

Topic	Draft 1 Version 2.0 PT Specification Comments	EPA Response/Version 1.0 Residential Climate Controls Specification Draft 1 Proposal
Partner Commitments	The specification lacks consumer education requirements to establish effective educational messages designed to increase proper usage of the devices. EPA, as part of the PT specification, should develop program-approved educational messages and initiate a review process to ensure that information on effective product use is included on the product packaging, promotional materials, "quick-start" guide, and instruction manual.	EPA is open to stakeholder feedback on this issue and may consider including educational requirements in the Partner Commitments section.
Partner Commitments	EPA should require a feature that indicates on the product when the system is in a mode that is within or outside of ENERGY STAR recommended operating parameters.	EPA believes that this feature will contribute to existing confusion among consumers and adds unnecessary complexity to the specification. Therefore, the Draft 1 Version 1.0 Residential Climate Controls specification does not include this feature.
Definitions	<b>Low Voltage Thermostat:</b> The description of the circuit would be more precise if it indicated NEC Class 2. The definition of a Class 2 circuit is found in the National Electrical Code (NEC).	EPA has revised definitions to align with NEC DC 3-2008.
Definitions	<b>Home Energy Management System:</b> The word "Home" should be removed from this term, allowing the use of this specification for small commercial buildings.	EPA has replaced the term "Home Energy Management (HEM) System" with "Energy Management System (EMS)."
Definitions	<b>Conventional HVAC:</b> The current definition of conventional HVAC implies that swamp coolers are conventional. Is that intended?	EPA does not intend swamp coolers to be defined as conventional. Therefore, EPA has defined HVAC systems as Heat Pump, Dual-Fuel Heat Pump and Non-Heat-Pump HVAC. Evaporative coolers are now explicitly referenced in the Non Heat Pump HVAC definition.
Definitions	<b>Dual Fuel Heat Pump:</b> "Multi-stage" should be removed from the definition for dual fuel heat pump.	EPA agrees that a system consisting of a Single-Stage Heat Pump with fossil fuel furnace is indeed a Dual-Fuel Heat Pump. Thus, the Draft 1 Version 1.0 Residential Climate Controls specification does not include the term "multi-stage" in the Dual Fuel Heat Pump definition.
Definitions	<b>Recovery Systems:</b> EPA should use the NEMA DC-3-2008 definitions for Recovery, Conventional; Recovery, Adaptive; and Recovery, Heat Pump with Auxiliary Heat. "Pre-Comfort" Recovery should not be used because it is not the typical industry terminology.	EPA has revised definitions to align with NEMA DC3-2008.

Definitions	<p>The following definitions should be added to the specification:</p> <p><u>Operating Differential</u> is an industry standard definition for room air temperature swing. It is defined in NEMA DC-3-2008 as: "The difference between cut-in and cut-out points as measured at the thermostat under specified operating conditions."</p> <p><u>Room Temperature Droop</u> should be added as a functional requirement. It is defined in NEMA DC-3-2008 as: "The deviation in the cut-in point that results from a change in the duty cycle, heating load, or cooling load."</p>	<p>EPA has harmonized definitions with NEMA DC 3-2008, where appropriate. Specific requirements for "Operating Differential" and "Room Temperature Droop" are not included in the Draft 1 Version 1.0 Residential Climate Controls specification and therefore, defining these terms is not necessary.</p>
Non-Residential Thermostats	<p>EPA should create different programs and requirements for residential and non-residential thermostats. Features found in non-residential thermostats are very different than that found in a residential thermostat (e.g., fan operation, no setback during the day), causing issues in the marketplace. Non-residential thermostats should be labeled as such in written materials and these materials should further explain that non-residential thermostats are inappropriate for residential units.</p>	<p>The Draft 1 Version 1.0 Residential Climate Controls specification only includes requirements for residential climate controls. It also includes a requirement to clearly label the product as a Residential Climate Control, both on the packaging and in the installer documentation. EPA is assessing the potential energy savings associated with Non-Residential Climate Controls and may consider either expansion of this product category, or creation of a new product category to capture these savings. Stakeholders are encouraged to provide feedback on this approach as well as the proposed mandatory text intended to limit installation of residential thermostats in non-residential applications.</p>
Non-Residential Thermostats	<p>If covered by ENERGY STAR, non-residential thermostats should: 1) have appropriate fan control; 2) have a different default schedule for Monday through Friday and unoccupied for the weekend; 3) have at least a 5-1-1 schedule mode; 4) have program backup capabilities; 5) have timed override up to 4 hours; 6) have vacation mode override up to 3 days; 7) be compatible with small AC systems that have a non-integrated economizer; 8) include a "trouble light" or warning message to signal errors; 9) include a "replace filter" light or message; 10) have an intuitive programming menu; 11) have communications capability; 12) not require the control to be a device where settings need to be entered; 13) have a method of signaling a demand response state and/or real time price of electricity.</p>	<p>The Draft 1 Version 1.0 Residential Climate Controls specification only includes requirements for residential climate controls. It also includes a requirement to clearly label the product as a Residential Climate Control, both on the packaging and in the installer documentation. EPA is assessing the potential energy savings associated with Non-Residential Climate Controls and may consider either expansion of this product category, or creation of a new product category to capture these savings. Stakeholders are encouraged to provide feedback on this approach as well as the proposed mandatory text intended to limit installation of residential thermostats in non-residential applications.</p>

