CTI STD-201RS Thermal Certification for Cooling System Heat Rejection Equipment Part 1: Performance Ratings

Mike Womack, Cooling Technology Institute

Keynote Speaker

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The recording and slides of this webinar will be made available to attendees via email within 2 days

PDH Certificates will be e-mailed to attendees within 2 days.

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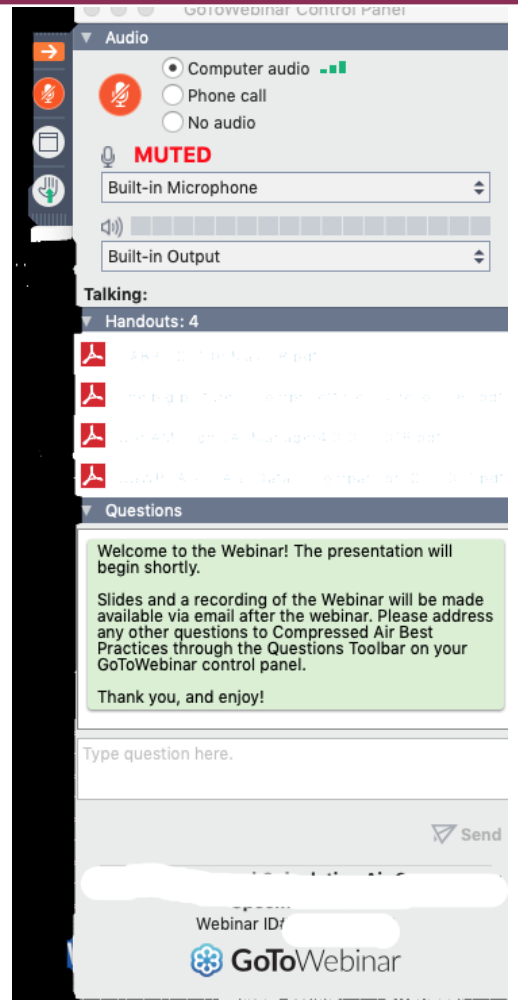
Q&A Format



- Panelists will answer your questions during the Q&A session at the end of the Webinar.
- Please post your questions in the Questions Window in your GoToWebinar interface.
- Direct all questions to Chiller & Cooling Best Practices® Magazine

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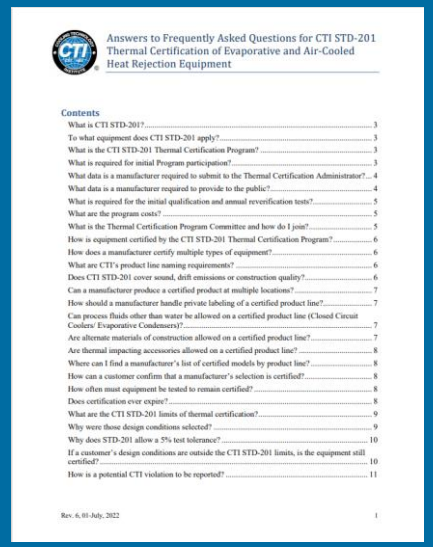
Handouts



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

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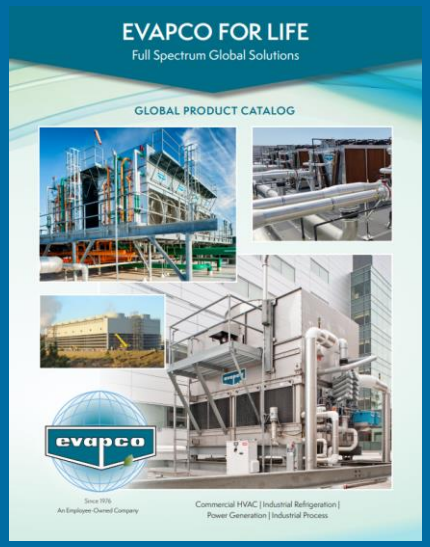
Rev. 6, 01-July, 2022 1



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Disclaimer

All materials presented are educational. Each system is unique and must be evaluated on its own merits.

CTI Session at the Best Practices 2023 Conference

Fundamentals of Cooling Towers &
Adiabatic Fluid Coolers presented by:

COOLING TECHNOLOGY INSTITUTE

- Fundamentals of Cooling Towers
- Fundamentals of Adiabatic Fluid Coolers

Tuesday, October 24, 10:15 a.m. - 12:15 p.m.

