

Dissemination from the Consensus Value for the kilogram

February 2023

The Consultative Committee for Mass and Related Quantities (CCM) requested in its Recommendation G1 of 2017, that until the dispersion in values becomes compatible with the individual realization uncertainties, the dissemination of the kilogram should be based on a Consensus Value, which would be determined based on the results of key comparisons between realization experiments. The CCM issued a [note on the dissemination process after the redefinition of the kilogram](#). The Consensus Value for the kilogram is determined from an arithmetic (non-weighted) mean of reference values of comparisons of kilogram realizations. The consensus value is reviewed after each key comparison of realisations, scheduled to take place, initially, every 2 years.

The results of the [first key comparison](#) were published in October 2020. The [first Consensus Value](#) was implemented on 1st February 2021. This marked the beginning of Phase 2 of the dissemination process. No adjustment to the international mass scale needed to be made. However, adjustments to the published Calibration and Measurement Capabilities (CMCs) of 31 NMIs were carried out to take into account the uncertainty in the Consensus Value. The results of the [second key comparison](#) were published in January 2023. Traceability for the SI unit of mass will be taken from the [second Consensus Value](#) of the kilogram commencing 1st March 2023. All NMIs need to reduce the mass value of their national as-maintained mass unit by 7 µg with respect to the mass value based on the IPK or by 5 µg with respect to the first Consensus Value. The adoption of the Consensus Value of 2023 requires no further adjustment to the published CMCs of NMIs.

An overview of the past and future bases for the dissemination of the kilogram is given in the table below. The Consensus Values of 2021 and 2023 are not absolute values but have to be expressed as an offset from a stable reference. This reference is the mass unit maintained by the BIPM, which represents the mass of the International Prototype of the Kilogram (IPK).

Date of implementation	Basis for dissemination	Uncertainty
20 May 2019	$m(\text{IPK}) = 1 \text{ kg}$	10 µg
1 February 2021	Consensus value 2021 $m(\text{IPK}) = 1 \text{ kg} - 2 \text{ µg}$	20 µg
1 March 2023	Consensus value 2023 $m(\text{IPK}) = 1 \text{ kg} - 7 \text{ µg}$	20 µg