

CERTIFICATE OF CALIBRATION**Customer :** Ohio Brass Co.**Address :** 8711 Wadsworth Rd.
Wadsworth, OH 44281**Contact :** Mr. Huo**Customer P.O.# :** 103161513-000**Manufacturer :** Ohio Brass Co.**Model # :** RG59/U**Description :** Cable**Serial # :** NA**Customer Asset # :** 345 / 368**Temperature :** 74 F**Certificate # :** 61513-134**Date Received :** 3/4/04**Cal. Date :** 3/31/04**Due Date :** 3/31/05**Data Sheet # :** 00142**Received Condition:** In Tolerance**Returned Condition:** In Tolerance**Relative Humidity :** 35%

Conrad Kacsik Instrument Systems Metrology Lab will maintain and document the traceability of all its standards to the National Institute of Standards and Technology, NIST(formerly NBS), or the National Research Council, NRC of Canada, or to other recognized national or international standard bodies, or to measurable conditions created in our laboratory, or accepted fundamental and/or natural constants, ratio type of calibration, or by comparison to consensus standards. The Conrad Kacsik Instrument Systems Metrology Lab, where applicable, conforms to the requirements of MIL-STD-45662A, ANSI/NCSS Z540-1-1994, ISO 9001:2000, and ISO/IEC 17025:1999.

*Complete records of work performed and asset traceability are maintained by **Conrad Kacsik Instrument Systems** and are available for inspection. Laboratory assets used in the performance of this calibration are shown below. The results in this report are related only to the unit under test(UUT).*

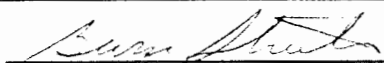
All calibrations are performed using standards having a ratio of the tolerance of the UUT to the uncertainty of the calibration procedure >4:1, unless otherwise noted. Uncertainties have been estimated at 95 percent confidence level(k=2). Limitations on the uses of the UUT are detailed in the manufacturer's operating instructions.

Calibration Notes:

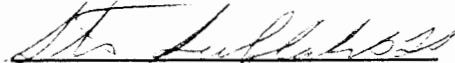
Assets Used:

<u>Asset #</u>	<u>Manufacturer</u>	<u>Model #</u>	<u>Description</u>	<u>Date Cal'd</u>	<u>Date Due</u>
0016	Hewlett Packard	3458A	DMM, 8½ digit	3/19/03	3/19/04
0017	Fluke	5520A/6	Instrument Calibrator	3/25/04	3/25/05

Cal'd By:


George Stueber, Lab Specialist

Reviewed By:


Steve Sulzbach, Quality Assurance

This certificate may not be reproduced except in full, without the written approval of Conrad Kacsik Instrument Systems, Inc.

CERTIFICATE OF CALIBRATION

Customer :	Ohio Brass Co.	Certificate # :	61513-3A
Address :	8711 Wadsworth Rd. Wadsworth, OH 44281		
Contact :	Mr. Huo	Date Received :	2/10/04
Customer P.O.# :	103161513-000	Location:	OnSite
Manufacturer :	Testo	Cal. Date :	2/13/04
Model # :	610	Due Date :	2/13/05
Description :	Thermohygrometer	Data Sheet # :	00406
Serial # :	none	Received Condition:	In Tolerance
Customer Asset # :	381 / 417	Returned Condition:	In Tolerance
Temperature :	74 °F	Relative Humidity :	23%

Conrad Kacsik Instrument Systems Metrology Lab will maintain and document the traceability of all its standards to the National Institute of Standards and Technology, NIST(formerly NBS), or the National Research Council, NRC of Canada, or to other recognized national or international standard bodies, or to measurable conditions created in our laboratory, or accepted fundamental and/or natural constants, ratio type of calibration, or by comparison to consensus standards. The Conrad Kacsik Instrument Systems Metrology Lab, where applicable, conforms to the requirements of MIL-STD-45662A, ANSI/NCCL Z540-1-1994, ISO 9001:2000, and ISO/IEC 17025:2000.

Complete records of work performed and asset traceability are maintained by **Conrad Kacsik Instrument Systems** and are available for inspection. Laboratory assets used in the performance of this calibration are shown below. The results in this report are related only to the unit under test(UUT).

All calibrations are performed using standards having a ratio of the tolerance of the UUT to the uncertainty of the calibration procedure $>4:1$, unless otherwise noted. Uncertainties have been estimated at 95 percent confidence level($k=2$). Limitations on the uses of the UUT are detailed in the manufacturer's operating instructions.

Calibration Notes:**Assets Used:**

Asset #	Manufacturer	Model #	Description	Date Cal'd	Date Due
0030	Honeywell	DR4500	Chart Recorder	5/13/02	5/13/03
0006	Rotronic	FT2C-W65	Humidity-Temp. Probe	5/13/02	5/13/03
	Honeywell		11.3 RH Salt Standard	NCR	NCR
	Honeywell		33.0 RH Salt Standard	NCR	NCR
	Honeywell		75.3 RH Salt Standard	NCR	NCR

Cal'd By: George Stueber
George Stueber, Lab Specialist

Reviewed By: Steve Sulzbach
Steve Sulzbach, Quality Assurance

This certificate may not be reproduced except in full, without the written approval of Conrad Kacsik Instrument Systems, Inc.

CKIS-702
issue date: 6/30/04

page 1 of 1

Attachment 2



Request No.	M04-03-6
Specification	ANSI C29.17 (7.2.1)

Date	July 1, 2004*
Engineer	BVB

[illegible]

Customer Representative		Ohio Brass Representative	BLK/CDP
-------------------------	--	---------------------------	---------

CERTIFICATE OF CALIBRATION

ISSUED BY: INSTRON CALIBRATION LABORATORY

DATE OF ISSUE: 09-Jun-03 CERTIFICATE NUMBER: 649846-6



Lab code: 200301-0



Instron Corporation

100 Royall St.
Canton, MA 02021-1089
Telephone: (781) 828-2500
Fax: (781) 575-5750
Email: service_requests@instron.com

Page 1 of 4 pages

Customer

Hubbell / Ohio Brass Company
8711 Wadsworth Road
Wadsworth, Ohio 44281

Contact: John Krause
P.O./Contract No.: 103134377000

Date of Verification: 09-Jun-03
Ambient Temperature: 73.2 deg F

Machine

Manufacturer: Omega Meter
Model: Digital
Serial No.: 014870-1
Type: N/A
Extended Range
Capacity: 5000
Year of Mfg: N/A

Transducer

Manufacturer: Strainert
Model: 5K Load Cell
Serial No.: 014870-1
Capacity: 5000 lbf
Type: Tension

Classification

1. Digital Readout (lbf) - PASSED

Certification Statement

This certifies that the forces verified with machine indicator 1 (listed above) are WITHIN $\pm 1\%$ accuracy, 1% repeatability, and zero return tolerance. All machine indicators were verified by Instron Corporation in accordance with ASTM E4-01.

The results indicated on this certificate and the following report relate only to the items verified. If there are methods or data included that are not covered by the NVLAP accreditation it will be identified in the comments. Any limitations of use as a result of this verification will be indicated in the comments. This report must not be used to claim product endorsement by NVLAP or the United States government. This report shall not be reproduced, except in full, without the approval of Instron Corporation.

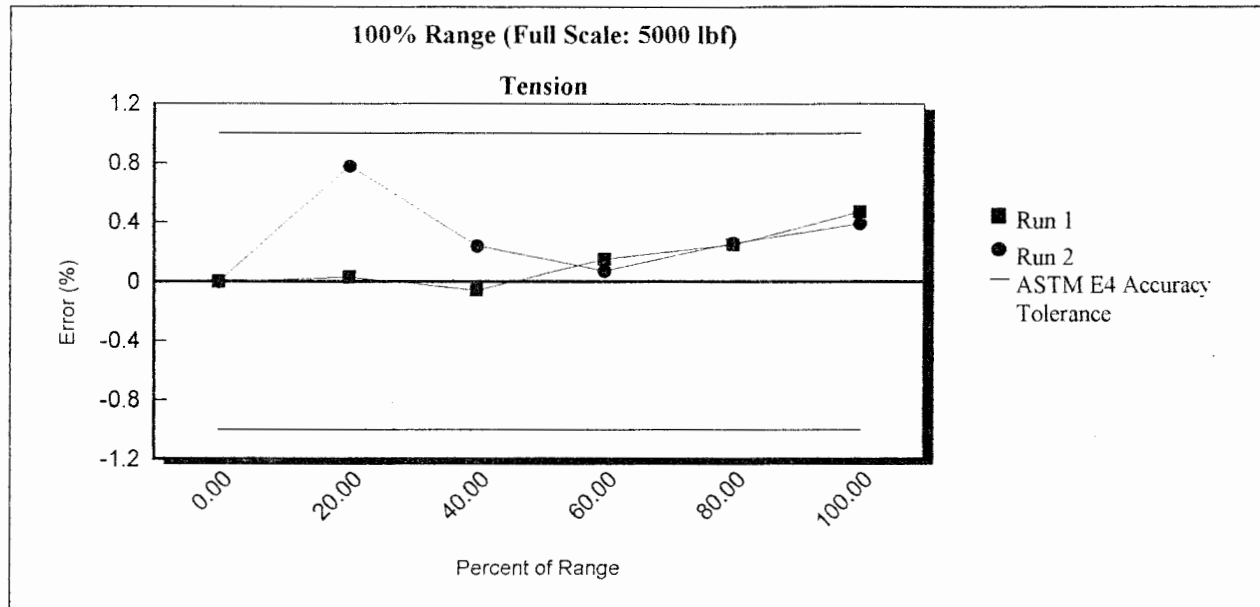
CERTIFICATE OF CALIBRATION

NVLAP ACCREDITED CALIBRATION LABORATORY No. 200301-0

CERTIFICATE NUMBER:
649846-6

Page 3 of 4 pages

Graphical Data - Indicator 1. - Digital Readout (lbf)



Verification Equipment

Reference	S/N	Description	Calibration Agency	Capacity	Cal Date	Cal Due
20KFC9	AU1374	Load Cell	Instron Corp.	22500 lbf	18-Jul-02	18-Jul-04
HBM ML38	88430011	Load Cell Indicator	Instron Corp.	N/A	11-Dec-01	11-Dec-03

Verification Equipment Usage

Range F. S. (lbf)	Standard S/N	Mode	Percent(s) of Range	Uncertainty of Applied Force (% of capacity)	Lower Limit (lbf) Standard Class A
5000	AU1374	T	20, 40, 60, 80, 100	.005	500

Instron standards certified to ASTM Standard E74-00A and traceable to NIST.

CERTIFICATE OF CALIBRATION

NVLAP ACCREDITED CALIBRATION LABORATORY No. 200301-0

CERTIFICATE NUMBER:
649846-6

Page 2 of 4 pages

Method of Verification

The testing machine was verified in the 'as found' condition with no adjustments carried out.

The verification and equipment used conform to a controlled Quality Assurance program which meets the specifications outlined in ANSI/NCSL Z540-1, ISO 10012-1, ISO 9001, and ISO/IEC 17025 (formerly ISO/IEC Guide 25).

Summary of Results

Indicator 1. - Digital Readout (lbf)

Range F/S (%)	Tested Force Range (lbf)	Mode	Max Error	Max Repeat Error (%)	Zero Return	Resolution (lbf)	ASTM Lower Limit (lbf)
100	1000 - 5000	T	.78	.75	Pass	5	1000

Data - Indicator 1. - Digital Readout (lbf)

TENSION

Run 1				Run 2			Repeat
% of Range	Indicated (lbf)	Applied (lbf)	Error (%)	Indicated (lbf)	Applied (lbf)	Error (%)	Error (%)
100% Range (Full Scale: 5000 lbf)							
20	1005.7	1005.40000	.03	1000	992.30000	.78	.75
40	2000	2001.20000	-.06	2000	1995.20000	.24	.30
60	3000	2995.60000	.15	3000	2997.80000	.07	.08
80	4000	3989.90000	.25	4000	3989.50000	.26	.01
100	5000	4976.50000	.47	5000	4980.50000	.39	.08
0 Return	0			0			

The Return to Zero tolerance is = the indicator resolution, 0.1 % of the maximum force verified in the range, or 1% of the lowest force verified in the range, whichever is greater.

CERTIFICATE OF CALIBRATION

NVLAP ACCREDITED CALIBRATION LABORATORY No. 200301-0

CERTIFICATE NUMBER:
649846-6

Page 4 of 4 pages

Comments:

Verification Due Date: 06/09/2004. Verified on Unit # 2. Calibration Numbers: Input 1= 4285, Read 1= 1000, Input 2= 16300, Read 2= 4000.

