

www.mooreeng.com

SDM Enterprises Inc.

Mussi Artworks Foundry

Attn: Tom Schrey

729 Heinz Ave.

Berkeley, CA 94710

May 20, 2014

RE: Bronze Plaque Slip Coating Evaluation

Dear Mr.Schrey;

Please find the results of our testing summarized below and attached detailed reports as created by the BOT-3000E tribometer. This testing was completed in conformance with the ANSI A137.1-2012 Specifications for Ceramic Tile §9.6.

A137.1 Evaluation: Bronze Plaques w/Slip Doctors Treatments				
Pre/Post Application	No.	SCOF / DCOF	Average	Level
Brushed "Dura-Grip" Application				
Pre	1	DCOF	0.62	High
	2	DCOF	0.57	High
	3	DCOF	0.56	High
Post	1	DCOF	0.47	High
	2	DCOF	0.45	High
Sprayed "Non-Slip" Application				
Pre	1	DCOF	0.62	High
	2	DCOF	0.63	High
Post	1	DCOF	0.46	High
	2	DCOF	0.46	High

After in-depth analysis of the bronze plaques with Slip Doctors coatings, the following conclusions have been made based on the data and observations above:

While both the Dura-Grip and Non-Slip coatings tested at a lower slip resistance than the untreated bronze, it is my professional opinion that the mode through which the coated surfaces gain traction in the presence of contaminants is invaluable in an application such as this. The uncoated bronze may provide high traction levels initially but is susceptible to contamination and polishing over time that could significantly reduce traction levels. Additionally In reviewing the reports created by the BOT-300E that are attached to this letter, it is clear that the

unfinished bronze provides a much more varied surface friction (variation seen in graphs of results).

As part of this testing both coatings were applied to the bronze plate samples. The Dura-Grip coating caused the bronze to oxidize almost immediately as shown in the photo below.



Photo 1 - Dura-Grip initial application w/o lacquer

However, when applied to a spray applied lacquer coating the surface bonded well and provided a durable high traction textured surface. Because these plaques come from the manufacturer with a lacquer coating it is practical to lightly sand the lacquer finish before spray applying the Dura-Grip coating. The manufacturer indicates that this coating can be applied by brush, roller or air sprayer; based on our experience it is best applied using a pneumatic spray system or by roller (preferably microfiber cover). Care should be taken to maintain a uniform distribution of the texture additive during application.

Thank you for your time and consideration, if you should have any questions please don't hesitate to contact us at smoore@mooreeng.com.

Sincerely,

MOORE ENGINEERING SERVICES
Scott D. Moore PE - *President*

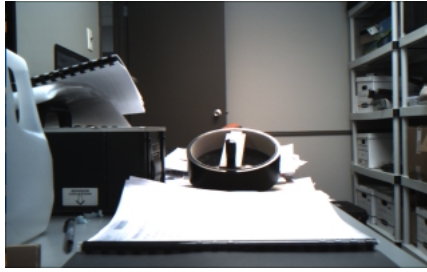
CC: File /
Enclosure(s)

ANSI A137.1 Report

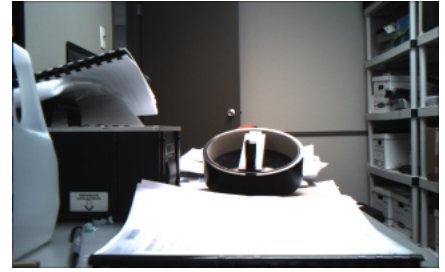
Regan Scientific Instruments

05/14/2014, 02:25P

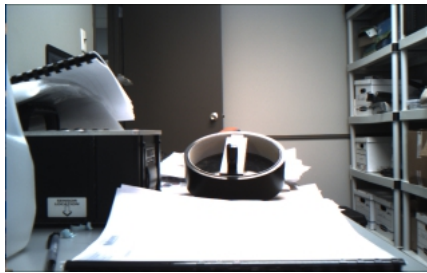
Method: DCOF
Facility: 000
Location: 000
Result: 0.62
Distance: 08 in.
Temp/Hum: 72 F, 47%



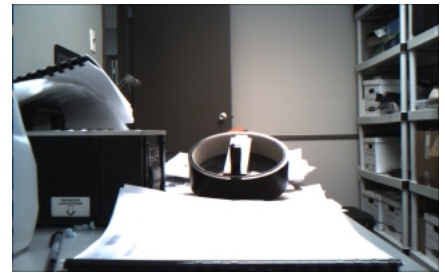
1.



2.

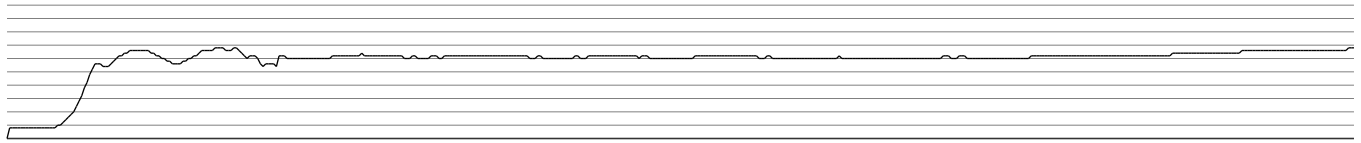


3.

