1. Introduction

1.1. AASHTO M 201 and ASTM C511 include many requirements that affect the test specimens and have a direct impact on the tests performed on those specimens following curing. The following policy describes the affected tests and explains the AASHTO Accreditation Program policy for handling some of the language presented in these standards so that laboratories understand the expectations for conformance.

1.2. This document does not represent a comprehensive explanation of all requirements of M 201 and C511. The user needs to read those standards to understand all requirements.

2. Mixing Rooms

2.1. Section 4.1 of C511 states that the "temperature of the air in the vicinity of the mixing slab, molds, and base plates shall be maintained at 23.0 ± 4.0 °C and at a relative humidity of not less than 50 %."

2.2. The following test methods require conformance with the temperature and humidity requirements of M 201 and C511 for mixing rooms:

- 2.2.1. T 106
- 2.2.2. C185 and T 137
- 2.2.3. C187 and T 129
- 2.2.4. C191 and T 131
- 2.2.5. C266 and T154
- 2.2.6. C305 and T162
- 2.2.7. C451 and T186
- 2.2.8. C1437

2.3. The following test method requires conformance with only the temperature requirement of C511 for mixing rooms:

- 2.3.1. C1506

2.4. The following test methods do not reference C511 but have their own requirements related to the C511 requirements for the temperature and humidity of mixing rooms:

- 2.4.1. C109: The temperature requirement is tighter than C511: 23.0 ± 3.0 °C instead of 23.0 ± 4.0 °C. The humidity requirement is the same as that for C511.
- 2.4.2. C227, C441, C1260, C1567, and T 303: The temperature shall be maintained at not less than 20 °C and not more than 27.5 °C. The humidity requirement is the same as that for C511.
- 2.4.3. C1038: The temperature and humidity requirements are the same as those for C511.

3. Moist Cabinets/Moist Rooms and Water Storage Tanks

3.1. The following test methods require conformance with M 201 and C511 for **both** Moist Cabinets/Moist Rooms **and** Water Storage Tanks:

- 3.1.1. C157 and T 160
- 3.1.2. C1038

4. **Moist Cabinets/Moist Rooms**

4.1. The following test methods require conformance with M 201 and C511 for Moist Cabinets/Moist Rooms:

- 4.1.1. C87 and T 71
- 4.1.2. C109 and T 106
- 4.1.3. C151 and T 107
- 4.1.4. C191 and T 131
- 4.1.5. C227
- 4.1.6. C266 and T 154
- 4.1.7. C348
- 4.1.8. C441
- 4.1.9. C452
- 4.1.10. C596
- 4.1.11. C672
- 4.1.12. C780 (Annex 6)
- 4.1.13. C882
- 4.1.14. C942
- 4.1.15. C953
- 4.1.16. C1090
- 4.1.17. C1105
- 4.1.18. C1140 (Latex admixture shotcrete panels only)
- 4.1.19. C1260 and T 303
- 4.1.20. C1293
- 4.1.21. C1567

5. **Moist Cabinets/Moist Rooms or Water Storage Tanks**

5.1. The following test methods require conformance with M 201 and C511 for **either** Moist Cabinets/Moist Rooms **or** Water Storage Tanks:

- 5.1.1. C31 and T 23
- 5.1.2. C39 and T 22
- 5.1.3. C78 and T 97
- 5.1.4. C192 and R 39
- 5.1.5. C293 and T 177
- 5.1.6. C469
- 5.1.7. C496 and T 198
- 5.1.8. C567
- 5.1.9. C1019
- 5.1.10. C1074 and T 325
- 5.1.11. C1202
- 5.1.12. C1609

6. **Accreditation Prerequisites**

6.1. If negative accreditation action is being taken against M 201 and C511 for any of the types of facilities noted above, the applicable, affected test methods as listed above will also be suspended.

6.2. Accreditation for C1077 (Concrete) and E329 (Concrete) will also be affected if Concrete standard C511 is affected.

7. **Recorder Data**

7.1. The AASHTO Accreditation Program requires the weekly review of the data per Section 5.2 of M 201 and C511 to be documented on the same document upon which the data is found, whether on the paper charts themselves or within the same electronic documents as the numerical or graphed data.

7.2. Chart recorders shall be set up for documenting only one week of data at a time.

7.2.1. Multiple weeks of data cannot be recorded on the same chart. New charts shall be installed each week.

7.2.2. Monthly charts cannot be used. This is to help ensure that the weekly review is consistently taking place, and that the individual 15-minute readings are both more discernible to the human eye and being accurately documented by the mechanics of the recorder.

7.3. Chart recorders shall not be equipped with pens that leave overly thick lines that obscure temperature fluctuations.