Verified by: Keith R. Hile
Instron Satec Service Eng.

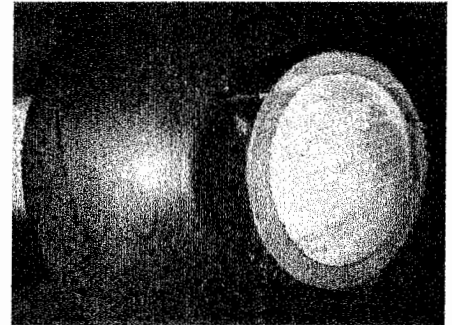
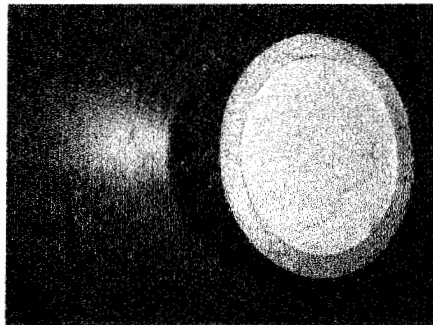
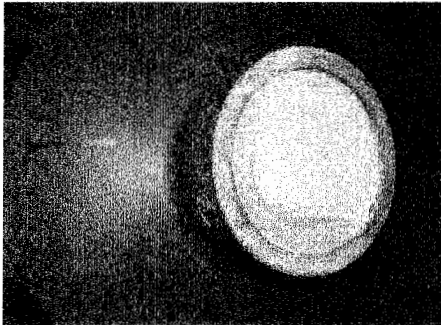
Keith R. Hile

NOTE: Clause 20 of ASTM E-4: 2001 states; It is recommended that testing machines be verified annually or more frequently if required. In no case shall the time interval between verifications exceed 18 months (except for machines in which long term test runs beyond the 18 month period). Testing machines shall be verified immediately after repairs that may in any way affect the operation of the weighing system or values displayed. Verification is required immediately after a testing machine is relocated and where there is a reason to doubt the accuracy of the force indicating system, regardless of the time interval since the last verification.

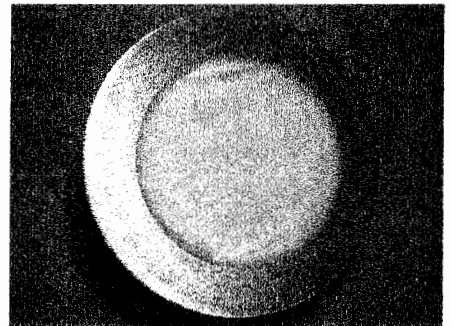
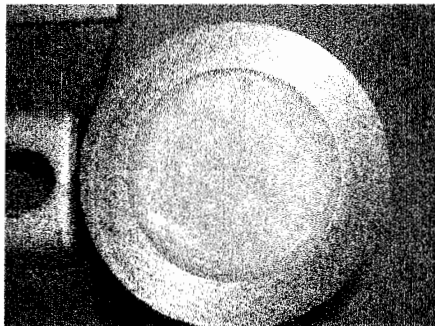
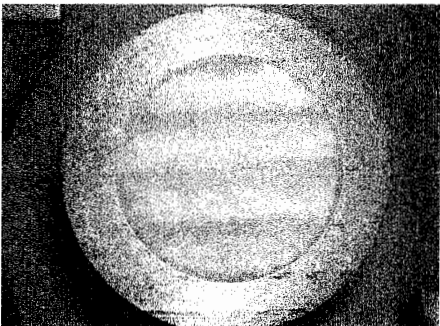
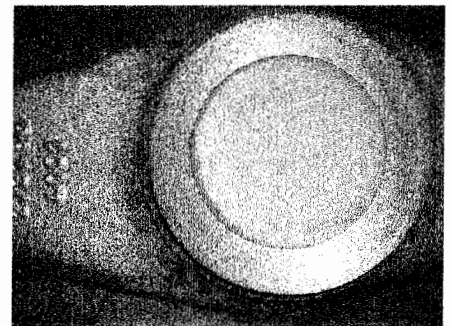
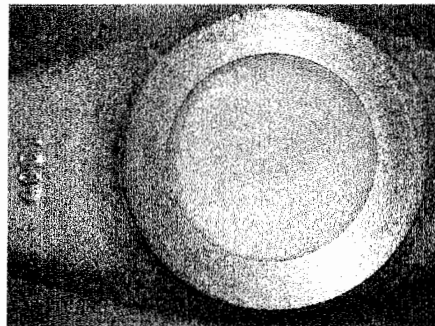
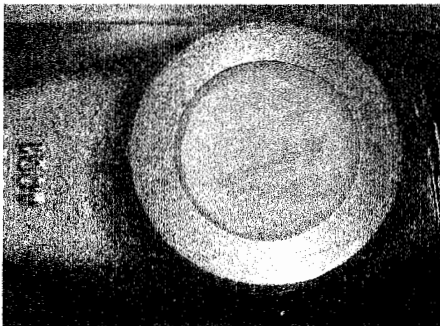
Attachment 3

Dye Penetration Test (ANSI 29.17-2002 Section 7.2.1)
Hi*Lite XL cat # 522011-1100

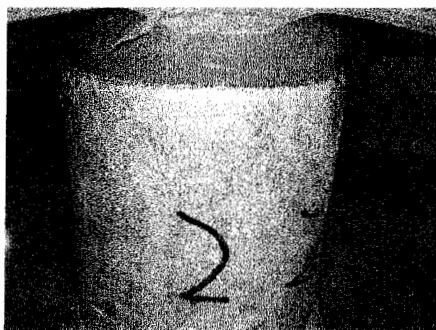
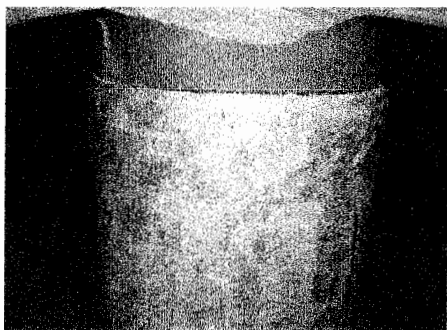
The first part of this dye penetration test requires that the test samples be cut 50mm from the base end fitting. This was done using a horizontal bandsaw with a diamond-coated blade. The markings on the cut pieces below are water stains from cutting fluid that was still in the lubrication system of the saw. The pictures below are of the cut 50mm from the base fitting.



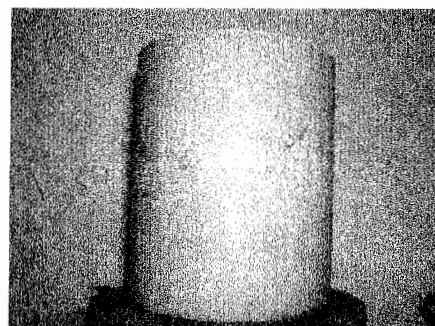
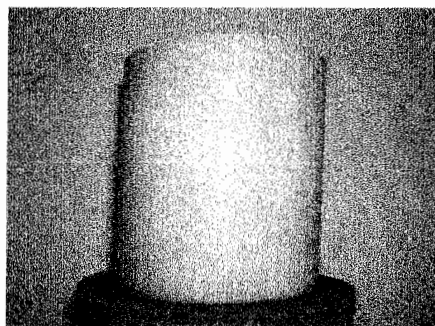
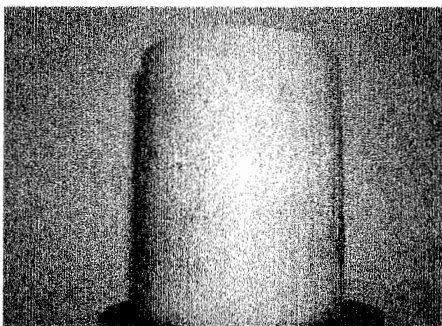
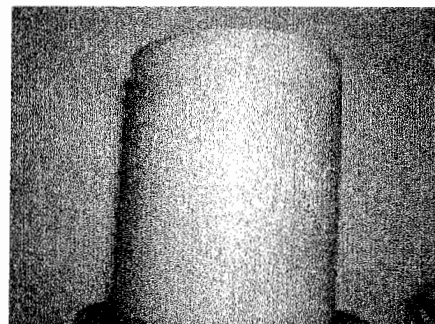
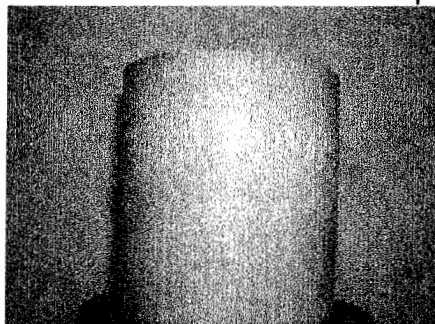
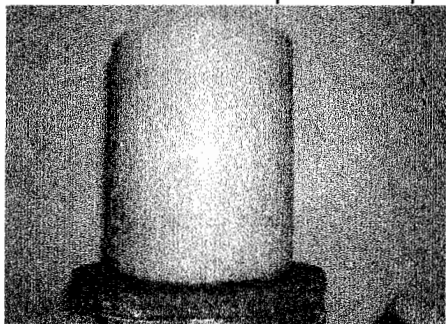
The next part of the test was to remove the line post base fitting. It is also necessary to remove this fitting so that the crimped part of the fitting can be cut in half. The next two rows of pictures are of both sides of the cut to remove the fitting from the sample.



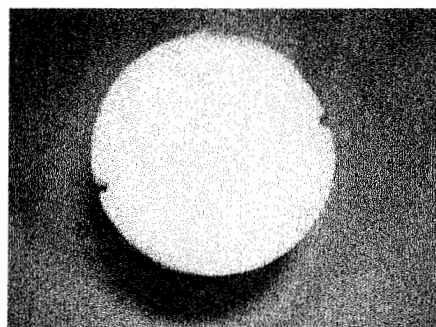
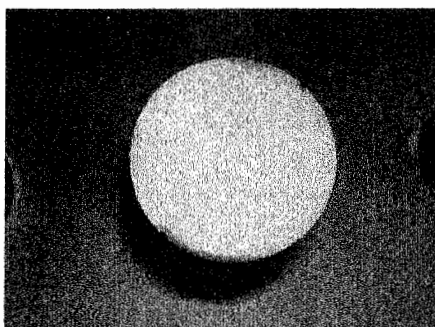
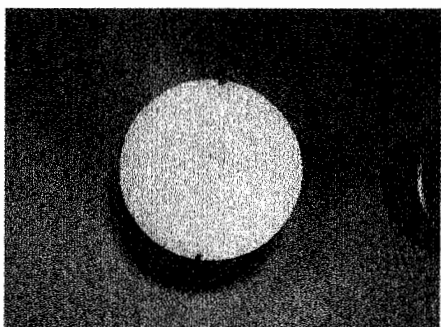
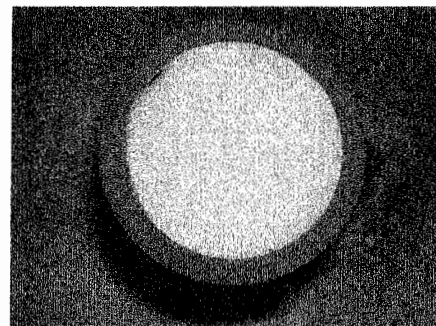
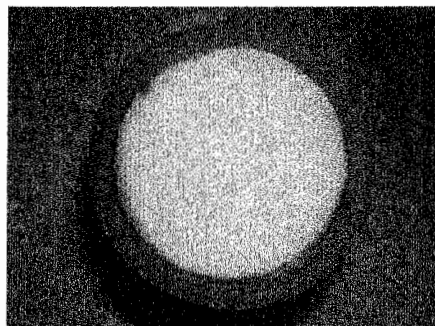
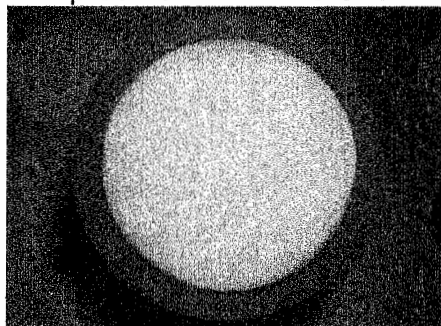
This test requires the base fittings to be examined for cracks, as well as separation. The next pictures show that there was no separation of the rubber to end fitting interface.



Next the metal end fittings were cut in the plane of the applied cantilever load. The fiberglass rod under the crimp was inspected for cracks. No cracks were present.