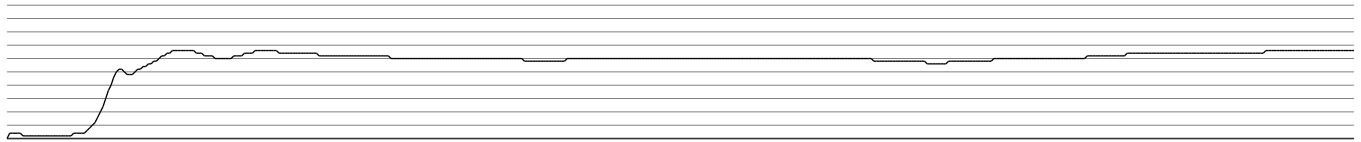


4.

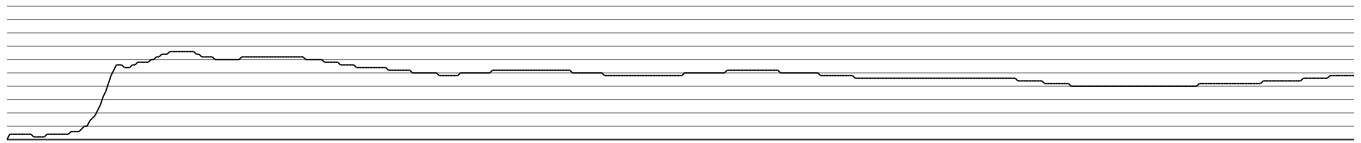
1. Avg = 0.63, Min = 0.58, Max = 0.70



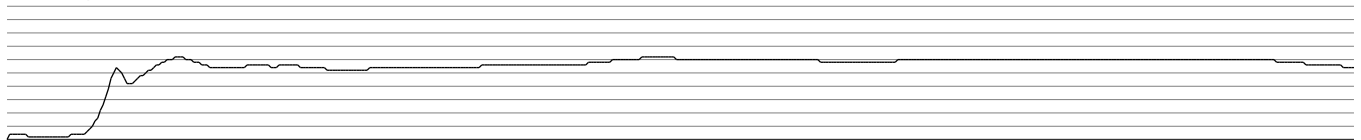
2. Avg = 0.63, Min = 0.49, Max = 0.73



3. Avg = 0.59, Min = 0.39, Max = 0.70



4. Avg = 0.62, Min = 0.48, Max = 0.70



Device: BOT-3000E

Serial No: 00023

Calibration: 04/24/2014

Verification: 04/24/2014, 11:56A PASS

Slider: 00177

Type: Rubber

Manuf. date: 03/29/2013

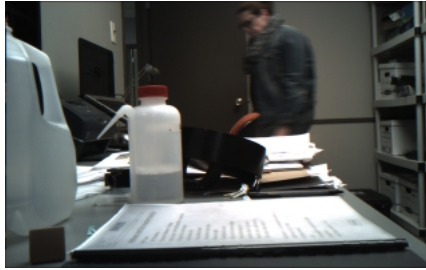
Ref. offset: ----

ANSI A137.1 Report

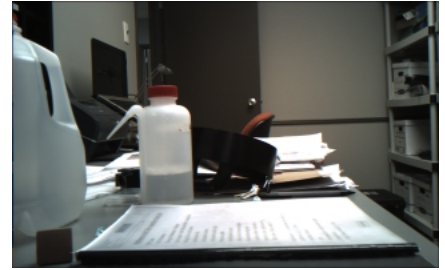
Regan Scientific Instruments

05/14/2014, 01:35P

Method: DCOF
Facility: 000
Location: 000
Result: 0.62
Distance: 08 in.
Temp/Hum: 72 F, 46%



1.



2.

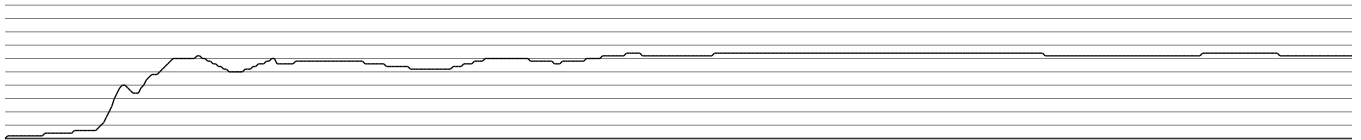


3.

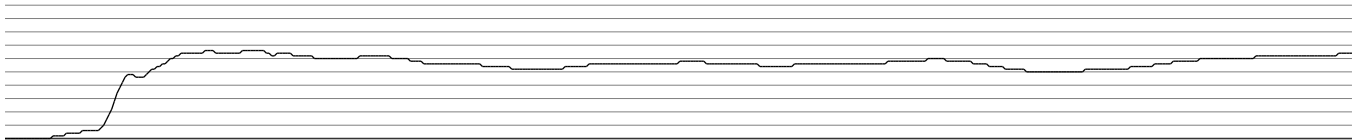


4.

