



Certifying the
finest in HVACR

HVAC Performance Verifier Certification

KATE

Knowledge Areas of
Technician Expertise

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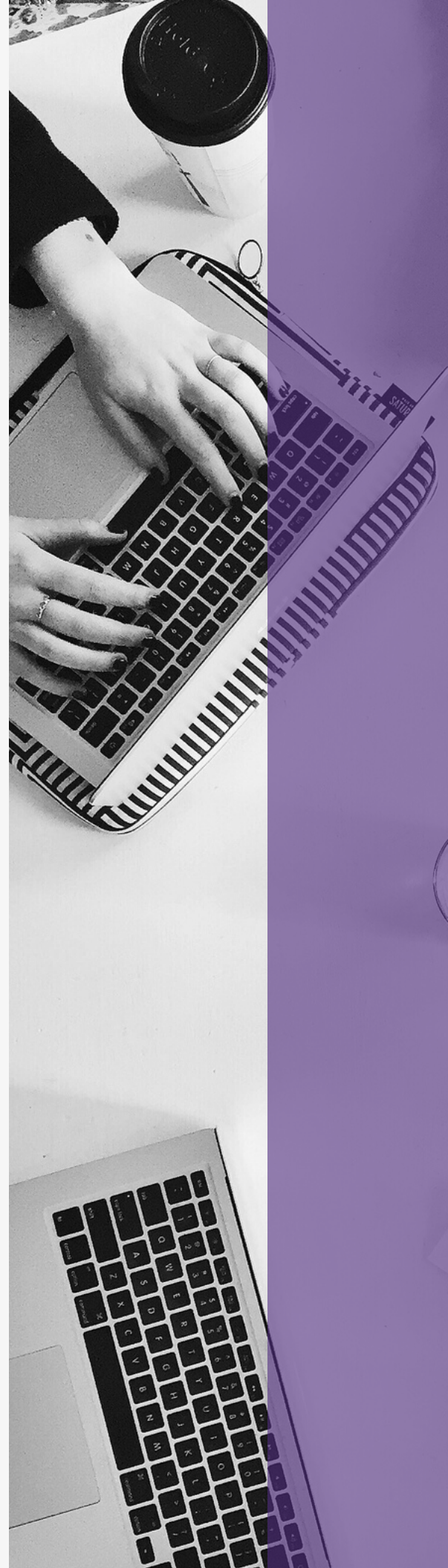
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HVAC Performance Verifier Certification Exam

Exam Information & Qualifications



The HVAC Performance Verifier Certification Exam tests a candidate's knowledge of a whole-system approach related to the environment being conditioned including reviewing load calculations and quality assurance reviews of the quality of installation of HVAC systems for such programs as EPA's ENERGY STAR Certified Homes, HVAC Quality Installation programs and ACCA's Residential Service & Installation (RSI) Program.

This is a test and certification for HERS Raters. This test for certification is not intended for the HVAC system designer, sales force, or the engineering community.

In order to qualify for this certification, individuals must hold current/active HERS rater certification from Residential Energy Systems Network (RESNET).
Test

Exam Copyrights

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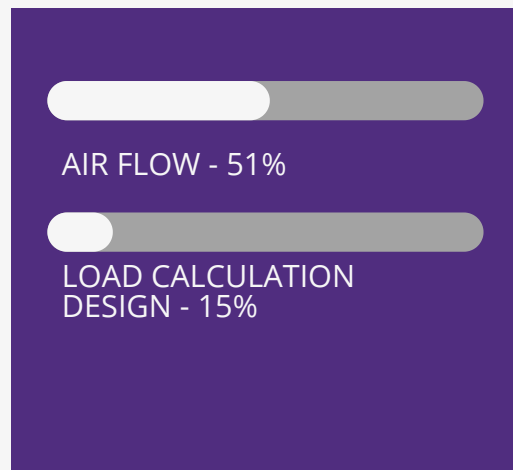
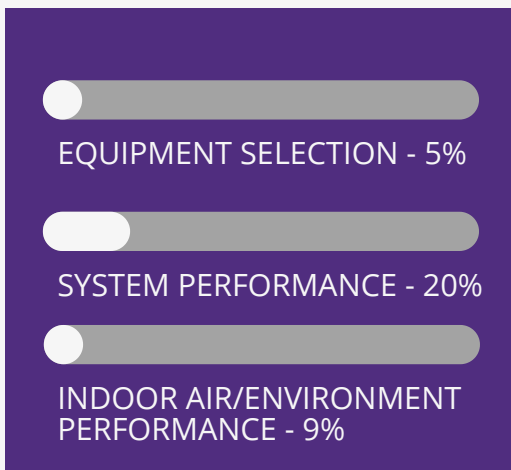
Passing Score Development Process



