

DACUM Research Chart for HVAC/R Technician

DACUM Panel

Scott Enos
Commercial Sales Engineer
Carrier Enterprise Mid-Atlantic

Thomas Harrington
Training Coordinator
NAVFAC MID-LANT

Harlan Krepcik
Sales Manager
Carrier Enterprise Mid-Atlantic

Matthew Miller
Supervisor
Colonial Webb

Mark Monse
Mechanical Engineer Supervisor
NAVFAC MID-LANT

Paul Thurston
President/GM
Cox-Powell Corporation

Stanley Yeskolski
President
Investigative Inspection Services

Mike Yurcak
Owner
Clean Air Solutions, Gilbert and
Son Moisture

DACUM Facilitators

William Clement
Diann S. Holt

Sponsored by



TIDEWATER COMMUNITY COLLEGE
From here, go anywhere.™

Produced by

Tidewater Community College

February 26-27, 2013

DACUM Research Chart for HVAC/R Technician

Duties		← Tasks →			
A	Perform Safety/ OSHA Procedures	A-1 Maintain paper-work (e.g., lockout, tagout, update MSDS sheets, accident reports)	A-2 Identify personal protective equipment (PPE) (e.g., fall protection)	A-3 Attend training/education sessions (e.g., lift cert, ORM)	A-4 Monitor confine space (e.g., gas free space)
		B	Perform Service Call	B-1 Acquire work order – arrive at job site	B-2 Adhere to safety practices
C	Maintain the HVAC/R System	C-1 Acquire work order – arrive at job site	C-2 Adhere to safety practices	C-3 Communicate with customer (e.g., visual inspection)	C-4 Maintain the chiller *
		C-12 Maintain furnace	C-13 Maintain control system (e.g., DDC, pneumatics)	C-14 Maintain geothermal unit *	C-15 Maintain renewable energy system **
		C-23 Fill out paperwork (e.g. customer, inventory)			
		D	Install HVAC/R System	D-1 Acquire work order – arrive at job site	D-2 Adhere to safety practices
E	Perform Comprehensive Start-Up Procedure	D-12 Install make-up air units *	D-13 Install heat pump *	D-14 Install air handler *	D-15 Install package units *
		D-23 Install geothermal unit *	D-24 Perform air and water balancing (e.g., observe system impact)	D-25 Install refrigeration unit *	D-26 Install ice machine *
		E-1 Acquire work order – arrive at job site	E-2 Adhere to safety practices	E-3 Communicate with customer	E-4 Evacuate and pre-charge piping system
		E-12 Verify package unit operation	E-13 Verify furnace operation	E-14 Verify renewable energy system operation	E-15 Verify VAV systems operation

*Requires EPA Certification

**May Require EPA Certification

A-5 Inspect electrical tools/ equipment vehicle	A-6 Oversee hygienic processes	A-7 Comply with EPA regulations (e.g., lead, asbestos, chemical treatment)				
B-5 Diagnose and identify the problem *	B-6 Educate the customer (e.g., get authorization)	B-7 Repair the problem *	B-8 Fill out paper work (e.g., customer inventory)			
C-5 Maintain the boiler	C-6 Maintain the cooling tower	C-7 Maintain pumping package	C-8 Maintain the fan coil unit *	C-9 Maintain package units *	C-10 Maintain air handler *	C-11 Maintain heat pump *
C-16 Employ air quality devices (e.g., humidifier, UV lights)	C-17 Maintain ERV/HRV systems	C-18 Maintain make-up air unit *	C-19 Maintain exhaust system	C-20 Maintain VAV systems	C-21 Clean ice machine (e.g., maintain) *	C-22 Maintain refrigeration unit (e.g. gaskets, heaters, hinges)
D-5 Install piping system *	D-6 Install control wiring	D-7 Install pumping package	D-8 Install fan coil *	D-9 Install the boiler	D-10 Install the chiller *	D-11 Install the cooling tower
D-16 Install furnace	D-17 Install control system (e.g., DDC, pneumatics)	D-18 Install renewable energy system **	D-19 Install VAV systems	D-20 Install exhaust system	D-21 Install ERV/HRV systems	D-22 Employ air quality devices (e.g. humidifier, UV lights, etc.)
D-27 Install walk-in cooler/ freezer *	D-28 Fill out paperwork (e.g., customer, inventory)					
E-5 Cycle system components	E-6 Verify boiler operation	E-7 Verify chiller operation	E-8 Verify cooling tower operation	E-9 Verify make-up air unit operation	E-10 Verify heat pump operation	E-11 Verify air handler operation
E-16 Verify exhaust system	E-17 Verify ERV/HRV system operation	E-18 Verify geothermal unit operation	E-19 Verify refrigeration unit operation	E-20 Verify ice machine operation	E-21 Verify water and air balancing	E-22 Fill out paper work (e.g., start-up sheets, etc.)

