How to Measure the Angle of Taper Thread for Nipple?

a) **Measuring method**   The value T_2 of a set block gauge shall be measured with a dial gauge. Then, ring gauges RA and RB are fitted with the specified clamping torque as given in figure 8, the space $T_2{'}$ is measured, and the difference ΔT_2 between $T_2{'}$ and T_2 is calculated. However, ΔT_2 may be directly measured in the measurement of $T_2{'}$ by adjusting the scale of the dial gauge to zero point in the measurement of T_2 of the set block gauge.


b) **Calculation**   The angle α' of taper thread to be obtained shall be calculated according to the following formula, and rounded off to the unit of minute (see figure 9).

$$\alpha' = 2\tan^{-1}\tan\frac{\alpha}{2}\left(\frac{T_2}{T_2 - \Delta T_2}\right) \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{(2)}$$

where, α' : angle of taper thread to be obtained (°)

α : angle corresponding to 1/3 taper ($18°\,55'\,29''$)

T_2 : standard dimension of gauge space as given in tables 4-1 and 4-2 (mm)

ΔT_2 : difference between T_2 and $T_2{'}$ [2] (mm)

Note [2]   The sign of ΔT_2 is positive when the angle α' is larger than the angle α ($18°\,55'\,29''$) corresponding to 1/3 taper, and negative when smaller.

c) **Illustration**
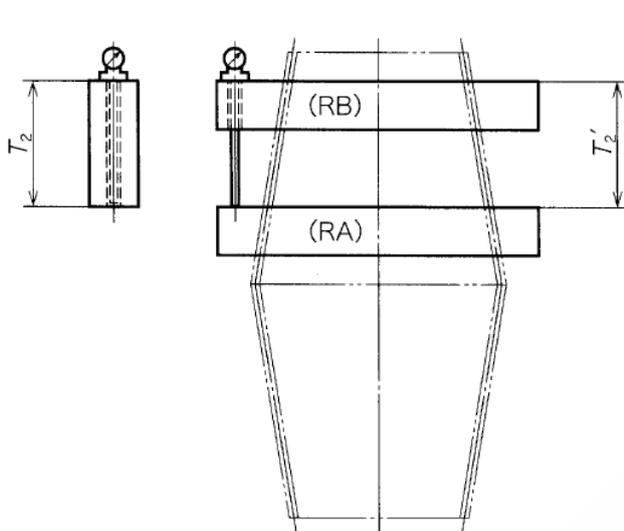
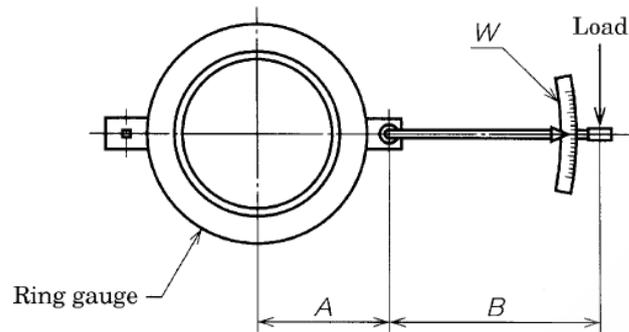**Figure 8 Combination of nipple taper measuring gauges**
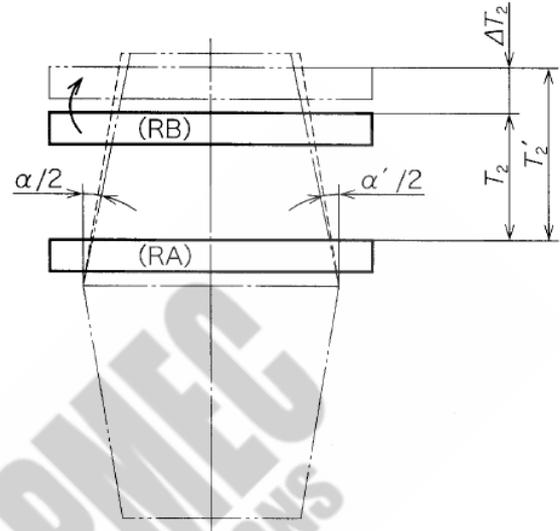
Figure 9 Taper of nipple

The clamping torque of a ring gauge shall be calculated according to figure 10 and formula (3).

Figure 10 Clamping torque of ring gauge

$$Q = \frac{W}{B} \times (A + B) \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (3)$$

where, Q : clamping torque $(kN \cdot cm)$

W : reading of torque wrench $(kN \cdot cm)$

A : distance between taper thread ring gauge centre and torque wrench connection point (cm)

B : distance between torque wrench connection point and loading point (cm)

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