McCormick Place, Chicago

At the end of the webinar, we are having a fun contest for a chance to win a free full conference pass valued at $675!

SUPER EARLY BIRD RATES END TUESDAY AUGUST 1!

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CTI STD-201RS Thermal Certification for Cooling System Heat Rejection Equipment Part 1: Performance Ratings

Introduction

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About the Speaker

Mike Womack
Cooling Technology Institute

- Thermal Certification Administrator, Clean Air Engineering, Inc. (under contract with the Cooling Technology Institute) 2014-present
- Licensed Professional Engineer, Illinois
- 37+ years Experience in Plant Performance Testing, Machinery Maintenance and Reliability and Project Management

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CTI to Add: "Thermally" to the logo to distinguish it from other certification types now offered…

STD-201 THERMAL CERTIFICATION PURPOSE

“This standard sets forth a program whereby the Cooling Technology Institute will certify that all models of a line of evaporative heat rejection equipment, or dry fluid coolers, offered for sale by a specific manufacturer will perform thermally in accordance with the manufacturer's published ratings. . . “

STD-201 THERMAL CERTIFICATION PURPOSE

By the purchase of a CTI Certified model, the Owner/Operator has assurance that the tower will perform as specified* in the publicly available data

*Performance as specified when the circulating water temperature is within acceptable limits and the air supply is ample and unobstructed. CTI Certification under STD-201 is limited to thermal operating conditions discussed in following slides…

STD-201 CERTIFICATION SCOPE
(Evaporative Product Lines)

- **Entering wet bulb temperature**

  10°C to 32.2°C (50°F to 90°F)

- **Cooling range > 2.2°C (4°F)**
- **Cooling approach > 2.8°C (5°F)**
- **Process fluid temperature < 51.7°C (125°F)**
- **Barometric pressure**

  Open Circuit: 77.8 kPa to 105.0 kPa (23” Hg to 31” Hg)

  Closed Circuit, and Evap. Condensers: 91.4 to 105.0 kPa (27” to 31” Hg)

STD-201 CERTIFICATION SCOPE
(Dry Cooler Product Lines)

- Entering dry bulb temperature

  +5°C to +50°C (41°F to 122°F)

- Cooling range > 2.2°C (4°F)
- Cooling approach > 2.8°C (5°F)
- Process fluid temperature < 100°C (212°F)
- Barometric pressure:

  91.4 kPa to 105.0 kPa (27” Hg to 31” Hg)

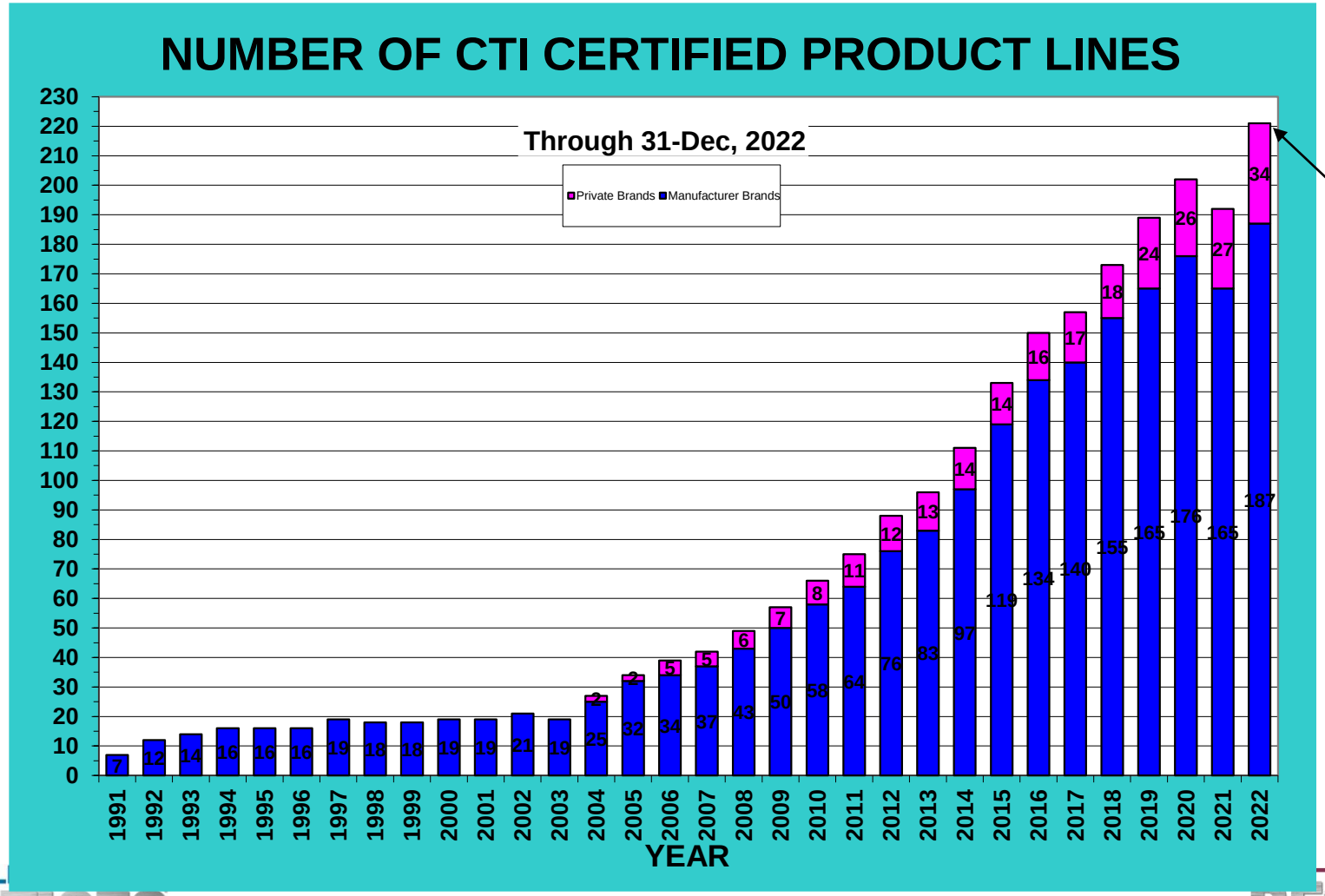
CURRENT STATUS (12/31/22)