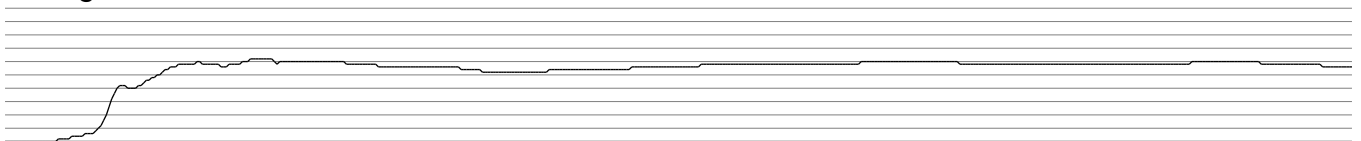
1. Avg = 0.65, Min = 0.54, Max = 0.72



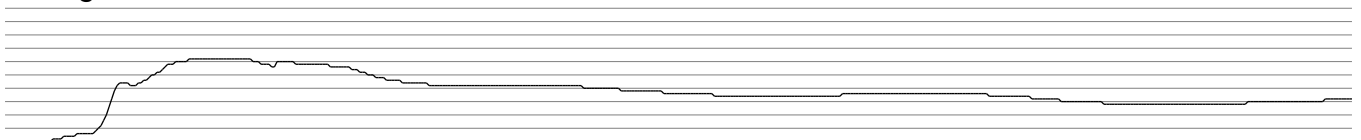
2. Avg = 0.64, Min = 0.50, Max = 0.74



3. Avg = 0.62, Min = 0.50, Max = 0.71



4. Avg = 0.56, Min = 0.27, Max = 0.73



Device: BOT-3000E

Serial No: 00064

Calibration: 09/09/2013

Verification: 04/11/2014, 08:13A PASS

Slider: 00177

Type: Rubber

Manuf. date: 03/29/2013

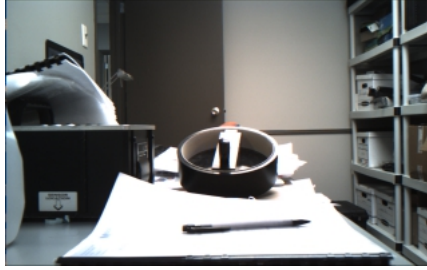
Ref. offset: ----

ANSI A137.1 Report

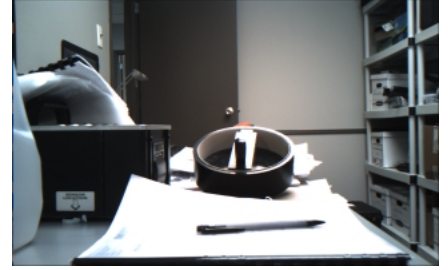
Regan Scientific Instruments

05/14/2014, 02:28P

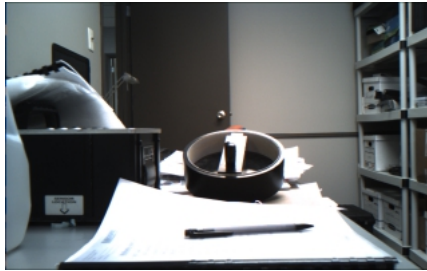
Method: DCOF
Facility: 000
Location: 001
Result: 0.57
Distance: 08 in.
Temp/Hum: 73 F, 47%



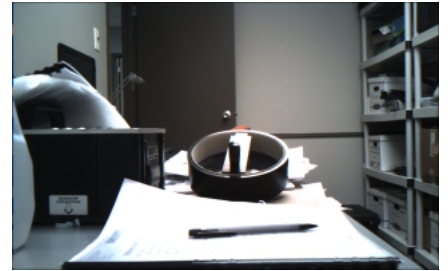
1.



2.

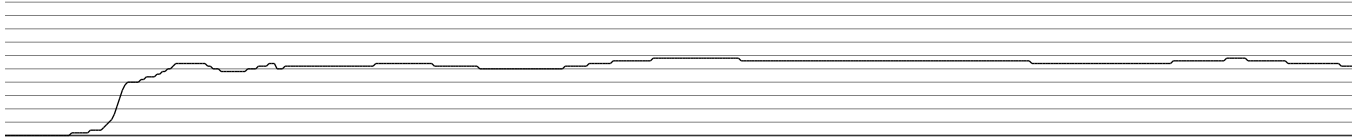


3.

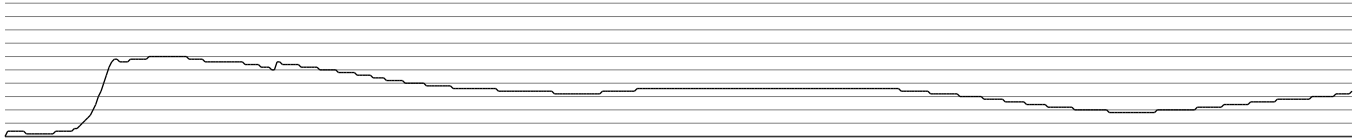


4.

