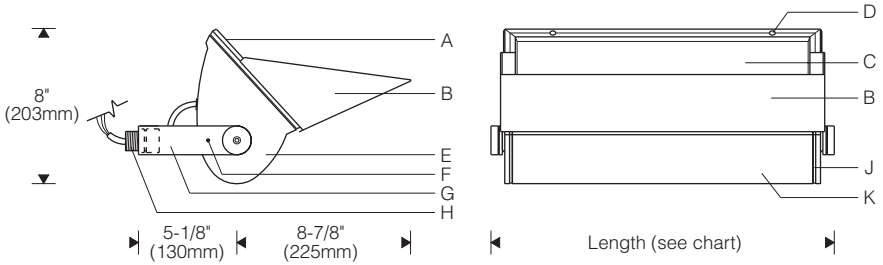
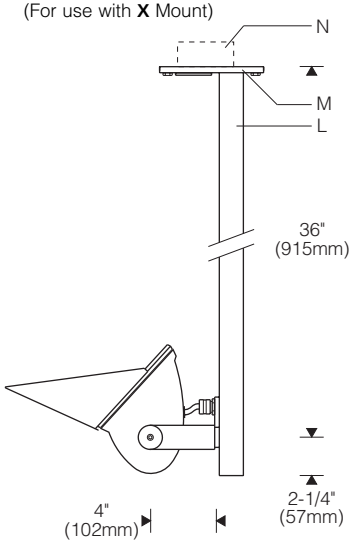
V Mount 1:10 Scale



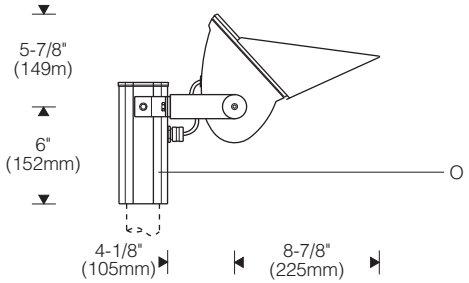
Cantilever 1:12 Scale
(For use with **X** Mount)



Wattage	*Source*	*Length*
150	HPS	12-1/16" (306mm)
175	MH	
300-500	Halogen	
250, 400	MH/HPS	17-13/16" * (452mm)
900,1000	Halogen	24-7/8" * (632mm)
2x400	MH/HPS	

*Yoke includes (2) 9/32" dia. holes at 12" (305mm) centers for supplemental mounting support (1/4" fasteners by others)

Side-Mount Slipfitter 1:12 Scale (For use with **X** Mount)



Specifications

- **A** Mitred extruded aluminum door with silicone gasket
- **B** Cutoff visor (included)
- **C** Clear, flat, thermal and impact resistant tempered glass lens
- **D** Tamper-resistant captive door screws
- **E** Die-cast aluminum end plates
- **F** Locking set screw
- **G** Aluminum yoke
- **H** 1/2" NPT nipple
- **J** Aluminum reveal plates (black)
- **K** Specular extruded aluminum reflector
- **L** 1-1/2" x 2" aluminum arm
- **M** Welded aluminum mounting plate with splice access cover
- **N** Recessed outlet box
- **O** Accessory extruded aluminum slipfitter for 2-3/8" O.D. pole or tenon

Finish:
Exterior surfaces - 6 stage pretreatment and electrostatically applied thermoset polyester powder coating for a durable abrasion, fade and corrosion resistant finish. Choice of semi-gloss colors (see ordering information).

Reflector and internal end plates - extruded high purity aluminum with clear anodized specular finish. All hardware and components - non corrosive stainless steel or aluminum. Door secured with captive tamper-resistant (#10 Torx) screws in stainless steel threaded reflector inserts to prevent seizing. Yoke attaches with recessed hex socket screws.

Mounting:
1/2" NPT nipple (wet location outlet box or fitting by others).

Aluminum cantilever mounting assembly ordered separately; specify **X** mount. Suitable backing structure required.

Accessory slipfitter ordered separately. Top-mount for single unit, or side-mount for one or two (back-to-back) units; specify **X** mount. Fits 2-3/8" O.D. stanchion, pole or tenon (by others).

Standard:
UL listed or CSA certified for wet locations.

Electrical:
Use 90°C wire for supply connections. Leads exit reflector through watertight flush cord entry, silicone coated fiberglass sleeving; 8" exposed beyond nipple. (60" leads on **X** mount).

Tungsten halogen - recessed single contact (RSC) lampholders in patented clamping supports for maximum heat dissipation.

Metal halide - position oriented mogul lampholder for use with either POMB horizontal or universal position lamp (medium base for 175W). Rotating bracket allows horizontal lamp to be locked in proper position after aiming (hinged lampholders for 2x400W are fixed in position for uplighting across overhead surface). End-of-lamp aligner ensures consistent optical performance and minimizes damage from shock or vibration.

HPS - pulse rated mogul lampholder (medium base for 150W).

Ballast - remote HPF constant wattage autotransformer (CWA) rated for -20°F/-29°C starting (high reactance autotransformer (HX-HPF) for 150W HPS). Weatherproof aluminum enclosure includes three 7/8" dia. entries and one 3/8" liquidtight conduit connector. Optional remote ballast for dry indoor location.

For complete ballast specifications, see Accessories Section.

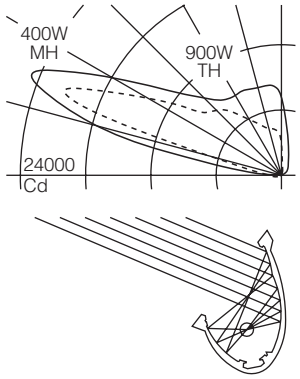
Features

- *Compact yet powerful - up to 1000W halogen, 2x400W metal halide for uplighting large vaults, canopies or arches*
- *Optimum performance - high output position oriented metal halide, end-of-lamp aligner, set screw locks aiming*
- *Built to last - all aluminum and stainless steel components, tempered glass lens, tamper-resistant door screws*

U 7.0

Performance

Two parabolic reflector sections drive light across the overhead plane from one edge. An elliptical section redirects its light to a parabola and shields the lamp. Asymmetry is maximized resulting in high beam efficiency and superior surface uniformity. The fast "runback" minimizes wasted spill light. Wide lateral distribution permits greater spacings.



For complete photometrics, visit www.elliptipar.com

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To form a Catalog Number

[ ] 1 5 2 - [ ] - [ ] - [ ] - V [ ] [ ]

1 2 3 4 5 6 7 8

1 Source

M = Metal halide
H = High pressure sodium
T = Tungsten halogen

2 Style

152 = Large outdoor, **remote** ballast

3 Lamp

Lamp Code	Wattage	Lamp Number	Voltage(s)	Ballast	Distance
Metal Halide*					
0175	175	MH175/U/MED	**A**, **B**, **H**	CWA	105'(32m)
0250	250	MH250/HOR	**A**, **B**, **H**	CWA	75'(23m)
0400	400	MH400/HOR	**A**, **B**, **H**	CWA	50'(15m)
2400‡	2x400	(2) MH400/HOR	**A**, **B**, **H**	CWA	50'(15m)
High Pressure Sodium					
0150	150	LU150/MED	**A**, **B**, **H**	HX-HPF	5'(1.5m)
0250	250	LU250	**A**, **B**, **H**	CWA	5'(1.5m)
0400	400	LU400	**A**, **B**, **H**	CWA	10'(3.0m)
2400	2x400	(2) LU400	**A**, **B**, **H**	CWA	10'(3.0m)
Tungsten Halogen					
0300	300	Q300T3	**A**		
0350+	350	Q350T3/CL/HIR+	**A**		
0500	500	Q500T3	**A**		
0900+	900	Q900T3/CL/HIR+	**B**, **G**		
1000	1000	Q1000T3	**A**, **F**, **G**		

For complete lamp and ballast information, see Accessories Section.

* Use clear metal halide horizontal or universal position lamp with compact envelope. 250 and 400W lamps are horizontal position oriented mogul base (POMB) that yield higher light output than universal position lamps. Standard metal halide lamp colors are 4000K for 175W, 3200K for 250 and 400W.

‡ 2x400W metal halide uses position oriented mogul lampholders that are hinged and fixed in position to uplight across an overhead surface (±15°).

+ 350 and 900W IR coated halogen yield approximately the same light output as conventional 500 and 1500W halogen lamps respectively.

U 7.1

Project: [ ]

4 Mounting

V = External yoke with 1/2" NPT nipple (wet location outlet box or fitting by others)
X = External yoke for use with accessory cantilever or slipfitter (order separately)

5 Finish

02 = Semi-gloss white
06 = Dark bronze
07 = Silver
08 = Semi-gloss black
12 = Green
99 = Custom RAL or computer matched color to be specified, consult sales representative.

6 Voltage

A = 120V
B = 277V
F = 220V (1000W TH only)
G = 240V (900W, 1000W TH only)
H = 347V

7 Option (See Accessories Section for specifications)

V0 = Cutoff visor included, no other options
VD = Remote ballast for dry indoor location
VH = Long distance remote HPS ballast up to 35' (10m) for 150W HPS, up to 50' (15m) for 250W and 400W HPS
VL = Micro-prismatic tempered glass lens (replaces clear, flat lens, offers smoother light pattern at reduced peak candlepower.)
VX = For modification not listed, include detailed description. Consult factory prior to specification.

Note: Cutoff visor included unless specified otherwise.

8 Standard

0 = UL, Underwriters Laboratories
J = CSA, Canadian Standards Association

Example

H152 - 0400 - V - 07 - B - VH0

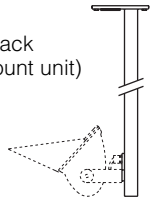
Large outdoor model for use with 400 watt high pressure sodium lamp. External yoke with 1/2" NPT nipple. Silver powder coat finish. Long distance (up to 50') remote 277V ballast in weatherproof enclosure. UL. Cutoff visor included.

Type: [ ]

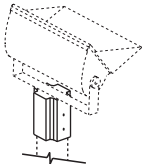
Accessories

Order separately. See Accessories Section for specifications.

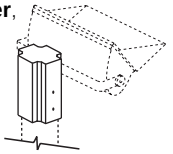
AC [ ] [ ] **36** [ ] = **Cantilever**, 36" (914mm) setback (for use with **X** mount unit)
0 = UL
J = CSA
5 Finish
L = single unit
U = double unit (back to back)



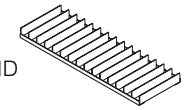
ASF [ ] **T10** = **Top-mount slipfitter**, for 2-3/8" O.D. pole, stanchion or tenon (for use with single **X** mount unit)
5 Finish



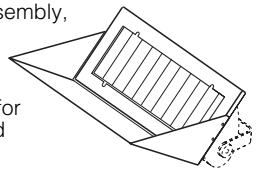
ASF [ ] **S** [ ] **0** = **Side-mount slipfitter**, for 2-3/8" O.D. pole, stanchion or tenon (for use with **X** mount units)
1 = single unit
2 = double unit (back to back)
5 Finish



AE [ ] **V** [ ] **0D0** = External vertical blade **baffle**, black, for lengthwise shielding
2 = 25° shielding
4 = 45°
C = 300W-350W TH; 150W-175W HID (not for use with 500W TH)
D = 250W, 400W HID
F = 900W, 1000W TH, 2x400W HID



AXF = Wet location **color filter** assembly, interchangable frame with stripped color glass, visor.
Not suitable for all lamp wattages. Consult factory for complete specifications and ordering information.



