



Advanced HVAC Training for TECH Clean California Contractors & Distributors

TECH Clean California NCI Training Program

TECH Clean California is a statewide initiative designed to accelerate the adoption of clean space and water heating technology across California homes. It provides market incentives and workforce education and training to make it easier for distributors and contractors to stock, sell, and install low-emissions heat pump technology for residential replacement projects. To help meet California's goal of being carbon-neutral by 2045, TECH Clean California supports both existing programs, through matched incentive funding. The initiative provides extended incentives statewide with emphasis on access for low-income and disadvantaged communities.

NCI's certification training is available to distributors and contractors participating in the initiative and their employees. This training focuses on helping participants provide the highest level of system performance and energy efficiency through advanced testing, diagnostics, and system renovations. The final ½ day Electrification module ties the principles taught throughout the program together and contextualizes them within a typical heat pump HVAC Electrification project.

Participants who complete the full series **gain valuable skills and tools to help qualify for Enhanced Incentives**, including Field Measured Performance based on ASHRAE Standard 221.



Program Training includes:

- Airflow Testing & Diagnostics – 1 day course
- Refrigerant-Side Performance – 2-day certification course
- Residential System Performance certification and Electrification training 2-½ day course
- Electrification for current NCI-certified technicians - ½ day course.

As a TECH Clean California participant you have access to NCI's world-class training and certification focused on High-Performance HVAC and Electrification. If you're not yet a TECH Clean California contractor,

CLICK HERE to learn more about the initiative and to enroll today! Click on **Curriculum** for detailed information on each of the classes offered through the program. Click on **Training Schedule & Registration** to enroll in a class today!



Leading the Industry in
High-Performance HVAC™

TECH CLEAN CALIFORNIA NCI TRAINING

Discover world class tools and training to help contractors and their employees participate in the TECH Clean California program.

Airflow Testing & Diagnostics

This is the place to start if you're new to NCI's high performance HVAC training! Learn how to assess existing duct systems and address issues to prepare for a new heat pump system. Prepares students for more advanced concepts taught throughout our TECH training series.

Are your systems performing in the field as specified by the manufacturer? Proper airflow is the critical first step to achieving high performance heat pump installations. Learn the basics of Static Pressure and Airflow and use this knowledge to offer HVAC performance solutions that work with NCI's simple Air Upgrade approach. Intended for HVAC contracting firm owners, managers, and technicians, this 1-day class provides technical training on performing static pressure testing, how to properly install static pressure test ports, and how to measure and interpret static pressures. We then cover airflow diagnostics and solutions to typical installation problems.

Airflow Testing & Diagnostics Pricing:

1 Day: Normally \$395 - TECH Participant Special Pricing: \$50/student refundable registration fee*

Get in on the ground floor and offer HVAC Performance Solutions that work with NCI's simple Air Upgrade approach!

Learn how to:

- Measure Total External Static Pressure on residential systems
- Understand component pressure drops and causes of high static pressure
- Identify Fan Type and Fan Speed
- Locate Fan Tables and Plot Fan Airflow
- Diagnose issues with existing furnace duct systems, and learn to correct those issues to pave the way for a high-performance heat pump installation
- Verify proper airflow and spot potential problems on a new heat pump system installation
- And much more...

Agenda

- The Air Upgrade Approach
- Introduction to Static Pressure
- Measure and Interpret Static Pressure
- Fundamentals of Fan Airflow
- Plotting Fan Airflow
- Completing an Air Upgrade.



****Registration Fee will be applied to a future class upon successful completion of the training.***

TECH CLEAN CALIFORNIA NCI TRAINING

Refrigerant-Side Performance

Ensure your heat pump system installations achieve their full potential by verifying that airflow can properly support the refrigeration cycle and tuning the refrigerant cycle to get the most out of each heat pump.

What if everything you thought you knew about diagnosing and solving refrigeration-side performance problems may not be totally correct?

Proper refrigerant charge is necessary for a heat pump to perform properly, but before you hook up a refrigerant gauge to a condensing unit, do you know for certain it's the right first step to solving the issue?

By tapping into the refrigerant-side and adjusting the charge before you establish the true causes of the problem, you may not solve it. In many cases, you might make things worse!

There is a better way!

This National Comfort Institute two-day advanced certification class provides you with real-world lessons and hands-on training. It's based on proven techniques on how to best approach refrigeration-side issues.



Refrigerant-Side Performance Certification Pricing:

2 Days: TECH Participant Special Pricing: \$100/student refundable registration fee*

Learn how to:

- Apply a performance-based, systematic approach to refrigeration-side diagnostics
- Explore new HVAC refrigeration cycle performance-related solutions
- Identify surgical system repairs to improve performance
- Use inspection, testing, and system history to determine if and when you need to tap into the refrigeration circuit
- Address underlying issues that impact the system before adjusting the charge.

Agenda

Day 1

- Introduction to refrigeration testing principles
- How refrigeration system components affect performance
- How static pressure and airflow measurements reveal hidden effects on the refrigeration cycle

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- High- and low-side of the system and how they affect performance
- Metering devices, evaporators, service valves, filter dryers, and line set sizing
- Hands-on testing throughout.

Day 2

- The benefits of purging with nitrogen while brazing
- Superheat, subcooling, and other refrigeration metrics
- Proper use of NCI's Expanded Refrigerant Diagnostic Table
- How to tell if non-condensables are in the system, and determine how they got there
- Measure and interpret HVAC system static pressure to plot airflow
- Hands-on testing throughout.

