



Vol.8

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Dear Educator:

Hello to all. I would like to take this opportunity to invite everyone to join our HVAC/R instructor's organization, the Council of Air-Conditioning and Refrigeration Educators.

First, I would like to introduce myself. I have been a member of CARE for nine years, on the board for four years and am currently the President-elect. I have been in the HVAC/R trade for twenty-five years and an educator for ten years. I run my own Heating and A/C, contracting and consulting companies in Centerville, Ohio.

CARE was established nine years ago at the second ARI instructor workshop to take HVAC education to a new level that would be recognized nationally by all parties concerned in our industry. We wanted to improve and standardize curriculum across the country, improve networking opportunities among instructors, suppliers, and manufactures in the HVAC field, and we needed a national voice in matters that concern HVAC education.

With ARI's help we are off to a good start. Some states have already started local chapters. Illinois, Ohio, and Alabama have existing chapters. Texas and Washington are looking to organize. We have set up school discounts with some suppliers of tools and test equipment. With the help of ARI, manufactures are donating HVAC equipment to schools in need. Programmatic accreditation was needed, so PAHRA was established by HVAC/R instructors with help from ARI and NATE. ACCA, PHCC, and RSES have joined ARI in hosting the Instructor Workshop held annually giving us a larger population to recruit from.

CARE currently has over one-hundred members across the USA. There is a web-site that is being up-dated. [[www.carehvacr.org](http://www.carehvacr.org)] and we have formed several committees, Web-site, Membership, Workshop, and Bylaws.

I urge all HVAC instructors to join CARE. Become involved by helping form state chapters, and help this organization reach the next level. Feel free to contact me by e-mail at [bob.feathers@sbcglobal.net](mailto:bob.feathers@sbcglobal.net). if you are interested in joining or helping us in anyway. Have a safe summer, and may everyone have a great school year.

Sincerely,

**Bob Feathers/CARE  
President**

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## Greg Goater

C.A.R.E. VP Proprietary Schools  
Isaac University

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I just had a conversation with a technician we recently hired away from another contractor. This fellow has 6 years experience installing and servicing heating and air conditioning equipment, a great mechanical aptitude, and one of those personalities you just enjoy having in your home. A great find for us!

As with all of our technical employees, we enrolled him in our Isaac University Training Program, and in my attempt to determine at what level he should appropriately enter our program, I took him down to the lab for a little AC troubleshooting. In analyzing a system we had “bugged” with a liquid line restriction, his first thought was to add refrigerant, a pretty common mis-diagnosis if you aren’t looking at super heat and sub cooling. I asked him about that and what I found was he didn’t have a clue as to how to even measure these, let alone use that information in forming a diagnosis.

My thoughts raced immediately ahead to all of the “experienced” technicians out there who have been doing the job incorrectly for all of these years. What happens to the technical information they learned in school? How are employers putting techs in the field without what I consider to be pretty elementary skills? Once in the field, how are employers continually training experienced techs to keep up with the advances in the industry? What happens when you send this technician on a 13 SEER TXV equipped piece of equipment? Pretty scary stuff!

What a terrific time to be an HVACR Educator. The need has obviously never been greater. Consider the potential impact each of us can have on the entire industry. Every employer wants well trained employees, and every educator wants classrooms full of eager students. As educators, we have a commodity at our disposal to sell! All we have to do is figure out a way to make our programs fit the needs of the industry. How flexible can we be in scheduling classes to allow working technicians the opportunity to attend them? How flexible can we be in taking our programs out of the traditional classroom and into the contractor’s place of business?

At each of the Instructor’s Workshops that I have attended, I hear an outcry about programs that are failing due to low enrollment, yet the need for training has never been greater. I encourage you to look at your programs with a skeptical eye, and see if we all are missing an opportunity to enhance our enrollments and positively impact our industry by being a little more “customer” focused.

# 13 SEER What to Expect!

Balancing out the 13 SEER information from manufacturer to consumer.

### Replacing Outdoor Unit Only: Mismatching Equipment

In a laboratory setting, the following conditions were simulated; Cooling conditions, 95°F outside / 80°F inside and heating conditions, 47°F outside / 70°F inside.

