

LUXEON

Application Design Guide v2.6

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LUXEON Application Design Guide

Introduction

- This Application Design Guide is intended to simplify your LED selection by application.
- Of course, depending on your specific design requirements, many other LED choices are available from Lumileds.

For more information about Lumileds products, please visit: <http://www.lumileds.com>

Lumileds Creates Value Through...

- Most Comprehensive LED Product Portfolio
- Leaders in Performance
- Proven Reliability and Quality of Light

Illumination Product Portfolio

★ New in 2015 or Coming Soon

High-Power



Mid-Power & Low-Power



Multi Die and Arrays



Color



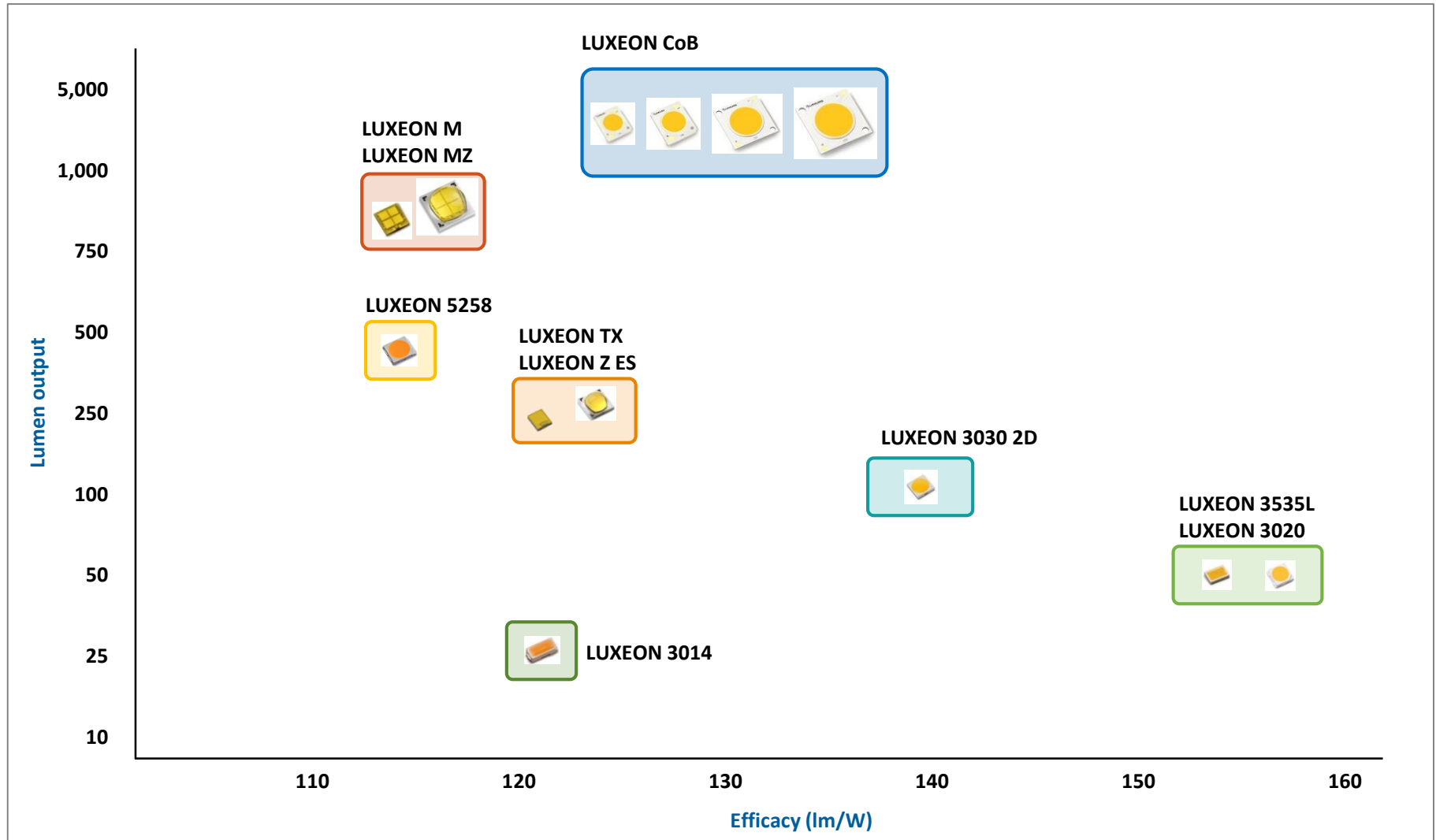
UV



Matrix Platform



Most Comprehensive Portfolio & Leaders in Performance



* Based on 4000K 80CRI

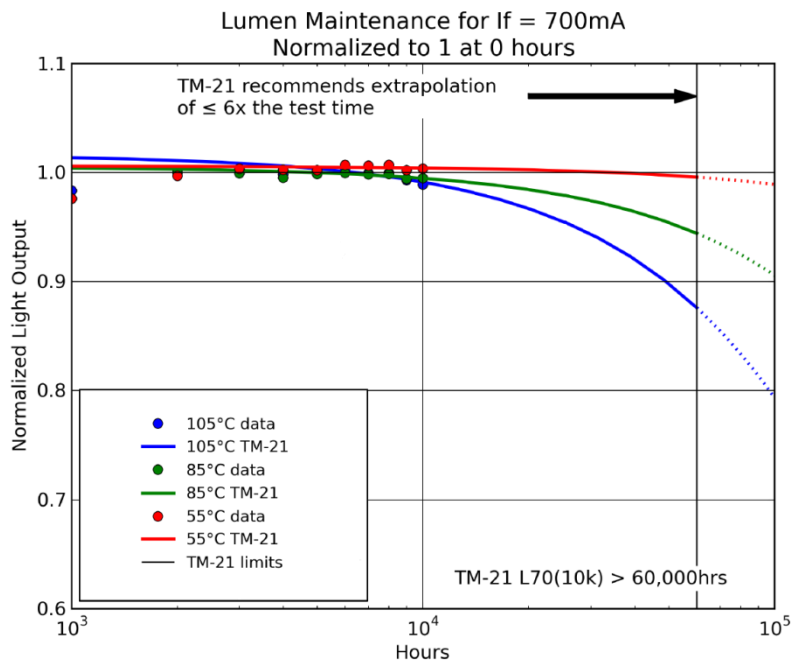
Proven Reliability and Quality of Light



Reliability

Example:

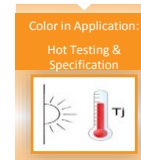
LUXEON LM-80 Test Graph showing Lumen maintenance projection exceeds 60,000 hours



Quality of Light



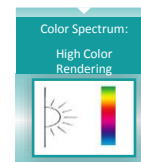
- First to provide “Freedom from Binning” with 3 step color consistency at 85°C



- First to provide “hot tested” performance. CCT and CRI specified at 85°C



- Color stability exceeding ENERGY STAR and DLC requirements based on LM-80 methodology