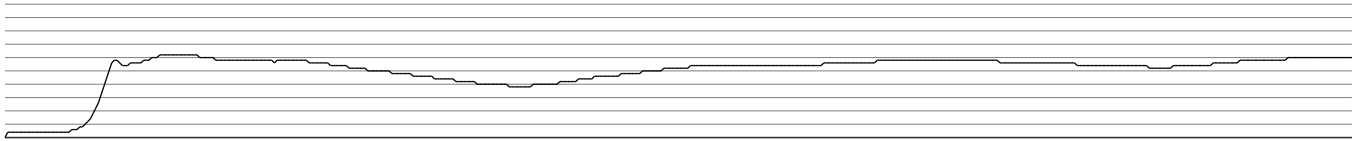
1. Avg = 0.60, Min = 0.45, Max = 0.69



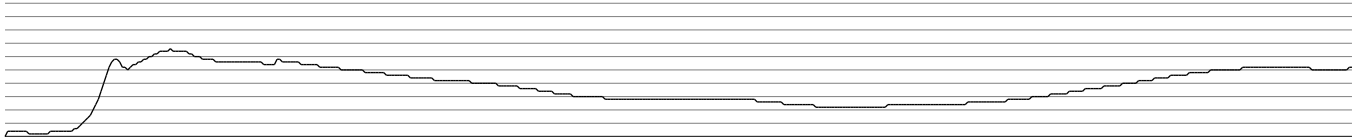
2. Avg = 0.53, Min = 0.18, Max = 0.71



3. Avg = 0.61, Min = 0.38, Max = 0.71



4. Avg = 0.55, Min = 0.22, Max = 0.71



Device: BOT-3000E

Serial No: 00023

Calibration: 04/24/2014

Verification: 04/24/2014, 11:56A PASS

Slider: 00177

Type: Rubber

Manuf. date: 03/29/2013

Ref. offset: ----

ANSI A137.1 Report

Regan Scientific Instruments

05/14/2014, 01:39P

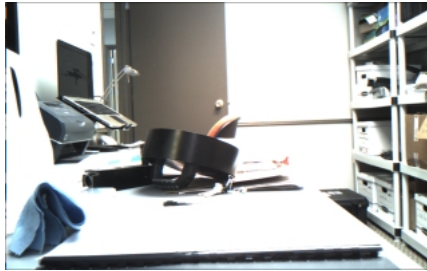
Method: DCOF
Facility: 000
Location: 001
Result: 0.63
Distance: 08 in.
Temp/Hum: 75 F, 44%



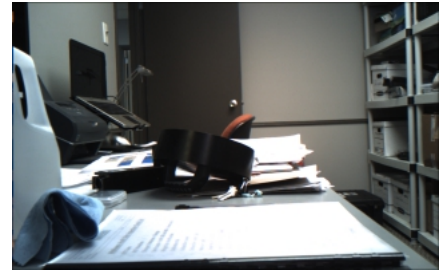
1.



2.

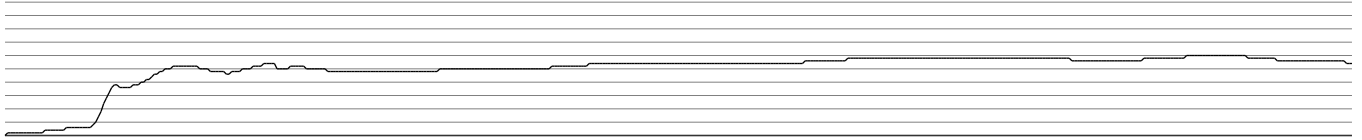


3.

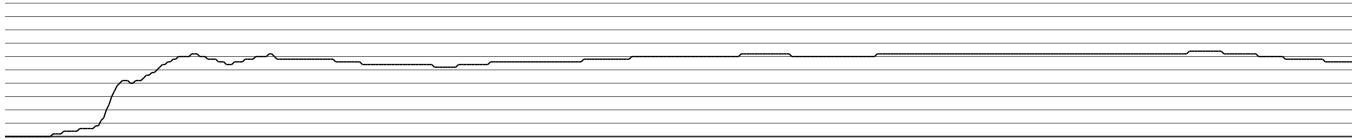


4.

