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*Comment Received From: International Institute of All-Natural Refrigeration  
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## **IIAR Perspective on Efficiency Ratings**

Please see attached letter.

*Additional submitted attachment is included below.*



1001 N. Fairfax St., Suite 503 • Alexandria, VA 22314  
703-312-4200 • F: 703-312-0065

[www.iiar.org](http://www.iiar.org)

May 15, 2026  
California Energy Commission  
Re: Title 24, part 6 Proposals

Dear California Energy Commission,

This letter is written regarding the California Energy Code proposals for updating Title 24, Part 6, for the 2028 code cycle.

The International Institute of All-Natural Refrigeration (IIAR) IIAR is a non-profit association that is considered a professional society as well as a trade association. We represent over 4000 members who are end-users, manufacturers, contractors, consultants, academics, and others in the industrial and commercial refrigeration industry. These members are instrumental to the supply and preservation of our nation's food and beverage resources, among many other functions pertaining to the use of refrigeration. Most of our members are practitioners of the use of natural refrigerants such as ammonia, carbon dioxide, and propane. Many of them are on the forefront of developing equipment and systems that are state of the art for increasing energy efficiency, reducing greenhouse gas emissions, and piloting the future applications of refrigeration technology.

IIAR has been an ANSI accredited standards developer since the 1970's. Our standards are recognized by the national code bodies and are directly referenced in the International and Uniform Mechanical Codes, Fire Codes, NFPA and various other state codes that are developed from these. IIAR standards are also considered "recognized and generally accepted good engineering practices" by federal and state regulatory agencies charged with enforcing environmental and labor rules (OSHA, EPA, and others). Our members are intimately familiar with working with authorities having jurisdiction and intimately understand the consequences of codes and standards development and the resulting impact on industry and ultimately the consumer. We have worked with several California agencies such as CARB, CalARP, CalOSHA, CUPA, on various topics related to the refrigeration industry. We would be happy to engage with California Energy Codes & Standards on developing changes to Title 24 rules.

We have reviewed several documents related to the Codes and Standards Enhancement Proposal and offer the following comments:



The proposed change to base the requirements for variable  $V_i$  on screw compressors to displacement rather than motor size is appropriate. Manufacturers have been able to incorporate this feature into smaller displacement compressors that could use a variety of refrigerants. Further, basing the requirement on motor power is perhaps not a legitimate metric because motor power requirements vary based on required suction and discharge pressures. A given compressor will require more horsepower when operated at a lower suction pressure or higher discharge pressure. Thus, displacement is a more appropriate metric.

Next, we note that currently evaporators for refrigerated warehouses are required to meet the AHRI-420 performance standard. This is problematic for a couple of reasons. Foremost, we understand that only one OEM claims compliance with AHRI-420. This reduces availability and competitive bidding. Next, AHRI-420 was written in the 1990's and the particulars of the test method and its use and the minimum values in the code are questionable. Some problems are how to adjust for external static, how to adjust for other operating conditions, how to adjust for FPI, if and how to adjust for a sold product that would be physically different from a rated product (e.g. for fans that require external static pressure), and whether airflow is an independent parameter in order to achieve desired temperature uniformity. Further it is not clear that Title 24 requires every evaporator sold to be "certified" to AHRI 420. In comparison, condensers have specific efficiency requirements (and rating conditions), but do not require testing to a standard. We propose that alternative requirements be considered for stating efficiency ratings. One example that draws on AHRI-420 is the DT1 method. This method determines evaporator capacity based on the difference between the entering air temperature and the saturated evaporating temperature. This will help to ensure accurate, conservative ratings and permit other OEMs to meet the intention of the code.

Next, we are concerned with requirements for adiabatic gas coolers for transcritical CO<sub>2</sub> systems. While adiabatic cooling is a very good technology, the industry has found that maintenance and life-cycle cost is more challenging than initially assumed. For large installations with regular planned maintenance, adiabatic cooling remains a good option. However, smaller facilities without dedicated maintenance teams may find adiabatic cooling to be problematic, resulting in ignored maintenance and thus decreased efficiency. The application of gas coolers to all sizes of systems creates a problem for cost effective installations for the smaller systems. Further, CO<sub>2</sub> condensing units are now available that could be applied for smaller systems, but many of these cannot incorporate adiabatic gas pre-cooling. CO<sub>2</sub> refrigeration has advanced considerably in the past several years since these provisions of the standard were promulgated and there are new and proven methods to attain



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703-312-4200 • F: 703-312-0065

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efficiencies comparable to the use of adiabatic gas cooling. The standard should consider eliminating the requirement for adiabatic gas pre-cooling and permit owners and engineers the option of using other technologies, such as the use of ejectors and parallel gas compression to meet an equivalent annual energy performance. This would open the use of CO<sub>2</sub> for a much wider range of climates and in turn reduce the use of high GWP refrigerants. It would also help to reduce concerns regarding water consumption in certain geographic regions of the state. In addition, if the overall goal of energy efficiency is to reduce greenhouse gas emissions, some consideration should be given for systems that are perhaps less energy efficient, yet use ultra-low GWP refrigerants to achieve a lower lifecycle carbon footprint.

IIAR appreciates the opportunity to submit our comments and concerns, and we stand willing to assist where we are welcome and able.

Sincerely,

A handwritten signature in blue ink, appearing to read "Eric M. Smith", is written over a light blue horizontal line.

Eric M. Smith, P.E. – Vice President of Technology, Advocacy, Research and Publications, IIAR