- LUXEON products achieve a high CRI of 95 with excellent red rendering, R9



- LUXEON products achieve superior color uniformity across the beam

General Applications	Architectural	Downlights	High Bay / Low Bay	Indoor Area	Lamps	Outdoor	Spotlights	Specialty
Specific Applications in the App Design Guide () = application ID	(1) Architectural & Entertainment	(2) Downlights	(3) High Bay & Low Bay	(4) Troffers (5) TLED	(6) A19 & BR (7) GU10 & MR16 (8) Candle (9) PAR (10) Color	(11) Bollards, WallPack, PathWay & Flood (12) RoadWay, Street, Tunnel & Undercanopy (13) High Mast & Sports	(14) Spotlights	(15) Residential Ceiling Lights
Chip on Board LEDs								
LUXEON S2S8					(7) Val, (8) Val, (9) Std			
LUXEON CoB Core Range		(2) Performance	(3) Standard		(9) Std	(11) Std, (12) Std	(14) Standard	
LUXEON CoB with CrispWhite Technology		(2) Performance			(9) Std		(14) Standard	
LUXEON CoB Compact Range					(7) Perf			
Color LEDs								
LUXEON 3535L Colors	(1) Value				(10) Val			(15) Performance
LUXEON C Colors	(1) Standard				(10) Std			
LUXEON Rebel Colors	(1) Standard				(10) Std			
LUXEON Z Colors	(1) Performance				(11) Perf			
High Power LEDs								
LUXEON FCW								
LUXEON M			(3) Performance		(6) Perf, (9) Perf	(11) Perf, (12) Perf	(14) Performance	
LUXEON MZ			(3) Performance		(6) Perf, (9) Perf	(11) Perf, (12) Perf	(14) Performance	
LUXEON Q								
LUXEON R								
LUXEON Rebel								
LUXEON Rebel ES								
LUXEON Rebel PLUS								
LUXEON T								
LUXEON TX			(3) Performance		(6) Perf, (9) Perf	(11) Perf, (12) Perf	(14) Performance	
LUXEON Z								
LUXEON Z ES					(6) Perf, (8) Perf, (9) Perf	(11) Perf, (12) Perf	(14) Performance	
Level 2 Solutions								
LUXEON K								
LUXEON S								
LUXEON XF-3535L		(2) Val, Std		(4) Std, Val, Perf				
LUXEON XR-3535L				(4) Std, Perf				
Mid Power LEDs								
LUXEON 2016								
LUXEON 2016 2D								
LUXEON 3014		(2) Value		(4) Std, (5) Value				(15) Standard
LUXEON 3020		(2) Standard		(4) Std, (5) Std	(6) Val			(15) Standard
LUXEON 3030 2D		(2) Value	(3) Value	(4) Val	(6) St, (7) St, (8) St, (9) Va	(11) Val, (12) Val	(14) Value	(15) Value
LUXEON 3535 2D								
LUXEON 3535 HV (Replace with 3030 HV)					(6) Va, (7) St, (8) St, (9) Va			
LUXEON 3535L		(2) Standard	(3) Value	(4) Perf, (5) Perf	(6) Std	(11) Val, (12) Val	(14) Value	(15) Performance
LUXEON 4014								
UV LEDs								
LUXEON FlipChip UV								
LUXEON Z UV								

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Architectural & Entertainment Lighting Design Approach

Value	Standard	Performance
 - Cost effective - Standard 3535 Package - Low lumen designs	 - High efficacy - Full color palette - Perfect color mixing with LUXEON C	 - High color density - Precise optical control - Broad gamut
Recommended LEDs		
 LUXEON 3535L Colors	 LUXEON C Colors  LUXEON Rebel Colors	 LUXEON Z Colors
Beam Control		
Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Diffuser / Lens
Color Portfolio		
		
Package Size		
0 3 6 9 12 15  mm²	0 3 6 9 12 15  mm²	0 3 6 9 12 15  mm²

Downlights Design Approach

Value	Standard	Performance
 Edge/Direct Lit Designs - High lumen/\$ - Slim designs	 Direct Lit Designs - High efficacy - Diffuse lighting	 Reflector Designs - Single shadow beam - Optimized spectrums
Recommended LEDs		
 LUXEON 3030 2D  LUXEON 3014  LUXEON XF-3535L	 LUXEON 3535L HE  LUXEON 3020  LUXEON XF/XR (Built-to-Spec)	 LUXEON CoB Core Range - CrispWhite available - Ambiance available
Beam Control		
Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser	Wide Medium Narrow  Reflector
Typical Flux per LED*		
0 100 250 500 1K 5K  Lumens	0 100 250 500 1K 5K  Lumens	0 100 250 500 1K 5K  Lumens
System Flux*		
0 1K 2K 3K 4K 5K  Lumens	0 1K 2K 3K 4K 5K  Lumens	0 1K 2K 3K 4K 5K  Lumens