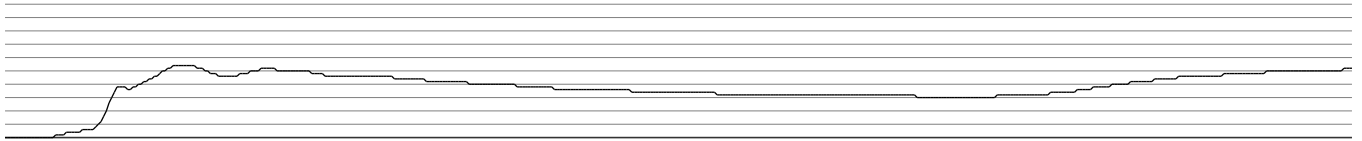
1. Avg = 0.64, Min = 0.49, Max = 0.80



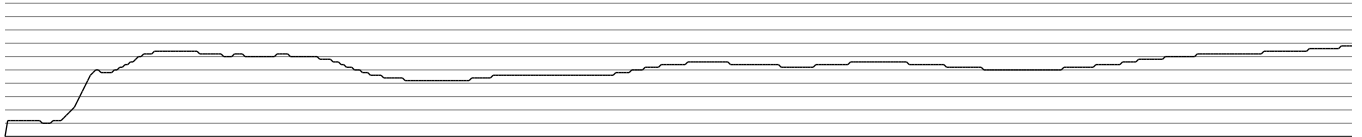
2. Avg = 0.65, Min = 0.42, Max = 0.80



3. Avg = 0.58, Min = 0.30, Max = 0.80



4. Avg = 0.64, Min = 0.42, Max = 0.79



Device: BOT-3000E

Serial No: 00064

Calibration: 09/09/2013

Verification: 04/11/2014, 08:13A PASS

Slider: 00177

Type: Rubber

Manuf. date: 03/29/2013

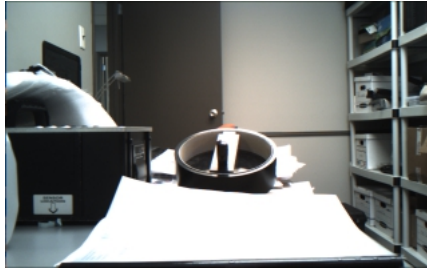
Ref. offset: ----

ANSI A137.1 Report

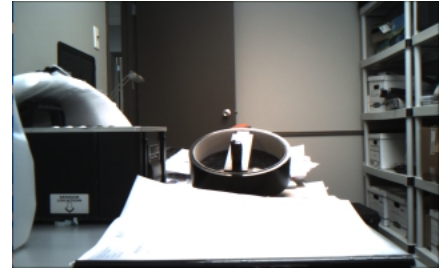
Regan Scientific Instruments

05/14/2014, 02:30P

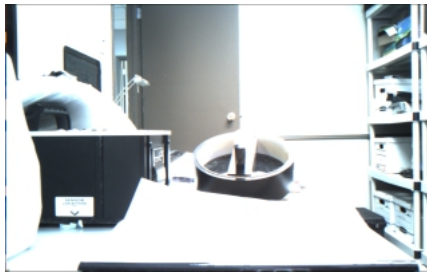
Method: DCOF
Facility: 000
Location: 002
Result: 0.56
Distance: 08 in.
Temp/Hum: 75 F, 47%



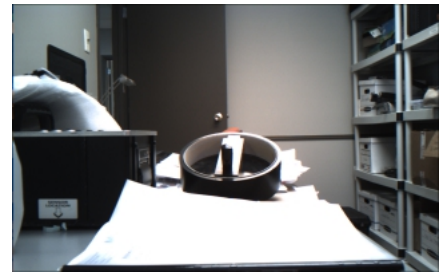
1.



2.

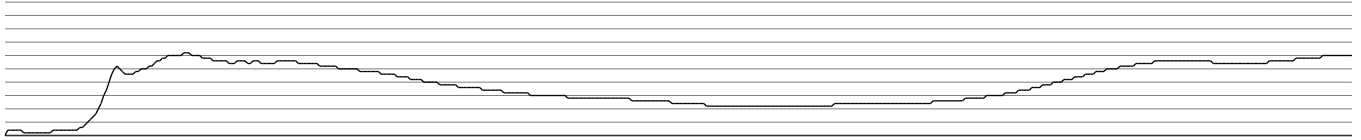


3.

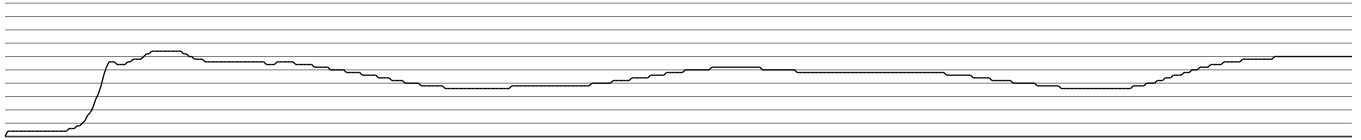


4.

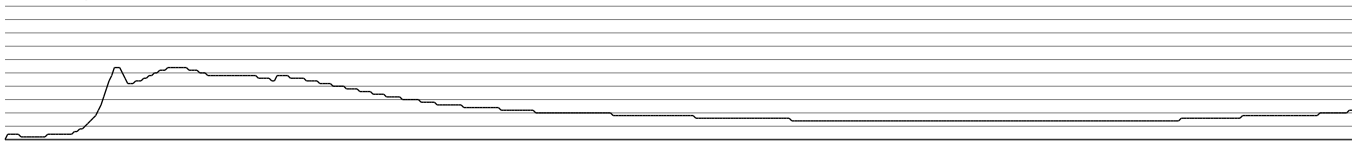
1. Avg = 0.55, Min = 0.21, Max = 0.69



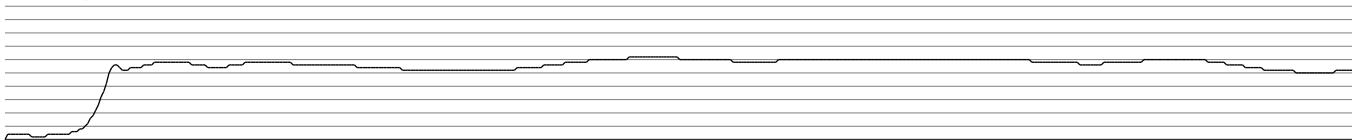
2. Avg = 0.59, Min = 0.35, Max = 0.73



3. Avg = 0.48, Min = 0.13, Max = 0.71



4. Avg = 0.62, Min = 0.50, Max = 0.69



Device: BOT-3000E

Serial No: 00023

Calibration: 04/24/2014

Verification: 04/24/2014, 11:56A PASS

Slider: 00177

Type: Rubber

Manuf. date: 03/29/2013

Ref. offset: ----

ANSI A137.1 Report

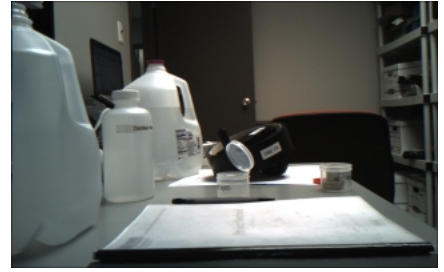
Regan Scientific Instruments

05/16/2014, 02:39P

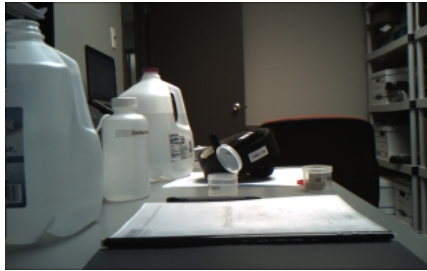
Method: DCOF
Facility: 000
Location: 002
Result: 0.47
Distance: 08 in.
Temp/Hum: 68 F, 51%



1.



