

ENERGY STAR® Draft 1 Version 4.0 Room Air Conditioners Specification.



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Dear ENERGY STAR Room Air Conditioner Administrator

Having reviewed the Draft 1, Version 4.0 ENERGY STAR Room Air Conditioner specification Friedrich is taking this opportunity to share its response to the key elements set forth in the draft.

Revised efficiency criteria: In prior room air conditioner federal energy reduction rulemakings manufacturers have modified product lines beginning in January 2010, October 2013, June 2014, and now a proposed ENERGY STAR 10% improvement is projected as early as January 2016. During this short timeframe non ODP refrigerants were introduced requiring significant reliability, sound, performance, service, and packaging design changes in meeting consumer expectations. Combined with these energy efficiency improvements came requirements to incorporate energy saving features like filter cleaning alert, fan with compressor cycling to better sample the conditioned space, and measuring standby power. The pace of engineering research and development is significantly stretched whenever alternate refrigerants are placed “into the mix”. The latest draft proposal to include flammable refrigerants within a one year period fails to consider the necessary timing to complete compressor life testing, finalize safety considerations for factory, service, and customer installation, let alone some iteration to optimize the refrigeration system performances. Based on lessons learned from the prior change to non ODP refrigerants component changes required many new investigations amounting to a minimum of a two year launch cycle. The draft would have an effect of promoting the use of A2L and A3 flammable refrigerants not only in window air conditioners, but also portable air conditioners and in PTACs. Per the EPA SNAP proposed rule dated 07/09/2014 it recommends window units, portable air conditioners, and PTACs be installed at specific heights off the floor. This oversimplifies how unlikely these consumer products, during installation, can be controlled by the manufacturer. It is known flammable refrigerants have been used globally in overseas refrigerators and freezers but not without considerable re-design. These products have not seen popular use here since we are a litigious society. Charge sizes for low pressure applications are also traditionally much smaller than in high pressure, high capacity, and domestic air conditioning applications. Typical Friedrich

ENERGY STAR® Draft 1 Version 4.0 Room Air Conditioners Specification

window and through-the-wall air conditioners have charges ranging from 500-2000 grams for use in residential and commercial applications, such as homes, stores, schools, and restaurants.

Coordinating factory protection, warehousing, transportation, and storage requirements for flammable refrigerants would be a significant challenge with added cost to design built-in redundancy in each of these areas to proactively safely manage the storage, shipment, and service network. A quick check done by our compressor supply base finds few readily available compressor displacements that match current component offerings.

Friedrich recognizes the impact associated with the lifetimes of different HFCs and how they persist in the atmosphere from weeks to centuries. Friedrich places a strong containment practice in window air conditioner production methods checking each brazed joint to ensure very low leak rates. Friedrich conducts regular service training programs informing field personnel on best practices for brazing, refrigerant recovery and reclaim of refrigerant.

Information from UNEP shows the main fluorocarbon contributors in the atmosphere are HFC-134a, HFC-143a, HFC-23, and HFC-125. Although HFC-125 is in the composition of HFC-410A it is also found in R-404A, R-507, R-407A, R-407C, most service blends of R-502, like R-402A, R-402B, R-408A, as well as most of the R22 and R-502 blends (R-417A, R-422A, R-422D, and R-438A). Friedrich favors the use of R410A as the refrigerant of choice in room air conditioners with a GWP of 2088. Friedrich is concerned significant risk to consumer safety is possible if flammable refrigerants were designed into the product especially with the common practice of seasonal removal for storage then re-installation of the window air conditioner. Further with the notice of acceptable subject to use conditions for the flammable alternatives a manufacturer would require a minimum of one year reliability testing by the compressor manufacturer as well as a minimum of 1 year testing in the refrigeration system to protect the consumer from potential catastrophic failures in the field. To ensure reliability pilots are normally operated in high ambient conditions for the better part of six months to verify no unforeseen chemical reactions in the closed loop refrigeration system.

Energy Saver Mode This feature allows the fan to sample the air not to exceed five minutes after the compressor cycles off. There is the added potential for this feature to be override-able. Friedrich believes this feature does provide an opportunity for energy savings for the consumer. At the same time it has generated service calls by some consumers who object to its less desirable feature of infrequent operation between both components

**ENERGY STAR® Draft 1 Version 4.0 Room Air Conditioners
Specification**

as a noise annoyance and allowing wider swings in overall room set point optimization.

Sound Performance Criteria Friedrich is not in favor of proposing higher fan speeds to increase system efficiency since products are measured not only on their dehumidification, energy efficiency, and cooling capacity, but especially on quiet operation. Requiring a mandated sound power level for an indoor sound power level not to exceed 60 dBA requires manufacturers to invest in a reverberation room or transport product testing to a third party sound room. Utilizing the EU EN 12102 standard would be an additional test burden. Friedrich recommends the main focus stay with energy not acoustic improvements.

Installation Criteria: The Draft 1 Version 4.0 references NREL estimated improvements in air leakage anywhere from 65-85%. Further the draft proposes installation instructions with changes from plastic to fabric accordion materials for window mounted air conditioners. Friedrich has supplied both plastic and pressboard cut-to-size panels that have long term protection from seasonal degradation. In addition insulation between window panes and between cabinet and unit accompany each product. To suggest covers for through-the-wall application and fabric to replace UVB protected plastic would add additional cost which, when compared to current designs, would not contribute anywhere close to the NREL suggested air leakage savings. Also fabric has a tendency to shrink and form mold with temperature and humidity swings.

Optional Connected Criteria Draft 1 Version 4.0 details product capability for operational/ demand response such that the unit has at least two messages relevant for performance issues: either the filter is clogged or the energy consumption is out of the range of expectation. Another proposal is the product shall be able to provide at least one Delay Appliance Load response in a rolling 24-hour period. Friedrich believes these added software proposals would create more problems for the consumer than advantages. There are currently service codes built into most software packages on the market today. Consumer outreach is available when the customer requires assistance. By designing the product with the optimum fin spacing along with service training and customer support Friedrich's objective is to not burden the consumer with additional interfaces but instead promote error free cooling and heating comfort.

Sincerely,

Ed Wuesthoff