Federal Legislation & DOE Rule Making Update

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History: Energy Policy Act 1992

Lighting Elements

- Labeling incandescent A-line and screw-based CFLs with energy cost info
- Minimum efficacies for incandescent R30 & R40, plus incandescent PAR lamps, effective 10/31/95
- Minimum efficacies and color rendering standards (CRI) for straight and U-bend fluorescent, effective for 4-ft and 8-ft lamps 10/31/95

Intents

- Encourage use of more energy-efficient screw-based lamps
- Encourage use of more energy efficient halogen reflector lamps
- Eliminate availability of full wattage T12 “halo” fluorescent lamps and encourage use of reduced wattage ES types or use of more efficient rare earth types, like T8s

This is the legislation that eliminated the 150R40/FL, F40/CW, FB40/CW and F96T12/CW lamps.

EPAct 2005:

Covered Lighting Products

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The Energy Policy Act of 2005: Lighting Products

Effective January 1, 2008…

- **Mercury Vapor Lamp Ballasts** for general illumination applications may not be manufactured or imported
  - Late in 2005, a notice in the Federal Register clarified that this also includes new luminaires containing such ballasts
  - 2007 EISA legislation provides for continued use in specialty applications provided the ballast is marked “Not for general illumination” and identifies the specialty application

The Energy Policy Act of 2005: Lighting Products

Beginning July 1, 2009…

- New efficiency requirements for **ballasts operating Energy Saver-type T12 fluorescent lamps** go into effect
  - The 2000 DOE ballast rulemaking covered the ballasts operating the full wattage versions of these lamps
- Covers ballasts that operate
  - T12 4-ft. and 2-ft. rapid start U-lamps with medium bi-pin bases
  - T12 8-ft. instant start lamps with single pin bases
  - T12 8-ft. rapid start HO lamps with RDC bases
- By 2010, ballast manufacturers cannot manufacture replacement ballasts that do not pass the new Ballast Efficacy Factors (BEF) requirements.
- Exceptions
  - Dimming ballasts that dim to 50% or less of its maximum output
  - T12 HO ballasts capable of starting down to -20° F or less and for use in an outdoor sign
  - A ballast that has a power factor of less than 0.90 and is designed and labeled for use only in residential building applications

The Energy Policy Act of 2005: Fluorescent Ballasts

2005 EPAct Ballast Regulations, added to 2000 Federal Ballast Rule

Action	Per 2000 Ballast Rule: BEF Standards for operation of full-wattage T12 Lamps	Per 2005 EPAct: BEF Standards for operation of energy-saving T12 Lamps
Ballast manufacturers can no longer make ballasts that do not pass the new requirements for use in new fixtures.	April 1, 2005	July 1, 2009
Ballast manufacturers cannot sell ballasts that do not pass the new requirements to U.S. fixture manufacturers.	July 1, 2005	October 1, 2009
Fixture manufacturers cannot sell fixtures that include ballasts that do not pass the new requirements.	April 1, 2006	July 1, 2010
Ballast manufacturers cannot manufacture replacement ballasts that do not pass the new requirements.	July 1, 2010	July 1, 2010

End of many popular magnetic ballasts!

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Federal Legislation

Energy Independence and Security Act of 2007 (EISA)

Signed into law on 12/19/07

Incandescent Reflector Lamps
and
General Service Incandescent Lamps

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Incandescent Reflector Lamps

LPW Standards

- Same as those established in 1992 for R & PAR medium screw base lamps >2.75 inches (22/8) in diameter →

Wattage Range	Minimum LPW
40-50W	10.5
51-66W	11.0
67-85W	12.5
86-115W	14.0
116-155W	14.5
156-205W	15.0

EISA Added

- BR, ER and BPAR (OPAR) lamps, and
- Reflector lamps > 2.25 (18/8) through 2.75 (22/8) inches in diameter → now includes Par & R 20 lamps!

