

# SMI, Inc.

12219 SW 131 Avenue  
Miami, Florida 33186-6401 USA

Phone: (305) 971-7047  
Fax: (305) 971-7048

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Attn: Milt Krause  
Simple Green  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649

Date: 05-May-2005

SMI/REF: 05MAR343-B

Product: **EXTREME SIMPLE GREEN** (received 21-Mar-2005)

Dilution: 1:1

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**Pratt & Whitney  
PWA 36604 Revision C  
Stress Corrosion**

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3.2.3.1 **Stress Corrosion:** Test specimens shall show no evidence of stress corrosion cracking when tested in accordance with Pratt & Whitney Materials Control Laboratory Manual Section E - 205 or ASTM F - 945, Method A using AMS 4911 and AMS 4916

**Tested in accordance with ASTM F 945:**

**General Procedure:**

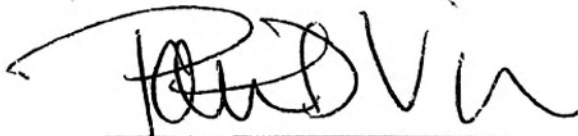
- Method A [Heat at  $900 \pm 20^{\circ}\text{F}$  ( $480 \pm 10^{\circ}\text{C}$ ) for  $8 \pm 0.2$  hours]
- **Determination of Test Results**
- Detection of cracks on either the tension or compression surfaces of any of the untreated (control) specimens shall be cause to repeat the entire stress corrosion test using acceptable titanium alloy sheet material.
- Failure to detect cracks on either the tension or compression surfaces of all of the sodium chloride solution-treated specimens shall be cause to repeat the entire stress corrosion test using titanium alloy sheet having a demonstrated susceptibility to stress corrosion cracking.
- Examine tension and compression surfaces of candidate solution treated specimens for cracks and make one of the following dispositions:
- Failure to detect cracks on any specimen shall constitute an acceptance test for the candidate cleaning material.
- Detection of cracks on all specimens shall be cause for rejection of the candidate cleaning material.
- If some of the specimens do not exhibit cracks, the entire stress corrosion test may be repeated at the option of the testing facility.

Client: Simple Green  
 Product: **EXTREME SIMPLE GREEN**  
 Dilution: 1:1  
 PWA 36604 Rev C: Stress Corrosion (ASTM F 945)

Date: 05-May-2005  
 SMI/REF: 05MAR343-B  
 Page 2 of 2

Alloy		OBSERVATION	RESULT
AMS 4911 Blank Control	# 1	No evidence of cracking.	AMS 4911 Titanium sheet meets acceptability and sensitivity criteria
	# 2	No evidence of cracking.	
	# 3	No evidence of cracking.	
AMS 4911 3% Salt Control	# 1	Cracking evident.	
	# 2	Cracking evident.	
	# 3	Cracking evident.	
AMS 4911 Candidate Solution	# 1	No evidence of cracking.	Conforms
	# 2	No evidence of cracking.	Conforms
	# 3	No evidence of cracking.	Conforms
AMS 4916 Blank Control	# 1	No evidence of cracking.	AMS 4916 Titanium sheet meets acceptability and sensitivity criteria
	# 2	No evidence of cracking.	
	# 3	No evidence of cracking.	
AMS 4916 100 ppm Salt Control	# 1	Cracking evident.	
	# 2	Cracking evident.	
	# 3	Cracking evident.	
AMS 4916 Candidate Solution	# 1	No evidence of cracking.	Conforms
	# 2	No evidence of cracking.	Conforms
	# 3	No evidence of cracking.	Conforms

Respectfully submitted,



Patricia D. Viani, SMI Inc.

