May 27, 2021

To Our Colleagues on the CARB Team:

On behalf of Therma-Stor and its subsequent dehumidification brands of Santa Fe, Ultra-Aire, Phoenix and Quest, I would like to submit the enclosed comments on the California Air Resources Board's (CARB) *Modifications to the Proposed Regulation Order: Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End Uses*.

Therma-Stor, based in Madison, WI, manufactures dehumidifiers for the commercial/industrial markets (Quest), restoration market (Phoenix), whole-home dehumidifiers (Ultra-Aire) and crawlspace (Santa Fe). Thema-stor is a subsidiary of Madison Industries, one of the largest and most successful privately held companies in the world with a significant footprint in the HVAC market with a mission to make the world safer, healthier and more productive by creating innovative solutions that deliver outstanding customer value.

Issue to Address
The items we would like to address:

- The definition of "dehumidifier", "residential dehumidifier" or any other classification of this type of equipment to define how various units fit into the proposed regulation.
- The 1/1/2023 deadline for certain categories of dehumidifiers to meet the 750 GWP or less requirement.

Let me begin by thanking Pamela Gupta, Glen Gallagher, and the rest of the team working on the proposed regulations for the Stationary Air Conditioning market for their efforts to work with us. The group has gone beyond our expectations to review our issues. We feel great strides have already been made in understanding the position of both parties and working towards an amicable solution for all.

Ultimately, Therma-Stor and all of the HVAC manufacturers owned by Madison Industries support the move to new refrigerants for our products with as low of a global warming potential (GWP) as possible. But in the process, we want to be certain that an accelerated timeline does not inadvertently generate other issues such as threats to human health and safety or additional GWP released due to a decrease in average equipment efficiency for any given application. Likewise, various market forces are converging to make it extremely difficult for us to transition to a sub 750 GWP refrigerant by 1/1/2023.

The mechanical dehumidification equipment Therma-Stor produces ranges in size from 70 ppd (pints per day) up to 876 ppd at AHAM rating conditions. This would be the equivalent of an air conditioner with a compressor ranging from ½ ton up to 5 tons. The units with the highest sales volume in California use a 1.5-ton compressor and contain over 2 lbs of refrigerant.

The source of many of the regulatory issues our units have stems from the lack of classification of dehumidifiers by size or function. All mechanical dehumidifiers tend to be lumped into a single category for regulatory purposes. What little regulation exists is geared toward the smaller units. Our larger units are either ignored or lumped in with air conditioning equipment.

To illustrate the different forms and functions of dehumidifiers, let me share with you how Therma-stor internally breaks down the different classifications of dehumidifiers for product development and marketing purposes:

Classification	Explanation	Installation/Use	Therma-stor Brand
Commercial/Industrial	Large dehumidifiers for commercial, industrial, and agricultural use. Typically, 208V or above and refrigerant charges above 2 lb.	Units can be hung in the space or ducted. Typically, subject to UL-60335-2-40 and ASHRAE Std. 15. Units may have the option for an external condensing unit.	Quest
Whole home	Medium sized dehumidifier ducted into a residential or light commercial HVAC system. Can be 120V or 220V and refrigerant charges slightly above or below 2 lbs.	Units are ducted. Can be subject to UL-60335-2-40, ASHRAE Std. 15 or 15.2. Units may have the option for an external condensing unit.	Ultra-Aire
Crawl space	Medium sized dehumidifier placed in the crawlspace of a residential or light commercial building. Often the same unit as a whole home, but without ductwork. Can be 120V or 220V and refrigerant charges slightly above or below 2 lbs.	Units are placed, unducted, into a crawlspace or basement. Code inspection requirements based on local regulations.	Santa Fe
Restoration	Rugged and portable units designed to dry out buildings after water incursion. Can be 120V or 220V and refrigerant charges slightly below to considerably larger than 2 lbs.	Units are always portable and sold to restoration professionals. They are never permanently installed and not subject to code inspection.	Phoenix
Consumer	Sold directly to the consumer and installed by the consumer for residential applications. 120V with charges much less than 2 lb.	A portable appliance that is not subject to code inspection.	Nothing in this category

Without proper classification, it is difficult for the dehumidifier industry to determine which regulations apply to our products.

As an example, the EPA SNAP program provides lists of SNAP Substitutes by Sector. There is a list titled, "Substitutes in Residential and Light Commercial Air Conditioning and Heat Pumps" and a list titled,

"Substitutes in Residential Dehumidifiers." Since the EPA does not define a "Residential Dehumidifier", it is difficult for manufacturers of units larger than "Consumer" size to know what refrigerants are allowed. Repeated attempts to request clarification from the EPA have gone unanswered.

