

**Opticom Technologies Inc.  
Temperature Testing of  
Model CC-02-4.3  
CCTV Camera**

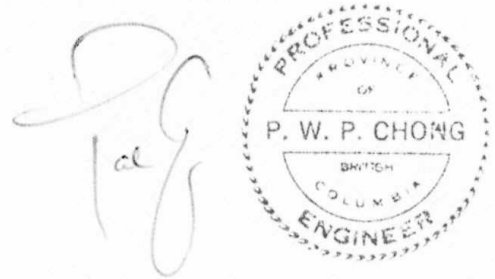
**Prepared by: Weir-Jones Engineering Consultants Ltd.  
2040 West 10th Avenue  
Vancouver, B.C.  
V6J 2B3**

Tel: 604 732-8821  
Fax: 604 732-4801  
E-mail: [wjgroup@weir-jones.com](mailto:wjgroup@weir-jones.com)  
Web: [www.weir-jones.com](http://www.weir-jones.com)  
***ISO 9001:2000 Registered***

**June 17<sup>th</sup>, 2005**

## AUTHORIZATION

The work described in this report was authorized by David Boyd of Opticom Technologies Inc. on June 10<sup>th</sup>, 2005. The report was prepared by Paul Chong, P.Eng.



Paul Chong, P.Eng.  
Project Engineer

Dated at Vancouver, June 14<sup>th</sup>, 2005.

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## 1.0 INTRODUCTION

On June 10<sup>th</sup>, 2005 Weir-Jones Engineering Consultants Ltd. (WJEC) was retained by Opticom Technologies Inc. to perform a set of temperature tests on three of its Model CC-02-4.3 CCTV cameras. The primary objective in testing the cameras was to verify their functionality at low temperatures. This was done by powering down the units and cooling them to -40°C and -50°C and verifying that they power-up and function properly at the two temperatures. The testing of the units was performed on June 10<sup>th</sup>, 2005.

## 2.0 TEMPERATURE TEST EQUIPMENT

### 2.1 Test Equipment

The equipment required for the temperature tests was an environmental chamber (see Figure 1). The specifications of the chamber are as follows:

Manufacturer:	Envirotronics
Model:	Evh33-2-705
Temperature range:	-73°C to +177°C
Maximum transition rate:	7°C per minute
Controller:	manufactured by Micristar

The controller for the environmental chamber was calibrated on April 1<sup>st</sup>, 2005 by TMC Services Inc. in Elk River, Minnesota, using instruments there were traceable to NIST. The calibration certificate of the controller is provided in Appendix 1.



**Figure 1:** Weir-Jones Engineering Consultants Ltd. environmental chamber.

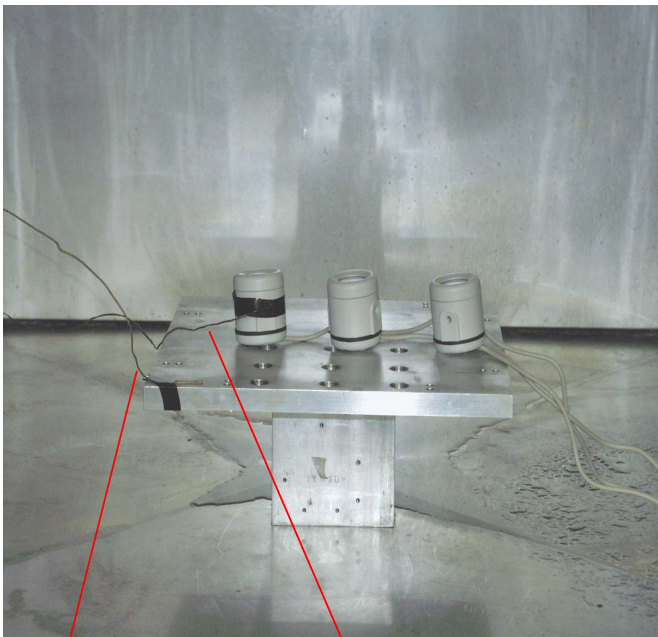
In addition to the Controller providing both dry-bulb and wet-bulb temperature readings, two external measurement devices were also used to display the ambient temperature inside the environmental chamber and also the temperature of the unit under test. The two measurement devices were:

- Fluke Model 80TK thermocouple module (S/N 6983158) for the display of the ambient chamber temperature.
- Fluke Model 80TK thermocouple module (S/N 6983164) for the display of the temperature of the unit under test.

The calibration certificates for the Fluke thermocouple modules are also provided in Appendix 1. The outputs from the thermocouple modules were recorded by a HP 34970A data acquisition unit at a sampling rate of one sample every five minutes.

## 2.2 Equipment Placement

The placement of the three Opticom CCTV cameras within the environmental chamber is shown in Figure 2. An external video monitor is placed outside the chamber in order to view the output from the cameras.



Thermocouple to monitor the temperature of the camera casing.

Thermocouple to monitor the ambient temperature within the chamber.

