



Australian Government

National Measurement
Institute

Bradfield Road, West Lindfield NSW 2070

Supplementary Certificate of Approval

No S502

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 instruments herein described.

Mettler Toledo Model IND780 Digital Indicator

submitted by Mettler Toledo Limited
 Unit 3, 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.

This approval has been granted with reference to document NMI R 76, *Non-automatic weighing instruments, Parts 1 and 2*, dated July 2004.

This approval becomes subject to review on **1/12/18**, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	9/11/07
1	Pattern approved – certificate issued	19/11/07
2	Variant 1 approved – certificate issued	27/07/09
3	Variant 2 approved – certificate issued	22/04/10
4	Pattern & variants 1 & 2 amended, reviewed & updated – certificate issued	25/07/13

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI S502' and only by persons authorised by the submitter.

Instruments incorporating a component purporting to comply with this approval shall be marked 'NMI S502' in addition to the approval number of the instrument, and only by persons authorised by the submitter.

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.

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

The values of the performance criteria (maximum number of scale intervals etc.) applicable to an instrument incorporating the pattern approved herein shall be within the limits specified herein and in any approval documentation for the other components.

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



Dr A Rawlinson

TECHNICAL SCHEDULE No S502

1. Description of Pattern

approved on 9/11/07

Mettler Toledo model IND780 digital mass indicator (Figure 1 and Table 1) which may be configured to form part of:

- A class III weighing instrument with a single weighing range of up to 10 000 verification scale intervals; or
- A class III multiple range weighing instrument with up to three weighing ranges, in which case it is approved for use with up to 3000 verification scale intervals per weighing range.

The changeover between weighing ranges is automatic. The range in use is indicated by ' $\rightarrow|x|\leftarrow$ ' being displayed, where x is a number, 1 – 3.

The indicator has a liquid crystal display (LCD) including provision for display of the weight value and of alphanumeric information/menus.

The indicator is available in either 'Harsh' or 'Panel Mount' enclosure styles as shown in Figure 1.

The indicator may be connected to a maximum of four baseworks. The indicator may be configured to display all baseworks at the same time or each basework individually.

Each basework may use conventional analog strain gauge type load cells connected to this indicator through an analog load cell interface board (one for each basework which is using analog type load cells). In this case the specifications in Table 1 apply to each basework separately. In addition, where more than one analog basework is connected the total of the excitation currents required by all the analog baseworks shall not exceed 458 mA.

The connected basework(s) may use approved Mettler Toledo 'DigiTOL', 'Powercell' or 'MTX' type load cells, *using a 'Powercell' connection board*. In these cases, the maximum number of verification scale intervals (VSI) applicable is determined by the number of VSI given in the approval documentation for the load cells used.

This approval does not include the use of the indicator as an automatic weighing instrument, unless specifically mentioned in a certificate of approval for such an instrument.

Where the indicator is intended to be installed as part of a weighbridge, it shall be ensured that all relevant weighbridge requirements of the National Measurement Legislation are met (e.g. in relation to weighbridge approaches, visibility and the location of the weighbridge indicator and platform).

This approval does not certify that such requirements have (or can be) met.

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

TABLE 1 – Specifications

Maximum number of verification scale intervals	10 000 or 3000 per range
Minimum sensitivity	1.0 μV / scale interval
Excitation voltage	10 V DC
Maximum excitation current	229 mA

1.1 Zero

Zero may be automatically corrected to within $\pm 0.25e$ whenever the instrument comes to rest within $0.5e$ of zero or whenever power is applied (in the case of multiple range configurations, e in this sentence refers to e_1). This feature may, or may not, be enabled.

If the instrument comes to rest outside that range but within the zero setting range, zero may be set by pressing the zero button.

The initial zero-setting device has a nominal range of not more than 20% of the maximum capacity of the instrument.

The instrument has a semi-automatic zero-setting device with a nominal range of not more than 4% of the maximum capacity of the instrument.