7.4. Presenting electronic graphs may require that the numerical data also be evaluated so that the 15-minute recordings can be verified.

7.5. The weekly review of the data shall include

7.5.1. the inclusive dates for the data,

7.5.2. the name of the technician who reviewed the data that week,

7.5.3. the date of the technician's review, and

7.5.4. confirmation that the data is within the required temperature range.

7.5.4.1. The confirmation shall include a brief description of corrective action that was taken or is being taken to address any nonconforming temperatures. Corrective actions involving more than minor actions, such as an adjustment to a thermostat, or ensuring that a door remains shut, may need to be documented separately. In such cases, the confirmation that is documented on the data itself shall include a reference to this corrective action documentation.

7.6. Temperature recorder data shall be maintained by the laboratory for at least three years.

7.7. Laboratories that have moved or converted their storage facilities or received certain nonconformities regarding the conformance of the storage facilities will need to submit at least three weeks of temperature recorder data to establish ongoing conformance. Examples of situations requiring at least three weeks of data include, but are not limited to, temperatures being out during an on-site inspection; the relocation of a laboratory or transition from one kind of storage design to another; facilities not being equipped with a recorder during an on-site inspection; data not being available to the on-site inspector during an inspection; data reviewed by the on-site inspector indicating that temperatures were not maintained within specification over time; the recorder not being within 1°C of the reference thermometer when verified by the on-site inspector during an inspection; etc. The possibility of a provisional exception to the three-week requirement is evaluated on a case-by-case basis.

8. **Thermostatic control**

8.1. Laboratories shall control the temperature fluctuations of moist rooms or moist cabinets by means of automatic thermostatic control for heating or cooling, or both, as may be necessary (Section 6.1.1 of M 201 and C511; Section 7.2 of M 201 and Section 7.1.1 of C511). This typically requires laboratories to utilize automatic thermostatic control for both heating and cooling. But in rare cases, where automatic thermostatic control is not provided and climactic changes or changing volumes in testing never cause the temperatures to rise or fall outside the range of acceptance, something less than automatic control can be considered for acceptance through approval by the AASHTO Accreditation Program's oversight committee. In such cases, laboratories not wishing to install thermostatic control for either heating or cooling to address an accreditation related concern shall provide temperature recorder data for the last 12 months or longer for evaluation along with detailed explanations and photos of the curing facilities.

8.2. If the laboratory is thermostatically controlling the space around a moist cabinet or moist room per Section 6.1.1.2 of M 201 and C511, the entire surrounding space is required to be temperature controlled (except for the rare cases just noted in Section 4.1 of this document). Confirmation of this requires the AASHTO Accreditation Program to review pictures of all four walls and the ceiling of the moist room, and the location of the sensor for the thermostat to ensure flow of thermostatically controlled air around the entire moist room. If the air temperature within the moist cabinet or moist room is not thermostatically control, the moist room cannot be constructed using any walls adjacent to areas that are not thermostatically controlled, such as an outside wall or roof.

9. **Standardization of the Temperature Recorder**

9.1. The temperature recorder shall be standardized in place at the laboratory during the normal operation of the moist cabinet, moist room or water storage tanks (Section 5.2.1.3 of M 201 and C511). Recorders that come with a factory standardization or that have been sent out to be standardized at a calibration agency's laboratory, will need to be re-standardized in the laboratory's storage facilities to meet this requirement.

10. **Calibration of the Reference Thermometer**

10.1. The reference thermometer shall be accurate and readable to 0.5°C.

10.2. The reference thermometer shall be calibrated by an ISO/IEC 17025-accredited calibration agency.

10.3. The calibration agency shall perform a thermodynamic calibration of the reference thermometer.

10.3.1. For digital contact thermometers that are constituted of separate probes and readout devices, the probe and readout device, as used by the laboratory, shall be calibrated as a unit.

10.3.2. All thermometers are calibrated thermodynamically by reading actual temperatures and comparing the readings obtained with those obtained by the calibration agency's reference thermometer.

10.3.3. The calibration report shall include measurement results and associated uncertainties at test points that bracket the range of use or at a single test point within the range of 21.0-25.0°C (Note 1).

10.3.4. The measurement uncertainties for the readings of the laboratory's reference thermometer cannot exceed 0.5°C (Note 1).

Note 1—If the reference thermometer is used to standardize more than just the M 201 and C511 temperature recorder, a single test point may not be acceptable, and a measurement uncertainty better than 0.5°C may be required. Applicable standards and accreditation requirements should be consulted for determining all requirements applicable to the selection and calibration of an appropriate reference thermometer when it is used to meet thermometric needs beyond the scope of M 201 and C511.