Participating Manufacturers (PM): 78 + 24 Private Brand Affiliates

PM Primary Locations:

11 - North America (10 – USA)
6 - Europe
61 - Asia

NUMBER OF CTI CERTIFIED PRODUCT LINES



221 CTI Certified Product Lines

CURRENT STD-201
TOWER SELECTIONS AVAILABLE

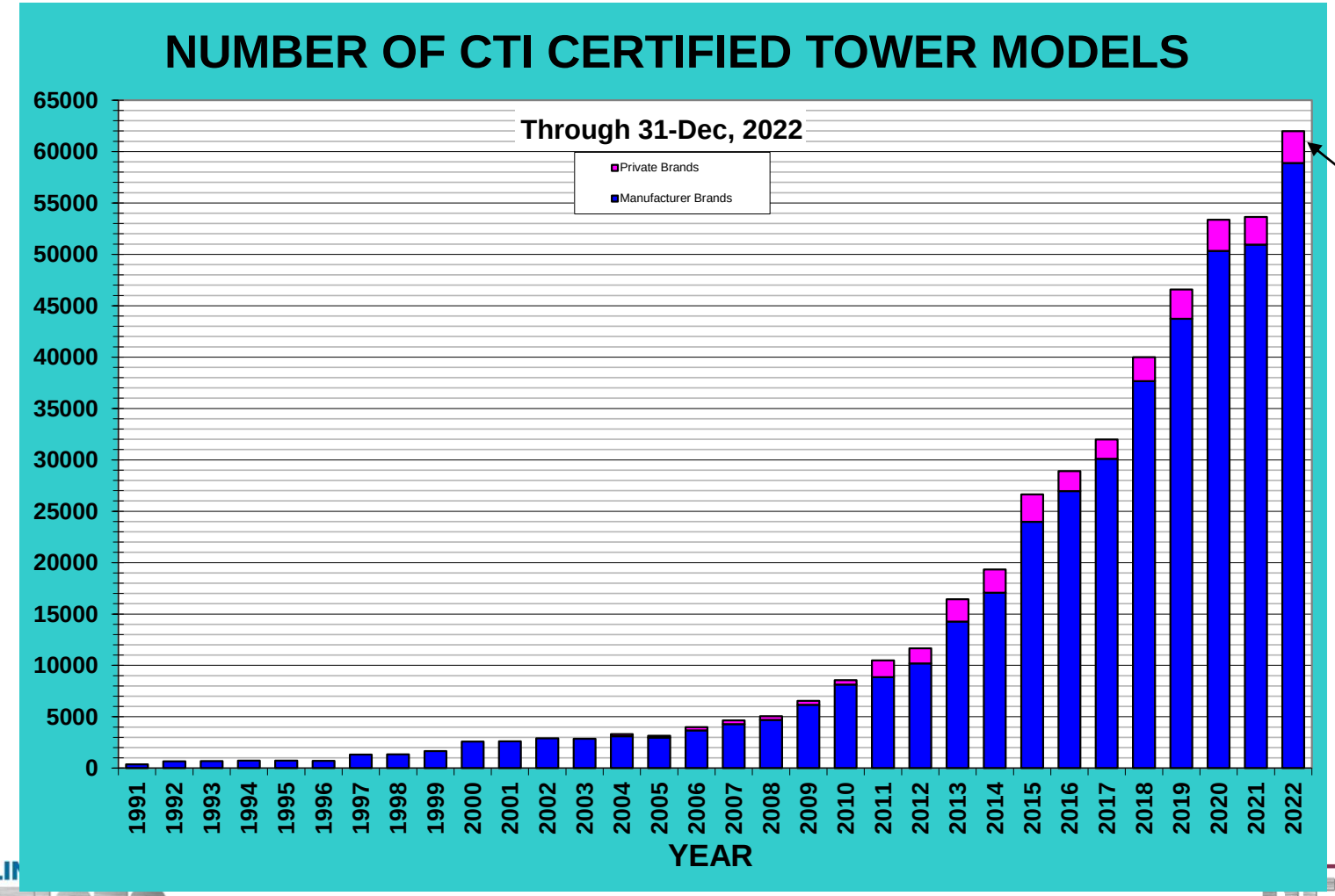
- **Open-Circuit and Closed-Circuit Evaporative**
- **Dry Coolers ***New*****
- **Diverse Variety of Construction Materials**

