Topic	Comment Summary	EPA Response
General		
Technology Neutral Approach	Technology neutrality has several potential benefits but it cannot be fully implemented until an efficiency test procedure can provide a more equitable basis for comparison of all water heater technologies. Fuel choice is the principal basis for consumer purchase decisions, and leads to fundamental differences in the production of hot water. Tankless water heaters are not identical in their installation requirements, footprint, or functional characteristics compared to tank type water heaters, and without a more rigorous test method to accurately compare the efficiency and performance of the two, some level of technology specificity is required.	Because of the differences in how various fuels are used to heat water, EPA agrees that fuel choice is a useful and necessary form of technology specificity. EPA agrees with stakeholders that the current test procedure does not provide the ideal means to evaluate technologies on an equal basis. In some cases, such as storage and tankless water heaters, EPA has chosen to keep the categories separate until such an appropriate test procedure is developed.
Specification 2.0, in General	The program should be as simple as possible due to time constraints. Revisions to the solar water heater test procedure, add on heat pumps, inclusion of commercial units, and other add on units should be left until Version 3.0. The new ENERGY STAR criteria should also reflect the revised Federal Test Procedure and accompanying standards.	EPA is continuing to monitor the progress of improved DOE Test Procedures. EPA also agrees that several product groups (commercial water heaters, hybrid products, water heater efficiency improvement add-ons) would be more appropriate for consideration in a future specification.
Hot Water Recirculation	Hot water recirculation, electric resistance storage water heaters, and commercial heat pump units should all be included in the program. They all represent potential for water and energy savings.	EPA confirms the opinion of many stakeholders that ancillary devices which do not heat water (recirculation pumps, on demand pumps, and drain water heat recovery devices), as well as units outside the definition of a Residential Water Heater may not be appropriate for the Residential Water Heater Program. EPA still stands by the exclusion of electric resistance water heaters as the energy savings for these products is minimal when compared to the federal standard, and the technology has limited to no potential to improve upon this.
Electric Resistance Water Heaters		
Commercial Water Heaters		
Whole Home Gas Water Heaters		
Do consumers set out to buy water heaters specifically with a tank, or are they indifferent?	The water heater market is dominated by unplanned failure replacements, thus consumers often want a direct replacement. While consumers are more frequently inquiring about tankless because of the energy savings, the plumber/contractor will often choose the path of least resistance in terms of installing a new water heater.	EPA appreciates feedback on market processes related to the purchase of water heaters.
Is it appropriate to assess tankless and storage technologies based on one EF level?	The Energy Factor (EF) rating method was developed decades ago to compare relative performance of tank water heaters. It is not believed that the method developers anticipated or calibrated the rating method for tankless units. While there is some agreement that tankless water heaters will generally be more efficient in heating water (due to decreased standby losses) the Federal EF test overstates this advantage. Several research studies have documented this particular shortcoming of the EF test procedure.	In addition to these comments, feedback during the stakeholder webinar indicated that until a test procedure is developed that more equally compares the performance of a storage water heater to that of a tankless water heater, that these product categories should remain separate. EPA will be interested in revisiting the potential to combine these categories during future specification revisions.

How might we compare system sizes between tank and tankless units?	Several different methods of sizing exist, but in general the calculation for a tank water heater includes storage volume, recovery rate, and first hour rating; for tankless the temperature rise at a certain flow rate and inlet water temperature are used. Specific correlations between rated input and tank size could be used.	EPA appreciates your responses and ideas in regards to creating a system for comparing tank and tankless units. As feedback has indicated, it is best to keep these two categories separate for this revision.
