13/2/1A
13 April 2011

Australian Government
National Measurement Institute

Bradfield Road, West Lindfield NSW 2070

Cancellation

Certificate of Approval

No 13/2/1A

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

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

Mettler Toledo Model SpaceWeigh 2000 Automatic Catchweighing and Dimensional Measuring Instrument

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

has been cancelled in respect of new instruments as from 1 May 2011.

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

13/2/1A
16 December 2002

National Standards Commission

12 Lyonpark Road, North Ryde NSW

Certificate of Approval

No 13/2/1A

Issued 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 SpaceWeigh 2000 Automatic Catchweighing and Dimensional Measuring Instrument

submitted by Mettler Toledo Limited
220 Turner Street
Port Melbourne VIC 3027.

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.

This Certificate is issued upon completion of a rveiew of NSC approval No 13/2/1.

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CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 October 2007, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked NSC No 13/2/1A and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the Commission 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 the Commission's Document NSC P 106.

The Commission 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.

DESCRIPTIVE ADVICE

Pattern: approved 10 September 2002

- A Mettler Toledo model SpaceWeigh 2000 automatic catchweighing and dimensional measuring instrument. May also be known as a model SW2000.

Variants: approved 10 September 2002

1. As a catchweighing and dimensional measuring instrument, with the catchweighing system having a maximum capacity of 50 kg.
2. Without the catchweighing system.
3. As a dimensional measuring instrument using a Cargoscan model CS5043 dimensioning frame.

Technical Schedule No 13/2/1A describes the pattern and variants 1 to 3.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 13/2/1A dated 16 December 2002
Technical Schedule No 13/2/1A dated 16 December 2002 (incl. Test Procedure)
Figures 1 to 6 dated 16 December 2002

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.

TECHNICAL SCHEDULE No 13/2/1A

Pattern: Mettler Toledo Model SpaceWeigh 2000 Automatic Catchweighing and Dimensional Measuring Instrument

Submittor: Mettler Toledo Limited
220 Turner Street
Port Melbourne VIC 3027

1. Description of Pattern

A Mettler Toledo model SpaceWeigh 2000 automatic catchweighing and dimensional measuring instrument (Figure 1) which is approved for use to weigh and to measure the linear dimensions of certain objects while in motion. Instruments may also be known as model SW2000.

1.1 Details

The pattern is approved for use as a class Y(a) or class Y(b) automatic catchweighing instrument with a maximum capacity of 100 kg and with a verification scale interval (*e*) of 0.1 kg. The pattern is approved to measure the linear dimensions of objects having maximum dimensions (i.e. length x width x height) of # x 92 x 90 cm and minimum dimensions of 20 x 10 x 10 cm, with a scale interval (*d*) of 1 cm. The maximum conveyor speed is 49 m/min and the minimum conveyor speed is 12 m/min.

(#) The maximum length object that can be **measured** is limited by the maximum length object that can be **weighed** which is determined by the formulae included in the Test Procedure, and is related to the length of the load receptor conveyor, the number of packages per minute, and the conveyor speed. When the longest conveyor (1500 mm) is used at the minimum conveyor speed (12 m/min), then the maximum length object is approximately 1440 mm.

The pattern is fitted with a belt-conveyor-type load receptor of either 900, 1200 or 1500 mm in length and includes an infeed conveyor system, a dimensioning frame, a system controller, an operator console, a high speed junction box, and a number of indicators. A bar code reader and a printer may also be fitted.

1.2 Operation

An object moving on the conveyor first passes through the dimensioning frame where a grid of infra-red lights detects the overall width and height of the object before it moves onto the load receptor. The length of the object is determined as a function of the time taken to pass through the frame and the conveyor speed. The system controller converts the detected characteristics into the linear dimensions of the smallest rectangular box (parallelepiped – *) that would fully contain the object. From these dimensions the volume is calculated; from this volume, a **'deemed** weight' (DW ... kg) is determined by means of a conversion factor.

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

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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. Reference should be made to the explanation of alarm functions as set out in the Cargoscan/ Mettler Toledo publications *CS5000 and CS5000HS Measuring Frames Operator's Manual* and *Dimension and Weigh Controller Technical Manual*.