Program Schedules	The specification should require three schedule periods instead of four to support users with atypical home/away schedules and reduce redundancy of similar "wake" and "evening" comfort settings.	To encourage ease of use with the flexibility to support various schedules, EPA has retained mandatory 4-period 5-2, 5-1-1, and 7-day program schedules in the Draft 1 Version 1.0 Residential Climate Controls specification.
Program Schedules	The current requirement reduces market value for more advanced models and could stifle innovation as more sophisticated scheduling is already standard in many available products. A more flexible thermostat with 7-day or 5-1-1 programs would need to default to a setting of 5-2 day. The requirement should be that products must have pre-programmed schedules of 5-2, 5-1-1 and 7-day.	
Program Schedules	The 5-2 schedule is reasonable, provided that users can adjust the start and end times for each schedule mode and associated setpoints to accommodate their lifestyle. The market should decide what programming is acceptable.	
Program Schedules	The terms "wake," "day," "evening," and "sleep" do not suit many users' unique work and lifestyle patterns. Programming commands should intuitively relate to "actions" versus "time of day." Recommend using terms such as: "wake," "leave," "return," and "sleep."	To ensure clarity and consistency for both residential and non-residential consumers, and to accommodate various schedules, EPA has revised schedule period terms to require: "Morning - Day - Evening - Night".
Communication	Currently no market exists for thermostats with communication features, which also adds little value for the customer. However, it may be useful once utilities begin to add thermostats to their HAN networks. It is doubtful that any currently available products can meet this requirement by December 31, 2009. This feature should be removed and added at a later time when HAN networks are defined and deployed in significant numbers to provide homeowner value.	An EMS that includes a PCT will provide energy users with vastly improved and potentially real-time information on HVAC energy consumption and cost. Armed with this information, users will be empowered and encouraged to adjust their HVAC usage to save energy and money. Thus, EPA has included communication requirements in the Version 1.0 Residential Climate Controls specification. This requirement may be met by Climate Controls that ship with built-in communications capability or Climate Controls that are field upgradeable to add the communicating capability.  Communication protocol is not specified and the terms "low-power" and "low-bandwidth" used in the previous Draft 1 Version 2.0 Programmable Thermostat specification are not used in this Draft 1 Version 1.0 document. The Climate Controls specification clarifies that PCTs that ship with communications built-in are eligible for qualification.
Communication	While communication with energy management systems is a worthwhile goal, PTs are effective systems without it. Communication is premature and may not be a true energy saving feature. Recommend less complexity in the specification.	
Communication	Including communication requirements in the specification is a good idea but the requirement as written seems vague and is subject to abuse.	

