

# **EPA Responses to Comments on ENERGY STAR Certified Manufactured Homes Version 2**

EPA has posted a compilation on its web site of all comments received during the 2nd comment period, which ended June 11, 2019, for its draft ENERGY STAR Certified Manufactured Homes Version 2 program requirements.

This document contains a summary of these comments, along with EPA's response to each point raised and the resulting policy change, if any.

When similar comments were received from multiple respondents, EPA has consolidated these ideas into a single summary bullet. However, EPA has attempted to retain all unique comments received, including those submitted by a single respondent.

*The Environmental Protection Agency  
is not responsible for any typographical errors or omissions.*

# EPA Responses to ENERGY STAR Certified Manufactured Homes Version 2 Comments

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## EPA Responses to ENERGY STAR Certified Manufactured Homes Version 2 Comments

ID	Comment Summary	EPA's Response	Outcome
<b>Editorial</b>			
1	<ul style="list-style-type: none"> <li>One respondent noted that there was a typographical error in the High-Efficiency Furnace Package table of Exhibit 1. Specifically the word "of" was missing in the sentence on the window SHGC requirements.</li> </ul>	<ul style="list-style-type: none"> <li>EPA agrees that this should be corrected.</li> </ul>	<ul style="list-style-type: none"> <li>EPA has revised Exhibit 1 accordingly.</li> </ul>
<b>Measure Life</b>			
2	<ul style="list-style-type: none"> <li>One respondent commented that assemblies with higher measure lives (e.g., insulation) should be prioritized over measures with shorter lives (e.g., HVAC equipment). They also pointed out that HVAC equipment is not guaranteed to be replaced with equipment equally or more efficient.</li> </ul>	<ul style="list-style-type: none"> <li>Consistent with EPA's approach across its residential new construction programs, partners are permitted to select their preferred efficiency measures to meet the required savings target. For example, in the ENERGY STAR certified homes program for site-built and modular homes, code-level insulation is permitted to be used as long as other efficiency measures are chosen. This allows partners to optimize the cost-effectiveness of certification and thereby increase participation resulting in greater programmatic impact. Because the program requirements for this sector rely upon prescriptive packages, rather than a performance-based approach, certain measures have been prioritized in each package. These include one envelope-only package that prioritizes envelope measures, which have long measure lives as the respondent noted.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
<b>Metrics</b>			
3	<ul style="list-style-type: none"> <li>One respondent commented that above-code programs are voluntary and should not consider a wide variety of metrics like energy efficiency, durability, comfort, and carbon reduction.</li> </ul>	<ul style="list-style-type: none"> <li>EPA uses a consistent set of metrics across all of its residential new construction programs, namely cost-effective savings of at least 10%, and does not believe that a unique set of metrics for this particular market sector is warranted.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
<b>Package Inputs</b>			
4	<ul style="list-style-type: none"> <li>Two respondents noted that the Electric Heat Pump Package includes a heat pump equal to the federal minimum standards. They stated that homes that are ENERGY STAR certified should have equipment better than the federal minimum, preferably ENERGY STAR certified equipment.</li> </ul>	<ul style="list-style-type: none"> <li>As stated in response to previous comments, the 2016 DOE Proposed Rule for Manufactured Housing indicates that 73% of electrically heated manufactured homes use electric resistance heat. Therefore, requiring a heat pump to be used provides significant savings for the large majority of homes, even if the efficiency of the heat pump itself meets federal minimum standards.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
5	<ul style="list-style-type: none"> <li>One respondent suggested that an ENERGY STAR Certified manufactured home should have ENERGY STAR windows, and the windows included in the</li> </ul>	<ul style="list-style-type: none"> <li>EPA notes that the window U-values and SHGC values in Version 2 of the program requirements are significantly improved over the baseline HUD values, as represented in the 2016 DOE Proposed Rule for Manufactured</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>

