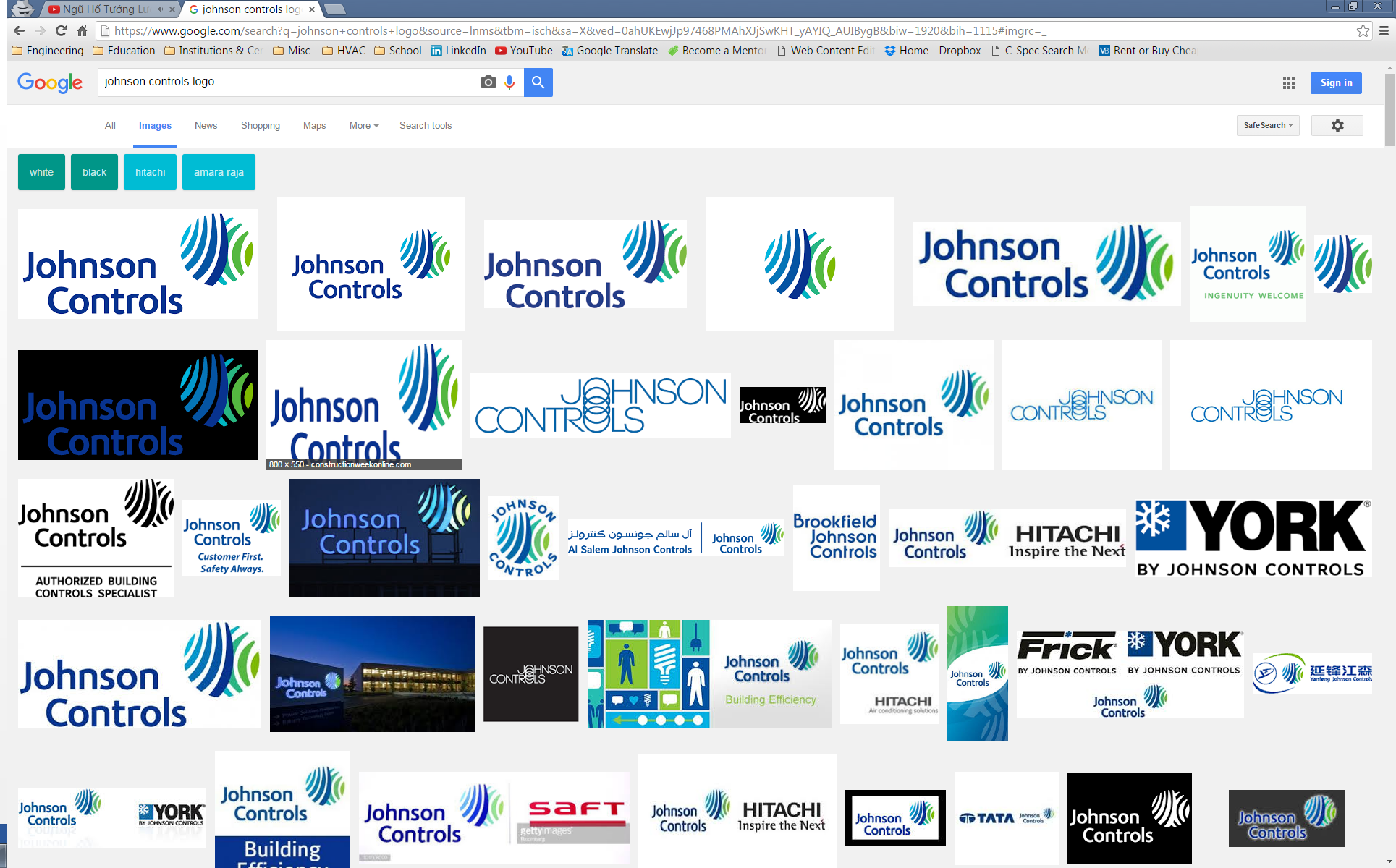
** CONFIDENTIAL**

November 23, 2020

California Environmental Protection Agency

California Air Resources Board (CARB)

