Answers to Frequently Asked Questions for CTI STD-201 Thermal Certification of Evaporative and Air-Cooled Heat Rejection Equipment

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What is CTI STD-201?

CTI Standard (STD) 201 sets forth a program for the Cooling Technology Institute to certify that all models of a line of evaporative or air-cooled heat rejection equipment offered for sale by a specific manufacturer will perform thermally in accordance with their published ratings.

The standard is presented in three parts.

- STD-201RS is titled *Performance Rating of Evaporative Heat Rejection Equipment* and contains the program requirements including testing, ratings, and published data requirements.
- STD-201Dry RS is titled *Performance Rating of Dry Fluid Coolers* and contains the program requirements including testing, ratings, and published data requirements.
- STD-201OM is titled *Operations Manual for Thermal Performance Certification of Evaporative and Air-Cooled Heat Rejection Equipment* and guides program participants in complying with the provisions of the latest edition of CTI Standard 201RS or 201 Dry RS.

To what equipment does CTI STD-201 apply?

This Standard applies to Mechanical Draft Evaporative and Air-Cooled Heat Rejection Equipment such as Cooling Towers, Closed Circuit Coolers and Evaporative Refrigerant Condensers where the thermal capacity is selected from published ratings.

What is the CTI STD-201 Thermal Certification Program?

The Thermal Certification Program, through the Thermal Certification Administrator, manages the validation and testing of manufacturer's equipment, publishes certification letters (both for product entries and withdrawals), answers questions from new and existing members, manages the CTI website and Journal content and leads the Thermal Certification Program Committee. See https://www.cti.org/cti-certification for more information and for a listing of CTI Certified product lines.

What is required for initial Program participation?

All information required for initial program participation is specified in STD-201RS, STD-201 Dry RS and STD-201OM. These documents are available for purchase on the CTI website at https://www.cti.org/shop-now.
In summary, the requirements include:

- Confidential data submission to the Thermal Certification Administrator including the Data of Record, rating information and rating methodology.
- Publically available data for customer support including thermal performance tables and

physical data.
- Completion of initial qualification testing and annual reverification testing of individual models selected from the line by the CTI Certification Administrator.

Please contact the Thermal Certification Administrator (tcas@cticertification.org) with any questions regarding the initial application process for certification.

What data is a manufacturer required to submit to the Thermal Certification Administrator?

The applicant company will be required to assemble and submit the Data of Record information and the supporting data folder for each of the product lines they wish to have certified. A template spreadsheet may be obtained at https://www.cti.org/certification-inquiry.

Applicant companies shall also provide rating information and a methodology to the Thermal Certification Administrator to allow the accurate calculation of the thermal performance (capacity) of each model to be certified throughout the applicable range of thermal conditions. Ideally, this is provided in the form of a selection program.

Proof of completion of an Initial Qualification Test by a CTI-licensed Certification Test Agency is also required. A CTI-licensed test agency will provide the necessary test instrumentation and personnel for the collection of data during the test. A list of CTI Licensed Certification Test Agencies is found at: https://www.cti.org/thermal-certification.

Information submitted to the Thermal Certification Administrator is kept strictly confidential from all other applicants and program participants. For more information on these data requirements see STD-201RS, STD-201Dry RS, and STD-201OM available for purchase at https://www.cti.org/shop-now or contact the Thermal Certification Administrator (tcas@cticertification.org).

What data is a manufacturer required to provide to the public?

Public data disclosures are required to assist potential buyers of certified models. This includes published ratings for at least the operating conditions listed in in STD-201RS, Section 6, Tables 3, 4 or 5 (Evaporative heat rejection equipment) or in STD-201Dry RS, Section 6, Table 3 and 4 as well as performance ratings and physical dimensions in the form of a catalog, bulletin, or preferably an electronic equivalent. Examples of the public disclosures from the current certified product lines may be found on the CTI Certification Directory website here: https://www.cti.org/certification-directory.

For more information on these data requirements see STD-201RS or STD-201Dry RS available for purchase at https://www.cti.org/shop-now or contact the Thermal Certification Administrator

(tcas@cticertification.org).

What is required for the initial qualification and annual reverification tests?

Program participation requires both an initial qualification test and an annual reverification test for each applicable product line. The tests must be performed in accordance with ATC-105, 105S or 106, as applicable for the product type, by a CTI-licensed test agency.