Acronyms

BAS – Building Automation Systems
 CO2 – Carbon Dioxide
 CPR – Cardio Pulmonary Resuscitation
 DDC – Direct Digital Controls
 EPA – Environmental Protection Agency
 ERV – Energy Recovery Ventilator
 HRV – Heat Recovery Ventilator
 HVAC/R – Heating, Ventilation, Air Conditioning, and Refrigeration
 IAQ – Indoor Air Quality

MSDS – Material System Data Sheet
 ORM – Operational Risk Management
 OSHA – Occupational Safety Health Administration
 PPE – Personal Protective Equipment
 PVC – Polyvinyl Chloride
 UV – Ultraviolet
 VAV – Variable Air Volume

General Knowledge and Skills

Ability to measure
Ability to read plans
Ability to read schematics
Ability to use digital and analog multimeter
Acute mechanical aptitude
Analytical skills
Brazing and welding skills
Communication skills
Computer skills
Electrical knowledge
First Aid/CPR Training
General construction knowledge
General safety knowledge
General trade tool knowledge
Good driving skills
Knowledge of air distribution
Knowledge of basic first aid
Knowledge of CPR
Knowledge of OSHA regulations
Knowledge of psychrometrics
Knowledge of using hand signals for crane operator
Knowledge of using psychrometer
Knowledge of water distribution
Math skills
Organizational skills
Reading skills
Time management
Understand refrigeration cycle
Writing skills

Future Trends and Concerns

Ability to inspect for mold and moisture
Advertising trends and shifts
Air balancing
BAS controls
Better understanding of air flow
Educating customers and the public
Effect of R22 becoming obsolete
Energy efficiency
EPA certifications
ERV/HRV systems
Global economy effects on the industry
Government regulation trends
Inability to measure system capacity
Journeyman's license
Labor pool
Low barrier of entry into the HVAC industry
Multistage modulating equipment
Negative air drying
Negative effects of crawl space moisture
New equipment and technology
Online technical training
Professional development
Renewable energy
Technical support
Understanding of anti-microbial
Understanding of indoor air quality
Understanding the building envelope
Variable flow refrigerant systems
Water treatment
World Health Organization

Worker Behaviors

Adaptable	Presentable
Confident	Problem solver
Determination	Productive
Empathy	Professional
Flexible	Proud
Good Communicator	Punctual
Good listener	Reliable
Handy	Resourceful
Hard worker	Safety conscious
Has common sense	Self disciplined
Has stamina	Self motivated
Honest	Sense of humor
Humble	Team player
Humility	Technology literate
Integrity	Thick-skinned
Multitasker	Thinker
Patient	Trainable
Personable	Willing to work
Physically able	Willingness to learn

Certifications

Associated Air Balancing Council (AABC)
EPA Refrigerant Recovery Type I Certification
EPA Refrigerant Recovery Type II Certification
EPA Refrigerant Recovery Type III Certification
Industry Competency Exam (ICE)
Journeyman's card
Journeyman -- Master card
National Air Duct Cleaners Association (NADCA)
National Environmental Balancing Bureau (NEBB)
North American Technical Exam (NATE)

Tools, Equipment, Supplies and Materials

Acid test kit	First aid kit	Psychrometer
Air compressor with nozzle	Fish tape	Pulley puller
Aluminized ducting tape	Flashlight	Pulleys
Anemometer	Flow hood	PVC glue and primer
Anti-seize oil	Flux	PVC pipe
Belts	Fuses	Radio
Booties	Gas valve	Reciprocating saw
Business cards	Gasket material	Recovery bottles
C02 cartridges	Glue	Recovery equipment
Calibration equipment	Ground fault interrupter	Refrigerant
Capacitor tester	Hand tools	Refrigerant gauges
Cell phone	Headlight	Refrigerant scale
Circuit boards	Hoses	Relays
Circuit breakers	Hydrometer	Safety cone
Coil cleaner	IAQ meter	Safety tape
Combustion analyzer	Infrared thermometer	Sand paper
Contactors	Inducer motors	Sequencer
Copper pipe 3/8 - 7/8	Key stock	Sheet metal screws
Cordless drill	Ladder	Shop vacuum
Digital camera	Lap top computer with DDC software	Silicon
Digital thermometer	Leak detector	Silver solder
Drill bits	Liquid leak detector	Soldering iron
Drop cloth	Lock tight	Spray bottle
Drop light	Manometer	Stationary
Duct sealant	Megohmmeter	Tachometer
Duct tape	Micrometer	Tape measure
Easy out	Mirror	Thermometer
Electric drill motor	Moisture meter	Thermostat wire
Electrical gloves	Motors	Thermostats
Electrical meter	Multimeter	Thread compound
Electrical tape	Nitrogen	Thread tape
Electrical tools	Nitrogen leak detector	Tool bags
Electrical wire	Nitrogen regulator	Tool boxes
Electrical mat	Oxyacetylene torch	Transformers
Electronic calculator	Penetrating oil	Vacuum pump
Extendable magnet	Personal protection equipment	Vacuum pump oil
Extension cords	Pipe bender	Van/Truck
Face shield	Pitot tube	Vise
Filter dryers	PPE	Wire nuts
Filters	Pressure gauge	Wire ties
Fire extinguisher	Propane torch	