EISA Exempted

- BR30, BR40 & ER40 lamps rated at 65W
- ER30, BR30, BR40 & ER40 lamps rated at ≤ 50W
- R20 lamps rated at ≤ 45W

EISA Effective dates

- 180 days after enactment – June 16, 2008

State laws with earlier effective dates remained in effect until these Federal standards became effective

Incandescent Reflector Lamps

Effect of this is to allow the continued sale of 65BR30 lamps as well as reduced wattage R20, BR40 and ER40 lamps

- **All wattages K19:** replace with Halogen PAR16 or possibly PAR20
- **50W R20 lamps:** replace with new 45W R20 or any wattage Halogen PAR20
- **BR40 lamps > 65W and < 205W**: replace with 65W BR40 or Halogen PAR38
  - Several halogen options - depending on whether matching the lumens or beam
- Sale of all white light OPAR (one-piece) lamps ended
  - Sale of special color OPAR lamps can continue
    - Red, blue, green, yellow, amber…

General Service Incandescent Lamps

Covers

- Incandescent or halogen lamps
- Intended for general service applications
- Medium screw base lamps
- Lumen range of 310-2600 (40-100W in today's wattages)
- Capable of operating in range of 110-130V

Establishes maximum wattages for 4 specific lumen ranges, minimum rated life and CRI (see next slide)

Caps candelabra-base lamps at 60W

Caps intermediate-base lamps at 40W

Identifies specialty types not covered

- Appliance, bug, colored, infrared, marine, mine, reflector, rough service, shatter-resistant, sign, 3-way, traffic, vibration service, etc.

Establish a watch list of lamps types that may be regulated in the future

- Rough service, vibration service, 3-way, shatter-resistant and 2601-3300 lumen lamps (150W)

General Service Incandescent Lamps

Current Wattage	Rated Lumen Ranges	Maximum Rated Wattage	Minimum Rated Lifetime	Effective Date (Manufactured on or after)
100	1490-2600	72	1,000 hours	1/1/2012
75	1050-1489	53	1,000 hours	1/1/2013
60	750-1049	43	1,000 hours	1/1/2014
40	310-749	29	1,000 hours	1/1/2014

Modified spectrum (*Daylight*™) lamp lumen ranges are 25% lower

Minimum of 80 CRI except for modified spectrum, which have a minimum of 75 CRI

New compliant halogen lamps are available today

Other options include CFLi and LED retrofit lamps

Metal Halide Fixtures

Really a backdoor ballast efficiency standard

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Metal Halide Fixtures

It's a Pulse Start world*!*

Covers

- Metal halide lamp fixtures operated with lamps ≥150W but ≤ 500W shall contain one of the following
  - A pulse-start metal halide ballast with a minimum ballast efficiency of 88% or
  - A magnetic probe-start ballast with a minimum ballast efficiency of 94% or
  - A non-pulse-start electronic ballasts with
    - A minimum ballast efficiency of 92% for wattages > 250W
    - A minimum ballast efficiency of 90% for wattages ≤ 250W

Not currently available

Exclusions

- Fixture with regulated lag ballasts
- Fixtures with electronic ballasts to operate at 480V
- Fixtures that
  - Are only rated for 150W lamps and
  - Are rated for use in wet locations and
  - Contain a ballast that is rated to operate at ambient air temperatures above 50°C

Effective Date

- Applies to fixtures manufactured on or after the later of 1/1/2009
  Or the date that is 270 days after the date of enactment

State laws with earlier effective dates remained in effect until the Federal standards became effective

2009

DOE IRL & GSFL Lamp Rule Making

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General Information

2009 DOE Lamp Rule Making

- Covers basically the same lamp families covered by EPAct 1992
  - Incandescent (& Halogen) Reflector Lamps (IRL)
  - General Service Fluorescent Lamps (GSFL)
  - Declared that the R20, BR30, ER30, BR40 and ER40 lamps exempted by EISA 2007 continue to be exempt
  - Adds 4-ft. T5 standard and HO fluorescent lamps with miniature bi-pin bases
- Process started in 2007
- Published in the *Federal Register* on July 14, 2009
- Became final on September 14, 2009
- Effective date to be in July 14, 2012 – 3 years after publication in the *Federal Register*

IRL Standards

Lamp Wattage	Lamp Type	Diameter	Voltage	Minimum LPW; expressed here as a range for 40W through 205W, as LPW is derived from a formula based on lamp watts
40W-205W	**Standard Spectrum**	> 2.5 inches **(PAR30, PAR38, BR30 & ER30, BR40 & ER40)**	≥ 125 **(130V)**	6.8 X lamp watts$^{0.27}$ **18.4 to 31.9 LPW**
			< 125 **(120V)**	5.9 X lamp watts$^{0.27}$ **16.0 to 27.6 LPW**
		>2.25 inches & ≤ 2.5 inches **(R20 & PAR20)**	≥ 125 **(130V)**	5.7 X lamp watts$^{0.27}$ **15.4 to 26.7 LPW**
			< 125 **(120V)**	5.0 X lamp watts$^{0.27}$ **13.5 to 23.4 LPW**
40W-205W	**Modified Spectrum**	**Standards are approximately 17% less stringent than for Standard Spectrum Lamps.**		