  Galvanized Steel, Stainless Steel, Fiberglass,

  Polyethylene, PVC…

- **Wide Choice of Nominal Capacities**

  ~ 1 l/s (16 gpm) to ~ 725 l/s (11,500 gpm)



~ 62,000 CTI Certified Models

STD-201 CERTIFICATION PROCESS

- Application Submitted to Thermal Certification Administrator
- Technical Review by Thermal Certification Administrator
- Selection of Tower Model for Initial Qualification Test
- Initial Qualification Test by Certification Test Agency
- Issue Approval Letter With Validation Number
- Annual Reverification Tests for Follow Up

For More Information…

CTI Home Page: https://www.cti.org/

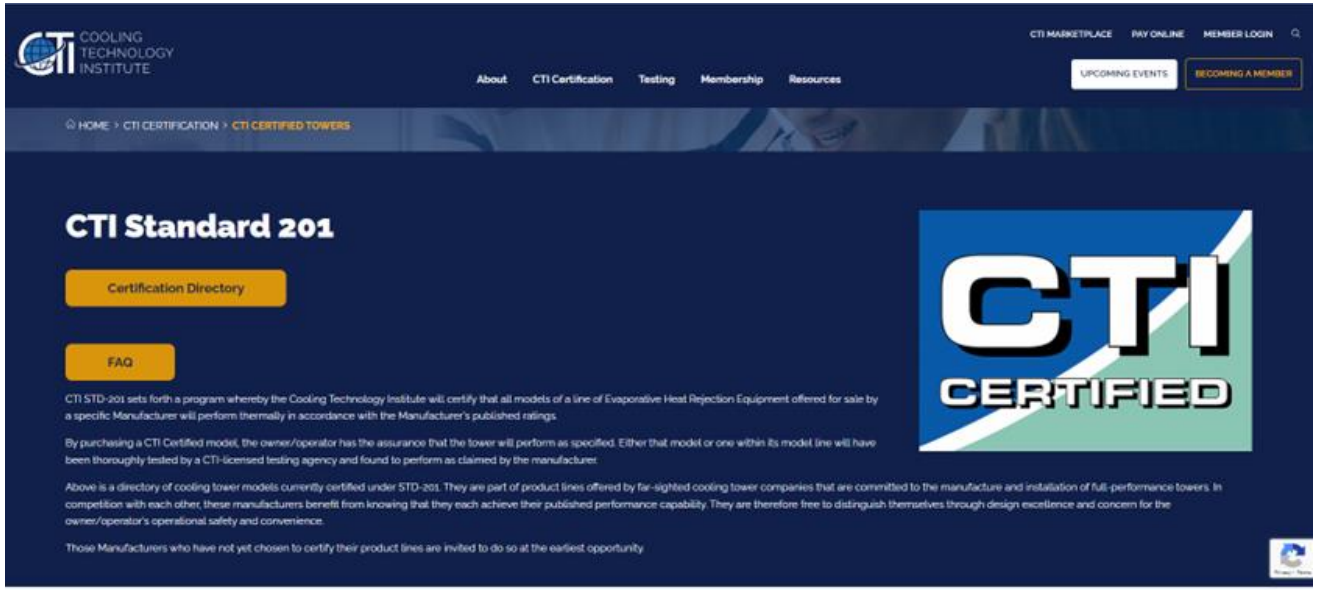
Thermal Certification Description: https://www.cti.org/cti-certified-towers