The applicant company should consider by what means each test will be conducted. Testing in the field - at a customer facility for example - is allowed by the program. However, additional preparations for testing are required, and of course the cooperation of the customer to provide adequate and stable heat duty for the tested unit. If the applicant company has access to or the means to build and configure a test facility - boiler or other heat source, pump, heat exchanger and controls for the above - then the initial and annual testing may preferably be conducted within a test facility.

A CTI-licensed test agency will provide the necessary test instrumentation and personnel for the collection of data during the test. A list of CTI Licensed Certification Test Agencies is found at: https://www.cti.org/thermal-certification.

For more information see STD-201RS and OM as well as ATC-105, 105S, 105DS and 106 (as applicable for the product type), available for purchase at https://www.cti.org/shop-now or contact the Thermal Certification Administrator (tcas@cticertification.org) .

What are the program costs?

The program costs fall into several categories:

1. CTI Certification Program Fees – for new, renewing or revised certifications;
2. Labor costs for review, consultation, record keeping, test report preparation and other administrative tasks by the Thermal Certification Administrator (initially and annually following certification);
3. Costs to conduct testing of the subject units – Licensed Certification Test Agent fees, test unit construction costs, test facility operating costs, and so on.

Please contact the Thermal Certification Administrator (tcas@cticertification.org) for up to date program costs.

What is the Thermal Certification Program Committee and how do I join?

The Thermal Certification Program Committee is a standing committee organized under the guidance of STD-201OM for the purpose of 1) advising the Thermal Certification Administrator, 2) ruling on any complaints relating to interpretation of the STD-201 standard, and 3) reviewing and approving the program budget and setting the CTI Program fee structure. The committee

also reviews pertinent technical topics of discussion and makes recommendations for additions, improvements and changes to the program via recommendations made to the STD-201 Standards Committee.

The Thermal Certification Program committee is made up of representatives from the participating equipment manufacturers who have currently certified product lines, along with representatives of the end-user community and CTI management. The Thermal Certification Administrator is the chairman for the committee.

Certification Program Committee meetings are held at the CTI Annual Conference and Summer Workshop sessions, and teleconference and web-based sessions throughout the year. Contact the Thermal Certification Administrator (tcas@cticertification.org) for more information or a schedule of upcoming events.

How is equipment certified by the CTI STD-201 Thermal Certification Program?

The program validates the thermal performance of the equipment in a manufacturer's product line through both thermal performance testing and comparative analysis where all of the models have the same basic design and only differ in relative size. Thermal performance testing is required annually or in the event of a substantial product design change resulting in a revision of thermal performance.

How does a manufacturer certify multiple types of equipment?

If the manufacturer has several basic designs, each basic design must be separately certified and issued a separate certification approval letter and separate CTI Certification Validation Number.

What are CTI's product line naming requirements?

If a manufacturer participating in the CTI STD-201 Thermal Certification Program has several product lines, each CTI Certified product line must have a unique model line name that is different from other product line names whether the other product lines are certified or not certified.

Does CTI STD-201 cover sound, drift emissions or construction quality?

The CTI STD-201 Thermal Certification Program is for thermal performance only and **does not include** sound, drift emissions, materials of construction or quality of construction. The CTI and other organizations have separate standards for sound, drift emissions, and materials and their properties.

Can a manufacturer produce a certified product at multiple locations?

There are no restrictions on the manufacturing plant where the towers are produced or assembled as long as the certified models produced are the same at all plants. Many of the participating manufacturers have several manufacturing plants and some towers may actually use components from several different plants or supply sources in the final assembly. Only one CTI Certification approval letter and validation number is issued for each product line and these are applicable wherever the final assembly or sale occurs.

The thermal selection software, tables or graphs used to determine the tower size versus performance must be the same for all towers regardless of the assembly or sale location. However, accommodation for different units of measurements may be made to match the customary units used in a particular market.

How should a manufacturer handle private labeling of a certified product line?

If a line of CTI Certified towers is sold by several organizations using different company names and/or line names, the manufacturer company is responsible for maintaining the "Data of Record" for both the manufacturer company brand towers and the private company brand towers. The private brand company does not have to sell every model that the manufacturer company has in the "Data of Record" but the private brand company cannot add models that do not have an equivalent model listed in the manufacturer's "Data of Record". Both the manufacture company brand and the private company brand of a line of certified towers will be issued and use the same CTI Certification Validation Number. Both the manufacture company brand and the private company brand of a line of certified towers must use the same thermal performance ratings.

