



ENERGY STAR® Program Requirements Product Specification for Clothes Washers

Eligibility Criteria Draft 1 Version 7.0

Following is the **Draft 1 Version 7.0** product specification for ENERGY STAR qualified clothes washers. A product shall meet all of the identified criteria if it is to earn the ENERGY STAR.

Note: In the Version 7.0 specification revision, the Environmental Protection Agency (EPA) is proposing to change the eligibility criteria and consider “connected” opportunities for residential clothes washers. EPA welcomes feedback on this Draft 1 proposal; please send comments via email to appliances@energystar.gov no later than September 28, 2012.

- 1) **Definitions:** Below are the definitions of the relevant terms in this document. Unless otherwise specified, these definitions are identical with definitions in the DOE test procedure at 10 CFR 430, Subpart B, Appendix J1 or in 10 CFR 430.2 and 10 CFR 431.152.
 - A. **Residential Clothes Washer:** A consumer product designed to clean clothes, utilizing a water solution of soap and/or detergent and mechanical agitation or other movement, and must be one of the following classes: automatic clothes washers, semi-automatic clothes washers, and other clothes washers.
 - i) **Residential Clothes Washer with Optional Dry Cycle:** A Residential Clothes Washer that has an optional add-on dry cycle, where drying is accomplished through use of electricity or gas as a heat source and forced air circulation; drying cannot be selected independently from a wash cycle.
 - B. **Commercial Clothes Washer:** A soft-mounted front-loading or soft-mounted top-loading clothes washer that is defined for use in:
 - (i) Applications in which the occupants of more than one household will be using the clothes washer, such as multi-family housing common areas and coin laundries; or
 - (ii) Other commercial applications.

Note: The ENERGY STAR definition of a commercial clothes washer, unlike the DOE definition, does not specify a maximum capacity (cu-ft).
 - C. **Combination All-in-One Washer-Dryer:** A consumer product designed to clean and dry fabrics in a single drum, where a separate drying cycle uses electricity or gas as a heat source and forced air circulation.
 - D. **Modified Energy Factor (MEF):** The quotient of the cubic foot (or liter) capacity of the clothes container divided by the total clothes washer energy consumption per cycle, with such energy consumption expressed as the sum of the machine electrical energy consumption, the hot water energy consumption, and the energy required for removal of the remaining moisture in the wash load.
 - E. **Water Factor (WF):** The quotient of the total weighted per-cycle water consumption divided by the cubic foot (or liter) capacity of the clothes washer.
 - F. **Basic Model:** Units of a given type of covered product (or class thereof) manufactured by one manufacturer, having the same primary energy source, and which have essentially identical electrical, physical, and functional (or hydraulic) characteristics that affect energy consumption, energy efficiency, water consumption, or water efficiency.

Note: Consistent with recent revisions to other ENERGY STAR appliance specifications, EPA is adding clarifying language that unless otherwise specified, ENERGY STAR definitions are identical to the definitions in the DOE regulatory program and has made minor edits to the definition of Modified Energy Factor (MEF) and Water Factor (WF) to make them identical to DOE's definitions. In addition, EPA added a clarifying note under the commercial clothes washer definition (that was most recently adopted through the Version 6.0 revision) to flag that the ENERGY STAR definition, unlike the DOE definition of a commercial clothes washer, does not specify a maximum capacity.

2) **Scope:**

- A. **Included Products:** Products that meet the definition of a Residential Clothes Washer or Commercial Clothes Washer as specified herein are eligible for ENERGY STAR qualification, with the exception of products listed in Section 2.B.
- B. **Excluded Products:** Clothes washers with a capacity of less than 1.6 ft³ and/or are configured in any way other than a front- or top-loading design are not eligible for ENERGY STAR. Combination All-in-One Washer-Dryers and Residential Clothes Washers with an Optional Dry Cycle are not eligible for ENERGY STAR.

Note: EPA remains interested in additional performance data on combination all-in-one washer-dryers and is working with manufacturers to assemble a larger dataset for these products.

3) **Qualification Criteria:**

- A. **Modified Energy Factor (MEF):** MEF shall be greater than or equal to the Minimum MEF (MEF_{MIN}) as calculated per Equation 1.

Equation 1. Calculation of Minimum MEF

$$MEF_{MIN} = MEF_{BASE} - MEF_{Adder_Connected}$$

where,

MEF_{BASE} is the base MEF, per Table 1

MEF_{Adder_Connected} is the MEF connected allowance, per Table 2

Table 1: Base MEF

Product Type	MEF _{BASE}
Residential Clothes Washers	2.6
Commercial Clothes Washers	2.2

Table 2: Connected Allowance

Product Type	MEF _{Adder_Connected} ²
Residential Clothes Washers ¹	0.05 x MEF _{BASE}

¹ Product must be qualified using the final and validated ENERGY STAR Test Method (TBD) to use the allowance.

² Calculated allowance shall be rounded down to the nearest tenth before being applied in Equation 1.

