Updating the definition of the kelvin

The international measurement community, through the International Committee for Weights and Measures, is considering updating the International System of Units (SI). This update, which will probably occur in 2011, will redefine the kilogram, the ampere and the kelvin in terms of fundamental physical constants. The kelvin, instead of being defined by the triple point of water as it is currently, will be defined by assigning an exact numerical value to Boltzmann's constant. The change would generalise the definition, making it independent of any material substance, measurement technique, and temperature range, to ensure the long-term stability of the unit.

For almost all users of temperature measurements, the redefinition will pass unnoticed; water will still freeze at 0 °C, and thermometers calibrated before the change will continue to indicate the correct temperature. The immediate benefits of the redefinition will be to encourage the use of direct measurements of thermodynamic temperatures in parallel with the methods described in the International Temperature Scale.

In the longer term, the new definition will allow the accuracy of temperature measurements to gradually improve without the limitations associated with the manufacture and use of triple point of water cells. For some temperature ranges at least, true thermodynamic methods are expected to eventually replace the International Temperature Scale as the primary standard of temperature.

For further information contact your NMI or see http://www.bipm.org/wg/CCT/TG-SI/Allowed/Documents/Report_to_CIPM_2.pdf.