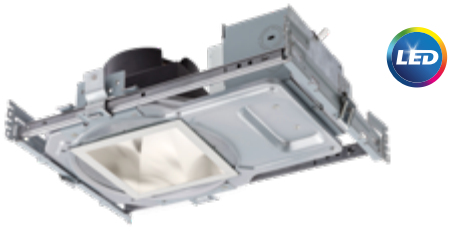
LIGHTOLIER
by signify

Downlighting

Calculite LED 4" gen 3

C4STW Square Tunable White



Calculite LED 4" generation 3 features industry leading visual comfort, excellent uniform illumination over time, and patented installation flexibility.

Project:
Location:
Cat.No:
Type:
Lamps: Qty:
Notes:

Complete luminaire = Frame + Engine + Trim + Accessories (optional)

Frame

example: C4SN

Series	Aperture	Installation	Voltage / Options
4	**S**		
4 4" Non-IC *	**S** Square	**N** New Construction **R** Remodeler	**—** Universal 120 V/277 V **LC** Chicago Plenum[2]
		A Airseal IC[1]	**—** Universal 120 V/277 V

Engine

example: C4L10865MDUTW

Series	Lumens	CRI	CCT	Beam	Dimming	Voltage	Options
C4L							**TW**
C4L Calculite LED 4"	**10** 1000 lm **12** 1200 lm[1]	**8** 80 CRI	**65** 6500-2700K	**M** Medium (56°)[4] **W** Wide (76°)	**D** Dali	**U** Universal 120 V/277 V/347 V	**TW** Tunable White
	12 1200 lm	**8** 80 CRI	**65** 6500-2700K	**M** Medium (56°) **W** Wide (76°)[4]	**P** Power over Ethernet	**E** Ethernet 48 V DC	**TW** Tunable White

Trim

example: C4SDLNMCCP

Series	Aperture	Style	Beam	Finish	Flange
C4	**S**				
C4 Calculite LED 4"	**S** Square	**DL** Downlight	**NM** Narrow & Medium **W** Wide	**CL** Specular clear **CC** Comfort clear **CD** Comfort clear diffuse	**–** White (matte) **P** Polished **F** Flangeless
		LW Lensed Wall Wash[4]	**–** blank	**WH** White (matte)	**–** White (matte) **F** Flangeless

Beam options

	Med engine	Wide engine
4" reflector	52° (0.8 s.c.)	72° (1.1 s.c.)

Mixing chambers

	Med engine	Wide engine
4" cone	0.8 s.c. (52°)	1.1 s.c. (72°)

Accessories

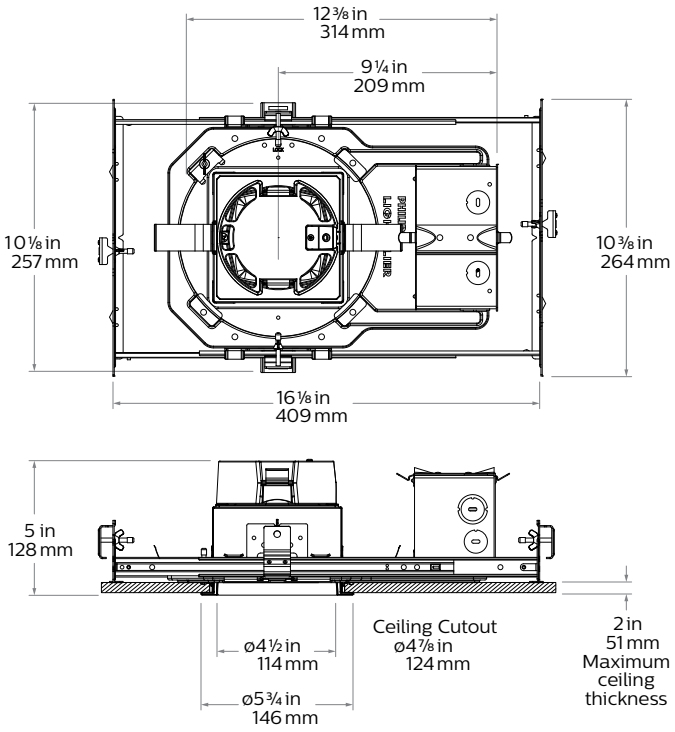
CA4SFT Mud-in ring for use with flangeless installations (ordered with a flangeless trim)

