



Australian Government
**National Measurement
Institute**

Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 6/4C/264

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 BBA229-BB60 Weighing 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.

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 1/08/15, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern & variants 1 to 5 approved – interim certificate issued	28/07/10
1	Pattern & variants 1 to 5 approved – certificate issued	14/01/11
2	Pattern & variants 1 to 5 updated – variants 6 to 8 approved – certificate issued	7/03/14

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 6/4C/264' 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 the instrument shall be within the limits specified herein and in any approval documentation for the components where they are approved separately.

This approval shall NOT be used in conjunction with General Certificate No 6B/0.

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

A handwritten signature in black ink, appearing to read 'A Rawlinson', with a horizontal line underneath.

Dr A Rawlinson

TECHNICAL SCHEDULE No 6/4C/264

1. Description of Pattern

approved on 28/07/10

A Mettler Toledo model BBA229-BB60 class III non-automatic multiple range self-indicating weighing instrument (Figure 1) with a verification scale interval of 0.01 kg for the low range which has a maximum capacity of 30 kg, and with a verification scale interval of 0.02 kg for the high range which has a maximum capacity of 60 kg.

Instruments are configured so that the weighing range can change automatically with increasing load and when the indication remains at rest at zero.

Instruments are NOT FOR TRADING DIRECT WITH THE PUBLIC and shall be so marked.

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

1.1 Basework

The Mettler Toledo model PBA429 basework has the load receptor directly supported by a single load cell. The load receptor (Figure 2) has maximum nominal dimensions of 300 × 400 mm, and typically uses a stainless steel construction.

1.2 Load Cell

An HBM model PW15AHC3MR load cell of 100 kg maximum capacity is used.

1.3 Indicator

A Mettler Toledo model IND226 digital indicator is used (Figure 1). The indicator is also described in the documentation of approval NMI S486. The indicator may be mounted on a column attached to the base.

1.4 Levelling

The instrument is provided with adjustable feet and adjacent to the level indicator is a notice advising that the instrument must be level when in use.

1.5 Sealing Provision

Sealing of the instrument is as described in the approval documentation for the indicator.

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Descriptive Markings and Notices

(a) Instruments carry the following markings:

Manufacturer's mark, or name written in full	Mettler Toledo
Indication of accuracy class	Ⓜ
Maximum capacity	<i>Max</i>/..... g or kg #1
Minimum capacity	<i>Min</i>/..... g or kg #1
Verification scale interval	<i>e</i> =/..... g or kg #1
Maximum subtractive tare	<i>T</i> = - g or kg #2
Serial number of the instrument
Pattern approval mark for the instrument	NMI 6/4C/264
Pattern approval mark for other components #3

#1 These markings shall also be shown near the display of the result if they are not already located there. For multiple range instruments, these markings shall include an indication of the range to which they apply, as shown in the instrument display (e.g. '→ | 1 | ←')

Range	1	2 (*)
<i>Max</i> kg kg
<i>Min</i> kg kg
<i>e</i> = kg kg

For single interval instruments (see variants) there is only one range therefore only one value of maximum capacity, minimum capacity and verification scale interval to be marked.

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

#3 May be located separately from the other markings.

(b) In addition, instruments shall carry a notice stating NOT TO BE USED FOR TRADING DIRECT WITH THE PUBLIC, or similar wording.

2. Description of Variant 1 approved on 28/07/10

Certain other Mettler Toledo BBA229 series multiple range instruments, similar to the pattern, of various capacities using various Mettler Toledo PBA429 series baseworks fitted with an HBM model PW15AHC3MR load cell. Characteristics are given in Tables 1 and 3 (the pattern is shown in **bold**).

3. Description of Variant 2 approved on 28/07/10

Certain Mettler Toledo BBA229 series single interval instruments, similar to the pattern, of various capacities using various Mettler Toledo PBA429 series baseworks fitted with HBM model PW15AHC3MR load cell. Characteristics are given in Tables 2 and 3.

4. Description of Variant 3 approved on 28/07/10

Certain Mettler Toledo BBA226 series multiple range instruments of various capacities, which are similar to the pattern but using PBA226 series baseworks fitted with a Mettler Toledo model 0785 or model 0795 load cell. Characteristics are given in Tables 4 (parts a & b) and 5.

