

## Most Efficient 2015 HVAC System Status and Messaging Preliminary Proposal - Stakeholder Comments

Topic	Comment	Draft Comment Response
<b>General</b>		
General	We believe that the requirements for Automatic Setup, Resident Alerts in Plain Text, and Fault History for Service Personnel add value for the homeowner and are achievable for 2015 sales.	Thank you for your comment.
	We believe that any future specification incorporating elements of the June 9th Memo needs to be very explicit about what is needed for a product to demonstrate compliance. By way of example, CA Title 24-2013 contained FDD requirements for RTUs with economizers. The requirements, as finalized, seemed manageable, but the process of determining how to demonstrate compliance proved exceedingly difficult; so much so that ultimately the deadline for compliance was extended. EPA should be guided by this history when incorporating similar requirements into any future specification for residential CAC and ASHP.	EPA looks forward to working with Ingersoll Rand and other stakeholders throughout this process to address this concern. Ideally, the guide for describing compliance that was released along with the proposed requirements would provide some clarity on compliance.
	Some of the features discussed within EPA's memorandum are patented by certain manufacturers, and cannot be mass produced by others due to patent infringement risks or high costs associated with licensing those patents. EPA should ensure that the requirements are specified in a generic and patent-neutral manner, so that all manufacturers can compete on a level-playing field with patent infringement being a non-issue.	EPA has modified the requirements partly to avoid this problem. Please let us know if such problems remain.
	The recognition criteria for the most efficient program do not necessarily have to change dynamically on an annual basis. The original ENERGY STAR programs for certain products have been implemented across several years and were able to consistently achieve the desired effect on early adopters for an extended time period.	The design of the ENERGY STAR Most Efficient program calls for annual review. For HVAC products, and others that change slowly, most years there will be no changes.
	The timing for this proposal does not leave sufficient time for manufacturers to effectively respond to any changes or upgrades to the Most Efficient requirements. These proposed requirements should be for a 2016 program to allow manufacturers time to make changes. This timing places significant disadvantage on foreign manufacturers who import their products, specifically ductless systems.	EPA has modified some requirements and eliminated others such that this may no longer be a concern.
<b>Minimum Efficiency</b>		
General	We believe that EPA should increase the minimum HSPF level for ductless mini-split and multi-split heat pumps to 10.5 HSPF; this would help meet EPA's goal to develop an advanced specification compared to the ENERGY STAR Most Efficient 2014 specification. In addition, raising the HSPF level would allow manufacturers to creatively compete within this program without risking the infringement of patents associated with overly prescriptive features.	Thank you for your comment. EPA is proposing to keep the levels the same for ESME 2015. To the extent that cold climate performance is critical, EPA understands that capacity and COP at a very low temperature may be useful indicators as well.

**Unit Setup Information**

General	<p>Although information related to capacity, the number of stages of cooling and heating, and default air flow for each stage is useful during the installation process, we believe that requiring such information to be transmitted to a controller would not necessarily guarantee that an HVAC system will be installed correctly and deliver the designed performance per the manufacturer's specified ratings. Goodman does have the ability to meet this proposal via a sophisticated indoor communicating system (ComfortNet™) that can be easily applied in the field by contractors.</p>	<p>After detailed discussion with stakeholders, EPA now proposes to keep the wording of the automatic setup requirement as it is now for 2014. .</p>
	<p>Certain air conditioners and heat pumps are equipped with dip switches, thereby providing a contractor with some limited flexibility to customize the air flow of a unit based on the installation need. Providing the default air flow information in such instances would be of no value to the consumer. Rather than relying on licensed contractors to perform a quality installation, certain homeowners who have no prior field experiences with regard to the installation of HVAC equipment could attempt to install equipment using the information provided on the controller.</p>	
	<p>Our question is "What will be done with this information?" Is the intent only for a type of electronic registration? If the intent is for communication to other devices or to receive commands from utility companies then that should be stated. There does not seem to be a need to communicate the capacity of the system unless it is just for electronic annotation if the system size. Also if the system is a multi-split how would the capacity be communicated?</p> <p>Inverter driven compressor systems have essentially infinite steps between low and high operating conditions and there should be recognition of this operating characteristic.</p>	<p>The intent of the automatic setup provision is to increase the likelihood of a correct installation.</p>
	<p>Automatic set up of a HVAC system is a convenience for the installer. It cannot assure the homeowner that the HVAC system was properly selected and applied.</p>	<p>Thank you for your comment.</p>

**Monitoring Requirements**

Fault History	<p>The difficulty with this proposal is that some of the fault code descriptors are long – would they have to be displayed all at one time? What is the minimum font size of the words in the display? It seems that a fault code display would be much more effective. If a manufacturer would have to change from a flash display or fault code display the engineering time would be at least one year.</p>	<p>EPA has relaxed this requirement to only require alphanumeric display, which will allow shorter codes to be used.</p>
	<p>We agree that fault history is important and helpful to service personnel; but note that while equipment features that detect improper installation and poorly operating components are helpful to service personnel and can improve HVAC system reliability, it could be misleading to imply that a system operating without a documented fault is the "Most Efficient."</p>	<p>EPA proposes to retain the stringent performance requirements for ESME HVAC, as well as updating the system status and messaging requirements.</p>
	<p>We believe that we can meet the fault history and message requirements proposals via our ComfortNet™ system. The system is capable of alerting the homeowner that a contractor should be notified when service is required on any part of the complete system.</p>	<p>Thank you for this information.</p>