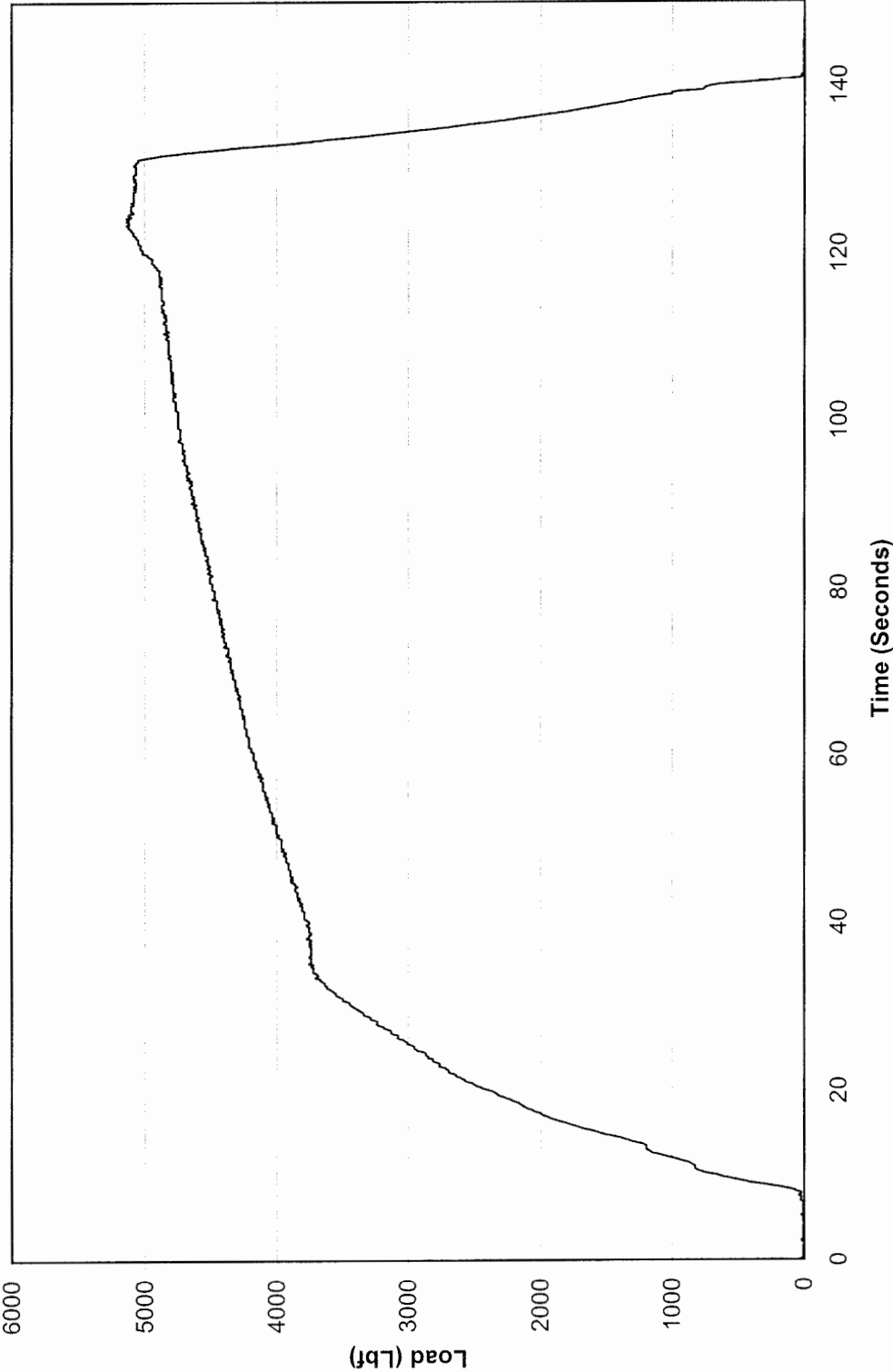


Lastly the samples were sanded using 180-grit sandpaper on a rotary disk sander. These prepared samples were then subjected to a Magnaflux, Spotcheck dye penetration test. For these samples no cracks were found.



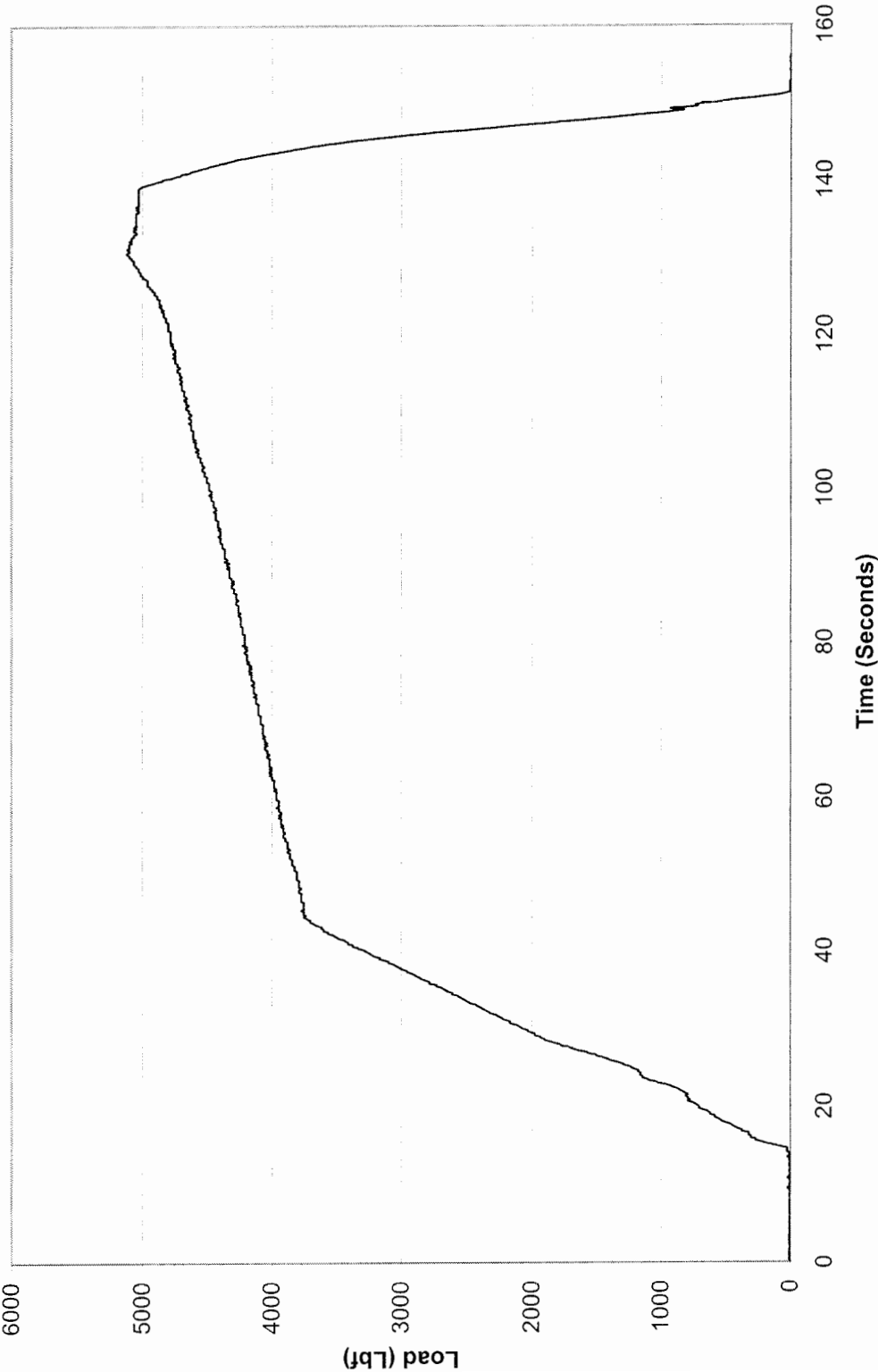
Attachment 4

M04-03-5 Unit 3
Load Vs. Time
Max. Applied Load = 5133 lbf



— M04-03-5.3

M04-03-5 Unit 2
Load Vs Time
Max. Applied Load = 5116 lbf

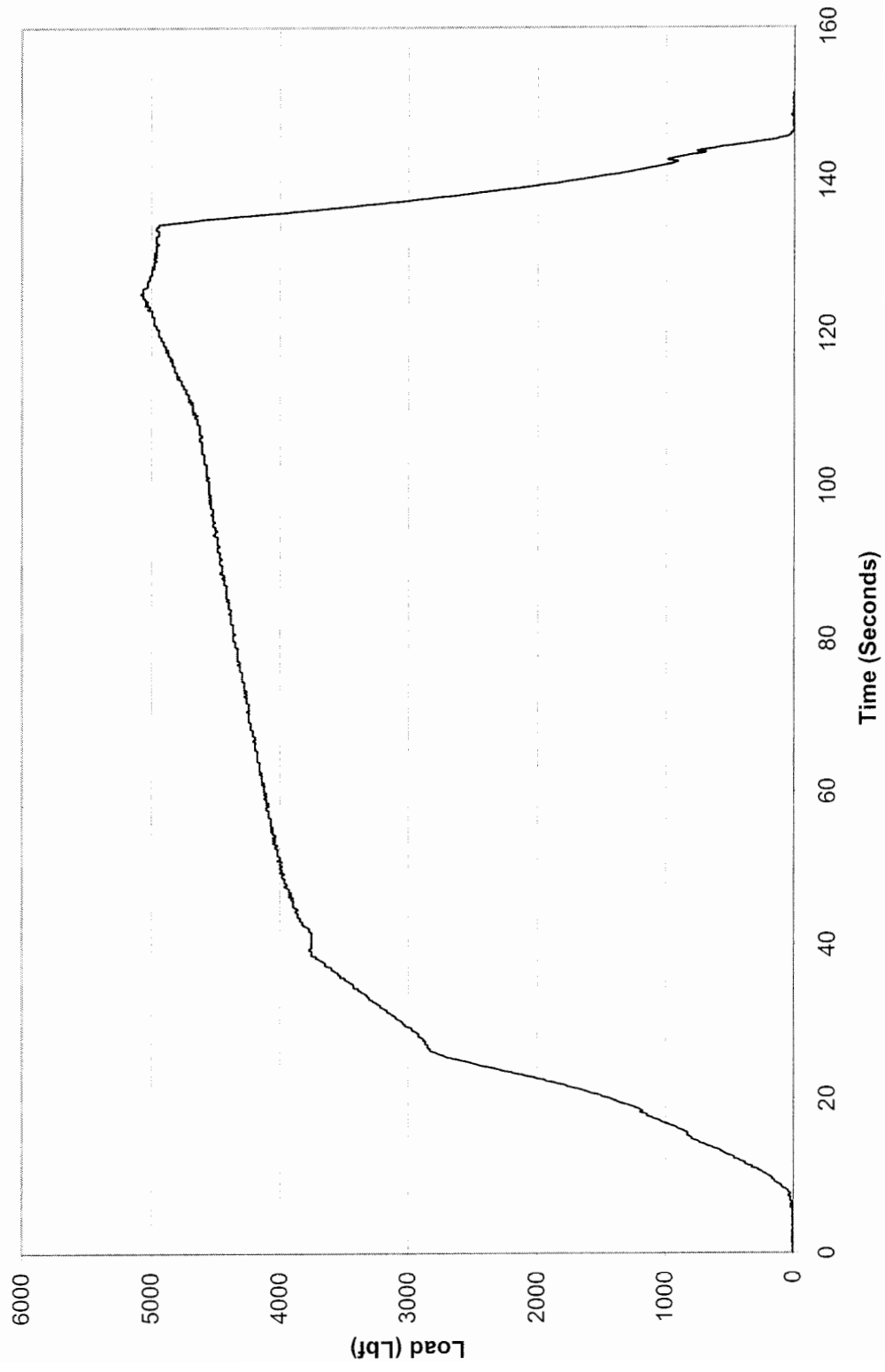


— M04-03-5.2

M04-03-5 Unit 1

Load vs Time

Max. Applied Load = 5081 lbf



CERTIFICATE OF CALIBRATION

ISSUED BY: INSTRON CALIBRATION LABORATORY

DATE OF ISSUE: 09-Jun-03 CERTIFICATE NUMBER: 649846-2



Lab code: 200301-0



Instron Corporation
100 Royall St.
Canton, MA 02021-1089
Telephone: (781) 828-2500
Fax: (781) 575-5750
Email: service_requests@instron.com

Page 1 of 4 pages

Customer Hubbell / Ohio Brass Company
8711 Wadsworth Road
Wadsworth, Ohio 44281

Contact: John Krause
P.O./Contract No.: 103134377000

Date of Verification: 09-Jun-03
Ambient Temperature: 69.3 deg F

Machine

Manufacturer: Baldwin
Model: 100 BTE
Serial No.: 53070
Type: N/A
Multi Range
Capacity: 100000
Year of Mfg: 1937

Transducer

Manufacturer: Baldwin
Model: 100K Capsule
Serial No.: 53070
Capacity: 100000 lbf
Type: Compression

Classification

1. Dial Indicator (lbf) - PASSED

Certification Statement

This certifies that the forces verified with machine indicator 1 (listed above) are WITHIN $\pm 1\%$ accuracy, 1% repeatability, and zero return tolerance. All machine indicators were verified by Instron Corporation in accordance with ASTM E4-01.

