

COLORADO DEPARTMENT OF REGULATORY AGENCIES  
OFFICE OF POLICY AND RESEARCH

# HEATING, VENTILATION, AIR CONDITIONING AND REFRIGERATION TECHNICIANS

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## 1995 SUNRISE REVIEW



***Joint Legislative Sunrise/Sunset Review Committee  
1995-1996 Members***

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June 30, 1995

The Honorable Richard Mutzebaugh, Chair  
Joint Legislative Sunrise/Sunset Review Committee  
State Capitol Building  
Denver, Colorado 80203

Dear Senator Mutzebaugh:

We have completed our evaluation of the sunrise application for licensure of **Heating, Ventilation, Air Conditioning and Refrigeration technicians** and are pleased to submit this written report which will be the basis for my office's oral testimony before the Sunrise and Sunset Review Committee. The report is submitted pursuant to section 24-34-104.1, Colorado Revised Statutes, 1988 Repl. Vol., (the "Sunrise Act") which provides that the Department of Regulatory Agencies shall conduct an analysis and evaluation of proposed regulation to determine whether the public needs, and would benefit from, the regulation.

The report discusses the question of whether there is a need for the regulation in order to protect the public from potential harm, whether regulation would serve to mitigate the potential harm and, whether the public can be adequately protected by other means in a more cost effective manner.

Sincerely,

Joseph A. Garcia  
Executive Director

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## INTRODUCTION

### **The Sunrise Process**

The Department of Regulatory Agencies Office of Policy and Research (OPR) has completed its evaluation of the proposed licensure of heating, ventilation, air conditioning, and refrigeration (HVACR) professionals submitted by the Colorado HVACR Licensing Coalition. The proposal seeks to regulate individuals who design, install, service and repair heating, ventilation, air conditioning, and refrigeration systems in public and private settings.

The applicant asserts that the safe and effective operation of these systems requires a specific and specialized body of knowledge that distinguish it from other licensed tradespeople such as plumbers and electricians. Licensing of these professions would establish a minimum standard of practice throughout the state and would help assure the consumer that these products and mechanical systems were correctly designed, installed, and serviced.

The applicant also proposes a bond requirement on all HVACR professionals. This coupled with licensure would protect the consumer from incompetent individuals who are not performing their work at industry standards as well as unethical actors preying upon the unknowledgeable homeowner.

OPR considered the concerns of the applicant and evaluated the benefits of the proposal to the public according to the following statutory criteria located in §24-4-104.1, C.R.S.:

- I. Whether the unregulated practice of the occupation or profession clearly harms or endangers the health, safety or welfare of the public, and whether the potential for harm is easily recognizable and not remote or dependent on tenuous argument;
- II. Whether the public needs and can be reasonably expected to benefit from, an assurance of initial and continuing professional or occupational competence; and
- III. Whether the public can be adequately protected by other means in a more cost-effective manner.

## **Methodology**

OPR contacted and interviewed the applicant, members of the HVACR community, city and county building code officials, district attorneys consumer protection offices, the Colorado Attorney General's Office, and the Board of Electricians. Additionally, other states' regulatory officials were contacted to provide a background on their programs and a literature search was conducted to familiarize the reviewer with the topic.

## **Request for Licensure**

The applicant requests that the state implement a cash funded licensure program for those professionals who install, repair or service heating, ventilation, air conditioning, or refrigeration systems. They propose that licensing would increase the standard of quality of the work performed by these tradespersons which would directly benefit the consumer safety-wise and economically. A statewide license would reduce the HVACR costs of business by eliminating local multiple licensing costs required by each municipality. Additionally, the applicant proposes a Licensing Bond required to be paid by all professionals who perform HVACR functions. This bond would provide the consumer to receive compensation for below standard work or unethical practices and procedures. The applicant proposes that the bond for commercial HVACR contractors would be set at \$10,000 costing the licensee approximately \$250 per year and a \$3,500 bond for residential contractors costing them approximately \$100.

## **Cost of Regulation**

Other licensure programs within the Department of Regulatory Agencies (DORA) usually consists of a seven member board who meet between six and 12 times a year. DORA estimates that the cost to implement a new licensure program is between \$40,000 and \$45,000. If the newly created licensing authority elects to develop its own exam for licensees, OPR estimates the additional cost to be \$30,000 and \$35,000. Taken together the program would cost between \$70,000 and \$90,000.

## BACKGROUND

### **HVACR Definition and Number of Practitioners**

The construction arena requires many different disciplines and each requires a specific knowledge or trade in order for the work to be performed correctly. For example, when a building is constructed there is a need for carpenters, electricians, bricklayers, roofers, electricians, and welders as well as tradespeople to install heating, ventilation, air conditioning or refrigeration.