Plain Text Alerts	<p>We strongly recommend that EPA not preclude error codes from meeting the message requirements proposal. We manufacture ductless units that are highly efficient and are capable of generating error codes that are explicit enough to trigger action from the homeowner. The messaging mode should not matter as long as it facilitates homeowner action.</p>	<p>EPA would welcome data showing that error code alerts are effective in triggering residents to take action. Some systems that have applied for ENERGY STAR Most Efficient recognition use alerts that are clearly insufficient.</p>
	<p>We support the EPA position that alerts should be provided to residents in plain text. The issue is whether the residents should be expected to respond to an alert in any manner other than to call a certified technician. There is a distinct difference between what would be truly meaningful diagnostic feedback versus something that is not effective. The EPA does not provide guidance on the quality of feedback/information and they remain open ended on whether the communications follows a given standard. EPA should more narrowly define the resident alerts in plain text.</p>	<p>EPA would welcome specific suggestions for clearer wording. We have included explicitly the two messages that we know make sense for residents (1.check filter, and 2.call service technician), but leave manufacturers flexibility to add others if appropriate for their system.</p>
	<p>A clarification is requested for this requirement – if the message is in plain text what would draw the attention of the resident to read the plain text? Will there also need to be a flashing LED? If that is the case it would be easier to have those 2 or 3 phrases printed in the thermostat next to an indicator LED.</p>	<p>EPA has explicitly allowed this option in the current proposal, and sees some value to residents of such a strategy.</p>
Static Pressure	<p>The 2013 edition of California’s Building Energy Efficiency Standards (Title 24) prescribes air filtration requirements within Section 150.0(m)12 of the standard; these requirements went into effect on July 1, 2014. EPA should review these requirements for air filters and consider them in lieu of the proposed static pressure signal requirement. Thermostat technology has been equipped with a filter replacement indicator for several years, so it is not like homeowners have never had access to technologies that alert them about the need to replace their filters. Ultimately, filter replacement is heavily dependent on user patterns, and current tools already make that information readily available to consumers.</p>	<p>EPA appreciates stakeholders' thoughtful responses to this requirement in the preliminary proposal, both supporting our vision of how it might be met, and questioning the practicality of the approach and how useful the information would be. EPA has retained the requirement in this proposal in anticipation of continued discussion on it, leading to a firm conclusion about its practicality and usefulness before the final requirements are released.</p>
	<p>The static pressure requirement will only work in an ideal world scenario. It is very much possible for a service need signal to be triggered immediately after the unit is installed (per the manufacturer’s instructions) if the ductwork within an existing home is of poor quality, thereby rendering this feature to be futile.</p>	
	<p>Monitoring requirements for static pressure can be indirectly associated with the electrical consumption of the blower motor. The static pressure is a function of the particular mode of the operation of the HVAC system and the particular configuration of the duct system.</p>	
	<p>The current state of technology readiness for sensing Static Pressure as a dirty filter alert, and using signals for Charge Level indication are not yet ready to be added to residential HVAC equipment and should be deferred to a future revision. It is true that the motors used in high efficiency blowers can sense a change in operating conditions. However, a dependable dirty filter alert system will need to be able to distinguish between changes in duct registers, the use of filters with different pressure drops, and a dirty filter to prevent false alarms. Since there is wide range of operating conditions, duct system designs, and filter types in use, proof of a reliable system requires significant field testing. Until then, a comfort</p>	

	control that measures run time and alerts the homeowner appropriately is a dependable approach.	
	This requirement should not apply to ductless systems. If the system is a multi-split with 3 different capacity ducted indoor units how would the ESP of each be communicated? This is a requirement that would take significant engineering work.	The proposed requirement does not apply to ductless systems.
Refrigerant Charge	<p>High pressure at the compressor could be a sign that the refrigerant charge is excessive, the indoor or outdoor fan is not operating or the filter is dirty. There are a number of system characteristics that a competent service provider will use to diagnose improper operation of a system that are not sufficient to conclusively diagnose a problem. While it is true that a properly operating HVAC system will provide the highest level of energy efficiency possible for a given configuration, it is not true that any monitoring system that signals a fault condition to the homeowner will result in reduced energy consumption.</p> <p>A refrigerant charge monitor system will require significant development and field testing to be dependable and without false alarms. The difference here is that most systems do not have the sensors that are needed to monitor charge level. As with the dirty filter alert, a charge monitor system cannot be developed and added to air conditioners and heat pumps for the 2015 calendar year. This feature should be deferred to a future revision.</p> <p>It is important for licensed contractors to follow the charging instructions that are specified within manufacturers' instruction manuals. For units that are charged within a manufacturing plant, the manufacturer typically optimizes the charge during product development. Although error codes can be generated to indicate an undercharge or overcharge, we believe that more evaluations need to be conducted in order to determine whether or not charging and diagnostics systems can effectively function across various units and efficiencies.</p> <p>How much loss of refrigerant charge would be considered an error? Should it also be capable of reporting if the initial charge, in the case of split-systems, is correct? This needs more definition and possibly significant engineering work depending on the detail of the requirements.</p>	EPA does not include refrigerant charge monitoring in this proposal. Through discussions with stakeholders and technical experts, EPA has concluded that systems that meet the other requirements for ENERGY STAR Most Efficient recognition are unlikely to suffer reduced efficiency due to refrigerant charge errors. Packaged systems (notably GHPs) are factory charged and sealed and are unlikely to have charge errors at all. Split systems meeting ESME SEER and HSPF requirements will have electronic expansion valves and modulating compressors, making them highly tolerant to refrigerant charge variation.