2.

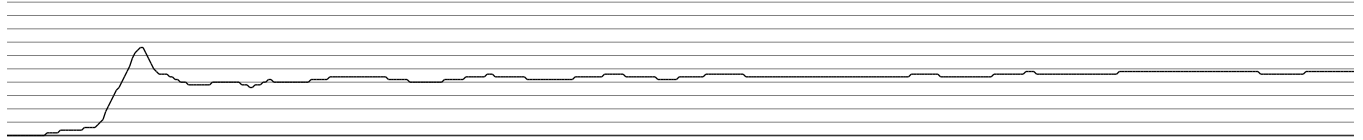


3.

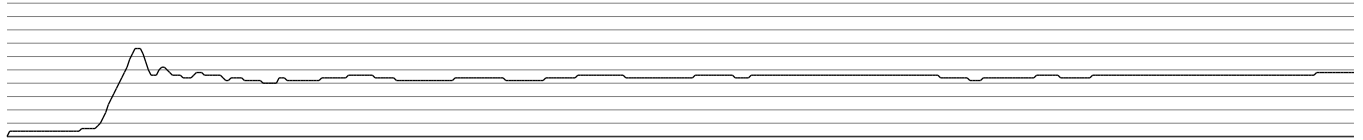


4.

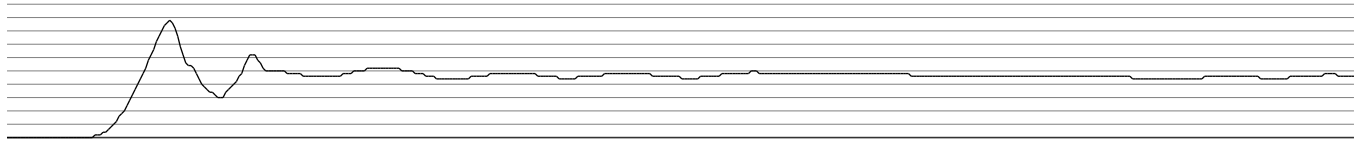
1. Avg = 0.47, Min = 0.37, Max = 0.52



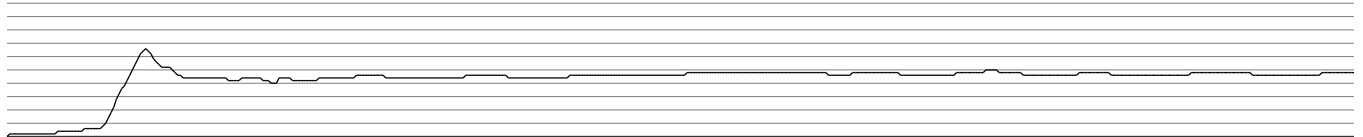
2. Avg = 0.47, Min = 0.35, Max = 0.54



3. Avg = 0.47, Min = 0.36, Max = 0.51



4. Avg = 0.48, Min = 0.42, Max = 0.54



Device: BOT-3000E

Serial No: 00064

Calibration: 09/09/2013

Verification: 04/11/2014, 08:13A PASS

Slider: 00299

Type: Rubber

Manuf. date: 04/18/2013

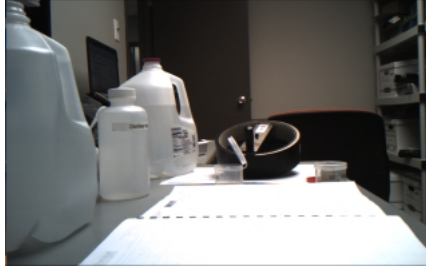
Ref. offset: ----

ANSI A137.1 Report

Regan Scientific Instruments

05/16/2014, 02:43P

Method: DCOF
Facility: 000
Location: 002
Result: 0.45
Distance: 08 in.
Temp/Hum: 72 F, 47%



1.



2.

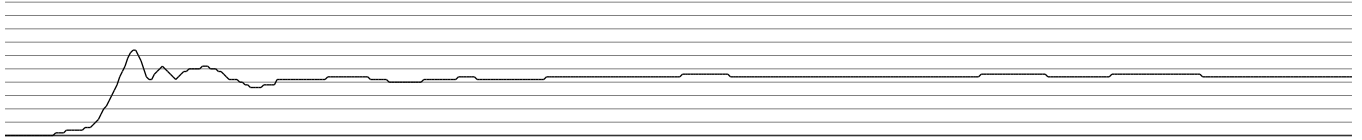


3.

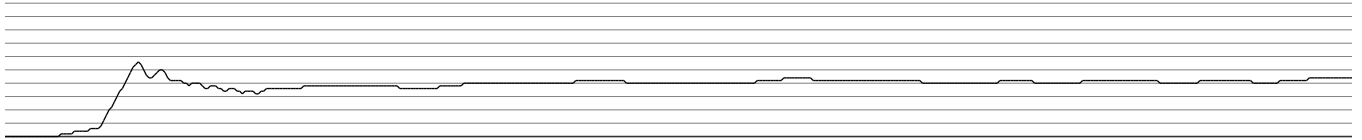


4.