The results indicated on this certificate and the following report relate only to the items verified. If there are methods or data included that are not covered by the NVLAP accreditation it will be identified in the comments. Any limitations of use as a result of this verification will be indicated in the comments. This report must not be used to claim product endorsement by NVLAP or the United States government. This report shall not be reproduced, except in full, without the approval of Instron Corporation.

CERTIFICATE OF CALIBRATION

NVLAP ACCREDITED CALIBRATION LABORATORY No. 200301-0

CERTIFICATE NUMBER:
649846-2

Page 2 of 4 pages

Method of Verification

The testing machine was verified in the 'as found' condition with no adjustments carried out.

The verification and equipment used conform to a controlled Quality Assurance program which meets the specifications outlined in ANSI/NCSL Z540-1, ISO 10012-1, ISO 9001, and ISO/IEC 17025 (formerly ISO/IEC Guide 25).

Summary of Results

Indicator 1. - Dial Indicator (lbf)

Range F/S (%)	Tested Force Range (lbf)	Mode	Max Error	Max Repeat Error (%)	Zero Return	Resolution (lbf)	ASTM Lower Limit (lbf)
100	20000 - 100000	C	-.89	.33	Pass	100	20000
8	1600 - 8000	C	.79	.59	Pass	8	1600

Data - Indicator 1. - Dial Indicator (lbf)

COMPRESSION

Run 1				Run 2				Repeat Error (%)
% of Range	Indicated (lbf)	Applied (lbf)	Error (%)	Indicated (lbf)	Applied (lbf)	Error (%)		
100% Range (Full Scale: 100000 lbf)								
20	20000	20123.40000	-.61	20000	20056.20000	-.28	.33	
40	40000	40117.80000	-.29	40000	40065.00000	-.16	.13	
60	60000	60188.40000	-.31	60000	60153.00000	-.25	.06	
80	80000	80664.60000	-.82	80000	80719.80000	-.89	.07	
100	97000	97627.80000	-.64	97000	97785.00000	-.80	.16	
0 Return	0			0				
8% Range (Full Scale: 8000 lbf)								
20	1600	1593.69000	.40	1600	1592.01000	.50	.10	
40	3200	3175.02500	.79	3200	3193.57500	.20	.59	
60	4800	4811.73000	-.24	4800	4785.41000	.30	.54	
80	6400	6375.00000	.39	6400	6373.20000	.42	.03	
100	8000	8046.60000	-.58	8000	8031.60000	-.39	.19	
0 Return	0			0				

The Return to Zero tolerance is \pm the indicator resolution, 0.1 % of the maximum force verified in the range, or 1% of the lowest force verified in the range, whichever is greater.

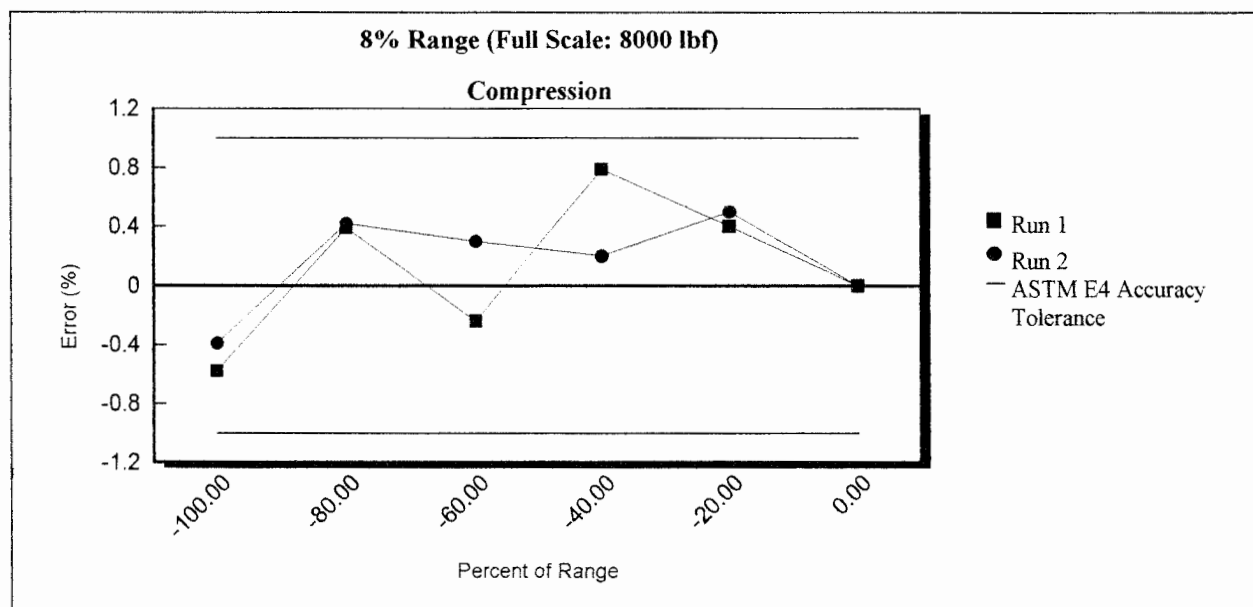
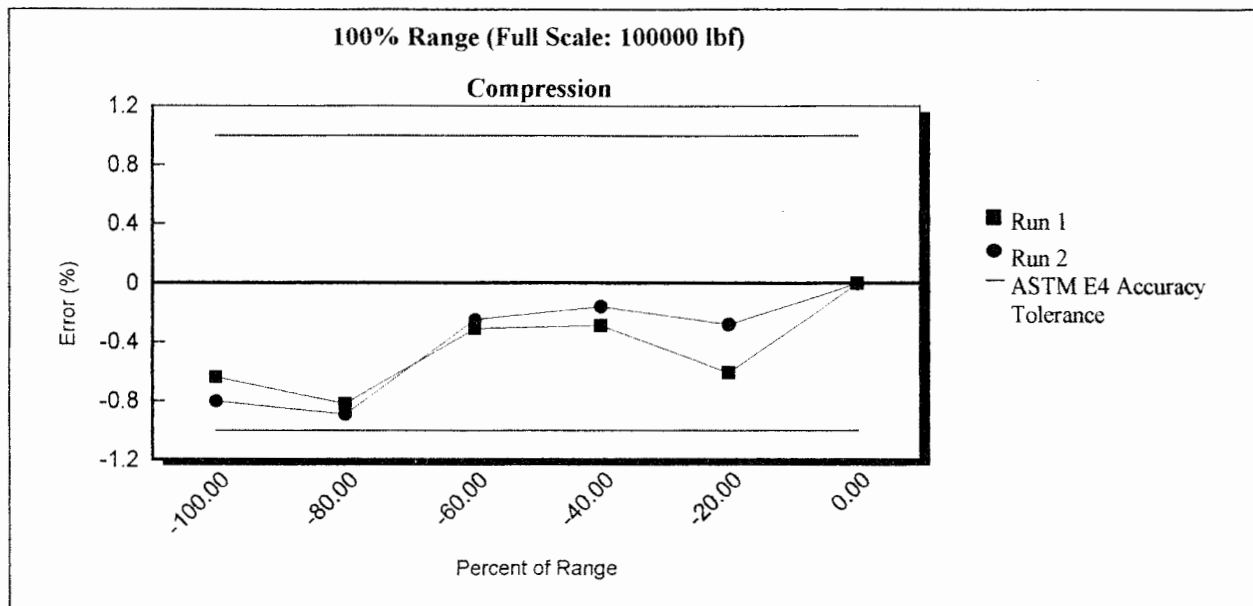
CERTIFICATE OF CALIBRATION

NVLAP ACCREDITED CALIBRATION LABORATORY No. 200301-0

CERTIFICATE NUMBER:
649846-2

Page 3 of 4 pages

Graphical Data - Indicator 1. - Dial Indicator (lbf)



CERTIFICATE OF CALIBRATION

NVLAP ACCREDITED CALIBRATION LABORATORY No. 200301-0

CERTIFICATE NUMBER:
649846-2

Page 4 of 4 pages

Verification Equipment

Reference	S/N	Description	Calibration Agency	Capacity	Cal Date	Cal Due
891214D	891214D	Load Cell	Instron Corp.	120000 lbf	14-May-02	14-May-04
K4X0513	K4X0513	Load Cell	Instron Corp.	6000 lbf	22-Jul-02	22-Jul-04
HBM ML38	88430011	Load Cell Indicator	Instron Corp.	N/A	11-Dec-01	11-Dec-03

Verification Equipment Usage

Range F. S. (lbf)	Standard S/N	Mode	Percent(s) of Range	Uncertainty of Applied Force (% of capacity)	Lower Limit (lbf) Standard Class A
100000	891214D	C	20, 40, 60, 80, 100	.005	5000
8000	891214D	C	80, 100	.005	5000
	K4X0513	C	20, 40, 60	.005	142

Instron standards certified to ASTM Standard E74-00A and traceable to NIST.

Comments:

Note: 10K & 100K Ranges Only. Verification Due Date: 06/09/2004.

Verified by: Keith R. Hile
Instron Satec Service Eng.

Keith R. Hile

NOTE: Clause 20 of ASTM E-4: 2001 states; It is recommended that testing machines be verified annually or more frequently if required. In no case shall the time interval between verifications exceed 18 months (except for machines in which long term test runs beyond the 18 month period). Testing machines shall be verified immediately after repairs that may in any way affect the operation of the weighing system or values displayed. Verification is required immediately after a testing machine is relocated and where there is a reason to doubt the accuracy of the force indicating system, regardless of the time interval since the last verification.

Attachment 5

Annex C

IEC 1109

client HUBBELL - The Ohio Brass Co., Wadsworth (USA)

equipment under test n°1 composite insulators with 120 kN SML
n°1 composite insulators with 210 kN SML

tests performed Tracking and erosion test of housing in severe environmental conditions

normative documents IEC 1109, - Annex C (1992) - and Client's requests

test date 1 september 1996 - 10 april 1997

the test results relate only to the sample tested
this document shall not be reproduced except in full without the written approval of CESI

no. of pages 20

issue date 31 July 1997

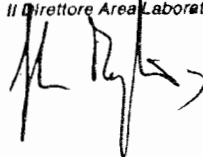
prepared TEST - A. Sironi
TEST - I. Aliprandi

approved TEST - U. Colombo

Sironi Albert
Aliprandi Paolo

CESI

CENTRO ELETTROTECNICO SPERIMENTALE ITALIANO
Il Direttore Area Laboratori



tests witnessed by:

identification of the object:

The Manufacturer guarantees that the tested object is manufactured according to the submitted drawings. CESI checked that these drawings adequately represent in shape and dimensions the essential details and parts of the tested object. These drawings identified by CESI and numbered 97/015392 no.2 and 97/015390 n.2 are annexed to this report.

the data necessary to permit repetition of the tests are contained in the document marked: \

laboratory informations

CESI testing team: Sig. Aliprandi Ilario
 Sig. Aprile Giuseppe

annex: calibration of the measurement system and scale, pag.

test laboratory: P231 Servathin

keywords:12015R 22342W 31020W 44040V 53001D 62570N

contents	page	test date
1. Test object characteristics	4 - 6	
2. Verification of the test object dimensional characteristics	7	
3. Test carried out	7	
4. Reference Standard	7	
5. Test procedure	8 - 10	
6. Test results	11	
6.1 External leakage current flowing during the test	11 - 13	
6.2 Surface conditions after the test	14	
7. Conclusions	15	
Reference document annexed: Drawing 97/015392 - (1 page) Drawing 97/015390 - (1 page)		

1. TEST OBJECT CHARACTERISTICS

1.1 N° 1 composite insulator - 5/8 HI lite XL suspension - with 120 kN SML. The subject insulator has been mounted vertically in the testing room. The main insulator characteristics are:

- manufacturer:	The Ohio Brass Co. (USA)
- type:	n° 234063-3001 Prototype
- creepage distance:	545 mm
- arcing distance:	215 mm
- specified mechanical load (SML):	120 kN
- drawing no.	S006156-00 Rev. no. 2
- year of construction:	1996
- weathershed material:	ESP™

A view of the insulator before the test is shown in the figure in page 5.