1.3 Dimensioning Frame

The Cargoscan model CS5000 dimensioning frame has a measuring field of 960 x 960 mm.

1.4 Catchweighing System

The Mettler Toledo model 9476 catchweighing system is approved for use as a class Y(a) or class Y(b) automatic catchweighing instrument with a maximum capacity of 100 kg and with a verification scale interval (e) of 0.1 kg. The load receptor has maximum nominal dimensions of 920 mm in width and either 900, 1200 or 1500 mm in length; it uses 4 HBM model Z6FD1 load cells of 200 kg maximum capacity mounted as shown in Figure 2.

The model 9476 system may be fitted with either a single (fixed) speed or a variable speed drive. The maximum conveyor speed is 49 m/min and the minimum conveyor speed is 12 m/min.

1.5 System Controller

A Mettler Toledo model DC2000 system controller (utilising QNX software) processes data from the tachometers, the model 9410 junction box, the measuring frame and the load cells and sends this to the indicators. The controller causes error messages to be displayed and also, when a variable speed drive is fitted, controls the speed of the conveyor.

1.6 Operator's Console

The operator's console consists of a conventional computer keyboard in a Mettler Toledo housing. The operator display is the same as the system indicator shown in Figure 6.

1.7 Junction Box

A Mettler Toledo model 9410 high speed junction box (Figure 3) performs in-motion weighing algorithms and produces the averaged weight of the package to the Mettler Toledo intelligent interfacing device. The 9410 interfaces directly to the load cells providing the load cell excitation voltage and converting the load cell analog output into a digital mathematically calculated in-motion weight.

1.8 Indicators

The following indicators are fitted:

(i) a weight indicator (Figure 4) displaying the static weight in kg;

(ii) a dimensional indicator (Figure 5) showing the length, width and height in cm, and the volume in dm^3; and

(iii) a system indicator (Figure 6) which shows the length, width and height in cm, and also displays the dynamic weight (in kg) at the top right-hand display. The bottom right-hand display shows the **'deemed** weight' (DW ...kg). The volume to **'deemed** weight' conversion factor (F) may be displayed when in SET-UP mode, by using the procedure set out in the Cargoscan/Mettler Toledo publication *Dimension and Weigh Controller Technical Manual*.

1.9 Verification/Certification Provision

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

1.10 Sealing Provision

Provision is made for the calibration adjustments to be sealed by means of lead and wire seals on the junction box housing (Figure 3) and by means of a destructible label on the dimensional indicator (Figure 5).

1.11 Markings

Instruments carry the following markings:

(a) For the complete system:

Manufacturer's mark, or name written in full	.....
Model designation	.....
Serial number	.....

(b) For the catchweighing system:

Manufacturer's mark, or name written in full	.....
Model designation	.....
Serial number	.....
Year of manufacture	
Pattern approval mark	NSC No 13/2/1A
Indication of accuracy class	Class Y(a) [or Y(b)]
Maximum capacity	*Max* .... kg
Minimum capacity	*Min* ..... kg
Verification scale interval	*e* = ... kg
Maximum conveyor speed (if multiple speed drive)	49 m/min
Minimum conveyor speed (if multiple speed drive)	12 m/min
Fixed conveyor speed (if single speed drive)	..... m/min
Maximum object length	..... cm (*)

(*) To be determined and marked at verification/certification.

(c) For the dimensional measuring system:

Manufacturer's mark, or name written in full	.....
Model designation	.....
Serial number	.....
Year of manufacture	.....
Pattern approval mark	NSC No 13/2/1A
Maximum object length	*Max* ..... cm (*)
Maximum object width	*Max* ..... cm
Maximum object height	*Max* ..... cm
Minimum object length	*Min* ..... cm
Minimum object width	*Min* ..... cm
Minimum object height	*Min* ..... cm
Scale interval	*d* = 1 cm
Maximum conveyor speed (if multiple speed drive)	49 m/min
Minimum conveyor speed (if multiple speed drive)	12 m/min
Fixed conveyor speed (if single speed drive)	..... m/min

(*) To be determined and marked at verification/certification.

In addition, instruments shall carry a notice stating THE OBJECT MUST BE STABLE WHILST PASSING THROUGH THE MEASURING FRAME, or similar wording.

