Air Filter Labeling

Response to California Energy Commission
2013 Pre-Rulemaking Appliance Efficiency
Invitation to Participate

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Summary

The information below provides direct response to the California Energy Commission's (CEC) Invitation to Participate (ITP) for the 2013 Appliance Efficiency Pre-Rulemaking, regarding Air Filter Labeling, including reference to several primary sources. This document includes all of the questions asked in the ITP, even for those with no response.

Air filters pose a unique challenge and opportunity for energy savings in California. Many homes in California have underperforming central heating and cooling systems due to high resistance to air flow. This resistance limits the air flow through the ducts, increasing fan run time and system energy use. 2013 Title 24 Standards include a requirement that a label identifying the proper filter resistance is affixed to the installation site. An additional label on filter products is necessary to give consumers and installers information to select a filter that optimizes the airflow in their system.

Below is a summary of the responses and primary sources:

- Product definition: Enclosed is a description of the product covered by the measure
- Existing products with MERV labeling: Enclosed are results from a survey of hardware stores which show the prevalence of particle efficiency metrics. The full results are shown in Appendix A.
- Label location: Enclosed is a recommendation for consistent label location.
- Other efficiency related information: Enclosed is a depiction of AHRI 680 test results and description of other useful metrics.
- Benefits of labels: Enclosed is a description of how the Title 20 measure assists existing Title 24 measure language.

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Air filter media are used to remove particles from the air stream in ducted heating or cooling systems present in the residential environment; 2013 Title 24 states that air filter media "is part of the air filter equipment, which is the actual particulate removing agent (CEC 2012)." 1

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1 Basic Information

1.1 Product Definition

Air filter media are used to remove particles from the air stream in ducted heating or cooling systems present in the residential environment; 2013 Title 24 states that air filter media "is part of the air filter equipment, which is the actual particulate removing agent (CEC 2012)."

1.2 How many products in the market are currently labeled with Minimum Efficiency Reporting Value (MERV) rating?

In 2012, a survey was conducted by Greg Barker of Energy Solutions on five hardware stores located in the San Francisco Bay Area. While this survey does not provide a comprehensive cross section of the air filter market, it does give anecdotal evidence on the use of MERV efficiency labels. The complete results can be found in Appendix A. Of the 32 air filter products surveyed, 11 products, or 34% of the sample set, had a MERV rating on the label. Two other particle efficiency ratings were found to be used, including the Microparticle Performance Rating (MPR) on 3M™ products (34% of sample set), and the Filter Performance Rating (FPR) on products found at Home Depot™ (25% of sample set). Figure 1 presents survey results.