Those who perform heating, ventilation, air conditioning and refrigeration work are comprised of 1000 contractors and 15,000 tradespeople in the state of Colorado. They design, install, engineer, and repair equipment related to these disciplines and may include mechanical contractors, sheetmetal workers, steamfitters, pipefitters, gas fitters, boilermakers, solar contractors, and heating and cooling contractors. The functions of these professionals are cross disciplinary and may incorporate small segments of work performed by other tradespeople, but not significantly overlapping any of them. For example, an HVACR may perform such activities as welding, low voltage wiring and piping. These are also performed by welders, electricians, and plumbers. However HVACR systems require additional expertise including the fabrication and installation of ductwork, combustion systems, and refrigeration equipment.

### **Scope of Practice**

HVACRs may be found in two traditional settings. They either work as independent contractors or sub contractors. They perform their work in a variety of locations, specifically in residential, commercial, and industrial settings.

#### ***Residential***

Residential work for HVACRs will often include the following areas:

- Heating
- Cooling
- Ventilation
- Filtration
- Humidification

Installation and service of heating systems require the knowledge of various types of heating sources. These may include boilers, forced hot air furnaces, solar systems, and electric resistance heating. Each heats a specific medium (air or water) which is then conveyed to various parts of the house. For example, forced hot air furnaces heat the air which travels through ducts to various parts of the house to reach the desired temperature.

The theory of cooling works the same way. However, a different expertise is required by the installer. The installation and service of cooling systems may use a variety of different devices including evaporative coolers, air washers, refrigerant direct expansion systems and chilled water systems. These coolers may be located on top of the roof or within the house itself. In some cases the heating and cooling devices will rely on the same pump and will pump air or water throughout the house via ducts or pipes in order to achieve the desired temperature.

In addition to heating and cooling, proper ventilation is very important in keeping a home at its proper temperature, as well as free from pollutants that may build up in the house (i.e. radon) or prevent pollutants from coming into the house from the outside. Ventilation may range from the simple whole house fans to the more complex controls found on solar heating systems. Homes may also have filtration devices designed to filter outside air or clean inside air. Finally HVACRs may install and repair humidification systems designed to provide and keep moisture in the home without creating mold.

### ***Commercial***

Many of the needs met by HVACRs in residential settings are also found in commercial work settings. The difference typically is that the systems are larger, more complex, and subject to stricter building code requirements. Commercial systems may also require refrigeration systems designed to maintain food and beverages. These refrigeration systems are often found in restaurants and grocery stores.



### ***Industrial***

Additional expertise is required by the HVACR tradespeople when performing services in industrial settings. For example, power plants may require the installation of sophisticated scrubbers to filter out environmental pollution. Other systems may require bag houses or containment systems to prevent contaminants from being released into the environment. Chemical processing plants may require ventilation hoods which remove the chemical vapors from the room. Other manufacturing facilities may have dust collection systems to remove fine particles out of the air.

In summary, the HVACR industry is a wide and diverse field requiring specific knowledge in the installation and operation of many different devices. Within each category of trade there are numerous specialties and those are divided by the type of setting the system is being used.

### **Education and Training**

Although there are no uniform entry requirements for the HVACR industry, tradespeople may receive their education through apprenticeship programs, academic programs offered through trade schools or community colleges, correspondence courses, trade unions and trade associations.

The apprenticeship program is one of the more common forms for learning this occupation. There are a number of these programs throughout Colorado. All of the apprenticeship programs require on-the-job training in conjunction with related instruction. The typical apprenticeship program lasts four to five years and requires approximately 160 hours per year in related classroom instruction.

Other sources of formal training, such as academic programs, are varied and may teach one or more aspects of the trade. The cost of these programs may be as high as several thousand dollars per person. Some of these programs are provided by the following groups:

Vocational and technical schools

The Associated Building Contractors

The Refrigeration Service Engineers Society

State Industries Trade Association

Construction Industries Training Council

Colorado Solar Energy Industries Association

### **Current Regulatory Process**

Currently there are a variety of checks, both governmental and private, that provide assurances that someone in the HVACR field is operating competently. The Uniform Mechanical Code (UMC), the Uniform Solar Energy Code (USEC) and the Uniform Plumbing Code (UPC) are all widely accepted guides for HVACR practices. Currently, the municipality or county is responsible for the safe and adequate installation or repair of heaters, air conditioners, coolers and other devices worked on by HVACRs. All of these communities require that installation or repair be conducted under the Uniform Mechanical Code. These national codes provide uniform standards as to how the work should be performed. Since the code is set to a national standard, localities within Colorado will often change certain parts of the code to suit their local needs. For example, settings on furnaces will be different in Denver than in another part of the country to compensate for the altitude.

