



Bringing Efficiency to LightSM

Final SSL V4.4 Field Adjustable Light Distribution Policy

April 10, 2019

Webinar Logistics

- Slides and recorded webinar will be posted to www.designlights.org after presentation
- All attendees on mute; Please use GoToWebinar Interface (Question pane) to submit questions as we go
- Live Q&A Session at the end
- If you experience any technical issues, use Chat feature to let us know

Agenda

- Introduction (Gabe Arnold)
- Policy Overview (Greg Barker)
- Application Examples (Dave Ryan)
- Considerations for Aimable Products (Dave Ryan)
- Updating Current Listings (Dave Ryan)
- Open Q+A (Bernadette Boudreaux moderating)

Field-Adjustable Light Distribution

- New policy to allow products with field-adjustable optics or distribution
- Beneficial new product feature
 - Economies of scale for supply chain
 - More flexibility for customers and installers
- Increasing number of products available with this feature





Definition:

Lamps, luminaires, or retrofit kits whose light distribution can be altered from the default factory "as-shipped" configuration.



field rotatable lens



Policy Development Considerations

Two approaches were considered:

Require Products to meet DLC requirements at one adjustment setting

- Simpler to understand and administer
- Less testing required
- Higher potential for gaming

Require Products to meet DLC requirements at all adjustment settings

- Significantly more complex
- More testing required
- Reduced potential for gaming

Commenters near unanimous in support for this approach



Poll

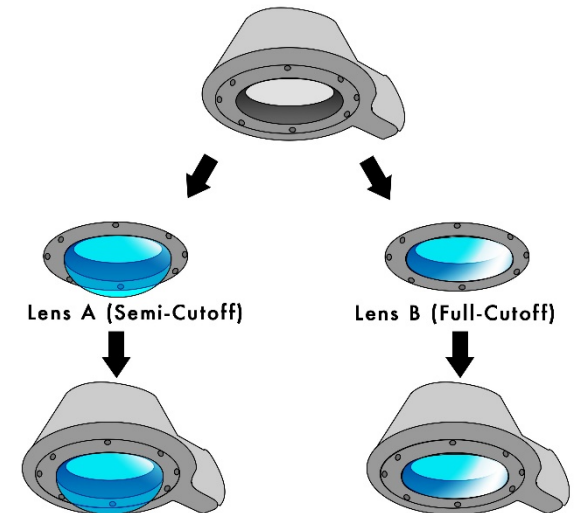
- Do you have or do you intend to submit Field-Adjustable Light Distribution Products to be listed by DLC?

*Responses will remain confidential; won't be shared

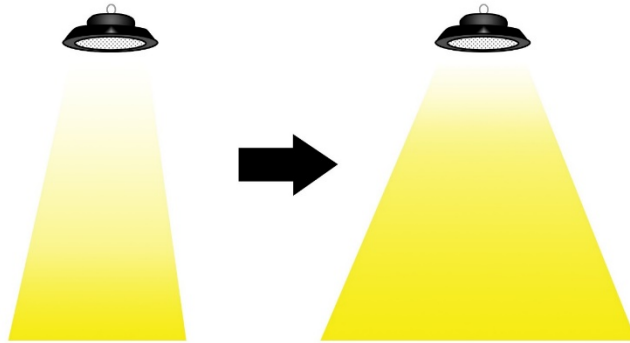
Policy Overview

2 Types of FALD Products

- **Integral FALD Products:** distribution can be adjusted by electrical or mechanical means without the addition, removal, or replacement of any parts or accessories.
 - rotatable light bars
 - Lenses that move relative to the LED primaries
 - LED primaries that turn on or off to change beam spread
- **Standard Component FALD Products** –distribution is adjusted by adding or removing parts that are included with the product as sold under a single model number.
 - luminaire shipped standard with three reflectors under a single model number, (installer chooses one of the reflectors at installation and discards other two)
 - Optional Components that do not come standard with every order are not FALD, must be applied for and listed separately!