Communication	Home Area Networks (HANs) should be included under Tier 2, since the HAN specification is still in its infancy.	
Communication	<p>The HAN requirement is too restrictive and technology specific. Moreover, HAN is premature and will increase homeowner cost of PTs by adding complexity to thermostats that may be better solved by other devices.</p> <p>Recommendations include the following:</p> <ul style="list-style-type: none"> <li>- Do not include any communication requirements except for the HAN module capability</li> <li>- Remove the HAN requirement and allow the market to determine the best method to communicate rate information to consumers or until HAN networks are defined and deployed in significant numbers to provide homeowner value</li> <li>- Remove reference to technology specific requirements (i.e., HAN, low-power, low-bandwidth)</li> </ul>	In order to maintain a technology-neutral specification, the term HAN is not used in the Draft 1 Version 1.0 specification.
Usability	<p>Usability requirements as currently proposed will not ensure intuitive interfaces and may discourage innovation, rendering the specification rapidly obsolete.</p> <p>Recommendations include the following:</p> <ul style="list-style-type: none"> <li>- Specification should follow performance-based summative usability test methods described in ISO 9126 standard. Metrics widely used by usability professionals include success rate, error rate, quitting rate, and time taken. Metrics should be very specific.</li> <li>- Usability criteria should be left to the manufacturers to decide.</li> <li>- Remove these requirements once usability benchmarks are set.</li> <li>- Leverage outside expertise on the following two areas to create benchmark for usability: (1) technical communications and effects of graphics and text on comprehension and retention; and (2) Human-Centered Design Processes for Interactive Systems (ISO 13407)</li> </ul>	EPA recognizes the limitations of prescriptive usability requirements. The Draft 1 Version 1.0 Residential Climate Controls specification allows manufacturers to choose <b>either</b> to qualify their products using a performance based usability test <b>or</b> to qualify products by meeting prescriptive requirements. EPA is offering this choice to provide a balance between testing burden and design flexibility.

Usability	A single button "away" seems redundant. A more generic requirement should be included in the specification otherwise EPA will discourage innovation.	The Climate Control must provide ease of programming and ease of manual set-back. Currently, dial-type mercury wetted relay manual thermostats are arguably easier to manually set-back than many programmable thermostats. In order to close this gap, EPA includes an Away button requirement in the Draft 1 Version 1.0 Residential Climate Controls specification. Away button functionality is intended to supplement programmed schedules and enhance energy savings and usability by providing easy access to an energy saving mode. The default Away Heat and Cool setpoints shall be 62°F and 85°F, respectively. The Away Heat setpoint may be user configurable but not above 65°F. Similarly, the Away Cool setpoint may be user configurable but not below 80°F.
Usability	The single button "away" requirement may result in consumers using this button in lieu of a fully programmed schedule. Recommend that this requirement only apply when the device is in its active/awake state.	
Usability	Properly designed PTs manage holds and temporary holds more effectively than what is prescribed by the proposed requirement. The requirement is too prescriptive and restricts the flexibility to design a good user interface. Recommend that the Single button "away" requirement be removed.	
Usability	The proposed "energy saving mode" should be changed to "away" mode and a "toggle" with push on/off that provides a visual indication when it is in "away" mode.	
Usability	EPA should not require that a backlight turn off after a certain amount of time. Suggestions include setting a minimum on-time after the last user interaction or to address overall power utilization. Recommend that EPA allow for a low-level constant backlight. If a model does not have constant backlight but has a temporary backlight function, the recommended duration is approximately 5-10 seconds to prevent unnecessary draining of batteries.	In response to this feedback, EPA has decided not to require a backlight to turn off after a certain amount of time. Instead, the Draft 1 Version 1.0 Residential Climate Controls specification proposes a 0.5 watt maximum power consumption limit for the product. Constant backlight illumination is permitted provided that the climate control meets the overall power consumption limit.
Usability	<p>The proposed font size requirement constrains innovation, places unnecessary limits on user interface designs, and is not universally applicable. Legibility depends on a number of factors, including typeface, contrast, display resolution, letter/line spacing, color, and viewing environment. Increased font size will increase the screen size of the thermostat, which also increases power consumption and unit cost.</p> <p>Stakeholder recommendations include the following:</p> <ul style="list-style-type: none"> <li>- Readability performance metrics/tests in its Tier 2 usability standards.</li> <li>- Primary characters must be clearly visible from a distance of 24 inches from the thermostat, and secondary characters from 12 inches.</li> <li>- 10pt font (approx 2 mm) for secondary font.</li> <li>- Minimum height of 9.5mm.</li> <li>- Allow the market to decide acceptable font size.</li> </ul>	Manufacturers who choose to qualify their products using the performance based usability test will not be subject to the font size requirement. However, EPA believes readability to be key to usability, so specific font sizes are required for manufacturers who choose not to use the performance based test. EPA is open to changing the requirement if stakeholders know of a suitable readability test to use instead.