1001 I Street

P.O. Box 2815

Sacramento, California 95814

**Subject**: HFC Stationary Refrigeration and Air Conditioning Rulemaking Comments

**Johnson Controls (JCI) appreciates the opportunity to provide comments regarding CARB’s proposed HFC regulation. With its experience in the industry, and its involvement with trade associations and licensing boards and its experience with distributors and contractors, JCI has extensive knowledge of the industry and its safety practices. While JCI strongly supports CARB’s objectives of adopting low GWP refrigerants, it is not possible to safely achieve these objectives in the timeframe CARB is proposing. Based on these public safety concerns, JCI urges CARB to delay its proposed 750 GWP implementation date of 1/1/2023 to 1/1/2025, while adopting measures proposed by AHRI that will meet or exceed targeted greenhouse gas emission reductions.**

JCI is a leading global provider of heating, ventilating and air conditioning equipment, building controls, security and fire/life safety solutions which includes brands such as York®, Metasys®, SimplexGrinnell®, and Zettler. Several of JCI’s businesses are leaders in the fire / life safety arena. This knowledge and experience makes JCI uniquely qualified to address major industry transitions such as the one being proposed by CARB. The company has ~104,000 employees and ~2,000 locations across six continents. Since JCI first set sustainability goals in 2002, the company has reduced greenhouse gas emissions from our global operations by 51%. JCI is one of the most highly rated sustainability companies in the world (MSCI AAA; Ethisphere Institute’s Most Ethical Companies, FTSE4Good Index). JCI is proudly a leading member of “We are Still In”; we fully support the Paris Climate accord and publicly advocate for and urge action. We have met and exceeded our emission reduction targets and offset 100% of our US plant emissions in the U.S. with renewable energy.

JCI supports California’s efforts to phase down HFCs and has even offered to accelerate transition dates for our chiller products ahead of the proposed CARB schedule. JCI is not opposed to other aspects of CARB’s proposed HFC regulation as those sectors do not present the same risk as the stationary AC transition. The stationary AC transition is unique in that it involves the transition from non-flammable to flammable refrigerants in residential applications, where such volumes of flammable refrigerants are not currently allowed by codes. Once codes and standards permit these applications and the appropriate training has been developed and deployed, flammable refrigerants can safely be used. We support and are confident this will be achieved in time for a 1/1/2025 transition.

JCI believes that CARB’s stationary AC transition in 1/1/2025 with a service ban on the use of new R410A in existing equipment beginning in 2023 as proposed by AHRI can be a win for the environment, consumers, distributors, inspectors, fire fighters and manufacturers who require a safe transition to flammable refrigerants, and a success for CARB in complying with its statutory mandates for the reduction of HFC emissions.

**Flammable Refrigerants Cannot Currently Be Used Safely**

JCI’s paramount concern with this proposed regulation is safety. The proposed HFC Rule requires the use of low-GWP refrigerants, classified as A2L’s by the American Society of Heating and Air-Conditioning Engineers (ASHAE) and are mildly flammable. The standards and training necessary for safely using these flammable refrigerants have not yet been finalized to allow air conditioning products to incorporate A2L refrigerants and still be safe for consumer use.

The proposed HFC Rule requires flammable refrigerants in quantities that have never been used before in traditional split system air-conditioners and heat pumps. New safety requirements must be developed and tested prior to use by original equipment manufacturers (OEM). Additionally, distributors, contractors, building inspectors, and fire fighters, must be trained properly and licensed prior to the introduction of these products. Homeowners and business owners will also need to be educated as flammable products require a higher degree of care. These requirements will not occur in time to meet CARB’s proposed 2023 transition date for stationary AC. For example, the CalFire Office of the State Fire Marshal, responsible for California’s fire safety standards, would need to make a recommendation to update those standards for the 2021 Triennial Code Cycle no later than November of 2020. Yet, CalFire’s Chief of Code and Development Analysis, Greg Andersen, has stated publicly and in an e-mail on October 30, 2020 *“The SFM is not moving a proposal to allow A2L refrigerants by adopting UL 60335-2-40 in the 2021 Triennial Code Cycle”* (see attached Exhibit A). It is impractical to impose a 2023 transition deadline, as it eliminates the legal installation of air-conditioning to millions of California homeowners and businesses.