AFK000X [ ] = Ballast **fuse** kit
0 = UL
J = CSA

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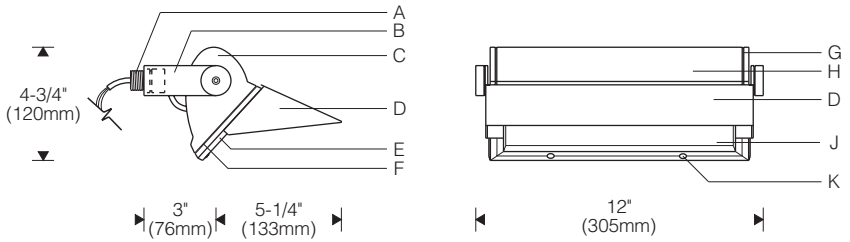
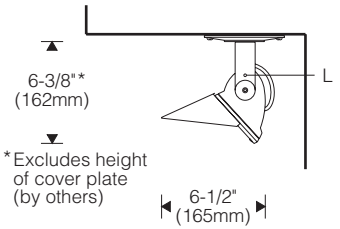
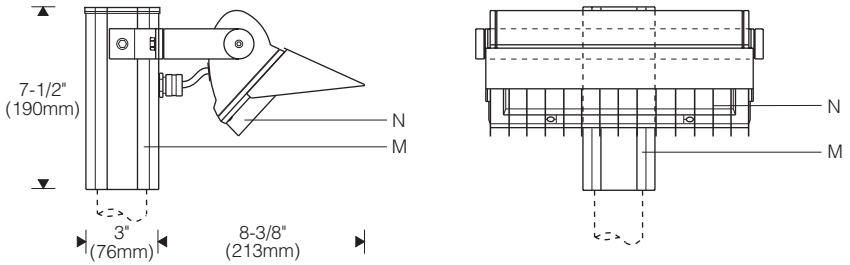
V Mount 1:8 Scale



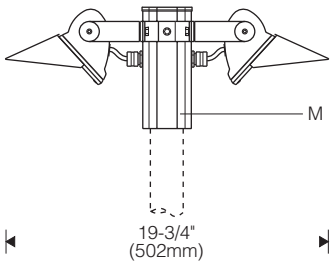
V Mount 1:12 Scale
(shown mounted under soffit/overhang)



Slipfitter: Single Unit 1:8 Scale (For use with **X** Mount)



Slipfitter: Double 1:12 Scale



Specifications

- **A** 1/2" NPT nipple
- **B** Aluminum yoke
- **C** Die-cast end aluminum plates
- **D** Aluminum cutoff visor (included)
- **E** Mitred extruded aluminum door frame
- **F** Precured silicone door and lens gasket
- **G** Aluminum reveal plates (black)
- **H** Specular extruded aluminum reflector
- **J** Micro-prismatic, thermal and impact resistant tempered glass lens
- **K** Tamper-resistant captive door screws
- **L** Locking set screw
- **M** Accessory extruded aluminum slipfitter for 2-3/8" O.D. tenon or pole
- **N** Accessory vertical blade cross baffle (black)

Finish:
Exterior surfaces - 6 stage pretreatment and electrostatically applied thermoset polyester powder coating for a durable abrasion, fade and corrosion resistant finish. Choice of semi-gloss colors (see ordering information).

Reflector - extruded high purity aluminum with clear anodized specular finish. All hardware and components - non corrosive stainless steel or aluminum. Door secured with captive tamper-resistant (#10 Torx) screws in stainless steel threaded reflector inserts to prevent seizing. Yoke attaches with recessed hex socket screws.

Mounting:
1/2" NPT nipple (wet location outlet box or fitting by others).

Accessory slipfitter (ordered separately) for 2-3/8" O.D. pole, tenon or stanchion (by others). Side-mount for single or double (back-to-back) units, specify **X** mount.

Electrical:
Use 90°C wire for supply connections. Leads exit reflector through watertight flush cord entry and silicone coated fiberglass sleeving with 8" (.2m) exposed beyond nipple. 60" (1.5m) leads for **X** mount.

Tungsten halogen - recessed single contact (RSC) or DC bayonet lampholders retained with patented clamping supports for maximum heat dissipation.

Metal halide - G12 lampholder for use with single ended lamp. Remote HPF high reactance autotransformer (HX-HPF) ballast rated for -20°F/-29°C starting. Die-cast aluminum weatherproof ballast enclosure includes four 1/2" NPT threaded entries. Optional electronic ballast with automatic shut-off to eliminate end-of-life cycling. Optional remote ballast for dry indoor location.

For complete ballast specifications, see Accessories Section.

Standard:
UL listed or CSA certified for wet locations.

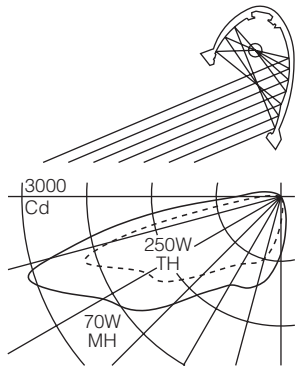
Features

- *High performance asymmetric lighting for broad areas where pedestrian scale, controlled distribution are desired*
- *Compact yet powerful - up to 250W halogen, 150W MH*
- *Durable and secure - thermal and impact resistant lens, tamper-resistant fasteners, set screw in yoke locks aiming*
- *Non corrosive - aluminum and stainless steel construction*

G 1.0

Performance

Two parabolic reflector sections drive light across the ground plane from one edge. An elliptical section redirects its light to a parabola and shields the lamp. Asymmetry is maximized resulting in high beam efficiency and superior surface uniformity. The fast "runback" minimizes wasted spill and trespass light. Wide lateral distribution permits greater spacings.



For complete photometrics, visit www.elliptipar.com.

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To form a Catalog Number

	1	5	1	-				-	V		
1	2			3	4	5	6		7	8	

1 Source

M = Metal halide
T = Tungsten halogen

2 Style

151 = Small outdoor, **remote** ballast

3 Lamp

Lamp Code	*Watt-age*	*Lamp Number*	*Volt-age(s)*	*Ballast*	*Dis-tance*
Ceramic Metal Halide*					
035G	35	CMH35/T6/G12	**A**, **B**	HX-HPF	15'(4.5m)
			1, **2**	Electr.	15'(4.5m)
070G	70	CMH70/T6/G12	**A**, **B**, **H**	HX-HPF	10'(3m)
			1, **2**	Electr.	15'(4.5m)
150G	150	CMH150/T6/G12	**A**, **B**, **H**	HX-HPF	10'(3m)
			1, **2**	Electr.	15'(4.5m)
Tungsten Halogen					
0100	100	Q100DC	**A**		
0150	150	Q150DC	**A**		
0200	200	Q200T3	**A**		
0250	250	Q250DC	**A**		

G 1.1

For complete lamp and ballast information, see Accessories Section.

* Metal halide lamps using ceramic arc tubes yield higher light output than lamps with quartz arc tubes. They offer improved lamp-to-lamp color consistency and a more stable color temperature over their life (±200K). Standard lamp color is 3000K / 80+ CRI.

4 Mounting

V = External yoke with 1/2" NPT nipple (wet location outlet box or fitting by others)
X = External yoke for use with accessory side-mount slipfitter (order separately)

5 Finish

02 = Semi-gloss white
06 = Dark bronze
07 = Silver
08 = Semi-gloss black
12 = Green
99 = Custom RAL or computer matched color to be specified, consult sales representative.

Project:

6 Voltage/Ballast

Magnetic
A = 120V
B = 277V
H = 347V (Canada)*

Electronic
1 = 120V
2 = 277V

* Not available for 35W metal halide

7 Option (See Accessories Section for specifications)

V0 = Cutoff visor included, no other options
VD = Remote ballast for dry indoor location
VH = Long distance remote metal halide ballast,
35W: 15' min. up to 50' max. (4.5m - 15m),
70W: up to 50' max. (15m),
150W: up to 50' max. (15m)
VX = For modification not listed, include detailed description. Consult factory prior to specification.
Note: Cutoff visor included unless specified otherwise.

8 Standard

0 = UL, Underwriters Laboratories
J = CSA, Canadian Standards Association

Example

T151 - 0250 - V - 02 - A - V0J

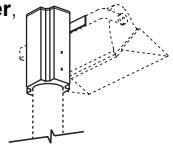
Small outdoor model for use with 250 watt tungsten halogen lamp. External yoke with 1/2" NPT nipple. Semi-gloss white powder coat finish. 120V. CSA. Cutoff visor included.

Type:

Accessories

Order separately. See Accessories Section for specifications.

ASF [ ] **S** [ ] **0** = **Side-mount slipfitter**, for 2-3/8" O.D. pole, tenon or rigid conduit (for use with **X** mount units)

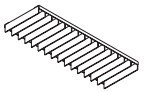


1 = single unit
2 = double unit (back to back)

5 Finish

AEBV [ ] **0D0** = External vertical blade **baffle**, black for lengthwise shielding

2 = 25° shielding
4 = 45°



AFK000X [ ] = Ballast **fuse** kit

0 = UL
J = CSA

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Architectural
Nemo Series

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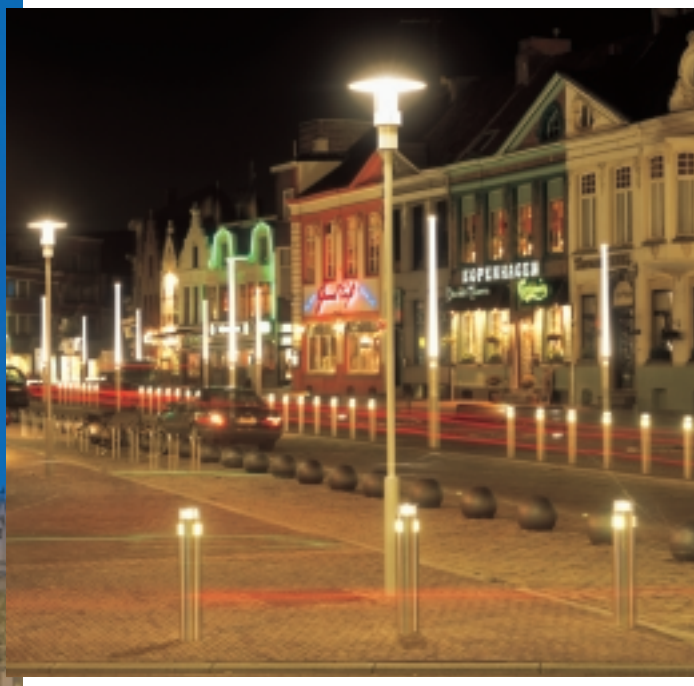

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Nemo Series

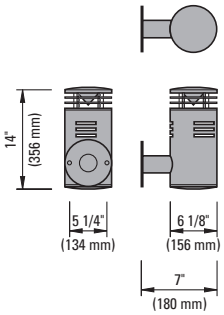
The **Nemo™** range, which is an original design, has been developed to satisfy the varied requirements of the urban environment.

The Nemo range can fulfill diverse needs associated with illumination, ambiance creation, and signage in towns and cities while maintaining a visual unity among its products.

All models (light column, wall luminaire, post-top luminaire, bollard) in the Nemo range are fitted with a "Sealsafe" optical chamber that meets IP66 tightness, thereby ensuring internal cleanliness and stability of photometric performance over a very long period of time.

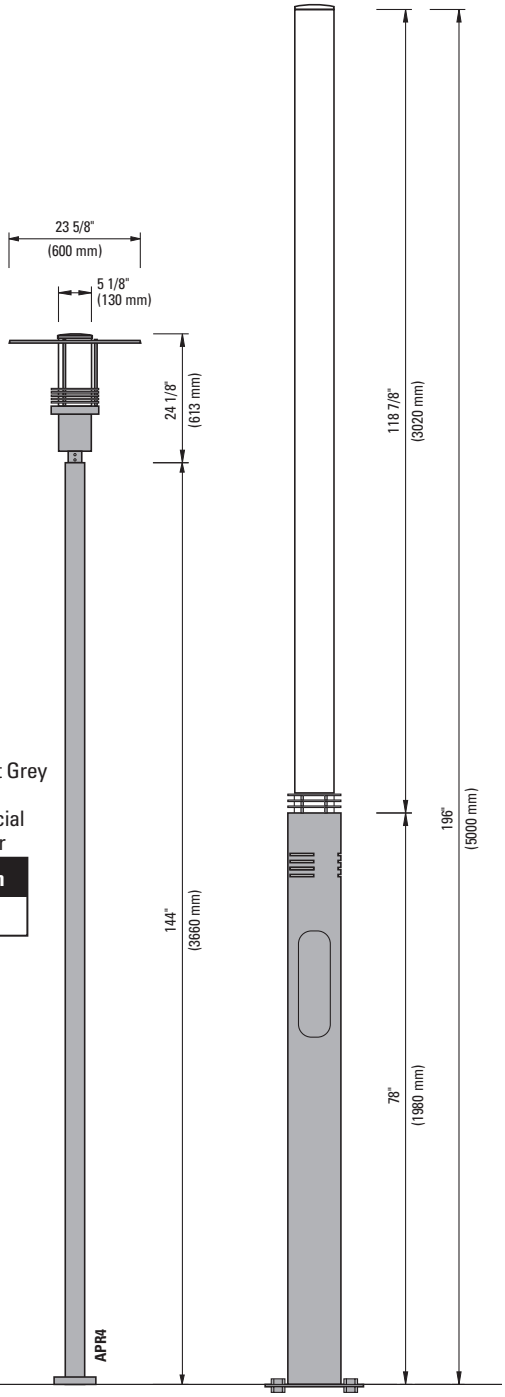
A particular feature of these products is their high degree of impact resistance along with a robust mechanical design.

Superior Photometric Performance:
The indirect lighting optics consists of a one-piece, anodized, brightened and hydroformed aluminum reflector.