- B. **Water Factor (WF):**

Table 3: WF Criteria

Residential Clothes Washers	WF ≤ 3.7
Commercial Clothes Washers	WF ≤ 4.5

95 **Note:** With the broad goal of reducing greenhouse gas emissions, the primary objective of the ENERGY STAR
96 Program is to recognize highly energy efficient products in the marketplace. In developing a specification, EPA
97 considers the following Guiding Principles:

- 98 • Significant energy and/or water savings can be realized on a national basis;
- 99 • Product performance can be maintained or enhanced with increased efficiency;
- 100 • Purchasers will recover their investment in increased efficiency within a reasonable period of time;
- 101 • Efficiency can be achieved through one or more technologies such that qualifying products are broadly
102 available and offered by more than one manufacturer;
- 103 • Product energy and/or water consumption and performance can be measured and verified with testing; and
- 104 • Labeling would effectively differentiate products and be visible for purchasers.

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106 Experience has shown that it is typically possible to achieve the necessary balance among principles by selecting
107 efficiency levels reflective of the top 25% of models available on the market when the specification goes into
108 effect.

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110 For Version 7.0, EPA is proposing revisions to the minimum efficiency requirements for residential washers, only.
111 No changes are being proposed for commercial clothes washers, which the Agency updated earlier in 2012 as
112 part of the Version 6.0 specification development process, in advance of the amended 2013 DOE standards for
113 commercial washers.

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115 The ENERGY STAR criteria for residential clothes washers last changed on January 1, 2011. Based on unit
116 shipment data (USD) collected by the Agency, EPA is aware that the market responded to the change more
117 quickly than expected. EPA estimates an ENERGY STAR clothes washer market share in 2011 of over 60%.
118 Considering this, as well the availability of products in the marketplace that significantly exceed the minimum
119 ENERGY STAR criteria, EPA believes stronger requirements are necessary to effectively differentiate highly
120 energy efficient residential clothes washers for consumers.

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122 In Draft 1 Version 7.0, EPA is proposing that to qualify for ENERGY STAR, residential washers have an MEF
123 greater than or equal to 2.6 and a WF of less than or equal to 3.7. Currently, EPA estimates that approximately
124 23 percent of all residential clothes washers on the market meet the proposed criteria. These models are
125 produced by six manufacturers under eleven different brands and include both front-load and top-load options.
126 To determine product availability, EPA used a dataset of residential clothes washers developed by combining the
127 current ENERGY STAR qualified product list with the U.S. Federal Trade Commission (FTC) dataset of clothes
128 washers sold in the U.S. in 2011. EPA estimates consumers would save on average approximately \$89 on their
129 utility bills annually; about \$980 over a residential clothes washer's typical 11-year lifetime. Factoring in pricing
130 data for these higher levels of efficiency, EPA believes that consumers will have a good selection of products
131 available and will be able to recoup their investment within a reasonable timeframe.

132 **Connected**

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134 EPA has begun to address the opportunities associated with "connected" functionality through several product
135 specification revisions over the past year. Consistent with the Agency's proposals for other home appliances, EPA
136 is planning to propose a set of optional connected criteria for residential clothes washers (Section 4) and has
137 proposed a supporting connected allowance in Section 3. Products that demonstrate, through use of an ENERGY
138 STAR demand response test method, that they meet the connected criteria could opt to use an allowance
139 equivalent to 5 percent of the product's base MEF requirement once their performance is validated using a DOE-
140 developed test procedure for residential clothes washer demand response functionality. This proposal is reflected
141 in Table 2 and Equation 1, above. Prior to the development of this test procedure, connected washers can be
142 qualified as connected through inspection of the product/product documentation, but will not be eligible for the
143 allowance.

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145 As in other appliance categories, EPA intends this allowance to serve as a temporary incentive to help jump-start
146 the market for connected appliances that provide immediate convenience and energy savings opportunities to
147 consumers as well as future-oriented demand response (DR) and price awareness capabilities.

149 **Cleaning and Rinse Performance**

150 Some stakeholders have expressed concerns to EPA that as energy and water efficiency levels become more
151 stringent, clothes washer cleaning and/or rinse performance may suffer. They have encouraged the Agency to
152 consider adding new performance requirements to the program. An ENERGY STAR test method to evaluate
153 these aspects of clothes washer performance is not currently available. Therefore, EPA is not planning to
154 incorporate cleaning and/or rinse performance requirements into the Version 7.0 specification. EPA did consider
155 cleaning performance when developing the proposed MEF and WF criteria and found that many highly efficient
156 clothes washers meeting the proposed criteria have received excellent scores in Consumers Union's ratings that
157 factor in washing performance. For example, over 15 models that have meet EPA's 2012 Most Efficient clothes
158 washer eligibility requirements – which exceeds the proposed Draft 1 levels – received top scores and are
159 recommended by Consumers Union.

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161 Both EPA and DOE encourage additional stakeholder feedback on whether the program should incorporate
162 cleaning and/or rinse performance into the ENERGY STAR program for clothes washers and the timing for doing
163 so. As an initial step in considering cleaning and/or rinse performance requirements for clothes washers, DOE
164 has begun reviewing available industry test procedures for characterizing clothes washer cleaning and rinse
165 performance.

