

**ENERGY STAR Residential Ceiling Fans Draft 1 Version 4.0 Comment Matrix**

| Topic  | Stakeholder Comment Summary   | EPA Response   |
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| <b>Ceiling Fan Certification Requirements</b>            |   |  |
| <b>Support Alignment with DOE Test Method and Metric</b> | Several commenters support EPA's alignment with the new DOE test method and efficiency metric for ceiling fans.   | Thank you for your comments. EPA appreciates the support for its proposed adoption of the DOE ceiling fan test procedure and efficiency metric.  |
| <b>Definitions</b>                                       | One commenter stated that the definitions for ceiling fan efficiency and for controls should be updated to offer more clarity to consumers and manufacturers. Another commenter suggested that "Standby Mode Power" should be referred to as "Standby Mode"   | EPA appreciates the suggested edits. EPA retains the definition aligned directly with DOE, but will ensure the consumer page is updated to make clear that the efficiency is a weighted metric. EPA has also incorporated "mobile device applications" into the definition for controls and agrees that "Standby Mode" better aligns with DOE.   |
| <b>Efficiency Requirements</b>                           | Several commenters support the proposed increase in stringency for ceiling fan efficiency, while one commenter does not. Said commenter recommends lowering the requirements to include both AC and DC motor ceiling fans. One commenter opposes a cfm/W efficiency metric in general and states it is a flawed metric. Several commenters point out that the slope of the ceiling fan efficiency line is too steep, thus too strict for large fans and not strict enough for small fans. One commenter stated that Low-Mount HSSD fans should be expected to meet more strict requirements than Standard fans. | EPA has proposed ceiling fan efficiency levels [cfm/W] for standard and hugger ceiling fans that are in line with DOE's trial standard level 5. 81 FR 6826, 6863 (January 19, 2017). This efficiency level is expected to be met by DC motor fans. If AC motor fans can reach this efficiency, then they can be certified. EPA has updated the proposed requirements for smaller fans, such that the ENERGY STAR requirement is always higher than the upcoming DOE minimum efficiency standard.<br><br>EPA maintains the proposal that Low-Mount HSSD ceiling fans meet the same efficiency level as Standard fans, and understands that this may only be a temporary fix until the DOE compliance date in 2020. In many cases, these fans are used for the same purposes by the same consumers as standard fans. |
| <b>Minimum CFM Requirement</b>                           | Two commenters support minimum airflow requirements. One commenter suggests that the Minimum High Speed Airflow requirement be more stringent, especially with regard to larger diameter fans.  | EPA and stakeholders discussed this topic at length, and agreed that it is actually air velocity that is important to providing service to consumers, but that a requirement based strictly on that would be too easy for smaller fans and too hard for larger fans. In Draft 2, EPA proposes a minimum performance requirement based on air speed for fans between 36 and 78 inches blade span, with intersecting constant CFM requirements for larger and smaller fans. EPA is confident this proposal is a large improvement over the previous performance requirement. EPA predicts that all currently certified fans meet this proposal, and looks forward to recognizing smaller high efficiency fans that will satisfy consumers.   |