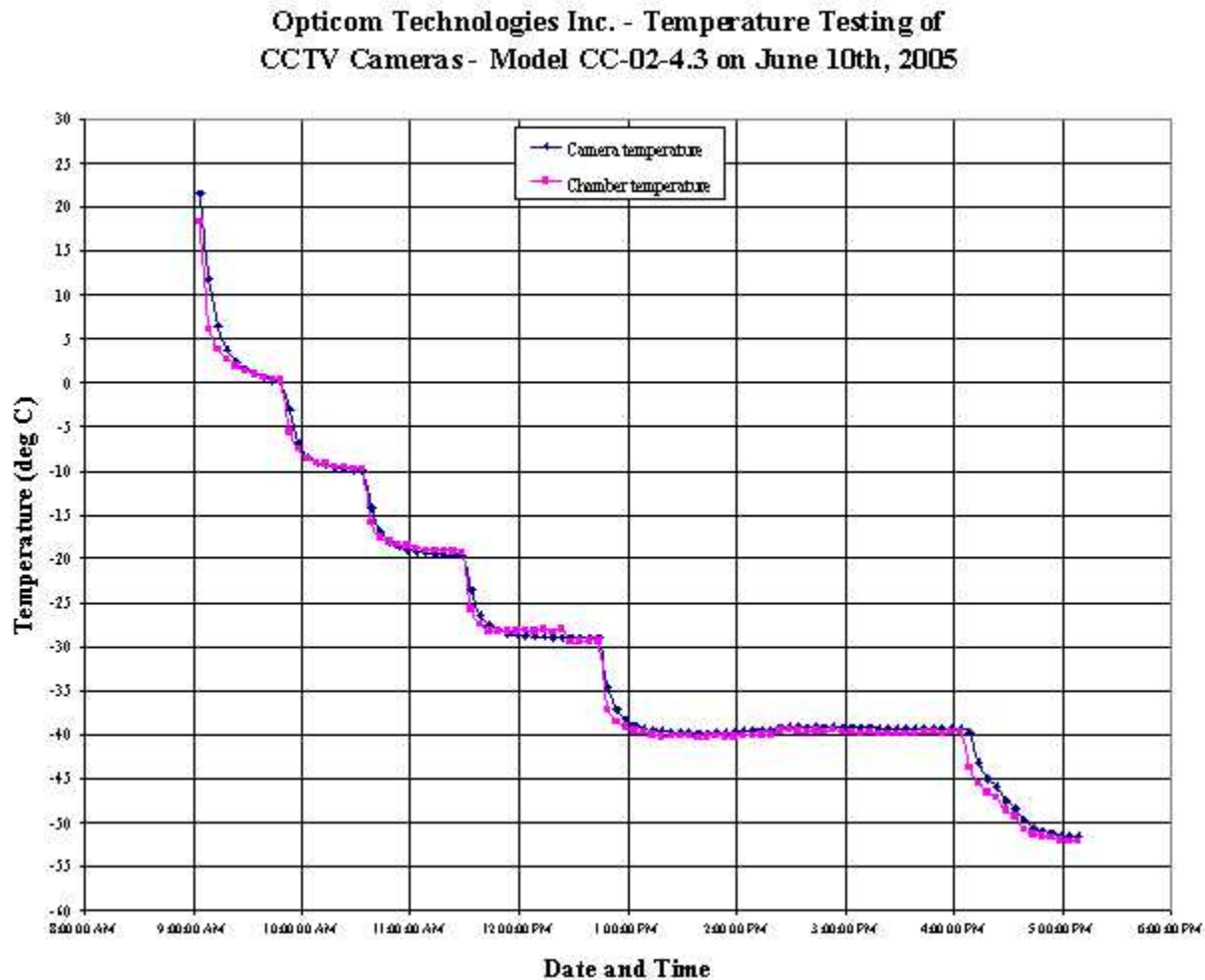


**Figure 2:** Placement of the CCTV cameras within the environmental chamber.

### 3.0 RESULTS

The graphical result for the temperature testing of the Model CC-02-4.3 CCTV cameras is presented in Figure 3. Based on the temperature measurements it can be seen that the temperature of the camera casing was cooled to  $-40^{\circ}\text{C}$  at around 13:00 on June 10<sup>th</sup> and allowed to soak at that temperature for approximately 3 hours. In addition, the temperature measurements also showed that the temperature of the camera casing was cooled to  $-50^{\circ}\text{C}$  at around 16:30 on June 10<sup>th</sup> and allowed to soak at that temperature for approximately 45 minutes.

The functionality of the three CCTV cameras was verified and witness by David Boyd of Opticom Technologies Inc. at the end of each temperature step by powering up the cameras and viewing the video output on the external monitor. In both temperature extremes, each camera powered up and provided video output to the external monitor. The results showed that all three CCTV cameras can operate at  $-40^{\circ}\text{C}$  and  $-50^{\circ}\text{C}$  and therefore will likely operate even when subjected to these temperatures for an external period.



