Kilogram
kg

Kilogram – Unit of Mass
Symbol: kg

The kilogram is defined by taking the fixed numerical value of Planck's constant *h* to be $6.62607015 \times 10^{-34}$ when expressed in the unit J s, which is equal to kg m^2 s^{-1}, where the meter and the second are defined in terms of c and $\Delta\nu$Cs.

www.nist.gov/si-redefinition

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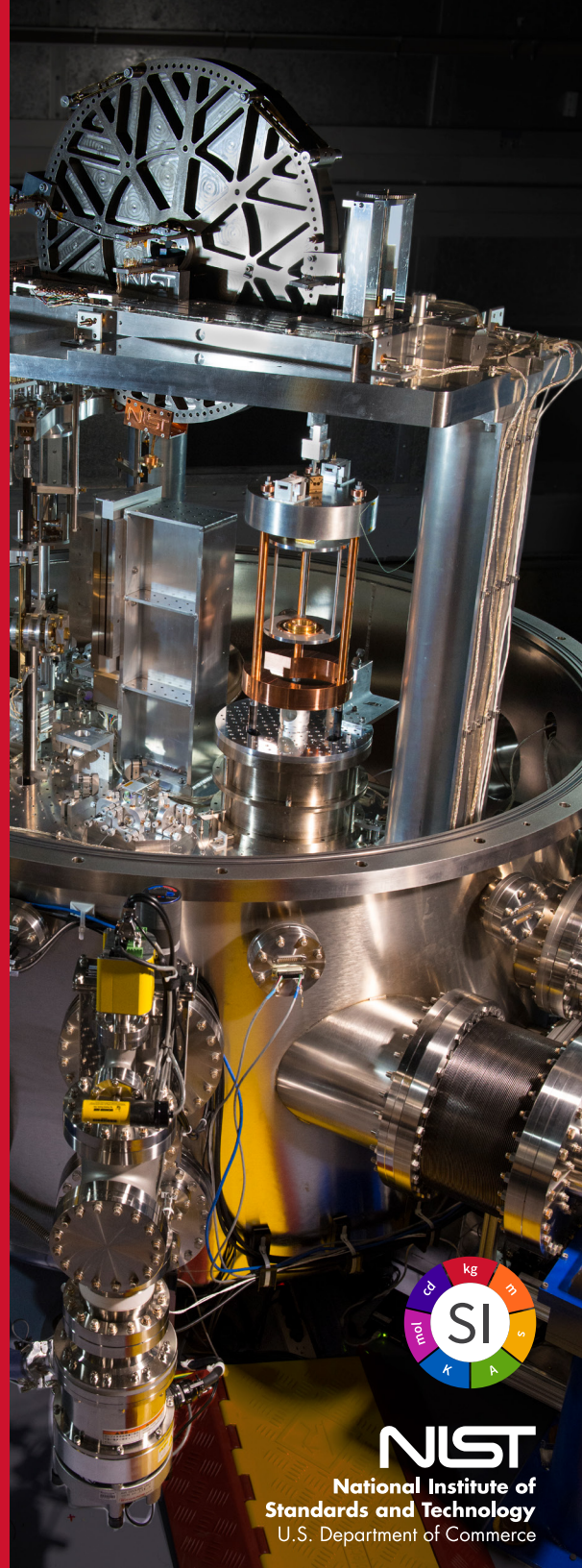
SI KILOGRAM



NIST
National Institute of Standards and Technology
U.S. Department of Commerce

Mass Calibrations under the New SI

1. Will the values of the corrections on my masses change as a result of the redefinition?

No. The redefinition was implemented such that continuity exists between the old and new definitions of the kilogram. This was proven by a pilot study conducted in 2016 between the National Metrology Institutes contributing to the new definition and the International Bureau of Weights and Measures.

2. Will the values of the uncertainties on my masses change because of the redefinition?

Yes. As of May 20, 2019, the International Prototype Kilogram (IPK) will be assigned an uncertainty of ± 0.010 mg. It will be necessary to add this uncertainty in quadrature to all one-kilogram calibrations that are traceable to the SI through the IPK. For example, if your current uncertainty (k=1) for your one-kilogram mass is 20 micrograms, the new uncertainty (k=1) becomes 22.4 micrograms.

3. Are you still calibrating weight sets? How about large masses?

Yes, we are still calibrating masses up to approximately 27,000 kg.

4. When should I have my weights recalibrated to the new definition?

There is no need for an immediate recalibration or a change in your calibration interval. You can have your weights recalibrated at the next scheduled calibration as dictated by your quality documentation (see #1).

5. Will my masses be calibrated in vacuum or put in the Kibble balance when I send them to NIST for calibration?

No, masses will not be calibrated in vacuum. All customer calibrations will be conducted at atmospheric pressure in typical laboratory conditions against working standards traceable to the new SI realization in vacuum.

6. I've heard that the kilogram isn't stable. Should I include a drift component in my uncertainty budget and if so how much?

The new definition of the kilogram has no systematic drift and is inherently stable as it is tied to Planck's constant. The artifacts used in the dissemination of mass may be unstable and it is up to each laboratory to monitor stability of their masses and apply appropriate corrections internally.

7. When will I be able to get a Kibble balance?

NIST and other National Metrology Institutes are partnering with industry leaders to develop tabletop Kibble balances. Public announcements will be made as they become available.

8. What uncertainty changes can I expect from NIST as a result of the redefinition?

As of May 20, 2019, there will be a slight increase in the uncertainty of your calibrated masses at the kilogram level. The classification of your masses based on legal metrology standards will not be affected.

9. What should my traceability statement say?

If you are traceable to the SI now, you will remain traceable under the new definition. For masses calibrated at NIST, you can get your traceability statement from the calibration report for your masses.

10. How should I change my quality documentation to reflect the new definition?

In your quality documentation you can state that traceability and continuity is maintained as detailed in #1 and #8.

11. Who can I contact with further questions about the redefinition's impact on me?

Any further questions can be directed to Zeina Kubarych (zeina.kubarych@nist.gov) or Patrick Abbott (patrick.abbott@nist.gov) of the Mass and Force Group at NIST.