Wall Luminaire

Bollard	Lamp	Voltage	Ballast	Finish
NEW	18W	120	EL	SS
	CFL: Up to 18W		**EL*** **EM**	**SS** Stainless Steel

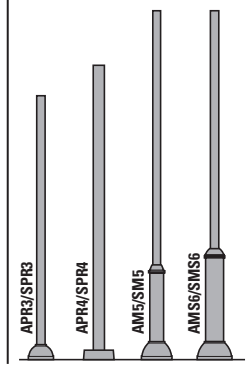


Luminaire

GLS Light Grey
SC Special Color

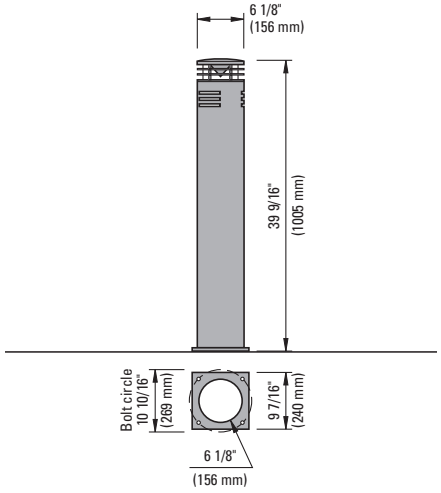
EL*, R, HX, CWA

Luminaire	Lamp	Voltage	Ballast	Pole	Finish
NEL	70MH	120	HX	AM5-12	GLS
	70 MH B17, T6 **150 MH** B17, T6, Induction and compact fluorescent lamps also available, consult factory				



Bollard

Bollard	Lamp	Voltage	Ballast	Finish
NEB	18W	120	EL	SS
	CFL: Up to 18W		**EL*** **EM**	**SS** Stainless Steel



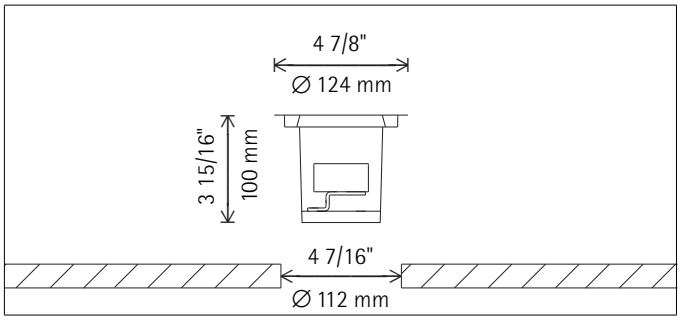
Light Column

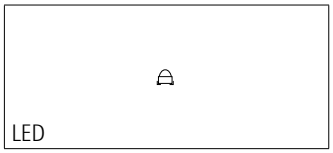
Column	Lamp	Voltage	Ballast	Finish
NEC	150MH	120	HX	SS
	70 MH B17, T6 **150 MH** B17, T6, Compact fluorescent lamps also available, consult factory		**EL*, R, HX, CWA**	**SS** Stainless Steel

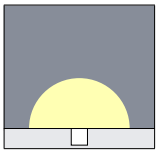
* EL ballast (120 or 277 volts only). All others are remote in pole or mounting

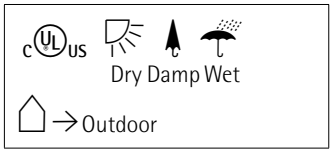
Nadir Recessed floor luminaire

with LED









33738.023 Silver LED Amber
LED 2.1W 120V AC

Product description
Size 3
Housing with mounting ring: corrosion-resistant, cast aluminum, No-rinse surface treatment. External silver double powder-coated. Mounting by means of an adjustable bar. Clamp extension 5/8"-1 3/8" / 15-35mm.
Cable, L 23 5/8" / 600mm.
Replaceable LED module.
Diffuser with Softec lens as safety glass, 5/16" / 8mm. Load 1349lb.wt / 6kN.
Mounting ring: corrosion-resistant cast aluminum, silver double powder-coated.
Suitable for wet location (IP67): dust-proof and protected against immersion damage.
To avoid ingress of water it is necessary to seal the mounting area on site or to provide a drainage.
Weight 1.43lbs / 0.65kg

ERCO Lighting, Inc.
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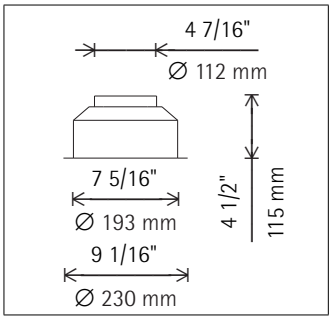
Technical Region: 120V/277V, 60Hz
Edition: December 21, 2005
Please download latest version from
www.erco.com/33738.023

ERCO

Nadir Recessed floor luminaire

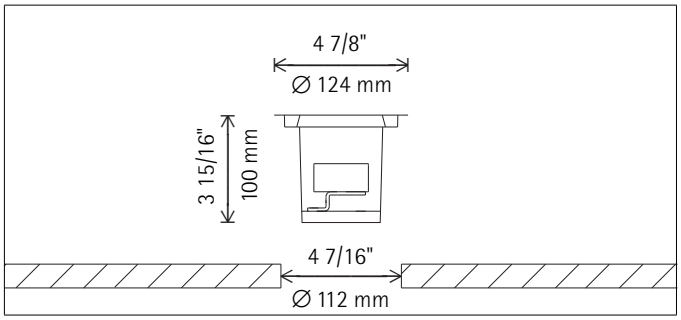
Accessories

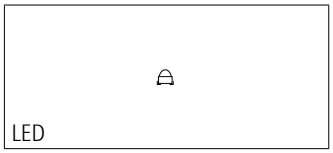
33890.000
Housing for recessed mounting
Aluminum, powder-coated. 2 cable entries. Cover: metal, powder-coated.
Weight 2.20lbs / 1.00kg

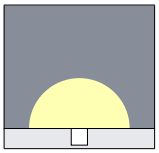


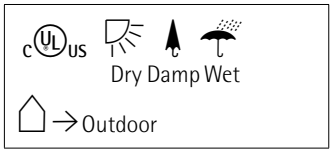
Nadir Recessed floor luminaire

with LED









33736.023 Silver LED Blue
LED 1.7W 120V AC

Product description
Size 3
Housing with mounting ring: corrosion-resistant, cast aluminum, No-rinse surface treatment. External silver double powder-coated. Mounting by means of an adjustable bar. Clamp extension 5/8"-1 3/8" / 15-35mm.
Cable, L 23 5/8" / 600mm.
Replaceable LED module.
Diffuser with Softec lens as safety glass, 5/16" / 8mm. Load 1349lb.wt / 6kN.
Mounting ring: corrosion-resistant cast aluminum, silver double powder-coated.
Suitable for wet location (IP67): dust-proof and protected against immersion damage.
To avoid ingress of water it is necessary to seal the mounting area on site or to provide a drainage.
Weight 1.43lbs / 0.65kg

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Technical Region: 120V/277V, 60Hz
Edition: December 21, 2005
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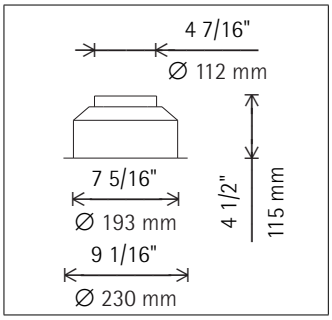
ERCO

Nadir Recessed floor luminaire

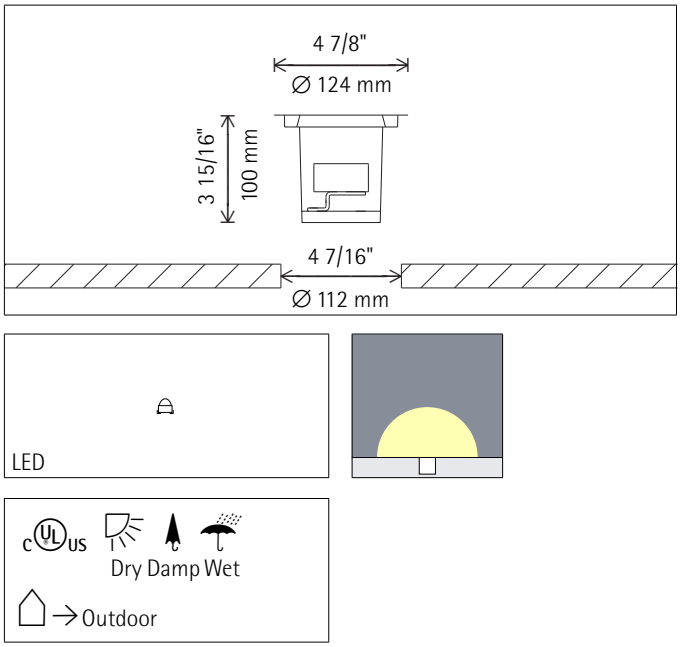
Accessories

33890.000
Housing for recessed mounting
Aluminum, powder-coated. 2 cable entries. Cover: metal, powder-coated.
Weight 2.20lbs / 1.00kg



Nadir Recessed floor luminaire

with LED



33737.023 Silver LED Green
LED 1.7W 120V AC

Product description
Size 3
Housing with mounting ring: corrosion-resistant, cast aluminum, No-rinse surface treatment. External silver double powder-coated. Mounting by means of an adjustable bar. Clamp extension 5/8"-1 3/8" / 15-35mm.
Cable, L 23 5/8" / 600mm.
Replaceable LED module.
Diffuser with Softec lens as safety glass, 5/16" / 8mm. Load 1349lb.wt / 6kN.
Mounting ring: corrosion-resistant cast aluminum, silver double powder-coated.
Suitable for wet location (IP67): dust-proof and protected against immersion damage.
To avoid ingress of water it is necessary to seal the mounting area on site or to provide a drainage.
Weight 1.43lbs / 0.65kg

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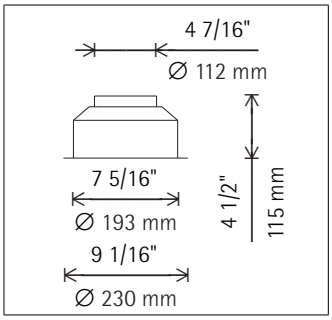
Technical Region: 120V/277V, 60Hz
Edition: December 21, 2005
Please download latest version from
www.erco.com/33737.023

ERCO

Nadir Recessed floor luminaire

Accessories

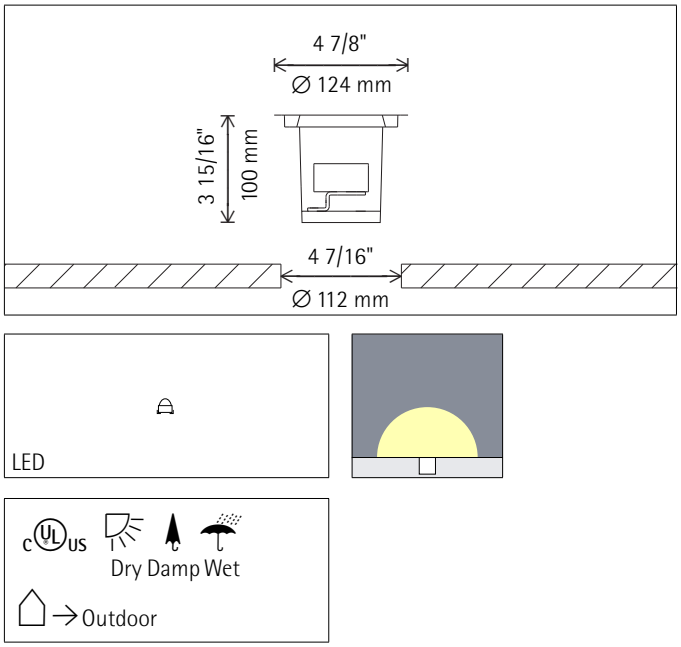
33890.000
Housing for recessed mounting
Aluminum, powder-coated. 2 cable entries. Cover: metal, powder-coated.
Weight 2.20lbs / 1.00kg



ERCO

Nadir Recessed floor luminaire

with LED



33735.023 Silver LED White
LED 1.7W 120V AC

Product description
Size 3
Housing with mounting ring: corrosion-resistant, cast aluminum, No-rinse surface treatment. External silver double powder-coated. Mounting by means of an adjustable bar. Clamp extension 5/8"-1 3/8" / 15-35mm.
Cable, L 23 5/8" / 600mm.
Replaceable LED module.
Diffuser with Softec lens as safety glass, 5/16" / 8mm. Load 1349lb.wt / 6kN.
Mounting ring: corrosion-resistant cast aluminum, silver double powder-coated.
Suitable for wet location (IP67): dust-proof and protected against immersion damage.
To avoid ingress of water it is necessary to seal the mounting area on site or to provide a drainage.
Weight 1.43lbs / 0.65kg

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Technical Region: 120V/277V, 60Hz
Edition: December 21, 2005
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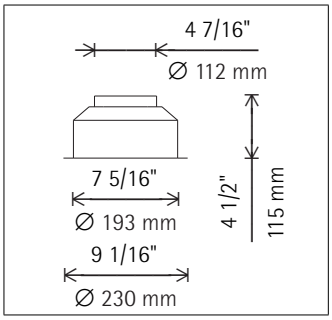
ERCO

Nadir Recessed floor luminaire

Accessories

33890.000
Housing for recessed mounting
Aluminum, powder-coated. 2 cable entries. Cover: metal, powder-coated.
Weight 2.20lbs / 1.00kg



Description

Series 66DIP is a totally harmonic task and ambient lighting element. Distinguished by its compact low profile and design and its highly efficient reflector and baffle system, it is ideal for low ceiling office lighting. T8 lamps are enclosed in a compact extruded aluminum profile. High level, glare free, wide spread illumination is projected up, down, or up and down. Pendant mounted applications are provided as singular elements or in continuous runs, finished to blend or accentuate.