Online Certification Directory: https://www.cti.org/certification-directory

Online Certification Directory

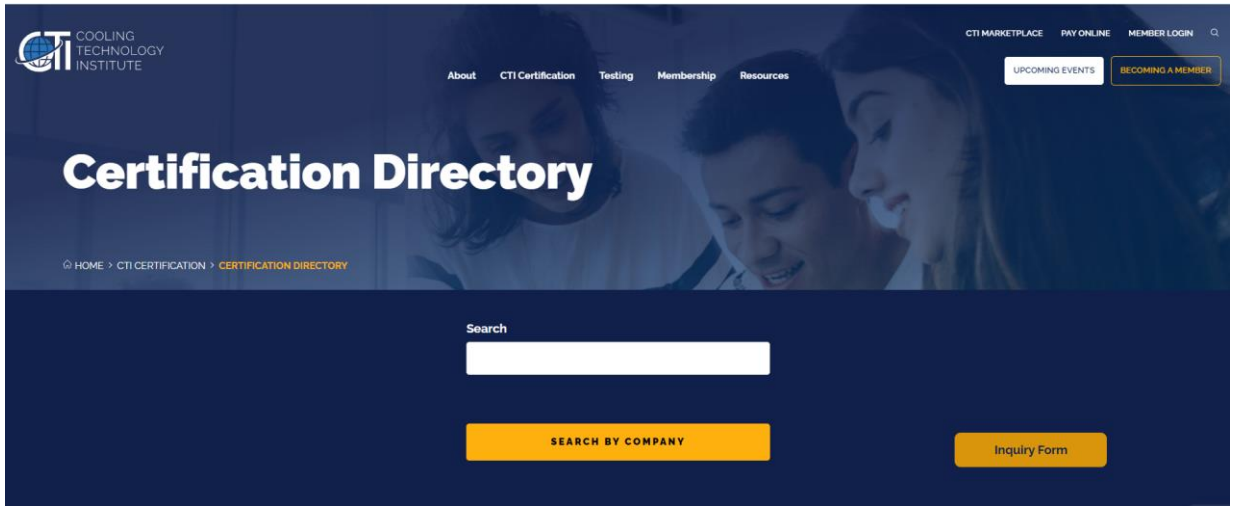
Introduction and FAQ

https://www.cti.org/cti-certified-towers



CTI Certification Directory Publication

https://www.cti.org/certification-directory



Alphabetical Company Listing Below

CTI Certification Directory Publication

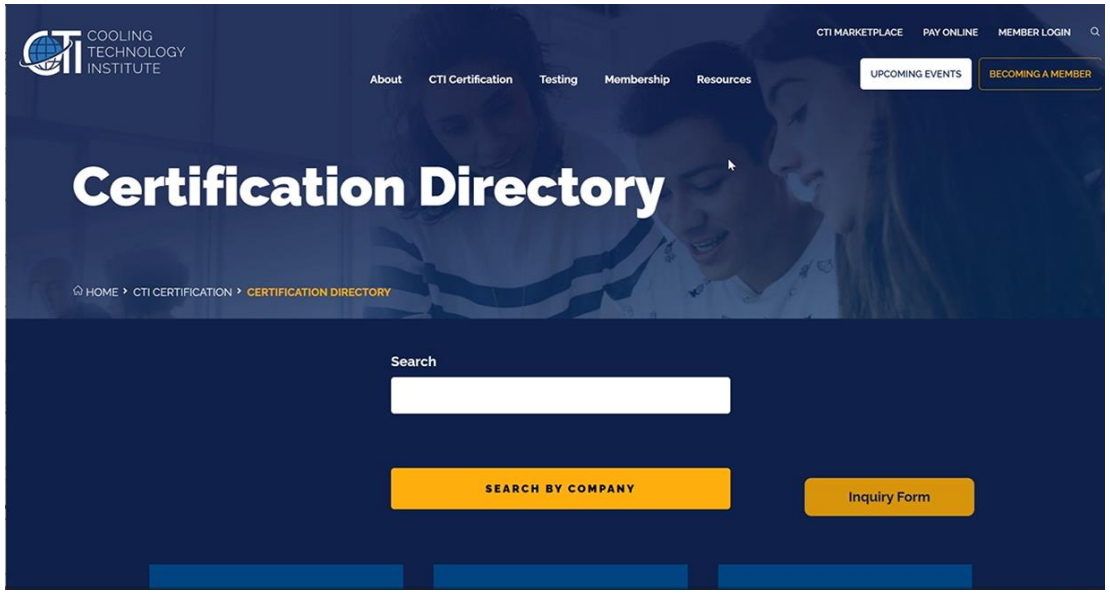
Current Thermally Certified** Product Lines (STD-201):

- Certified Model Listing
- Informational Brochure (listing basic dimensions of models, nominal capacity and power consumption, etc.) or website link with required data
- Required Selection Data (defines capacity at stated thermal conditions)

**Withdrawn (i.e. no longer valid) Certifications are posted with a copy of the applicable withdrawal notice for a period of one year after withdrawal date.

Video 1 – Published Data Demo

Video 2 – Dry Cooler Published Data Demo




CTI
CERTIFIED
MANUFACTURER'S PUBLISHED THERMAL PERFORMANCE IS CERTIFIED BY THE COOLING TECHNOLOGY INSTITUTE UNDER THE PROVISIONS OF STD-201 (21)
Certification Validation Number
COOLING TECHNOLOGY INSTITUTE
EST. 1950

Additional Certification Information

- **CTI Web Site**
  https://www.cti.org/

- **CTI Journal**

- **CTI Office in Houston, Texas USA**

- **CTI Certification Administrator**
  Michael Womack
  C/O Clean Air Engineering
  Email: tcas@cticertification.org
  Phone: 217-347-0842 (office)
  217-690-9321 (mobile)

About the Speaker

Mihir Kalyani
Evapco

- Global Product Manager Dry and Adiabatic Fluid Coolers, Evapco
- Mechanical Engineer (BSME) from the University of Maryland in College Park
- 10 Years of experience at Evapco

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The Importance of CTI Certification

Mihir Kalyani
Global Product Manager
Dry & Adiabatic Coolers