Should hybrid systems (more than 1 gal storage per 4,000 btu/hr input, but less than 20 gallons total) be considered? Is there a test method for these products?	20 gallons of storage is an arbitrary limitation on capacity, and a more straightforward solution is to determine what criterion can be used to include all kinds or sizes of efficient water heaters (such as either EF or Thermal Efficiency). Federal definitions and test procedures do not currently exist for residential water heaters with instantaneous-sized burners and >2 gallons of storage capacity.	Due to the legislation distinction in test methods between hybrid products and currently included products, EPA will withhold from including hybrids at this time. EPA anticipates revisiting this issue as part of a potential commercial water heaters program, or in a future revision of this specification.
Gas Condensing - Framework Document		
Combining all Gas-powered Categories	Combining the gas condensing and gas high efficiency water heater categories into a single category with the EF specified for high efficiency models will eliminate the inconsistency of the current criteria. There is a lack of availability of condensing storage water heaters, and merging the condensing and non-condensing storage categories could help bring condensing products to market in a short timeframe. EPA should consider raising the efficiency requirement for all gas storage water heaters. The DOE product class definitions are used by manufacturers in their long term planning and decision making, so ENERGY STAR should recognize this alignment with the residential water heater market.	EPA appreciates feedback on the proposal to combine High Efficiency Gas Storage and Condensing Gas storage water heaters into a single product category. In line with the goal of technology neutrality, and to simplify the current criteria, EPA will propose to merge these two product categories. The current ENERGY STAR market share of gas storage water heaters (less than 12%) does not justify raising the level at this time. EPA will continue to evaluate the efficiency levels of products on the market, and as it becomes more feasible to increase the EF criteria towards condensing levels, will re-evaluate what the appropriate EF requirement for this category should be.
What is the potential for gas condensing storage products to be developed at or below 75,000 Btu/hr input rating?	DOE has found that condensing gas storage units could be produced at cost effective levels. There are not believed to be any significant incremental maintenance costs for a gas condensing storage heater relative to other storage heaters. Condensing tank units may have fewer challenges from hard water precipitates than tankless water heaters. Installation and maintenance costs could be slightly higher for condensing storage, although there is great uncertainty due to the lack of availability of residential condensing models at this time.	EPA appreciates the feedback in regards to the development of cost effective gas condensing products at the residential level. This information has helped EPA to better understand the gas condensing product category
What is the range of projected installed costs for gas condensing storage units? What are the associated maintenance costs over a product's lifetime?		

Do gas condensing storage water heaters reliably draw enough energy out of flue gas to condense, or is there an issue with partial load that affects efficiency under field load conditions?	All existing (commercial) gas condensing storage water heaters are designed in such a way that a significant portion of the latent heat of combustion is captured, leading to condensation of flue gases.	EPA appreciates your responses to this question.
Solar - Framework Document		
Solar Water Heaters	Consumers purchase solar water heaters for various reasons including environmental concerns, payback, and energy savings, and most often compare the lifetime costs to that of operating a traditional tank water heater to evaluate savings.	For the purposes of this specification, EPA will continue to treat solar as a separate fuel source, and to assess payback for solar water heaters as compared to a traditional gas or electric storage water heater. EPA remains concerned about the cost effectiveness of solar water heaters, and seeks ideas on more effective tools than ENERGY STAR labeling to encourage their adoption. Should this issue be resolved satisfactorily, SEF appears to be a viable efficiency metric for solar water heaters. In addition, comments indicate that SRCC's OG-300 rating system is the most reliable tool available today to rate solar water heating systems, and will be continued to be used in the ENERGY STAR specification.
How do consumers make a decision to purchase a solar water heater? What do they compare it to for cost and operational savings?		
How does the SEF metric compare to EF metric? Could they be considered equivalent compared? Does the SRCC calculate a First Hour Rating parameter that could be compared to that from the DOE test?	SEF and EF are not completely identical because SEF is calculated through computer modeling instead of being measured. More research needs to be done. The SRCC test is based on a modified version of the federal EF test procedure and is designed to allow direct comparison between solar water heaters and conventional electric and gas-fired water heaters.	