The passing score for this test was established using a systematic procedure (a Passing Score Study). This procedure employed the judgment of experienced RESNET professionals and educators. The passing scores were set using criteria defining competent performance.

Exam Subject Areas

Percentages of questions that will be in each section of the exam:



Exam Specifications:



Passing Score: Pass/Fail



2.5 Hour Time Limit



OPEN Book



100 Questions

Industry References

The reference materials list below will be helpful in preparing for this exam. These materials may not contain all of the information necessary to be competent in this specialty or to pass the exam.



- American National Standards Institute (ANSI) / Air Conditioning Contractors of America (ACCA) Manuals - Latest Edition
 - "D", "J", and "S"
- ACCA Manuals "P", "T", "RS", and "Z" - Latest Editions
- ASHRAE Standard 62.2 – Latest Edition with Addendum
- Air Diffusion Council: Flexible Duct Performance & Installation Standards, Installation Guidelines
- ACCA Technician Guide for Quality Installation (Support Document for Standard 5)
- Residential Energy (Kriger & Dorsi)
- Energy Star Version 3
- Consortium for Energy Efficiency: Efficient Installation and Maintenance Practices for Residential HVAC Systems

References continue on next page

Industry References (continued)

- ASHRAE 62.2
- ASHRAE 52.2
- ACCA Standard 9, "Quality Installation Verification Protocols"
- Cleveland State Community College Energy Efficient Residential Construction Volume 3 - HVAC_2006



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Knowledge Areas of Technician Expertise

All NATE exams are based on Knowledge Areas of Technician Expertise (KATES), statistically proven job task analysis from experts in the HVACR industry. This KATES outline covers all information tested in the **HVAC Performance Verifier Certification Exam** and should be used as reference material.

Load Calculation Design

- Customer Survey
 - Weather Data
 - Building Orientation
 - Take Offs - Blueprint Or Actual Site Review
- Zoning
 - Single Zone
 - Multiple Zones
- Infiltration
 - Air Changes Per Hour
 - Occupancy Standards
 - Equipment Requirements
 - Diagnostic Tools
- Exfiltration - Exhaust Requirements
 - Occupancy Standards
 - Equipment Requirements
- Ventilation
 - Heat Recovery Ventilator (Hrv)
 - Energy Recovery Ventilator (Erv)
 - Internal Loads
 - Calculation - Ashrae 62.2
- Heat Loss
 - Total
 - Sensible
 - Latent
- Heat Gain
 - Total
 - Sensible
 - Latent
 - Internal Gain
- Duct Loads
 - Gain
 - Loss
 - Duct Design Loss

KATES

Knowledge Areas of Technician Expertise

Load Calculation Design (continued)

- Regulations
 - Indoor Air Quality
- Design Considerations - Comfort
 - Temperature
 - Humidity
 - Indoor Air Quality
 - Sound Level
 - Zoning
- Design Considerations - Residential
 - Split Systems
 - Air Balancing
 - Hydronic Balancing
- Design Considerations - Components
 - Impact Of Diffusers, Grilles, & Registers
 - Ducts & Fittings - Impact On Energy Use
 - Special Ducts & Fittings
 - Static Pressure Losses
 - Blueprint Reading
- Mechanical Code
 - Equipment Access
 - Refrigerant Line Routing
 - Condensate Drains
- Industry Standards
 - Equipment Standards
 - System Standards
- Design Considerations - Incorrect Load
 - Consequences Of Under-sizing
 - Consequences Of Over-sizing

