



## International System of Units overhauled in historic vote

**16th November 2018, Paris, France** – Today, in a landmark decision, representatives from 60 countries voted to redefine the International System of Units (SI), changing the world’s definition of the kilogram, the ampere, the kelvin and the mole, forever. The decision, made at the General Conference on Weights and Measures in Versailles, France, which is organized by the International Bureau of Weights and Measures (BIPM), means that all SI units will now be defined in terms of constants that describe the natural world. This will assure the future stability of the SI and open the opportunity for the use of new technologies, including quantum technologies, to implement the definitions.

The changes, which will come into force on 20<sup>th</sup> May 2019, will bring an end to the use of physical objects to define measurement units.

The definition of the kilogram for more than 130 years, the *International Prototype of the Kilogram* (IPK), a cylinder of a platinum alloy stored at the BIPM in France, will now be retired. It will be replaced by the Planck constant – the fundamental constant of quantum physics. While the stability of the IPK could only be confirmed by comparisons with identical copies, a difficult and potentially inaccurate process, the Planck constant is ready for use everywhere and always.

“The SI redefinition is a landmark moment in scientific progress.” said Martin Milton, Director, International Bureau of Weights and Measures (BIPM), “Using the fundamental constants we observe in nature as a foundation for important concepts such as mass and time means that we have a stable foundation from which to advance our scientific understanding, develop new technologies and address some of society’s greatest challenges.”

“Today marks the culmination of decades of work by measurement scientists around the world, the significance of which is immense” said Barry Inglis, Director of the International Committee for Weights and Measures. “We will now no longer be bound by the limitations of objects in our measurement of the world, but have universality accessible units that can pave the way to even greater accuracy, and even accelerate scientific advancement.”

The new definitions impact four of the seven base units of the SI: the kilogram, ampere, kelvin and mole, and all units derived from them, such as the volt, ohm and joule.

- The kilogram – will be defined by the Planck constant ( $h$ )
- The ampere – will be defined by the elementary electrical charge ( $e$ )
- The kelvin – will be defined by the Boltzmann constant ( $k$ )
- The mole – will be defined by the Avogadro constant ( $N_A$ )

Although the size of these units will not change (a kilogram will still be a kilogram), the four redefined units will join the second, the metre and the candela to ensure that the set of SI base units will continue to be both stable and useful. The revised SI will maintain its relevance by facilitating technical innovations. Just as the redefinition of the second in 1967 provided the basis for technology that has transformed how we communicate across the globe, through GPS and the internet, the new changes will have wide-reaching impact in science, technology, trade, health and the environment, among many other sectors.



### **Notes to editors**

You can find more information on the SI units here: [www.bipm.org/en/measurement-units/rev-si/](http://www.bipm.org/en/measurement-units/rev-si/)

Images to accompany this release, along with captions, can be downloaded here:

<https://www.dropbox.com/sh/94pcn4m5c0lzfj8/AADZhQd9QLaGMIfMG6VMOnC6a?dl=0>

Footage of the vote is available on request, please contact [bipm@aprilsixproof.com](mailto:bipm@aprilsixproof.com)

### **About the BIPM**

The signing of the Metre Convention in 1875 created the BIPM and for the first time formalized international cooperation in metrology. The Convention established the International Bureau of Weights and Measures and laid the foundations for worldwide uniformity of measurement in all aspects of our endeavours, historically focusing on and assisting industry and trade, but today just as vital as we tackle the grand challenges of the 21st Century such as climate change, health, and energy. The BIPM undertakes scientific work at the highest level on a selected set of physical and chemical quantities. The BIPM is the hub of a worldwide network of national metrology institutes (NMIs) which continue to realize and disseminate the chain of traceability to the SI into national accredited laboratories and industry. <https://www.bipm.org/en/about-us/>