5. Description of Variant 4 **approved on 28/07/10**

Certain Mettler Toledo BBA228 series single interval instruments of various capacities, which are similar to the pattern but using PBA428 series baseworks fitted with a Mettler Toledo SSH series load cell. Characteristics are given in Tables 6 and 7.

6. Description of Variant 5 **approved on 28/07/10**

Certain baseworks of this approval, as listed in Tables 1 to 7, used with a compatible approved (by Supplementary Certificate) indicator provided the conditions set out below are met.

The approved baseworks and their limiting characteristics are given in Tables 1 to 7. Some typical baseworks are shown in Figure 2.

The resulting instrument may be single range, multiple range, or multi-interval (according to the indicator used), provided that the conditions given are met.

Characteristics of the load cells used are needed to determine that the required conditions are met.

In addition to the markings specified in clause **1.7 Descriptive Markings and Notices**, instruments are marked with the NMI approval number for the indicator used, together in the same location. Where the resulting instrument is a multiple range instrument, appropriate markings regarding the ranges and scale intervals shall be provided in accordance with the Supplementary Certificate for the indicator.

The conditions to be met are given below, and include calculations using the following terms:

Ex = Excitation from indicator (V)

LC_Sens = Load cell sensitivity (mV/V)

E_{max} = Load cell maximum capacity (kg)

Indicator Sensitivity = Minimum sensitivity value per verification scale interval for the indicator (μ V)

e = verification scale interval of the instrument (kg). ***In the case of multi-interval or multiple range instruments, any reference to 'e' refers to the smallest verification scale interval (i.e. e_1).***

e_1, e_2, \dots = verification scale interval of each range for multiple range instruments (or partial weighing ranges for multi-interval instruments), e_1 refers to the smallest verification interval.

Max = the maximum capacity of the instrument. This refers to the maximum capacity of the highest range (i.e. Max_r for multiple range instruments).

Max_r = the maximum capacity of the instrument for a multiple range instrument, i.e. the maximum capacity of the highest range.

Max_1, Max_2, \dots = the maximum capacity of the various ranges for a multiple range instrument. Max_1 refers to the maximum capacity of the smallest range.

n_{LC} = the maximum number of verification intervals for which the load cell or basework is approved (e.g. 3000 for a 'class C3' load cell).

DR = dead load return value for the load cell. Note: Many load cells do not have a specified DR value.

The conditions are:

- The excitation voltage used is within the range approved for the baseworks.
- The maximum load applied to the basework (live load plus any dead load) does not exceed the load cell maximum capacity.
- The verification scale interval is not less than the minimum value specified. ***In the case of multi-interval or multiple range instruments, the verification scale interval refers to the smallest verification scale interval (i.e. e_1).***
- The number of verification scale intervals is less than or equal to the n_{max} value specified. ***In the case of multi-interval or multiple range instruments, the number of verification scale intervals refers to the largest number in any weighing range or partial weighing range (i.e. the largest of Max_1/e_1 , Max_2/e_2 etc).***
- The signal voltage per verification scale interval is not less than the minimum sensitivity value per verification scale interval for the indicator (as specified in the approval documentation for the indicator), i.e.

$$\text{Indicator Sensitivity} \leq 1000 \times Ex \times LC_Sens \times e / E_{max}$$

Additional requirement for multi-interval operation:

In the case of indicators which are configured to form a multi-interval weighing instrument the instrument shall comply with one of the following conditions:

- (i) ***The smallest verification scale interval (e_1) shall satisfy the following:***

$$e_1 \geq Max/n_{LC}$$

- (ii) ***Or, the smallest verification scale interval (e_1) shall satisfy the following:***

$$e_1 \geq 2 \cdot DR \cdot Max/E_{max}$$

Of course (ii) cannot apply where a value of 'Deadload return' DR is not given.

Additional requirement for multiple range operation:

In the case of indicators which are configured to form a multiple range weighing instrument the instrument shall comply with one of the following conditions:

- (i) ***The smallest verification scale interval (e_1) shall satisfy the following:***

$$e_1 \geq 0.4 Max_r/n_{LC}$$

- (ii) ***Or, the smallest verification scale interval (e_1) shall satisfy the following:***

$$e_1 \geq DR \cdot Max_r/E_{max}$$

Of course (ii) cannot apply where a value of 'Deadload return' DR is not given.

7. Description of Variant 6 **approved on 7/03/14**

Mettler Toledo BBA239 series of various capacities, which are similar to the pattern, and variants 1 & 2 but are fitted with a Mettler Toledo model IND236 indicator (Figure 3). The indicator is also described in the documentation of approval NMI S653.