# SMI, Inc.

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Attn: Milt Krause  
Simple Green  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649

Date: 05-May-2005

SMI/REF: 05MAR343-A

Product: **EXTREME SIMPLE GREEN** (received 21-Mar-2005)

Dilution: 1:5

Page 1 of 2

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**Pratt & Whitney**  
**PWA 36604 Revision C**  
**Stress Corrosion**

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3.2.3.1 **Stress Corrosion:** Test specimens shall show no evidence of stress corrosion cracking when tested in accordance with Pratt & Whitney Materials Control Laboratory Manual Section E - 205 or ASTM F - 945, Method A using AMS 4911 and AMS 4916

**Tested in accordance with ASTM F 945:**

**General Procedure:**

- Method A [Heat at  $900 \pm 20^{\circ}\text{F}$  ( $480 \pm 10^{\circ}\text{C}$ ) for  $8 \pm 0.2$  hours]
- **Determination of Test Results**
- Detection of cracks on either the tension or compression surfaces of any of the untreated (control) specimens shall be cause to repeat the entire stress corrosion test using acceptable titanium alloy sheet material.
- Failure to detect cracks on either the tension or compression surfaces of all of the sodium chloride solution-treated specimens shall be cause to repeat the entire stress corrosion test using titanium alloy sheet having a demonstrated susceptibility to stress corrosion cracking.
- Examine tension and compression surfaces of candidate solution treated specimens for cracks and make one of the following dispositions:
- Failure to detect cracks on any specimen shall constitute an acceptance test for the candidate cleaning material.
- Detection of cracks on all specimens shall be cause for rejection of the candidate cleaning material.
- If some of the specimens do not exhibit cracks, the entire stress corrosion test may be repeated at the option of the testing facility.

Client: Simple Green  
 Product: **EXTREME SIMPLE GREEN**  
 Dilution: 1:5  
 PWA 36604 Rev C: Stress Corrosion (ASTM F 945)

Date: 05-May-2005  
 SMI/REF: 05MAR343-A  
 Page 2 of 2

Alloy		OBSERVATION	RESULT
AMS 4911 Blank Control	# 1	No evidence of cracking.	AMS 4911 Titanium sheet meets acceptability and sensitivity criteria
	# 2	No evidence of cracking.	
	# 3	No evidence of cracking.	
AMS 4911 3% Salt Control	# 1	Cracking evident.	
	# 2	Cracking evident.	
	# 3	Cracking evident.	
AMS 4911 Candidate Solution	# 1	<b>No evidence of cracking.</b>	<b>Conforms</b>
	# 2	<b>No evidence of cracking.</b>	<b>Conforms</b>
	# 3	<b>No evidence of cracking.</b>	<b>Conforms</b>
AMS 4916 Blank Control	# 1	No evidence of cracking.	AMS 4916 Titanium sheet meets acceptability and sensitivity criteria
	# 2	No evidence of cracking.	
	# 3	No evidence of cracking.	
AMS 4916 100 ppm Salt Control	# 1	Cracking evident.	
	# 2	Cracking evident.	
	# 3	Cracking evident.	
AMS 4916 Candidate Solution	# 1	<b>No evidence of cracking.</b>	<b>Conforms</b>
	# 2	<b>No evidence of cracking.</b>	<b>Conforms</b>
	# 3	<b>No evidence of cracking.</b>	<b>Conforms</b>

Respectfully submitted,



Patricia D. Viani, SMI Inc.

**SMI, Inc.**

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Phone: (305) 971-7047  
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Attn: Milt Krause  
Simple Green  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649

Date: 09-May-2005  
SMI/REF: 05MAR343-A

Product: **EXTREME SIMPLE GREEN** (received 21-Mar-2005)

Dilution: 1:5

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**Pratt & Whitney**  
**PWA 36604 Revision C**  
**ARP 1755B**  
**EFFECT OF CLEANING AGENTS ON AIRCRAFT ENGINE MATERIALS**  
**Stock Loss Test Method**  
**Category 10 Aqueous Cleaner**

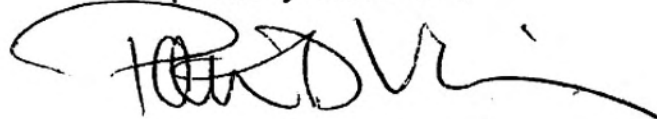
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Parameters:

Dilution: 1:5  
Temperature: 120 °F  
Immersion Time: 30 minutes

Result See attached

Respectfully submitted,



Patricia D. Viani, SMI Inc.