1. The 1200lm (12) Dali package is only compatible with the Airseal (4SA) frame.
2. Emergency (EM) and Chicago Plenum (LC) options are only available with New construction (N) installations. Emergency (EM) option not available for PoE.
3. Emergency (EM) frame comes with emergency battery pack and ceiling mountable test switch. Reflector mounted test switch requires above ceiling access. For reflector mounted test switch, order emergency frame and add "EM" suffix to reflector (example: C4SDLCCEM).
4. Medium (M) beam is ideal for Lensed Wall Wash (LW) applications.

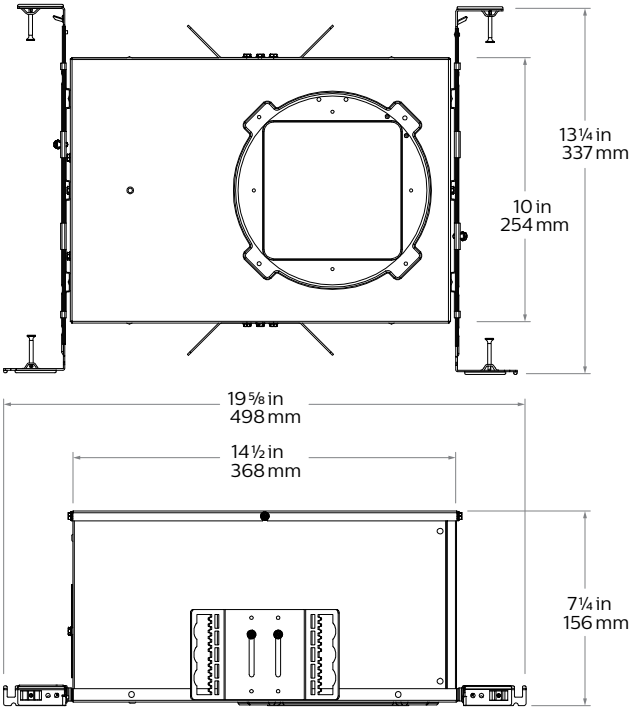
C4STW Calculite LED 4" gen 3

Square Tunable White

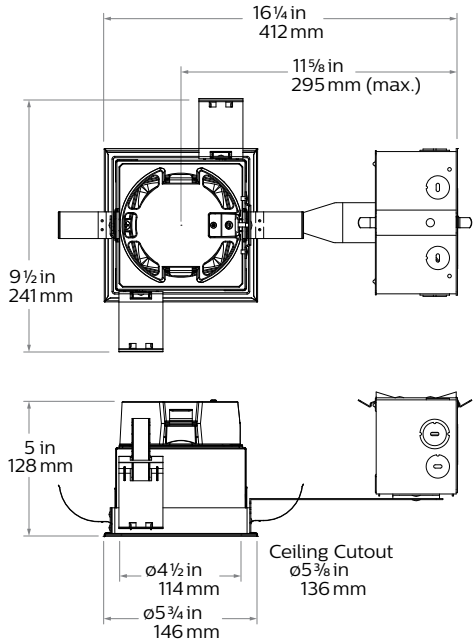
New Construction (N)



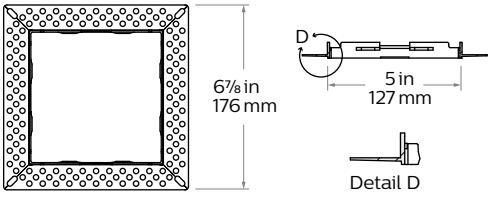
Chicago Plenum (LC)



Remodeler (R)



Flangeless mud-in ring (CA4SFT) accessory



C4STW Calculite LED 4" gen 3

Square Tunable White

Disclaimers/Recommendations

For best performance, we recommend using Lightolier Dynalite products when designing your controls system.