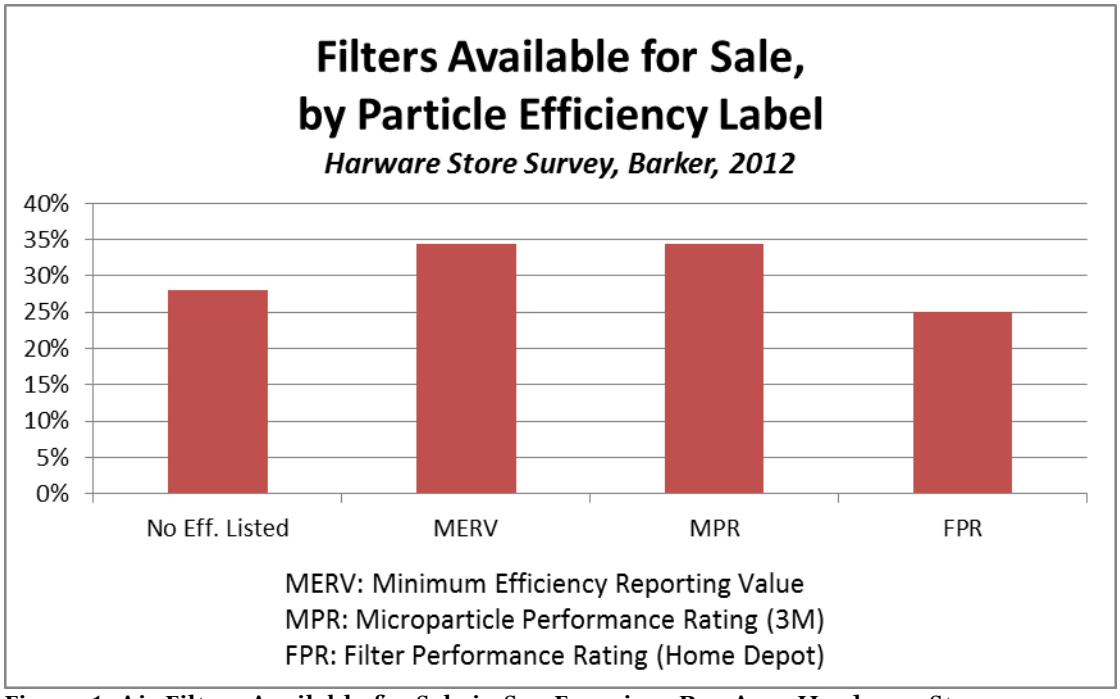

Figure 1: Air Filters Available for Sale in San Francisco Bay Area Hardware Stores

1.3 What is the estimated cost to manufacturers to produce and affix a label? Does it differ by label location and format?

No response.

1.4 What are the estimated costs to manufacturers to alter an existing label?

No response.

1.5 Are there technical or logistical barriers to labeling air filters?

No response.

1.6 What are the current annual sales 2008-2013 and estimated Compound Annual Growth Rate (in CA and nationwide)?

No response.

1.7 What is an appropriate location of the label so that energy efficiency information is easily accessible to consumer?

The label location should be consistent across all brands and products to the extent possible. Consistent placement can enhance consumer understanding by making the information easy to locate and facilitate comparison of products produced by different manufacturers.

1.8 Other than the MERV is there other efficiency related information that could be on an air filter?

When speaking of air filters, the term efficiency can be interpreted two ways. The MERV rating refers to the filter's *particle efficiency*, or ability to remove particles from the air. However, this rating does not directly discuss *energy efficiency* impacts of the filter. To capture the energy impacts of the filter, the label should also disclose the pressure drop, or resistance imposed on the HVAC system. As shown in Table 1 below, testing done in accordance with AHRI Standard 680 produces this metric, as well as the dust holding capacity and loaded filter pressure drop (resistance produced by the filter after loaded with particulates). At a minimum, the Energy Commission should include a measure of pressure drop at a set airflow rate, and consider including additional pressure drop values at a range of airflow rates, as well as dust holding capacity and loaded pressure drop. As most consumers will be unfamiliar with the metrics appearing on the label, it is important to develop a clear and comprehensible label where the energy impact of the product selection is easily understood.

Table 1: Air Filter Resistance

AHRI 680 Standard Rating						
Airflow Rate (CFM)	Initial Resistance (in H20)	Final Resistance** (in H20)	Dust Holding Capacity** (g)	Particle Size Efficiency** (0.30 - 1.0 µm)%	Particle Size Efficiency** (1.0 - 3.0 µm)%	Particle Size Efficiency** (3.0 - 10 µm)%
400	0.05					
800	0.10					
1200	0.17					
1600	0.25					
2000*	0.32	0.50	45	17	53	87
* Maximum Rated Airflow Rate as published by the manufacturer. ** Standard Rating requires that these shall be tested at Maximum Rated Airflow Rate as published by the manufacturer.						

Source: AHRI 2010

1.9 What are the benefits of affixing labels to products?

Language for Title 24 section 150.0 is excerpted below.

> 12. Air Filtration
>
> A. System Design and Installation
>
> iv. All system air filter device locations shall be labeled to disclose the applicable design airflow rate and the maximum allowable clean-filter pressure drop as determined according to subsection ii above. The labels shall be permanently affixed to the air filter device readily legible, and visible to a person replacing the air filter media.

This language requires the HVAC system to be labeled with the appropriate filter pressure drop to maintain the design airflow of the system. However, without also requiring labels on the filters, consumers will not know if purchased filters meet the criteria listed on their HVAC system. Because the effectiveness of Title 24 labels is dependent on Title 20 labels, it is essential that both labeling requirements are implemented.

1.10 How does the MERV and other factors of an air filter impact the performance of HVAC equipment?

No response.

1.11 How many small businesses are involved in the manufacture, sale, or installation of these products?

No response.

1.12 Any other data relevant to this proceeding

No response.

2 References

[AHRI] Air-Conditioning, Heating, and Refrigeration Institute. 2010. "2009 Standard for Performance Rating of Residential Air Filter Equipment." Arlington, VA: AHRI.

Barker, Greg (Energy Solutions). 2012. Personal communication. July 3.

[CEC] California Energy Commission. 2012. 2013 Building Energy Efficiency Standards. Title 24, Part 6, and Associated Administrative Regulations in Part 1. May 2012. http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/final_rulemaking_documents/44_Final_Express_Terms/2013_Standards_FINAL.pdf.