FALD Eligibility



- FALD Products must meet **Zonal Lumen Distribution (ZLD)** requirements for their Primary Use Designation (PUD) at *one light distribution setting*
- FALD Products must meet *all other* DLC Technical Requirements for their Category and PUD **across the full range of the product's light distribution integral settings and standard components**
 - Efficacy, Light Output, CCT, CRI, Power Quality, Thermal condition
 - Surveillance testing may be performed at any FALD setting or standard component combination
- **Premium** FALD products must meet all DLC Premium classification requirements across the range of settings and components

FALD Testing Requirements

- Family Testing rules apply
- Testing conducted in the FALD settings that result in the worst-case performance value:



Technical Requirement Category	Light Characteristics	Electric Characteristics	Thermal Characteristics
Technical Requirements	Efficacy, Wattage, Lumen Output	Power Factor, Total Harmonic Distortion	LED Thermal, Driver Thermal
Test Reports Required	1 – 3 LM-79s	0 – 1 electrical bench tests	1 – 2 ISTMTs
Notes		0 if included in LM-79s	2 only for DLC Premium

FALD Policy Table is on DLC's website

Located from menus:

- Solid State Lighting
 - Policy Development
 - ✓ FALD

The screenshot shows the DLC website page for FALD products. The URL is <https://www.designlights.org/solid-state-lighting/testing-reporting-requirements/field-adjustable-light-distribution-products/>. The page features a navigation bar with links for 'About Us', 'Contact Us', 'Sign In / Create an Account', and a main menu with categories like 'Solid State Lighting', 'Horticultural Lighting', 'Lighting Controls', 'Current Efforts', 'News and Events', and 'Res'. A sidebar on the left contains a tree view under 'Field-Adjustable Light Distribution Products', with 'Policy Development' and 'Solid State Lighting FAQs' highlighted. The main content area includes a disclaimer about optional components, a paragraph on testing requirements, and a paragraph defining products with adjustable light output. Below this is a table with six columns: FALD TYPE, INTEGRAL FALD PRODUCTS, STANDARD COMPONENT FALD PRODUCTS, PRODUCTS w/ OPTIONAL DISTRIBUTION-ALTERING COMPONENTS, PRODUCTS w/ BOTH INTEGRAL & STANDARD COMPONENT FALD, and FALD PRODUCTS THAT MAY ALSO BE ORDERED WITH DISTRIBUTION-ALTERING OPTIONAL COMPONENTS. The table's first row is the header, and the second row provides definitions for each type.

FALD TYPE	INTEGRAL FALD PRODUCTS	STANDARD COMPONENT FALD PRODUCTS	PRODUCTS w/ OPTIONAL DISTRIBUTION-ALTERING COMPONENTS	PRODUCTS w/ BOTH INTEGRAL & STANDARD COMPONENT FALD	FALD PRODUCTS THAT MAY ALSO BE ORDERED WITH DISTRIBUTION-ALTERING OPTIONAL COMPONENTS
DEFINITION	Products where the distribution can be altered by means integral to the product, electrical or mechanical	Products where the distribution is altered by adding or removing parts that are included with every product order under a single model number	Products where the distribution is altered by adding or removing optional parts not included with every product order	Products where the distribution is altered by both integral means and by means of standard components included under a single model number	Products with integral distribution adjustment, distribution-altering standard components, or both, but also available with optional parts that alter light distribution



FALD Application Documentation

- **Instructions** for adjusting light distribution, including any required device or software
- Description of the adjustable setting position and/or the Standard Component combination used for each worst-case test submitted, with written justification for why each test represents a worst case
- Multiple .ies files may be submitted with one family application. Applicants must document which **.ies file** corresponds to each family member:

Please provide correlation information for each product on your application. You must list for each product: an IES file which represents a relative distribution that the product can achieve, along with the a name for the setting that results in that relative distribution.

Please ensure that the first four columns below match the entries in the application form for the given Product Model Number listed below.

Note: please add additional rows as needed, dependent on the number of products in the application.