2. Description of Variants

2.1 Variant 1

As an automatic catchweighing (class Y(a) or class Y(b)) and dimensional measuring instrument, with the catchweighing system having a maximum capacity of 50 kg and with a verification scale interval of 0.1 kg.

2.2 Variant 2

Without the catchweighing system in which case instruments are used only for dimensional measuring.

The Cargoscan model CS5000 dimensioning frame is approved for use within the limits specified in the description of the pattern and shall be installed in accordance with the manufacturer's instructions – see Cargoscan/Mettler Toledo publications *Mechanical Designers Manual* and *Cargoscan Service & Installation Manual*.

The maximum length object that can be **dimensionally measured** is equal to the length of the infeed conveyor or the length of the outfeed conveyor, whichever is the smaller.

2.3 Variant 3

As a dimensional measuring instrument using a Cargoscan model CS5043 dimensioning frame.

Instruments are approved for use with a maximum conveyor speed of 150 m/min. The maximum length object that can be **dimensionally measured** shall be marked on the instrument and may be greater than the length of the infeed conveyor or the length of the outfeed conveyor, provided that additional conveyors are provided on the infeed and/or outfeed sides which are correctly aligned so as to minimise any disturbance of the object as it moves between conveyors.

TEST PROCEDURE

The maximum length object that can be measured is to be determined at verification/ certification and marked on the instrument nameplate.

The maximum length object that can be **weighed** is determined by the following:

Conveyor Belt Speed (CBS) = Pitch x Packages per minute

where Pitch = Load Receptor Conveyor Length (CL) + 50 mm

$$\text{Weigh Time (WT)} = \frac{\text{(Conveyor Length (CL) - Object Length (OL))}}{\text{Conveyor Belt Speed (CBS)}}$$

Solving for Object Length: OL = CL - (WT x CBS)

For catchweighing and dimensional measuring instruments (the pattern and variant 1), the maximum length object that can be **measured** is limited by the maximum length object that can be **weighed**.

For variant 2 dimensional measuring instruments, the maximum length object that can be **dimensionally measured** is equal to the length of the infeed conveyor or the length of the outfeed conveyor, whichever is the smaller.

For variant 3 dimensional measuring instruments, the maximum length object that can be **dimensionally measured** may be greater than the length of the infeed conveyor or the length of the outfeed conveyor provided the conditions set out in clause **2.3 Variant 3** are met.

Static Weighing – the weight indicator (Figure 4) should be used.

The maximum permissible errors for increasing and decreasing loads on initial verification/certification for loads, m, expressed in verification scale intervals, e, are:

$\pm 0.5e$ for loads $0 \leq m \leq 500$; and
$\pm 1.0e$ for loads $500 < m \leq 2\,000$.

- With the conveyor switched off, carry out a load test and an eccentricity test.

Dynamic Weighing – the system indicator (Figure 6) should be used.

The maximum permissible errors for a class Y(a) catchweighing instrument for increasing and decreasing loads on initial verification/certification for loads, *m*, expressed in verification scale intervals, *e*, are:

±1.5*e* for loads $0 \leq m \leq 500$; and
±2*e* for loads $500 < m \leq 2\,000$.

The maximum permissible errors for a class Y(b) catchweighing instrument for increasing and decreasing loads on initial verification/certification for loads, *m*, expressed in verification scale intervals, *e*, are:

±1.5*e* for loads $0 \leq m \leq 50$;
±2*e* for loads $50 < m \leq 200$; and
±2.5*e* for loads $200 < m \leq 1000$;

- With the conveyor running, apply two test objects approximately equal to 10% and 80% of the maximum weighing capacity. The masses of the test objects shall be measured on a verified, non-automatic weighing instrument with an uncertainty equal to or better than 0.5*e*.
- Vary the position of the test objects across the receptor.
- Check that the indication of weight on the system indicator (top right-hand indication) is within the maximum permissible error.

Note: Use Commission document *NSC P 104, Test Procedure for the Elimination of Rounding Error for Weighing Instruments with Digital Indication* to determine compliance with the maximum permissible errors.

