



**BSR/ASHRAE Addendum a to
ANSI/ASHRAE Standard 41.1-2020**

Public Review Draft

**Proposed Addendum a to Standard
41.1-2020, Standard Methods for
Temperature Measurements**

**First Public Review (May 2021)
(Draft shows Proposed Changes to Current Standard)**

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ASHRAE, 180 Technology Parkway, Peachtree Corners GA 30092

This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and strikethrough (for deletions).

Section 3, Definitions: Add the new definition below for clarification.

steady-state criteria: the criteria that establish negligible change of temperature or temperature difference with time.

Section 5.1, Test Plan: Revise as shown below to make it easier for Method of Test (MOT) and Method of Rating (MOR) standards to adopt this standard by reference.

5.1 Test Plan. ~~A test plan shall specify the temperature measurement system accuracy and the test points operating conditions to be performed. Additionally, the test plan shall include the test points, targeted set points, and corresponding operating tolerances to be performed.~~ The test plan shall be one of the following documents:

- a. A document provided by the person or the organization that authorized the tests and calculations to be performed.
- b. A method of test standard.
- c. A rating standard.
- d. A regulation or code.
- e. Any combination of items a. through d.

The test plan shall specify:

- a. The temperature or temperature difference measurement system accuracy.
- b. The values to be determined and recorded that are selected from this list: temperature, temperature difference, temperature measurement uncertainty, and temperature difference measurement uncertainty.
- c. Any combination of test points and targeted set points to be performed together with operating tolerances.

Section 5.2, Values to Be Determined and Reported: Revise as shown below to make it easier for MOT/MOR standards to adopt this standard by reference.

5.2 Values to be Determined and Reported

The test values to be determined and reported shall be as shown in Table 5-1 if specified in the test plan in Section 5.1. Use the units of measure in Table 5-1 unless otherwise specified in the test plan in Section 5.1.

TABLE 5-1 Measurement Values and Units of Measure

| Quantity | Units of Measure | |
|---|------------------|-----|
| | SI | I-P |
| Temperature | °C | °F |
| Uncertainty in the Temperature Measurement | °C | °F |
| Temperature Difference | K | °R |
| Uncertainty in the Temperature Difference Measurement | K | °R |

Section 5.4, Uncertainty: Revise as shown below to make it easier for MOT/MOR standards to adopt this standard by reference.

5.4 Uncertainty. The uncertainty in each temperature and temperature difference measurement shall be estimated as described in Section 4.08 for each test point ~~unless otherwise~~ if specified in the test plan. Alternatively, if specified in the test plan, the worst-case uncertainty for all test points shall be estimated and reported for each test point.

Section 5.5, Steady-State Test Criteria: Revise as shown below to make it easier for MOT/MOR standards to adopt this standard by reference.

5.5 Steady-State Test Criteria. Temperature and temperature difference test data shall be recorded at steady-state conditions unless otherwise specified in the test plan in Section 5.1. ~~If the test plan requires temperature or temperature difference test data points to be recorded at steady state test conditions and provides the operating condition tolerance but does not specify the steady state criteria, then determine that steady state test conditions have been achieved using one of the following methods:~~

- ~~a. Apply the steady state criteria in Section 5.5.1 if the test plan provides test points for temperature measurement.~~
- ~~b. Apply the steady state criteria in Section 5.5.2 if the test plan provides test points for temperature difference measurement.~~
- ~~c. Apply the steady state criteria in Section 5.5.3 if the test plan provides targeted set points for temperature measurement.~~
- ~~d. Apply the steady state criteria in Section 5.5.4 if the test plan provides targeted set points for temperature difference measurement.~~

5.5.1 Steady-State Test Criteria Under Laboratory Test Conditions. If the test plan requires temperature or temperature difference test data points to be recorded at steady-state test conditions and

provides the operating condition tolerance but does not specify the steady-state criteria, then determine that steady-state test conditions have been achieved using one of the following methods:

- a. Apply the steady-state criteria in Section 5.5.1.1 if the test plan provides test points for temperature measurement.
- b. Apply the steady-state criteria in Section 5.5.1.2 if the test plan provides test points for temperature difference measurement.
- c. Apply the steady-state criteria in Section 5.5.1.3 if the test plan provides targeted set points for temperature measurement.
- d. Apply the steady-state criteria in Section 5.5.1.4 if the test plan provides targeted set points for temperature difference measurement.

5.5.2 Steady-State Test Criteria Under Field Test Conditions. If the test plan requires temperature or temperature difference test data points to be recorded at steady-state test conditions and provides the operating condition tolerance but does not specify the steady-state criteria, the methods in Section 5.5.1 are optional.

Informative Note: The steady-state methods in Section 5.5.1 are likely to be impractical under field test conditions. Under these circumstances, the user may want to select another method to determine the conditions for field test data to be recorded.

Section 5.5, Revise subsection headers as shown below.

5.5.1.1 Steady-State Temperature Criteria for Test Points

5.5.1.2 Steady-State Temperature Difference Criteria for Test Points

5.5.1.3 Steady-State Temperature Criteria for Targeted Set Points

5.5.1.4 Steady-State Temperature Difference Criteria for Targeted Set Points

Section 8.1, Uncertainty Estimate: Revise as shown below to make it easier for MOT/MOR standards to adopt this standard by reference.

8.1 Uncertainty Estimate. An estimate of the measurement system uncertainty, performed in accordance with ASME PTC 19.1⁴, shall accompany each temperature measurement and temperature difference measurement if specified in the test plan in Section 5.1. Where two temperature measuring instruments are used to measure a temperature difference, the individual instrument accuracies shall be included in the temperature difference measurement uncertainty estimate.

Informative Note: An example of temperature measurement uncertainty calculations is provided in Informative Appendix B.

Section 9.5, Test Results: Revise as shown below to make it easier for MOT/MOR standards to adopt this standard by reference.

9.5 Test Results if Specified in the Test Plan in Section 5.1.

- a. Temperature, °C (°F).
- b. Uncertainty of temperature measurement, °C (°F).
- c. Temperature difference, °C (°F).
- d. Uncertainty of temperature difference measurement, °C (°F).