On the state level, all communities require that the work be permitted, done by uniform code standards, and are inspected. Municipalities and counties will have inspectors that will review the work to ensure that it is up to code standards. If the work is performed incorrectly, the inspector has authority to take certain actions. If the work is still in the construction phase, the inspector may pull the permit, and work on the project will cease. If the project has been completed, the inspector can demand that the project be modified to comply with the code. Other codes such as the fire code may be used to shut down a poorly installed furnace if it could create a fire hazard.

In addition to requiring compliance with the UMC, localities throughout Colorado have additional licensing provisions. Larger municipalities including Denver, Aurora, Boulder, Colorado Springs, Greeley, Littleton and Longmont require that a HVACR contractor be licensed. License requirements require passing a written examination and a fee. Other communities may not conduct an examination but require the contractor to be licensed. Smaller communities such as Alamosa do not have the money or expertise to perform testing for licensing. However, as part of their license requirement, they will require the applicant to provide a license from another community, or if the applicant does not have a license, three references. The building inspector for that locality will then verify the license and its status or will check references.

Work performed by HVACR tradespeople also overlaps into federal jurisdiction. Any person performing refrigeration work that involves ozone depletion compounds must complete an EPA training program and be certified by the EPA. For example, this regulation could apply to individuals who work on air conditioning systems and large commercial coolers.

Privately, owners of businesses have in their best interest to ensure that the work is done properly. When they hire an employee, that employee will have either been trained at an educational facility and/or may have done an apprenticeship up to four years. Once hired, it is typical for the person to be supervised until the employer feels that the employee is competent. Finally, third parties, such as the local gas company may get involved. If they believe that a heater was installed improperly and poses a life threatening risk, they will turn off the gas to that house.

Protection for consumers from unethical and iniquitous HVACR tradespeople may be provided under the Colorado Consumer Protection Act (CCPA) (§6-1-105, et seq., C.R.S.) This act provides prosecutorial action against persons involved in deceptive advertising or fraudulent marketing practices. The consumer is eligible to receive treble damages, the cost of the action, and attorney fees.

The act prohibits persons from:

- making misleading statements concerning the price of a product or the reasons for the price reduction;
- knowingly passing off goods, services or property as those of another;
- knowingly making a false representation as to the characteristics, uses, benefits, or alteration of services or property;
- representing a product as original or new if he knows or should know that they are deteriorated, altered, reconditioned, reclaimed, used or second hand;
- representing that a product is of a particular standard, quality or grade, or that goods are of a particular style or model if he knows or should know that they are of another;
- advertising a product with intent not to sell them as advertised;

- accepting a deposit for the product and subsequently switching the purchase ordered to higher-priced goods; and
- failing to make delivery of the goods within a reasonable time or to make a refund therefor.

In addition to the above, the CCPA also prohibits many other types of unscrupulous business practices.

## OTHER REGULATION

Conditioning Contractors of America (ACCA) in 1994 indicates that 33 states currently have some sort of licensing requirement for HVACR contractors. Of the states surrounding Colorado, Arizona, New Mexico, Nevada, and Utah have a licensing program.

Arizona's licensing program has been in existence since 1931 and is indicative of other licensing programs in other states. They regulate many different types of contractors including HVACRs, but not the individual. Contractors are required to obtain a state license and are subject to disciplinary procedures if they are at fault. In the past year, Arizona received approximately 200 complaints against residential and commercial HVACR contractors. Of those complaints, approximately two thirds were from residential licensees. When these complaints are compared to other contractor complaints, they are relatively small. Whereas there were 200 complaints against HVACRs, there were 6,000 complaints against contractors overall. Arizona officials find that the HVACR industry has a history of lower complaints than other contractors. Most of these complaint are against scam artists.

Nevada, like Arizona only licenses the HVACR contractor, not the individual. HVACR licensing is one of 42 primary classifications that are licensed in the state. Under the HVACR classification, there are subclassifications that an individual can be licensed under. Examples of these subclassifications include chilled water piping and sheetmetal. Although the State of Nevada could not provide specific numbers of complaints against HVACR contractors, their investigators did state that this group of tradespeople had not been a problem when compared to other trades that are licensed.

## *PUBLIC HARM*

An improperly installed HVACR system could have a variety of detrimental effects ranging in severity from life threatening to increasing the homeowner's heating bill. The applicant proposes licensure for contractors who design, install, service, or repair heating, ventilation, air conditioning, and refrigeration systems in public and private places. It is the applicant's contention that licensing would establish a minimum standard of practice and would assure the consumer that products and services and mechanical systems are designed, installed and serviced correctly. Licensure would allow the consumer to verify credentials, and provide a complaint and disciplinary process. The applicant also proposes a bonding requirement on all HVACRs. This would act as a consumer tool by which the bond would cover any nefarious activities conducted by the licensed HVACR.