Client: SIMPLE GREEN Date: 09-May-2005  
 Product: EXTREME SIMPLE GREEN SMI/REF: 05MAR343-A  
 PWA 36604: ARP 1755B Category 10 Aqueous Cleaner Page 2 of 3

This section to be completed by the VENDOR or by the LABORATORY conducting the test.

Vendors Name: Simple Green Name of Laboratory: SMI, Inc.  
 Address: 15922 Pacific Coast Highway 12219 SW 131 Ave  
 Huntington Harbour, CA 92649  
 Miami, FL 33186  
 Telephone: 562-795-6000 Telephone: (305) 971-7047

Product Name or Reference No.:	Category (Table 1)	Dilution Operating Limits	Temperature Operating Limits	Recommended Cycle Time in Minutes	Date Submitted
EXTREME SIMPLE GREEN	10	Tested at a dilution of: 1:5	Tested at a temperature of: 120°F (48.9°C)	Tested utilizing an immersion time of: 30 minutes	21-Mar-2005

THIS SECTION FOR ENGINE MANUFACTURERS USE ONLY:

Engine Mfr. Prelim. OK for Service Test	Name and Location of Recognized Overhaul Shop & Starting Date	Engine Mfr. Field Rep. Report No. & Date Received	Date Final OK for Service Use	Engine Mfr. Designation for This Product, If Any	AMS Number

Respectfully submitted,  
  
 Patricia D. Viani, SMI Inc.

Client: SIMPLE GREEN  
 Product: EXTREME SIMPLE GREEN  
 Dilution: 1:5

Date: 09-May-2005  
 SMI/REF: 05/MAR343-A

Temperature: 120°F Immersion Time: 30 minutes  
 PWA 36604; ARP 1755B Category 10-Aqueous Cleaner

Vendor Name: SIMPLE GREEN  
 Product Name: EXTREME SIMPLE GREEN

Alloy	Panel Not Rec'd	Panel Serial Number	Loss in Inches	Panel Serial Number	Loss in Inches	Average Loss in Inches	Average Weight Loss (per 2"x4" panel)
<b>UNCOATED PANELS</b>							
AMS 4037 Aluminum	1AL37	<0.000010	2AL37	<0.000010	3AL37	<0.000010	0.0007 g
AMS 4375 Magnesium	1MG75	0.000019	2MG75	0.000024	3MG75	0.000017	0.0101 g
AMS 4442 Magnesium	(not tested due to unavailability of alloy)						
AMS 4507 Copper	1CU07	<0.000010	2CU07	<0.000010	3CU07	<0.000010	0.0001 g
AMS 5544 Nickel	1NI44	<0.000010	2NI44	<0.000010	3NI44	<0.000010	0.0001 g
AMS 4640 Aluminum Bronze	1AB40	<0.000010	2AB40	<0.000010	3AB40	<0.000010	0.0001 g
AMS 4911 Titanium	1TI11	<0.000010	2TI11	<0.000010	3TI11	<0.000010	0.0005 g
AMS 5040 Steel	1ST40	<0.000010	2ST40	<0.000010	3ST40	<0.000010	0.0003 g
AMS 5582 Cobalt	1CO82	<0.000010	2CO82	<0.000010	3CO82	<0.000010	0.0002 g
AMS 5504 Corrosion Resistant Steel	1ST04	<0.000010	2ST04	<0.000010	3ST04	<0.000010	0.0005 g
AMS 5508 Corrosion Resistant Steel	1ST08	<0.000010	2ST08	<0.000010	3ST08	<0.000010	0.0003 g
AMS 5524 Corrosion Resistant Steel	1ST24	<0.000010	2ST24	<0.000010	3ST24	<0.000010	0.0001 g
AMS 5525 Corrosion Resistant Steel	1ST25	<0.000010	2ST25	<0.000010	3ST25	<0.000010	0.0001 g
AMS 5536 Nickel	1NI36	<0.000010	2NI36	<0.000010	3NI36	<0.000010	0.0003 g
AMS 5537 Cobalt	1CO37	<0.000010	2CO37	<0.000010	3CO37	<0.000010	0.0003 g
AMS 5596 Nickel	1NI96	<0.000010	2NI96	<0.000010	3NI96	<0.000010	0.0005 g
AMS 5661 Nickel	1NI61	<0.000010	2NI61	<0.000010	3NI61	<0.000010	0.0014 g
AMS 6431 Steel	1ST31	<0.000010	2ST31	<0.000010	3ST31	<0.000010	0.0007 g
AMS 4434 (AZ92) Magnesium <sup>1</sup>	1AZ92	0.000013	2AZ92	0.000017	3AZ92	0.000019	0.0104 g
Mar-M™.002	(not tested due to unavailability of alloy)						
IMI™-685	(not tested due to unavailability of alloy)						