Exemptions to IRL Standards:
Lamps that are 50W or less: ER30, BR30, BR40, and ER40
Lamps that are 65W exactly: BR30, BR40, and ER40
Lamps that are 45W or less: R20
Exemptions should remain intact until July 1, 2013, per pending federal energy legislation

Key Impacts on IRL Products – Industry in General

- All of today's standard PAR halogen lamps will be eliminated.
- Likely that all 130V PAR halogen lamps will be eliminated.
- Only a few of today's halogen reflector lamps, e.g. PAR20, PAR30 and PAR38, can meet the standards in the Final Rule.
- In order to meet the new standards, reflector lamps will need to use new technologies such as advanced infrared (IR) coatings and optimized reflector coatings.
  - IR coatings redirect wasted heat energy emitted by the lamp filament back to the filament, increasing the temperature of the filament, and thus enabling it to produce more light without increasing wattage.
  - Optimized reflector coatings will more efficiently direct light produced by the lamp out of the lamp and into the space being illuminated.
  - Other technology options are also being explored.
- The few existing lamps that meet the new standards are more expensive than the standard halogen lamps on the market today.
  - While the initial cost of the new higher efficiency reflector lamps will be higher, the consumer should see a payback through reduced electrical bills depending on the amount of time the lamps are "on".

GSFL Standards

Lamp Type	Correlated Color Temperature	Energy Conservation Standard lm/W
4-Foot (T8-T12) Medium Bi-pin ≥25W	≤ 4,500K	89
	> 4,500K and ≤ 7,000K	88
2-Foot (T8-T12) U-Shaped ≥25W	≤ 4,500K	84
	> 4,500K and ≤ 7,000K	81
8-Foot (T8-T12) Single Pin Slimline ≥52W	≤ 4,500K	97
	> 4,500K and ≤ 7,000K	93
8-Foot (T8-T12) High Output	≤ 4,500K	92
	> 4,500K and ≤ 7,000K	88
4-Foot (T5) Miniature Bi-pin Standard Output ≥26W	≤ 4,500K	86
	> 4,500K and ≤ 7,000K	81
4-Foot (T5) Miniature Bi-pin High Output ≥49W	≤ 4,500K	76
	> 4,500K and ≤ 7,000K	72

Key Impacts on T12 GSFL – Industry in General

- T12 4-ft. & 2-ft U-lamps with medium bi-pin bases
  - Majority of today's F40 and F34T12 lamps and all FB40 and FB34T12 U-lamps fail
  - A very few very high lumen rare earth phosphor lamps will pass
  - CWX/DX/DSGN50/C50 are exempt due to CRI ≥ 87
- T12 8-ft. Slimline with single pin bases
  - All of today's 75W F96T12 lamps fail
  - All of today's 60W F96T12/ES fail except for the 800/SPX & few some 700/SP long life lamps
  - CWX/DX/DSGN50/C50 are exempt due to CRI ≥ 87
- T12 8-ft. 800mA HO with RDC bases
  - All of today's 110W F96T12 HO lamps fail; requires enhanced coatings & 10,120 lumens to pass
  - All of today's 95W F96T12/ES/HO fail; requires enhanced coatings & 8740 lumens to pass
  - CWX/DX/DSGN50/C50 are exempt due to CRI ≥ 87
  - F96T12/CW/HO/CT & D/HO/CT (Cold Temperature) are exempt

Key Impacts on T8 & T5 GSFL – Industry in General

- T8 4-ft. & 2-ft. U-lamps with medium bi-pin bases
  - All 4-ft. T8 basic 700 Series lamps @ 2800 lumens fail
  - All other 4-ft. pass
  - Some 700 Series 2 ft. U-lamps pass; all 2-ft. 800 Series U-lamps pass
- T8 8-ft. Slimline with single pin bases
  - All pass except some 700/SP Series; requires 5723 lumens @ 59W to pass
- T8 8-ft. HO with RDC bases
  - All pass except some 700/SP Series; requires 7912 lumens @ 86W to pass
- T5 4-ft with miniature bi-pin bases
  - All pass
  - Intent of T5 standard is to keep lesser performing lamps out of the U.S. market

