

# ITS-90 Subrange Review Protocol

## ITS-90 Subrange review guidelines:

No review needed:

$$U_{\text{CMC}} / U_{\text{comb}} \geq 1 \text{ and } U_{\text{CMC}} \text{ (FPs) OK}$$

RMO scrutiny and CCT-WG-CMC acceptance:

$$1 > U_{\text{CMC}} / U_{\text{comb}} \geq 2/3 \text{ and } U_{\text{CMC}} \text{ (FPs) OK}$$

RMO scrutiny and CCT-WG-CMC scrutiny:

$$U_{\text{CMC}} / U_{\text{comb}} < 2/3 \text{ and } U_{\text{CMC}} \text{ (FPs) OK}$$

“ $U_{\text{CMC}}$  (FPs) OK”: those FPs used for that temperature subrange are smaller than that of the  $U_{\text{CMC}}$  function for the SPRT.

If  $U_{\text{CMC}}$  (FPs) are not OK, then no acceptance is allowed.

Cutoff criteria table for review process:

ITS-90 subrange	$U_{\text{comb}}$ range, mK	
Ar to 0.01	0.53	0.082
Hg to Ga	0.29	0.20
0 to Ga	0.082	0.20
0 to In	0.082	0.77
0 to Sn	0.082	0.91
0 to Zn	0.082	0.95
0 to Al	0.082	1.91
0 to Ag	0.082	3.41

Other combinations are acceptable. Examples of those combinations are

Zn to Al	0.95 mK to 1.91 mK
Hg to 0.01 °C	0.29 mK to 0.082 mK
Ar to Ga	0.53 mK to 0.20 mK

The  $U_{\text{comb}}$  values are estimated from the 25<sup>th</sup> percentile of the K3, K4 and K9 values and non-uniqueness from several published and unpublished literature sources.  $U_{\text{CMC}}$  submission must capture the maximum uncertainty for the given temperature subrange. If two values are given, then it will be interpreted as a linear function between end points, everywhere  $\geq$  the calculated uncertainty.

**ITS-90 SPRT subrange protocol - Scrutiny criteria required**

1. Proper propagation of  $U_{FPs}$
2. Non-uniqueness values used for the specified temperature subrange.
3. Copy of a Report of Calibration.
4. Calibration process (method) used for SPRT.
5. Stability assessment of SPRT

**CMC submission protocol:**

- RMO review level
  - Post review on WG8 discussion forum for 6 weeks
  - new topic created for each submission
  - executive summary and any supporting documentation
  - judging of implementation of review protocol

WG8 chair will submit the CMCs to JCRB Exec Sec for fasttrack if no comments after 6 weeks or if all WG8 RMO representatives give approval before the 6 week deadline.

- CCT WG8 review level
  - Post review on WG8 discussion forum for comment
  - new topic created for each submission
  - executive summary and any supporting documentation
  - review at next available meeting with those NMIs present for discussion of their submission and supporting documentation