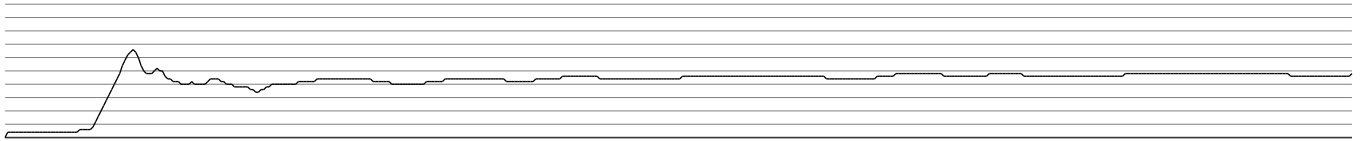
1. Avg = 0.46, Min = 0.40, Max = 0.55



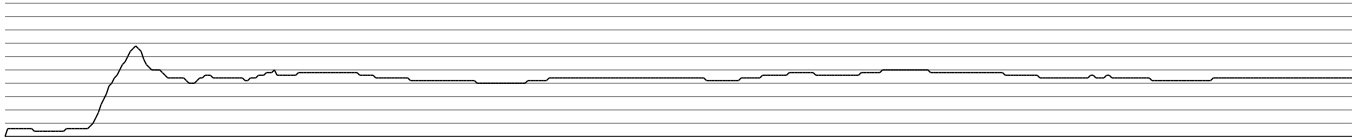
2. Avg = 0.43, Min = 0.34, Max = 0.50



3. Avg = 0.46, Min = 0.36, Max = 0.50



4. Avg = 0.45, Min = 0.37, Max = 0.52



Device: BOT-3000E

Serial No: 00064

Calibration: 09/09/2013

Verification: 04/11/2014, 08:13A PASS

Slider: 00299

Type: Rubber

Manuf. date: 04/18/2013

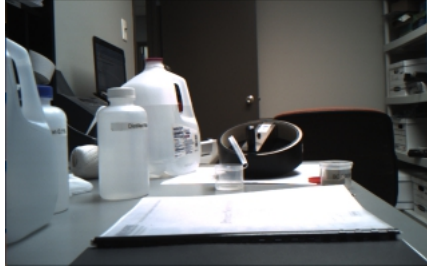
Ref. offset: ----

ANSI A137.1 Report

Regan Scientific Instruments

05/16/2014, 02:46P

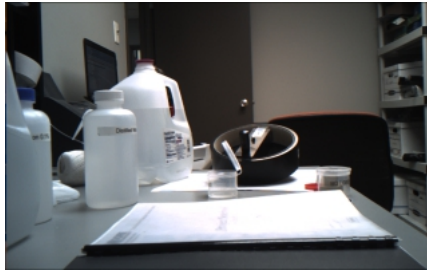
Method: DCOF
Facility: 000
Location: 003
Result: 0.46
Distance: 08 in.
Temp/Hum: 73 F, 46%



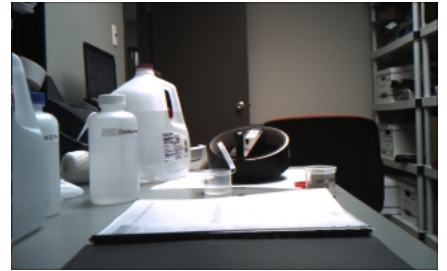
1.



2.

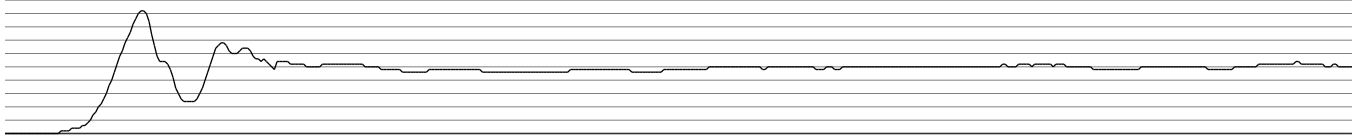


3.

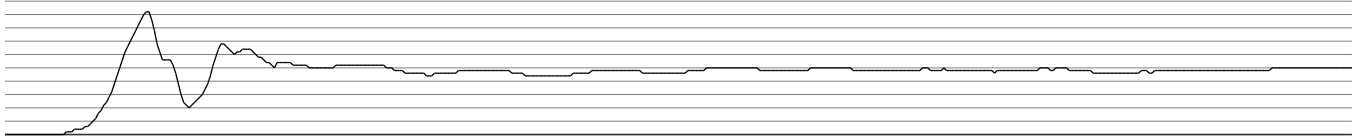


4.