8. Description of Variant 7 **approved on 7/03/14**

Mettler Toledo BBA236 series of various capacities, which are similar to variant 3 but are fitted with a Mettler Toledo model IND236 indicator (Figure 3). The indicator is also described in the documentation of approval NMI S653.

9. Description of Variant 8 **approved on 7/03/14**

Mettler Toledo BBA238 series of various capacities, which are similar to variant 4 but are fitted with a Mettler Toledo model IND236 indicator (Figure 3). The indicator is also described in the documentation of approval NMI S653.

TEST PROCEDURE No 6/4C/264

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.

TABLE 1 – BBA229 series **multiple range** instruments
using an HBM model PW15AHC3MR load cell
(the pattern, model BBA229-BB60, is shown in **bold**)

Instrument model	n/a (#1)	BBA229 -A15	BBA229 -BB30	BBA229 -BB60	BBA229 -B60
Basework model	PBA429 -A6 (#1)	PBA429 -A15	PBA429 -BB30	PBA429 -BB60	PBA429 -B60
Platform size (mm x mm)	240 x 300	240 x 300	300 x 400	300 x 400	400 x 500
Maximum capacity (kg)	3/6	6/15	15/30	30/60	30/60
Typical verification scale Interval (kg)	0.001/ 0.002	0.002/ 0.005	0.005/ 0.01	0.01/ 0.02	0.01/ 0.02
Max. number of verification scale intervals (n_{max})	3000/3000	3000/3000	3000/3000	3000/3000	3000/3000
Number of load cells	1	1	1	1	1
Load cell maximum capacity (E_{max}) (kg)	20	20	50g	100	100
Min. value of verification scale interval for basework (v_{min} of load cell) (kg)	0.0008	0.0008	0.002	0.01	0.01

TABLE 2 – BBA229 series **single interval** instruments
using an HBM model PW15AHC3MR load cell

Instrument model	BBA229-A3	BBA229-A6
Basework model	PBA429-A3	PBA229-A6
Platform size (mm x mm)	240 x 300	240 x 300
Maximum capacity (kg)	3	6
Typical verification scale interval (kg)	0.001	0.002
Max. number of verification scale intervals (n_{max})	3000	3000
Number of load cells	1	1
Load cell maximum capacity (E_{max}) (kg)	10	20
Min. value of verification scale interval for basework (v_{min} of load cell) (kg)	0.0004	0.0008

TABLE 3 – Features common to HBM model PW15AHC3MR load cells

Load cell classification	C
Load cell sensitivity (at E_{max})	2 (mV/V)
Input impedance	380 Ω
Excitation voltage (maximum)	15 V
Cable length (± 0.1 m) (#3)	3 m
Number of leads (plus shield)	6

Notes:

- (#1) This basework cannot be used with a model IND226 indicator (approval NMI S486) to form a multiple range instrument; the basework can only be used with an alternative indicator, e.g. the model IND236 (approval NMI S653) to form a multiple range instrument in accordance with variant 5.
- (#2) The cable length supplied with the basework shall not be altered.

TABLE 4 (part a) – BBA226 series **multiple range** instruments using a Mettler Toledo model 0785 load cell

Instrument model	BBA226 -A6	BBA226 -A15	BBA226 -BB30	BBA226 -BB60
Basework model	PBA226 -A6	PBA226 -A15	PBA226 -BB30	PBA226 -BB60
Platform size (mm x mm)	240 x 300	240 x 300	300 x 400	300 x 400
Maximum capacity (kg)	3/6	6/15	15/30	30/60
Typical verification scale Interval (kg)	0.001/ 0.002	0.002/ 0.005	0.005/ 0.01	0.01/ 0.02
Max. number of verification scale intervals (n_{max})	3000/3000	3000/3000	3000/3000	3000/3000
Number of load cells	1	1	1	1
Load cell maximum capacity (E_{max}) (kg)	11	22	50	100
Min. value of verification scale interval for basework (v_{min} of load cell) (kg)	0.0005	0.0009	0.0021	0.0042
Cable length (m \pm 0.1 m) (#1)	1.8	1.8	2.3	2.3

TABLE 4 (part b) – **Additional** BBA226 series **multiple range** instruments using a Mettler Toledo model 0785 [**or 0795 (#2)**] load cell