Equipment Selection

- Capacity
 - Design Heating Load
 - Design Cooling Load
 - Design Ventilation Load
- Efficiency
 - System Efficiency
 - Heating Efficiency
 - Cooling Efficiency

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Knowledge Areas of Technician Expertise

Air Flow

- Duct Systems
 - Impact On Energy Use Of Basic Duct Systems
 - Impact On Energy Use Of Duct Location
 - Basic Zone Systems
 - Impact On Energy Use Of Duct Materials
 - Grilles
 - Impact On Energy Use Of Filtration Systems
 - Ventilation Systems
- Duct Installation
 - Field Construction / Installation
 - Installing Metal Duct
 - Installing Flexible Duct
 - Installing Ductboard
 - Duct Sealing Materials
 - Install. Grille, Register, Diffuser, & Damper
 - Chases Used As Ducts
 - Reconnecting Duct When Replacing Equipment
 - Installation Of Plenums And Duct
- Airflow Principles
 - Airflow
 - Blowers And Fans
- Airflow Measurements
 - Tools
 - Airflow Velocity Measurements
 - Airflow Pressure Measurements
 - Air Volume Measurements
 - Duct Leakage Measurements (Allowance)
- Air Balancing
 - Gathering Design Information
 - Preparation Of System For Air Tests
 - Procedures For Conducting Air Tests
 - Making Adjustments
 - Final Test
 - Completion Of Appropriate Forms
- HVAC System Analysis
 - Noise Problems
 - High Utility Bills
 - Wide Temperature Swings
 - Single/Multiple Area Is Hot Or Cold
 - Indoor Air Quality

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Knowledge Areas of
Technician Expertise

Air Flow (continued)

- Analyzing Reported Symptoms In Cooling
 - Poor Cooling
 - Humidity Problems
 - Drafty
- Analyzing Reported Symptoms In Heating
 - Poor Heating
 - Humidity Problems
 - Drafty

System Performance

- Gas Heating
 - Components
 - Operation
- Oil Heating
 - Components
 - Operation
- Air Conditioning / Heat Pumps
 - Components
 - Operation
- Electronic Controls
 - Electronic Controllers
 - Electronic Thermostats
 - Zone Controls
 - Electronic Compressor Controls
 - Electronic Timers

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Knowledge Areas of
Technician Expertise

System Performance (continued)

- Electromechanical Sensing Controls
 - Electromechanical Wall Thermostats
 - Electromechanical Temperature Controls
 - Pressure Controls
 - Electromechanical Outdoor Thermostats
 - Troubleshooting Sequence Of Operation
 - Analyzing Reported Symptoms
 - System Air Side Diagnostics
 - Vent System Checks
 - Diagnosing Combustion Problems
 - Leak Detection - Fuel Lines
 - Flue Gas Analysis
 - Leak Detection - Flue Passages
 - High Utility Bills
 - Indoor Air Quality
 - Humidity Problems
 - Drafts
 - Refrigerant System Diagnostics

Indoor Air / Environmental Quality

- Designing For Acceptable IAQ / IEQ
 - Understanding Ventilation And Acceptable IAQ
 - Understanding Filtration Systems
- Installing IAQ / IEQ Systems
 - Preventing Re-entrainment & Cross-contamination
- Operating & Maintaining IAQ / IEQ Systems
 - Filtration Systems
 - Recovery Ventilators
 - Ultraviolet C (UVC)
 - Exhaust/ventilation Fans

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Knowledge Areas of
Technician Expertise

Indoor Air / Environmental Quality (continued)

- IAQ / IEQ Control Strategies
 - Pollutant Pathways
 - Source Control - Remove / Contain
 - Filtration
 - Dilution Air
 - Local Exhaust
 - Whole House Ventilation
 - Powered Attic Ventilators