



**Australian Government**  

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**National Measurement  
Institute**

12 Lyonpark Road, North Ryde NSW 2113

**Certificate of Approval**

**No 13/1/10**

Issued by the Chief Metrologist under Regulation 60  
of the  
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the

Mettler Toledo Model Cargoscan CS900 Dimensional Measuring Instrument

submitted by Mettler Toledo Limited  
220 Turner Street  
Port Melbourne VIC 3207.

**NOTE:** This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

**CONDITIONS OF APPROVAL**

This approval becomes subject to review on 1 April 2010, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked with approval number 'NMI 13/1/10' and only by persons authorised by the submittor.

It is the submitter's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

The National Measurement Institute reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

**Special:**

Instruments are only approved for use for determination of the dimensions of a rectangular box and for the calculation of volume and/or 'dimensional weight' value of the item, for the purposes of determining freight or postal charges.

The dimensions determined may also be used for the calculation (by peripheral equipment) of a volume and/or 'dimensional weight'(\*) value of the object, also for the purposes of determining freight or postal charges.

(\*) A 'dimensional weight' value is a calculated value deemed to be a weight value obtained by applying a conversion factor to the object's volume.

DESCRIPTIVE ADVICE

**Pattern:** approved 21 March 2005

- A Mettler Toledo model Cargoscan CS900 dimensional measuring instrument.

Technical Schedule No 13/1/10 describes the pattern.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 13/1/10 dated 11 July 2005  
Technical Schedule No 13/1/10 dated 11 July 2005 (incl. Test Procedure)  
Figures 1 and 2 dated 11 July 2005

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the National Measurement Regulations 1999.

A handwritten signature in black ink, appearing to be 'J. H. T.', located in the bottom right corner of the page.

## TECHNICAL SCHEDULE No 13/1/10

**Pattern:** Mettler Toledo Model Cargoscan CS900 Dimensional Measuring Instrument

**Submittor:** Mettler Toledo Limited  
220 Turner Street  
Port Melbourne VIC 3207

### 1. Description of Pattern

A Mettler Toledo model Cargoscan CS900 dimensional measuring instrument (Figure 1) which is approved for use for the determination of the linear dimensions of certain objects while they are in motion.

Instruments may be fitted with output sockets (output interfacing capability) for the connection of auxiliary and/or peripheral devices.

#### 1.1 Details

The pattern is approved for use for the determination of the linear dimensions of objects having maximum dimensions (i.e. length x width x height) of 100 x 90 x 92 cm and minimum dimensions 10 x 10 x 10 cm, with a scale interval of measurement (d) of 10 mm, with a belt speed ( $V_{max}$ ) from 30 to 70 m/min.

The pattern is approved for use in measuring the linear dimensions of opaque rectangular box-shaped objects (rectangular parallelepiped – #) only; the dimensions determined may also be used for the calculation of volume and/or 'dimensional weight' value (\*) of the item (refer to the Special Condition of Approval).

(#) A rectangular box (rectangular parallelepiped) is a polyhedron having six faces that are parallel in pairs; each face is a parallelogram and adjacent edges are perpendicular.

(\*) A '**dimensional weight**' value is a calculated value deemed to be a weight value obtained by applying a conversion factor to the object's volume as calculated from the measured dimensions.

#### 1.2 Dimensioning Unit

The pattern includes a Cargoscan model CS900 dimensioning unit mounted on a supporting frame above a belt-conveyor type load receptor (Figure 1 shows a typical conveyor arrangement). Within this dimensioning unit there are two dimensioning heads each consisting of a laser diode based range finder that scans the object (forming a 'light curtain') via an optical scanning mechanism consisting of a rotating polygon with 6 mirrors and mirror arrangement including a curved mirror. The laser range finders determine data regarding the profile of the object as it passes beneath the dimensioning unit. Data from the laser range finders and from the pulse generator (see cl. **1.3 Pulse Generator**) is analysed by the CPUs to determine the linear dimensions of the object.

### 1.3 Pulse Generator

A Leine & Linde model 54004621-2500 pulse generator provides information regarding the belt speed which is used in the data analysis by the CPU to determine object length.

### 1.4 Indicator/Control Panel

The Cargoscan model CS2200 indicator/control panel (Figure 2) shows the length, width and height in cm. This indicator/control panel also displays a volume in dm<sup>3</sup> of each object being measured.

Note: For charging purposes, calculations involving volume should use volume calculated from the length x width x height rather than the displayed volume (for small objects the rounding of the displayed volume may result in excessive relative errors).

The instrument has a number of alarm functions which display error messages if the object is too big, too small, outside the measurement field, too reflective, etc. An explanation of alarm functions and error messages is given in the instrument manual.

### 1.5 Peripheral Calculation, Storage or Printing Devices

As indicated in the Special Conditions of Approval, this approval includes the possibility of peripheral equipment being used to calculate, store or print a 'dimensional weight' and/or a postal or freight charge, in addition to the linear dimensions and volume.

Although this approval does not describe specific peripheral equipment, various equipment may be used provided that at verification/certification it will be necessary for the correct operation of this peripheral equipment to be determined, as follows:

(i) Calculation of volume (see note under cl. **1.4 Indicator/Control Panel**):

The volume shall be shown in m<sup>3</sup> with at least four digits after the decimal place rounded to the nearest digit (e.g. 11 cm x 10 cm x 11 cm = 0.00121 m<sup>3</sup> – this would round to 0.0012 m<sup>3</sup> (4 digits).