**ELECTROPLATED PANELS**

AMS 4037/AMS 2470 Anodic Treatment	1EAN	<0.000010	2EAN	<0.000010	3EAN	<0.000010	0.0011 g
AMS 5504/AMS 2400 Cadmium Plated	1ECD	<0.000010	2ECD	<0.000010	3ECD	<0.000010	0.0001 g
AMS 5504/AMS 2406 Chromium Plating	1EACR	<0.000010	2EACR	<0.000010	3EACR	<0.000010	0.0002 g
AMS 5504/AMS 2410 Silver Plating	1EAG	<0.000010	2EAG	<0.000010	3EAG	<0.000010	0.0003 g
AMS 5504/AMS 2416 Ni-Cad Plating	1ENC	<0.000010	2ENC	<0.000010	3ENC	<0.000010	0.0012 g
AMS 5504/AMS 2418 Copper Plating	1ECO	<0.000010	2ECO	<0.000010	3ECO	<0.000010	0.0008 g
AMS 5504/AMS 2424 Nickel Plating	1ENI	<0.000010	2ENI	<0.000010	3ENI	<0.000010	0.0004 g

**PLASMA COATED PANELS** (plasma coated on one side only)

AMS 4911/AMS 2437-3	1PT2	<0.00010	2PT2	<0.00010	3PT2	<0.00010	0.0033 g
AMS 5504/AMS 2437-2	1P-2	<0.00010	2P-2	<0.00010	3P-2	<0.00010	+ 0.0019 g
AMS 5504/AMS 2437-3	1P-3	<0.00010	2P-3	<0.00010	3P-3	<0.00010	0.0098 g
AMS 5504/AMS 2437-5	1P-5	<0.00010	2P-5	<0.00010	3P-5	<0.00010	+ 0.0019 g
AMS 5504/AMS 2437-6	1P-6	<0.00010	2P-6	<0.00010	3P-6	<0.00010	0.0042 g
AMS 5504/AMS 2437-7	1P-7	<0.00010	2P-7	<0.00010	3P-7	<0.00010	0.0006 g

The maximum allowable stock loss is 0.000025" for any alloy panel or electroplated panel.  
 The maximum allowable stock loss is 0.0001" for plasma spray deposits.  
 1: For informational purposes only, not currently required for ARP 1755B.

Respectfully submitted,

*Patricia D. Viani*  
 Patricia D. Viani, SMI Inc.

Result: Informational

# SMI, Inc.

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Attn: Milt Krause  
Simple Green  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649

Date: 06-Jun-2005  
SMI/REF: 05MAR343-A

Product: **EXTREME SIMPLE GREEN** (received 21-Mar-2005)

Dilution: 1:5

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**Pratt & Whitney  
PWA 36604 Revision C  
Hot Corrosion**

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3.2.3.2 Hot Corrosion: Test specimens shall show no evidence of hot corrosion greater than 0.0002 inches in depth when tested and examined in accordance with the procedure in Appendix A.

APPENDIX A:

1. Preparation of Test Specimens:

- 1.1 Prepare one panel of each of the following alloys for each cleaner material to be tested, plus one additional panel of each to serve as a control: AMS 4037, AMS 4375, AMS 5508, AMS 5536, AMS 5544, AMS 5608, AMS 6359. Take care not to contaminate the control panels with the cleaner being tested.
- 1.2 Panels shall be a minimum of 0.050 inch thick, with a minimum surface area of 0.5 square inches.
- 1.3 Mark one side of each panel with the material specification and cleaner identification using silver pencil or mechanical engraving to ensure identification after thermal exposure.
- 1.4 Polish the side opposite panel identification to a finish equivalent to that produced by 600 grit emery cloth.