Product Model Number	General Application	Primary Use Designation	Adjustable Distribution Setting	Representative IES File
Ex. ABC-123	High Bay	High-Bay Luminaire for Commercial and Industrial Buildings	Beam 2	ABC-123_setting2.ies

FALD Listing

- Product Performance characteristics will be listed at the light distribution setting that produces the worst-case efficacy
- **Max Tested Wattage** field will display power at highest consumption setting
- New QPL field **Adjustable Distribution Setting** will display the Applicant-submitted description of the Integral FALD setting or Standard Component configuration designated as ZLD-compliant
- **Product Features** tab on the SSL Qualified Products List (QPL) will display **FALD Type**

The screenshot shows a product listing interface. A blue callout box highlights 'New fields added:' with a bullet point: 'Adjustable Distribution Setting – for FALD products to document the light distribution setting at which the products are tested and reported.' A grey callout box points to the 'Field-Adjustable: Light Distribution' field, stating: 'This “product feature” will be identified here for **Integral FALD** products, **Standard Component FALD** products, or **Integral and Standard Component FALD** products.'

Model# [Redacted]

Manufacturer: [Redacted]
Brand: [Redacted]
Technical Requirements Version: 4.3
Date Qualified: 05/14/2018
Product ID: [Redacted]

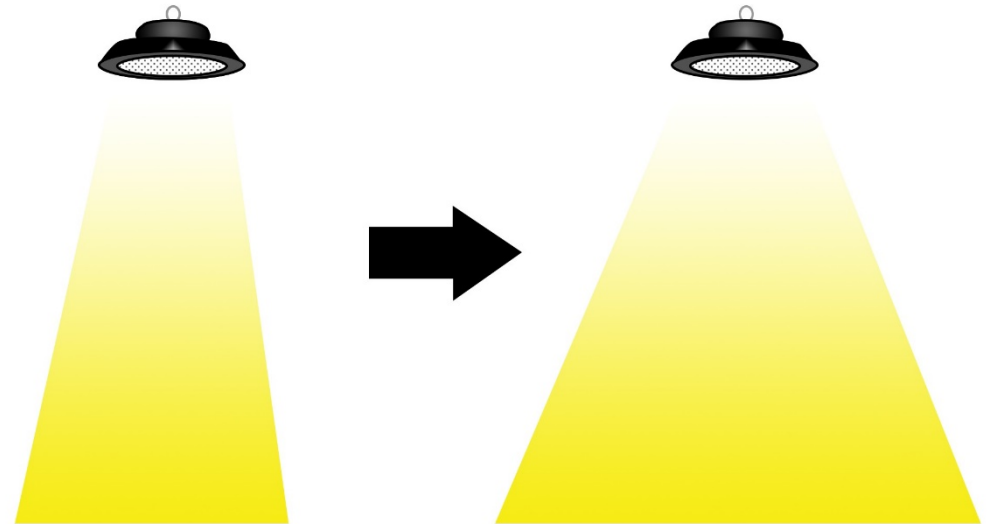
Classification: standard [View Notes](#)
Is Parent Product: No
DLC Family Code: KKKZXT
Listing Status: Listed

Reported Data	Zonal Lumens	Spacing Criteria
Dimming Status: Continuous Below 10		
Integral Controls: Has Integral Controls		
Field-Adjustable: Light Distribution		