Can process fluids other than water be allowed on a certified product line (Closed Circuit Coolers/ Evaporative Condensers)?

Ratings for units with alternate process fluids can be certified if at least one qualifying test is conducted, and the alternate ratings are publicly disclosed. Certification for Closed Circuit Coolers is commonly sought with aqueous glycol solutions as process fluid, for which disclosure of ratings shall be made at one concentration. Please check the footnotes to the Certified Model List for each product line, published at https://www.cti.org/certification-directory, to learn the approved process fluid choices for that line. Where no alternate fluids are listed, the certification is based on water-only as the process fluid.

Are alternate materials of construction allowed on a certified product line?

The CTI STD-201 Thermal Certification Program allows for alternate materials of construction as long as the components used for thermal performance are unchanged. Therefore, it is common to have multiple materials such as galvanized steel, stainless steel and fiberglass used as alternatives in the structure and external casing.

Are thermal impacting accessories allowed on a certified product line?

If an option or accessory affects the thermal performance of a certified cooling tower, it must be identified and its impact on thermal performance must be stated. Those models must have their model numbers modified to identify the option or accessory or be listed as separate units. Please check the footnotes to the Certified Model List for each product line, published at https://www.cti.org/certification-directory, for additional details regarding optional accessories.

Where can I find a manufacturer's list of certified models by product line?

A list of the models in a line of evaporative or air-cooled heat rejection equipment with CTI STD-201 Thermal Certification is provided on the CTI website (see https://www.cti.org/certification-directory) for each product line that is CTI Certified. The list also contains footnotes which may be needed to clarify the effects of any options or accessories.

How can a customer confirm that a manufacturer's selection is certified?

A list of the models in a line of cooling towers with CTI STD-201 Thermal Certification is provided on the CTI website (see https://www.cti.org/certification-directory) for each product line that is CTI Certified. The list also contains footnotes which may be needed to clarify the effects of any options or accessories. If the unit model in question is not included in the manufacturer's model list located on the CTI website, then it is not a certified model. Contact the Thermal Certification Administrator (tcas@cticertification.org) with any questions regarding an individual model's certification status or to report invalid use of certification claims.

How often must equipment be tested to remain certified?

Following the successful review of the certification application, an Initial Qualification Test is conducted for at least one model of the applicant product line. After the successful certification is completed, a different model will be selected by the Administrator and tested each calendar year of valid certification. For additional information on test schedule requirements refer to Section 4.14 of STD-201OM.

Does certification ever expire?

The certification as issued does not expire. However, the manufacturer must comply with all rules and program provisions, including the successful annual test of a different model each year, in order for the certification to remain valid. Please check the listing at https://www.cti.org/certification-directory for a complete list of currently certified product lines and certified models.

What are the CTI STD-201 limits of thermal certification?

As stated in STD-201RS, the limits of certification are different for cooling towers/closed circuit coolers and evaporative condensers.

For Cooling Towers and Closed-Circuit Coolers:

	SI Units	IP Units
Wet Bulb Temperature	10ºC to 32.2ºC	50ºF to 90ºF
Maximum Process Fluid Temperature	51.7ºC	125ºF
Minimum Range	2.2ºC	4ºF
Minimum Approach	2.8ºC	5ºF
Barometric Pressure (Cooling Towers)	77.8 kPa to 105 kPa	23 in Hg to 31 in Hg
Barometric Pressure (Closed-Circuit Coolers)	91.4 kPa to 105 kPa	27 in Hg to 31 in Hg

For Evaporative Refrigerant Condensers:

	SI Units	IP Units
Wet Bulb Temperature	10ºC to 32.2ºC	50ºF to 90ºF
Maximum Condensing Temperature	43.3ºC	110ºF
Barometric Pressure	91.4 kPa to 105 kPa	27 in Hg to 31 in Hg

For Dry Coolers:

	SI Units	IP Units
Dry Bulb Temperature	5ºC to 50ºC	41ºF to 122ºF
Maximum Process Fluid Temperature	100ºC	212ºF
Minimum Range	2.2ºC	4ºF
Minimum Approach	2.8ºC	5ºF
Barometric Pressure	91.4 kPa to 105 kPa	27 in Hg to 31 in Hg

Please note that the Original Equipment Manufacturer may place more restrictive operating condition limits upon their products, so long as they are within the range of conditions listed above. The Manufacturer shall state within their published data any applicable limits, and they may not provide capacity information for conditions outside of those stated limits.

