

Prepared by:
Proctor Engineering Group, Ltd.
San Rafael, CA 94901
(415) 451-2480

Report on NATE test of April 10, 1998

Prepared for:
E Cube, Inc.
NEES
Massachusetts Electric
Narragansett Electric
Granite State Electric
Nantucket Electric

Final Report
April 11, 1998

Author:
John Proctor P.E.

Creators of CheckMe!®



On April 10, 1998, I took 19 modules of the North American Technician Excellence (NATE) Certification Tests. The objective was to assess the current NATE Certification Test for the inclusion of factors affecting energy efficiency and the effectiveness of the current test in that regard. NATE, VGI Testing Services, and the local Proctor (Mark Waters) were all very helpful.

Immediately following my completion of each test module I ranked that module on the clarity of the questions/answers and on the content (importance) of the areas covered. These rankings were done on a ten point scale. A rank of one is very poor, five is acceptable, eight is desirable, and ten is excellent. These rankings are displayed in Table 1.

Table 1. Ranking of Test Modules			
Examination	Module	Clarity	Content
Air Conditioning (Service Level)	Tools and Measurements	2	3
	Electrical	3	5
	Basic Systems	2	4
	Installation	4	6
	Service and Repair	5	7
	Controls	7	8
	Regulations and Safety	10	10
	Design	9	4
Air Conditioning (Installation Level)	Service and Trouble Shooting	9	5
	Design	9	5
Air Distribution (Service Level)	Tools and Measurements	7	7
	Basic Systems	6	3
	Installation	10	4
	Service and Repair	3	4
	Controls	8	3
	Design	9	4
Heat Pump (Service Level)	Basic Systems	6	5
	Installation	5	6
	Design	9	5

Where appropriate, the content ranking was strongly influenced by how the content covered items effecting energy efficiency. For example, air distribution installation was ranked less than adequate because of a lack of coverage of important energy efficiency items. On the other hand, the electrical section did not need to address energy efficiency related issues.

Discussion

Clarity

The test is difficult to understand. A number of questions/answers are unclear from my reading. The test is also very “word oriented”. Many of the technicians we work with and train would have a hard time with the test because it is not “hands-on” enough. The questions should rely on graphics to the largest extent and on written descriptions to the smallest extent possible. I think that some very good technicians will have a hard time with this test and some very poor technicians will pass it.

Content

This test clearly represents a major amount of work. NATE has defined a wide range of items to cover:

- ten areas
- on two levels (Service and Installation)
- with five sectors (AC, Air Distribution, Heat Pumps, Gas Furnaces, Oil Furnaces).

They have tried to build a module for each of these items. In some cases this is unnecessary. In attempting to cover each of these combinations they appear to sometimes be struggling to find the questions to ask to fill out the module. The result is significant overlap even within one sector and level.

The overall result is that the level of importance of a particular area of knowledge is not necessarily reflected in the amount of questions relating to that area. This is more true in the area of energy efficiency than in other areas.

AC sizing practices, Heat Pump sizing practices, Duct sizing practices, and Air flow measurement were covered, but in insufficient detail and in an insufficient number of questions to ensure that the technician will know these areas in order to pass the test.

Refrigerant charge and brazing were covered adequately. Evacuation was covered, but not as well as I would have liked to see. Duct leakage was covered, but the questions appear to be based on a shallow knowledge of the area (for example, no mention of effect of duct leakage on house pressures, no adequate coverage of duct leakage measurements, etc.). Duct insulation was pretty much ignored.

The air distribution modules are heavily into traditional balancing and zoning which is rare in residential construction and certainly of lesser importance than the various methods of measuring and eliminating duct leakage, safety effects of duct leaks, duct insulation, duct restrictions, and durability of duct installations.

Conclusions

The test is unlikely to affect the field practices of the technicians in areas of energy efficiency. It introduces some concepts that the vast majority of technicians do not know (duct sealing information for example) and asks questions on items they do not usually do (evacuation and proper charge for example). Nevertheless, there is an insufficient number of questions on the items they do not know to make study essential.

It is questionable that field practices on charge, brazing, and evacuation can be changed by test questions, but an attempt to make those field changes with test questions should probably be centered on the negative effects of doing it wrong.

Recommendations

I recommend that the individual modules be reviewed and revised in the following manner:

- Determine the need for the module, if it is unnecessary eliminate it.
- Determine the MOST IMPORTANT items that a technician needs to know within the area of the module. Focus the questions on those areas only and determine the number of questions on each area based on their priority within the module.
- Remove any questions that do not relate directly to that module. Do not overlap between modules.
- Revise the questions for clarity, simple language, and use graphical presentations whenever possible.