Dimensional Measuring

The maximum permissible error at verification/certification, expressed in terms of scale interval, *d*, is:

±1.0*d* for lengths from the minimum length to any value up to and including the maximum length capacity of the instrument.

- Test objects shall be used, in the shape of rectangular boxes with known linear dimensions 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 dimensions (approximately) specified on the instrument nameplate. Each test object shall be opaque, rigid and with flat faces and well-defined edges. All adjacent faces and edges shall be perpendicular to each other. The dimensions shall be equal to Nd and known to an uncertainty equal to or better than ±1/3*d* using a verified length standard. N is a whole number.

- Vary the position across the receptor, and the orientation of the test objects so that each axis is tested for the five dimensions.
- Tests shall be conducted at both the minimum and maximum conveyor speeds, or at the specified single speed, as marked on the instrument nameplate.
- Check that the dimensions indicated on the dimensional indicator (Figure 5) are within the maximum permissible error, i.e. the display is either N*d* or (N±1)*d*. Check that the dimensions indicated on the dimensional indicator are repeated on the system indicator.
- Check that the volume indicated on the dimensional indicator is equal to the volume calculated using the displayed dimensions rounded to the nearest 0.1 dm^3.
- Check that the **'deemed** weight' indicated on the system indicator is equal to the **'deemed** weight' calculated using the displayed volume and the conversion factor (F) rounded to the nearest DW 0.1 kg.

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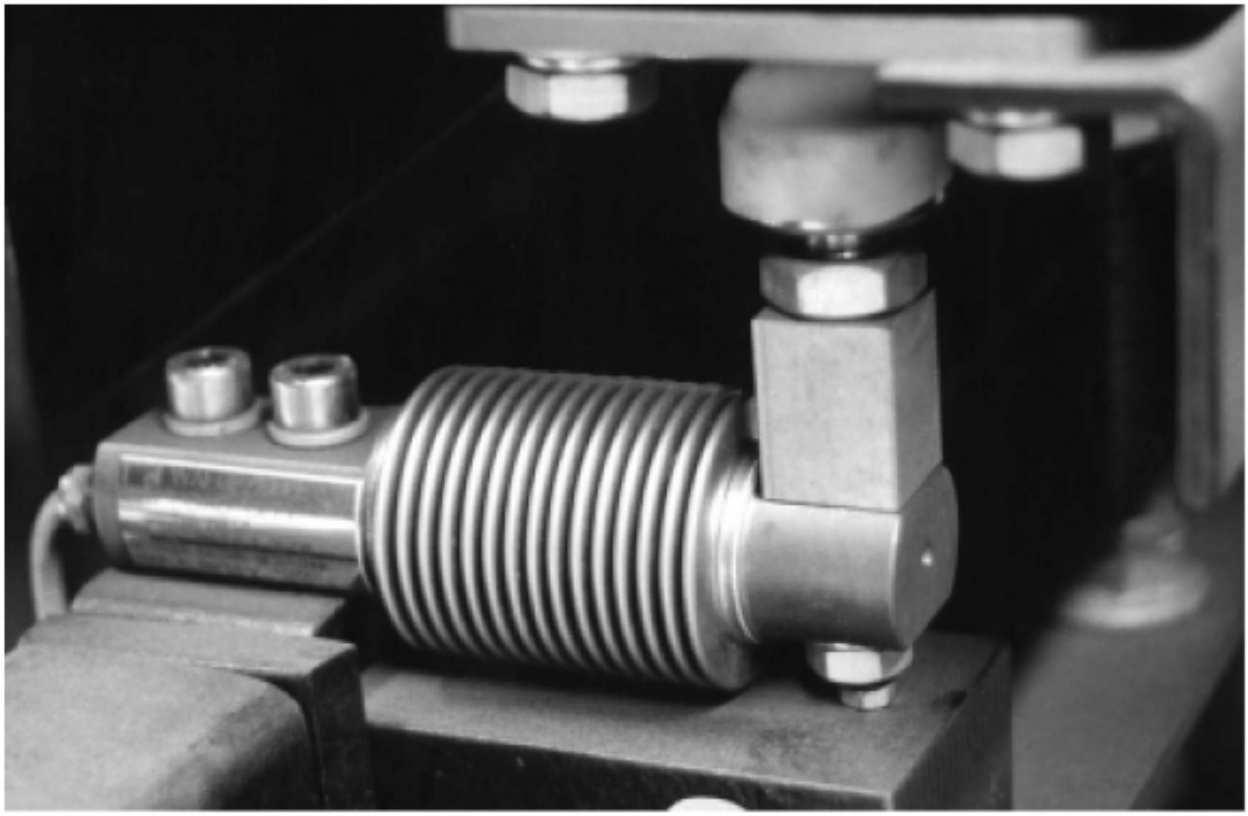
FIGURE 13/2/1A - 1

