612-0045 (15-006) Bell Thermal Expansion

Warranty:

We replace all missing or defective parts free of charge. All products guaranteed free from defect for 90 days. This guarantee does not include accident, misuse, or normal wear and tear.

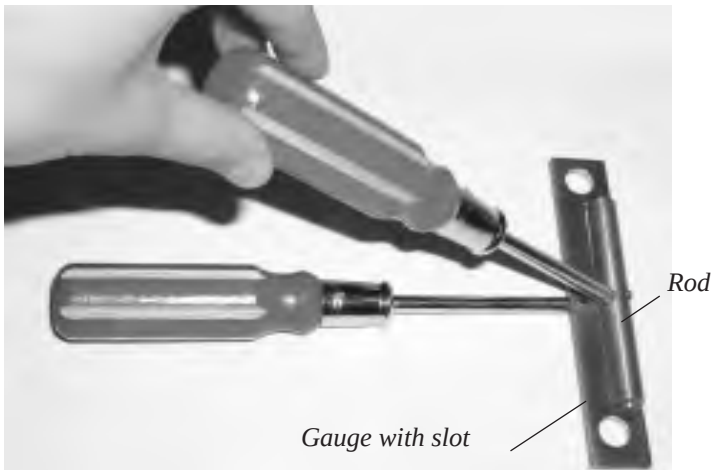
Description:

Why do bridges need expansion joints? Why are small gaps left between metal sleepers on railway tracks? Why are airplanes designed to expand without breaking?

The "Ball and Ring" demonstration has been around awhile and attempts to answer these questions. The ball fits through the ring until it is heated and expands just enough to become too big. But just when you thought this experiment was old hat, we've developed a new twist. Since it was invented by our late company owner **Raymond Bell,** we've named it in his honor.

This precision machined thermal expansion demonstration is literally "two for one". It demonstrates *both* linear and cylindrical expansion, unlike the traditional Ball and Ring. It consists of two pieces, both with wooden handles for safety. The first is a mild steel **rod,** 110 x 12. 5 mm length and diameter. The other is a brass **gauge,** 150 x 38 mm, with a precision-machined 7.5 cm cutout, and two holes about 1 cm in diameter into which the rod passes endways when cold.

Meets National Science Education Content Standard B: Physical Science Transfer of Energy, grades 5-8.



Purpose:

The Bell Thermal Expansion apparatus is used to demonstrate both the linear and cylindrical thermal expansion (contraction) of metals.

Other Materials Needed:

- Bunsen burner or source of heat
- Dry ice slurry in thermos flask

Operation:

Before performing the demonstration, light a Bunsen burner. Hold both brass rod and brass gauge by the wooden safety handles. Show how smoothly the rod end can pass through both holes in the gauge when both are at room temperature. Show also how the rod fits into the gauge's slot when at room temperature.

Take care throughout the demonstration to heat the apparatus only to the degree necessary for the experiment. Overheating may permanently distort the dimensions. The device will be extremely hot and needs time to cool before handling.

Heat the rod in the gas flame a short while. The rod no longer fits in the slot. It **does** fit in Hole 1 but **does not** fit in Hole 2. Nor does it fit in the slot in the gauge.

Allow the rod to cool to room temperature. The rod passes easily through both holes once more.

For safety reasons, you may wish to cool the gauge with slot using a dry ice slurry. This reduces the possibility of injury and the chance of damage to the apparatus through overheating.

Cool the gauge with slot in the dry ice slurry for about 30 seconds. Try to slip the rod through the holes in the gauge. It will not fit.

P/N 24-5006