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The Importance of CTI Certification

This session will cover:

- The Need for Independent Thermal Performance Testing & Certification
- Types of Heat Rejection Equipment Covered by CTI Test Codes & Performance Standards
- CTI Test Codes and Standards for Heat Rejection Equipment
- The Value of CTI Certification

For Evaporative, Hybrid and Air-Cooled Heat Rejection Equipment

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The Importance of CTI Certification

The Need for Independent Thermal Performance Testing & Certification

- Consumers have many equipment and manufacturer options to choose from:

Evaporative

Hybrid

Air-Cooled

- Lacking independent third-party certification, consumers and engineers must rely on the manufacturer's published ratings
- If the ratings are overstated, the unit will underperform when it matters the most
- An underperforming unit will consume more energy and water and cost the consumer more over the unit's life

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The Importance of CTI Certification

The Need for Independent Thermal Performance Testing & Certification

Example:

3,000 nominal ton (15,000 MBH) cooling requirement

9,000 GPM cooled from 95F to 85F at 78F ambient wet-bulb

	CTI Certified Cooling Tower	Non-CTI Certified Cooling Tower
Tested Capacity	101.7%	87%**
Overall Unit Dimensions (LxWxH)	24'x36'x19' **6% larger**	24'x36'x18'
Connected Fan Motor Power	240 HP **50% greater**	160 HP
Annual Energy Usage*	142,494 kWh **15% less**	165,107 kWh

*Based on Industrial Load profile in Baltimore, Maryland

This unit **will not meet 95F/85F temps for almost 200 hours per year in Baltimore, Maryland

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The non-certified unit will cost the end user ~$6,000 **more** per year in unit energy costs & even more in operating efficiency & chiller energy