Instrument model	BBA226 -B30	BBA226 -B60	BBA226 -B150 (#2)
Basework model	PBA226 -B30	PBA226 -B60	PBA226 -B150 (#2)
Platform size (mm x mm)	400 x 500	400 x 500	400 x 500
Maximum capacity (kg)	15/30	30/60	60/150
Typical verification scale Interval (kg)	0.005/ 0.01	0.01/ 0.02	0.02/ 0.05
Max. number of verification scale intervals (n_{max})	3000/3000	3000/3000	3000/3000
Number of load cells	1	1	1
Load cell maximum capacity (E_{max}) (kg)	50	100	100
Min. value of verification scale interval for basework (v_{min} of load cell) (kg)	0.0021	0.0042	0.02
Cable length (m \pm 0.1 m) (#1)	2.3	2.3	2.3

TABLE 5 – Features common to Mettler Toledo models 0785 and 0795 load cells

Load cell classification	C
Load cell sensitivity (at E_{max})	2 mV/V
Input impedance	410 Ω
Excitation voltage (maximum)	15 V
Number of leads (plus shield)	6

Notes:

- (#1) The cable length supplied with the basework shall not be altered.
- (#2) This basework in this model is fitted with a Mettler Toledo model **0795** load cell.

TABLE 6 – BBA229 series **single interval** instruments
using a Mettler Toledo SSH series load cell

Instrument model	BBA228 -BC150	BBA228 -BC300	BBA228 -CC150	BBA228 -CC300
Basework model	PBA428 -BC150	PBA428 -BC300	PBA428 -CC150	PBA428 -CC300
Platform size (mm x mm)	500 x 650	500 x 600	600 x 800	600 x 800
Maximum capacity (kg)	150	300	150	300
Typical verification scale interval (kg)	0.05	0.1	0.05	0.1
Max. number of verification scale intervals (n_{max})	3000	3000	3000	3000
Load cell model used Mettler Toledo SSH series	SSH-300	SSH-500	SSH-300	SSH-500
Number of load cells	1	1	1	1
Load cell maximum capacity (E_{max}) (kg)	300	500	300	500
Min. value of verification scale interval for basework (v_{min} of load cell) (kg)	0.041	0.068	0.041	0.068

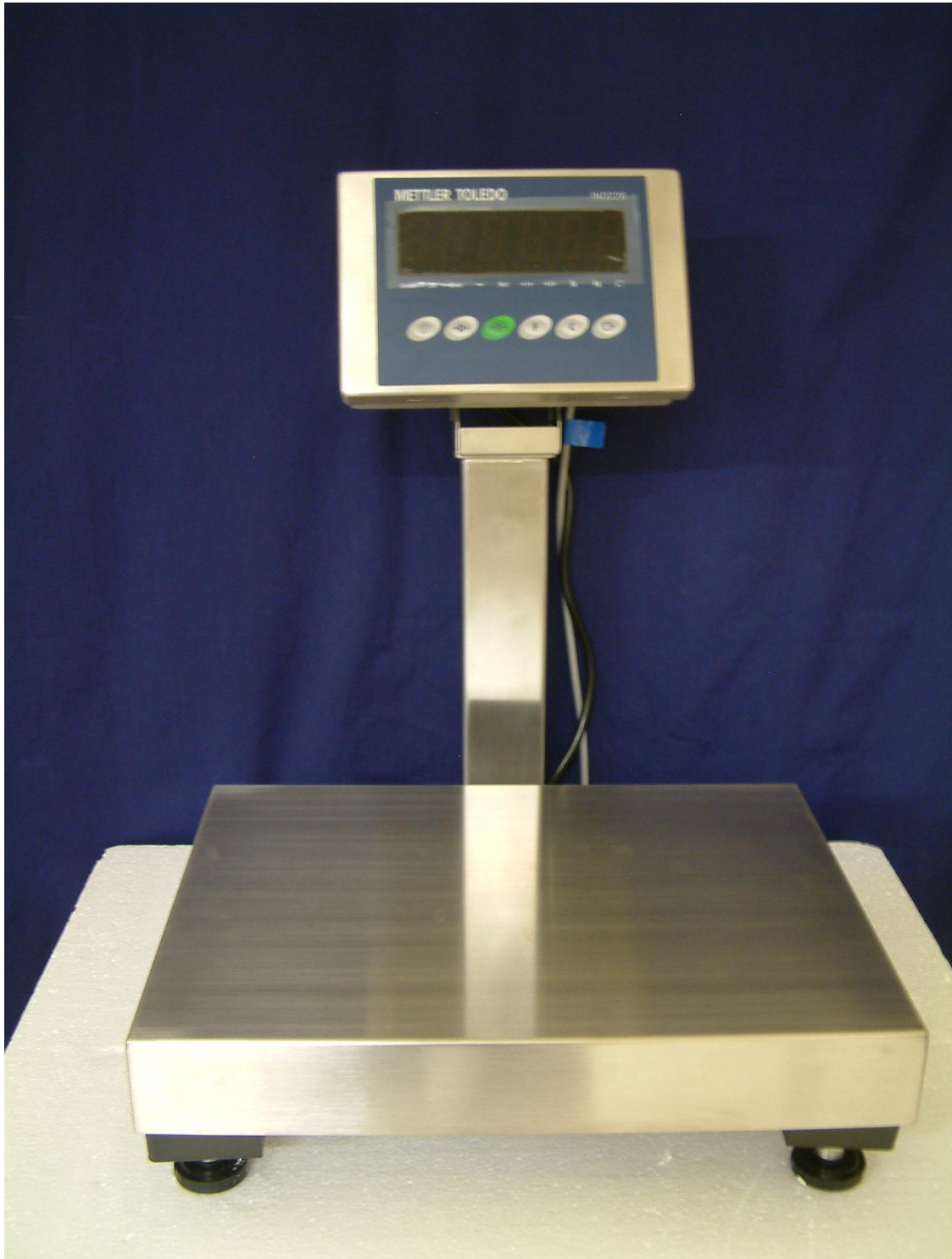
TABLE 7 – Features common to Mettler Toledo SSH series load cells