**Figure 3:** Temperature testing results for the Model CC-02-4.3 CCTV cameras.

## ***APPENDIX 1: Calibration Certificates***

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## Certificate of Calibration

**Date of Calibration:** 4/1/05

**Model:** 828-D11-403-403-020-00

**Serial Number:** 10908

**RMA Number:** 20050311.1624

**Customer:** Weir Jones Engineering Consultants Ltd.

TMC Services, Inc. certifies that the instrument referenced above meets or exceeds all published specifications. The accuracy of the standards and instruments used to calibrate this unit are traceable to the National Institute of Standard and Technology. Instruments used in this calibration are as follows:

<u>Instrument</u>	<u>ID Number</u>	<u>Calibration Date</u>	<u>Calibration Due</u>
Meter	365	4/26/2004	4/26/2005
Millivolt Source	412	10/18/2004	10/18/2005
Temperature Meter	853	7/19/2004	7/19/2005
RTD Box			
RTD Box			

Certified By:

TMC Services, Inc.  
950 Highway 10, Suite 3  
Elk River, MN 55330

Phone: (763) 241-1456  
Fax: (763) 241-1829



# CERTIFICATE OF CALIBRATION

100075549

Certification Number

Issued By

## WESCAN CALIBRATION SERVICES INC.

#9 - 12240 Horseshoe Way  
Richmond, BC V7A 4X9  
Ph: (604) 275-0600  
Fax: (604) 275-0610



UKAS 8232 ANSI-RAB 10160

Certification Issued To: WEIR-JONES ENGINEERING CONSULTANTS  
2040 WEST 10TH AVENUE  
VANCOUVER, BC V6J 2B3

Issue Date: 03/10/2005

Purchase Order Number: 6378

Instrument ID: 6983164  
Manufacturer: FLUKE  
Serial Number: 6983164

Type: THERMOCOUPLE MODULE, FLUKE 80TK  
Model Number: 80TK  
Size: -5°C~1000°C/-58°F~1832°F

Date Instrument Calibrated: 03/10/2005

Date Next Calibration Due: 03/10/2006

Laboratory Temperature: 23 Deg C

Laboratory Humidity: 37%RH

Technician Performing Calibration: A.B

Calibration Procedure Used: T1115

Calibrated In: Wescan Calibration Services Richmond Laboratory

Approved

Date

03/10/05

Title

Wescan Calibration Services hereby certifies that the instrument identified above has been calibrated in accordance with the noted procedure and that this certificate applies only to the instrument identified above. This certificate may not be reproduced, except in full, without the prior written approval of Wescan Calibration Services Inc. All measurements performed are traceable to the Institute for National Measurement Standards, the National Institute of Standards and Technology, are derived from natural physical constants, from ratio measurements, or are compared with consensus standards. Where stated, measurement uncertainties represent expanded uncertainties expressed at approximately 95% confidence level with a coverage factor  $k = 2$ . Unless stated, the contribution to the measurement uncertainties of all measurement processes used in this calibration is less than 3% (corresponding to a TUR of 4:1 or better). If a calibration due date is provided, any number of factors may cause the instrument to drift, or otherwise fall out of tolerance before the calibration due date. Wescan Calibration Services' calibration system complies with the requirements of ISO/IEC 17025: 1999, ISO 9001:2000 and ANSI/NCSL Z540-1-1994.

See Attached Data Sheet For Additional Calibration Data

Cert Format: WESCAN01 revised 06/01/2004

# CERTIFICATE OF CALIBRATION

1000075551

Certification Number

Issued By

## WESCAN CALIBRATION SERVICES INC.

#9 - 12240 Horseshoe Way  
Richmond, BC V7A 4X9  
Ph: (604) 275-0600  
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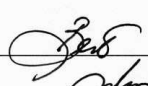
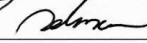
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Manufacturer : FLUKE  
Serial Number : 6983158

Type : THERMOCOUPLE MODULE, FLUKE 80TK  
Model Number : 80TK  
Size : N/A

Date Instrument Calibrated : 03/10/2005  
Laboratory Temperature : 23 Deg C  
Technician Performing Calibration : A.B

Date Next Calibration Due : 03/10/2006  
Laboratory Humidity : 37%RH  
Calibration Procedure Used : T1115

Calibrated In: Wescan Calibration Services Richmond Laboratory

Approved  Date 03/10/05  
Title 

Wescan Calibration Services hereby certifies that the instrument identified above has been calibrated in accordance with the noted procedure and that this certificate applies only to the instrument identified above. This certificate may not be reproduced, except in full, without the prior written approval of Wescan Calibration Services Inc. All measurements performed are traceable to the Institute for National Measurement Standards, the National Institute of Standards and Technology, are derived from natural physical constants, from ratio measurements, or are compared with consensus standards. Where stated, measurement uncertainties represent expanded uncertainties expressed at approximately 95% confidence level with a coverage factor  $k = 2$ . Unless stated, the contribution to the measurement uncertainties of all measurement processes used in this calibration is less than 3% (corresponding to a TUR of 4:1 or better). If a calibration due date is provided, any number of factors may cause the instrument to drift, or otherwise fall out of tolerance before the calibration due date. Wescan Calibration Services' calibration system complies with the requirements of ISO/IEC 17025: 1999, ISO 9001:2000 and ANSI/NCSL Z540-1-1994.

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