Appendix A: Barker, 2012 Hardware Store Filter Survey

MFR	Brand	Size	Filter Type	MERV	MPR rating (for 3M products)	FPR rating (for Home Depot)	Cost	Store	Store Type	Pressure drop
Flanders	PrecisionAire	01.14.24	Pleated	None			$ 2.49	True Value Eastern Supplies	Small Hardware	None
Flanders	NaturAire	01.14.25	Pleated	8			$ 3.99	True Value Eastern Supplies	Small Hardware	None
Flanders	EZ Flow II	01.16.20	Fiberglass	None			$ 1.29	True Value Eastern Supplies	Small Hardware	None
3M	Filtrete	01.16.20	Pleated	None	600		$ 8.99	True Value Eastern Supplies	Small Hardware	None
American Air Filter	ElectroKlean	01.15.20	Washable, non-adjustable	None			$21.99	True Value Eastern Supplies	Small Hardware	None
Clarcor	Purolator	01.14.25	Pleated	6			$ 4.50	Ashby Lumber	Independent Hardware	None
TrueBlue	TrueBlue	01.14.25	Pleated	7			$ 4.50	Ashby Lumber	Independent Hardware	None
3M	Filtrete	01.14.25	Pleated	None	1000		$15.99	Ashby Lumber	Independent Hardware	None
American Air Filter	DustDemon	01.16.20	Pleated	6			$ 3.99	Orchard Supply Hardware	Chain Hardware	None
3M	Filtrete	01.16.20	Pleated	6			$ 3.99	Orchard Supply Hardware	Chain Hardware	None
3M	Filtrete	01.16.20	Pleated	None	300		$ 6.29	Orchard Supply Hardware	Chain Hardware	None
3M	Filtrete	01.16.20	Pleated	None	1000		$12.99	Orchard Supply Hardware	Chain Hardware	None
3M	Filtrete	01.16.20	Pleated	None	1500		$16.99	Orchard Supply Hardware	Chain Hardware	None
3M	Filtrete	01.16.20	Pleated	None	1900		$19.99	Orchard Supply Hardware	Chain Hardware	None
WEB		variable	Adjustable, washable	None			$21.99	Orchard Supply Hardware	Chain Hardware	None
American Air Filter		01.16.20	Fiberglass	None			$ 0.99	Orchard Supply Hardware	Chain Hardware	None
Flanders		01.14.24	Fiberglass	None			$ 0.75	Home Depot	Chain Hardware	None
Flanders	NaturAire	01.12.20	Pleated	8		4	$ 3.97	Home Depot	Chain Hardware	None
Flanders	NaturAire	01.12.24	Pleated	8		4	$ 3.97	Home Depot	Chain Hardware	None
Flanders	NaturAire	01.14.24	Pleated	11		8	$ 8.97	Home Depot	Chain Hardware	None
Flanders	NaturAire	01.14.24	Pleated	8		4	$ 3.97	Home Depot	Chain Hardware	None
Flanders	PrecisionAire	variable	cut to fit	None			$ 7.97	Home Depot	Chain Hardware	None
WEB			Adjustable, washable	None		4	$19.97	Home Depot	Chain Hardware	None
3M	Filtrete	01.14.24	Pleated	None	1900	10	$19.97	Home Depot	Chain Hardware	None
3M	Filtrete	01.14.24	Pleated	None	1500	9	$16.97	Home Depot	Chain Hardware	None
3M	Filtrete	01.14.24	Pleated	None	1000	7	$10.97	Home Depot	Chain Hardware	None
ACE		01.12.24	Pleated	8			$ 4.49	ACE Grand Ave	Small Hardware	None
3M	Filtrete	01.12.24	Pleated	None	1000		$12.99	ACE Grand Ave	Small Hardware	None
ACE	30-day	01.12.24	Fiberglass	None			$ 1.29	ACE Grand Ave	Small Hardware	None
Flanders		02.16.25	Pleated	None			$ 6.99	ACE Grand Ave	Small Hardware	None
Flanders	NaturAire	01.10.30	Pleated	8				ACE Grand Ave	Small Hardware	None
3M	Allergen	01.12.24	Pleated	None	1500		$18.49	ACE Grand Ave	Small Hardware	None

Products listed with Efficiency Labels

	None	MERV	MPR	FPR	Total Products surveyed
Count	9	11	11	8	32
Percent	28%	34%	34%	25%	