Usability	The "modification indicator" feature is covered by intellectual property and should be removed from the specification.	EPA believes feedback when user input is accepted is a critical aspect of usability, but understands that in the realm of Climate Controls such a requirement may raise intellectual property issues. EPA is interested in stakeholder recommendations on how such a requirement may be suitably crafted.
Usability	<p>EPA should consider the following documentation requirements:</p> <ul style="list-style-type: none"> <li>- Manuals should be simple with large print.</li> <li>- Instruction manuals should include instructions for how to determine the program settings to best meet the needs of all residents in the household.</li> <li>- Thermostat company website addresses should be placed on the thermostat with instructions on how to download the manuals.</li> </ul>	As currently proposed in the Draft 1 Version 1.0, documentation requirements for Residential Climate Controls apply only to product installation and appear as requirements under the Ease of Installation section. EPA is encouraging development of Climate Controls that are intuitive and simple to use and program. These Climate Controls will not require the user to consult written documentation in order to use and program the product.
Usability	Almost every thermostat sold in this country is set to the F scale. The display area that would be consumed by the 0.5 resolution for Celsius would increase the cost of the display unnecessarily. Recommend removing the requirement to use decimals in the temperature display to avoid complicating and crowding the interface.	In response to this feedback, the Draft 1 Version 1.0 Residential Climate Controls specification allows a minimum resolution of 1-degree for both Fahrenheit and Celsius.
Usability	<b>Standard Time Signals (i.e., atomic clock requirement):</b> This requirement adds cost, does not contribute to energy savings, and is unnecessary. The ability to retrieve time settings via a WiFi connection, direct Internet connection, or a connection to a utility-provided "smart meter" should be sufficient to satisfy the requirement.	The Draft 1 Version 1.0 Residential Climate Controls specification includes a requirement that the product automatically set and maintain the date/time without action by the user.

Hold Modes	EPA should recognize two issues in removing permanent hold from the specification: (1) hold does not mean a thermostat's setting is outside of ENERGY STAR specifications; and (2) permanent hold is needed for contractors' acceptance. The stakeholder recommends user education to encourage the use of energy savings settings rather than removing the hold feature.	
Hold Modes	The Long Term Hold should allow the user to reconfigure the duration of the hold setting.	<p>The proposed hold requirements in the Draft 1 Version 1.0 Residential Climate Controls specification allow, and encourage, manufacturers to implement as many hold modes as they deem appropriate. For example, an implementation that allows the user to reconfigure the duration of the hold setting is allowable.</p> <p>A "permanent hold" was not part of the Version 1.2 ENERGY STAR Programmable Thermostat specification, but is allowable under the Version 1.0 Residential Climate Controls specification in response to stakeholder concerns about usability.</p> <p>However, "permanent" implies non-overridable, which is likely not the intended functionality. Thus, in lieu of using the term "permanent hold," EPA recommends alternate terms such as "long term hold" (hold until cancelled); "vacation hold" (hold until specified date/time); "timed hold" (hold for x days or hours); and "scheduled hold" (hold from date/time 1 to date/time 2). Stakeholders are encouraged to comment on these suggestions.</p>
Hold Modes	Any hold requirement should not allow for a permanent override of settings. Recommend that hold should only be good for one cycle of the setback routine.	
Hold Modes	There should be three override modes: "Away" (conservation mode until next scheduled mode); "Vacation" (conservation mode until manually reset); and, "Comfort" (comfort mode, holding it there until the end of the period).	