What are the sales channels for solar water heaters?	Solar water heaters are typically sold as part of packages through dealers and installers. In the case of dealers, they purchase the components of the system from manufacturers or distributors/wholesalers before they sell the packages to installers or direct to home/business owners.	
Are there any alternatives to the OG-100 test and/or OG-300 rating method?	There is no acceptable alternative currently available other than the OG-100 and OG-300 rating method. Wisconsin has their own computer program into which the panel performance characteristics and the physical parameters of the remainder of the system components are entered, and a resulting pass/fail metric is determined.	
Add-On Heat Pump Water Heaters - Framework Document		
Heat Pump Water Heaters	The Northern Climate Heat Pump Water Heater Task Force is working to encourage the development of heat pump water heater technologies that deliver superior performance in the more severe operating environments of the northern half of the United States. We strongly endorse the Task Force's work and urge EPA to adopt its specifications for these products.	EPA appreciates the technical expertise and guidance offered by the Northern Climate Heat Pump Specification.
Add-On Heat Pump Water Heaters	The inclusion of system add-on devices in an ENERGY STAR program for water heaters is not supported. Devices are untested, and should be categorized as ancillary energy efficiency devices; not water heaters. They broaden the market potential for heat pump technology and should be included in the program.	EPA disagrees that add on heat pump water heaters are not water heaters and that in fact they are defined as such (10 CFR 430 Subpart B Appendix E 1.12.3.b). They also represent a unique efficiency upgrade opportunity for consumers who own a functioning electric resistance water heater, and as such represent potential for large nationwide energy savings.
In what situations are add-on heat pump water heaters actually used? Are there situations in which they compete directly with new units, particularly new integrated heat pump units?	Add on heat pump water heaters are used in retrofit situations, as well as new situations in addition to large tanks for which no integrated alternative is available, when space constraints prohibit the use of an integrated unit, as a solar backup, and when the heat pump and storage tank are not in the same physical space. Sales channels include the standard distribution channels for water heaters, as well as direct internet sales.	Comments indicate that the market for add-on heat pump water heaters is great enough to support inclusion in the ENERGY STAR program.
What are the distribution channels for add-on electric heat pumps?		

Is COP the most appropriate metric for assessing the efficiency of Add-On Heat Pump water heaters? How could COP be used in conjunction with the EF of the tank to determine total system efficiency? At what performance level would a COP requirement be set so as to assure the consumer of significant energy savings? What are the costs associated with this?	The addition of a COP metric is not supported. Testing and research are required to correlate COP and EF levels. The most appropriate metric is one that allows the consumer to evaluate add-on heat pumps against alternate technologies. EF is recommended.	EPA agrees with stakeholders that the addition of a new efficiency metric (COP) could cause confusion when trying to compare various products, and proposes using EF as the sole efficiency requirement.
What additional performance requirements should be considered for the add-on heat pump category? How could those requirements be verified?	In order to evaluate an add-on heat pump correctly, the unit onto which it will be added will have to be well defined. This is necessary to insure that is no gain or loss in performance due to differences in the type of unit onto which it is added.	EPA appreciates your responses, and looks forward to continuing this discussion.
What are the appropriate warranty requirements to assure consumers a reliable product?	Installations of add on heat pump water heaters may or may not void the existing tank warranty. The installation of add on modules with external heat exchangers do not void some manufacturer warranties. The warranty implications need to be adequately addressed. The add on heat pump manufacturer must assume the warranty of the tank being used in the add-on system as the Customer warranty from the tank supplier is voided. "Alterations to the tank" must be carefully defined.	Feedback indicates that some cases, any addition of an add-on heat pump regardless of design, would cause a void in the original tank manufacturer's warranty. In efforts to protect the consumer, EPA proposes that all add-on heat pump manufacturers assume a portion of the remaining warranty of the tank being retrofitted. Attempting to define "alterations to the tank" would be a very delicate process which may cause more complications than necessary. In addition, doing so has the potential to place the consumer in an undesirable position between the add-on heat pump manufacturer and the original tank manufacturer in a dispute about warranty fulfillment.