The thermal capacity of a certified model that is designed or operated at thermal conditions above or below the stated limits is not certified by the CTI. The product line remains certified within the limits of certification but capacities that are out of limits are not.

Why were those design conditions selected?

The STD-201 Limitations of Certification establish ranges of conditions under which the product lines may be accurately tested. The buyers of certified products are advised that if their specific design conditions fall outside of the STD-201 limitations of certification, then the capacity of any model selected (from any manufacturer) would not be certified by CTI.

Wet Bulb Temperature – The normal operating wet bulb range for the certified equipment manufacturers have selected for the wet bulb temperature range.

Dry Bulb Temperature – The normal operating dry bulb range for the certified equipment manufacturers have selected for the dry bulb temperature range.

Maximum Process Fluid Temperature - The normal limiting temperature for common materials used in the construction of the equipment type was selected as the maximum process fluid temperature.

Minimum Range – Per STD-201 minimum allowable instrumentation accuracy for temperature measurement is ±0.10°F (±0.05°C). With a minimum range of 4ºF (2.2ºC), a 0.20°F (0.11°C) inaccuracy in temperature (equivalent to a 0.1ºF inaccuracy in each hot water and cold water temperature readings) can result in a ±5% inaccuracy of the tested load. Due to cumulative instrument minimum measurement accuracies anything less than the minimum range results in a cumulative test error band that is outside of the allowable test tolerance of 5%. This cumulative error will increase as the range further decreases.

Minimum Approach – Similar to the minimum range, due to cumulative instrument minimum measurement accuracies, anything less than the minimum approach results in a cumulative test error band that is outside of the allowable test tolerance of 5%. This cumulative error will increase as the approach further decreases.

Maximum Condensing Temperature – The upper limit for normal operation was selected for the maximum condensing temperature.

Barometric Pressure - The normal atmospheric range for the certified equipment manufacturers was selected for the barometric range.

Why does STD-201 allow a 5% test tolerance?

The tolerance was established to account for uncertainties in the design and manufacture of a "randomly" selected test model. It also accounts for the test uncertainty. Each test measurement instrument carries a known minimum accuracy (STD-201RS and 201Dry RS, Table 2) which will combine to determine the final test result.

If a customer's design conditions are outside the CTI STD-201 limits, is the equipment still certified?

If the customer's specified design conditions fall outside of the STD-201 certification limits, then no, the capacity of the selected models would not be certified by the CTI. The product line remains certified within the limits of certification but capacities that are out of limits are not.

Under those circumstances, the customer may still require that the proposed models be selected from the models listed for certification on the CTI certification website. However, all manufacturers answering such a specification should note in their proposals and documentation that the design conditions of the subject tower are beyond the CTI certification limits.

How is a potential CTI violation to be reported?

Complaints regarding non-compliance can be submitted to the CTI Certification Administrator by Certification Program Committee participants or by customers who have purchased a certified product. Complaints should be submitted within twenty-four (24) months after shipment from the Manufacturer. The unit in question shall have been in service for not less than one (1) month or more than twelve (12) months.

How long is a unit expected to remain in certified condition after it has been installed and operational?

Per STD-201OM, complaints of non-compliance must be submitted within twenty-four (24) months after shipment from the Manufacturer and have been in operation for not less than one (1) month or more than twelve (12) months.

Is field performance testing (other than for certification testing) covered under CTI STD-201?

No. STD-201 is a thermal performance certification program. Only testing performed for thermal certification is covered by STD-201. Field performance tests follow the test procedures outlined in ATC-105, ATC-105S, ATC-105DS or ATC-106, which are the same procedures used for STD-201 testing but are not considered STD-201 tests.

Does CTI STD-201 apply to field assembled cooling towers, closed circuit coolers, evaporative refrigerant condensers and dry fluid coolers?

No.STD-201 applies only to factory assembled equipment or, equipment that is designed to be assembled in the factory but is assembled in the field according to factory instructions.

Is a field test necessary for a CTI Certified product?

No. The thermal performance of each model in a product line is evaluated by the Thermal Certification Administrator prior to certification being granted. The capacity of individual models is then confirmed via annual recertification testing and does not require individual field performance testing.

Why is CTI Certification necessary on new construction jobs?

ASHRAE 90.1 requires CTI certification of cooling towers and closed circuit coolers on all new construction projects. Any project requiring ASHRAE 90.1 compliance must use certified equipment.