Further issues revolve around the application of industry standards and codes to the construction and installation of our units. Much like many of the air conditioning units that have a compliance date of 1/1/2025, most of our units are subject to the rules of UL-60335-2-40, ASHRAE Std. 15, and/or ASHRAE standard 15.2 along with the subsequent building codes that reference these standards. The degree to which it will impact our units is unknown until the final version of these standards and codes are adopted. The best projection we have is this will not occur until early 2024, after the 1/1/2023 compliance date.

The final major issue Therma-Stor is experiencing is a general lack of components (i.e. compressors, coils) available for R-32, R-454B and any other alternative refrigerant that meets the 750 GWP requirement. Since the rest of the HVAC industry is working on a timeline of being ready by 1/1/2025, we have very limited options for components in our largest dehumidifiers. While this issue is on us and the HVAC industry supply chain, we ask that you take it into consideration as you develop this regulation.

Suggested Resolution
We propose that the following definitions be included in *§ 95373 Definitions* of the proposed regulation:

> *"Dehumidifier" means an air-conditioning product, other than a portable air conditioner, room air conditioner, or packaged terminal air conditioner, that is a self-contained, electrically operated, and mechanically encased assembly consisting of:*
>
> > *(1) A refrigerated surface (evaporator) that condenses moisture from the atmosphere;*
> > *(2) A refrigerating system, including an electric motor;*
> > *(3) An air-circulating fan; and*
> > *(4) A means for collecting or disposing of the condensate.*
>
> *"Consumer Dehumidifier" means a dehumidifier that can be purchased by the end-user through retail channels. The unit is used as a free-standing appliance that is not subject to code inspection prior to operation.*
>
> *"Residential Dehumidifier" is a dehumidifier that is incorporated into the ducted system of a residential HVAC system or installed in an unoccupied crawlspace or basement. The unit is typically purchased and installed by a licensed contractor and may be subject to code inspection prior to operation.*
>
> *"Restoration Dehumidifier" is a dehumidifier used for the remediation of water after a flood or other water incursion into a structure. These units are portable, not constructed for permanent ducting or permanent installation and in excess of 60 ppd capacity at 80F/60% conditions.*
>
> *"Commercial Dehumidifier" is a dehumidifier that is built for commercial, industrial and/or agricultural application. It may be ducted and may be subject to code inspection prior to operation. The unit will typically use 208 V power or above.*

Based upon these new definitions we request:

- The compliance date for "Commercial Dehumidifier" be adopted as 1/1/2025.
- The compliance date for "Restoration Dehumidifier" be adopted as 1/1/2025.

- A consideration be given to pushing the compliance date for “Residential Dehumidifier” back to 1/1/2025.
- A consideration be given to pushing the compliance date for “Consumer Dehumidifier” back to 1/1/2025.

Explanation
From the language proposed in the *Modifications to the Proposed Regulation Order: Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End-Uses* released on May 13th, we believe that it is CARB’s intention to push back the compliance date to 1/1/2025 on the dehumidifiers I have defined as “Commercial” and “Restoration”. If this is so, we fully appreciate and support that intention. Therma-stor is simply asking for this additional language to clarify the intention.

From the language in the aforementioned May 13th document, it was not clear if it is CARB’s intention to push back the compliance date for what I have defined as “Consumer Dehumidifier” or for any dehumidifier that was built for a residential application (i.e. “Consumer” and “Residential”) While we would appreciate it if the compliance date for what I have defined as “Residential Dehumidifier” was pushed back to 1/1/2025, Therma-stor will support any regulation CARB proposes for the residential market.

If further conversation is warranted to reduce the number of definitions required to achieve CARB’s desired modifications, we would be glad to assist.

Conclusion
Again, I would like to thank the Stationary Air Conditioning team and the rest of the CARB members involved in this process for their time, attention, and consideration of our comments. Regardless of the actual timeline for compliance, it is Therma-Stor’s intention to bring units to market with a sub-750 GWP refrigerant as soon as we feel we can deliver a product that meets our industry leading efficiency performance and regulatory requirements for installation. As the manufacturer of the world’s most efficient dehumidifiers, reduction of the environmental impact of our products to make the world safer, healthier and more productive is our mission.

We welcome any conversation you wish to have on this topic either in writing or by phone. We will make ourselves available to your convenience.

Respectfully submitted,

Applications Engineer, Quest
Madison, WI
608-237-8470
ddettmers@questclimate.com