FACT SHEET: Misclassification of Residential Fans

DOE finalized a Test Procedure for ceiling fans in July 2016. Companies are required to comply as of January 23, 2017.

What is the problem?

The DOE Test Procedure defines several types of ceiling fans. A small-diameter ceiling fan is less than seven feet in diameter. In order to then define sub-classes of small diameter fans, DOE borrowed a well-established safety classification table from the Underwriters Laboratory, called UL 507. It was reprinted in the final DOE Test Procedure as follows:

> *"1.11. High-speed small-diameter ceiling fan means a small-diameter ceiling fan that is not a very-small-diameter ceiling fan, highly-decorative ceiling fan or belt-driven ceiling fan and that has a blade thickness of less than 3.2 mm at the edge or a maximum tip speed greater than the applicable limit specified in the table in this definition."*

TABLE 1—UL 507 BLADE THICKNESS AND MAXIMUM TIP SPEED LIMITS

Airflow direction *	Thickness (t) of edges of blades		Maximum speed at tip of blades	
	(mm)	(Inch)	(m/s)	(feet per minute)
Downward-only	4.8 > t ≥ 3.2	3/16 > t ≥ 1/8	16.3	3200
Downward-only	t ≥ 4.8	t ≥ 3/16	20.3	4000
Reversible	4.8 > t ≥ 3.2	3/16 > t ≥ 1/8	12.2	2400
Reversible	t ≥ 4.8	t ≥ 3/16	16.3	3200

* The "downward-only" and "reversible" airflow directions are mutually exclusive; therefore, a ceiling fan that can only produce airflow in the downward direction need only meet the "downward-only" blade edge thickness and tip speed requirements and a ceiling fan that can produce airflow in the downward and upward directions need only meet the "reversible" requirements.

Unfortunately, DOE mad slight tweaks to the presentation of the UL Table. It has led to an unintended consequence of reclassifying certain residential fan models ("low-speed") as industrial ("high-speed small diameter").

Specifically, by using the term "downward-only" under Airflow Direction, DOE is describing a fan that does not have the capability of being reversed. UL's interpretation of its own table uses the word "downward" to describe ceiling fans that are currently engaged in the downward (non-reversed) motion, even if that same fan has the capability of being reversed.

This seemingly small distinction results in a reclassification for residential fans that creates a significant challenge for fan marketers, the EPA Energy Star Program, and overall confusion for consumers.

UL is aware that DOE has taken a different interpretation of its 507 Table and in order to preclude any future confusion, has made changes to its 10th edition of the Table, finalized in November 2017. The new table uses the terms "Downward" and "Upward" rather than Downward-only and Reversible.

What is the solution?

Legislate an amended version of Table 1, reflecting the consensus-based industry standard (UL).

CEILING FAN BLADE AND TIP SPEED CRITERIA

Airflow direction*	Thickness (t) of edges of blades		Maximum speed at tip of blades	
	(mm)	(inch)	(m/s)	(feet per minute)
Downward	4.8 > t ≥ 3.2	3/16 > t ≥ 1/8	16.3	3200
Downward	t ≥ 4.8	t ≥ 3/16	20.3	4000
Upward	4.8 > t ≥ 3.2	3/16 ≥ t ≥ 1/8	12.2	2400
Upward	t ≥ 4.8	t ≥ 3/16	16.3	3200
The "downward" and "upward" airflow directions are not mutually exclusive; therefore, a ceiling fan that can only produce airflow in the downward direction need only meet the "downward" blade edge thickness and tip speed requirements. A ceiling fan that can produce airflow in the downward and upward directions must meet the downward requirements when operating in the forward direction and the upward requirements when operating in the reverse direction.				

The new version of the Table would simply change the term "downward-only" to "downward" and "reversible" to "upward." The values in the columns to the right would not change. This conforms the DOE rule to the existing industry standard UL 507 and corrects the reclassification of some residential fans.