2.0 Preparation of Test Specimens for Exposure

- 2.1 Arrange test panel(s) and control(s), polished side up, on a suitable sheet of high temperature alloy or in a container that will withstand test temperatures.



Client: Simple Green  
Product: **Extreme Simple Green**  
Dilution: 1:5

Date: 06-Jun-2005  
SMI/REF: 05MAR345-A

PWA 36604 Rev C Hot Corrosion (Appendix A)

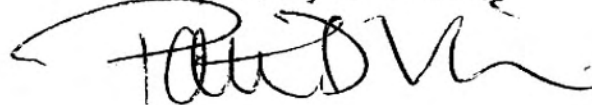
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- 2.2 Cover the surface of the test panel(s) with the cleaner to be tested. Do not allow the cleaner solution to contact the control panel(s).
- 2.3 Dry the test panels in a low temperature oven or other low heat source such as heat lamps.
3. Thermal Exposure:
- 3.1 Expose coated test panel(s) for a minimum of eight (8) hours and a maximum of ten (10) hours at the temperatures shown.

ALLOY	TEMPERATURE	DEPTH OF ATTACK (inches)
AMS 5544 (Waspaloy)	1600°F ± 10°F	0.0001
AMS 5536 (Hastelloy X)	1600°F ± 10°F	0.0001
AMS 5608 (Haynes 188)	1600°F ± 10°F	0.0001
AMS 5508 (Greek Ascoloy)	1050°F ± 10°F	0.0001
AMS 6359 (4340 Steel)	750°F ± 10°F	0.0001
AMS 4037 (2024-T3 Aluminum)	600°F ± 25°F	0.0001
AMS 4375 (AZ31B-0 Magnesium)	600°F ± 25°F	0.0001

Result Conforms

Respectfully submitted,



Patricia D. Viani, SMI Inc.

# SMI, Inc.

12219 SW 131 Avenue  
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Attn: Carol Chapin  
Sunshine Makers, Inc./Simple Green  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649

Date: 26-Sep-2006  
SMI/REF: 0609-961

Product: **EXTREME SIMPLE GREEN AIRCRAFT & PRECISION CLEANER**  
(received 25-Sep-2006)

Dilution: 1:5 (one part product to 5 parts water) Page 1 of 3

**Pratt & Whitney**  
**PWA 36604 Revision D**  
Compatibility with Non-Metallic Materials

3.2.3.3 Compatibility with Non-Metallic Materials: Hardness and volume changes shall not exceed the limits of Table 2 when determined in accordance with Appendix E.

Table 2 - Hardness and Volume Change				
MATERIAL	ALLOWABLE DUROMETER HARDNESS CHANGE	RESULTS	ALLOWABLE VOLUME CHANGE	RESULTS
AMS 7267	-10 to + 5	2	15 % maximum	< 1 %
AMS 7271	0 to +15	0	5 % maximum	< 1 %
AMS 7273	-10 to 0	0	20 % maximum	< 1 %
AMS 7276	-5 to +15	1	5 % maximum	< 1 %
PWA 407	-5 to + 5	2	5 % maximum	< 1 %

Result Conforms

Respectfully submitted,



Patricia D. Viani, SMI Inc.

