NMI P 104

Test Procedure for the Elimination of Rounding Error for Weighing Instruments with Digital Indication

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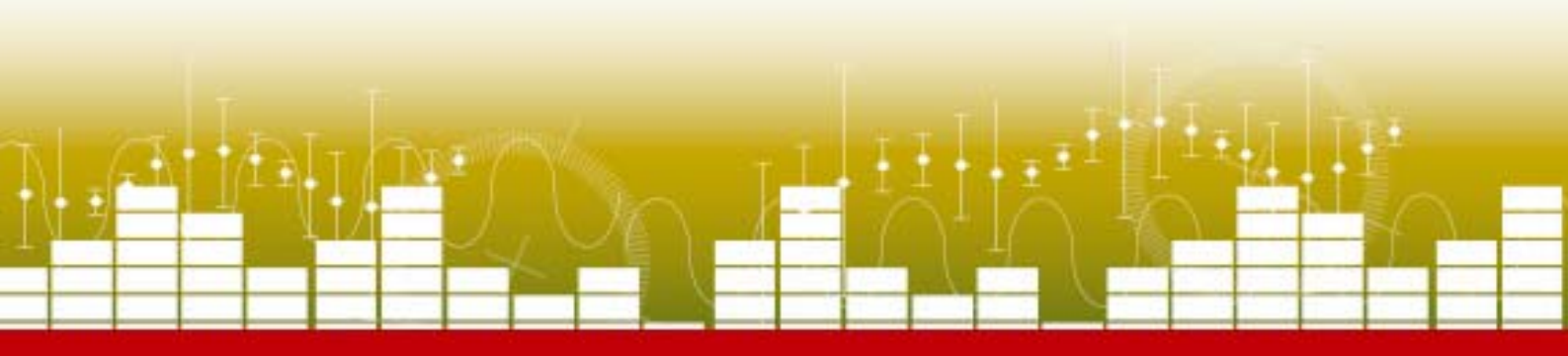Second edition, second revision — July 2004 (renamed NMI P 104)

All digital indicators associated with a weighing instrument shall be tested, without reference to any analogue indicator except for the purpose of setting zero, by applying test masses to the load receptor and observing the reading as detailed in the following four tests.

The first test is for zero alignment of the digital indicator and the zero indicator. The other three tests are for maximum permissible errors of $\pm 0.5e$, $\pm 1e$ and $\pm 1.5e$.

The following symbols are used:
e = verification scale interval
n = positive whole number

Each test lists the maximum permissible error and the test loads necessary to check for this error over the appropriate range of scale intervals. The test loads are related to the verification scale interval and are chosen so that the limits of the error fall at or near changeover points in the digital indicating system.

All the possible readings for each test mass are listed and the instrument is accepted or rejected, depending on which reading is indicated.

Two readings are taken at each applied load with the instrument equilibrium being disturbed before each reading.

Test 1 — Zero Test (Maximum Permissible Error = ±0.25e)

First Test Load = 0.25e

Readings:
e and e: reject
0 and e: pass to second test (limit)
0 and 0: pass to second test

Second Test Load = 0.75e

Readings:
0 and 0: reject
0 and e: accept (limit)
e and e: accept

Test 2 — Maximum Permissible Error = ±0.5e

0 to 50 000e for class 1 instruments
0 to 5 000e for class 2 instruments
0 to 500e for class 3 instruments
0 to 50e for class 4 instruments

Test Load = ne

Readings:
$(n-1)e$ and $(n-1)e$: reject
$(n-1)e$ and ne: accept (limit)
ne and ne: accept
ne and $(n+1)e$ accept (limit)
$(n+1)e$ and $(n+1)e$: reject

Test 3 — Maximum Permissible Error = ± 1e

Over 50 000e and up to 200 000e
for class 1 instruments

Over 5 000e and up to 20 000e
for class 2 instruments

Over 500e and up to 2 000e
for class 3 instruments

Over 50e and up to 200e
for class 4 instruments

Test Load = $(n + 0.5)e$

Readings:
$(n-1)e$ and $(n-1)e$: reject
$(n-1)e$ and ne: accept (limit)
ne and ne: accept
ne and $(n+1)e$: accept
$(n+1)e$ and $(n+1)e$: accept
$(n+1)e$ and $(n+2)e$: accept (limit)
$(n+2)e$ and $(n+2)e$: reject

Test 4 — Maximum Permissible Error = ±1.5e

Over 200 000e for class 1 instruments
Over 20 000e for class 2 instruments
Over 2 000e for class 3 instruments
Over 200e for class 4 instruments

Test Load = ne

Readings:
$(n-2)e$ and $(n-2)e$: reject
$(n-2)e$ and $(n-1)e$: accept (limit)
$(n-1)e$ and $(n-1)e$: accept
$(n-1)e$ and ne: accept
ne and ne: accept
ne and $(n+1)e$: accept
$(n+1)e$ and $(n+1)e$: accept
$(n+1)e$ and $(n+2)e$: accept (limit)
$(n+2)e$ and $(n+2)e$: reject