The applicant's primary reason for licensure is the potential physical and economic harm that may result from an unskilled person working on one of the HVACR systems. Improper installation and ventilation of a heater may potentially cause a gas explosion or carbon monoxide poisoning. Although this is a serious matter, these situations occur infrequently in the state. When problems arise, the fault is almost always with the homeowner who either personally did the improper installation or repair, or failed to maintain the equipment by not having a professional look at the furnace. Consequently, licensure would not prevent these problems.

Improper installation or repair of a heating system, air conditioner, ventilation system, or humidification system, can cause damages to the home itself (i.e. water damage due to a leaking pipe), or result in higher costs to the consumer through repairs or overcharging. The applicant has proposed a bond requirement on all professional HVACRs as a tool to persuade incompetent HVACRs to move out of the field and to compensate the consumer who is injured by the negligent or malicious actions of the HVACR. The applicant states that the smaller communities in the state do not have the expertise to ensure that

installations and repair are done according to uniform building code requirements. The applicant surveyed all of the counties and municipalities building inspectors to determine the extent of complaints attributed to HVACRs. Only twenty-five responses were received, with the overwhelming majority indicating they had less than five complaints per year. However a few of the smaller communities confirmed the applicant's statement regarding their lack of expertise.

Discussions with surrounding district attorney consumer protection offices also indicate that this is not a prevalent issue. Offices collectively are not reporting a large number of complaints. This number is smaller when taken collectively with all other complaints that an office receives. (See Chart) In cases where a problem arises, if it is a contractual issue, the case is forwarded to the district attorney's office. Boulder county has a high number of these complaints which is thought to be a result of the large amount of construction in the area. However, when compared to the total annual number of contractor complaints in general, approximately 700, it is relatively small. Often complaints concern scam artists preying on the consumer's fear of a gas leak. These people will drive around a community seeking to be hired to clean the furnace. Once hired they then tell the homeowner that there is a gas leak, and sell the homeowner a new furnace for thousands of dollars. Eighty percent of Jefferson County complaints on HVACRs come from these types of scams. Although a bond may assist in eliminating some of these practices, it is unclear whether these people would continue to operate. A more viable and less costly option would be to educate the consumer to get second opinions or contact groups such as the Better Business Bureaus for references. District attorney consumer protection offices vigorously pursue these complaints under the Consumer Protection Act. Adams County is an example of that type of enforcement. They used to have more than a dozen complaints each year. Now those complaints are down to one or two per year.



**HVACR Complaints**

<b>Locality</b>	<b># of Complaints</b>
Adams County	2/yr.
Denver County	8/yr.
Douglas County	30/yr.
Boulder County	50/yr.

One sub-group has distinguished itself from the other members of the coalition in showing that there is some harm from their tradespeople. Tradespeople who install solar heating or hot water systems require a special knowledge in the installation and repair of these devices. Quite often they are grouped with plumbers but because of the intricacies of these systems, additional knowledge is required to install them correctly. The Colorado Office of Energy Conversation conducted a survey of solar hot water systems. Extrapolating from their findings in the survey, they inferred that 10-15% of all systems were improperly installed. Damages from the improper installation can range from leaks causing water damage to higher heating bills. Because most solar heating systems have backup systems for when it is cloudy, it is often difficult for the consumer to identify that the solar system is improperly working. Installation and repair must meet code specifications and future information should be collected and reviewed again to determine if some regulatory mechanism should be imposed.

## RECOMMENDATION

community does not appear to be of a proportion to warrant state licensure. The public is adequately protected by the enforcement of codes by the local communities and the requirement of local licensing. A large majority of the danger to the public from improper installation of heaters and furnaces comes at the hands of the homeowner. OPR found that the homeowner's own installation or repair of their furnace or their lack of hiring a professional were the causes of physical danger. OPR also found that the economic welfare of the public was adequately protected by the Colorado Consumer Protection Act, and to a lesser extent, the local licensing authority. The number of complaints received by District Attorney Consumer Protection Offices were small compared to complaints of other professions. The primary complaints regarding HVACR contractors and tradespeople were from con artists. Here the CPA was adequately enforced against these people. However the CPA could be strengthened by making it a misdemeanor for violating the Act by an HVACR. The second largest group of complaints came from contracting disputes. Also relatively small, they arose more often in areas where there was a high level of construction. These cases are adequately handled by the locality and often are resolved with a letter to the contractor. The applicant under §24-4-104.1, C.R.S. has the burden to prove that regulation is required in order to protect the public health safety and welfare and that the regulation is not currently adequate to protect the public. OPR believes that this burden has not been met. Therefore, OPR recommends that there be no state regulation of persons conducting heating, ventilation, air conditioning, and refrigeration services.

The harm caused by  
the HVACR