**The Proposed HFC Rule is Inconsistent with Building Codes**

The codes implemented by the California Building Standards Commission and the national building codes, including the Uniform Mechanical code (used by California) and the I-Codes (used in most other states) do not currently allow for the volumes of flammable refrigerants necessary for consumer air conditioning products. These codes must be updated to allow the use of any new refrigerant and such modification typically takes several years to implement.

For example, ASHRAE standard 15.2P addresses the use of flammable refrigerants in residential applications and is currently going through the public review process. In addition, this standard must be harmonized with other standards, such as UL 60335-2-40 and ASHRAE 15, the existing application standard. The different ASHRAE and UL standards must be modified consistently to avoid conflicting and overlapping information and to provide clarity throughout the supply chain as well as to the building inspectors in order to safely develop, install, and use air conditioners with flammable refrigerant. ASHRAE and UL do not expect to complete this work until 2021, at a minimum, depending on the number of comments and changes required to be made to the various standards. For products to be sold in the market, the ASHRAE and UL standards need to be incorporated into the national building codes and subsequently adopted by the California Building Standards Commission. The opportunities for incorporating the above safety standards into the 2021 Uniform Mechanical Code used by California are expired. As the national model codes run in 3-year cycles, the next opportunity for adoption would be the 2024 model code cycle. This could begin to be adopted by California in mid-2024, or more likely, in 2025. JCI supports the 2024 national model code update cycle which will allow for adoption by California and other states into their state building codes en masse thereby maximizing reduction of HFC emissions across the entire nation.

CARB recognizes that there is a discrepancy with the standards and suggests some alternatives.[[1]](#footnote-1) Unfortunately, none of the alternatives identified by CARB are feasible. First, CARB relies on the fact that the State Fire Marshal and the Department of Housing and Community Development (HCD) can propose code changes now. Although these agencies have the authority to propose changes in advance of the National Model Codes, as stated above, the CalFire Chief of Code and Development Analysis has stated that this is not possible to achieve and he is not recommending a code change at this time. Any code change proposed by the State Fire Marshal would not take effect prior to July 1, 2024.

CARB also suggests that compliance with the HFC Rule can occur by using R-466A, an A1 refrigerant, which does not have the flammability issues associated with A2L refrigerants but it is not currently EPA SNAP approved and while R-466A is promising, it remains at a testing state and is not yet being used commercially.JCI is currently evaluating several low GWP alternatives on a variety of performance and market metrics such as capacity, efficiency, reliability, availability, longevity, etc. Due to confidentiality restrictions we are not able to discuss the specifics of our test results. We can confirm that with additional time and testing, alternatives such as R-466A might ultimately prove viable, however; such qualification involves several years of dedicated field trials prior to market introduction of such fluids. Once JCI has a confirmed alternative, additional time is needed to develop the full suite of necessary system components (e.g., compressors, heat exchangers / coils, filter driers, thermostatic expansion valves, etc.). New fluids such as R-466A have unique formulations that require all components go through their own individual, development and qualification cycles. Given the substantial timeframes required to qualify these new fluids and the necessary system components, it is impossible for manufacturers such as JCI to complete this work per CARB’s proposed transition timeline. Should CARB ultimately decide to a later transition date, JCI would reevaluate its low GWP refrigerant options, however; the longer industry lacks certainty on a transition and the shorter the timeframe between CARB’s final approved rule and its actual effective date the less likely manufacturer’s like JCI will be able to utilize one of these new low GWP fluids.

Lastly, CARB identifies natural refrigerants such as hydrocarbons, as a compliance option. However, even CARB recognizes that this option is not widely available. These substances are also flammable and with very limited exceptions, are inconsistent with current safety standards and building codes.

**The Proposed HFC Rule is Inconsistent with EPA’s SNAP Program**

The A2L refrigerants required by the proposed HFC Rule are not yet approved by the EPA SNAP Program. Currently, R-32 is the only A2L refrigerant to receive SNAP approval and is subject to use conditions for small charge, self-contained systems such as window units where codes currently permit such limited quantities of mildly flammable refrigerants. Mildly flammable refrigerant, such as R32 have not previously been allowed in the quantities typically utilized in traditional split system air-conditioners and heat pumps.