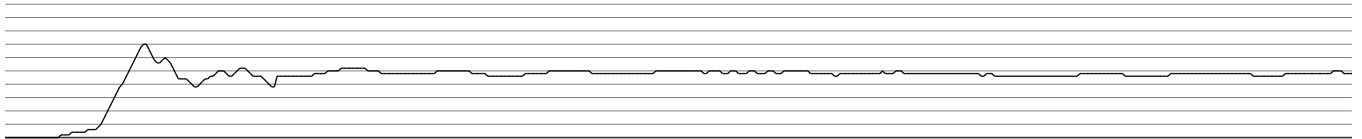
1. Avg = 0.47, Min = 0.35, Max = 0.54



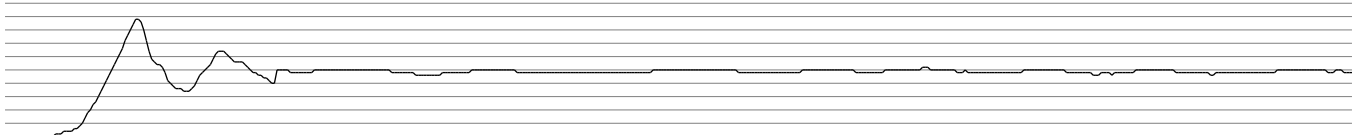
2. Avg = 0.46, Min = 0.35, Max = 0.50



3. Avg = 0.45, Min = 0.36, Max = 0.51



4. Avg = 0.47, Min = 0.36, Max = 0.51



Device: BOT-3000E

Serial No: 00064

Calibration: 09/09/2013

Verification: 04/11/2014, 08:13A PASS

Slider: 00299

Type: Rubber

Manuf. date: 04/18/2013

Ref. offset: ----

ANSI A137.1 Report

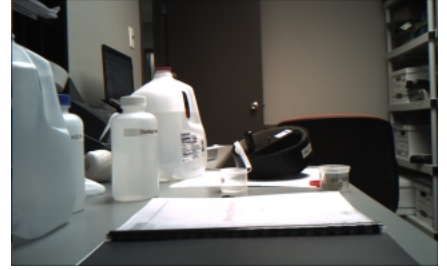
Regan Scientific Instruments

05/16/2014, 02:51P

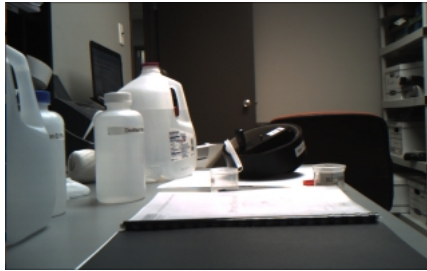
Method: DCOF
Facility: 000
Location: 003
Result: 0.46
Distance: 08 in.
Temp/Hum: 75 F, 47%



1.



2.

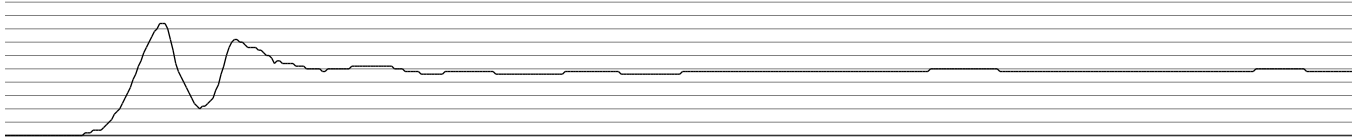


3.

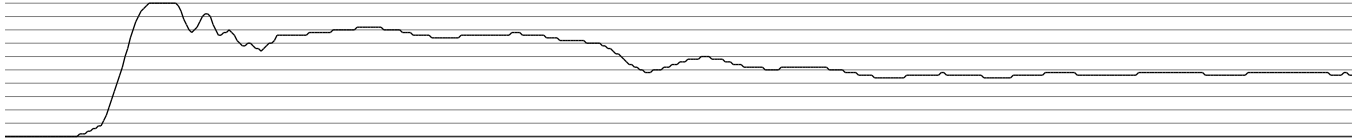


4.

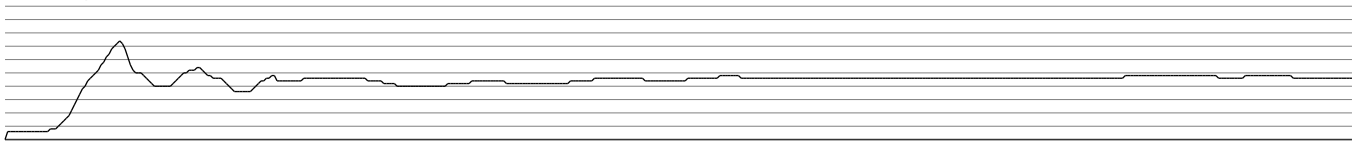
1. Avg = 0.47, Min = 0.37, Max = 0.50



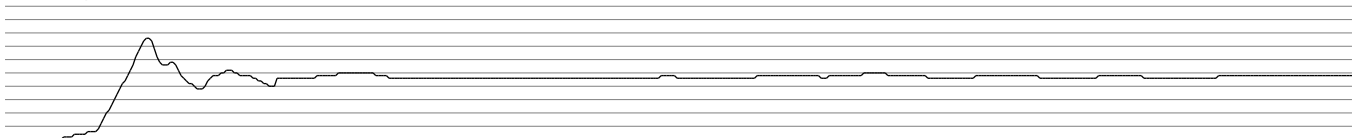
2. Avg = 0.48, Min = 0.35, Max = 0.77



3. Avg = 0.44, Min = 0.34, Max = 0.48



4. Avg = 0.45, Min = 0.36, Max = 0.49



Device: BOT-3000E

Serial No: 00064

Calibration: 09/09/2013

Verification: 04/11/2014, 08:13A PASS

Slider: 00299

Type: Rubber

Manuf. date: 04/18/2013

Ref. offset: ----