANSI/ADA Specification No. 108:2009/ISO 11143:2008 (approved February 2009) with the ANSI/ADA Specification No. 108:2009, Addendum (approved November 2011)
Description:	Hg5-Mini with Series CC-1M Collection Container Tested to ISO11143:2008 and ANSI/ADA Specification No. 108:2009, Addendum
Test Type:	Efficiency and operation
Test Dates:	September 1, 2015 and September 3, 2015
Test Location:	NSF International Ann Arbor MI
Job Number:	J-00182232
Project Number:	10013698 (PL01)
Project Manager:	Sharon Steiner

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: Michael Chamberlain

Report Authorization: Digitally signed by Ata Ciechanowski DN: cn=Ata Ciechanowski, o=NSF International, ou=Engineering Laboratory, email=ciechanowski@nsf.org, c=US Date: 2015.09.11 10:48:18 -04'00'

Ata Ciechanowski, Assistant Director – Engineering Laboratory

Authority:

Paul Anderson - Director, Engineering Laboratory

TEST REPORT

Test Sample

Manufacturer:	SolmeteX, LLC
Designation:	Hg5-Mini with Series CC-1M Collection Container
Type Classification:	Type 2 - Sedimentation
Serial Number:	HG5-MN-4413
Maximum Flow Rate:	1 Liter per minute
Maximum Fillable Volume:	0.950 Liters
System Dimensions:	Height – 21 inches Length – 7 inches Width – 9 inches

Figure 1 – Hg5-Mini with collection container series CC-1M

Vacuum collection system wastewater enters the Hg5-Mini surge tank and then drops by gravity into the removable CC-1M 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 ANSI/ADA Specification No. 108:2009/ISO 11143:2008 (approved February 2009) with the ANSI/ADA Specification No. 108:2009, Addendum (approved November 2011). This standard 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 ANSI/ADA Specification No. 108:2009/ISO 11143:2008 (approved February 2009) with the ANSI/ADA Specification No. 108:2009, Addendum (approved November 2011). 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 100416-10/14

Test Procedure

The test procedure used to determine the efficiency of the separators is defined in ANSI/ADA Specification No. 108:2009/ISO 11143:2008 (approved February 2009) with the ANSI/ADA Specification No. 108:2009, Addendum (approved November 2011) 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
    - No separating gauze was used in between filter membranes. Filter membranes were not stacked during filtering.
    - Filtering was completed by vacuum instead of pressure.

Filters

A single filter was used for each amalgam retention efficiency test:

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

Number of Tests Performed

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

During one run of full amalgam separator testing, an overflow occurred due to clogging of the ventilation hole in the collection vessel. That data was considered invalid and was not included in the result.

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	237.5	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	8.8409	8.8457	0.0048	9.9930	99.952%
Trial 1 Total				0.0048		
2	1.2 µm	8.8445	8.8484	0.0039	9.9909	99.961%
Trial 2 Total				0.0039		
3	1.2 µm	8.9051	8.9066	0.0016	9.9932	99.984%
Trial 3 Total				0.0016		
Average						**99.966%**

Table 3 – Full 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	9.1489	9.1565	0.0076	9.9786	99.924%
Trial 1 Total				0.0076		
2	1.2 µm	8.8374	8.8412	0.0038	9.9942	99.962%
Trial 2 Total				0.0038		
3	1.2 µm	9.1520	9.1553	0.0033	9.9957	99.967%
Trial 3 Total				0.0033		
Average						**99.951%**

Efficiency

The minimum efficiency required by ANSI/ADA Specification No. 108:2009/ISO 11143:2008 (approved February 2009) with the ANSI/ADA Specification No. 108:2009, Addendum (approved November 2011) is 95% by mass.

Empty Amalgam Separator: Hg5-Mini with collection container series CC-1M, η_1 = 99.966%

Full Amalgam Separator: Hg5-Mini with collection container series CC-1M, η_2 = 99.951%

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 99.951%.

Warning System (Type 2 System)

The Hg5-Mini 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-Mini 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

Hg5-Mini with collection container series CC-1M Maximum Fillable Volume: 950 mL
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.

Electrical Safety

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

Results Obtained

Efficiency Pass/Fail Criteria:	Hg5-Mini with collection container CC-1M, 99.951%	Pass
Warning System:	Hg5-Mini with collection container CC-1M –	Pass
Alarm System for Collecting Container:	Hg5-Mini with collection container CC-1M –	Pass
Removal of Filled Collecting Container:	Hg5-Mini with collection container CC-1M –	Pass
Maximum Fillable Volume:	Hg5-Mini with collection container CC-1M –	Pass

Appendix A
Test Sample Particle Size Distribution Reports

BECKER TECHNOLOGIES

Manufacturer Certificate for samples according ISO 11143

Production date: October 2014 — ISO 11143
Charge 100416-10/14 — ISO amalgam sample
Fraction 1: 500 - 3150 µm
Fraction 2: 100 - 500 µm
Customer: SolmetaX — Fraction 3: < 100 µm
50 Bearfoot Road
Northborough, MA 01532

Sedigramm chart date: October 23, 2014

Order No: PO No. 192 dated Dep 16, 2014

Delivery: 05.11.2014

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
1	5,999	1,001	3,003	10,003
2	6,004	1,000	2,998	10,002
3	6,000	1,001	3,003	10,004
4	6,002	1,000	3,001	10,003
5	5,998	0,999	3,002	9,999
6	6,000	1,001	3,001	10,002
7	6,000	1,000	3,002	10,002
8	6,003	1,001	2,999	10,003
9	6,001	0,998	3,000	9,999
10	5,998	0,999	3,004	10,001
11	6,004	0,997	3,000	10,001
12	6,003	1,000	2,998	10,001
13	5,999	1,001	3,001	10,001
14	5,997	1,002	3,001	10,000
15	6,000	1,003	2,999	10,002
16	6,004	0,998	3,002	10,004
17	6,003	1,000	3,000	10,003
18	5,999	1,001	3,000	10,000
19	6,004	0,998	2,999	10,001
20	6,004	0,999	2,999	10,002
21	6,000	1,001	3,000	10,001
22	6,001	1,000	3,001	10,002
23	6,001	0,998	3,000	9,999
24	5,999	0,999	3,002	10,000

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

Eschborn, November 4th, 2014 — Stamp/Signature

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

Kornverteilung

Kornanalyse:
Sample Density:
Liquid Density:
Sample-Density ISO-Norm:
Umrechnung Partikelgröße auf "Normdichte":

Micromeritics 23.10.2014
ρ_s= 12,0650 [kg/m³]
ρ_L= 1,1728 [kg/m³]
$\rho_{s,N}$= 9,5000 [kg/m³]

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

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	99,5	343,1			
250	99,4	285,9			
150	99,0	171,6			
100	97,2	114,4	100,0	100,00	100,00
80	96,5	91,5	99,3	98,75	99,15
60	94,3	68,6	97,0	97,50	97,89
50	92,7	57,2	95,4	96,25	96,58
40	90,4	45,7	93,0	93,75	94,87
30	86,2	34,3	88,7	90,00	92,40
20	77,1	22,9	79,3	82,50	84,90
15	68,5	17,2	70,5	75,00	75,70
10	54,1	11,4	55,7	58,75	55,00
8	45,3	9,1	46,6	46,25	43,53
6	34,5	6,9	35,5	31,25	28,50
5	28,2	5,7	29,0	22,50	20,00
4	21,3	4,6	21,9	15,00	12,54
3	13,9	3,4	14,3	8,13	7,14
2	6,5	2,3	6,7	2,50	2,85
1	2,0	1,1	2,1