Application Examples

Scenario 1: Integral FALD, 2 PUD

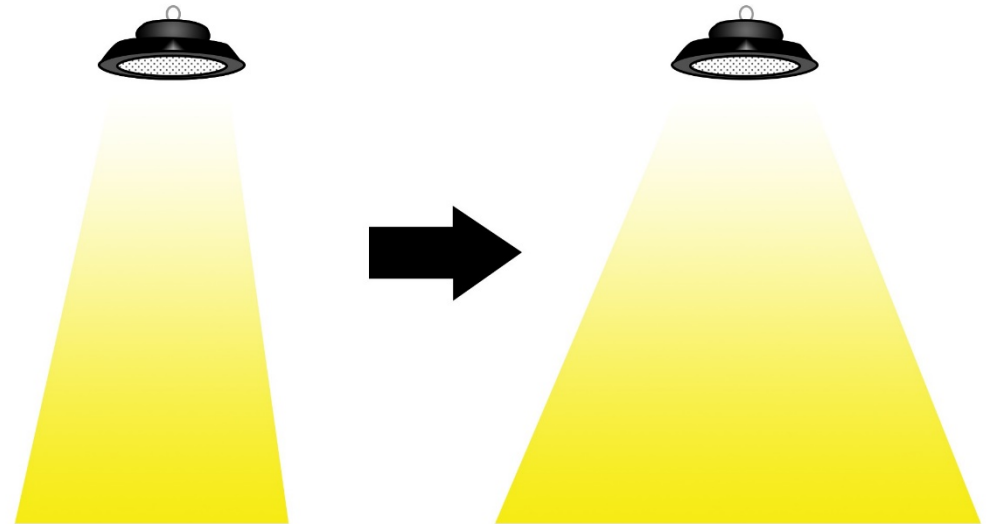
- Luminaire, intended for general high-bay AND high-bay aisle applications
- Controls which alter beam spread based on setting
- Manufacturer desires to list in **both** applicable PUDs



Model, Setting	Light Output (lm)	Wattage (W)	Efficacy (lm/W)
ABC-123, Beam 1	12,000	100	120
ABC-123, Beam 2	12,100	100	121


Scenario 1: Integral FALD, 2 PUD

- LM-79 on worst-case light output, efficacy (Beam 1)
- ISTMT on worst-case thermals (Beam 1)
- IES files for both settings
 - Correlation document IES-file-to-PUD
- Contingencies
 - Power quality, any setting
 - Color properties, any setting
 - If one beam meets ZLD for both PUD, only 1 IES file required



Model, Setting	Light Output (lm)	Efficacy (lm/W)
ABC-123, Beam 1	12,000	120
ABC-123, Beam 2	12,100	121