Client: Sunshine Makers, Inc./Simple Green Date: 26-Sep-2006  
 Product: **EXTREME SIMPLE GREEN AIRCRAFT & PRECISION CLEANER**  
 Dilution: 1:5 (1 part product to 5 parts water) SMI/REF: 0609-961  
 PWA 36604 Revision D Page 2 of 3

**MATERIALS TESTED:**

- AMS 7267 Rings, Sealing, Silicon Rubber**
- AMS 7271 Rings, Sealing, Butadiene-Acrylonitrile Rubber**
- AMS 7273 Rings, Sealing, Fluorosilicone Rubber**
- AMS 7276 Rings, Sealing, Fluorocarbon Rubber**
- PWA 407 Rubber**

**Procedure:** (taken from Pratt & Whitney guidelines)

- a. Measure hardness of material on the Durometer A scale and record as "Hardness Reading A".
- b. Weigh test material in air and record as "Weight A".
- c. Weigh test material in DI water and record as "Weight B".
- d. Expose test material to solution for 2 hours at room temperature.
- e. Rinse thoroughly using DI water.
- f. Weigh test material in DI water and record as "Weight C".
- g. Dry and measure hardness of test material using the Durometer A scale and record as "Hardness Reading B".

$$\text{Density (D}_1\text{)} = \frac{\text{Wgt in air}}{\text{Wgt in air} - \text{Wgt in water}} = \frac{A}{A - B}$$

$$\text{Density (D}_2\text{)} = \frac{\text{Wgt in air}}{\text{Wgt in air} - \text{Wgt in water (post exposure)}} = \frac{A}{A - C}$$

$$\text{Volume Change} = \frac{\text{Density before exposure} - \text{Density after exposure}}{\text{Density after exposure}} = \frac{(D_1 - D_2)}{D_2} 100$$

$$\text{Hardness Change} = \text{Hardness Reading A} - \text{Hardness Reading B}$$

<b>DUROMETER DATA (HARDNESS READINGS)</b>			
	A (initial)	B (final)	A - B (hardness change)
AMS 7267	77	75	2
AMS 7271	75	75	0
AMS 7273	75	75	0
AMS 7276	84	83	1
PWA 407	54	52	2

Client: Sunshine Makers, Inc./Simple Green  
 Product: **EXTREME SIMPLE GREEN AIRCRAFT & PRECISION CLEANER**  
 Dilution: 1:5 (1 part product to 5 parts water)  
 PWA 36604 Revision D

Date: 26-Sep-2006  
 SMI/REF: 0609-961  
 Page 3 of 3

<b>DENSITY DATA</b>						
<b>MATERIAL</b>	<b>Wgt A (g)</b>	<b>Wgt B (g)</b>	<b>Wgt C (g)</b>	<b>Density D<sub>1</sub> (initial)</b>	<b>Density D<sub>2</sub> (final)</b>	<b>% Density Change</b>
AMS 7267	1.6882	0.3875	0.3913	1.298	1.302	< 1 %
AMS 7271	7.2287	3.2863	3.2706	1.834	1.826	< 1 %
AMS 7273	6.7918	1.6065	1.6145	1.310	1.312	< 1 %
AMS 7276	7.2098	3.2632	3.2852	1.827	1.837	< 1 %
PWA 407	29.5620	7.2757	7.5460	1.326	1.343	1.2 %

"Wgt A": Weight of test material in air  
 "Wgt B": Weight of test material in water  
 "Wgt C": Weight of test material in water after 2 hours exposure

<b>VOLUME DATA (ASTM D 471)</b>					
<b>MATERIAL</b>	<b>M<sub>1</sub></b>	<b>M<sub>2</sub></b>	<b>M<sub>3</sub></b>	<b>M<sub>4</sub></b>	<b>% VOLUME CHANGE</b>
AMS 7267	1.6882	0.3875	1.6947	0.3913	< 1 %
AMS 7271	7.2287	3.2863	7.2300	3.2706	< 1 %
AMS 7273	6.7918	1.6065	6.8192	1.6145	< 1 %
AMS 7276	7.2098	3.2632	7.2114	3.2852	< 1 %
PWA 407	29.5620	7.2757	29.6280	7.5460	< 1 %

M<sub>1</sub> = Mass of test material in air (grams), initial  
 M<sub>2</sub> = Mass of test material in water (grams), initial  
 M<sub>3</sub> = Mass of test material in air (grams), final  
 M<sub>4</sub> = Mass of test material in water (grams), final

$$\text{Change in Volume, \%} = \frac{(M_3 - M_4) - (M_1 - M_2)}{(M_1 - M_2)} \times 100$$