The Importance of CTI Certification

The Need for Independent Thermal Performance Testing & Certification

- To protect the consumer, independent thermal performance testing & validation is crucial
- CTI STD-201 is the most widely accepted and stringent independent thermal performance certification standard in the industry

CTI Standard (STD) 201 is presented in three parts:

- STD-201RS, Performance Rating of Evaporative Equipment, covers the testing, ratings and published data requirements for evaporative and hybrid cooling towers and coolers
- STD-201 Dry RS, Performance Rating of Dry Fluid Coolers, covers testing, ratings, and published data requirements for dry fluid coolers
- STD-201OM, Operations Manual for Thermal Performance Certification of Evaporative and Air-Cooled Heat Rejection Equipment, monitors compliance with STD-201RS and STD-201 Dry RS

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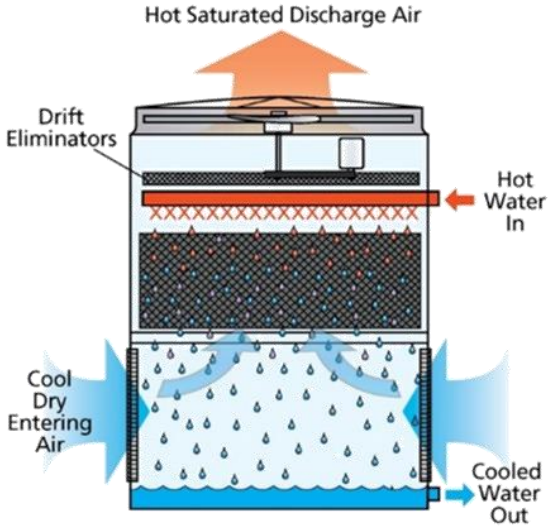
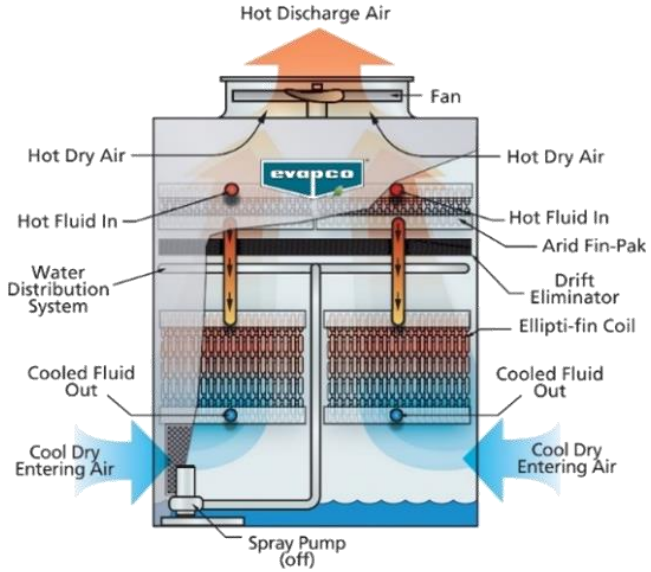
The Importance of CTI Certification

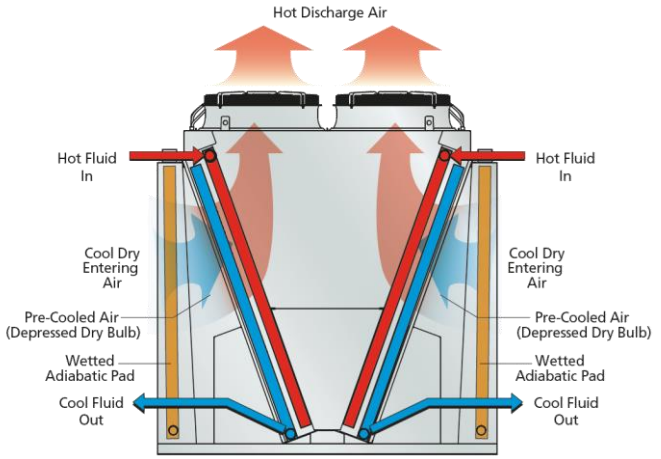
Types of Heat Rejection Equipment Covered by CTI Test Codes & Performance Standards