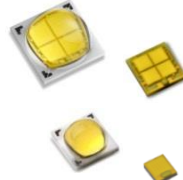
High Bay & Low Bay Design Approach

Value	Standard	Performance
 - High efficacy - Excellent uniformity	 - Ease to design - Uniform beams	 - High luminous intensity - Precise optical control
Recommended LEDs		
 LUXEON 3535L HE  LUXEON 3030 2D	 LUXEON CoB Core Range	 LUXEON M  LUXEON MZ  LUXEON TX
Beam Control		
Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Reflector / Lens	Wide Medium Narrow  Lens
Typical Flux per LED*		
0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens
System Flux*		
0 10K 20K 30K 40K 50K  Lumens	0 10K 20K 30K 40K 50K  Lumens	0 10K 20K 30K 40K 50K  Lumens

Troffers Design Approach		
Value	Standard	Performance
 Edge Lit, Indirect Lit & Reflector Designs - High lumen/\$ - Low LED count	 Direct Lit Designs - Good/High efficacy - Excellent uniformity	 Direct Lit Designs - Highest efficacy - Excellent uniformity
Recommended LEDs		
 LUXEON 3030 2D LUXEON XF-3535L	 LUXEON 3020 LUXEON 3014 LUXEON XF/XR-3535L	 LUXEON 3535L HE LUXEON XF/XR (Built-to-Spec)
Beam Control		
Wide Medium Narrow  Diffuser / Reflector / Lenses	Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser
Typical Flux per LED*		
0 20 40 60 80 100  Lumens	0 20 40 60 80 100  Lumens	0 20 40 60 80 100  Lumens
System Efficacy*		
75 90 105 120 135 150  Lumens / Watt	75 90 105 120 135 150  Lumens / Watt	75 90 105 120 135 150  Lumens / Watt

TLED Design Approach		
Value	Standard	Performance
 - Cost effective - Excellent uniformity	 - High efficacy - Good uniformity	 - Highest efficacy - Good uniformity
Recommended LEDs		
 LUXEON 3014	 LUXEON 3020	 LUXEON 3535L HE
Beam Control		
Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser
Typical Flux per LED*		
0 20 40 60 80 100  Lumens	0 20 40 60 80 100  Lumens	0 20 40 60 80 100  Lumens
System Efficacy*		
75 90 105 120 135 150  Lumens / Watt	75 90 105 120 135 150  Lumens / Watt	75 90 105 120 135 150  Lumens / Watt

A19 & BR Lamps Design Approach

Value	Standard	Performance
 Up to 60W Equivalent - Low BoM - Reduced driver size (HV)	 Up to 75W Equivalent - High flux density (2D) - High efficacy (HE)	 100W Equivalent - High efficacy - High uniformity
Recommended LEDs		
 LUXEON 3020 LUXEON 3535 HV	 LUXEON 3030 2D LUXEON 3535L HE	 LUXEON M LUXEON MZ LUXEON TX LUXEON Z ES
Beam Control		
Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser
Typical Flux per LED*		
0 50 100 200 500 1K  Lumens	0 50 100 200 500 1K  Lumens	0 50 100 200 500 1K  Lumens
System Flux*		
0 250 500 750 1K 2K  Lumens	0 250 500 750 1K 2K  Lumens	0 250 500 750 1K 2K  Lumens