CCT targeting table is for guidance only. Lightolier cannot guarantee color targeting precision, accuracy, or general performance with third party controls.

Lightolier cannot provide post sales configuration or commissioning support when using control systems that are not in the Lightolier product offering. Please contact your controls manufacturer for support.

Lightolier cannot provide guidance on programming dynamic show behaviors (circadian rhythm, daylight mimicry, etc.).

Any configuration, commissioning, or support is solely owned by the sales agent/rep/specifier.

Objective

Provide an application note to reps/agents/trade channel partners that provides information for integration of Lightolier tunable white luminaires with third party controllers.

All Lightolier tunable white luminaires leave the factory with the following settings:

Cool white CCT: 6500K

Warm white CCT: 2700K

When either channel is at 100% brightness
Warm white lumen output = Cool white lumen output

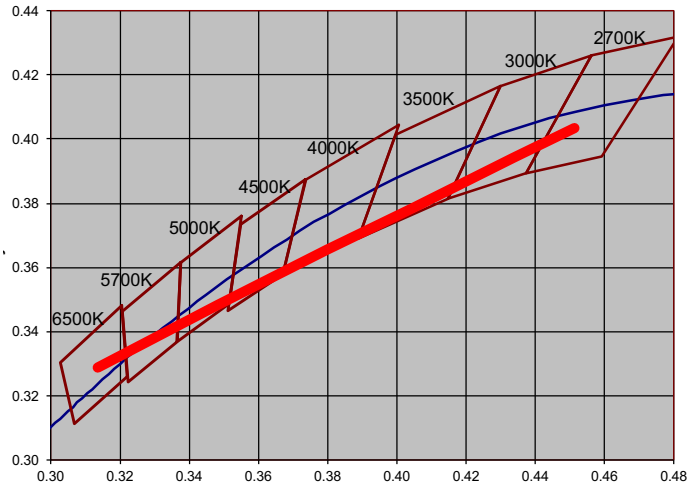
Communication protocol:
DALI 2.0 (Device Type 6)
Power over Ethernet 48V

CCT targeting guidance

Target CCT	WW%	CW%
2700K	100	0
3000K	82	18
3500K	66	34
4000K	49	51
5000K	24	76
6500K	0	100

Color information (Dali)

4" 1000lm	2700K	3000K	3500K	4000K	5000K	6500K
Flux (lms)	909	920	942	951	927	927
Power (W)	10.24	10.24	10.22	10.19	9.94	9.98
Efficacy (lm/W)	88.8	89.8	92.2	93.4	93.3	92.8
CCT	2766	2974	3423	3933	4866	6458
CRI	86	87	88	89	87	83
R9	21	26	33	36	32	13
x	0.4513	0.4335	0.404	0.3797	0.3483	0.3136
y	0.4034	0.394	0.3783	0.3653	0.3483	0.3288
Duv	-0.0019	-0.0036	-0.0053	-0.0052	-0.0029	0.0026



Lifetime (TM-21) data

Lumens	Narrow beam	Medium/Wide beam*
1000lm 1200lm	L90 @ 60,000hrs.	L90 @ 60,000hrs.

* Lutron 3000lm with Medium/Wide beam is L80 @ 60,000hrs.