Catalog #		Type
Project		
Comments		Date
Prepared by		

SPECIFICATION FEATURES

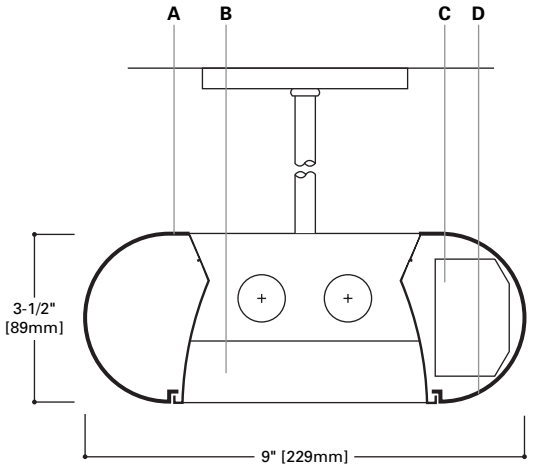
A ... Construction
Construction Extruded aluminum housing. Nominal 4' or 8' illuminated sections.

B ... Louver
Pearlescent parabolic baffle.

C ... Electrical
120 or 277 Volt, electronic ballast. Luminaires and electrical components certified to UL and CUL standards.

D ... Finish
Baked on low gloss white powder coated polyester.

Mounting
Pendant with single stem (standard) or single cable. Canopy: 5-1/2" diameter.



Omni
Series 66DIP

1 & 2T8
1 & 2T5
1 & 2T5HO

SUSPENDED
DIRECT/INDIRECT

Light Distribution
Indirect - 52.0%
Direct - 48.0%

ORDERING INFORMATION

Sample Number: S66DIP/2T8/ST84/1EB-DU

Series
66= Omni

Light Output
DI= Direct/Indirect

Mounting
P= Pendant

Number of Lamps
1= 1 Lamp
2= 2 Lamps

Lamp Type
T8= T8
T5= T5
T5HO= T5HO

Pendant
SC= Single Cable
ST= Single Stem[1]

Run Length
Overall Nominal Run Length __ ft.

Voltage [2]
1= 120V
2= 277V
3= 347V

Ballast
EB= Electronic Ballast
DB= Dimming Ballast

Switching Options
SI= Single Switching
DU= Double Switching

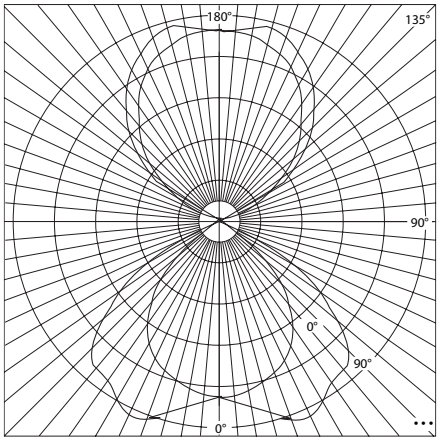
Emergency
EM= Emergency Pack

Fusing
GLR= GLR
GMF= GMF

Shielding Options
S58= KSH-12 Acrylic Lens
S79= Parabolic Baffle

Notes: 1 Available with 7° or earthquake 45° swivel canopy assembly.
2 Not all options available. Please consult your Cooper Lighting Representative for availability.

Photometrics



66DIP-2T8-S79
(2) F40T12RS/WW
3200 Lumens

Efficiency 75.5%

Test Report
#5667.0

Coefficients of Utilization

Effective floor cavity reflectance					20%					
rc	80%				50%			30%		
rw	70	50	30	10	50	30	10	50	30	10
RCR										
1	74	72	69	67	56	54	53	46	45	44
2	69	64	60	56	50	48	46	42	40	39
3	63	57	52	48	45	42	39	38	36	34
4	58	51	45	41	41	37	34	34	32	20
5	54	45	40	36	36	33	30	31	28	26
6	49	41	35	31	33	29	26	28	25	23
7	45	37	31	27	30	26	23	25	22	20
8	42	33	27	24	27	23	20	23	20	17
9	39	30	24	21	24	20	17	20	17	15
10	36	27	22	18	22	18	15	18	15	13

Zonal Lumen Summary

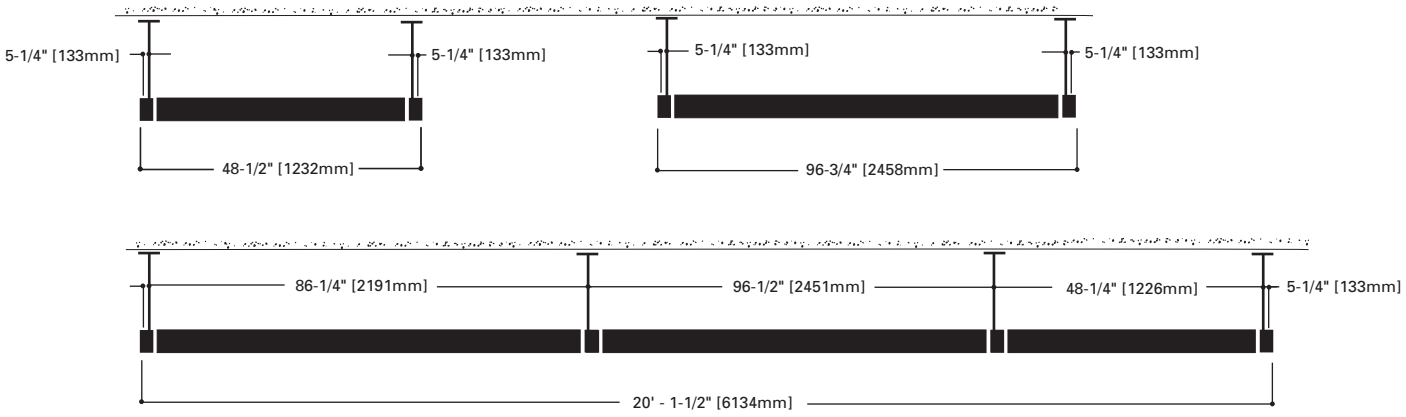
Zone	Lumens	%Lamp	%Fixture
0-30	779	12.2	16.1
0-40	1317	20.6	27.3
0-60	2218	34.7	45.9
0-90	2310	36.1	47.8
90-180	2522	39.4	52.2
0-180	4832	75.5	100.0

Total Luminaire Efficiency = 75.5%

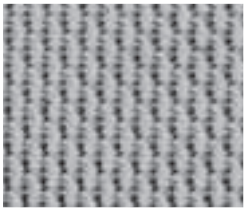
Candela

Angle	Along ⏐⏐	45°	Across ⊥
0	897	897	897
5	893	902	914
15	796	890	980
25	770	987	1080
35	644	884	1001
45	429	673	862
55	213	444	604
65	25	73	149
75	5	8	9
85	1	2	2
90	0	0	0
95	9	4	4
105	105	77	30
115	281	251	223
125	440	476	428
135	543	629	668
145	755	830	842
155	870	942	963
165	880	918	941
175	972	971	986
180	976	976	976

Mounting Information



Shielding Information

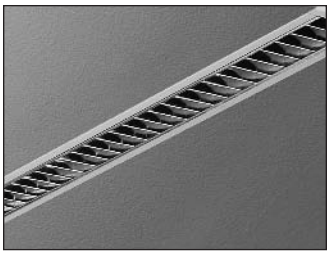


S58 Acrylic Lens
1/8" thick, clear acrylic prismatic lens.

S79 Parabolic Louver
1-1/4" high blades. 2.4" o.c., semi-specular lo-brightness Pearlescent Aluminum baffle. Continuous and unbroken, no visible joints.

M60 Linear Fluorescent Recessed

se'lux®



Project: _____ **Type:** _____ **Qty:** _____

Fixture Series	Lamp Type	Shielding	Mounting	Linear Footage	Finish	Voltage
_____ –	_____ –	_____ –	_____ –	_____ –	_____ –	_____ –

Options **(refer to separate data sheets for ordering codes and details)**

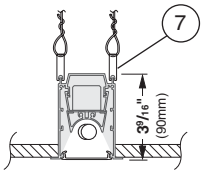
Fixture Series	Lamp Type	Shielding	Mounting	Linear Footage	Finish	Voltage	Options
M6R1 M60 Recessed Continuous Flange (Flanged Extrusion/ Flanged Endcaps) **M6R2** M60 Recessed Flush End (Flanged Extrusion/ Flangeless Endcaps)	**1T5** F28T5 **1T5HO** F54T5HO	**MP** Silky Specular Parabolic Louver **SD** Satine Lens **OD** Extra Diffuse Lens	**SH** Suspension Clips **RC** Rotating Crossbars **PM** Perimeter Mount **TS** 1" Studs (factory installed)	**004** 4 foot **008** 8 foot **012** 12 foot For actual lengths see layout dimensions. For other lengths, configurations indicate nominal length rounded to the next highest foot. Factory will supply layout drawings. Individual fixtures cannot be field joined.	**WH** White **BK** Black **SV** Silver **SP** Specify RAL#	**120** **277** **347**	**TB** Lengths to Fit 2' Grid T-Bar Ceiling System (M6R1 only) **(qty.)EM** Stand-by Battery Pack[1] (prefix quantity, i.e. - **5EM**) **FS** Single Fusing **DM** Dimming[1] (specify system) **DMA** Digital Addressable Dimming[1] **SI** Satine Acrylic Inlay[2] **FW** Flex Whip (standard) **FW1** Flex Whip (dimming) **Track** Eutrac Standard[3] **DL** Suitable for Damp Locations **CCEA** Chicago Plenum **Downlights** (See MR11 spec sheet, pp.98)

[1]Must be low profile ballasts (1 3/16" wide x 1 3/16" high); consult factory for details. [2]Available for MP Louver only. [3]Consult factory for details.

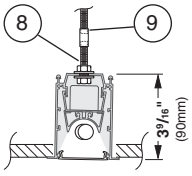
Mounting Diagrams

Scale = 1 : 8

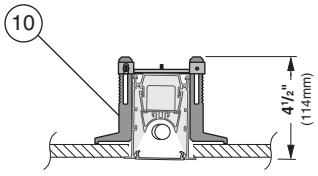
Suspension Clips (SH)



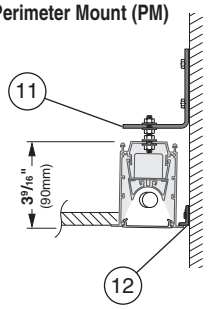
Pre-installed Rod (TS)



Rotating Crossbars (RC)

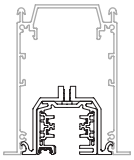


Perimeter Mount (PM)



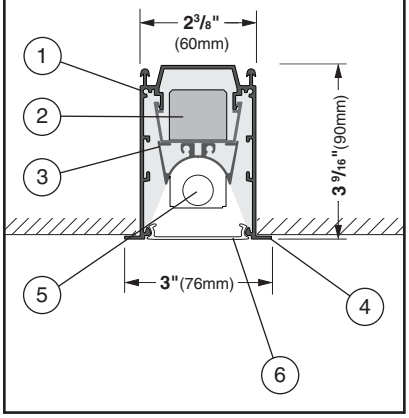
Track

Track insert including track available for all configurations, consult factory for details.



M6R1
M6R2

Scale = 1 : 4



1. Housing - Continuous, 6063-T5 extruded aluminum profile up to 16 feet long.

2. Ballast - Electronic, high power factor, class "P", type "A" sound rating. Specify 120v, 277v, or 347v. Ballast is factory pre-wired with leads to one end of fixture. Consult factory for ballast options.

3. Gear Tray - Die formed tray with specular aluminum reflector. Gear tray installs as complete electrical unit and is held in place with 1/4 turn latches. It is fully accessible from below ceiling.

4. Flange - 5/16" (8mm) wide flange is part of the main extruded body. Specify continuous flange (M6R1) or flush end (M6R2) .

5. Lamps - As noted (by others). Other lamp lengths or wattages available, consult factory.

6. Shielding - Louvers offer excellent glare control in longitudinal, lateral, and all diagonal planes. High quality aluminum louvers and acrylic shielding allow true freedom of layout for today's modern spaces.