While EPA has proposed[[2]](#footnote-2) the approval of six additional A2L refrigerants (R-32, R-452B, R-454A, R-454B, R-454C, and R-457A); these refrigerants have not yet been approved. EPA could list the proposed refrigerants as acceptable, acceptable subject to use

conditions, acceptable subject to narrowed use limits, or unacceptable (prohibited) for specific uses thus manufactures would be taking significant risk to utilizing one of these fluids prior to their formal approval. Even if these refrigerants are approved by EPA prior to 2023, manufacturers will still need time to incorporate them into dedicated low GWP designs; given there is scarcely two years remaining and the fact the manufactures must design two complete platforms (a low GWP platform and an R410A platform for all other states and countries) there is simply not enough time.

**Critical Research Remains**

While some low-GWP research has been completed, there are several critical research projects under development that will not be completed until late 2021, assuming that there are no further delays due to issues such as limited testing capacity or disagreement over test parameters. JCI referenced each of these research projects in its formal comments to CARB on February 21, 2020. The results of this research should be considered and incorporated into the safety standards and building codes.

**Training and Licensing**

Training for contractors, inspectors, fire fighters, and trade unions (e.g. plumbers, pipe fitters), as well as education of home and business owners all must be completed before equipment using flammable refrigerants is introduced into the market. California has over 11,000 registered HVACR contactor businesses, with each company having the potential to employ anywhere from 3 - 10 technicians on average. Training these groups will take several years to fully execute. Standards need to be finalized before training can occur. JCI strongly urges that training includes hands-on components developed by accredited, nationally known contractor trade organizations such as the Air-conditioning Contractors of America (ACCA) and is executed by established and reputable HVACR trade schools. Training curriculums should include actual demonstration of skills as it relates to the brazing, evacuating, charging, handling, storage, transportation, etc. of flammable refrigerants. It is of paramount importance that this training includes periodic, reoccurring licensing requirements to ensure contractors are up to date on the latest safety requirements for handling flammable refrigerants. Testing and licensing must also be conducted in a standardized format on a statewide basis in order to the ensure quality and consistency of programs. Such a program could serve as the model for the rest of the nation.

**Reducing Cost to Consumers and Businesses**

If California were to modify its building codes to allow flammable refrigerants by 1/1/2023 and require OEMs to develop a California-only solution, Californians will bear the brunt of the increased costs related to a low-GWP transition; California residents will be forced to purchase unique products produced in lower volumes that would otherwise be scaled up and spread across a much larger population under a single, national transition date. JCI previously provided its proprietary investment requirements as well as its estimated product cost increases for a low-GWP California offering in its February 28, 2019 Survey for AC OEM’s. As noted in the survey responses, the price actually paid by consumers would be multiplied several times over the manufacturers cost increases due to the multi-step, independent distribution utilized by the HVACR equipment supply chain.

Aligning California’s stationary AC transition with other states to support a single, national transition on 1/1/2025 at 750 GWP will increase manufacturers’ volume and scale and will result in lower costs for consumers and businesses compared to a California only offering. JCI is actively working in coalition with Air Conditioning, Heating, and Refrigeration Institute (AHRI) and other manufacturers to secure a national HFC transition at the federal level through its support for the American Innovation in Manufacturing Act (AIM – S. 2764) that would grant EPA the authority to regulate HFC’s based on GWP. Such legislation, if enacted, would result in the greatest environmental benefits and the lowest cost to consumers for a low GWP product offering.

**COVID-19 Impacts**

Like many other businesses, the HVACR industry has been directly and indirectly impacted by the on-going COVID-19 crisis. JCI has experienced substantial supply chain disruptions and extended lead times for test equipment including technician shortages needed to operate laboratory test facilities. These disruptions have had a significant impact on labor availability to continue our A2L testing and new product development. If COVID related disruptions and delays continue it will be impossible to meet CARB’s proposed deadline. It is also important to note that OEMs will be required to prioritize the development and testing of incumbent R410A refrigerant platforms that will be utilized by the remainder of US states in order to meet the mandated Department of Energy (DOE) efficiency increases by 1/1/2023. Allowing for the delay to 2025 will decrease the spike in additional resources that would otherwise have been needed to support the simultaneous launch of both product platforms on 1/1/2023.

