

# THE TEST MANUAL FOR WORKING STANDARD METRE BAR

## 1.0 MATERIAL

The working standard metre bar (hereinafter called metre bar) shall be manufactured from 58 per cent nickel-steel, or austenitic stainless steel, or stainless steel with 13 per cent chromium or pure nickel (minimum purity 99 per cent).

## 2.0 SHAPE AND DIMENSIONS

- (a) The metre bar shall have a rectangular cross section of minimum dimensions 20mmx10mm. The existing cross section with dimensions 30mmx15mm shall be preferred.
- (b) The overall length of the metre bar shall be 1030-or+ 1mm and the graduated length shall be 1010mm.
- (c) Ungraduated length of 10mm shall be left after the last graduated marks.

## 3.0 FINISH

The graduated surface shall be bright, polished and free from surface irregularities neighborhood of the graduation marks.

## 4.0 GRADUATIONS

- (a) The metre bar shall be graduated in millimetres throughout from 0 to 1000 mm on the wider upper surface.
- (b) A length of 10 mm before the zero graduation mark shall also be graduated in millimetres.
- (c) The scale shall be 'regular'. The thickness of the graduation marks shall be uniform and shall lie between 30 and 80 micrometres.
- (d) The width of the graduation marks shall be uniform to within – or + fifteen per cent of the average width of all the marks.
- (e) The graduation marks representing centimeters shall be longer than those representing half centimeters, and the graduation marks representing half centimeters shall be longer than those representing millimeter.
- (f) Each graduation mark shall be straight to within ten micrometres over its length.
- (g) The graduation marks shall be parallel to one another to within ten micrometres.
- (h) The length of the graduation marks shall be not less than:-
  - 3 mm for mm marks
  - 5 mm for half cm marks
  - 8 mm for cm marks.
- (i) The centimeters graduation marks shall be numbered in the increasing order of numeration.
- (j) The heights of the numerals and the letters (symbols) shall be approximately 3 mm.
- (k) The graduation marks shall be square to the scale axis to within 30 minutes of arc.

## 5.0 CURSOR

- (a) The errors on the length measure under verification shall be determined by means of a scale marked on a plate, made from transparent material, which is carried by a cursor capable of moving along the length of the metre bar. The plate shall have appropriate and constant dimensions and thickness.
- (b) The scale on the plate shall:-
  - either be a length of 9 mm divided into 10 parts thus forming a vernier scale to read the errors to the nearest of 0.1 mm; or
  - one millimetre divided into 10 parts for reading the errors directly to the nearest of 0.1 mm.
- (c) The thickness of the graduation marks on the scale shall be less than that of the graduation marks on the metre bar.

- (d) The graduation marks on the scale shall be inscribed on the surface facing the graduation marks on the metre bar.
- (e) The readings shall be taken by means of a magnifying glass, the magnification of which shall be not less than 5 xs if the scale is graduated in 0.1 mm and not less than 3x of the scale is of vernier type.
- (f) The cursor shall be such that it would be possible to move it smoothly without jerks, along a straight line from one end of the measure to the other.
- (g) A mechanism to raise, lower and laterally move the measure under verification, within a view to putting its graduated surface at a proper level and aligning its zero mark with that of the metre bar shall be provided.
- (h) For facilitating the verification of end measures, two vertical stops bearing reference lines shall be provided. The first stop shall be such that its reference line can be aligned with the zero mark of the metre bar. The second stop shall be capable of moving along the entire length of the metre bar.

## 6.0 MAXIMUM PERMISSIBLE ERRORS

- (a) The error on the length between any two graduation marks on the working standard length measure, at the standard temperature of 20 degrees C, shall not exceed the value calculated according to the following formula:-

$$e = (50 + L/20) \text{ micrometres.}$$

Where  $L$  is the nominal length in millimeters of that part of the metre bar between the two graduation marks, the error on which is being determined. The calculated value of “ $e$ ” shall be rounded to the nearest integer.

- (b) The errors on the length between any two graduation lines on the plate *shall not exceed – or + 20 micrometres.*

## 7.0 INSCRIPTION

The metre bar shall bear the following inscription:-

- (a) the words "**WORKING STANDARD METRE BAR**"
- (b) identification number of the metre bar,
- (c) the name of the manufacturer,
- (d) the material of the metre bar
- (e) the words, figures and letter "**STANDARD AT 20**"
- (f) the year of manufacture.

## 8.0 PROTECTIVE AND CARRYING CASE

- (a) The standard metre bar shall be housed in a case made from suitable material and provided with a handle, lined internally with velvet, a plastic material or any other material and in such a way that the metre bar is not likely to be damaged, particularly by shocks or corrosion.
- (b) The case shall have affixed on it a plate bearing the inscription "**WORKING STANDARD METRE BAR**" and the identification number.

**NOTE:** The existing working standard length measure (metre bars) may differ in minor details in regard to inscriptions etc. on it.