Data Storage	This requirement is too specific and the system should hold all program settings for the equipment it is designed to control in non-volatile memory.	
Data Storage	The term "usage data" should be more clearly defined.	
Data Storage	<p>Retaining usage data will increase the cost of products and is inconsistent with most thermostat designs. Energy savings will not be achieved by viewing 7 days' worth of usage information without a context for analyzing the data.</p> <p>Stakeholder recommendations include the following:</p> <ul style="list-style-type: none"> <li>- Specify the minimum data required to be stored and eliminate the restriction of having to keep the data stored in the device itself.</li> <li>- Remove requirement in case where thermostat is integrated in a home energy management system.</li> <li>- Revise requirement to provide for a feature that helps consumers manage their energy usage.</li> </ul>	Data accumulation, analysis and presentation are of primary importance for an EMS with an integrated, communicating Climate Control, but are of nominal importance for a non-communicating Climate Control. Thus, EPA is not requiring data storage in the Draft 1 Version 1.0 Residential Climate Controls specification.
Cycle Rate	Meeting maximum cycle rate and minimum temperature fluctuation requires installation consistency that sometimes isn't present in the field. Also, adding zoning and HVAC equipment would complicate testing.	
Cycle Rate	Different equipment requires different cycle rate settings and most thermostats allow a range of 1 to 12 cycles per hour to match the appropriate system type. Limiting the number of cycles per hour to a value of 5 would make it impossible to maintain accuracy in temperature control. This requirement should either be removed or revised to require that the minimum duration of cycles should be a configuration setting.	NEMA DC3-2008 specifies that thermostats with selectable cycle rate control be tested at the default setting, but allows configuration of parameters that directly or indirectly affect cycle rate. EPA has received substantial stakeholder comments regarding cycle rate and has decided <u>not</u> to include a maximum cycle rate requirement in the Draft 1 Version 1.0 Residential Climate Controls specification. EPA is interested in additional stakeholder input regarding the relationship between energy efficiency and operating differential, cycle rate, droop and undershoot to determine reasonable requirements to reduce energy consumption while maintaining an acceptable level of user comfort.

Pre-Comfort Recovery	<p>Pre-comfort recovery is confusing to homeowners and different users have different expectations regarding this capability.</p> <p>Stakeholder recommendations include the following:</p> <ul style="list-style-type: none"> <li>- Remove the requirement</li> <li>- Allow an option to turn the pre-comfort recovery feature on/off</li> <li>- Enable recovery functionality with a configurable maximum recovery and anticipation time to provide flexibility to adapt to all cases</li> <li>- Change the language to replace "heat pump and pre-comfort" with "and adaptive"</li> <li>- Allow control algorithms to minimize the use of auxiliary heat when recovering from setback temperatures</li> </ul>	<p>In order to optimize user comfort and drive consistent default schedule behavior of labeled climate controls, the Draft 1 Version 1.0 Residential Climate Controls specification requires default recovery algorithms designed to attain the comfort setpoint <u>at or near</u> the scheduled start to the comfort schedule period. For heat pump systems, recovery must also minimize use of auxiliary heat. To achieve these goals, EPA believes it may be necessary for recovery algorithms to vary the recovery start time and duration based on system capacity, operating conditions and other data. For heat pump systems, outside temperature may be a key data point for intelligently varying the recovery period to maximize comfort while minimizing use of auxiliary heat. Further stakeholder feedback is encouraged. EPA is also interested in suggestions regarding consumer education about this feature.</p> <p>Recovery terms are harmonized with NEMA DC 3-2008. Note that configurable recovery protocols and recovery control algorithms will be permitted.</p>
Pre-Comfort Recovery	The pre-comfort requirement violates the minimum 8 hour setback time due to the need to start the equipment several hours early to minimize the use of auxiliary heat.	The minimum 8-hour setback time applies only to the duration of setback periods in the default schedule.
Other Comfort Issues	This requirement should include a heading of "Operating Differential." The best way to reduce energy is to use a thermostat with low droop and overshoot. Consumers can sense an ambient change of more than 2 degrees F. The swing requirement should be +/- 1 degree F. A requirement for room temperature droop should also be included, not to exceed 1.5 degrees F when tested to NEMA DC-3-2008, Section 4.5.4.	EPA understands that the relationship between energy efficiency and operating differential, cycle rate, droop and undershoot has been a topic for debate within the stakeholder community. EPA is interested in further stakeholder input to determine reasonable requirements to reduce energy consumption while maintaining an acceptable level of user comfort. Note that the +/- 2 degree F operating differential requirement does not prohibit a partner from implementing and promoting a smaller operating differential such as +/- 1 degree F.
Other Comfort Issues	A small percentage of US homes require dehumidification, and including a humidity requirement in the specification would increase homeowner cost of PTs. Using this feature (dehumidification in particular) will also result in longer run times of the HVAC unit, increasing energy usage. This requirement should be removed or made optional.	Humidity control is a key parameter for maintaining user comfort. When properly implemented this feature can reduce energy consumption by maintaining user comfort at a higher cooling setpoint. Therefore, EPA is proposing to keep a humidity sensing and control requirement in the Draft 1 Version 1.0 Residential Climate Controls specification.