Color information (PoE)

Flux (lm)	1300	1275	1284	1279	1266	1248	1221	1223
Power (W)	11.62	11.55	11.16	11	10.92	10.9	10.98	10.85
Efficacy (lm/W)	111.9	110.4	115.1	116.2	115.9	114.5	111.2	112.7
CCT	2729	2987	3508	4019	4536	5076	5869	6480
CRI	85	86	88	88	87	86	85	83
Color Rendering Index (R9)	16.5	23.1	31	33.9	33	28.6	22.3	14.1
x	0.4564	0.4336	0.3998	0.3762	0.3579	0.3425	0.3245	0.3132
y	0.4084	0.396	0.3773	0.3639	0.3535	0.3446	0.3342	0.3276
Duv	-0.0005	-0.0028	-0.0048	-0.0049	-0.0040	-0.0025	0.0001	0.0023
TM30 Rf	86	86	87	87	86	85	84	84
TM30 Rg	98	100	100	100	100	100	99	98

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Square Tunable White

Reflector

Specular clear (CL): Most specular and most efficient finish, delivers maximum photometric performance but can produce a mirror image effect of the interior space.

Comfort clear (CC): Semi-specular finish that softens the light at the source of the reflector and creates a subtle, even luminance from the reflector cone.

Comfort clear diffuse (CD): Slightly diffuse clear finish, that eliminates iridescence and reduces the mirror image effect inherent with specular finishes.

Champagne bronze (CZ): Semi-specular finish that softens light at the source of the reflector while providing a warmer reflector appearance (slightly warmer).

White (WH): (matte) Brightest illuminated aperture and provides the smoothest transition to most ceilings when off (white is only available with a white flange).

Black (BK): (matte) Specular finish that provides the lowest aperture brightness possible and significantly reduces source identification in a ceiling.

Flange

White (–): (matte) Provides the smoothest transition to ceilings when off.

Polished (P): (matches aperture) Produces a continuous look throughout the reflector (aperture matching).

Flangeless (F): (flush-mount) Creates a flush, virtually seamless transition from aperture to ceiling.

Frame-in-kits

New Construction

Galvanized stamped steel for dry or plaster ceilings. Preinstalled telescoping mounting bars from 13" to 24". For 4' distances, use 1/2" EMT, 1-1/2" x 1/2" U or C channel.

Max ceiling thickness is 2".

AirSeal

Black painted steel housing for dry or plaster ceilings. Pre-installed telescoping mounting bars from 13" to 24".

Patented install Mounting frame

With no driver attached, this versatile frame is independent of driver accommodating a wide range of lumen packages, driver types and CCTs, including 120V and 277V inputs.

Close-cut aperture design eliminates possibility of gap between ceiling opening & reflector flange.

Separate wiring compartment for wiring frame to building allows inspection prior to light engine install.

Simple plug-and-play connection between frame and light engine from below ceiling eliminates need for wiring between frame and LED driver, and also saves time during installation and future replacements/upgrades. Plug-and-play receptacle accommodates technology upgrade of light engines and replacements for the life of the building.

Drivers

- EldoLED ECOdrive Dali 1% Dimming

Rated life

60,0000 hrs at 70% lumen maintenance based on IES LM-80-08 and TM-21-11.

Power over Ethernet

Powered via Lightolier PoE lighting controller: Complies with FCC rules per Title 47 part 15 (Class A) for EMI / RFI (conducted & radiated). PoE lighting controller accessible from below ceiling.

Optical systems

Comfort throughout the space:
Patented optical system combines primary and secondary optics to provide a true 50° physical cutoff and 45° reflected cutoff virtually eliminating the view of the light source and bright spots in the reflector. A new reflector curve reduces reflector brightness by up to 50% compared to existing products, allowing for the use of higher lumen packages in smaller apertures without creating bright spots in the ceiling.

Quality of light: 2 SDCM ensures color consistency from fixture to fixture and over the luminaire's long lifetime. Proprietary optical grade silicone lens with patterned surface provides soft, even beam diffusion without hotspots or dark rings.

