



Department of Energy
Washington, DC 20585

Mr. Alex Baker
Lighting Program Manager, ENERGY STAR
US Environmental Protection Agency
Washington, DC 20460

January 13, 2011

Mr. Baker,

I am pleased to provide the following comments to the Final Draft Version 1.0 of the ENERGY STAR Program Requirements for Luminaires.

1) With regard to adding cove lighting to the Commercial category at the same levels as Residential (minimum 200 lumens per foot and 45 lm/W luminaire efficacy), this would set ENERGY STAR levels below commonly available commercial linear fluorescent for output and efficacy.

A) Please see the [CALiPER Round 10 Summary report](#) (Table 1c, pg 5) for cove lighting benchmarking results. The T5HO luminaire measured at 660 lm/ft and 48 lm/W.

B) In a review of T5, T5HO, and T8 luminaires, a total of (12) IES files representing cove lighting products were downloaded from various manufacturers that are available on Elumit. Asymmetric cove tends to be T5/T5HO (though some T8 does exist). Average luminaire efficiency was 66%, with the lowest efficiency being 57%. The mean light output of a T5 lamp from a major manufacturer is 2697 lumens at 35° C (T5s are designed to operate better at 35° rather than the standard 25° for most lamps, it was assumed that the confined space in a cove would be warmer).

[Calculation: 2697 mean lumens * 66% (luminaire efficiency) / 4' (nominal for T5/T5HOs) = 445 lumens per lineal foot. Or using the lowest fixture efficiency of the 12 luminaires reviewed (57%) it would be 385 lm/ft. The lumen output of the IES files was divided by the input wattage to determine the luminaire efficacy. The average luminaire efficacy was 56 lumens per watt and the minimum was 47 lm/W.]

2) Minimum efficacy levels for some product categories may be quite low, relative to available LED products, potentially discouraging advancements in efficiency. A review of LED products listed on [Lighting Facts](#) shows the median, minimum, and maximum efficacies as delineated below, along with comparison to ENERGY STAR Luminaires proposed requirements.

Reported Luminaire Efficacy of Fixtures Listed on Lighting Facts, Compared to ENERGY STAR Luminaires Required Levels						
Lighting Facts 1/10/2011	n=	Median lm/W	Minimum lm/W	Maximum lm/W	ENERGY STAR required lm/W	ENERGY STAR (e) – Median Lighting Facts (c)
	(a)	(b)	(c)	(d)	(e)	(f)
Outdoor decorative fixture	63	55	37	87	35	-36%
Portable desk lamp	27	42	26	64	29	-31%
Recessed downlight	227	44	11	80	42	-5%
Under-cabinet or Shelf-mounted light	55	40	13	55	29	-27%

3) The proposed minimum required luminaire efficacy levels for outdoor decorative fixtures, portable desk lamps, and under-cabinet or shelf-mounted lights have not changed from the original requirements established in ENERGY STAR for SSL Luminaires, version 1.0 and 1.1 (dated Sep 12, 2007 and Dec 19, 2008, respectively).

	Proposed ENERGY STAR Luminaires minimum luminaire efficacy (lm/W)	Original ENERGY STAR for SSL Luminaires minimum luminaire efficacy (lm/W)	Original publication date	% change from original requirement to proposed	% difference between proposed ES Luminaires requirement and median performance of Lighting Facts listed products
Outdoor decorative fixture	35	35	12/19/2008	0%	-36%
Portable desk lamp	29	29	9/12/2007	0%	-31%
Recessed downlight	42	35	9/12/2007	20%	-5%
Under-cabinet or Shelf-mounted light	29	29	9/12/2007	0%	-27%

LED package efficacy for commercially available warm white packages increased approximately 50% between 2007 and 2010, from 59 lm/W to 88 lm/W, for the same cost per thousand lumens (see DOE SSL R&D Multiyear Program Plan, March 2008, Table 4-2, p. 65, and March 2010, Table 4.4, p. 69).

4) CCT – ANSI C78.377-2008 also lists 4500 K. Since 4000 K and 5000 K are listed in the ENERGY STAR Luminaires document, perhaps 4500 K should be included too.

Helpful links to assist in resolving these comments are:

DOE SSL R&D Multiyear Program Plan, March 2008:

http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2008_web.pdf

DOE SSL R&D Multiyear Program Plan, March 2010:

http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_mypp2010_web.pdf

CALiPER Round 10 Summary Report:

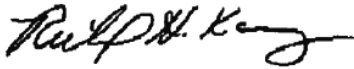
http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/caliper_round-10_summary.pdf

Lighting Facts product list (accessed Jan 11, 2011):

<http://www.lightingfacts.com/downloads.aspx?type=products&mode=xls>

If you have any questions, please feel free to contact me

Sincerely,

A handwritten signature in black ink, appearing to read "Richard H. Karney". The signature is fluid and cursive, with the first name "Richard" being more prominent.

Richard H. Karney, P.E.
Emerging Technologies
Office of Building Technologies