Load cell classification	C
Load cell sensitivity (at E_{max})	2 mV/V
Input impedance	381 Ω
Excitation voltage (maximum)	20 V
Cable length (± 0.1 m) (#1)	2.5 m
Number of leads (plus shield)	6

Notes:

(#1) The cable length supplied with the basework shall not be altered.

FIGURE 6/4C/264 – 1



Mettler Toledo Model BBA229-BB60 Weighing Instrument
Using a Mettler Toledo Model IND226 Indicator

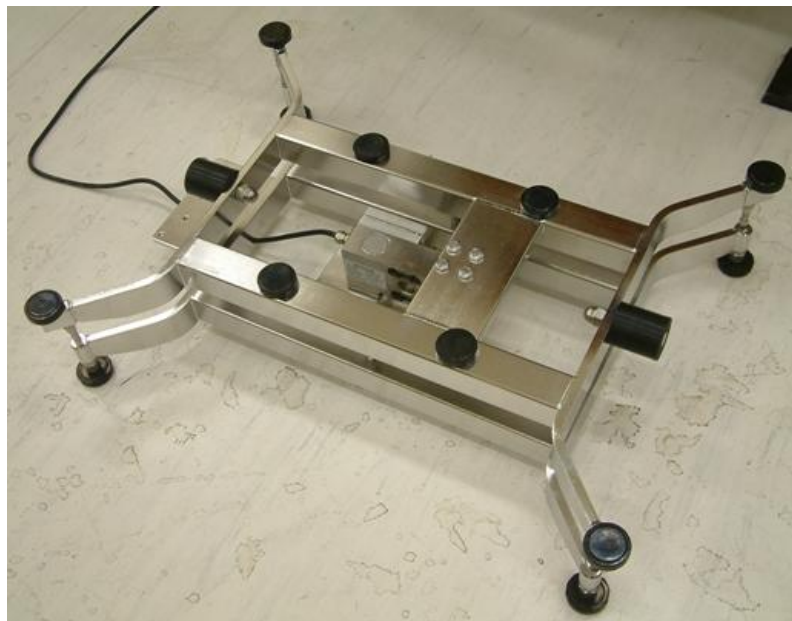
FIGURE 6/4C/264 – 2



PBA226 Series Basework (similar to the basework used in the pattern)



PBA429-A* Series Basework



PBA428 Series Basework

Some Typical PBA Series Baseworks of This Approval (not to scale)

FIGURE 6/4C/264 – 3



Typical Mettler Toledo BBA Series Basework (Actually a Model BBA238) With a Mettler Toledo Model IND236 Indicator

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