Light Engine

Quick connect power pack comprised of light source and driver allow for easy installation and replacement from below ceiling with no need for additional wiring. This allows for

- Frame and ceiling installation to be performed while still finalizing details such as lumen packages, CCT and control type.
- Easy replacement of electronics at end of life with minimal wasted material and labor required.
- Ease and upgradability of technology.

Options and Accessories

Flangeless mud-in ring: Use **CA4SFT** for use with flangless plaster installations.

Labels and Listings

- cULus listed for wet locations
- RoHS certified

Warranty

5 year limited warranty

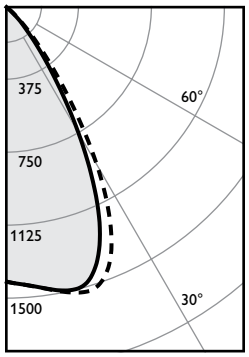
Visit Signify.com/warranties for more information on Signify's standard 5-year limited warranty on complete luminaire systems.

C4STW Calculite LED 4" gen 3

Square Tunable White (with Dali driver)

Medium beam, 1500lm Engine, 103.8 lm/w

Candela Curve



Frame: **C4SN or 4SN**
Engine: **C4L15835MZ10U**
Trim: **C4SDLNMCL**

CCT[1]:	3500K
Output lumens:	1475 lms
Input watts:	14.2 W (±5%)
CRI:	80 min
Spacing Crit.:	0.9
Beam Angle:	58°

Zonal summary

Zone	Lumens	%Luminaire
0-30	1092	74.0%
0-40	1393	94.5%
0-60	1475	100.0%
0-90	1475	100.0%

Angle	0°	45°	Lms
0	1414	1414	
5	1442	1442	139
10	1481	1484	
15	1494	1522	422
20	1387	1485	
25	1119	1287	531
30	755	943	
35	430	561	301
40	217	285	
45	100	129	82
50	0	0	
55	0	0	0
60	0	0	
65	0	0	0
70	0	0	
75	0	0	0
80	0	0	
85	0	0	0
90	0	0	

Single unit data

Height to lighted plane	Initial center beam foot-candles	Beam diameter (ft)*
5'	57	4.5'
6'	39	5.4'
7'	29	6.3'
8'	22	7.2'
9'	17	8.1'

* Beam diameter is where foot-candles drop to 50% of maximum.

Multiple unit data - RCR 2

Spacing on center	Initial center beam foot-candles	Watts per sq. ft.
5'	67.5	0.63
6'	44.3	0.41
7'	31.6	0.30
8'	26.4	0.25
9'	21.1	0.20

38' x 38' x 10' Room, Workplane 2.5' above floor, 80/50/20% Reflectances

Efficacy: 103.8 lm/w
Report[2]: T20161398

Adjustment factors

Finish		CCT		Lumens	
CL	= 100%	80CRI 4000K	= 102%	3000lm	= 200%
CC	= 95%	80CRI 3500K	= 100%	2500lm	= 167%
CD	= 87%	80CRI 3000K	= 97%	2000lm	= 133%
CZ	= 63%	80CRI 2700K	= 87%	1500lm	= 100%
WH	= 87%	90CRI 3000K	= 77%	1000lm	= 67%
BK	= 57%	90CRI 2700K	= 73%	500lm	= 33%

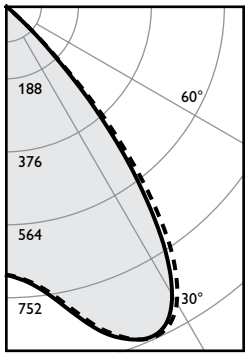
Coefficients of utilization

Ceiling	80%				70%		50%		30%		0%
Wall	70	50	30	10	50	10	50	10	50	10	0
RCR	Zonal cavity method - Effective floor reflectance = 20%										
0	119	119	119	119	116	116	111	111	106	106	100
1	114	111	109	106	109	105	105	101	101	98	94
2	108	103	99	96	102	95	98	93	96	91	87
3	103	97	92	88	95	87	93	86	90	84	82
4	98	90	85	81	89	80	87	79	85	78	76
5	93	85	79	75	84	74	82	74	80	73	71
6	88	79	74	69	79	69	77	69	76	68	66
7	84	75	69	65	74	64	73	64	72	64	62
8	80	70	64	60	70	60	69	60	68	60	58
9	76	66	61	57	66	57	65	56	64	56	55
10	72	63	57	53	62	53	62	53	61	53	51