1.2 N° 1 composite insulator - HI lite suspension insul - with 210 kN SML. The subject insulator has been mounted horizontally in the testing room. The main insulator characteristics are:

- manufacturer:	The Ohio Brass Co. (USA)
- type:	n° 234068-3001 Prototype
- creepage distance:	535 mm
- arcing distance:	210 mm
- specified mechanical load (SML):	210 kN
- drawing no.	S006215-00 Rev. no. 2
- year of construction:	1996
- weathershed material:	ESP™

A view of the insulator before the test is shown in the figure in page 6.

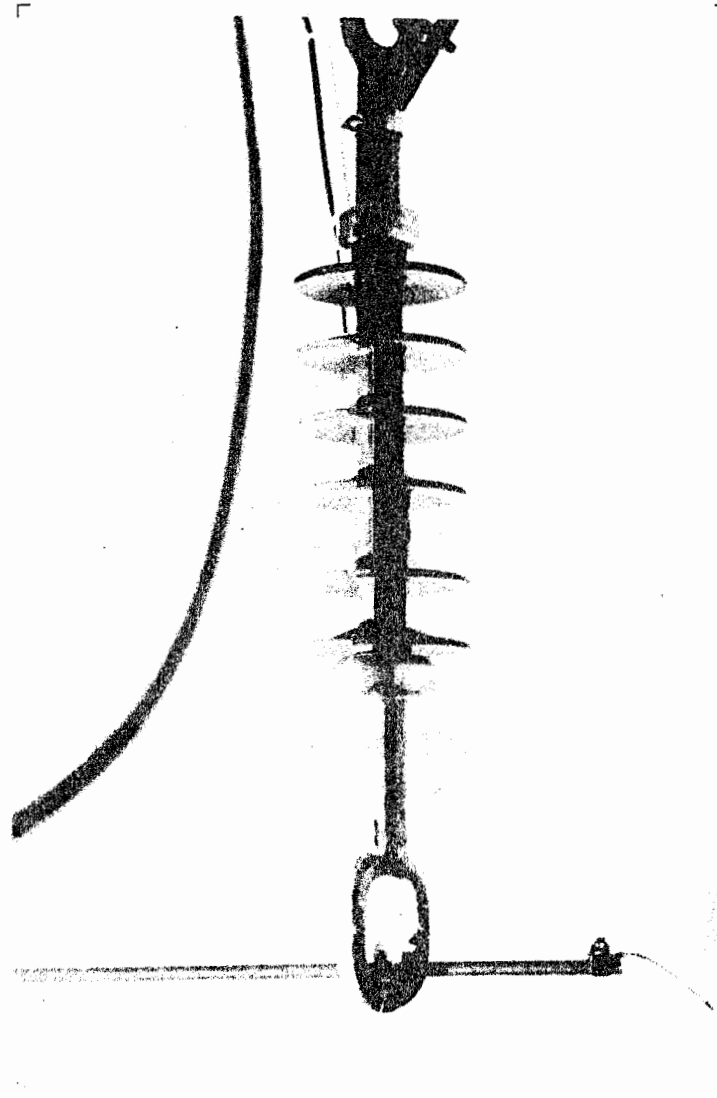


Fig. 1 - View of the insulator n° 234063-3001 before the test

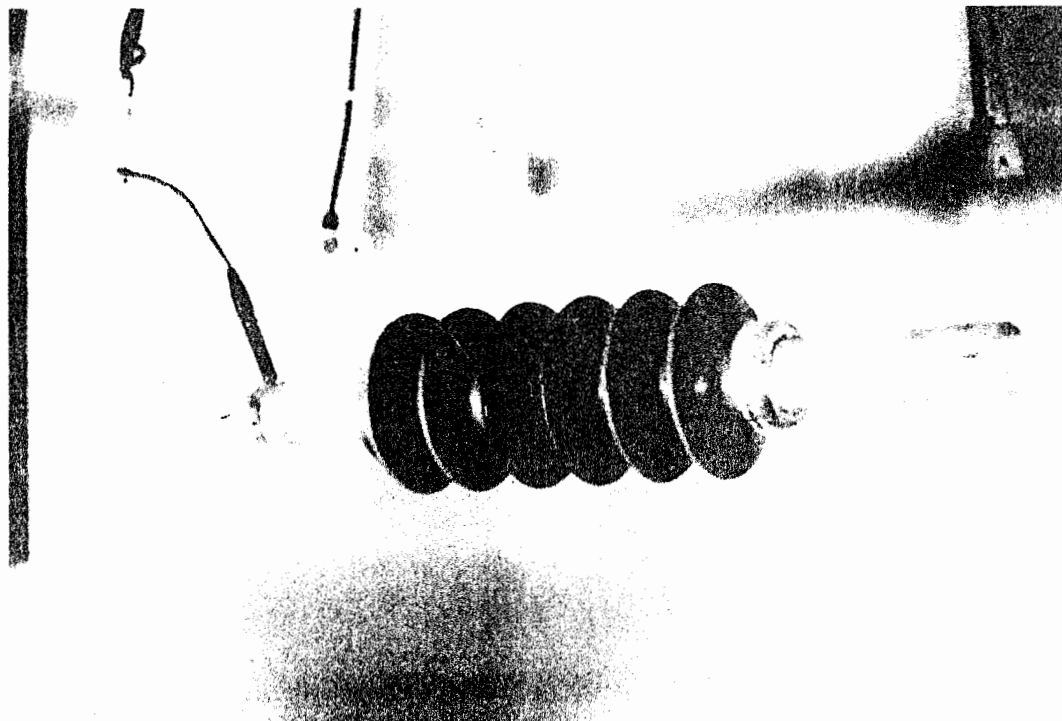


Fig. 2 - View of the insulator n° 234068-3001 before the test

2. VERIFICATION OF THE TEST OBJECT DIMENSIONAL CHARACTERISTICS

The test object dimensional characteristics measured on the insulators are reported in the following table:

sample	number of sheds	height [mm]	shed diameter [mm]	creepage distance [mm]	core diameter [mm]	spacing [mm]
n° 234063-3001	6	540	92	550	25	36
n° 234068-3001	6	650	100	550	32	37

note:

The checked dimensions have been found in satisfactory agreement with those submitted by the

3. TEST CARRIED OUT

Ageing test under operating voltage simulating weather conditions:

Test voltage: $V_t = 15.8 \text{ kV}$

Test duration: 5000 h.

4. REFERENCE STANDARD

The test procedure has been according to IEC Publication 1109 - Annex C - (1992), following:

- On Client request prototype n°234063-3001 has been tested only in vertical position.
- On Client request prototype n°234068-3001 has been tested only in horizontal position.

5. TEST PROCEDURE

The test procedure is based on the repetition of a daily cycle for 208 times for a total duration of about 5000 hours.

A scheme of the daily ageing cycle is shown in fig. 3 on page 9.

A sketch of the test configuration is shown in figure 4 on page 10.

During the test the samples have been energized at a power frequency voltage equal to $V_t = 15.8$ kV.

The main characteristics of the different environmental stresses applied during the test are reported in the following table:

environmental stress	daily duration [h]	total duration [h]	severity
salt fog	8	1664	7 g/l - 0.4 l/h per m ³
humidification	4	832	98 %
rain	2	416	100 Ωm - 1.5 mm/min
U.V. radiation	12	2496	90 mW/cm ²
heating	10	2080	50 °C

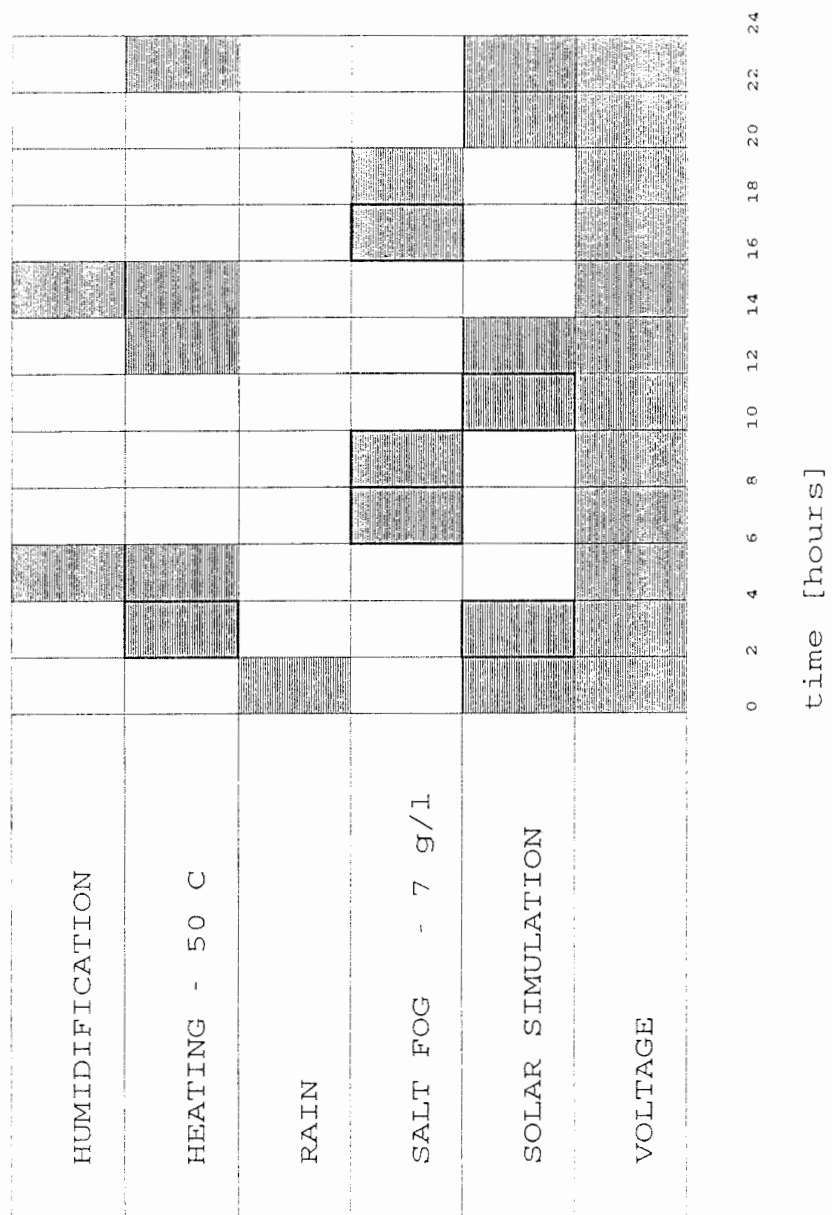


Fig. 3 - Scheme of the daily ageing cycle

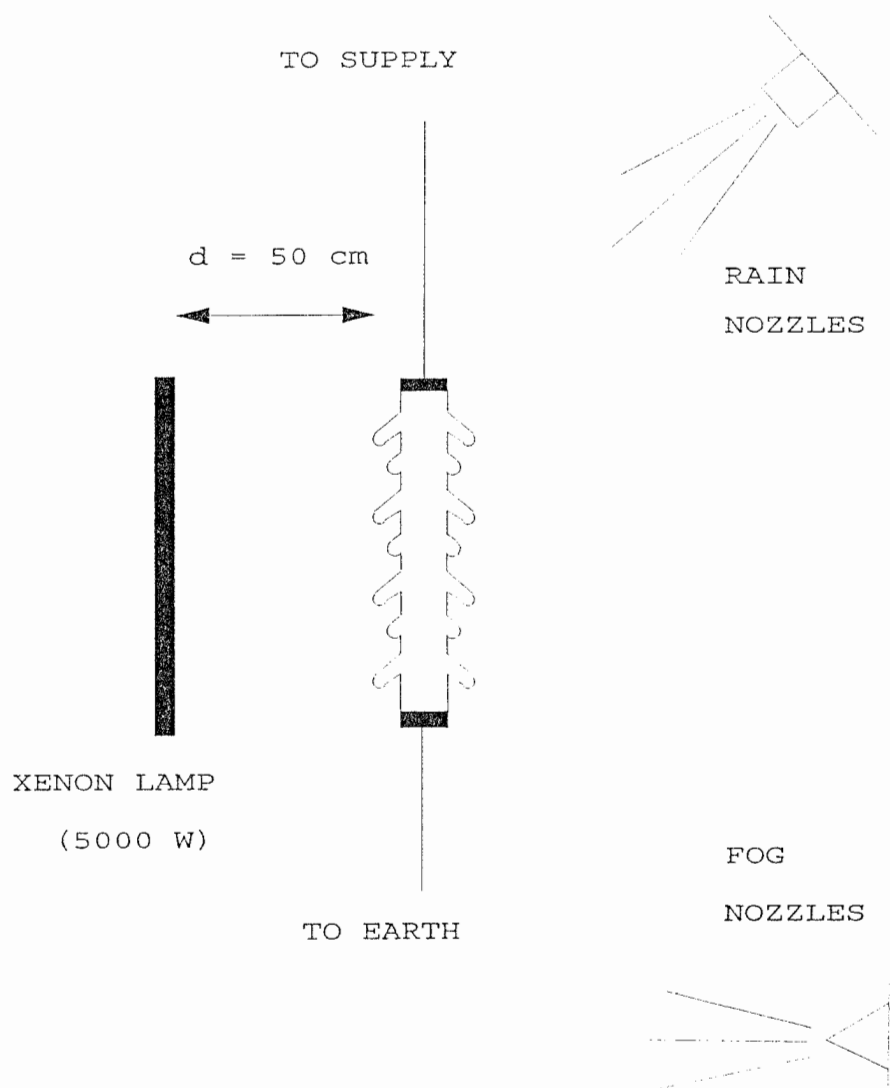


Fig. 4 - Sketch of the test configuration

6. TEST RESULTS

6.1 External leakage current flowing during the test

No flashover has been observed during the test on the sample.