Mettler Toledo Model SpaceWeigh 2000

FIGURE 13/2/1A - 2



Showing Load Cell Mounting

FIGURE 13/2/1A - 3

Model 9410 Junction Box

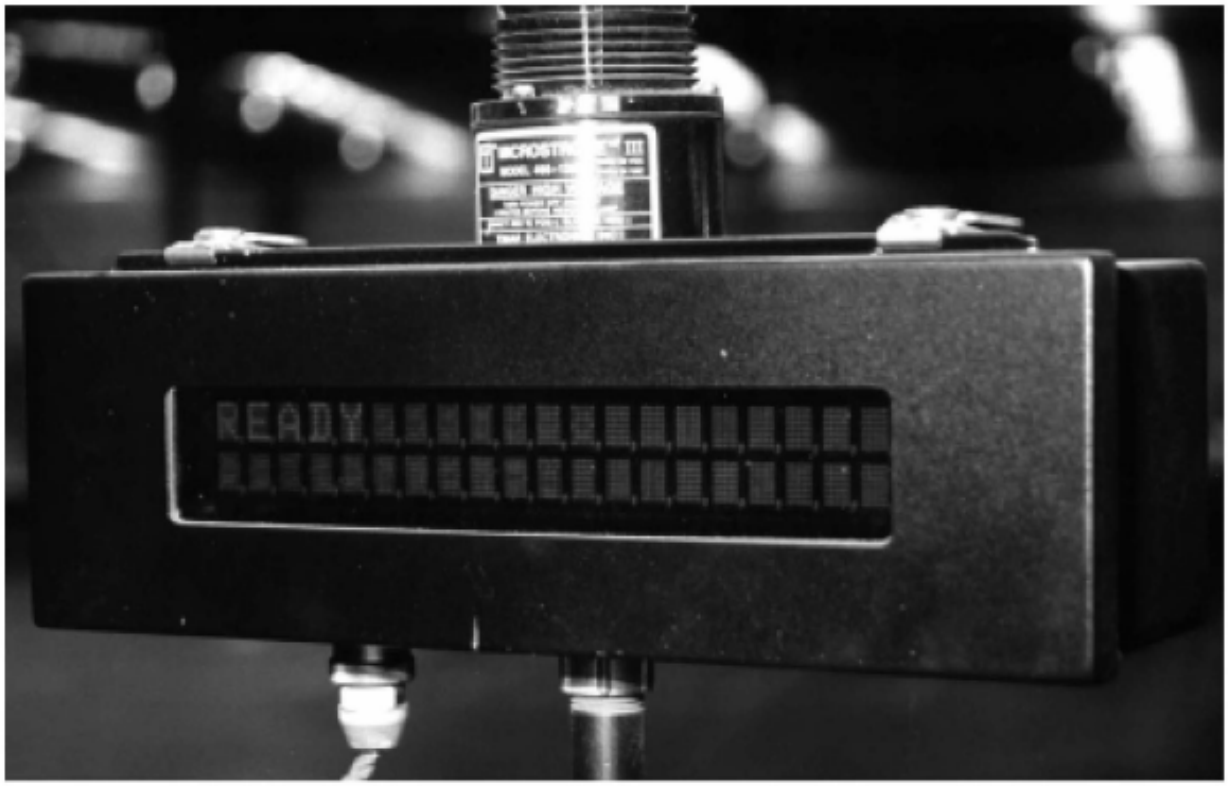
FIGURE 13/2/1A - 4

Weight Indicator

FIGURE 13/2/1A - 5

Dimensional Indicator

FIGURE 13/2/1A - 6



System Indicator