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167 C. Significant Digits and Rounding: All calculations shall be carried out as specified in Appendix J1 to
168 Subpart B of Part 430 and 10 CFR Part 430.23(j).

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170 **Note:** EPA has revised the significant digits and rounding requirements to cite the applicable sections of the Code
171 of Federal Regulations (CFR).

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173 D. Model Numbers: Model numbers used for ENERGY STAR qualified product submissions shall be
174 consistent with Federal Trade Commission (FTC) and Department of Energy (DOE) submissions.

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176 4) **Connected Criteria**: TBD

177 **Note:** For this Draft 1 specification EPA has included a placeholder for optional connected product criteria. EPA
178 intends to propose connected criteria for residential clothes washers in the Draft 2 Version 7.0 Clothes Washer
179 specification and encourages stakeholder feedback on what types of connected functionality should be
180 considered for clothes washers.

181 EPA is in the process of vetting optional connected product criteria for Refrigerators/Freezers (R/F) with
182 stakeholders. Similar to what has been discussed for that product category, EPA intends to propose connected
183 clothes washer criteria that enable both near-term consumer benefits associated with energy management and
184 added convenience features as well as longer-term, societal benefits associated with smart grid interconnection.
185 EPA plans to leverage the latest connected language developed for R/F and recommendations related to clothes
186 dryer demand response (DR) functionality provided to EPA and DOE in the 2010 *Joint Petition to ENERGY STAR*
187 *to Adopt Joint Stakeholder Agreement as It Relates to Smart Appliances*.

188 In addition to this, EPA is interested in stakeholder feedback as to whether price signals and related consumer
189 feedback are of particular importance for clothes washers given their schedulable nature. EPA believes there
190 may be opportunities for clothes washers to offer additional consumer savings and grid benefits through the ability
191 to receive price signals and provide consumers with feedback that encourages operation during favorable pricing
192 periods. EPA welcomes suggestions on how to express this in the specification.

193 5) **Test Requirements**:

- 194 A. One of the following sampling plans shall be used to test for qualification to ENERGY STAR:

- 195 a. A representative unit shall be selected for testing based on the definition for Basic Model provided
196 in Section 1. above; or
197 b. Units shall be selected for testing per the sampling requirements as defined in Table 4:

**Table 4: ENERGY STAR
Sampling Requirements for Clothes Washers**

Residential Clothes Washers	10 CFR § 429.20, which references 10 CFR § 429.11
Commercial Clothes Washers	10 CFR § 429.46, which references 10 CFR § 429.11

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200 B. When testing the energy and water efficiency of clothes washers, the following test method shall be used
201 to determine ENERGY STAR qualification:
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Table 5: Test Methods for ENERGY STAR Qualification

Efficiency Requirement	Test Method Reference
MEF	10 CFR § 430, Subpart B, Appendix J1 ¹
WF	

¹ And in accordance with any applicable DOE issued test procedure guidance, listed here: <http://www1.eere.energy.gov/guidance/default.aspx?pid=2&spid=1>

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204 C. Compliance with Connected functionality, as specified in Section 4, shall be through examination of
205 product and/or product documentation. In addition, demand response functionality shall be certified using
206 the **TBD** ENERGY STAR test method in order to be eligible for the connected allowance.
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Note: DOE plans to develop a test method to validate the DR capabilities of residential clothes washers that will be referenced in this specification. DOE's test method development will be dependent upon working with manufacturers to obtain products for connected testing. This test is also anticipated to be a separate, add-on test method. Products would need to be qualified using this final and validated ENERGY STAR test method to use the proposed allowance.

In the meantime (prior to when this new ENERGY STAR test method for demand response is available), qualified clothes washers with connected features, as specified in the future Section 4, would be highlighted on the ENERGY STAR Qualified Product List.

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218 6) **Effective Date:** The ENERGY STAR Clothes Washer specification shall take effect on **TBD**. To qualify for
219 ENERGY STAR, a product model shall meet the ENERGY STAR specification in effect on the model's date of
220 manufacture. The date of manufacture is specific to each unit and is the date on which a unit is considered to
221 be completely assembled.
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Note: Under EPA's anticipated schedule for the residential clothes washer specification revision, a final version of the specification would be published in February 2013 to be effective 9 months later, in approximately November 2013.

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227 7) **Future Criteria Revisions:** ENERGY STAR reserves the right to change the specification should
228 technological and/or market changes affect its usefulness to consumers, industry, or the environment. In
229 keeping with current policy, revisions to the specification are arrived at through industry discussions. In the
230 event of a specification revision, please note that the ENERGY STAR qualification is not automatically
231 granted for the life of a product model.
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Note: EPA is aware that manufacturers will be required to test using a new DOE test procedure for clothes washers and comply with new DOE standards, beginning March 2015. EPA is planning to transition the ENERGY STAR clothes washer specification to this new test procedure at that time, harmonizing with DOE's schedule. With assistance from DOE, EPA also plans to crosswalk the final Version 7.0 levels for residential clothes washers to equivalent levels expressed using the new energy and water performance metrics: Integrated Modified Energy Factor (IMEF) and Integrated Water Factor (IWF), respectively.