The day concludes with NCI's exclusive Refrigerant-Side Performance certification exam.

TECH CLEAN CALIFORNIA NCI TRAINING

Residential HVAC System Performance & Electrification

Learn and practice the skills you need to perform ASHRAE 221-compliant Field Measured System Performance testing. Connect all the dots between the various NCI TECH training courses with a coherent method to assess potential electrification projects and tailor solutions to unique project requirements.

Are you ready to move beyond the SEER and HSPF trap? Want to avoid going back to jobs to install a larger heat pump or electric heat strips to address customer comfort issues? This training program provides the keys to delivering true system performance. True system performance leads to enhanced comfort, safety, and energy efficiency for your customers. The class also covers the importance of proper heat -pump installation to ensure high efficiency and comfort. This is key to installations that meet and exceed California's electrification standards.

Residential HVAC System Performance & Electrification includes a 2-day certification course with a special ½ day training to help you apply your knowledge specifically to residential HVAC electrification projects.

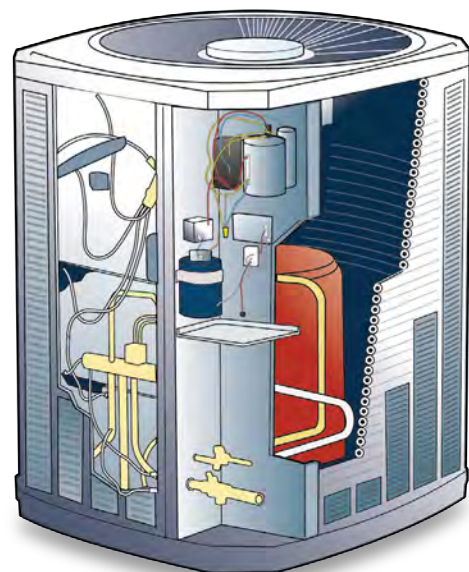
Learn how to:

- Discover hidden defects in existing furnaces and duct systems that would prevent a heat pump retrofit from providing efficiency and comfort
- Reduce call-backs and increase customer satisfaction
- Guarantee results using NCI's exclusive System Delivered Btu technology
- Measure field system performance and qualify for additional TECH Clean California incentives
- Test both new and existing installations
- Provide real solutions through system renovations and documented results.

Benefits:

- Open the door to increased sales and customer loyalty through professional testing and diagnostics services
- Increase average equipment changeout tickets by 100% or more by uncovering and repairing hidden system defects that lead to reduced comfort and increased energy consumption
- Reduce warranty and call-back costs by up to 70% by diagnosing and correcting the real problem the first time

- Improve field-measured system operating efficiency from average of 57% to over 90% – with the ability to prove your results to your customers
- Enhance profitability by selling highly profitable services at gross margins generally exceeding 60%
- Use HVAC performance diagnostic techniques to identify and solve system performance issues, improve IAQ and reduce energy consumption
- Establish yourself in your marketplace as a true beyond-the-box HVAC expert, and the go-to contractor to solve long-standing problems.



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Agenda

Day 1

The Key Elements of HVAC System Performance

- Review the typical sales call and its shortcomings
- Overview of test methods to identify performance issues
- Test instruments review – the good, the bad and the ugly
- Testing principles of static pressure, airflow and temperature
- Verifying Btus at the equipment and at the registers
- Airflow testing and verification methods
- Static pressure measurement – a key diagnostic tool
- Measuring dry bulb temperatures and diagnostic properties
- Understanding total system performance
- Introduction to ComfortMaxx Pulse™ software.

Day 2

Diagnose and Improve Poor System Performance

- Review of test methods, measurement and calculations
- Temperature, humidity and enthalpy measurement
- Equipment Btus versus delivered Btus at the registers
- Measuring airflow using NCI's 3 test methods: Static Pressure/Fan Tables, Balancing Hood, and Duct Traverse
- Rating operating HVAC system performance
- Sharing findings with customers in easy to understand terms
- Air distribution system renovation and repair
- Review ComfortMaxx Pulse™ and full test-in and test-out software.

The day concludes with NCI's exclusive Residential HVAC System Performance certification exam.

Day 3

Electrification (8 am to 12 pm)

Module One - Introduction to Electrification Projects

- Electrification Principles – what it is
- Electrification Pros and Cons – what a high-performance HVAC professional should expect
- How your NCI training ties into Electrification
- What we will cover and not cover in these modules
- Additional knowledge needed beyond this course
- A tale of two heat pump quotes – one measured, the other didn't
- Project expectations and customer communication
- Assessing an electrification project – overview
- Various heat pump options to consider
- Electrification project levels – overview
- Electrification assessment report – overview
- Section recap.



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Module 2 – Complete an Electrification Assessment Report

- Generate customer discussion
- Heating and cooling equipment inspection
- Initial duct system inspection
- Initial electrical service inspection
- Initial heating and cooling system testing
- Initial building information
- Identifying other trades in the project
- Estimating the electrification project level
- Section recap.

Module 3 – Evaluate an Electrification Project

- Evaluating an electrification project
- Electrification project guidelines – detailed
- System performance testing
- The building side of the duct system
- Common building defects and visual clues
- Blower door testing introduction
- Creating a scope of work
- Next steps to consider
- Section recap.

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Scan the QR Code
to Learn More
and Register.

Register now and discover the
High-Performance HVAC™ Difference!

For more information, call 800-633-7058
or visit NationalComfortInstitute.com