GU10 & MR16 Lamps Design Approach

Value	Standard	Performance
 Up to 35W Equivalent - Highest lumen/\$ - Reduced driver size - Single shadow beam	 Up to 50W Equivalent - Design flexibility - CCT tuning option - Showerhead	 50W Equivalent - Highest efficacy - Highest quality of light - Single shadow beam
Recommended LEDs		
 LUXEON 5258 - 24V & 96V available	 LUXEON 3030 2D  LUXEON 3535 HV	 LUXEON CoB Compact Range - CrispWhite available
Beam Control		
Wide Medium Narrow  Reflector / Lens	Wide Medium Narrow  Lens	Wide Medium Narrow  Reflector / Lens
Typical Flux per LED*		
0 50 100 200 500 1K  Lumens	0 50 100 200 500 1K  Lumens	0 50 100 200 500 1K  Lumens
System Flux*		
0 200 400 600 800 1K  Lumens	0 200 400 600 800 1K  Lumens	0 200 400 600 800 1K  Lumens

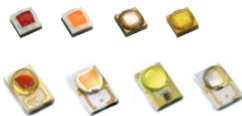
Candle Lamps Design Approach

Value	Standard	Performance
 Single LED Design - Highest lumen/\$ - Reduced driver size	 Multi-LED Design - CCT tuning option - Smaller drivers (HV)	 Single / Multi-LED Design - High luminous density - Design flexibility
Recommended LEDs		
 LUXEON 5258 - 24V & 96V available	 LUXEON 3030 2D LUXEON 3535 HV	 LUXEON Z ES
Beam Control		
Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Diffuser / Lens
Typical Flux per LED*		
0 50 100 200 500 1K  Lumens	0 50 100 200 500 1K  Lumens	0 50 100 200 500 1K  Lumens
System Flux*		
0 200 400 600 800 1K  Lumens	0 200 400 600 800 1K  Lumens	0 200 400 600 800 1K  Lumens

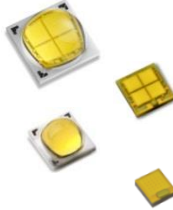
PAR Directional Lamps Design Approach

Value	Standard	Performance
 Multi-LED Design - Highest lumen/\$ - CCT tuning option	 Single LED Design - Highest quality of light - Single shadow beam	 Single / Multi-LED Design - High flux intensity - Precise optical control
Recommended LEDs		
 LUXEON 3030 2D  LUXEON 3535 HV	 LUXEON CoB - CrispWhite available  LUXEON 5258 - 48V and 96V available	 LUXEON M LUXEON MZ  LUXEON TX LUXEON Z ES
Beam Control		
Wide Medium Narrow  Lens	Wide Medium Narrow  Reflector / Lens	Wide Medium Narrow  Lens
Typical Flux per LED*		
0 100 250 500 1K 5K  Lumens	0 100 250 500 1K 5K  Lumens	0 100 250 500 1K 5K  Lumens
System Flux*		
0 250 500 750 1K 2K  Lumens	0 250 500 750 1K 2K  Lumens	0 250 500 750 1K 2K  Lumens

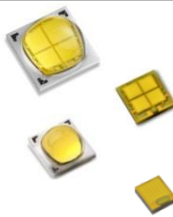
Color Lamps Design Approach

Value	Standard	Performance
 - Cost effective - Standard 3535 package	 - High efficacy - Full color palette - Perfect color mixing with LUXEON C	 - High color density - Precise optical control - Broad gamut
Recommended LEDs		
 LUXEON 3535L Colors	 LUXEON C Colors LUXEON Rebel Colors	 LUXEON Z Colors
Beam Control		
Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Diffuser / Lens
Color Portfolio		
		
Package Size		
0 3 6 9 12 15  mm²	0 3 6 9 12 15  mm²	0 3 6 9 12 15  mm²

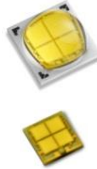
Outdoor Area Design Approach (Bollards, Wall Pack, Pathway, Flood)