**Codes and Standards Must Be Updated Before Low GWP Product Can Be Made Available**

It is important to note that JCI and the broader HVACR industry have officially conveyed to CARB via AHRI that industry needs a minimum 3 years once codes are finalized to bring a new product platform to market. This time is needed to design a product to conform to the relevant codes and test the equipment to ensure safety and effectiveness. The codes in California that would impact mildly flammable equipment have not been have updated and therefore are still in flux and subject to change; manufacturers must have firm, finalized codes prior to designing and testing equipment. For example, JCI must know which safety standards will be required so that it can design its products to meet those standards. Without final standards, JCI is required to guess at the requirements and may design a product that might not be compliant. A 2025 deadline provides JCI with the time required to design and manufacture products that will conform to the building and safety codes and meet CARB’s regulatory requirements.

**The Proposed 2023 Deadline is Premature and Does Not Meet the OAL Rulemaking Criteria**

California’s Office of Administrative Law (OAL) reviews agency rules and evaluates them using six criteria defined by the California Government Code (See Section 11349 of the Code). Because the 2023 deadline will be inconsistent with current safety standards and building codes, the HFC Rule, as proposed, will not meet the OAL criteria and should not be finalized until the deficiencies are addressed.

To meet the criteria, CARB must show how this proposed HFC Rule will be consistent with the California and national standards. As discussed in this letter, the standards will not be updated in the timeframe needed to be consistent with the proposed HFC Rule. CARB acknowledges that it is acting to finalize the HFC Rule before the necessary safety requirements are incorporated into the ASHRAE and UL standards, but proposes moving forward anyways. This is inconsistent with the OAL criteria. While CARB is hopeful that an update can occur prior to the 2023 effective date for the stationary air conditioning sector, there is no evidence to show that this is a reasonable deadline. The Office of the California Fire Marshal does not currently support the immediate code changes needed to meet the 2023 deadline and it appears that the National Model Codes will not be updated until 2024. The alternative refrigerants suggested by CARB are not feasible, resulting in an inability to comply with both the HFC rule and other laws, such as the National and California Building Codes. Without the updated standards and codes, JCI cannot manufacture products that use flammable refrigerants. The proposed HFC Rule is not implementable with the 2023 deadline and should not move forward without an extension to January 1, 2025.

**Alternatives to 2023 Previously Presented**

JCI has met with CARB on several occasions and has offered multiple alternatives to support a 1/1/2025 transition for stationary AC including the following:

* Splitting the very broad stationary AC sector by allowing individual sectors such as window units and hotel / motel units (e.g. Packaged Terminal Air-conditioners) to transition on CARB’s proposed 1/1/2023 date as California codes currently permit small charge systems with mildly flammable refrigerants due in part to their safety risks being lower as well as their comparatively small charge volumes. Such systems are also pre-charged and sealed at the factory as part of the manufacturing process thus reducing installation risk.
* At CARB’s request, JCI provided alternative emissions models during our March 18, 2020 meeting with more accurate inputs for refrigerant leakage, from recent reports by the Intergovernmental Panel on Climate Change (IPCC)[[3]](#footnote-3) and the United Nations Environment Programme (UNEP)[[4]](#footnote-4), which demonstrated that a 2025 transition date for stationary AC still ensured that CARB would meet its statutory obligations to reduce overall HFC emissions down to its 10 mmt CO2eq goal by 2030.
* Several OEM’s have proposed lowering the maximum allowable GWP for stationary AC from CARB’s proposed 750 GWP down to 500 GWP if the transition date were pushed back to 1/1/2025. While this option may not be unanimously supported by all HVACR OEM’s, it should be a viable alternative for those companies willing to commit to such a large GWP reduction. JCI would like to note that the 300 GWP option in 2025 CARB offered via AHRI is not a viable alternative as the recent EPA SNAP 23 listing which included a fluid with a GWP < 300 is not suitable for high pressure systems like those found in stationary AC equipment. It is not possible for any stationary AC OEM to produce a product with a subpar 300 GWP fluid within this time frame as there are no compressor, thermal expansion valves, etc. available from which to construct a complete system.
* As an active member of AHRI, JCI is engaged in the development of alternative proposals which CARB staff has thus far all rejected,
  + AHRI’s July 30, 2020 proposal to mandate the use of reclaimed R410A in [the installed equipment base for service operations], which is the largest source of indirect emissions[[5]](#footnote-5). JCI remains supportive of this AHRI industry consensus counter proposal for CARB to mandate the use of reclaimed R410A in parallel with the effective date for new stationary equipment of 1/1/2025. We believe that once distributors and contractors know of the imminent phase-out of virgin R410A that this will cause the market to shift to reclaimed R410A in mass providing maximum environmental benefits. This also helps with enforcement as virgin R410A should be the only available refrigerant in the California market on 1/1/2025 and will serve to increase reclaimed R410A’s monetary value to the point where contractors would be motived to recover the small charge volumes found in the typical residential systems.
* AHRI’s September 18th proposal to offset HFC emissions from the proposed two-year delay from 1/1/2023 to 1/1/2025 through the recovery, destruction or use of reclaimed refrigerant. While JCI believes the AHRI July 30th service ban proposal provides the maximum environmental benefits and will result in systemic behavior changes prompting contractors to recover small charge systems; it is supportive of developing a reclaim program that is implementable, enforceable, feasible and doesn’t result in additional GHG emissions throughout the supply chain. JCI supports the following credits for manufacturers:
  + 2,088 GWP (R410A) down to 750 GWP (CARB’s maximum proposed limit for stationary AC)
  + < 750 GWP (the lower the GWP below 750 the more credit should be given; this is simple math
  + Smaller charge size (smaller charge systems should be given more credit; microchannel coils, etc.)
    - JCI is supportive of simplifying the above into a single credit provided the reduction benefits are equivalent. JCI believes a simple percentage credit can be applied based on refrigerant density properties. It is important to note that there are many factors which impact system design; if manufactures know for certain there will be benefit for charge reduction, we will specifically design for it. It is not correct to assume manufacturers would by default prioritize charge reduction over other design aspects such as airflow, surface area or performance.
  + JCI is also supportive of shipping new AC products with reclaim R410A provided the following provisions are allowed:
    - Reclaimed R410A be allowed to be mixed with virgin R410A at the factory and in the field as they are chemically identical,
    - Reclaim be sourced from any location within and outside of California; there is simply not enough supply within the state of California to supply all manufacturer’s needs.
    - Avoiding the creation of “California Only” models which can be shipped anywhere; this will result in increased consumer choice and reduced cost to California consumers and businesses.
  + As there is not enough supply of reclaimed R410A within the state of California; JCI must request that credits also be given for other high GWP fluids beside R410A recovered for reclamation, reuse or destruction.
    - Reclaimers have existing documentation that will provide enforcement mechanism as to location, refrigerant type and quantity.
    - JCI would also be willing to provide legally blessed documentation subject to data privacy requirements of any high GWP (> 750) refrigerant that it or its California distributors purchased for reuse, reclaim or destruction.
    - JCI does not support the Environmental Investigation Agency (EIA) proposal referenced in its October 20, 2020 45 Day Draft Language / Initial Statement of Reasons (ISOR) that manufacturer’s recover ~150% of the original factory charge. Given there is insufficient supply of reclaim R410A available within the California market and the fact that manufacturers are two levels removed from independent contractors who are responsible for field charging of such equipment; it is not reasonable or even possible for manufacturers to enforce such a mandate.
* JCI is enthusiastically supportive of AHRI’s latest industry consensus proposal which was presented to CARB leadership on November 15, 2020 by AHRI and the Alliance for Responsible Atmospheric Policy (ARAP) executive leadership. This proposal maintains the previous new equipment ban of 1/1/2025 with a 750 GWP level however it differs by pulling up the service ban from 1/1/2025 to 1/1/2023. The pull-up of the service ban to 2023 pulls millions of existing R410A units into scope two years earlier and ensures that CARB can more than exceed its statutory obligations for HFC reductions. This proposal provides the greatest environmental benefits of any option presented to CARB thus far; we strongly prefer it over any of the other proposed alternatives presented thus far. To facilitate a contractor behavior shift and to aid CARB in enforcement, manufacturers have also proposed to add wording directly to their equipment and supporting literature noting that any units built on or after 1/1/2023 the equipment must be serviced with reclaimed R410A for units installed in California. Manufacturers have also agreed to promote, educate and encourage contractors and technicians on the importance and obligation of refrigerant recovery. JCI has committed to CARB that it will create and provide copies of marketing, technical literature and training materials promoting such practices.