1.2 Tare

The instrument has provision for subtractive semi-automatic tare and pre-set tare devices each of up to maximum capacity for each basework.

Pre-set tare values may be stored and recalled, and may be associated with product or item look-up tables. Keyboard-entered tares are also available if enabled.

1.3 Display Check

A display check is initiated whenever power is applied.

Software identification information is displayed during the start-up.

1.4 Power Supply

The instrument operates from mains AC power (110–240 V AC nominal).

1.5 Linearisation Facility

Instruments are fitted with a linearisation correction facility having up to four correction points.


1.6 Multiple Baseworks Facility

Up to four baseworks may be connected to the indicator. These baseworks may be either of a type using approved Mettler Toledo 'DigiTOL', 'Powercell' or 'MTX' type load cells (using one or more 'Powercell' connection boards), or may use conventional approved analog strain gauge type load cells (using one or more A/D boards).

Note: Each load cell connection board contains a memory device so that calibration parameters of the basework(s) can be stored. However it should be noted that if the indicator is replaced or repaired, reverification of the instrument is required.

a) Individual weight display

Up to four baseworks may be connected to a single IND780 digital indicator. The instrument may be configured to display all baseworks at the same time or each basework individually.

The basework to be used is selected using a key marked with a 'SCALE' symbol () and is indicated by a programmable name appearing in the display (e.g. 'SCALE 1', 'PLAT 2') being highlighted in green.

Note: In the case of this feature, each basework/combination shall be clearly identified to correspond to the appropriate scale display shown on the indicator. That is, there shall be a clear correspondence between the basework identification and the scale selected indication (shown by illumination of 'SCALE 1', 'PLAT 2', etc.).

b) Summed weight display.

The instrument may be configured to display all baseworks at the same time, and at the same time to provide an indication of the mathematical SUM of the indications of these baseworks (the indication of each basework being a 'component value' of the sum).

Where the indicator is able to provide a summed indication, the instrument shall operate such that:

- The value displayed as the summed indication shall equal the mathematical sum of the measurement values displayed for each load receptor being summed.
- The scale interval of the summed indication shall be of a value to suit the sum of the scale intervals of each load receptor being summed or of the sum. That is, if the load receptor scale intervals are 50 and 20, the sum is 70, and therefore the scale interval of the summed indication is 10.
- The summed indication (and any print-out of summed indication) shall be blank or show non-numerical characters if any of the indications being summed is blank or is displaying a negative number, or indicating an error condition (e.g. under or over capacity).
- The summed value shall not be displayed (i.e. blanking or an error message shall occur) if any of the component values are below zero, or above their individual maximum capacities (Max + 9e), or have any other error. In addition the summed value shall not be displayed (i.e. blanking or an error message shall occur) if any of the component values are in different operational modes.
- The summed indication shall indicate the denomination of the value being displayed.
- Neither the tare nor the pre-set tare device may be operational.
- The zeroing device may operate on the component values individually, or alternatively it is acceptable to provide a zeroing device which operates simultaneously on all the component values.

1.7 Data Storage Memory

The indicator may contain memory for the storage of weighing results.

Where the instrument uses memory for the storage of weighing results, the information stored (and retrieved) for each weighing shall include the weighing results together with identification of that weighing by means such as the date and time of the weighing.

1.8 Interfaces

The indicator may be fitted with interfaces for the connection of auxiliary and/or peripheral devices. Any interfaces shall comply with clause 5.3.6 of document NMI R76 (the basic intent of which is that it shall not be possible to alter weighing results via the interfaces).

Any measurement data output from the instrument or its interfaces (including any data storage memory) shall only be used for trade in compliance with any relevant Supplementary Certificate (e.g. S1/0B).

Indications other than the indications of measured mass (i.e. gross, tare, net, totals) displayed either on the indicator or on an auxiliary or peripheral device, are not for trade use.

Data derived from any analogue output or interface shall not be used for trade use.