Value	Standard	Performance
 Multi-LED Design - Cost effective - High efficacy	 Single / Multi-LED Design - Ease of design - Ease of assembly	 Single / Multi-LED Design - Design flexibility - Precise optical control
Recommended LEDs		
 LUXEON 3535L HE LUXEON 3030 2D	 LUXEON CoB Core Range	 LUXEON M LUXEON MZ LUXEON TX LUXEON Z ES
Beam Control		
Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Reflector / Lens	Wide Medium Narrow  Lens
Typical Flux per LED*		
0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens
System Flux*		
0 10K 15K 20K 25K 30K  Lumens	0 10K 15K 20K 25K 30K  Lumens	0 10K 15K 20K 25K 30K  Lumens

Roadway, Street, Tunnel, Under Canopy Lighting Design Approach

Value	Standard	Performance
 Multi-LED Design - Cost effective - High efficacy	 Single / Multi-LED Design - Ease of design - Ease of assembly	 Multi-LED Design - Design flexibility - Precise optical control
Recommended LEDs		
 LUXEON 3535L HE LUXEON 3030 2D	 LUXEON CoB Core Range	 LUXEON M LUXEON MZ LUXEON TX LUXEON Z ES
Beam Control		
Wide Medium Narrow  Diffuser / Lens	Wide Medium Narrow  Reflector / Lens	Wide Medium Narrow  Lens
Typical Flux per LED*		
0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens
System Flux*		
0 10K 15K 20K 25K +30K  Lumens	0 10K 15K 20K 25K +30K  Lumens	0 10K 15K 20K 25K +30K  Lumens

High Mast & Sports Lighting Design Approach

Value	Standard	Performance
 Multi-LED Design - Ease of design - Ease of assembly	 Multi-LED Design - High efficacy - Precise optical control	 Multi-LED Design - High lumen density - Precise optical control
Recommended LEDs		
 LUXEON CoB Core Range	 LUXEON TX LUXEON Z ES	 LUXEON M LUXEON MZ
Beam Control		
Wide Medium Narrow  Reflector / Lens	Wide Medium Narrow  Lens	Wide Medium Narrow  Lens
Typical Flux per LED*		
0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens	0 100 250 500 1K 15K  Lumens
System Flux*		
0 25K 50K 75K 100K +125K  Lumens	0 25K 50K 75K 100K +125K  Lumens	0 25K 50K 75K 100K +125K  Lumens

Spotlights Design Approach

Value	Standard	Performance
 - Cost effective - Flood lighting - Low lumen density	 - Variety of spectrums - Single shadow beam - Ease of design	 - High luminous intensity - Precise optical control - Design flexibility
Recommended LEDs		
 LUXEON 3030 2D  LUXEON 3535L HE	 LUXEON CoB Core Range - CrispWhite available - Ambiance available	 LUXEON M LUXEON MZ  LUXEON TX LUXEON Z ES
Beam Control		
Wide Medium Narrow  Lens	Wide Medium Narrow  Reflector / Lens	Wide Medium Narrow  Lens
Typical Flux per LED*		
0 100 250 500 1K 5K  Lumens	0 100 250 500 1K 5K  Lumens	0 100 250 500 1K 5K  Lumens
System Flux*		
0 1K 2K 3K 4K 5K  Lumens	0 1K 2K 3K 4K 5K  Lumens	0 1K 2K 3K 4K 5K  Lumens

Residential Ceilings Design Approach

Value	Standard	Performance
 - Cost effective	 - Good uniformity	 - Full color lighting - Dynamic lighting
Recommended LED		
 LUXEON 3030 2D	  LUXEON 3014 LUXEON 3020	    LUXEON 3535L Colors LUXEON 3535L HE
Beam Control		
Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser	Wide Medium Narrow  Diffuser
Typical Flux per LED*		
0 20 40 60 80 100  Lumens	0 20 40 60 80 100  Lumens	0 20 40 60 80 100  Lumens
System Flux*		
0 1K 2K 3K 4K 5K  Lumens	0 1K 2K 3K 4K 5K  Lumens	0 1K 2K 3K 4K 5K  Lumens



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