7. Spring steel suspension clips - Supplied two places, located nominally every 4 ft. Support wires Supplied and installed by others.

8. Pre-installed 1" 1/4-20 Stud - Attached to fixture every nominal 4 feet.

9. Coupling and Threaded Rod to Structure - Supplied and installed by others.

10 Rotating Crossbar - For inaccessible ceilings, adjustable for ceiling thicknesses from **1/4"** to **2".** Support required nominally every 4'.

11. Steel Wall Bracket and 1/4-20 Rod - Supplied nominally every 4 ft. (Fasteners to wall and wall anchors by others.)

12. Aluminum Wall Bracket - Secured to wall (fasteners and wall anchors by others) and runs entire length of fixture. Also supplied for width of M6R1 continuous flange fixtures. Allows for 1/8" gap between flange and wall to create shadow line.

Interior Luminaire Finish - Standard interior colors are White (WH), Black (BK) and Silver (SV). RAL Classic colors (SP) are available, please specify RAL#.

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FAX: (845) 691-6749
www.selux.com/usa

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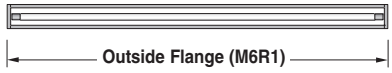
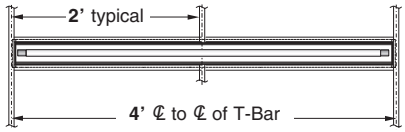
Union Made Affiliated with **IBEW** *Local 363*

M6R1 and M6R2 Standard Layout Dimensions

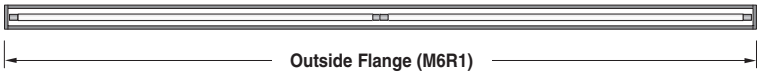
M6R1 Recessed - nominal 4 foot individual



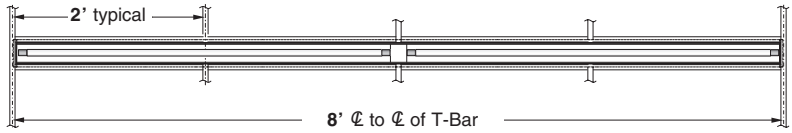
M6R1 Recessed - T-Bar Length - nominal 4 foot individual



M6R1 Recessed - nominal 8 foot individual

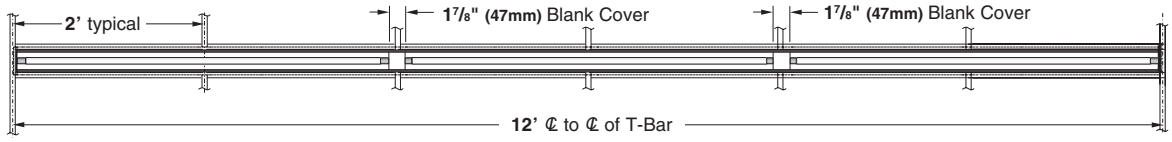


M6R1 Recessed - T-Bar Length - nominal 8 foot individual

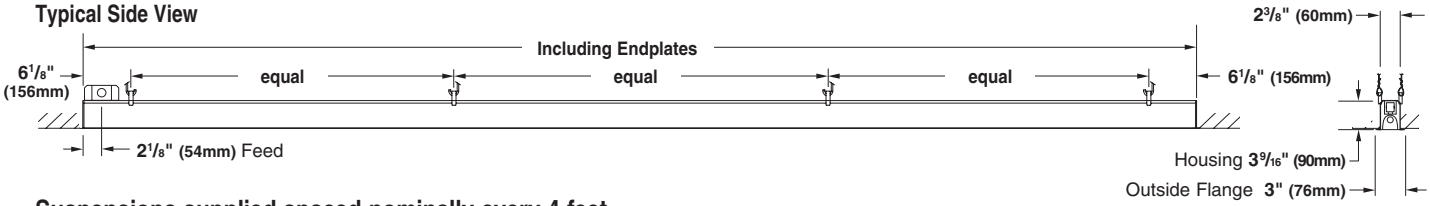


M6R1 Recessed - nominal 12 foot individual

M6R1 Recessed - T-Bar Length - nominal 12 foot individual



Typical Side View



Continuous Flange (M6R1)

Flush End (M6R2)

Suspensions supplied spaced nominally every 4 feet.
Fixture supplied with 7/8 knockout located 2 1/8" from end in top of fixture.

	T5 (1 or 2 lamp)			
	M6R1/M6R2 Including Endplates	**M6R1** Outside Flange	**M6R1/M6R2 - TB** Including Endplates	**M6R1 - TB** Outside Flange
4 foot individual	47.28" (1201mm)	46.63" (1184mm)	47.03" (1195mm)	47.91" (1216mm)
8 foot individual	93.72" (2380mm)	93.03" (2362mm)	95.21" (2418mm)	95.88" (2435mm)
12 foot individual	140.13" (3559mm)	139.43" (3541mm)	143.25" (3638mm)	143.22" (3638mm)

For other lengths, lamping, continuous runs or configurations please specify overall length (in feet), accessories desired and sketch/drawing of configuration. SELUX will detail project drawings upon order and supply submittal drawings for approval. Individual fixtures cannot be field joined. If you have any questions please contact SELUX customer service or applications engineering for assistance (1-800-SELUX-CS).

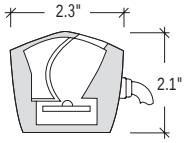
SELUX Corp. © 2006
PO Box 1060, 5 Lumen Lane / Highland, NY 12528
TEL: (845) 691-7723 / FAX: (845) 691-6749
E-mail: seluxus@selux.com / Web Site: www.selux.com/usa
M6R1-02 (02/06)

BEST IN SHOW LIGHTFAIR INTERNATIONAL 2004

line H.O.
series 2.0

asymmetric
PATENT PENDING

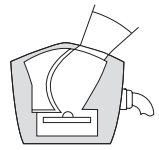
Dimensions



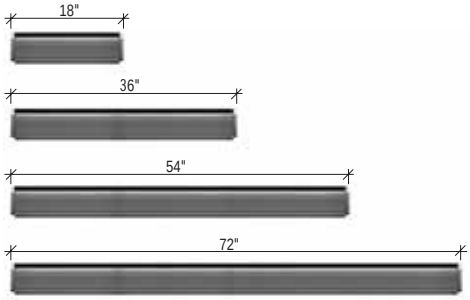
2.75" Dimension includes electrical feed and wire bending radius for interior applications.

3.25" Dimension includes electrical feed and wire bending radius for exterior applications.

Asymmetric Beam Spread



Individual Unit Lengths



Application

io Lighting's line series 2.0 H.O. utilizes the same extruded aluminum housing as the line series 2.0 standard product. While the scale of the luminaire's housing is the same, the light output is 50% greater, hence "High Output". This low voltage linear floodlight luminaire utilizes high brightness LEDs and may be specified for interior or exterior applications. Nominal lengths include: 18", 36", 54", and 72". series 2.0 H.O.'s highly controlled asymmetric beam spread is a great solution for exterior building facade lighting or sign lighting. io's precise optical assembly practically eliminates stray light making it perfect for applications where light pollution and/or light trespass are important design considerations. Symmetric beam spreads (5°, 30°, 60°) are also available. See dedicated specification sheet for these beam spread options.

Individual series 2.0 H.O. units may be placed end to end to create continuous rows without obvious shadows between fixtures. Similar to halogen light sources, LEDs are point sources that offer superior definition to three dimensional objects and sparkle to reflective surfaces. Average rated life for series 2.0 H.O. is 50,000 hours. Lamp lumen depreciation at 50,000 hours is 30%.

Light Output

series 2.0 H.O.'s award winning optical assemblies produce a luminaire efficiency rating of 95%. Refer to light output tables for footcandle values at various distances. IES format files may be obtained from the factory or downloaded from iolighting.com.

- Warm White (3000° K): 267 lms/ft
- Cool White (5000° K): 445 lms/ft

Construction

Heavy-duty aluminum housing provides recommended heat sink requirements for LEDs. Precision optics are composed of a customized acrylic material offering excellent light transmission and UV stability. High strength adhesive bonds the housing and optical assembly. series 2.0 H.O. is UL listed for wet locations.

Mounting Options

series 2.0 H.O. may be surface mounted, side surface mounted or surface mounted with field adjustability and lockable aiming.

Electrical

All fixtures are pre-wired and pre-assembled for easy installation. 8'-0", 18 AWG electrical feed is side mounted to enable continuous row mounting. 8'-0", 18 gauge jacketed electrical feed is mounted to the side of the housing (as shown in photo) to allow for unobstructed continuous row mounting. series 2.0 H.O. is a low voltage luminaire that requires a "driver" (power supply). The driver can be remotely located up to 18'-0" (w/18 AWG), 46'-0" (w/14 AWG) and 71'-0" (w/12 AWG) and may accommodate both a universal 120v or 277v input. Dimming is available, consult factory for details.

series 2.0 H.O. is a UL class II luminaire. Individual units *may* be daisy chained and fed from a high capacity driver. Consult factory for more information.

Power Consumption

- high output: 15 w/ft

Finish

Anodized aluminum finish is standard. Custom anodized finishes available upon request.

370 Corporate Woods Pkwy Vernon Hills, IL 60061-3107
T 847.735.7000 F 847.735.7001 E info@iolighting.com W iolighting.com

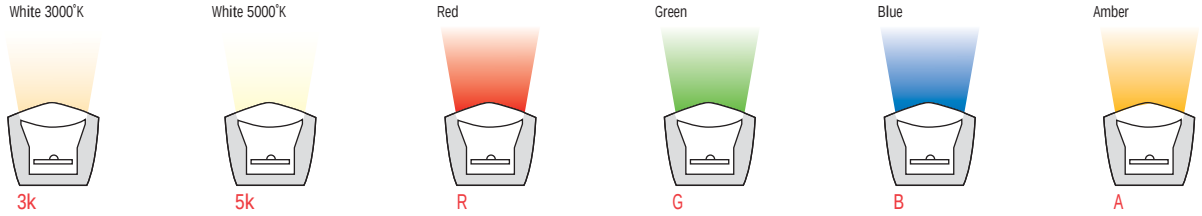
line H.O.
series 2.0

asymmetric

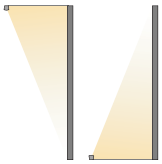
PATENT PENDING

BEST IN SHOW LIGHTFAIR INTERNATIONAL 2004

Color Options



Wall washing or sign lighting illuminance guide



Distance from ceiling (or floor).	18" units 4'-0" O.C. 3'-0" from wall						54" units 7'-0" O.C. 3'-0" from wall									units mounted continuously 3'-0" from wall									
1'	12	12	12	12	12	12	24	24	22	19	17	19	22	24	24	34	34	34	34	34	34	34	34	34	34
2'	18	18	17	17	18	18	35	35	32	27	25	27	32	35	35	50	50	50	50	50	50	50	50	50	50
3'	17	17	17	17	17	17	33	33	30	27	25	27	30	33	33	48	48	48	48	48	48	48	48	48	48
4'	14	14	14	14	14	14	26	26	24	22	21	22	24	26	26	39	39	39	39	39	39	39	39	39	39
5'	11	11	11	11	11	11	20	20	19	18	17	18	19	20	20	30	30	30	30	30	30	30	30	30	30
6'	9	9	9	9	9	9	16	16	15	15	14	15	15	16	16	24	24	24	24	24	24	24	24	24	24
7'	7	7	7	7	7	7	12	12	12	12	12	12	12	12	12	20	20	20	20	20	20	20	20	20	20
8'	6	6	6	6	6	6	10	10	10	10	10	10	10	10	10	16	16	16	16	16	16	16	16	16	16

Note: Calculations are based on 5000˚ Kelvin LEDS

Series 2.0's optical assembly is designed to practically eliminate stray light, making it perfect for applications where *light pollution* and/or *light trespass* are important design considerations.

IES format photometrics may be downloaded from www.iolighting.com

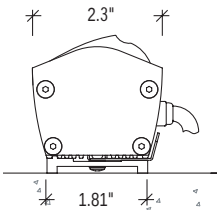
Multipliers for Alternate Light Source Colors	.6	.43	.6	.19	.43
	3000k	RED	GREEN	BLUE	AMBER

Asymmetric

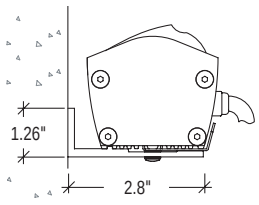
line series 2.0 HO is UL listed for wet locations. It is not rated for submersible applications. line should not be mounted in conditions where there is any standing water whatsoever.