Alternatively the volume may be shown in dm<sup>3</sup> with at least one digit after the decimal place, rounded to the nearest digit (e.g. 11 cm x 10 cm x 11 cm = 1.21 dm<sup>3</sup> – this would round to 1.2 (1 digit).

(ii) Calculation of 'dimensional weight' where necessary.

'Dimensional weight' = Conversion factor x Volume

Note: the conversion factor shall be displayed or printed by the peripheral equipment.

The 'dimensional weight' value shall be shown with an appropriate number of significant digits. This can be determined by calculating 10% of the minimum dimensional weight (i.e. 10% of minimum volume multiplied by the conversion factor) – the 'dimensional weight' value should not be rounded to less than the resulting value.

For example the minimum volume is 10 cm x 10 cm x 10 cm = 0.001 m<sup>3</sup> if the conversion factor is 167 kg/m<sup>3</sup> the minimum 'dimensional weight' will be 0.167 kg, 10% of this is 0.0167 kg. The 'dimensional weight' value should be rounded to three digits (the nearest 0.001 kg), but should not be rounded to 1 digit.

### 1.6 Sealing Provision

Provision is made for the calibration adjustments in the Cargoscan model CS2200 indicator/control panel to be sealed by means of an electronic sealing feature which is password protected. A four digit event counter records every time the electronic seal is opened; the counter resets to '1' when it passes 9999 counts. By noting the value of the event counter at the time of verification/certification it is possible to verify if the seal has been opened since the previous verification/certification.

Alternatively, the sealing dipswitch inside the Cargoscan model CS2200 indicator/control panel may be set to the ON position and then the indicator housing sealed by means of destructible adhesive labels.

### 1.7 Descriptive Markings and Notices

(a) Instruments carry the following markings:

Manufacturer's mark, or name written in full	Mettler Toledo Limited
Model designation	Cargoscan CS900
Serial number of the instrument	.....
Year of manufacture	.....
Pattern approval mark	NSC 13/1/10
Maximum dimensions for each axis	Max ..... cm
Minimum dimensions for each axis	Min ..... cm
Scale interval	d = ..... cm
Maximum belt speed	..... m/min
Minimum belt speed	..... m/min

(b) Instruments shall carry appropriate notices regarding restrictions on use. For example:

- Place object with most stable surface down.
- TO BE USED FOR MEASURING RECTANGULAR BOXES ONLY, or similar wording.

### 1.8 Verification/Certification Provision

Provision is made for the application of a verification/certification mark.

## TEST PROCEDURE

Note: Printed and displayed information must be made available for verification/certification and must comply with the requirements set out in NSC Document NSC R129.

### **Maximum Permissible Error at Verification/Certification**

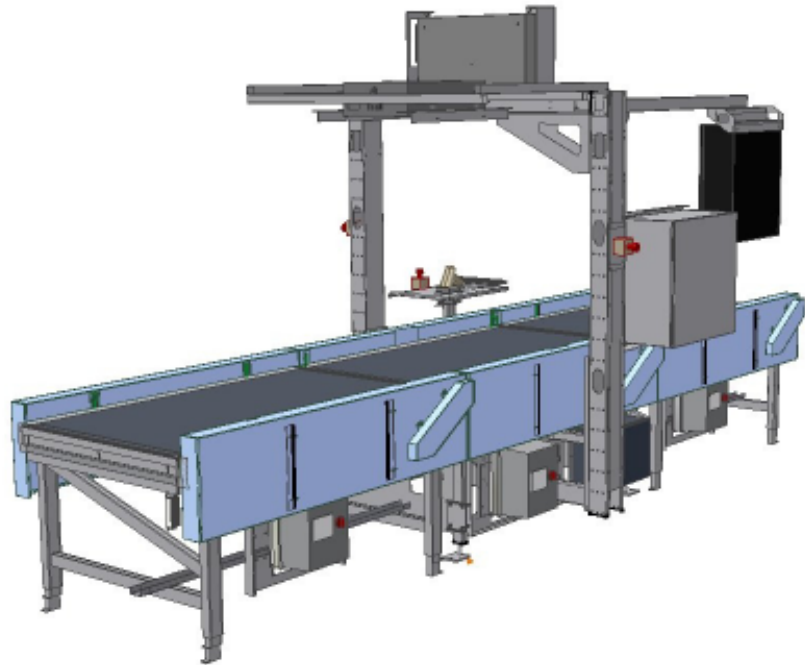
The maximum permissible error at verification/certification is:

$\pm 1.0$  cm for lengths from the minimum length to any value up to and including the maximum length capacity of the instrument.

Instruments shall be tested as follows:

- (a) Test objects shall be used of known lengths such that each axis (i.e. length x width x height) is tested for at least five dimensions between and including the minimum and maximum lengths specified on the instrument nameplate. Each test object shall be rigid and with well-defined edges to simulate the edges of a rectangular box. The lengths shall be known to an uncertainty equal to or better than  $\pm 2$  mm.
- (b) Carry out at least three test runs for each length. Each measurement shall be within the maximum permissible error.
- (c) Check that instruments carry one or more notices stating **TO BE USED FOR MEASURING RECTANGULAR BOXES ONLY**, or similar wording.

FIGURE 13/1/10 – 1



Mettler Toledo Model Cargoscan CS900 Dimensional Measuring Instrument

13/1/10  
11 July 2005

FIGURE 13/1/10 – 2



Cargoscan Model CS2200 Indicator/Control Panel