This latest AHRI industry consensus proposal will result in a win-win outcome for CARB and industry by extending the transition deadline from 2023 to 2025 and mandating the use of reclaimed R410A for service of existing equipment beginning on 1/1/2023. This would allow the needed time for mandatory safety codes to be updated as well as the necessary safety training to occur, while resulting in the maximum amount of HFC emissions reductions proposed thus far which will help to ensure that California meets its greenhouse gas emission goals.

**Conclusion**

JCI urges CARB to consider the impacts of codes, COVID, training, and research and respectfully requests the revision of this proposed stationary AC transition from 1/1/2023 to the industry consensus date of 1/1/2025. A 1/1/2025 date provides for a safe transition to flammable, low-GWP refrigerants in a manner that will reduce the cost impact to California consumers and businesses, as well as ensure maximum HFC emissions reductions are achieved nationwide.

JCI appreciates the opportunity to submit these written comments and is open to further discussion should CARB have any additional questions.

Respectfully,



Chris M Forth David Stephens, Ph.D., P.E., PEM

Executive Director Director

Regulatory, Codes & Environmental Affairs Global Product Safety Compliance

Johnson Controls Johnson Controls

chris.m.forth@jci.com david.stephens@jci.com

(405) 826-5802 (405) 416-6573

**Exhibit A**

**From:** Andersen, Greg@CALFIRE <[Greg.Andersen@fire.ca.gov](mailto:Greg.Andersen@fire.ca.gov)>   
**Sent:** Friday, October 30, 2020 1:47 PM  
**Subject:** Status of A2L Proposals

Kevin,

The SFM is not moving a proposal to allow A2L refrigerants by adopting UL 60335-2-40 in the 2021 Triennial Code Cycle.

The SFM is continuing with the SFM A2L Refrigerant Workgroup and other stakeholders to evaluate the safety concerns.  The testing that is being done by UL to address the issues of firefighter safety is an important factor for this process.  The UL testing is scheduled to completed in December 2020 with the final report around May.  The timeline for the testing did not allow for evaluation of the safety concerns and the adoption in the 2021 Triennial Code Cycle for proposals for the A2L refrigerants.

Thank you,

Gregory Andersen

Chief of Code Development & Analysis

916.568.2915

[greg.andersen@fire.ca.gov](mailto:greg.andersen@fire.ca.gov)

1. Staff Report: Initial Statement of Reasons, at 20-25. [↑](#footnote-ref-1)
2. EPA SNAP 23: https://www.epa.gov/snap/fact-sheet-proposed-rule-23-protection-stratospheric-ozone-listing-substitutes-under [↑](#footnote-ref-2)
3. Bjønness, Kathrine Loe, T. Gustafsson, J. Ishikawa, M. Maione, B. Gschrey, T. Okada, R. de Aguiar Peixoto, and W. Schwarz, Intergovernmental Panel on Climate Change, National Greenhouse Gas Inventories, Volume 3, Chapter 7 [↑](#footnote-ref-3)
4. United Nations Environment Programme – Ozone Secretariat, Montreal Protocol on Substances that Deplete the Ozone Layer,”2018 Report of the Refrigeration, Air Conditioning and Heat Pumps Technical Options Committee” [↑](#footnote-ref-4)
5. AHRI Proposal July 30, 2020: Titled: Prohibitions on Use of Certain Hydrofluorocarbons in Stationary Refrigeration, Stationary Air-conditioning, and Other End Uses addressed to Elizabeth Scheele, California Air Resources Board [↑](#footnote-ref-5)