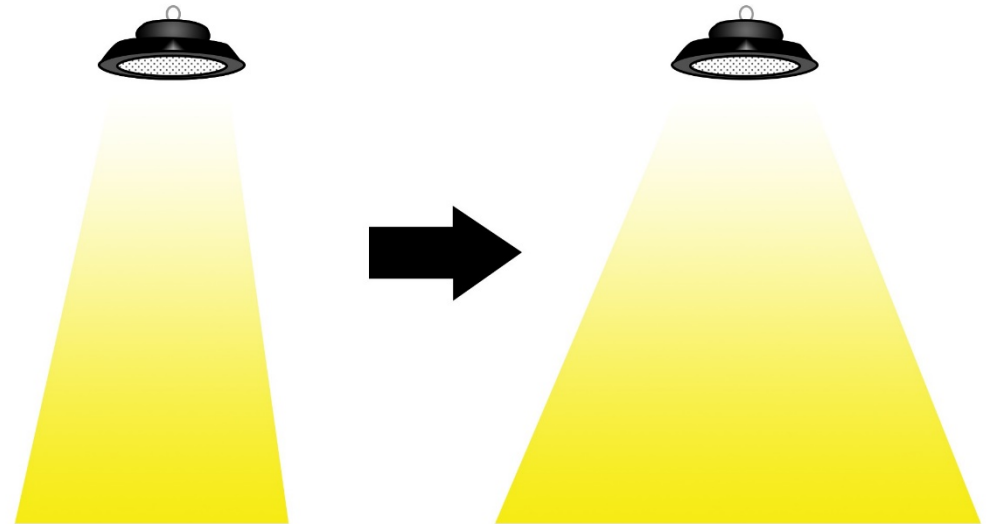
Scenario 1: Application Form

	A	B	G	H	I	K	AG	AH	AI	AN	
1				Instructions: The table below MUST be filled out with scaled performance information for each product submitted for qualification.							
2											
3											
	General Application	Primary/Speciality Use Designation	Model Number	Scaled Light Output (lumens)	Scaled Efficacy (AC) (lm/w) <i>AC products only</i>	Scaled Input power (W)	Is this a Field-Adjustable Light Distribution product? (Yes/No)	Field Adjustable Distribution Type <i>Field Adjustable Light Distribution Products only</i>	Adjustable Distribution Setting <i>Field Adjustable Light Distribution Products only</i>	Max. Wattage <i>White Tunable and Field Adjustable Light Distribution Products only</i>	
77											
78	High-Bay	High-Bay Luminaires for Commercial and Industrial Buildings	ABC-123	12000	120	100	Yes	Integral FALD	Beam 2	100	
79	High-Bay	High-Bay Aisle Luminaires	ABC-123	12000	120	100	Yes	Integral FALD	Beam 1	100	
sn											

- All performance values consistent with worst-case efficacy test condition, therefore *listings for both PUDs are the same*
- “Adjustable distribution setting” column notes the setting where IES file shows compliance with PUD ZLD requirements
- Max wattage column needs to be completed

Scenario 2: Integral FALD, 1 PUD

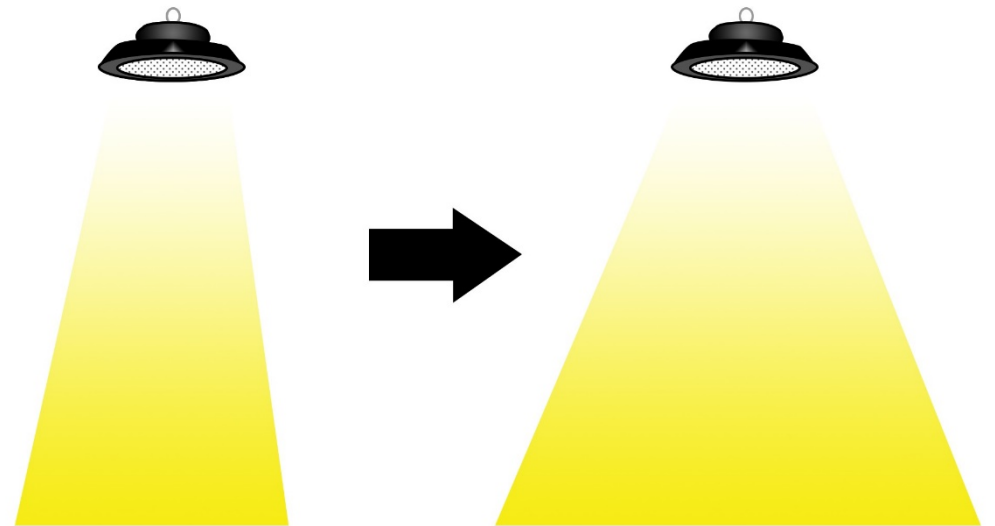
- Luminaire intended for general high-bay AND high-bay aisle applications
- Controls which alter beam spread based on setting
- Manufacturer desires to list in **only** in high-bay luminaire PUD (and not in high-bay aisle)



Model, Setting	Light Output (lm)	Wattage (W)	Efficacy (lm/W)
ABC-123, Beam 1	12,000	100	120
ABC-123, Beam 2	12,100	100	121


Scenario 2: Integral FALD, 1 PUD

- LM-79 on worst-case light output, efficacy (Beam 1; "aisle" setting)
- ISTMT on worst-case thermals (Beam 1; "aisle" setting)
- IES files for High-Bay (non-aisle) settings (Beam 2)
 - Correlation document *IES-file-to-PUD*
- Contingencies
 - Power quality, any setting
 - Color properties, any setting
 - If one beam meets ZLD for both PUD, either IES file sufficient



Model, Setting	Light Output (lm)	Efficacy (lm/W)
ABC-123, Beam 1	12,000	120
ABC-123, Beam 2	12,100	121