Room Cavity Ratio

Wide beam, 1500lm Engine, 90.8 lm/w

Candela Curve



Frame: **C4SN or 4SN**
Engine: **C4L15835MZ10U**
Trim: **C4SDLWCL**

CCT[1]:	3500K
Output lumens:	1288 lms
Input watts:	14.2 W (±5%)
CRI:	80 min
Spacing Crit.:	1.2
Beam Angle:	69°

Zonal summary

Zone	Lumens	%Luminaire
0-30	725	56.3%
0-40	1141	88.6%
0-60	1288	100.0%
0-90	1288	100.0%

Angle	0°	45°	Lms
0	688	688	
5	713	709	69
10	766	757	
15	846	837	237
20	907	904	
25	923	928	419
30	854	878	
35	666	720	416
40	410	466	
45	163	181	146
50	28	27	
55	0	0	1
60	0	0	
65	0	0	0
70	0	0	
75	0	0	0
80	0	0	
85	0	0	0
90	0	0	

Single unit data

Height to lighted plane	Initial center beam foot-candles	Beam diameter (ft)*
5'	28	6.0'
6'	19	7.2'
7'	14	8.4'
8'	11	9.6'
9'	8	10.8'

* Beam diameter is where foot-candles drop to 50% of maximum.

Multiple unit data - RCR 2

Spacing on center	Initial center beam foot-candles	Watts per sq. ft.
5'	57.9	0.63
6'	38.0	0.41
7'	27.1	0.29
8'	22.6	0.25
9'	18.1	0.20

38' x 38' x 10' Room, Workplane 2.5' above floor, 80/50/20% Reflectances

Efficacy: 90.8 lm/w
Report[2]: T20161399

Adjustment factors

Finish		CCT		Lumens	
CL	= 100%	80CRI 4000K	= 102%	3000lm	= 200%
CC	= 95%	80CRI 3500K	= 100%	2500lm	= 167%
CD	= 87%	80CRI 3000K	= 97%	2000lm	= 133%
CZ	= 63%	80CRI 2700K	= 87%	1500lm	= 100%
WH	= 87%	90CRI 3000K	= 77%	1000lm	= 67%
BK	= 57%	90CRI 2700K	= 73%	500lm	= 33%

Coefficients of utilization

Ceiling	80%				70%		50%		30%		0%
Wall	70	50	30	10	50	10	50	10	50	10	0
RCR	Zonal cavity method - Effective floor reflectance = 20%										
0	119	119	119	119	116	116	111	111	106	106	100
1	113	110	107	105	108	103	104	100	100	97	93
2	107	102	97	93	100	92	97	90	94	88	85
3	101	94	88	84	92	83	90	82	87	81	78
4	95	87	80	76	85	75	83	74	81	74	71
5	89	80	74	69	79	69	77	68	75	67	65
6	84	74	67	63	73	63	72	62	70	62	60
7	79	69	62	57	68	57	67	57	65	57	55
8	74	64	57	53	63	53	62	52	61	52	50
9	70	59	53	49	59	48	58	48	57	48	46
10	66	56	49	45	55	45	54	45	53	44	43

Room Cavity Ratio

1. Correlated Color Temperature within specs as defined in ANSI_NEMA_ANSLG C78.377-2008: Specifications for the Chromaticity of Solid State Lighting Products.
2. Tested using absolute photometry as specified in LM79: IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.

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