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Proposal for Criteria for the Inclusion of a Method in the MeP-K

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The inclusion of a method for the realisation of the base unit kelvin in the *mise en pratique* for the definition of the kelvin (MeP-K) requires that the following criteria are fulfilled:

- ✓ For primary-thermometry methods, a well derived equation of state describing the relation between thermodynamic temperature and other independent quantities of the physical system used must exist that does not contain unknown or significantly temperature-dependent parameters. If the equation of state is based on an approximation of a complex theory, it must at least be possible to estimate the order of magnitude of the deviation from theory.
- ✓ Methods applied for the approximation of either thermodynamic temperature or defined temperature scales must be based on well derived approximate formulas or empirical relations that allow a reliable interpolation or extrapolation after necessary parameters have been arrived at through reference to temperature fixed points.
- ✓ A complete uncertainty budget must be approved by CCT.
- ✓ The uncertainty of the realisation of the kelvin must not be more than one order of magnitude larger than the state-of-the-art uncertainty achieved with primary thermometry or defined temperature scales, or the uncertainty needed by the stakeholders.
- ✓ At least two independent realisations applying the method with the necessary uncertainty must exist. Ideally the results have been compared directly.
- ✓ A comparison of the realisations with the results of already accepted methods must be performed; any significant, unresolved deviations should be addressed by the CCT prior to inclusion of the new method in the MeP-K.
- ✓ The methods should be applicable over temperature ranges that are acceptable for the stakeholders in metrology, science or industry.
- ✓ The experimental technique necessary for applying the methods should be documented in detail in the open literature so that experts in metrology can realise it independently.