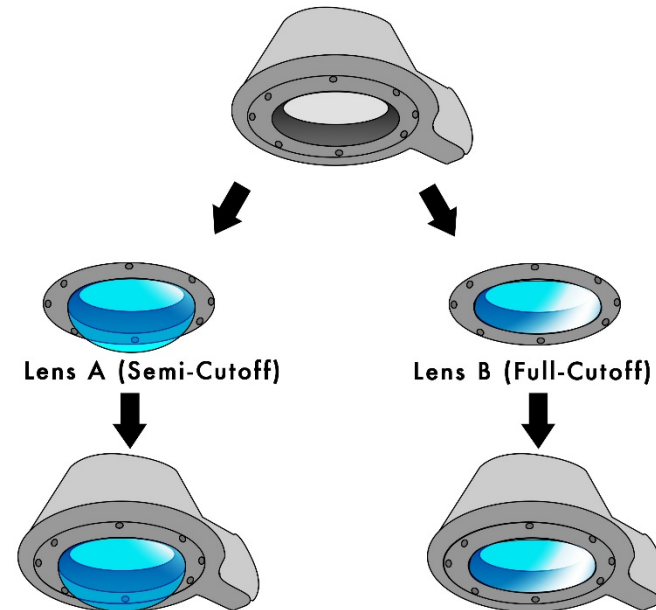
Scenario 2: Application Form

A	B	G	H	I	K	AG	AH	AI	AN
			Instructions: The table below MUST be filled out with scaled performance information for each product submitted for qualification.						
General Application	Primary/Speciality Use Designation	Model Number	Scaled Light Output (lumens)	Scaled Efficacy (AC) (lm/w) <i>AC products only</i>	Scaled Input power (W)	Is this a Field-Adjustable Light Distribution product? (Yes/No)	Field Adjustable Distribution Type <i>Field Adjustable Light Distribution Products only</i>	Adjustable Distribution Setting <i>Field Adjustable Light Distribution Products only</i>	Max. Wattage <i>White Tunable and Field Adjustable Light Distribution Products only</i>
High-Bay	High-Bay Luminaires for Commercial and Industrial Buildings	ABC-123	12000	120	100	Yes	Integral FALD	Beam 2	100

- All performance values consistent with worst-case efficacy test condition, therefore *listings is at Beam 1 conditions, even though product is applying for a PUD intended for use with Beam 2.*
- “Adjustable distribution setting” column notes the setting where IES file shows compliance with PUD ZLD requirements
- Max wattage column needs to be completed

Scenario 3: Standard Component, 2 PUD

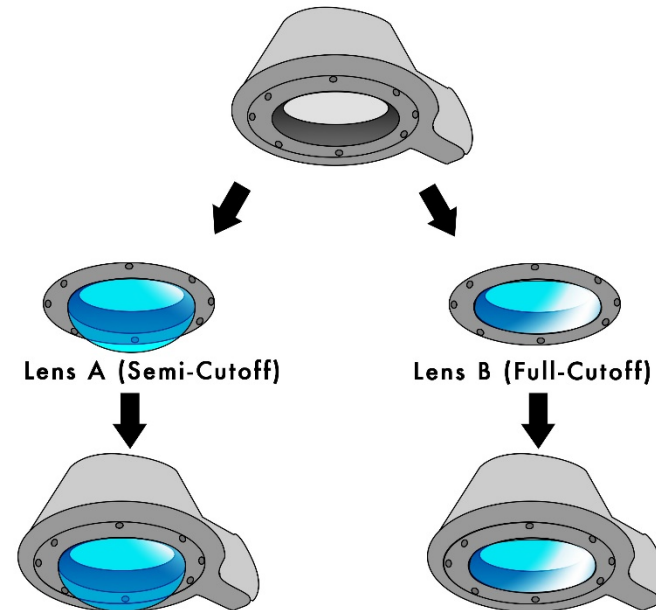
- Luminaire intended for semi-cutoff AND full-cutoff outdoor area lighting applications
- Lens options included in single ordering code, can be switched in the field at or after installation.
- Manufacturer desires to list in **both** applicable PUDs



Model, Setting	Light Output (lm)	Wattage (W)	Efficacy (lm/W)
ABC-123, Lens A	3,125 (3000, 0-90°)	25	125 (120, 0-90°)
ABC-123, Lens B	2,678	25.5	105