Mounting Options

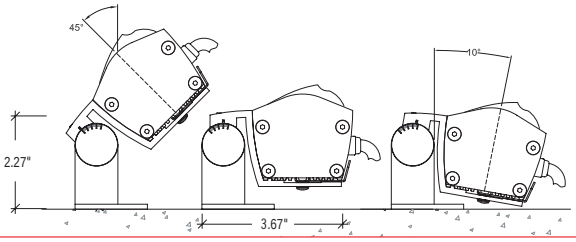
100 surface



101 side surface



102 field adjustable with lockable aiming



Order Code

0	05	□	□□	90	□□□	□	□□	□	□
io	2.0 HO	Location	Color	Distribution	Mounting	Finish	Length	Voltage Dimming	Driver Enclosure

Location
- I Interior
- E Exterior

Color
- 3kHO White 3000˚K
- 5kHO White 5000˚K
- *R Red
- *G Green
- *B Blue
- *A Amber

**Note: Driver options and details vary from white light. Consult factory for details.*

Distribution
- 90 Asymmetric

Mounting
- 100 Surface
- 101 Side surface
- 102 Field adjustable

Finish
- 1 Anodized Aluminum
- 2 Custom

Length

UNITS		(actual)
18	18"	(17.71")
36	36"	(34.71")
54	54"	(51.71")
72	72"	(68.71")

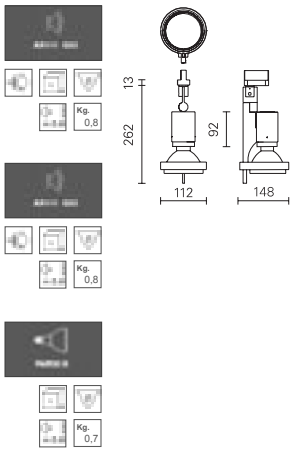
CONTINUOS ROW
Specify Length
i.e. 60'-0"

Voltage Dimming
SIDE FEED STANDARD
- 1 120v
- 2 277v
- 3 120v w/dim
- 4 277v w/dim
- 5 other

Driver Enclosure
- I Interior
- E Exterior
- N Not Req'd

Supplied by electrical contractors

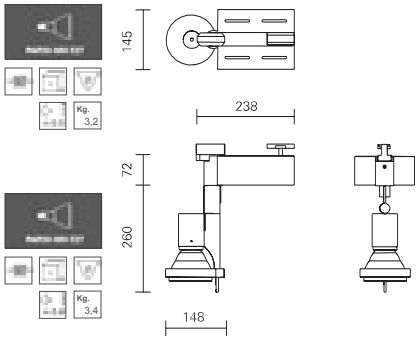
70 Corporate Woods Pkwy Vernon Hills, IL 60061-3107
T 847.735.7000 F 847.735.7001 E info@iolighting.com W iolighting.com



AR111, max 1x50W 230/12v
featuring an electronic transformer with integrated dimmer
and adapter for track fixtures
fixture **34138.__**

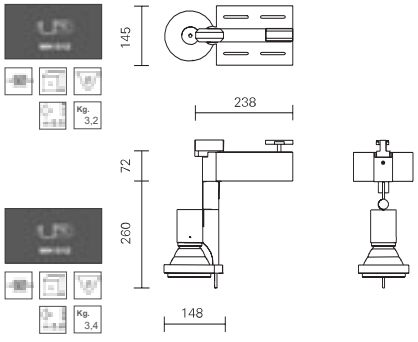
AR111, max 1x100W 230/12v
featuring an electronic transformer
and adapter for track fixtures
fixture **34159.__**

PAR30S, max 75W
with adapter for track fixture
fixture **34158.__**



PAR30 MH, 35W
electromagnetic control gear
complete with control gear
and adapter for track fixtures
fixture **34155.__**

PAR30 MH, 70W
fixture **34156.__**



MH, 35W G12
electromagnetic control gear
complete with control gear
and adapter for track fixtures
fixture with a 9°+9° beam **34150.__**
fixture with a 20°+20° beam **34153.__**

MH, 70W G12
fixture with a 9°+9° beam **34151.__**
fixture with a 20°+20° beam **34154.__**

MH, 150W G12
fixture with a 9°+9° beam **34152.__**
fixture with a 20°+20° beam **34157.__**

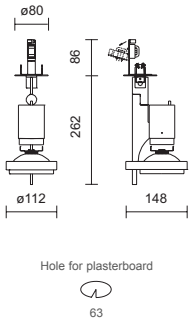
Finish colour code

white

_____.11

glazed grey

_____.82



AR111, max 1x50W 230/12v
recessed fixture
featuring an electronic transformer
with integrated dimmering system
fixture **34136.__**

AR111, max 1x100W 230/12v
recessed fixture
featuring an electronic transformer
fixture **34141.__**

PAR30 S halogen, max 1x75W E27
recessed fixture
fixture **34140.__**

All the fixtures in the SAX series can be adjusted easily and accurately. The wide horizontal (330°) and vertical (±90°) rotation angles ensure absolute flexibility during the designing phase.

Long-lasting, precision locking is guaranteed by the screws on the joints, completely insensitive to any vibrations there may be in the environment.

Finish colour code

white

_____.11

glazed grey

_____.82

SAX80 coloured filters.
Complete the filter code with the finish colour code where necessary.

blue

34181.__

yellow

34183.__

green

34184.__

red

34185.__

SAX130 coloured filters.
Complete the filter code with the finish colour code where necessary.

blue

34171.__

yellow

34173.__

green

34174.__

red

34175.__

Anti-glare louver and concentrating Fresnel lenses for SAX130 only.
Complete the accessories code with the finish colour code where necessary.

CUT-OFF screen

34179.__

Fresnel lens

34178.__

Control gear kit for SAX80 and SAX130 fixtures

electromagnetic control gear SAX130

35140.00 MH 35W
35141.00 MH 70W
35142.00 MH 150W

electronic control gear SAX130

35143.00 MH 35W
35144.00 MH 70W
35145.00 MH 150W

electronic transformer SAX80/130
230v 50 Hz

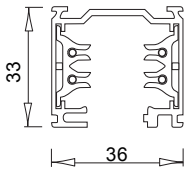
105W code 4.94094.81

Sax **accessories**

Complete the track fixture with the colour code: **_____.11** for white, **_____.27** for black and **_____.21** for anodized.

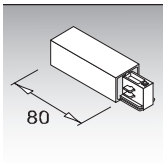
Three-phase track fixture, 16A Class1

Made in extruded aluminium, the 1 mm² section wires are housed inside it, treated to resist oxidation and enclosed in two PVC extruded elements with high insulation resistivity.



Track 1,000 mm long	**35061.__**
Track 2,000 mm long	**35062.__**
Track 3,000 mm long	**35063.__**

Complete track fixture accessories and components with the colour code: **_____.11** for white, **_____.27** for black

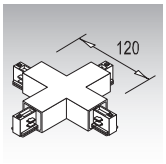


R.H. control gear

35070.__

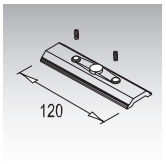
L.H. control gear

35071.__



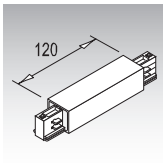
X joint

35077.__



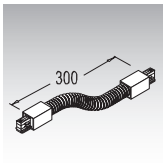
Flat wire
L=120mm

35078.00



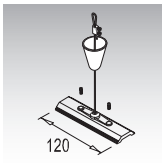
Central control gear and linear joint

35065.__



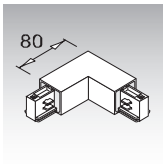
Flexible joint

35066.__



Steel suspension wire kit
h=2000mm

35069.__

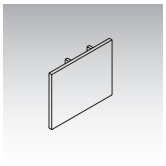


Internal L joint

35067.__

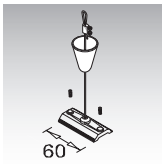
External L joint

35068.__



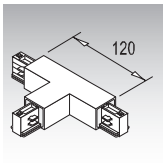
Closing element

35080.__



Steel suspension wire kit
h=2000mm

35074.__

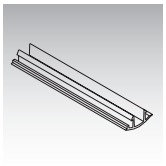


Right T joint

35072.__

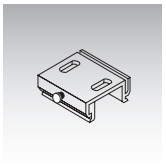
Left T joint

35073.__



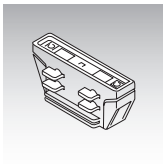
Track cover
L=1000mm

35079.__



Ceiling mounting kit

35081.00



Linear joint with contacts

35075.__

Linear joint without contacts

35076.__

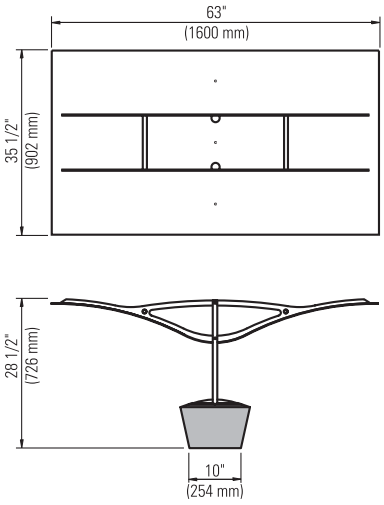
Architectural
Hermes Series

Lumec-Schréder

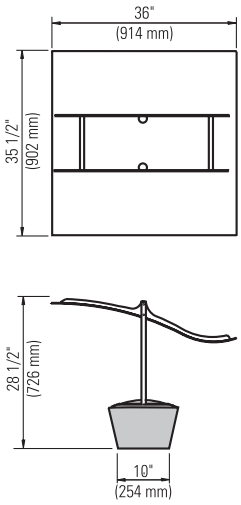
Lumec-Schréder Inc.
800, Curé-Boivin
Boisbriand (Quebec)
Canada J7G 2A7
Tel. : (450) 979-2747
Fax : (450) 979-2749
www.lumecschreder.com

Lumec-Schréder

Dimensions



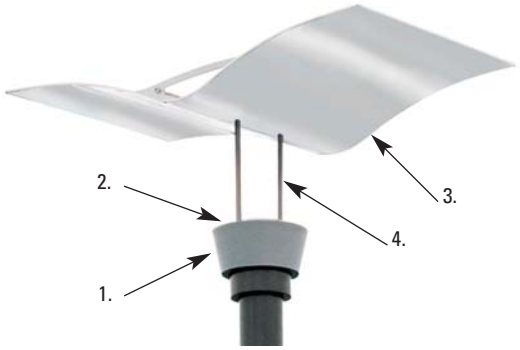
Weight: 66 lbs (30 kg)
EPA: 1.87 sq.ft. (0.174 m²)



Weight: 59 lbs (27 kg)
EPA: 1.32 sq.ft. (0.123 m²)

Hermes Series

1. Housing in cast aluminum, painted and textured finish.
2. Sealsafe optical assembly closed by thermally hardened curved glass (IP66). The ballast tray is incorporated under the optical assembly.
3. Reflector wing in smooth white-painted aluminum. The wing can be symetrical or asymmetrical.
4. Stainless steel rods.



Specification Fields

39 MHT6
70 MHT6
150 MHT6

Specify the mounting height between **15** to **25** feet.

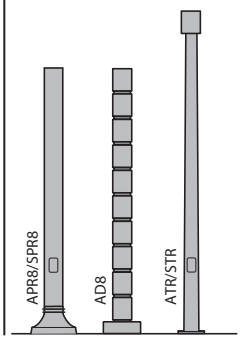
COLTX Standard color textured
SCTX Special Color textured

Luminaire	Lamp	Optic	Voltage	Pole	Mtg. H.	Finish
HER	150MHT6	SYM	120	ATR	25	COLTX

Optic
ASYM
SYM

Voltage
120
208
240
277
347

Pole
ATR Aluminum tapered pole
STR Steel tapered pole
APR8 Aluminum round pole
SPR8 Steel round pole
AD8 Decorative multi-disc aluminum pole



TYPE:

CATALOG#:

Portfolio

DESCRIPTION

A high wattage 4" diameter downlight for use with metal halide T6 lamps. (70W max.) The smooth beam and wide spacing out performs PAR20 and ED17 lamps in downlight applications. The precisely formed non imaging reflector ensures 45° cutoff to lamp and lamp image. The housing system supports interchangeable optics with a lensed wall wash trim.

SPECIFICATION FEATURES

A···Reflector
Two piece reflector system consists of a lower non imaging parabolic reflector, 0.050" spun aluminum available in low iridescent clear, haze, straw, wheat, and specular black Alzak finishes. Upper elliptical reflector, 0.050" spun aluminum, is always specular clear for maximum light delivery. The focal point is within the lower reflector. Soft focus lens eliminates beam striations for a smooth beam and is captive during relamping. Positive reflector mounting via two torsion springs pulls trim tight to ceiling.

SPECIFICATION FEATURES

B···Trim Ring
High impact polymer with satin white finish or self flanged reflector.

C···Housing
Precision die cast aluminum 1 1/2 (38mm) deep collar. Steel housing is painted optical matte black. Reflector/ wallwash trims are keyed to prevent mis-aiming of unit after relamping.