Other Comfort Issues	<p>The cool setpoint temperature of 82 degrees during sleep is too warm and uncomfortable, particularly in warm and humid climates, leading consumers to disable the device. Recommendations include setting the temperature to 75 or 78 degrees.</p> <p>Other recommendations for setpoint temperatures include the following:</p> <ul style="list-style-type: none"> <li>- Tables 1 and 2 should be the mandatory default for Monday to Friday; a different default schedule should be set for weekends</li> <li>- Include tables from the draft NEMA Annex to DC-3 in specification</li> <li>- Tables should be based on period designations of Wake, Leave, Return, and Sleep</li> <li>- Set cooling setpoint temperature for Leave at 82 degrees F</li> </ul>	In response to stakeholder concern regarding user comfort, the default cooling setpoint temperature for the "Night" schedule period is now proposed at 78 degrees Fahrenheit in the Draft 1 Version 1.0 document.
Power Consumption	Some technologies consume more power than others, and it would be impractical to determine an appropriate level that covers all the technological possibilities. Setting the maximum too low could restrict innovation. EPA should require manufacturers to list their maximum operating and standby power consumption that can be audited by EPA to ensure accuracy.	To allow flexibility in innovation, while at the same time ensuring that overall energy use is considered in new designs, EPA is proposing a cap on power consumption in the Draft 1 Version 1.0 Residential Climate Controls specification.
Power Consumption	EPA should address power consumption of the control but any requirement should only apply to the HVAC-controlling unit.	In the previous Draft 1 Version 2.0 Programmable Thermostat specification, EPA requested suggestions regarding a maximum energy consumption limit. In response to limited feedback on an appropriate limit, EPA is now proposing 0.5 watt. Stakeholders are encouraged to comment on this new proposal. <b>Note that the limit only applies to the Climate Control</b> ; it does not apply to the Climate Control with installed and/or active communication capability.
Power Consumption	Most users will want the display active at all times. This requirement should be limited to being active in the comfort mode and when a "read" button is pushed. Power requirements will depend on the type of thermostat; i.e. a PCT may require up to 10 watts.	
Power Consumption	EPA should not impose a hard limit on peak energy utilization. Certain features such as big bright touch screen displays and wireless communications consume more power but increase ease of use and accessibility.	