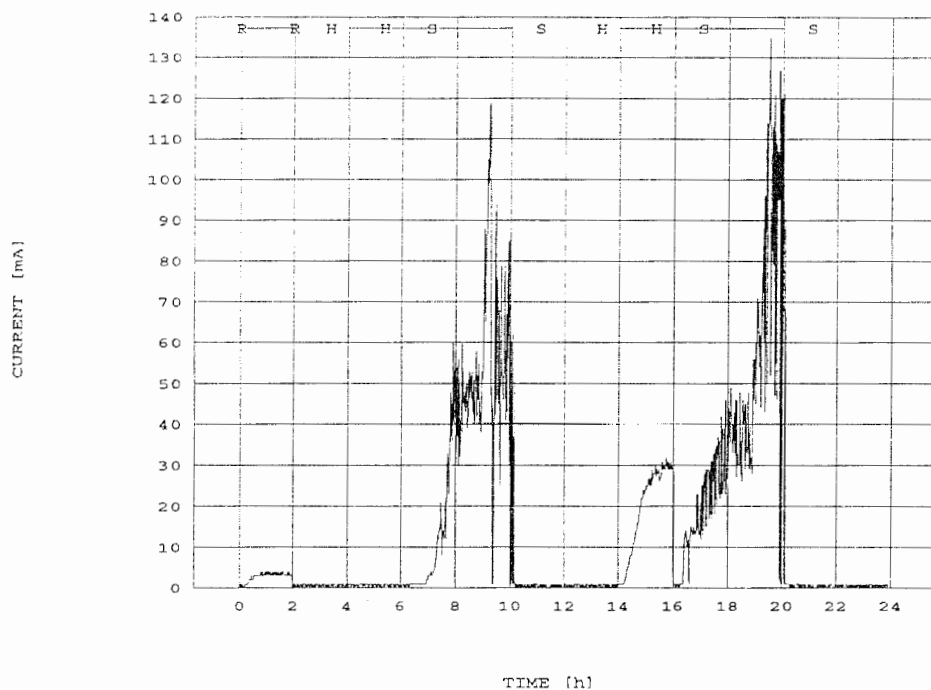
The value of the maximum peak current measured during the whole test is given in the below table.

test sample	maximum peak current [mA]
n° 234063-3001	135
n° 234068-3001	118

An example of the trend of the peak current and cumulated energy relevant to each insulator during a daily cycle is given in the figures from page 12 to page 13. The examples refer to the cycles where maximum peak occurred.

MAXIMUM PEAKS OBJECT O.B. 234063-3001 E

Cycle n. 68 - 15-11-1996 - U=16 kV



CUMULATED ENERGY OBJECT O.B. 234063-300

Cycle n. 68 - 15-11-1996 - U=16 kV

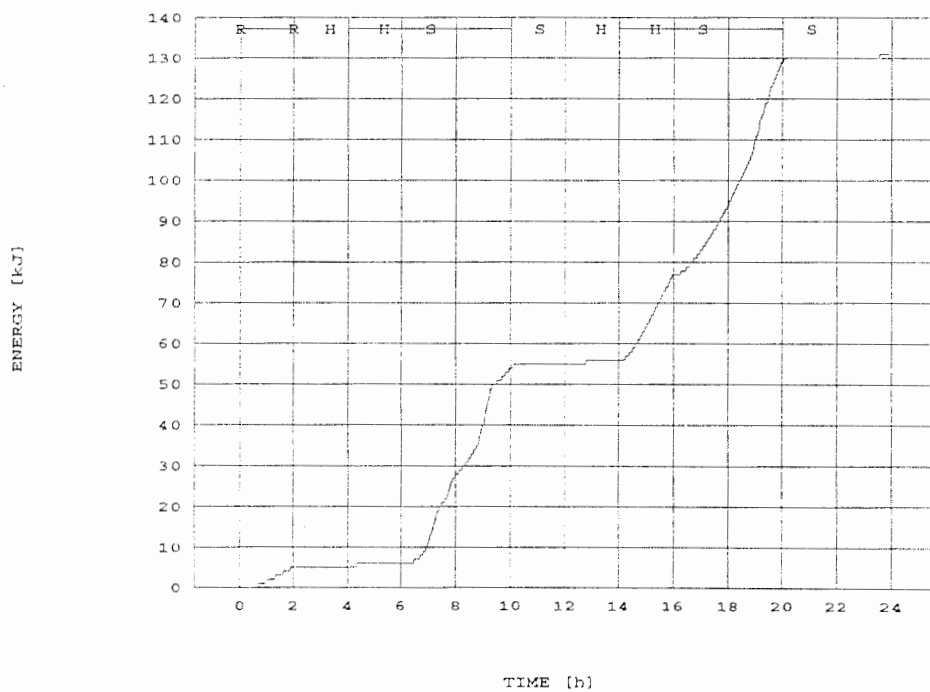
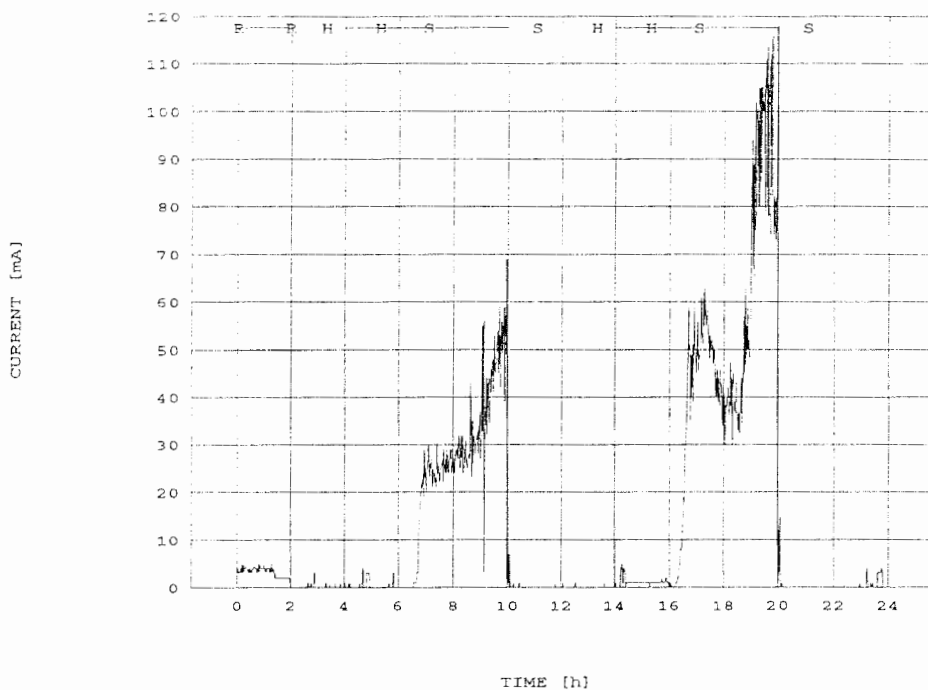


Fig 5 - Example of the trend of the peak current and of the cumulated energy during a daily cycle.

MAXIMUM PEAKS OBJECT O.B. 234068-3001 E

Cycle n. 74 - 21-11-1996 - U=16 kV



CUMULATED ENERGY OBJECT O.B. 234068-300

Cycle n. 74 - 21-11-1996 - U=16 kV

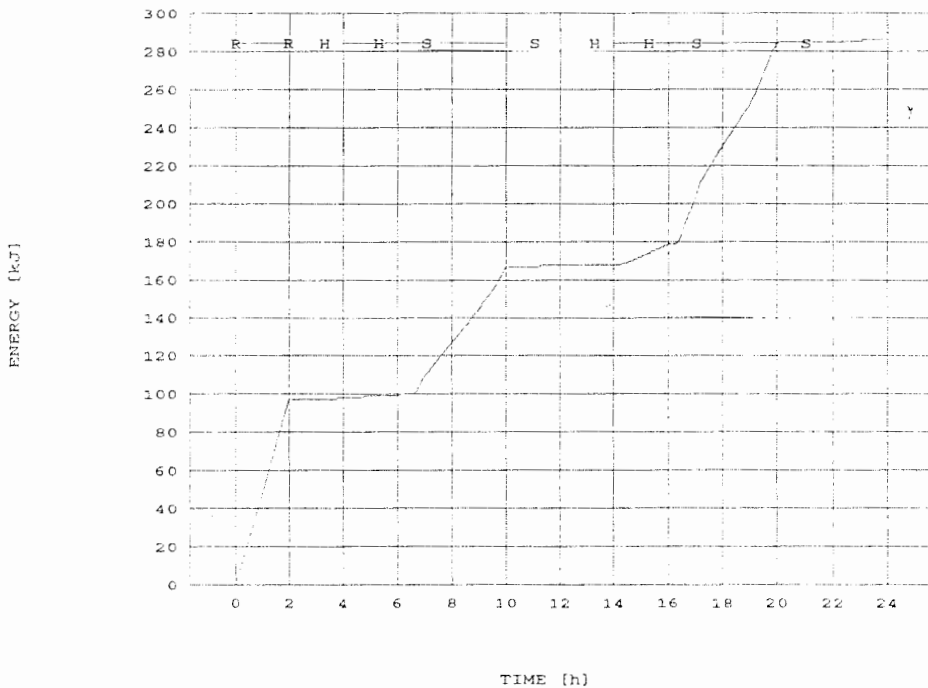


Fig 6 - Example of the trend of the peak current and of the cumulated energy during a daily cycle.

6.2 Surface conditions after the test

Ohio Brass n° 234063-3001:

No significant tracking and shed punctures have been observed on the tested sample.
Light erosion has been observed in correspondence to the moulding line.
Salt deposits are visible on the core and under the sheds.

A view of the insulators and details of the surface at the end of the test are shown in the figs. 7 and 8 on pages 16 and 17, respectively.

Ohio Brass n° 234068-3001:

No significant tracking and shed punctures have been observed on the tested sample.
Light erosion have been observed on the core between third and fourth shed (fig. 10 on page 19), and in correspondence to the moulding line.
Salt deposits are visible on the core and under the sheds.

A view of the insulators and details of the surface at the end of the test are shown in the figs. 9, 10 and 11 on page 18, 19 and 20, respectively.

7. Conclusions

Flashover has not occurred during the whole test period of 5000 hours on the tested samples.