D···Conduit Fittings
Die-cast screw tight connectors.

E···Universal Mounting Bracket
Accepts 1/2" EMT, C channel, T bar fasteners, and bar hangers (See Accessories). Provides 5" total vertical adjustment.

F···Junction Box
Galvanized with (6) 1/2" and (2) 3/4" KOs. Listed for twelve #12AWG (six in, six out) 90°C conductors and feed through branch wiring.

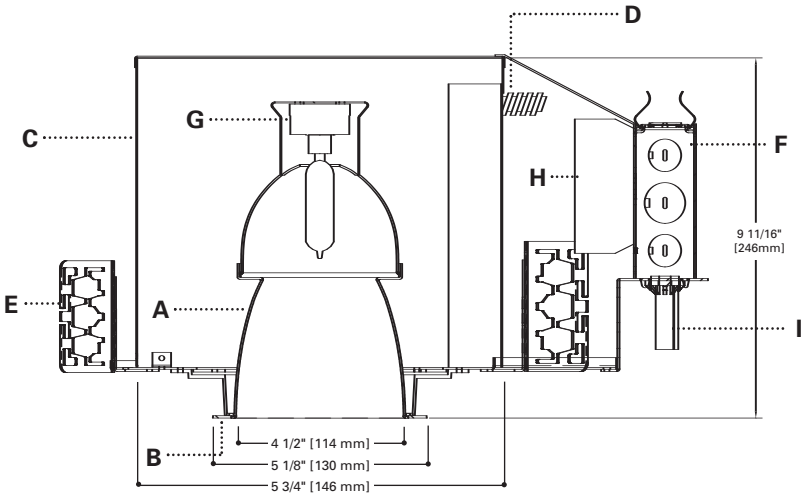
G···Socket
4kV rated G12 Bi Pin socket.

H···Ballast
Thermally protected, Class A electronic ballast provides full light output and rated lamp life. Provides noise free operation and starting. Offers excellent line voltage regulation (+/- 0.5% output variation with +/- 10% changes in line voltage) resulting in increased color stability and flicker free operation. Extended brown-out survival eliminates most lamp drop-outs caused by short term sags of input voltage. Ballast is warrantied against defects in material and workmanship for three years from the date of shipment.

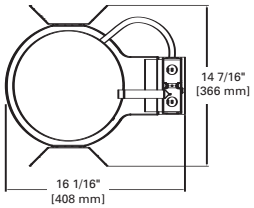
I···Insulation Detector
Self-resetting insulation detector opens circuit if insulation is improperly installed.

Labels
U.L. listed, C.S.A. certified, wet location, IBEW union made.

Options & Accessories
TRM=Metal Trim Rings to replace polymer trim ring
TRR=Rimless Trim Rings for minimal flange appearance in plaster ceilings



Top View



M4xxT6E 4950

39-70W
T6
Electronic Metal Halide

4" MEDIUM BEAM REFLECTOR

ENERGY DATA

Lamp: 39W MH
Input Watts: 120V-44W, 277V-46W
Max Current" 120V 0.37A, 277V-0.17A
Power Factor:>95%
T.H.D.:<10%
Min Starting Temperature: 5°F (-15°C)
Sound Rating: A

Lamp: 70W MH
Input Watts: 120V-78W, 277V-79W
Max Current" 120V 0.67A, 277V-0.29A
Power Factor:>95%
T.H.D.:<10%
Min Starting Temperature: 5°F (-15°C)
Sound Rating: A

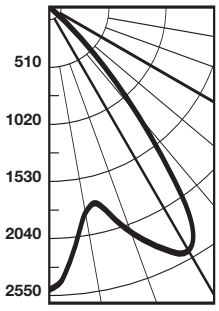
NOTES: Accessories should be ordered separately.
For additional options please consult your Cooper Lighting Representative.
Alzak is a registered trademark of Aluminum Company of America.

ORDERING INFORMATION: Complete unit consists of housing, ballast and trim.

Housing	Ballast	Trims	Finish	Options	Accessories
M439T6=4" 39W T6 Metal Halide **M439T6CP**=4" 39W T6 Metal Halide, Chicago Plenum **M470T6**=4" 70W T6 Metal Halide **M470T6CP**=4" 70W T6 Metal Halide, Chicago Plenum	**1E**=120V 50/60 Hz Electronic **2E**=277V 50/60 Hz Electronic	**4950**=Reflector, Polymer Trim Ring, White **4951**=Reflector, Self Flanged	**LI**=Low Iridescent Clear **H**=Haze **S**=Straw **WH**=Wheat **WMH**=Warm Haze **B**=Black **W**=White	**WF**=White Painted Flange (Self Flanged only)	**HB26**=C Channel Bar Hanger, 26" Long, Pair **HB50**=C Channel Bar Hanger, 50" Long, Pair **RMB22**=Wood Joist Bar Hanger, 22" Long, Pair **HSA4**=Slope Adapter for 4" Aperture Housings, Specify Slope **TRM4**=Metal Trim Ring, Specify Finish **TRR4**=Rimless Trim Ring, White **FK**=Field Installed Fuse Kit, Specify Amperage

PHOTOMETRICS

Candlepower Distribution



Test No. H39130
M4T6-4950LI
Lamp=CDM70/T6/830
Lumens=6200
Spacing Criteria=1.1
Efficiency=55.3%

Candlepower

Deg.	CD
0	2493
5	2233
15	1814
25	2313
35	2113
45	398
55	52
65	22
75	10
85	2
90	0

Average Luminance

Deg.	CD/SQ M
45	54835
55	8832
65	5071
75	3764
85	2236

Cone of Light

Distance to Illuminated Plane	Initial Nadir Footcandles	Beam Diameter
5'6"	82	6'0"
6'6"	59	7'0"
8'0"	39	9'0"
10'0"	25	11'0"
12'0"	17	13'0"
14'0"	13	15'6"

Beam diameter is to 50% of maximum footcandles, rounded to the nearest half-foot.

Footcandle values are initial, apply appropriate light loss factors where necessary.

Finish Multiplier:
Haze=0.95
Black=0.70
Straw=0.90
Wheat=0.90

Zonal Lumen Summary

Zone	Lumens	%Lamp	%Luminaire
0-30	1804	29.1	52.7
0-40	3024	48.8	88.3
0-60	3391	54.7	99.0
0-90	3426	55.3	100.0
90-180	0	0.0	0.0
0-180	3426	55.3	100.0

Coefficient of Utilization

rc	80%				70%			50%		30%		10%		0%
rw	70	50	30	10	50	30	10	50	10	50	10	50	10	0
RCR														
0	66	66	66	66	64	64	64	61	61	59	59	56	56	55
1	62	61	59	58	59	58	57	57	55	55	53	53	52	51
2	59	56	53	51	55	53	51	53	49	51	48	50	47	46
3	55	51	48	46	51	48	45	49	45	48	44	46	43	42
4	52	47	44	41	47	43	41	45	40	44	40	43	39	39
5	49	44	40	37	43	40	37	42	37	41	36	40	36	35
6	46	40	37	34	40	36	34	39	34	38	33	37	33	32
7	43	37	34	31	37	33	31	36	31	35	30	35	30	29
8	41	35	31	28	34	31	28	34	28	33	28	32	28	27
9	38	32	29	26	32	28	26	31	26	31	26	30	26	25
10	36	30	26	24	30	26	24	29	24	29	24	28	24	23

rc=Ceiling reflectance, rw=Wall reflectance, RCR=Room cavity ratio

CU Data Based on 20% Effective Floor Cavity Reflectance.

Note: Specifications and Dimensions subject to change without notice.

Visit our website at www.cooperlighting.com

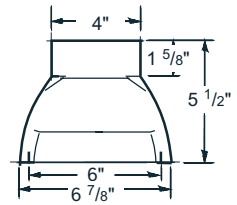
COOPER Lighting

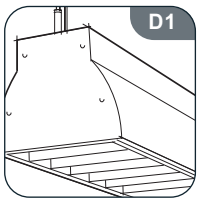
Customer First Center 1121 Highway 74 South Peachtree City, GA 30269 770.486.4800 FAX 770 468.4801 ADP030526
Cooper Lighting 5925 McLaughlin Rd. Mississauga, Ontario, Canada L5R 1B8 905.507.4000 FAX 905.568.7049

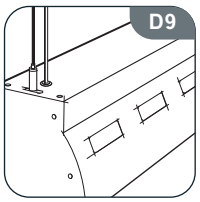
Type
Job Name
Catalog Number

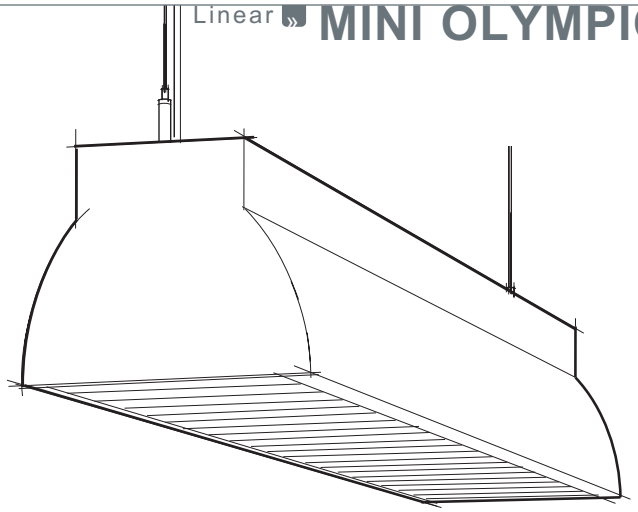
Linear

MINI OLYMPIC









ordering

lamp series/rows	nominal length	shielding	color/finish	distribution	circuiting	voltage	mounting	ceiling system	options
M-OLY-									
1T8	04'	SPL* silver parabolic louver	TMW* textured matte white	D1 direct	SC single circuit	120	CA48"* aircraft cable (adjustable)	X1* exposed T-bar	EML
2T8	08'	PRA prismatic acrylic lens	YGW gloss white	D9 semi-direct (89/11)	DC* dual circuit (in-line)	277	CA96" aircraft cable (adjustable)	X3 hard ceiling	EMH
1T5	R__*	*standard	Y__ premium color		*2 lamp only	347*	CA144" aircraft cable (adjustable)	X6 slot grid	DM
2T5	*row length		CC custom color			*T8 only & T5HO only	SSC__ top-swivel stem mount (specify length in inches)	*standard	RSE*
1T5HO			CCA clear commercial anodized				SUR surface mount		10THD*
2T5HO			GLV galvanized				*standard		B__
			*standard						FH
									BSH**
									*T8 only **stem-mounting only

Applications Classrooms, conference rooms, libraries, offices, retail.

Features A compact linear direct or semi-direct lighting system. Aluminum semi-specular parabolic louver is 1 1/2" high, 2 3/8" on center and provides a 34° longitudinal shielding. Optional slotted top housing offers a semi-direct distribution for illuminating ceilings when stem- or cable-hung. Finish plates can be removed for continuous-row installation. Fixtures are aligned and secured together by bolting through alignment holes in end plates.

Construction The housing, available in 4- or 8-foot standard lengths, is formed of 20-gauge steel. Finish plates are 18-gauge steel.

Finish The standard exterior body color is textured matte white (TMW) or optional gloss white (YGW) using polyester powder paint. Refer to ordering matrix for optional metal finishes or refer to **Defining Section** for optional paint colors. Finish plates, canopies and stems are painted black when CCA finish specified; all others match body color unless otherwise specified. Galvanized fixtures come with galvanized canopies and pewter stems when stem mounting specified, unless other finish specified.

Electrical T8 fixtures have instant-start electronic ballasts with less than 20% THD. T5/HO fixtures have programmed-start electronic ballasts with less than 10%THD. Fixtures are U.L. Damp labeled and I.B.E.W. manufactured. Maximum ballast size available: 2 3/8" width x 1 1/2" height.

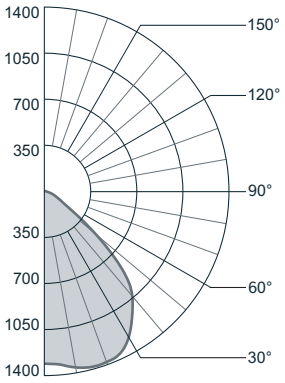
Mounting Fixture is surface-mounted or suspended with aircraft cables or stems.