Interfaces of the following types may be fitted:

- serial data interfaces, e.g. RS232, RS422/RS485, PS2, USB, Ethernet
- analogue output
- digital I/O
- A keyboard may be connected to the indicator for convenient data entry. Relevant functions (such as tare and zero setting) may be possible via corresponding remote commands.

1.9 Additional Features

The model IND780 indicator may be provided with certain other facilities and pre-set operational arrangements (including by way of additional software packages), as indicated below.

a) Truck Weighing Functions

Providing functions intended specifically for truck weighing applications, including provision for 'truck and product' identification data and pre-set tare values to be stored in memory.

The truck weighing functions provide for:

- simple vehicle weighing, where the gross weight of a vehicle is determined by a single weighing;
- first/second weighing, where a vehicle is weighed before and after a loading or unloading operation;
- single pass weighing, where the net weight of a vehicle is determined from the gross weighing operation and the application of a pre-set tare value; and

- function keys programmed to perform various functions (such as accessing and searching stored vehicle, item, product or client information).

b) Setpoint (Under / Over / Target), Filling and Batching Features

The model IND780 indicator may have additional set point facilities and indications (under/over/target limits, etc.) related to filling operations, and the making of batches according to recipes of various products. Only the weight of the final delivery of the material is approved for trade use.

These facilities and/or software packages may utilise features such as:

- Set point facilities and operations (under / over limits etc).
- Facilities for entering/initiating set points, zero setting, tare (pre-)setting, or printing through the interfaces of the instrument.
- Function keys programmed to perform various functions.



The approval does not include the use of the indicator as an automatic weighing instrument, unless specifically mentioned in a certificate of approval for such an instrument.

The additional functions (other than the indications of measured mass, i.e. gross, tare, net, totals, displayed either on the indicator or on an auxiliary or peripheral device) are not approved for trade use.

1.10 Sealing Provision

To ensure that the calibration is 'secured', it is important that the calibration switch within the indicator has been correctly set, so that access to the instrument menus that allow calibration adjustments is prevented.

This can be checked by the following procedure:

- (a) Commence with the indicator switched on in normal weighing mode.
- (b) Press the down arrow key ('v') a number of times until the  symbol appears on the bottom line of the display.
- (c) Press the button directly below the  symbol.
- (d) A drop down menu will appear with various items, some of which may have [+] displayed alongside them indicating that they can be expanded to show sub menus.
- (e) Use the up and down keys to move through the menu items, and the right arrow key ('>') to expand sub menus.
- (f) In particular, ensure that the 'Setup' menu within the 'IND780' menu is expanded.
- (g) Scroll through the 'Setup' items and select the 'Scale' item for any basework connected. Then select 'Type' and check 'approval' – this must be set to 'Australia', in which case it is not possible to exit the Setup mode without setting the calibration switch to 'secured'.

For the ‘Harsh’ Enclosure Style: Use at least two destructible adhesive labels, one at each side of the instrument case, to seal access to the calibration switch (Figure 2a). Alternatively a lead and wire type seal may be used to seal the cover/display to the rear housing.

For the ‘Panel Mount’ Enclosure Style: Seal the back panel to the enclosure using a lead and wire type seal as shown in Figure 2b, or alternatively using two destructible adhesive labels, one at each side of the back panel. In addition, ensure that all access holes shown in Figure 2b are sealed, unless they are occupied by cables which would therefore prevent access to the calibration switch.

1.11 Markings and Notices

Instruments carry the following markings:

Manufacturer’s mark, or name written in full	Mettler Toledo Limited
Indication of accuracy class	Ⓜ
Maximum capacity (for each range)	<i>Max</i> kg #1
Minimum capacity (for each range)	<i>Min</i> kg #1
Verification scale interval (for each range)	<i>e</i> = kg #1
Maximum subtractive tare	<i>T</i> = - kg #2
Serial number of the instrument	.....
Pattern approval mark for the indicator	NMI S502
Pattern approval mark for other components	..... #3

#1 These markings are also shown near the display of the result if they are not already located there.

