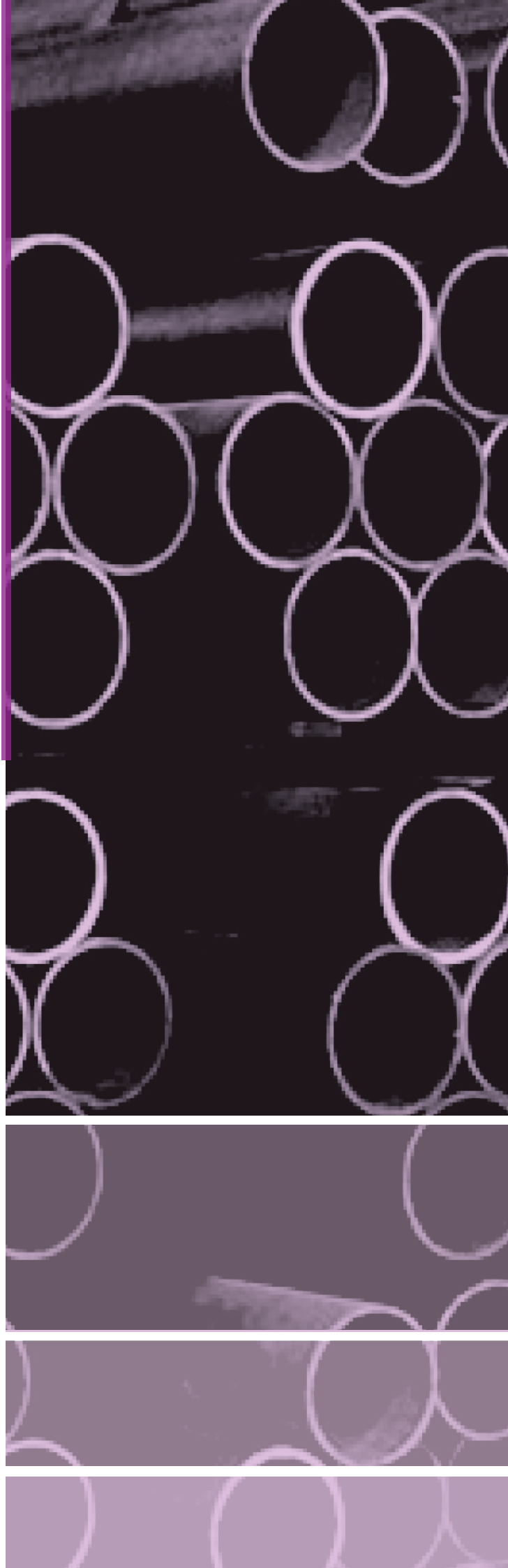


STEEL PIPES



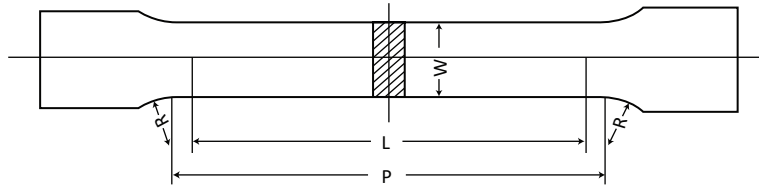
Appendix 'A'

Tension Test Pieces for Metallic Materials - Japanese Industrial Standard
(Extracts from JIS Z 2201)

Classification of Test Piece

The test pieces shall be classified into No.1, No.4, No.5, No.11 and No.12 test piece in accordance with the shape and size, and the standard dimensions of these test pieces shall comply with following.

No.1 Test Piece The test piece shall be principally used for tension test of steel plates, steel flats and steel sections.



