

# Verification of Liquid Thermostats with a Miniature Sodium Fiducial Point Ampoule

**A.F. Brodnikov**<sup>1</sup>, Novosibirsk Branch of FSAEI FVT Academy for Standardization, Metrology and Certification (Training), Assoc. Prof. Dr., [mainbox@asmsnsk.ru](mailto:mainbox@asmsnsk.ru)

**A.N. Vikhareva**<sup>1</sup>, FSBEI HE Siberian State University of Geosystems and Technologies, Assoc. Prof. Dr., [Milana-maria@mail.ru](mailto:Milana-maria@mail.ru)

<sup>1</sup> Associate Professor, Novosibirsk, Russia

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## key words

fiducial point, miniature ampoule, sodium solidification, liquid thermostat, heterogeneity, instability, differential method

We have investigated and justified the possibility of using miniature ampoules of reference points as reference measures for reproducing and transmitting the temperature unit during verification (certification) of liquid thermostats. The advantage of these ampoules is a small volume, high metrological reliability, as well as an acceptable cost due to the small weight (less than 10 g) of especially pure metals used in them. We have experimentally tested and propose a method for determining the actual temperature of the coolant in a liquid thermostat using a reference point of solidification of sodium in a miniature ampoule and a multi-solder differential thermocouple. The advantage of the considered method in comparison with the traditional one based on the use of reference platinum thermometers is the simplicity and reliability of the devices implementing it. The technique can be used for certification (verification) of liquid thermostats using miniature ampoules with reference points of other metals, such as gallium, indium, tin and zinc.

## References

1. Bedford R. E., Bonnier G., Maas H., Pavese F. (WG 2 of the CCT). Recommended values of temperature on the ITS-90 for a selected set secondary reference points, *Metrologia*, 1996, no. 33, pp. 133–154.
2. Shevelev Yu.V., Cherepanov V.Ya. Realizatsiya repornykh toчек temperaturnoy shkaly v malogabaritnykh ampulakh [Realization of reference points of the temperature scale in small-sized ampoules], *Izmeritel'naya tekhnika*, 2004, no. 2, pp. 39–42.
3. Brodnikov A.F., Cherepanov V.Ya. Rezul'taty issledovaniy i perspektivy ispol'zovaniya miniatyurnykh ampul repornykh toчек dlya vosproizvedeniya i peredachi temperaturnoy shkaly [Research results and prospects for the use of miniature ampoules of reference points for reproduction and transmission of the temperature scale], *Izmeritel'naya tekhnika*, 2009, no. 10, pp. 49–52.
4. Brodnikov A.F., Cherepanov V.Ya. Metodika vosproizvedeniya i peredachi edinitsy temperatury repornymi tochkami v miniatyurnykh ampulakh [The technique of reproducing and transferring the unit of temperature by reference points in miniature ampoules], *Izmeritel'naya tekhnika*, 2016, no. 1, pp. 41–42.
5. Szymrka-Grzebek A., Lipinski L. Cryogenic standards in Poland, *Pribory*, 2007, no. 7, pp. 16–19.
6. Brodnikov A.F., Cherepanov V.Ya. Analiz vozmozhnostey sozdaniya novykh repornykh i postoyannykh toчек temperaturnoy shkaly [Analysis of the possibilities of creating new reference and constant points of the temperature scale], *Pribory*, 2007, no. 8, pp. 15–19.

## НОВАЯ КНИГА

Серова Т.Б.



## Манометры

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Приведены основные сведения о методах измерения давления, механических (шкальных) приборах избыточного давления, методах и средствах их поверки и калибровки. Описаны принципы действия, основные схематические решения, технические и метрологические характеристики приборов. Подробно анализируются вопросы поверки манометров: правильный выбор эталонных средств, особенности методов поверки, представление конечных результатов. Рассмотрены типы грузопоршневых манометров и методика их поверки. Пособие может быть полезно специалистам в области эксплуатации, поверки и калибровки средств измерений давления, ремонта манометров, студентам, обучающимся по данному направлению.

**По вопросам приобретения обращайтесь по адресу:** Академия стандартизации, метрологии и сертификации (АСМС), 109443, Москва, Волгоградский пр-т, 90, корп. 1. Тел. / факс: 8 (499) 742 4643. Факс: 8 (499) 742 5241. E-mail: [info@asms.ru](mailto:info@asms.ru)