



Measurement

Volume 120, May 2018, Pages 21-27

Evaluation of different calibration equations for NTC thermistor applied to high-precision temperature measurement

Guang Liu ^{a, b}, Liang Guo ^a , Chunlong Liu ^a, Qingwen Wu ^a

[Show more](#)

<https://doi.org/10.1016/j.measurement.2018.02.007>

[Get rights and content](#)

Abstract

Using a negative temperature coefficient (NTC) thermistor for high-precision temperature measurement can give a resolution and accuracy as low as 5 mK. The performance of an NTC thermistor is affected markedly by its calibration equation. Two series of high precision calibration for NTC thermistors in a precision water bath by means of comparison method were presented. Nine approximate calibration equations for the resistance–temperature characteristics of the MF501 NTC thermistor are evaluated within a temperature range of 278.15–328.15 K. It is confirmed that the fitting quality is influenced greatly by the number of coefficients used in the calibration equation, and that the Hoge-2 equation is the best calibration equation for the MF501 NTC thermistor for high-precision temperature measurements. The combined standard uncertainty of the thermistor calibration system is estimated as 4.31 mK. The calibration procedure and evaluation method proposed can be used for calibration of any types of NTC thermistors.

Keywords

Calibration equation; NTC thermistor; High precision; Uncertainty

[Previous](#)[Next](#)[Recommended articles](#)

Citing articles (0)

© 2018 Elsevier Ltd. All rights reserved.

ELSEVIER[About ScienceDirect](#) [Remote access](#) [Shopping cart](#) [Contact and support](#)[Terms and conditions](#) [Privacy policy](#)

We use cookies to help provide and enhance our service and tailor content and ads. By continuing you agree to the [use of cookies](#).

Copyright © 2018 Elsevier B.V. or its licensors or contributors. ScienceDirect® is a registered trademark of Elsevier B.V.

RELX Group™