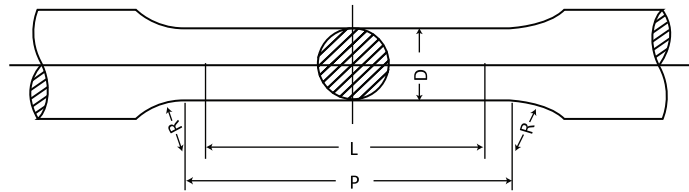
Gauge Length	$L = 200 \text{ mm}$
Length of parallel portion	$P = \text{approx. } 220 \text{ mm}$
Radius of shoulder	$R = 25 \text{ mm or more}$

The thickness shall be as the original size

Unit: mm

Division Of Test Piece	Width w
1A	40 mm (or 38 mm be used)
1B	25 mm

No.4 Test Piece This test piece shall be principally used for tension test of steel castings, steel forgings, rolled steel, malleable iron castings and nodular graphite iron castings. And it shall also be used for tension test of bars and castings of non-ferrous metal (or alloy thereof).



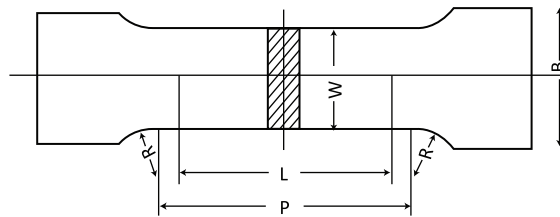
Gauge Length	$L = 50 \text{ mm}$
Length of parallel portion	$P = \text{approx. } 60 \text{ mm}$
Diameter	$D = 14 \text{ mm}$
Radius of shoulder	$R = 15 \text{ mm or more}$

This test piece is required that the section of the parallel portion is finished to a circle, but it should not be finished, as a rule, for malleable castings. Where the test piece of dimensions specified above can not be obtained for the reason of the material, the diameter of the parallel portion and the gauge length shall be determined by the following formula. In this case, the gauge length may be rounded up to an integer.

$$L = 4\sqrt{A} = 3.54D$$

Where, A represents the sectional area of parallel portion of the test piece

No.5 Test Piece This test piece shall be principally used for tension test of pipes and tubes, steel sheets and non-ferrous metal (or alloy thereof) sheets and sections.

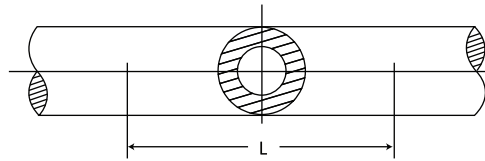


Gauge Length	$L = 50 \text{ mm}$
Length of parallel portion	$P = \text{approx. } 60 \text{ mm}$
Width	$W = 25 \text{ mm}$
Radius of shoulder	$R = 15 \text{ mm or more}$

The thickness shall be as the original size. For thin steel sheets only, the following shall be applied.

Radius of shoulder	$R = 20 \sim 30 \text{ mm}$
Width of gripped portion	$B = 30 \text{ mm or more}$

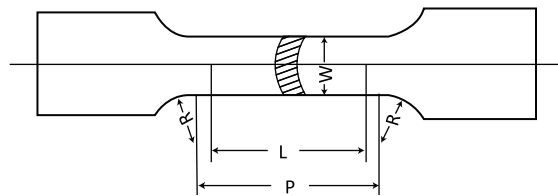
No.11 Test Piece This test piece shall be used for tension test of pipes and tubes, where the test is carried out on a specimen of tubular form.



Gauge Length $L = 50\text{mm}$

The cross-section of this test piece shall be left same as cut from the original material, and its both gripped ends should be either inserted with mandrels or flattened by hammering. Further, in the latter case, the length of parallel portion should be 100 mm or more.

No.12 Test Piece This test piece shall be principally used for tension test of pipes and tubes, where the test is not carried out on a specimen of tubular form.



Gauge Length	$L = 50\text{ mm}$
Length of parallel portion	$p = \text{approx. } 60\text{ mm}$
Radius of shoulder	$R = 15\text{ mm or more}$

Unit: mm

Division Of Test Piece	Width w
12A	19 mm
12B	25 mm
12C	38 mm

Both gripped ends of the test piece may be flattened by hammering at cold state.