Ease of Installation	Ease of installation requirements are outside the scope of the ENERGY STAR program. The focus should be on ensuring that thermostats reduce energy consumption and not on how they are installed or supported.	EPA aims to develop a specification that targets Climate Controls that are easy to use and install to promote energy savings from proper use of these products. Improperly installed or configured Climate Controls may not control HVAC equipment in the most efficient manner. Difficult to install Climate Controls may present a barrier to adoption. Consistent with this intent, EPA includes ease of installation requirements in the Draft 1 Version 1.0 Residential Climate Controls specification.
Ease of Installation	The feature to facilitate a "no new wires" installation requirement is too restrictive and could impede innovation. Certain technologies and advanced features require power to be on all the time. This requirement would also significantly curtail the functionality of products requiring a 24 Vac to operate. Moreover, a thermostat/controller that uses a proprietary protocol for advanced, premium HVAC products would be prohibited from bearing the ENERGY STAR label. This requirement should be removed or revised to read that at least 5 wires are permitted.	In response to stakeholder concerns, EPA will not include a "no new wires" requirement in the Draft 1 Version 1.0 Residential Climate Controls specification.
Ease of Installation	EPA should specify an industry recognized standard for the requirement to include batteries.	In installations where there is no ground wire available at the thermostat, battery powered Climate Controls greatly enhance ease of installation by eliminating the need to upgrade thermostat wiring and/or install an adapter at the HVAC equipment location. This situation is common for the replacement of mechanical thermostats.
Ease of Installation	Battery requirements have little to do with "ease of installation."	
Ease of Installation	The typical battery life for battery-operated thermostats is 12 months so this requirement should be changed to 12 months.	Based on stakeholder input, EPA has specified a battery life requirement of 12 months in the Draft 1 Version 1.0 Residential Climate Controls specification.

Product Availability	Most companies will not be able to offer a product that meets the proposed specifications for at least 18 months, resulting in a gap in product labeling that will confuse consumers, erode their confidence in the ENERGY STAR brand, and negatively impact many HVAC distributor business.	Several stakeholders have indicated to EPA that their programmable thermostat requires only firmware updates to meet the proposed Draft 1 requirements. Therefore, EPA expects that more of these products will become available by the time the Climate Controls specification goes into effect.
Product Availability	Multi-stage heat/cool equipment and HAN capabilities represent a small percentage of the installed base. Given the slow rate of adoption of these equipment types, requiring these capabilities in the specification will result in very little utilization of the features and energy savings in the foreseeable future.	
Product Availability	Only a few products would meet proposed specification requirements and they are significantly more expensive than today's ENERGY STAR qualified thermostats.	
		EPA intends to work with industry stakeholders to collect data to determine the cost-effectiveness of products that would qualify under the new Version 1.0 Residential Climate Controls specification.
Test Criteria	Testing criteria should include schedule protocols, setting ability, etc. The test requirements are not sufficient to verify that a PT meets the functional requirements in the Eligibility Criteria document.	EPA is interested in leveraging existing certification programs as part of its product verification efforts and is currently monitoring U-SNAP and Zigbee Smart Energy technical work. The Smart Energy Profile defines communications between energy management devices including thermostats, energy monitors and smart utility meters. Smart Energy Profile requirements, however, are not designed to maximize energy efficiency. Thus, EPA does not agree that harmonization between Smart Energy Profile certification and ENERGY STAR requirements is justified.
Test Criteria	ENERGY STAR requirements should be harmonized with an existing industry accreditation such as the Smart Energy Profile certification program to save time and money for manufacturers.	
		EPA is evaluating test criteria as a broader, ENERGY STAR wide effort to provide a high-level of assurance that labeled products meet specification requirements.