Scenario 3: Standard Component, 2 PUD

- LM-79 on worst-case light output, efficacy (Lens B)
- ISTMT on worst-case thermals (Lens B)
- IES files for both lenses
 - Correlation document IES-file-to-PUD
- Contingencies
 - Power quality, either lens
 - Color properties, either lens



Model, Setting	Light Output (lm)	Efficacy (lm/W)
ABC-123, Lens A	(3000, 0-90°)	(120, 0-90°)
ABC-123, Lens B	2,678	105

Scenario 3: Standard Component, 2 PUD

			Instructions: The table below MUST be filled out with scaled performance information for each product submitted for qualification.							
General Application	Primary/Speciality Use Designation	Model Number	Scaled Light Output (lumens)	Scaled Efficacy (AC) (lm/w) <i>AC products only</i>	Scaled Input power (W)	Is this a Field-Adjustable Light Distribution product? (Yes/No)	Field Adjustable Distribution Type <i>Field Adjustable Light Distribution Products only</i>	Adjustable Distribution Setting <i>Field Adjustable Light Distribution Products only</i>	Max. Wattage <i>White Tunable and Field Adjustable Light Distribution Products only</i>	
Low Output	Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires	ABC-123	2700	105	25	Yes	Standard Component FALD	Lens A	25	
Low Output	Outdoor Full-Cutoff Wall-Mounted Area Luminaires	ABC-123	2700	105	25	Yes	Standard Component FALD	Lens B	25	

- All performance values consistent with worst-case efficacy test condition, therefore *listings for both PUDs are the same.*
- “Adjustable distribution setting” column notes the setting where IES file shows compliance with PUD ZLD requirements
- Max wattage column needs to be completed

Example Scenarios

- <https://www.designlights.org/solid-state-lighting/testing-reporting-requirements/field-adjustable-light-distribution-products/>

Downloads	
Integral FALD with Field-Adjustable Light Output & Color Tuning listed in 1 Primary Use and General Application - Explanation	Download
Integral FALD with Field-Adjustable Light Output & Color Tuning listed in 1 Primary Use and General Application - Sample Application	Download
Integral FALD with Field-Adjustable Light Output listed in 1 Primary Use and General Application - Explanation	Download
Integral FALD with Field-Adjustable Light Output listed in 1 Primary Use and General Application - Sample Application	Download
Integral FALD listed in 1 Primary Use and General Application - Explanation	Download
Integral FALD listed in 1 Primary Use and General Application - Sample Application	Download
Integral FALD listed in 2 Primary Uses - Explanation	Download
Integral FALD listed in 2 Primary Uses - Sample Application	Download
Standard Component FALD listed in 1 Primary Use - Explanation	Download
Standard Component FALD listed in 1 Primary Use - Sample Application	Download
Standard Component FALD listed in 2 Primary Uses - Explanation	Download
Standard Component FALD listed in 2 Primary Uses - Sample Application	Download

Aimable Product Considerations

Aimable Products

- Products with a static beam, but aimable head or aperture now fall under the FALD policy.
- Goal is increased consistency in how products are listed, without adding additional burden.
 - For historically eligible products, testing requirements and technical review are unchanged
- Technical justification for tested setting should note aimability of product.
- Adjustable distribution setting column should note IES file orientation



Updating Current Listings

Updating Existing Products

- Certain types of historically eligible products (e.g. aimable) now fall under the FALD policy.
- Products on the QPL are not *required* to be updated to FALD
 - Products updating for other purposes and choosing not to update to FALD will be noted in Notes field
- Products on the QPL *may* update, if desired
 - Administrative updating fees, per size of group
 - Any update of a product previously represented as not field adjustable requires new testing; normal family grouping review fees would apply



Number of Products in Update Family Group	Fee to Update Family
1-10	\$260.00
11-100	\$365.00
101-500	\$445.00
501-1000	\$520.00
1001-2500	\$625.00
2501+	\$675.00

Q&A