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	<p>packages are worse than current ENERGY STAR window specifications, which has a high market share already.</p> <p>Another respondent had a similar comment that the window U-values and SHGC values in the packages were worse than what is used for base code compliance.</p>	<p>Housing. Furthermore, while the Proposed Rule assumed what the SHGC value of the windows in a code-compliant home would be based upon their specified U-value, the HUD code in fact does not include any SHGC requirements. This is in contrast to Version 2 of the program requirements, which do specify a maximum SHGC value.</p> <p>The specific U-values and SHGC values assumed for a home compliant with the HUD Code and for a home compliant with the Version 2 program requirements are as follows:</p> <p style="text-align: center;">Window U-Values</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">TZ</th> <th style="text-align: center;">HUD Code</th> <th style="text-align: center;">ENERGY STAR</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1.08</td> <td style="text-align: center;">0.34-0.35</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">0.50</td> <td style="text-align: center;">0.34-0.35</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">0.35</td> <td style="text-align: center;">0.34-0.35</td> </tr> </tbody> </table> <p style="text-align: center;">Window SHGC Values</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">TZ</th> <th style="text-align: center;">HUD Code</th> <th style="text-align: center;">ENERGY STAR</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0.70</td> <td style="text-align: center;">0.34</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">0.60</td> <td style="text-align: center;">0.34</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">0.33</td> <td style="text-align: center;">0.34</td> </tr> </tbody> </table> <p>EPA notes that the window values in the program requirements offer significant improvements for Thermal Zones 1 and 2. For Thermal Zone 3, the packages offer equal or modest improvement over the baseline values, while still achieving EPA's goal of at least 10% savings through other measures. While the SHGC value in the program requirements for Thermal Zone 3 slightly exceeds the HUD code, this will result in slightly more heat gain in the northernmost climate, potentially increasing savings.</p> <p>Additionally, within each package the same U-value and SHGC value are specified for all Thermal Zones. This simplifies the program requirements for manufacturers, which was EPA's primary intent with Version 2 of the program requirements.</p>	TZ	HUD Code	ENERGY STAR	1	1.08	0.34-0.35	2	0.50	0.34-0.35	3	0.35	0.34-0.35	TZ	HUD Code	ENERGY STAR	1	0.70	0.34	2	0.60	0.34	3	0.33	0.34	
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6	<ul style="list-style-type: none"> <li>• One respondent noted that DOE published a Supplemental Notice of Proposed Rulemaking in 2016 for energy conservation standards for residential furnaces. In that,</li> </ul>	<ul style="list-style-type: none"> <li>• EPA notes that the metrics the respondent cited refer to a national analysis, and were not specific to Thermal Zone 1, where the benefits of improved heating equipment</li> </ul>	<ul style="list-style-type: none"> <li>• No change</li> </ul>																								