#2 This marking is required if *T* is not equal to *Max*.

#3 May be located separately from the other markings.

In addition, instruments *not greater than 100 kg capacity* carry a notice stating NOT TO BE USED FOR TRADING DIRECT WITH THE PUBLIC, or similar wording.

For multiple range instruments the markings shall be as above, with the exception of that the maximum capacity, minimum capacity and verification scale interval for each range shall be marked, with an indication of the range to which they apply, as shown in the instrument display, e.g. ‘→|x|←’.

Range	→|1|←	→|2|←	→|3|←
<i>Max</i>	.... kg	.... kg	.... kg
<i>Min</i>	.... kg	.... kg	.... kg
<i>e</i> =	.... kg	.... kg	.... kg

For instruments using the multiple basework facility (clause 1.6), markings shall be provided for each basework. For example, in the case of an instrument with two multiple range baseworks, the following would be an acceptable tabulation of *Max*, *Min* and *e* values.

	SCALE 1		SCALE 2	
Range	→|1|←	→|2|←	→|1|←	→|2|←
<i>Max</i>	.... kg	.... kg	.... kg	.... kg
<i>Min</i>	.... kg	.... kg	.... kg	.... kg
<i>e</i> =	.... kg	.... kg	.... kg	.... kg

1.12 Verification Provision

Provision is made for the application of a verification mark.

2. Description of Variant 1

approved on 27/07/09

With the use of certain other features, as listed below.

The approval does not include the use of the indicator as an automatic weighing instrument, unless specifically mentioned in a certificate of approval for such an instrument.

The additional functions (other than the indications of measured mass, i.e. gross, tare, net, totals, displayed either on the indicator or on an auxiliary or peripheral device) are not approved for trade use.

2.1 With a number of IND780 indicators networked

IND780 indicators may be networked.

In a networked arrangement it may be possible for an indicator to access the indication of other baseworks in the network, and for a remote indicator (i.e. an indicator other than that to which the basework is directly attached) to control the operation of another instrument and the baseworks to which it is attached. It is also possible for a number of indicators to share printers or provide information to or have their operation controlled by other indicators on the network (which may not have any basework directly attached to them). It is only possible to alter the calibration of a basework from the particular indicator to which it is directly attached (this may be sealed as described for the pattern).

Each basework shall be clearly identified to correspond to the appropriate scale display shown on the indicator. That is, there shall be a clear correspondence between the basework identification, the scale selected indication and the scale selection function (accessed using the indicator keyboard, and which includes a configurable description of the basework which is selected).

2.2 With programmable software features

The IND780 may utilise additional software programs (in some cases these are known by Mettler Toledo as 'Task Expert' programs) to perform additional functions customised to particular applications (e.g. for data collection or operator interface relating to a transaction). These programs may include process control related aspects, and utilise features such as: set point facilities, product flow control and stopping/starting, databases to store order or product information, recipes, client data, counting facilities, ability for programming sequences of operations, etc.

In addition the instrument may have facilities for a number of dialogue (menu access) and function keys to be programmed to perform various functions. Any use of this feature shall be implemented so as not to cause confusion with the normal weighing results.

However this approval relates only to use for trade of the instrument (incorporating the indicator) as a non-automatic weighing instrument, in which static weighing (gross or net) of product on the load receptor (hopper/tank etc.) is carried out. In particular, the approval does not extend to, nor provide any endorsement by the National Measurement Institute, of the additional software or functionality.

2.3 With combined networking and programmable software features

This arrangement (intended primarily for use with multi-deck weighbridges) includes up to six networked IND780 indicators, with up to four baseworks connected to each IND780 indicator. The weight indications for baseworks connected to the first IND780 indicator may be shown on the primary display of the second IND780 indicator and vice versa. The sum of the weight indications may also be shown.