Point of Use - Framework Document		
POU Water Heaters	Efficiency claims for POU water heaters are based solely on location of installation, not technology. Electric tankless water heaters may impose an additional electricity demand on the distribution system, even if they are small, POU units. These units may provide little or no efficiency or environmental benefit, and the case for including these products is not compelling. We support the concept of including point of use electric water heaters.	EPA would like to acknowledge that the potential for energy savings with point of use water heaters comes from multiple effects - improved unit efficiency (EF > 0.97), improved distribution efficiency, and negligible standby losses compared to a tank style electric resistance water heater. In addition, it is EPA's opinion that these products give a valid pathway for consumers to improve the performance of their current hot water system without using additional energy.
How would models appropriate for POU be distinguished from whole home models? Maximum input power? Storage capacity as well or instead? Should there be a limit on physical dimensions?	Point-of-use can be defined in terms of input capacity, physical size, and storage. Water heaters of any size or type can be used for a whole home or point-of-use. The term "point-of-use" may not be appropriate, as it applies to the location of the water heater relative to the fixtures, not about the size of the water heater.	Stakeholders agree that POU units may be defined by input, storage capacity, and/or physical dimensions. EPA has taken this advice, and has proposed a definition for POU within the first draft of the specification. EPA notes that small electric tankless water heaters are sold at retail under the name "point of use". Given that, and the inclusion of distribution efficiency in the payback calculation, EPA will retain use of the term, despite acknowledging that "point of use" refers to installation location.
How can the efficiency of POU systems be characterized? Are the current test procedure and existing metrics sufficient?	The efficiency can be described using the EF metric, as specified in 10 CFR 430. In some cases, the current test procedure is problematic for small-volume POU storage heaters. Existing tests would assume inappropriate levels of hot water usage when evaluating POU applications.	EPA agrees that until such a test procedure is developed which is more appropriate for POU water heaters, the current EF method can be used to rate efficiency.

How would water savings be measured for point-of-use products? How can in-field energy savings best be quantified? Would the savings be compared to other point of use products?	The exact water savings for a POU unit cannot be quantified. Other test methods need to be developed to efficiently measure water savings. In some cases, WaterSense methods or empirical estimates can be used. LBNL research points to water savings of approximately 50% in some situations.	EPA appreciates your comments on quantifying water savings in POU units, and looks forward to discussing alternative means to measure these savings.
Can the efficiency of whole home and POU systems be compared? If so, how?	The efficiency of whole home and POU products cannot be compared, because they are not supplying hot water at the same point in the distribution system. In order to compare them equally, the savings from less wasted hot water and less wasted energy in the piping must be factored into the POU application.	EPA appreciates your responses.
What additional performance requirements should be considered for the point-of-use category? How should those factors be verified?	A water heater manufacturer cannot be held accountable for system performance, efficiency, or water savings, so it is recommended that POU heaters be rated like whole-home heaters – by efficiency and water-delivery capabilities. POU water heaters could be held to standards of efficiency, water delivery, min and max flow rates at a specified temperature, input modulation, user selected setpoint, lead free, power quality, and safety.	Taking the proposed recommendations into account, EPA has included additional performance requirements in the first draft specification for POU electric water heaters.
In what situations are POU water heaters actually used? Are there situations in which they compete directly with whole home units?	Potential applications for POU water heaters are varied, and include remote fixtures, sanitation fixtures, and sometimes they can also compete with whole home units when many are used throughout the home. Cost and installation feasibility are often the deciding factor in determining their use.	EPA appreciates your responses.
Are there any differences in the distribution channels of point of use units vs. whole home?	POU units are sold through the same channels as a standard water heater POU units have a meaningful direct-sales channel via the internet.	EPA appreciates your responses.