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	<p>DOE found that a 92 AFUE mobile home gas furnace had a life-cycle cost savings of \$1,049 with a simple payback of 1.9 years. The respondent suggested that the furnace efficiency for Thermal Zone 1 in the High-Efficiency Furnace Package be revised to include a 92 AFUE furnace based on DOE's analytical results. The respondent correctly notes that this DOE rulemaking has, to date, not resulted in a new energy conservation standard for mobile home gas furnaces, and the current standard is 80 AFUE. Note that DOE uses the term "mobile home", which is equivalent to the term "manufactured home" that EPA is using.</p>	<p>would be diminished because it is a cooling dominated climate.</p> <p>Even though a 92 AFUE furnace was not specified for Thermal Zone 1 in the High-Efficiency Furnace Package, the package still achieved greater than the targeted 10% savings due to the combination of upgraded equipment and an improved thermal envelope.</p> <p>EPA will continue to monitor the development and adoption of new codes and standards, including energy conservation standards applicable to equipment in manufactured homes, and revisit the stringency of program requirements as warranted.</p>	
7	<ul style="list-style-type: none"> <li>Multiple respondents commented generally that the packages should not contain measures which are equal to baseline code values. Some comments from respondents were specific to a certain package measure.</li> </ul>	<ul style="list-style-type: none"> <li>Consistent with EPA's approach across its residential new construction programs, not every attribute of a home must be upgraded for the home to be certified, as long as the overall performance of the home is better than a home built to code. EPA notes that the three packages generate at least 10% savings using a mix of efficiency measures. Because the program requirements for this sector rely upon prescriptive packages, rather than a performance-based approach, certain measures have been prioritized in each package to provide flexibility to partners. This means that some measures in each package have not been upgraded from the baseline values. However, in all cases the packages meet EPA's savings target. Therefore, further increases in stringency to the measures that are not upgraded are not necessary.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
8	<ul style="list-style-type: none"> <li>One respondent reiterated a previous comment from another respondent that suggested packages with R-11 walls be changed to R-13. They noted that it is difficult and expensive to upgrade wall insulation after construction, and that insulation is a cost-effective and long lasting measure. Another respondent commented generally that wall and floor R-values should be better than baseline code values.</li> </ul>	<ul style="list-style-type: none"> <li>EPA maintains its previous response that the minimum wall R-values are based on the values used to represent the HUD code in the 2016 DOE Proposed Rule for Manufactured Housing. While R-11 walls are not considered to be an upgrade relative to the baseline HUD code, other measures are included in these packages to achieve at least 10% savings. This applies to floor assemblies as well. This is consistent with EPA's approach across its residential new construction programs, which is that not every attribute of a home must be upgraded for the home to be certified, as long as the overall performance of the home is better than a home built to code.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>

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9	<ul style="list-style-type: none"> <li>One respondent noted that there are different Uo values for single-section and multi-section homes and that a single Uo value would be more appropriate. They also stated that the Uo values do not appear to correspond with the defined R-values and asked if there are calculations that can be reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>EPA notes that the analysis to develop the packages and determine Uo values mirrors that in the 2016 DOE Proposed Rule for Manufactured Housing. In that rule, single-section and multi-section homes were analyzed separately because a home's Uo is dependent on its geometry. The two Uo values shown in the packages reflect the typical geometry of single-section and multi-section home, with both using the same set of R-values. This approach allows manufacturers to select an assembly package that works across their product line, meeting EPA's goal to simplify program participation. The Uo values were calculated using a calculator developed by the Pacific Northwest National Laboratory and assumptions from the 2016 DOE Proposed Rule for Manufactured Housing. This calculator and DOE's assumptions are available in the DOE rulemaking docket, available at <a href="http://www.regulations.gov/docket?D=EERE-2009-BT-BC-0021">www.regulations.gov/docket?D=EERE-2009-BT-BC-0021</a>.</li> </ul>	<ul style="list-style-type: none"> <li>No change</li> </ul>
<b>Quality Assurance</b>			
10	<ul style="list-style-type: none"> <li>One respondent recommended that EPA clarify that field evaluations specified in step 6 of the ENERGY STAR Certification Process be performed on multi-section homes only.</li> </ul>	<ul style="list-style-type: none"> <li>EPA agrees that field evaluations add the most value for verification of mandatory measures for multi-section homes (i.e., marriage line seal and duct installation) that are installed after the home leaves the plant, and therefore, are not subject to the in-plant quality assurance protocols.</li> </ul> <p>For homes using the Electric Heat Pump Package, the heat pump measure is also installed after the home leaves the plant. However, due to the binary nature of this requirement – a qualifying heat pump is either installed or it is not – EPA believes that a documentation review on a larger sample of homes will be more effective than a smaller number of field inspections.</p> <p>For the remaining single-section homes that do not use the Electric Heat Pump Package, EPA agrees that field evaluations would be of limited value.</p>	<ul style="list-style-type: none"> <li>EPA has revised step 6 of the ENERGY STAR Certification Process to limit the 2% field evaluations to multi-section homes and require 10% documentation review of the heat pump installation for homes using the Electric Heat Pump Package. Single-section homes that do not use the Electric Heat Pump Package are no longer subject to field evaluations specified in step 6.</li> </ul>