



**Australian Government**  
**National Measurement**  
**Institute**

# NMI P 105

## Pattern Approval Specifications for the Graduation of Analogue Scales

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**CONTENTS**

1.	Form of Scale Marks .....	1
2.	Arrangement of Scale Marks.....	1
3.	Numbering of Scale Marks.....	1
4.	Recommended Numbering Arrangements .....	1
4.1	First Alternative .....	1
4.2	Second Alternative.....	2
4.3	Third Alternative.....	2

### 1. FORM OF SCALE MARKS

Scale marks shall be made up of lines of the same thickness and the thickness shall be constant and shall be between one-tenth and one-quarter the width of a scale spacing without being less than 0.2 mm.

The length of the shortest lines shall not be less than the width of a scale spacing.

### 2. ARRANGEMENT OF SCALE MARKS

Three recommended arrangements for graduated scales are as follows, where  $n$  is any positive or negative whole number or zero:

- style A (top), numerical value of graduation,  $d$ , is  $1 \times 10^n$ ;
- style B (middle) numerical value of graduation,  $d$ , is  $2 \times 10^n$ ;
- style C (bottom) numerical value of graduation,  $d$ , is  $5 \times 10^n$ .



Special consideration will be given to alternative arrangements if space or other restrictions prevent the recommended arrangements being met.

### 3. NUMBERING OF SCALE MARKS

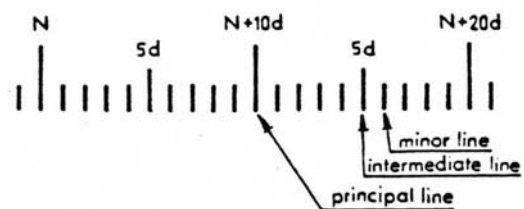
- (a) The actual or apparent height of numbers shall be not less than  $L/330$ , without being less than 2 mm, where  $L$  is the reading distance.

- (b) The width of a number measured parallel to the base of the scale shall be less than the distance between two consecutive numbered scale marks.
- (c) The decimal marker on numbers less than unity shall be preceded by a zero digit.
- (d) The decimal marker shall be a point with a diameter of 1.5 times the thickness of the lines forming adjacent digits; the point shall be on the base line of the digits or at mid-height.
- (e) Digits of the number shall be horizontally aligned except on fan-shaped dials.
- (f) Vulgar fractions are not acceptable.
- (g) A comma or similar mark shall not be marked between third and fourth digits of a number.

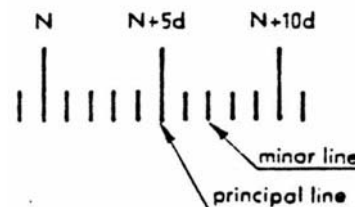
### 4. RECOMMENDED NUMBERING ARRANGEMENTS

#### 4.1 First Alternative

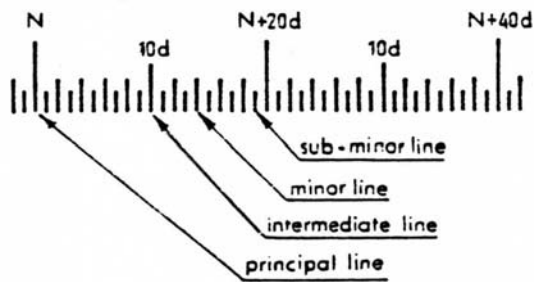
Style A ( $d = 1 \times 10^n$ ) where  $N$  is an integral multiple of  $10d$ .



Style B ( $d = 2 \times 10^n$ ) where  $N$  is an integral multiple of  $10d$ .



Style C ( $d = 5 \times 10^b$ ) where  $N$  is an integral multiple of  $20d$ .



#### 4.2 Second Alternative

All minor graduation lines (except sub-minor lines) may be numbered incrementally from the preceding principal line, as follows:

- (a) style A –  $1d, 2d, 3d$  etc up to  $9d$ ;
- (b) style B –  $1d, 2d, 3d, 4d$ ; and
- (c) style C –  $2d, 4d, 6d$  etc up to  $18d$ .

#### 4.3 Third Alternative

All graduation lines (except sub-minor lines) may be numbered progressively from zero at 1, 5 or 10 graduation intervals.