

# Certificate of Compliance

**Certificate:** 1365666

**Master Contract:** 175984(LR 108726)

**Project:** 1365666

**Date Issued:** April 3, 2003

**Issued to:** METTLER-TOLEDO (Albstadt)GMBH  
Unter dem Malesfelsen 34  
Albstadt-Ebingen, 72458  
GERMANY  
**Attention:** Mr. Heiko Carlos, Q. A. Manager

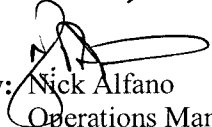
*The products listed below are eligible to bear the CSA Mark shown*



**Issued by:** Z. Grysz



**Authorized by:** Nick Alfano  
Operations Manager



## PRODUCTS

CLASS 9068 01 - SCALES - For Hazardous Locations

Class I, Groups C and D:

- Paint Mixing Scale system comprising of Power Supply Model PS-EX1P (located in non-hazardous area), input rated 120V ac, 50/60Hz, 120mA and providing intrinsically safe output for connection to scale, Model Panda 7/(b)X, located in Class I, Groups C and D, Temperature Code T4. I/O port connected per Installation drawing 71148389A.

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### APPLICABLE REQUIREMENTS

CSA Std C22.2 No.142-M1987 - Process Control Equipment  
CAN/CSA-C22.2 No.157-92 - Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations

### MARKINGS

- Company name
- Model number
- Serial number
- Electrical rating
- Hazardous locations designation
- CSA Monogram
- Temperature Code Rating (as applicable)
- The Symbol Exia
- The Symbol [Exia]
- The words "INTRINSICALLY SAFE/SECURITE INTRINSEQUE";
- The words "ASSOCIATED EQUIPMENT/APPAREILLAGE CONNEXE";
- A statement re Intrinsically Safe.
- Warning re substitution of components.



CSA INTERNATIONAL

## *Supplement to Certificate of Compliance*

**Certificate:** 1365666

**Master Contract:** 175984 (108726)

*The products listed, including the latest revision described below,  
are eligible to be marked in accordance with the referenced Certificate.*

### **Product Certification History**

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<b>Project</b>	<b>Date</b>	<b>Description</b>
1365666	April 3, 2003	Original Certification - Paint Mixing Scale system comprising of Power Supply Model PS-EX1P and Scale Model Panda 7/(b)X.



# Descriptive and Test Report

**MASTER CONTRACT:** 175984 (LR 108726)

**REPORT:** 1365666

**PROJECT:** 1365666

**Edition 1:** April 3, 2003; Project 1365666 - Toronto  
Issued by Z. Gryś

Contents: Certificate of Compliance - Pages 1 to 2  
Supplement to Certificate of Compliance - Page 1  
Description and Tests - Pages 1 to 6  
Descriptive Documents Package - Filed in CSA Engineering Main File Only  
Attachments – 3 (Engineering File Only)

## PRODUCTS

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Note: Suffix (b) is a code of maximum three letters used to indicate omission of indicator, software variants and mechanical variants, all not related to safety.

The test report shall not be reproduced, except in full, without the approval of CSA International.

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### **APPLICABLE REQUIREMENTS**

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### **Method of Marking**

- The required information is on self adhesive labels per Dwg Nos 71148754 and 22007858 and Installation Drawing 71148389.

- Two label types can be used and they are:

Tesa Laser Etikete 6930, acrylate 0.09mm thick with acrylate epoxy resin adhesive; manufactured by Beiersdorf, Hamburg, Germany.

Ground layer is white polyester B7626 by Brady, Denmark and transparent protective layer by 3M Type 7741.

Note: Both labels were tested for exposure to solvents with satisfactory results in previous Mettler Toledo projects.

### **ALTERATIONS**

- Markings as above.
- Power supply PCB per Dwg ME21200005 Rev.D shall have highlighted area coated twice with varnish No 1360.
- Power supply PS-EX1 power cord, shall have a metal cable clamp P/N 21301781 clamping the cord on inside of power supply enclosure (see Dwg ME-21201489A).