First a matched 13 SEER Heat Pump was installed. Listed is the performance of the system:

Cooling mode:	Heating Mode	
Capacity (BTU/hr)	36794	36484
SEER	13.62	15.71
Superheat (F)	17.93	12.05
Subcool (F)	6.08	21.07
Liquid (PSIG)	222.76	203.88
Return gas pressure	81.38	58.09



Next is a mismatched system, 13 SEER outdoor and a 10 SEER indoor. The factory refrigerant charge of the outdoor unit is 8 lbs 7ozs.

Cooling mode:		
Capacity (BTU/hr)	22208	Low
SEER	8.46	Low
Superheat (F)	54.54	High
Subcool (F)	0.98	Low
Liquid (PSIG)	209.94	Little below normal
Return gas pressure	58.42	Low
Heating mode:		
Capacity (BTU/hr)	29997	Low
EER	10.60	Low
Superheat (F)	11.24	Little below normal
Subcool (F)	26.73	Little above normal
Liquid (PSIG)	233.03	Little high
Return gas pressure	60.86	Normal

Next is a mismatched system, 13 SEER outdoor and a 10 SEER indoor. The refrigerant charge balanced for heating performance (10 lbs 0.5ozs).

Cooling mode:		
Capacity (BTU/hr)	26188	Low
SEER	9.08	Low
Superheat (F)	50.31	High
Subcool (F)	4.12	Little below normal
Liquid (PSIG)	214.25	Little below normal
Return gas pressure	62.48	Low
Heating mode:		
Capacity (BTU/hr)	30178	Low
EER	9.47	Low
Superheat (F)	11.22	Little below normal
Subcool (F)	62.23	High
Liquid (PSIG)	310.50	High
Return gas pressure	61.83	Normal

Next is a mismatched system, 13 SEER outdoor and a 10 SEER indoor. The refrigerant charge balanced for cooling performance (14lbs 14 ozs).

Cooling mode:		
Capacity (BTU/hr)	29823	Low
SEER	8.92	Low
Superheat (F)	14.68	Little below normal
Subcool (F)	17.58	High
Liquid (PSIG)	262.49	High
Return gas pressure	79.96	Little below normal
Heating mode:		
Capacity (BTU/hr)	18706	Low
EER	5.74	Low
Superheat (F)	6.6	Low
Subcool (F)	87.00	High
Liquid (PSIG)	410.1	Very high
Return gas pressure	64.60	Little above normal

A mismatched system, 13 SEER outdoor and a 10 SEER indoor with a TEV. The refrigerant charge balanced for cooling performance (10 lbs 6 ozs).

Cooling mode:		
Capacity (BTU/hr)	31266	Low
SEER	11.85	Low
Superheat (F)	26.22	High
Subcool (F)	2.20	Low
Liquid (PSIG)	220.06	Normal
Return gas pressure	77.06	Little below normal
Heating mode:		
Capacity (BTU/hr)		
EER		
Superheat (F)		
Subcool (F)		
Liquid (PSIG)		
Return gas pressure		

High Pressure Switch opened because head pressure exceeded 410 psi. Charge needs to be reduced for heating but cooling is requiring more charge

## Result of Only Replacing Outdoor Unit

Up to 40% reduced capacity in cooling, meaning system may not be able to keep up with thermostat setting.

Up to 48% reduced capacity in heating resulting in strip heat coming on earlier.

Up to 40% reduced efficiency in cooling resulting in higher utility bills. Not only is it going to run longer but dollars per cooling will be more as well.

Up to 60% reduced efficiency in heating resulting in higher utility bills.

System charging becomes critical since the charge might seem correct for one condition but flood in another.

TEV will not solve the charge problem for all cases since the SH and SC can change dramatically with conditions.

All of these situations will result in numerous service calls and most likely the only way to resolve it is replace the indoor coil with a larger coil anyway.



**Clifford H. "Ted" Rees, Jr. Scholarship:** The Clifford H. "Ted" Rees, Jr. Scholarship Foundation was established to assist with the recruitment and competency of future Heating, Ventilation, Air-Conditioning, and Refrigeration (HVACR) technicians by awarding scholarships to qualified students who are enrolled in an institutionally accredited school.

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The following companies support HVACR Programs with discounts, etc.

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Simutech 10% off for Workshop Attendees  
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