Be Pro-Active Today

- The fluorescent lamps the will meet the 2012 standards are available today
  - T8 OCTRON®: 700XP, 800, 800XP, 800XP/SS, 800XPS
  - T5 PENTRON®: T5 standard and T5 HO
- High efficiency ballasts are available today
  - QUICKTRONIC® QHE T8 Instant Start
  - QUICKTRONIC PROStart® T8 PSN & PSX Program Start
  - QUICKTRONIC PROStart T8 QUICKStep® Bi-level
  - QUICKTRONIC POWERSENSE® T8 Dimming
  - QUICKTRONIC PowerSHED™ T8 Demand Response Load Shed
  - QUICKTRONIC PROStart T5 Program Start
  - QUICKTRONIC POWERSENSE® T5 Dimming
- Pair them together with controls that help reduce energy usage and help end users save $ today

What’s Next?

Pending Legislation

U.S. House Bill HR2454 (Waxman-Markey Climate Bill) & the Senate S 3059 (possibly to be titled National Energy Efficiency Enhancement Act of 2010)

- Covers today's exempted incandescent reflector lamps
  - 65W BR30, BR40 and ER40
  - ≤ 50W BR30, ER30, BR40 and ER40
  - ≤ 45W R20
  - New standard to be published by July 1, 2011 to be effective July 1, 2013
  - The next amended standards to be published January 1, 2015 to be effective 3 years later
  - Shall consider incandescent and non-incandescent technologies and new metrics (metric other than LPW)
  - ***The DOE has scheduled a hearing for May 26, 2010 which could start a rulemaking without this legislation becoming law***
- Also provides for the end of mercury vapor HID lamps for general lighting applications by January 1, 2016 and sets LPW standards for many double-ended halogen lamps
- Sets new energy efficiency standards for outdoor and roadway lighting luminaires

Pending and Expected DOE Rulemakings

Fluorescent Ballast Rulemaking

- Will set standards to replace those originally established by the DOE Rule Making in 2000 that were updated by the EPAct 2005 Legislation
- Will cover
  - Ballasts for T8 and T12 4-ft. and 2-ft. U-lamps with medium bi-pin bases including ballasts for residential applications
  - Ballasts for T8 and T12 8-ft. lamps with single pin bases
  - Ballasts for T8 and T12 8-ft. HO lamps with RDC bases, including CT and Sign
  - Ballasts for 4-ft. T5 standard and HO lamps with miniature bi-pin bases
- Next hearing to be on April 26, 2010
- To be finalized in mid 2011 and Effective date will be in 2014

Metal Halide Luminaire Rulemaking

- Began in January 2010
- Really a ballast efficiency rulemaking
- May expand range of wattages covered beyond150-500W covered today

HID Lamp Rulemaking

- Initial notice published April 27, 2010 with comments due May 27, 2010
- Announcement discusses eliminating probe-start lamps

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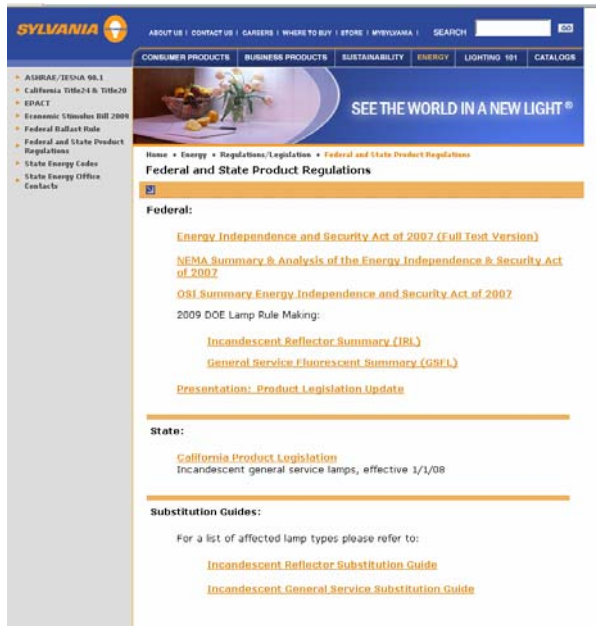

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