An additional remote display (to which no basework is directly connected) may be connected to the first IND780 indicator to display the summed weight indication.

3. Description of Variant 2

approved on 22/04/10

With a Mettler Toledo POWERCELL PDX interface card, in which case the indicator shall only be used with the NMI approved Mettler Toledo POWERCELL PDX series load cells. The load cells may also be known as model SLC820.

The maximum number of verification scale intervals (VSI) applicable is determined by the number of VSI given in the approval documentation for the load cell used.

TEST PROCEDURE No S502

Instruments shall be tested in accordance with any relevant tests specified in the National Instrument Test Procedures.

The instrument shall not be adjusted to anything other than as close as practical to zero error, even when these values are within the maximum permissible errors.

Maximum Permissible Errors

The maximum permissible errors are specified in Schedule 1 of the *National Trade Measurement Regulations 2009*.

Tests

For multiple range instruments with verification scale intervals of $e_1, e_2 \dots$, apply e_1 for zero adjustment, and maximum permissible errors apply $e_1, e_2 \dots$, as applicable for the load.

FIGURE S502 – 1



(a) Mettler Toledo Model IND780 Digital Indicator – 'Harsh' Enclosure Style

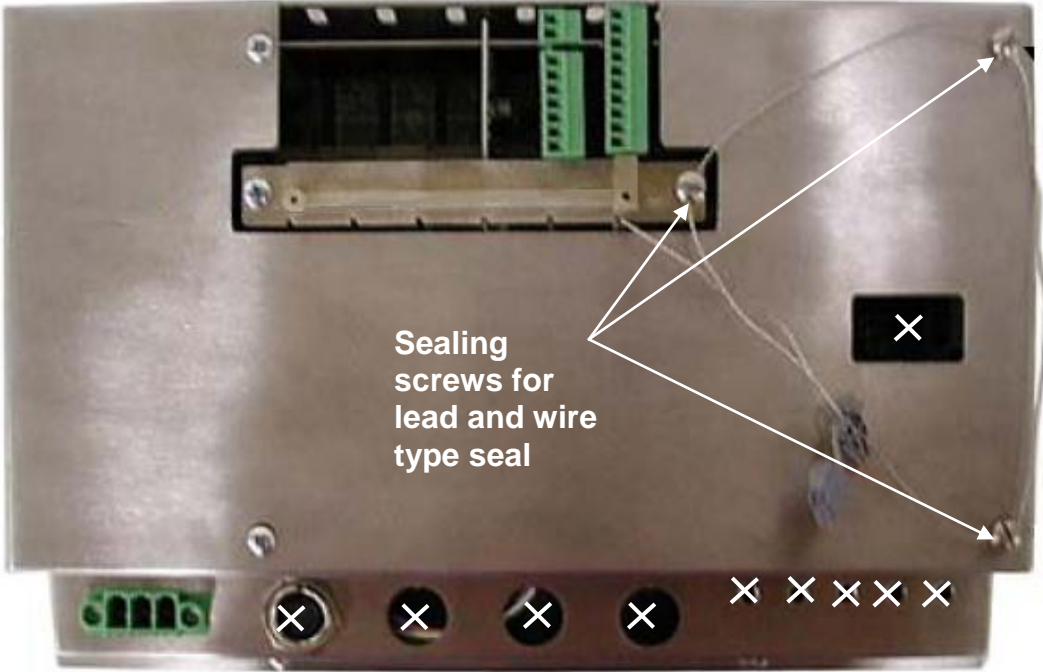


(b) Mettler Toledo Model IND780 Digital Indicator – Panel Mount Enclosure Style

FIGURE S502 – 2



Seal to be applied at each side of case.
(a) Sealing arrangement – ‘Harsh’ Enclosure Style



Ensure access holes marked X are sealed unless used by cables which prevent access.

(b) Sealing arrangement – rear of ‘Panel Mount’ Enclosure Style

Sealing Arrangements – Typical Mechanical Sealing