## **FACTORY TESTS**

1. The equipment at the conclusion of manufacture and before shipment, shall withstand for one min, without breakdown, the application of the following ac potentials:
  - (a) 1000V for equipment rated 250V or less, and 1000V plus twice rated voltage for equipment rated at more than 250V between low voltage live parts and the enclosure if such circuits leave or enter the enclosure;
  - (b) 1000V for equipment rated 250V or less, and 1000V plus twice rated voltage for equipment rated at more than 250V between live parts of low and extra-low voltage circuits and different low voltage circuits if such circuits leave or enter the enclosure;
  - (c) 500V between extra low potential live parts and exposed non-current-carrying metal parts or ground terminal, if such circuits leave or enter the enclosure.
2. A transformer, if provided, shall withstand for one min without breakdown, the application of an ac potential of 1000V plus twice the max voltage of the winding applied between each winding and all other windings, the core, and the enclosure; except that if the max voltage of a winding does not exceed 30V, the test voltage may be reduced to 500V ac for that winding. Ungrounded metallic shields are to be treated as windings when performing these dielectric strength tests.

### Notes:

1. As an alternative, potentials 20 percent higher may be applied for one second.
2. Where it is more convenient to do so, the dielectric strength tests may be made by applying a direct current voltage instead of an ac voltage, provided that the voltage used is 1.414 times the values specified above.
3. Capacitors in the secondary circuit may be disconnected during the dielectric strength tests specified in Items 1(a) to (c).
4. The test specified in Item 1(c) shall be waived on grounded or Class 2 circuits.
5. Transformer manufacturer's agreement to perform Test No 2 will be acceptable. Also, this test shall be waived on Certified transformers.

Warning: The factory test(s) specified may present a hazard of injury to personnel and/or property and should only be performed by persons knowledgeable of such hazards and under conditions designed to minimize the possibility of injury.

**Descriptive Documents:**

<u>Subject</u>	<u>Drawing</u>	<u>Rev.</u>	<u>Date</u>
Installation Dwg	71148389	A	31-07-02
Scale Label	71148754	A	14-11-02
Power Supply Label	22007858	A	27-09-02
Panda 7/X Overall Assy.	71147862	A	25-04-02
<u>Power Supply</u>			
Power Supply Assembly	22007866		13-08-02
BOM for Power Supply Assy.	22007866	-	23-04-96
Cord Set	ME-21201475B	-	8-06-01
DC Cable	71143900A		17-04-02
Schematic	ES-21201477	-	28-09-95
Power Supply PCB Layout	ME21201477	E	25-02-02
Power Supply PCB Artwork (2 pages)	CL-21200005C	C	12-09-93
Power Supply PCB Specifications	ME-21200005D	D	19-02-02
Power Supply PCB Component List(2 pages)	21201477	-	1-01-99
Transformer (2 pages)	ME21202009	-	20-03-96
<u>Scale</u>			
Schematic sheet 1	71143789AR01		25-04-02
Schematic sheet 2	71143789AR02		29-02-02
PCB Board Assy. Layout	71143790AA01		25-04-02
PCB Board Assy. Layout	71143790AA02		25-04-02
PCB Trace Layout	71143789AC01		25-04-02
PCB Trace Layout	71143789AC02		25-04-02
Display PCB Schematic	CC867a	A	16-05-02
Display PCB Layout	71145898AA		25-04-02
Display PCB Parts List	CMT-PC867UPSY-N		31-05-02
Display PCB Trace Layout	71145898BC		25-04-02
Display Cable	71147034A		10-05-02
Grounding Cable	71147033A		10-05-02
Keypad	71148316A		25-04-02
Display Housing Rear	71146549A		25-04-02
Display Housing Front	71146548A		25-04-02
Rotation Joint	71146551A		25-04-02
Stand Base	71149615A		8-08-02
Stand Base Cap	71149615A		8-08-02
<u>Load Cell</u>			
Assembly			
Layout	71142734A		1-05-02
Factory Mutual Report	71125514B		9-08-02

Note: Above drawings filed in CSA Engineering Main File and same drawings shall be made available by the submitter at the factory designated for CSA certification/inspection purposes.

## DESCRIPTION

General: The above is a paint mixing scale system where the power supply PS-EX1P is located in the safe area (non-hazardous locations) and it provides intrinsically safe output for connection to table top Panda 7/(b)X scale located in hazardous location.