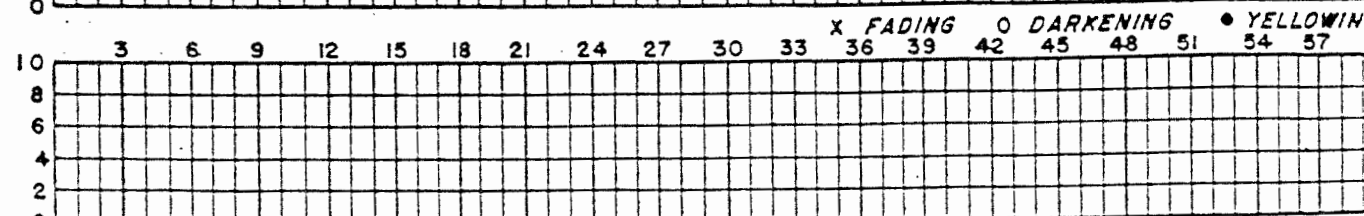
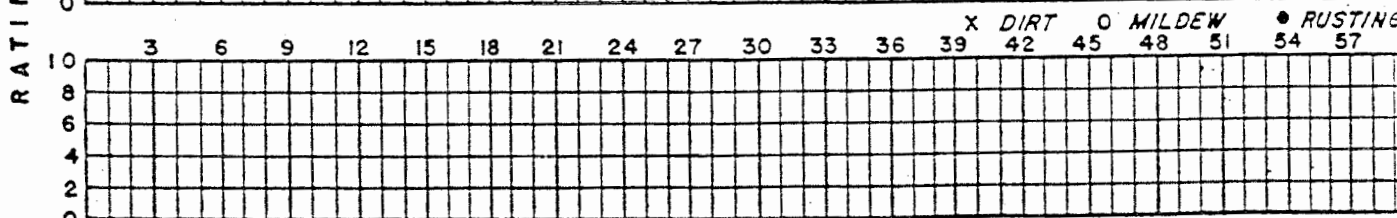
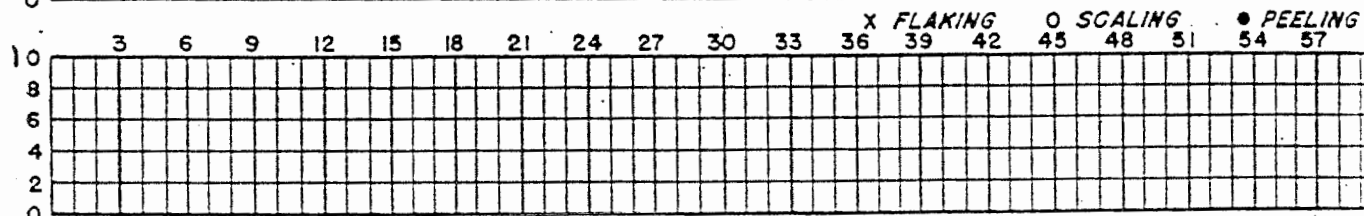
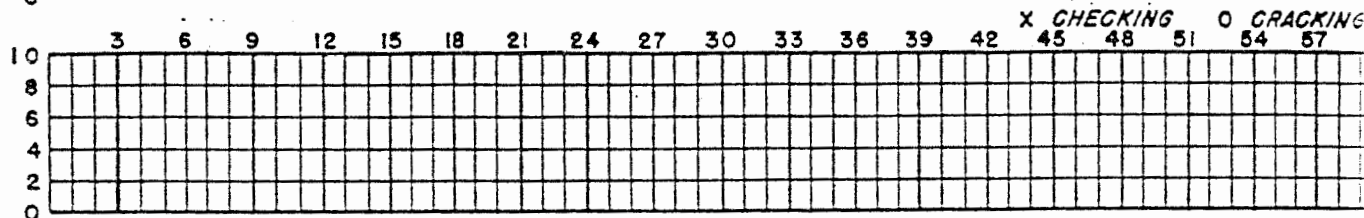
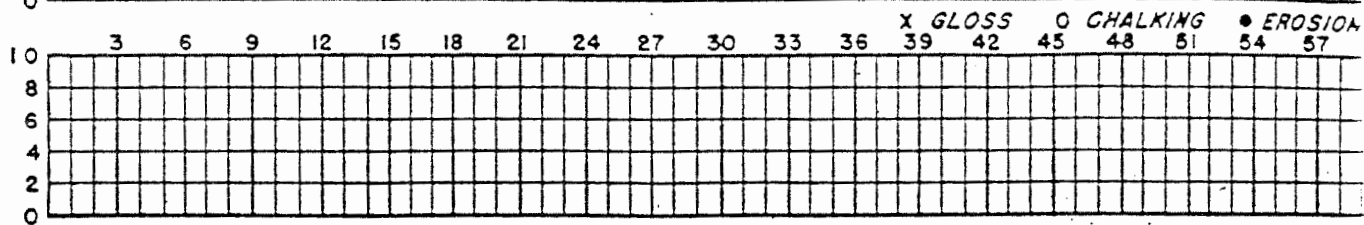
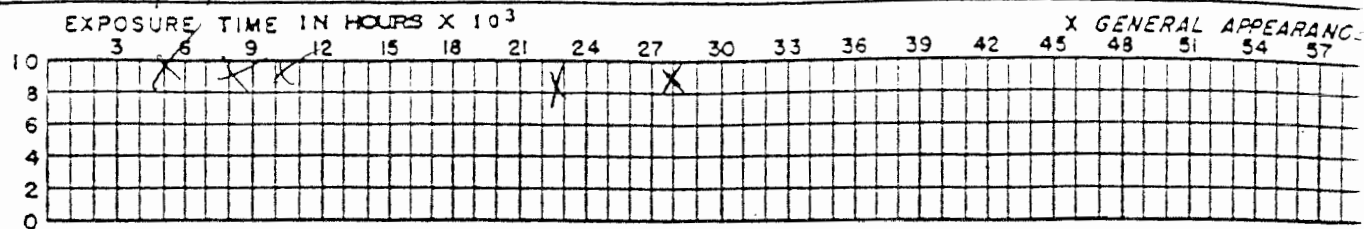
Very light erosion has been observed on the surface of the tested sample n° 234068-3001 and 234063-3001 at the end of the test.

Attachment 6

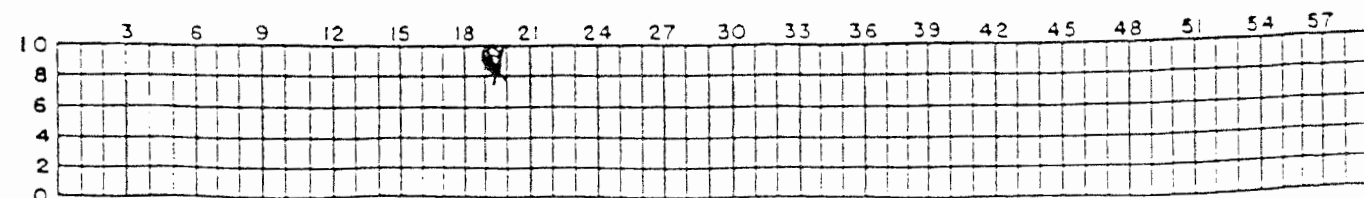
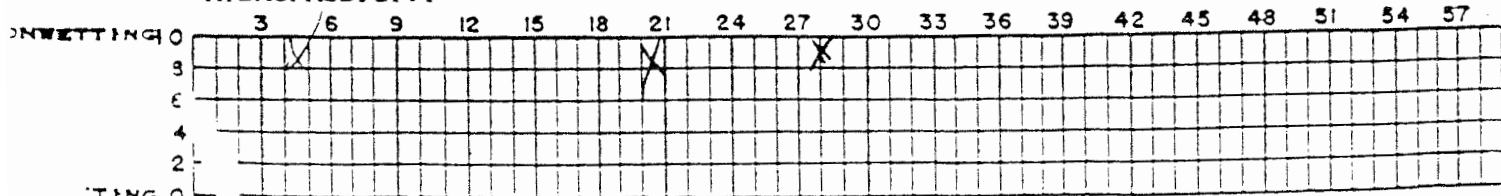


Customer Representative		Ohio Brass Representative	MD
-------------------------	--	---------------------------	----

TEST NO. _____ TOTAL HOURS ^{OFF} ON 35298 EIGHT HOURS ^{OFF} ON 23136
 SUBSTRATE OBX-343 LOCATION R 4 COLOR Dark Grey
 PURPOSE OF TEST _____
 EXPOSED 3/17/99 REMOVED _____ EXPOSURE Stressed QUV

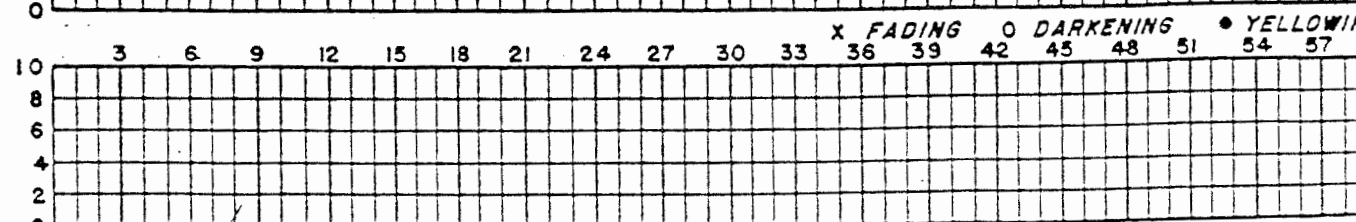
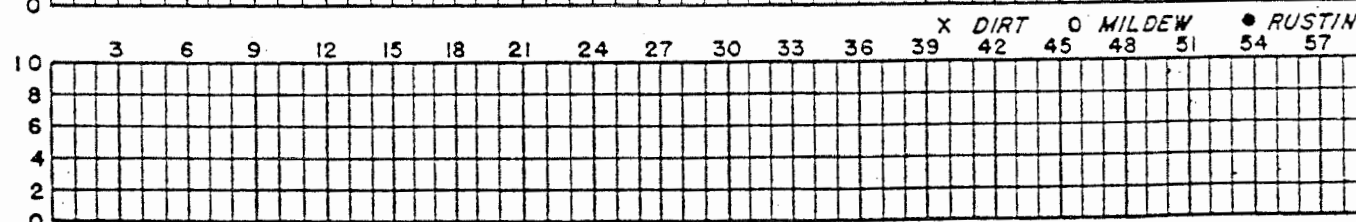
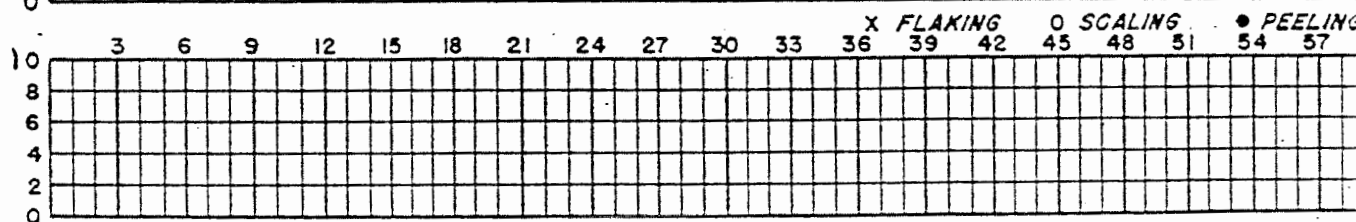
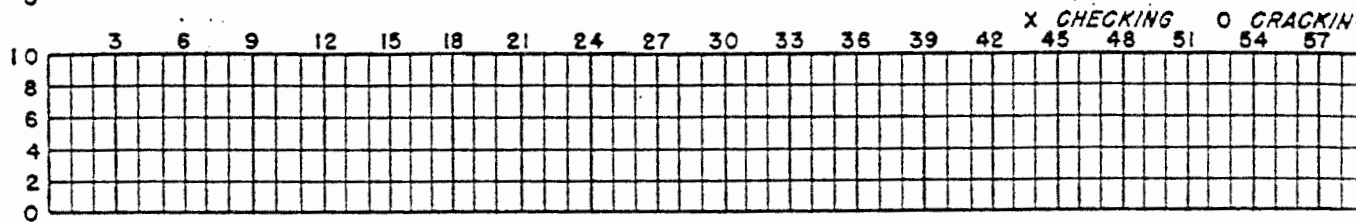
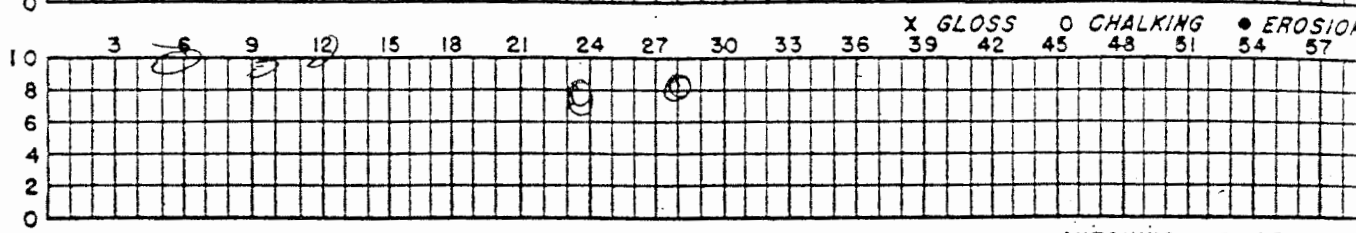
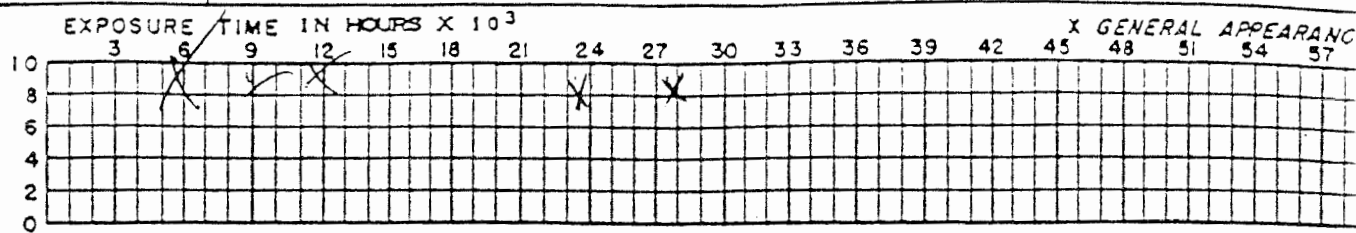