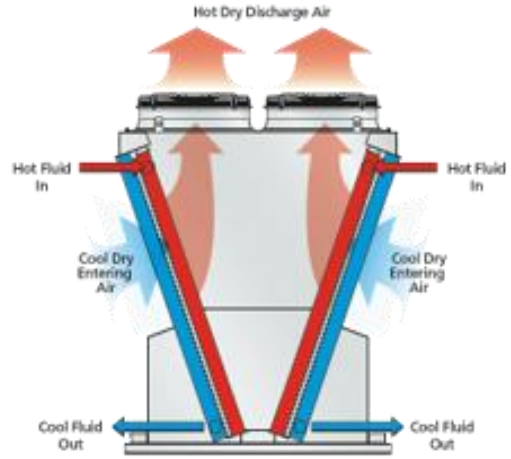
Evaporative



Hybrid*



Adiabatic



Dry

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The Importance of CTI Certification

CTI Test Codes & Standards for Heat Rejection Equipment

- **ATC-105:** Acceptance Test Code for evaporative and evaporative performance of hybrid units
- **ATC-105 DS and ATC-105 Adiabatic:** Acceptance Test Codes for dry coolers and adiabatic coolers respectively
- **CTI STD-201:** Thermal Performance Certification Standard for evaporative, hybrid and dry heat rejection equipment*
- CTI certified products and models are listed on www.cti.org

*Adiabatic fluid coolers are currently pending inclusion in CTI STD-201

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The Importance of CTI Certification

CTI Test Codes & Standards for Heat Rejection Equipment

- Due to increasing sensitivity to water use and rising water costs, **dry coolers** and **adiabatic coolers** are increasing in prominence
- CTI recently included dry coolers in STD-201 in September 2022
- ATC-105 Adiabatic was adopted recently in May 2023 and are pending inclusion into CTI STD-201
- CTI is taking proactive steps and staying abreast of developments in the cooling industry to ensure consumers are protected, regardless of their equipment choice

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The Importance of CTI Certification

CTI Test Codes & Standards for Heat Rejection Equipment

Our recommendation as a manufacturer:

- In the event an owner chooses to purchase non-certified equipment, a field performance test by a licensed CTI test agency should be conducted to verify rated performance per the established ATC
- If the test proves a deficiency in performance, the manufacturer should be held responsible to correct the deficiency and bear the expenses associated with testing and verification

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The Importance of CTI Certification

CTI Test Codes & Standards for Heat Rejection Equipment

To achieve CTI certification, manufacturers must:

- Pay testing & certification fees
- Submit “Data of Record” to CTI
- Test thermal performance by a CTI licensed test agency
  - Annual reverification required
  - Model(s) selected by Thermal Certification Administrator
- Publish data to the public
  - www.cti.org
  - Manufacturer website
  - Selection programs

Dry cooler test in Evapco R&D Lab

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The Importance of CTI Certification

Value of CTI Certification

- Engineers and owners can rest assured that their equipment will perform as rated if it is CTI certified
- CTI Certification saves the project on costly & schedule straining field testing requirements
- Choosing to **specify** and **purchase** CTI certified equipment ensures a level playing field between manufacturers, which ultimately benefits the owner & specifying engineers

Find Evapco & other manufacturer's CTI certified products on www.cti.org

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The Importance of CTI Certification

Questions?

mkalyani@evapco.com

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Best Practices EXPO Contest

Play for a chance to win a **FREE Full Conference Pass** to the Best Practices 2023 EXPO & Conference!! This is a $675 value! This contest is open to factory personnel, compressed air distributors, utility incentive programs and engineering firms. Exhibiting and sponsor companies are not qualified. Winners will be randomly selected from those who submitted a correct answer and notified tomorrow via email.

Please submit your answer in the upcoming poll

What type of Heat Rejection Equipment is covered by CTI STD-201?

A	• Evaporative
B	• Dry
C	• Hybrid

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*By entering you are giving permission to announce your name if you are a winner

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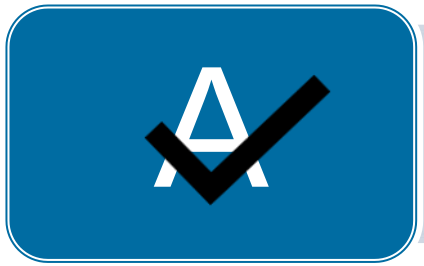

• Evaporative

• Dry

• Hybrid

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Q&A

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Thank you for attending!

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June 2023 Webinar

Vacuum Pump Maintenance

Tie Duan
E.W. Klein & Co
Keynote Speaker

Thursday, June 8, 2023– 2:00 PM EST
Register for free at
www.airbestpractices.com/webinars

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