Power supply Model PS-EX1P and paint mixing scale Model Panda 7/(b)X are constructed per drawing list under Descriptive Documents and supplemented by Factory Mutual Research Reports J.I. 0B1A1.AX (Att.1), 3012766 (Att.2) and 3015308 (Att.3) (Engineering File only).

### Paint Mixing Scale Model Panda 7/(b)X:

1. Temperature Code Rating: C22.2 No. 157-M1992, Cl. 6.3

Temperature code rating tests were waived due to insignificant heating of components considering maximum power dissipation is equal or less than 2/3 of component ratings with possible faults applied. Temperature Code of T4 assigned by manufacturer is considered to be acceptable for this purpose. Refer to item 2 below for calculations.

2. Protective Components Rating: C22.2 No. 157-M1992, Cl. 4.4.2

- 2.1.1 Resistors, R6//R7; R8//R9; R11// R12, rated 180  $\Omega$ , 2W, 5%:

$$\begin{aligned} I_{R6} &= \frac{14.3 \text{ V}}{85.5 \Omega} \\ &= 0.167\text{A} / 2 \\ &= 83.5\text{mA} \\ P_{R6} &= 83.5\text{mA}^2 \times 180 \Omega \\ &= 1.26\text{W} < 2/3 \text{ of rating.} \end{aligned}$$

- 2.1.2 Resistors, R1 and R2, rated 220  $\Omega$ , 1/4 W, 5%:

Note: Output to RS232 Data I/O connected to 9V, 350  $\Omega$  barrier.

$$\begin{aligned} P_{R1} &= \frac{9 \text{ V}}{350 + 209 \Omega} \\ &= 0.016\text{A}^2 \times 220 \Omega \\ &= 0.057\text{W} < 2/3 \text{ of rating.} \end{aligned}$$



2.2.1 Zener Diodes, D24 and D25, rated 8.2V, 3W, 5%

$$P_{D24} = (14.3V/90 \Omega)A \times 8.61V \\ = 1.37W < 2/3 \text{ of rating}$$

2.2.2 Zener Diodes, D23 and D26, rated 5.1V, 5W, 5%

$$P_{D23} = (14.3V/90 \Omega)A \times 5.35V \\ = 0.86W < 2/3 \text{ of rating}$$

3. Spark Ignition: C22.2 No. 157-M1992, Cl. 6.2

3.1 Capacitance Evaluation:

3.1.1 **Analog circuit** lump-sum capacitance is 12uF, inclusive of tolerance. Permissible capacitance based on Max. voltage of 8.6V (D24/D25) with 1.5 safety factor was determined to be 15uF for Group C per Figure 9 of Std. C22.2 No 157.

3.1.2 **Digital circuit** lump-sum capacitance is 110uF, inclusive of tolerance. Permissible capacitance based on Max. voltage of 5.4V (D23/D26) with 1.5 safety factor was determined to be 1000uF for Group C per Figure 9 of Std. C22.2 No 157

3.1.3 **Backlight circuit** lump-sum capacitance is 1.2uF, inclusive of tolerance. Permissible capacitance based on Max. voltage of 14.3V (V<sub>o</sub> of PS-EX1P) with 1.5 safety factor was determined to be 3uF for Group C per Figure 9 of Std. C22.2 No 157

Spark ignition tests involving Data I/O cable capacitance of 2nF (10m), and 0.3uF of above effective capacitance were waived based on the lump-sum capacitance of 0.3uF being acceptable under Capacitance Circuits Ignition curves at 9V (9V barrier to Data I/O), plus 1.5 safety factor, under Groups C where a max. permissible capacitance of 12uF.

**I/O data cable** capacitance of 2nF (10m) is considered to be acceptable when connected to I/O zener barrier rated 9V max. Permissible capacitance for Group C per Figure 9 of Std. C22.2 No 157 is 4.5uF based on 9V and 1.5 safety factor.

3.2 Inductance: Circuit inductance is negligible.

**Power supply Model PS-EX1P**

Evaluation and testing conducted in CSA Report 158035-1240591 and supplemented by Factory Mutual Research Reports J.I. 0B1A1.AX (Att.1), 3012766 (Att.2) and 3015308 (Att.3) is considered acceptable for this application.