# Methods For Reuniting Separated Columns

**AVAILABLE IN:** English

## Methods For Reuniting Separated Columns

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The largest single cause for the failure of precision thermometers in the lab is the separation of mercury columns. This can occur in transit or in the lab. The life of the instrument can be greatly extended if the following procedures are rigidly employed. Other methods may damage the thermometer.

### Cooling Method

With the thermometer in an upright position, gradually immerse ***only*** the bulb in a solution of solid $CO_2$ (Dry Ice) and alcohol so that the mercury column retreats slowly into the bulb. Do not cool the stem or mercury column. Keep the bulb in the solution until the main column and the separated portion retreat into the bulb. Remove and swing thermometer in a short arc, forcing all the mercury into the bulb.

Most mercury thermometers can be reunited using this method regardless of range (with the exception of deep immersion thermometers) provided ***only the bulb*** is immersed in the $CO_2$ and alcohol solution.

**Caution:** Do not touch the bulb until it has warmed sufficiently for the mercury to emerge from the bulb into the capillary. Never subject the stem or mercury column to the $CO_2$ solution as it will freeze the mercury column in the capillary and may cause the bulb to fracture.

### Heating Method

This method applies to thermometers with a maximum range of 260°C (500°F) equipped with expansion chambers sufficiently large to accommodate the separations plus a portion of the main column. Immerse as much of the bulb ***and stem*** as possible in a large beaker containing a liquid whose flash point is well above the highest indication of the thermometer being reunited. Heat the beaker, stirring the liquid with the thermometer, until the separation and a portion of the main column enter the chamber. Tap the thermometer in the palm of gloved hand reuniting the column.

Allow to cool slowly.

**Caution:**

1. Never use an open flame on the bulb.
2. Never fill the expansion chamber more than two-thirds full.
3. Make certain the flash point of the liquid is well above the highest temperature indicated on the thermometer.
4. Thermometers whose ranges exceed 260°C (500°F) ***cannot*** be reunited using heat without damaging the instrument.

## Reuniting Organic-Filled Columns

Separated columns in organic-filled (spirit) thermometers require a somewhat different technique in order to be reunited. The simplest and safest method is to force the liquid down the capillary by using a centrifuge, if one is available, with a cup deep enough to ensure that the centrifugal force is below the liquid column. Carefully insert the thermometer, bulb down, in the centrifuge. Have some cotton wadding at the bottom of the cup to prevent any damage to the bulb. Turn on the centrifuge and in just a few seconds all the liquid will be forced past the separation. If the cup is not deep enough and all the centrifugal force is not below the column, the column will split, forcing part of the liquid down. The remainder will be forced up, filling the expansion chamber.

If a centrifuge is not available, the column can be reunited by getting the liquid to run down. This can be accomplished by holding the thermometer in an upright position and gingerly tapping the stem above the separation against the palm of your hand. As you gently tap the thermometer, observe the liquid above the separation until it breaks away from the wall of the capillary and runs down to join the main column.