Effective Date	EPA should give manufacturers a minimum of nine months to transition to the new specification.	<p>EPA intends to complete the Version 1.0 Residential Climate Controls specification in October 2010. When revising ENERGY STAR product specifications, EPA gives manufacturers at least nine months to transition to the new requirements. However, since there is currently no ENERGY STAR program for Climate Controls, there is no need to delay the Version 1.0 effective date. Therefore, EPA intends for the specification to take effect immediately upon finalization (i.e., October 2010).</p> <p>There is no grandfathering in ENERGY STAR specifications. Products must meet the specification in effect at the time of manufacturing. EPA considers Residential Climate Controls to be a new ENERGY STAR program. Products that were qualified under the old Version 1.2 Programmable Thermostat specification will need to meet the requirements of this Version 1.0 specification and be resubmitted for ENERGY STAR qualification. Manufacturers will also need to resign onto the program as ENERGY STAR partners.</p>
Effective Date	EPA should include a Tier 1 effective date of January 1, 2011.	
Effective Date	Tier 2 should not come into effect until three years after the Tier 1 effective date and grandfathering should be permitted.	
Effective Date	Several stakeholders support a tiered approach. One stakeholder notes that Tier 1 should be relatively simple and target the mass market of the installed base of single-stage systems to capture maximum energy savings. The stakeholder also recommends that Tier 1 requirements are retained when Tier 2 is introduced and EPA allow grandfathering.	
Other	Since electric strip heat is less efficient, improved controls have the potential of generating the highest savings. As such, line voltage thermostats should be eligible to qualify for ENERGY STAR.	EPA recognizes the significant savings opportunity presented by line voltage heating, including baseboard and in-floor radiant systems. Therefore, EPA is proposing separate ENERGY STAR qualification requirements for low-voltage and line voltage thermostats in the Draft 1 Version 1.0.
Other	The majority of thermostats do not require multiple stages and the cost of unused relays will drive up overall costs of PTs. EPA should allow models that have less staging (1 or 2 stage heat / 1 stage cool) to qualify for ENERGY STAR.	In response to these concerns, qualification criteria have been created for both 2-heat/1-cool and 3-heat / 2-cool climate controls.

Other	Support for external temperature sensors requirement is technology specific and restrictive. Outdoor temperature and humidity readings can be retrieved, for example, via an internet weather feed. An outdoor sensor should only be required for dual fuel systems. Recommend that EPA change requirement wording to a "means of determining the outdoor temperature" or expand the definition of external temperature sensor to include other means of determining the local outdoor temperature.	Outside temperature data is important for EMS and may be utilized by the Climate Control to intelligently vary the recovery period to ensure comfort temperature at the start of a comfort schedule period, while minimizing energy consumption and use of auxiliary heat. Therefore, EPA is proposing a requirement that Climate Controls have access to outside temperature data in the Draft 1 Version 1.0 Residential Climate Controls specification.
Other	Dual fuel systems are regional and the large majority of homeowners will not realize any benefits from this additional functionality, only additional overhead. This requirement should be optional.	In response to this concern, Dual-Fuel Heat Pump support is not required in the Version 1.0 Residential Climate Controls specification. However, if this compatibility is specified, the manufacturer must ensure that the Climate Control meets specific requirements associated with the control of these systems.
Other	The Mercury / RoHS Compliance requirement is unclear. Specifically, EPA should clarify whether it is referring to the EU Directive or another specific "RoHS" set of requirements.	EPA has clarified in the Draft 1 Version 1.0 Residential Climate Controls specification that this requirement indeed references the EU RoHS Directive.
Other	Certain requirements are protected by patents and other intellectual property laws. EPA should require that partners disclose patents, or applications for patents, and sign an agreement to make these patents freely available to other companies who are looking to manufacture thermostats that meet ENERGY STAR requirements.	<p>One of EPA's Guiding Principles is that ENERGY STAR specifications do not unjustly favor any one technology. Therefore, EPA intends to develop a specification that allows several technologies and designs to qualify for ENERGY STAR. For more information on EPA's Guiding Principles: <a href="http://www.energystar.gov/productdevelopment">www.energystar.gov/productdevelopment</a>.</p> <p>Stakeholders are encouraged to continue providing suggestions that support this principle.</p>
Other	EPA should encourage the use of programmable setback thermostats on the widest possible range of installed systems.	The Version 1.2 Programmable Thermostat specification was perceived as being relatively easy and ENERGY STAR was not providing the intended differentiation in the marketplace. In contrast, with the Version 1.0 Residential Climate Controls specification, EPA intends requirements to be attainable by leadership models that maximize energy savings from the HVAC system and provide enhanced ease of use.

Other	EPA should suspend the program for now and work to develop a comfort control specification, as ENERGY STAR has not shown savings associated with the use of programmable thermostats.	EPA has suspended the Version 1.2 Programmable Thermostat specification as of December 31, 2009. No PTs may be qualified for ENERGY STAR after this date. EPA is committed to working with industry and experts to develop an appropriate specification for Climate Controls that encourages improvement in user interface design and delivers products that will produce verifiable energy savings.
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