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| <b>Controls</b>                                      | Overall, commenters stated that a hard-wired backup to a remote control is not feasible for DC motor ceiling fans. This type of backup is only applicable to AC motor fans. One commenter suggested that multiple wireless technologies could serve as a backup to primary control signal failure, while another commenter stated that wireless backup may not be suitable if the receiver failed altogether. | In discussions with stakeholders, it became clear that hard-wired backups are not something consumers look for in fans. In addition, even wireless wall-mounted controls are becoming less common, in favor of wall-mounted holders for handheld remotes. Lastly, in conversation there was general agreement that wireless controls are reliable and if lost can be replaced. The one exception was a Wi-Fi control, particularly one that relied on the cloud, which is not reliable enough to be the sole control path. Draft 2 no longer requires a hard wired backup for the control, but does require an alternate control path for fans with Wi-Fi control. |
| <b>Motor and Driver Electronics Warranty</b>         | Several commenters stated that a 10 year warranty on motor electronics is far too strict. One commenter suggested that a one year warranty would be more appropriate while another commenter suggested that a 5 year warranty may be feasible. Overall, commenters supported a 10 year warranty for the motor itself.   | EPA has eliminated the motor warranty requirement, having recognized that the motor is unlikely to fail. Instead, EPA proposes a 3 year warranty on the fan. In combination with similar requirements in other ENERGY STAR specifications of products using small DC motors, EPA hopes to drive the electronics market to offer more reliable components for driver electronics.   |
| <b><u>Lighting Requirements for Ceiling Fans</u></b> |   |  |
| <b>Support Inclusion of Lighting Requirements</b>    | Several commenters support the inclusion of the CFLK lighting requirements within the body of the ceiling fan specification. They feel that the proposed CFLK requirements make the specification easier to use.  | Thank you for your comments. EPA appreciates the support for including the ceiling fan light kits requirements into the body of the specification. EPA agrees that this should make the certification process for ceiling fan light kits easier.   |
| <b>Flicker and Dimmability</b>                       | Two commenters support the use of NEMA-77 as the test method for flicker. Both commenters support NEMA SSL-7A for dimmability testing as well. One commenter suggests that EPA make sure NEMA-77 is fully vetted before adopting it as the test method for flicker.   | EPA appreciates the comments regarding flicker and dimmability testing and agrees with the commenters in support of applying NEMA-77 testing to all CFLKs. This test is very new, but requiring this test will help ensure proper performance for both dimming and non-dimming lamps.  |
| <b>Serviceable Integrated LEDs</b>                   | One commenter stated that testing serviceable integrated LED units with a glass cover in place would not be fair.   | Thank you for your comment. EPA agrees that testing a serviceable/separable integrated LED unit without the glass cover on is appropriate. Testing of a non-serviceable/non-separable integrated unit is conducted on the installed-configuration of the light kit.  |
| <b><u>General / Miscellaneous</u></b>                |   |  |
| <b>Connected Criteria</b>                            | Several commenters support the proposed connected criteria and agree that aligning it with the connected criteria in ENERGY STAR Luminaires Version 2.0 is a useful approach. One commenter states that a 30 minute interval for reporting energy consumption data would be more appropriate than a 15 minute interval.   | Thank you for your comments. EPA agrees that for ceiling fans, which use relatively little energy, a 30 minute interval is acceptable for energy use reporting.  |
| <b>Standby Power Requirement</b>                     | One commenter supports having standby power as a reporting requirement.   | Thank you for your comment. EPA appreciates the support of standby power as a reporting requirement.   |

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| <b>CFLK Clarity</b>                  | One commenter states that the title of the specification should be "ENERGY STAR Product Specification for Residential Ceiling Fans and Ceiling Fan Light Kits." Another commenter encourages EPA to explicitly state that for ceiling fans sold with a light to be certified, both product must meet applicable criteria. | EPA has made it explicit that for a ceiling fan sold with a CFLK, both components must meet applicable criteria for the product to be labeled as ENERGY STAR.  |
| <b>Labelling Requirements</b>        | One commenter is concerned with the amount of labelling required for ENERGY STAR certification, unless consumers find this information useful.  | EPA proposes eliminating the start time labelling requirement for CFLKs using solid-state lighting. However, this labelling requirement is still applicable to CFLs.   |
| <b>Test Lab Variability</b>          | One commenter states that the DOE test method for ceiling fan efficiency has been shown to produce up to 20% variability in results between certified test labs.  | Thank you for your comment. EPA appreciates the insight regarding the test variability for ceiling fan efficiency.   |
| <b>Ceiling Fan Wind Power Metric</b> | One commenter suggest that a ceiling fan efficiency requirement based on wind power that the fan produces would more accurately represent performance than cfm/W.   | DOE analyzed reports from testing over 30 ceiling fans in early 2014 and found that while airflow efficiency (CFM/W) at a given speed does tend to be lower at higher RPM, the reverse is true for fan efficiency based on wind power: fan efficiency based on wind power at a given speed tends to be lower at lower RPM and higher at higher RPM. Therefore, in the same way that manufacturers could opt to add more lower-RPM speeds on their ceiling fans to increase their overall weighted-average airflow efficiency, manufacturers could opt to remove lower-RPM speeds on their ceiling fans to increase their overall weighted-average fan efficiency based on wind power. DOE notes that lower-RPM speeds consume less energy than higher-RPM speeds, and the removal of lower-RPM speeds eliminates the ability of consumers to use lower speeds when appropriate. In addition, because airflow efficiency is the metric accepted by the majority of the ceiling fan industry, DOE and EPA are using airflow efficiency as the basis of the integrated efficiency metric for ceiling fans. 81 FR 48620, 48625 (July 25, 2016) |