HYDROPHOBICITY

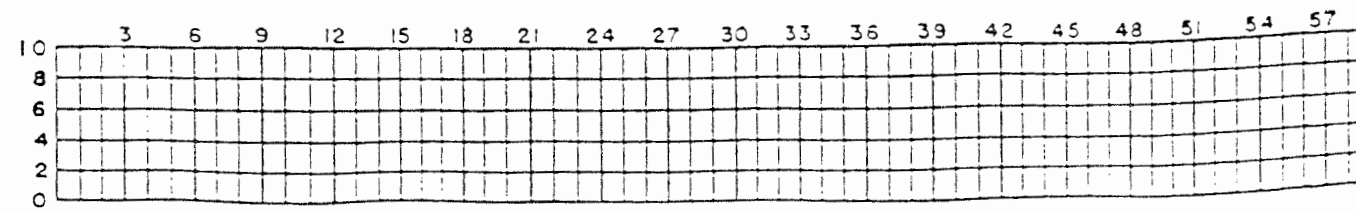
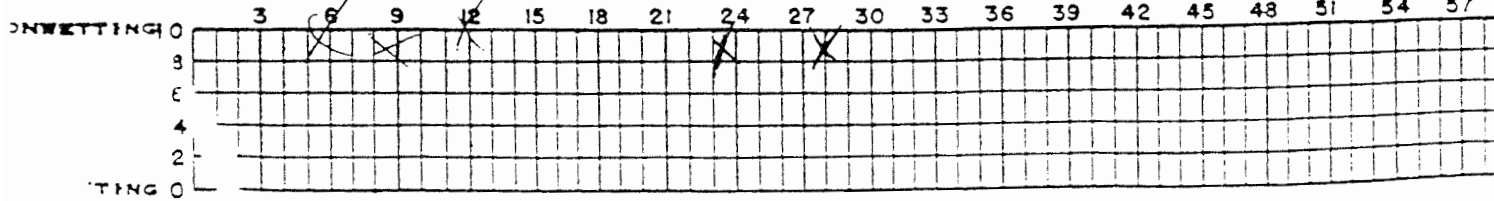


INSPECTED BY _____

TEST NO. _____ TOTAL HOURS ON 35298 EIGHT HOURS ON 23136
 SUBSTRATE OBX-343 LOCATION 2-4 COLOR Dark Green
 PURPOSE OF TEST _____
 EXPOSED 3/17/99 REMOVED _____ EXPOSURE Stressed QUV



HYDROPHOBICITY



INSPECTED BY _____

TEST NO. _____ TOTAL HOURS ^{OFF}/_{ON} 35326 NIGHT HOURS ^{OFF}/_{ON} 23157
SUBSTRATE OBX 343 LOCATION Q-2 COLOR DK Grey
PURPOSE OF TEST _____
EXPOSED 3/19/99 REMOVED _____ EXPOSURE Stressed QUV

EXPOSURE TIME IN HOURS $\times 10^3$

X GENERAL APPEARANCE

[illegible][illegible][illegible][illegible][illegible]

	3	6	9	12	15	18	21	24	27	30	33	X FADING	O DARKENING	• YELLOWING
10														
8														
6														
4														
2														
0														

HYDROPHOBICITY

[illegible]

Attachment 7

07/02/2004

Request #: M04-07-2

Date Submitted: 07/02/2004

Originator: BVB

Date Test Required:

Eng. Project Title ANSI Design Tests

Project Number

Product: HI*LITE POST

Test Standard: ANSI C29.11-1989

Name of Test: ANSI C29.11 - 7.4.1 - Dye Penetrati

Test Description: perform dye penetration test on 250 rod from hi-lite XL post. In accordance with ANSI C29.11 clause 7.4.1

Reason for Test:

Date Parts Available: 07/02/2004

Number of Parts:

Technician: BLK

Date Test Started: 07/07/2004

Comments Testing Completed 07/07/2004
Data Given to BVB 07/07/2004

Date Test Completed: 7/07/2004

Date Report Issued:

Test Area: Polymer Lab



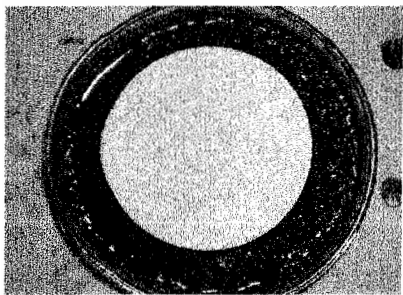
Request No.	M04-07-2
Specification	ANSI C29.11 (7.4)

Date	July 07, 2004
Engineer	BVB

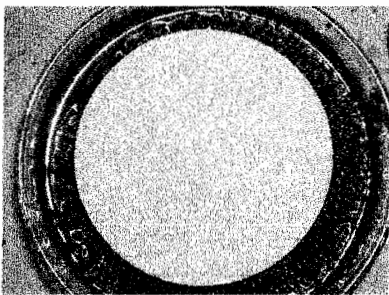
[illegible]

Customer Representative		Ohio Brass Representative	BLK
-------------------------	--	---------------------------	-----

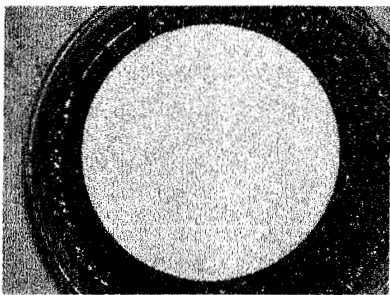
M04-07-2: ANSI C29.11 Clause 7.4.1 Dye Penetration Test



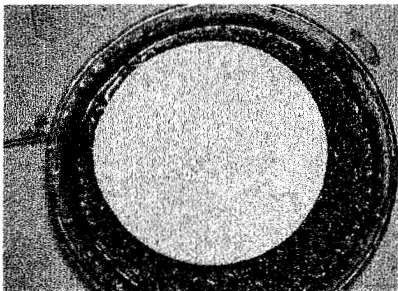
#1 Pass



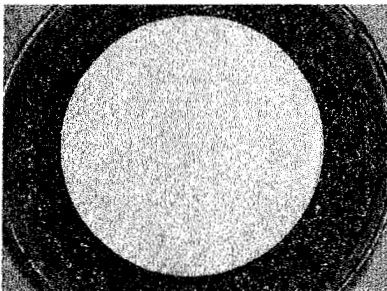
#2 Pass



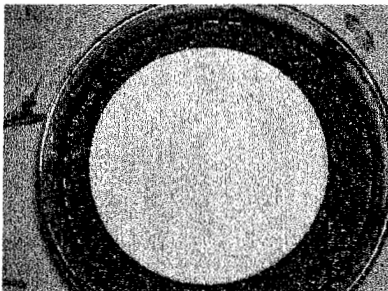
#3 Pass



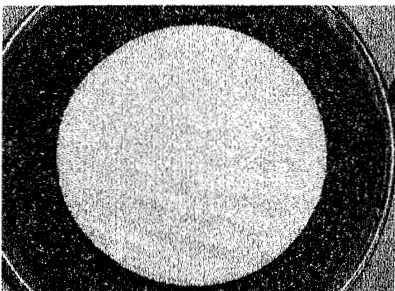
#4 Pass



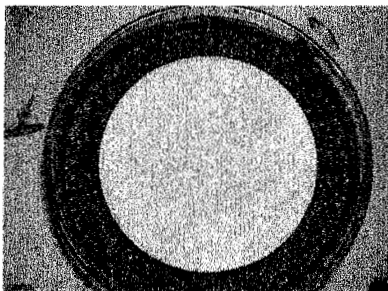
#5 Pass



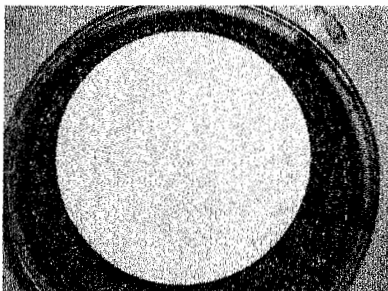
#6 Pass



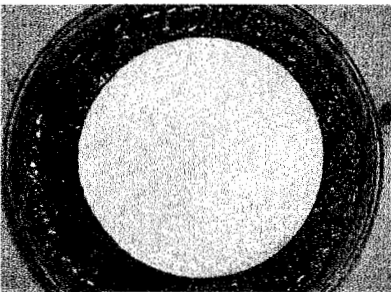
#7 Pass



#8 Pass



#9 Pass



#10 Pass

Attachment 8



Request No.	E04-07-3
Test	Water diffusion Test
Customer	BvB
Catalog No.	522011
Specification	ANSI C29.17

[illegible]

Customer Representative		Ohio Brass Representative	
-------------------------	--	---------------------------	--

Attachment 9

Flammability Tests

**Ohio Brass Company
OBX-343 Rubber Compound**

M.D. Dragutinovic
June 26, 2003

I. INTRODUCTION

This report describes the results of flammability tests on OB polymer compound OBX-343. This ESP rubber compound is used for the injection molding of insulators manufactured by The Ohio Brass Company.

The tests were conducted in accordance with IEC Publication 707, "Methods of test for the determination of flammability of solid electrical insulating materials when exposed to an igniting source."

The specific tests employed were IEC Method FV: Flame – Vertical specimen.

II. RESULTS

Method FV:

The igniting source and test units are defined in paragraphs 9.1 and 9.2 of the referenced publication.

Procedure:

"Each specimen is to be fixed vertically by the clamp on the ring stand. The burner is placed remote from the specimen, ignited and adjusted in the vertical position to produce a blue flame 20 ± 2 mm high. The flame is obtained by adjusting the gas supply and the air ports of the burner until a 20 ± 2 mm yellow tipped blue flame is produced and then the air supply is increased until the yellow tip disappears. The height of the flame is measured again and corrected in necessary.

The burner is to be placed centrally under the lower end of the test specimen and allowed to remain for 10 s. The burner is then to be withdrawn at least 150 mm away and the duration of flaming of the specimen noted. When flaming of the specimen ceases, the burner is to be immediately placed again under the specimen. After 10 s the burner is again to be withdrawn and the duration of flaming and glowing to be noted.

If the specimen drips molten or flaming material during either of the flame applications, the burner may be tilted to an angle up to 45 degrees and also slightly withdrawn away from one of the 13 mm sides of the specimen during the flame application, to avoid material dripping into the tube of the burner.

If the specimen drips molten or flaming material or is consumed during the test, the burner is to be hand-held, and the 10 mm distance between the bottom of the specimen and the top of the burner tube is to be maintained during the flame application. Any molten strings of the material are to be ignored and the flame is to be applied to the major portion of the specimen."

Evaluation:

OBX-343 is classified as Category FV 0 material based on the following test results:

<u>Sample</u>	Flaming Combustion Time (s)	
	First flame Application	Second flame Application
1	0	0
2	0	0
3	0	2
4	0	2
5	0	1
6	0	1
7	0	2
8	0	1

As shown, the total flaming combustion time for the sixteen flame applications to the set of eight specimens was 9 seconds.