Options **EML**: emergency battery (T8=600-700 lumens, T5/HO=600-700 lumens); **EMH**: emergency battery (T8=1100-1400 lumens, T5/HO=1100-1400 lumens); **DM**: dimming (consult factory); **RSE**: rapid-start electronic (T8 only); **10THD**: ballast with <10% total harmonic distortion (T8 only); **B_**: specific ballast, specify manufacturer and catalog number (consult factory); **FH**: fixture fusing (slow blow); **BSH**: longitudinal body sway hanger (stem-mounting only).

photometric data

M-OLYP-2T8-04-SPL-CCA-D1

Report # LSI19184 D=100% I=0.0%
Spacing Criteria: Along 1.2 Across 1.4
Lamp Lumens: 2950 Input Watts: 57



Candlepower Summary

Vertical Angle	Horizontal Angle 0°	22.5°	45°	67.5°	90°	Output Lumens
0	1311	1311	1311	1311	1311	
5	1311	1301	1307	1317	1321	127
10	1280	1278	1311	1348	1360	
15	1234	1246	1308	1363	1384	368
20	1179	1210	1286	1354	1383	
25	1114	1162	1244	1322	1363	570
30	1039	1099	1181	1247	1285	
35	953	1018	1087	1122	1165	667
40	852	917	954	982	1042	
45	738	791	793	813	838	603
50	605	639	608	541	518	
55	428	445	392	283	252	330
60	219	225	192	143	148	
65	89	88	80	89	100	96
70	41	38	34	51	65	
75	22	19	16	22	31	24
80	11	9	8	9	11	
85	4	3	3	3	4	4
90	0	0	0	0	0	

Zonal Lumen Summary

Zone	% Lamp	% Luminaire
0-90	47.28	100.00
90-180	0.00	0.00

Efficiency = 47.3%

Luminance Summary (cd/m²)

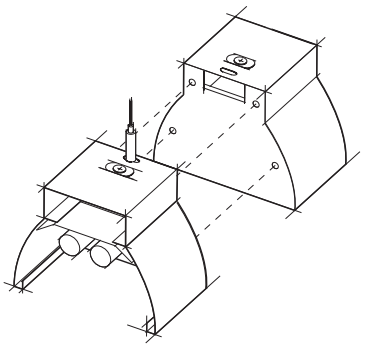
Angle	0°	45°	90°
45	6162	6646	7017
55	4404	4052	2601
65	1239	1127	1397
75	501	368	707
85	255	189	260

Coefficients of Utilization (%)

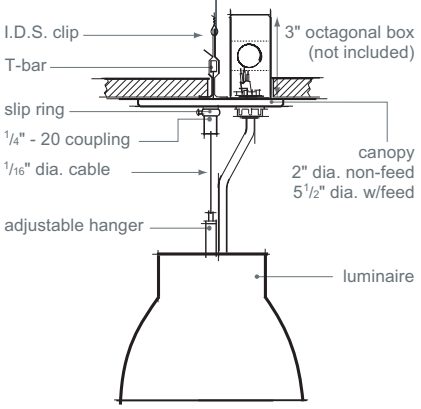
Floor	effective floor cavity reflectance = .20										
Ceiling	80				70				50		
Wall	70	50	30	10	70	50	30	10	50	30	10
RCR **0**	56	56	56	56	55	55	55	55	53	53	53
1	53	51	50	49	52	50	49	48	48	47	46
2	50	47	44	42	49	46	44	42	44	43	41
3	46	42	40	37	45	42	39	37	41	38	36
4	43	39	35	33	42	38	35	33	37	34	32
5	40	35	31	29	39	34	31	29	33	31	28
6	37	32	28	26	36	31	28	26	31	28	25
7	34	29	25	23	34	28	25	23	28	25	22
8	32	26	22	20	31	26	22	20	25	22	20
9	29	23	20	17	29	23	20	17	23	19	17
10	27	21	18	15	27	21	18	15	21	17	15

installation

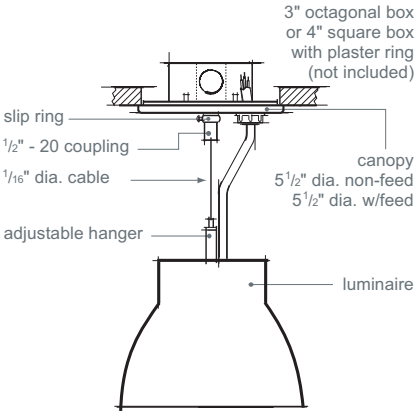
Adjoining Detail



Suspension (x1)

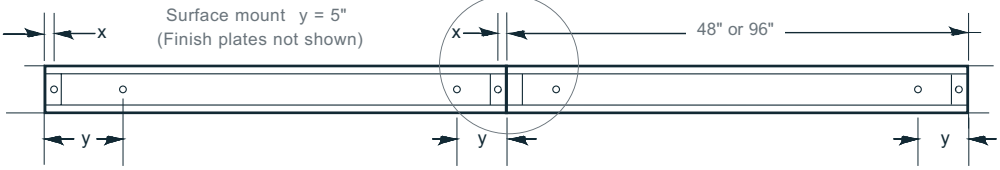


Suspension (x3)



Mounting Locations

Cable mount x = 1/4"
Cable/cord mount x = 1/4"
Stem mount x = 1 1/2"
Surface mount y = 5"
(Finish plates not shown)

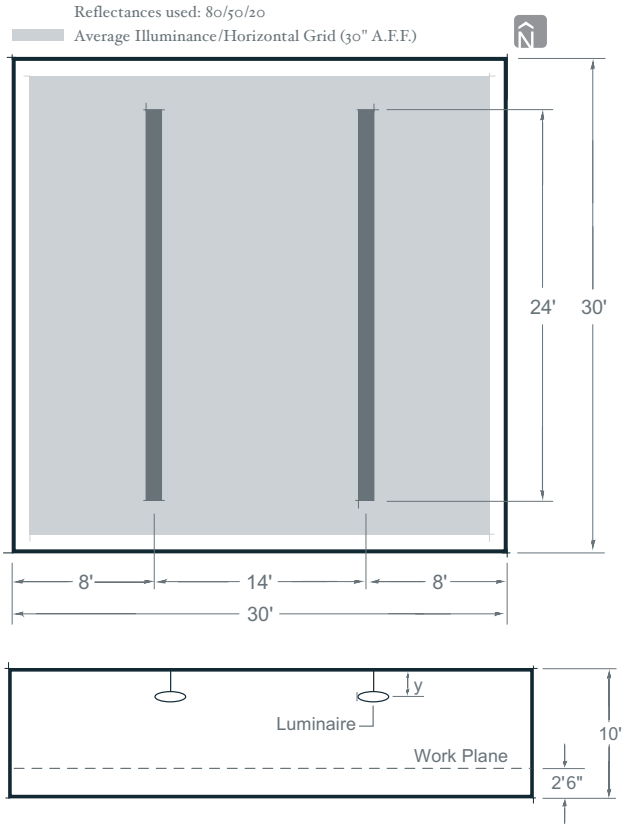


Note: When connecting two or more fixtures in a row, mounting assemblies are required on both ends of the first fixture, with only one mounting assembly required on each additional fixture.

In an effort to continually provide the highest quality products, Prudential reserves the right to change design specifications and/or materials, without notice.

classroom application

30' x 30' x 10' Classroom Layout



2 Rows on 14' Centers – M-OLYP-2T8-SPL-CCA-D1

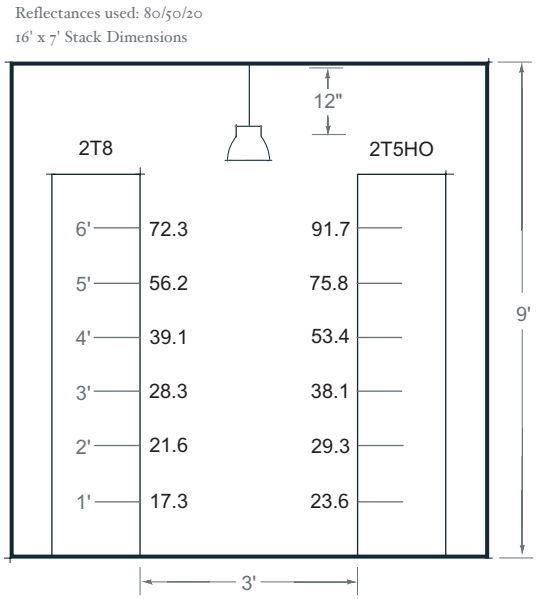
Overall Suspension ceiling to center of lamp	Average Illuminance maintained (LLF = .74)	North Wall Average maintained	Ceiling Uniformity between fixtures	Watts/ Square Foot
12"	34.9 FC	6.8 FC	1.5	.76
18"	35.8 FC	6.3 FC	1.5	.76
24"	36.3 FC	5.9 FC	1.2	.76

2 Rows on 14' Centers – M-OLYP-1T5HO-SPL-CCA-D9

Overall Suspension ceiling to center of lamp	Average Illuminance maintained (LLF = .85)	North Wall Average maintained	Ceiling Uniformity between fixtures	Watts/ Square Foot
12"	38.9 FC	9.6 FC	1.7	.72
18"	39.6 FC	9.2 FC	1.7	.72
24"	40.5 FC	8.8 FC	1.7	.72

stack lighting application

10' x 20' x 9' Room Dimensions



16' Single Fixture – M-OLYP-2T8-04'-SPL-D9 Vertical Footcandles

Overall Suspension ceiling to center of lamp	Average Illuminance maintained (LLF = .74)	Max FC	FC's 1' A.F.F.
12"	35.2 FC	72.3	17.3

16' Single Fixture – M-OLYP-2T5HO-04'-SPL-D9 Vertical Footcandles

Overall Suspension ceiling to center of lamp	Average Illuminance maintained (LLF = .85)	Max FC	FC's 1' A.F.F.
12"	46.2 FC	91.7	23.6

iCOLOR COVE MX POWERCORE

iColor® Cove MX Powercore is the highest-intensity member of the Color Kinetics® iColor Cove® family of intelligent color changing cove lights, offering more than double the intensity of any other model in the line. This high-performance 12 inch (30.5 cm) cove light features patent-pending Powercore™ technology for greater operational efficiency and simplified installation.

iColor Cove MX Powercore utilizes the patent-pending Powercore technology, a digital power processing technology to drive LED systems, integrating power and data management directly into the fixture and eliminating the need for an external power supply. Powercore surpasses traditional power supply technology by streamlining multiple conversion and regulation stages into a single, flexible, microprocessor-controlled power stage that controls power output to LED systems directly from line voltage and significantly increases overall system efficiency. Built-in active power factor correction (PFC) yields higher system efficiencies and minimizes stress on building wiring, making the installation and system more cost effective.

iColor Cove MX Powercore meets specifications for dry locations. The integral, two-point mounting bracket simplifies installation and minimizes required tools, and permits 180 degrees of rotation, with detents every 10 degrees. The end-to-end locking connectors, capable of making 180° turns, make iColor Cove MX Powercore extremely versatile and easily adaptable for even the most challenging mounting requirements. An optional mounting track is available for linear runs.

iColor Cove MX Powercore receives data via Color Kinetics' Data Enabler—a data formatting device that accepts DMX or Color Kinetics Light System Manager (LSM) Ethernet protocol. Each Data Enabler can support to 60 fixtures at 120VAC, 90 fixtures at 220VAC or 95 fixtures 240VAC for a single run, end-to-end installation. The 30-foot (9 m) leader cable is field-cuttable and a one-foot (30 cm) jumper cable is available for installations that require spacing between units. iColor Cove MX Powercore can be controlled by Color Kinetics' line of controllers, including Color Kinetics Light System Manager, or a third-party DMX controller.

iCOLOR COVE MX POWERCORE SPECIFICATIONS

COLOR RANGE	16.7 million (24bit) additive RGB colors; continuously variable intensity
SOURCE	High intensity LEDs
BEAM ANGLE	60° x 60°
HOUSING	Die cast aluminum, powder coated. 12" x 1.65" x 1.54" (30 cm x 4.2 cm x 3.9 cm)
CONNECTORS	Integral male/female connectors
LISTINGS	C-UL US listed, CE certified

COMMUNICATION SPECIFICATIONS

DATA INTERFACE	Color Kinetics Data Enabler
CONTROL	Color Kinetics full line of controllers including Light System Manager or other DMX512 (RS485) sources

ELECTRICAL SPECIFICATIONS

POWER REQUIREMENT	100-240VAC, 50-60 Hz
POWER CONSUMPTION	12W at full output
POWER FACTOR	0.95 or greater at 120VAC
LEADER CABLE	30-ft (9m) iColor Cove MX Leader Cable Item# 108-000021 (30-ft)
JUMPER CABLE	1-ft (0.3m) iColor Cove MX Jumper Cable Item# 108-000022-00 (1-ft)

ENVIRONMENTAL SPECIFICATIONS

TEMPERATURE RANGE	-4˚F to 122˚F (-20˚C to 50˚C) based on testing of specific product

SOURCE LIFE

Color Kinetics illumination products utilize high brightness LEDs as the illumination source. LED manufacturers predict LED life of up to 100,000 hours MTBF (mean time between failure), the standard used by conventional lamp manufacturers to measure source life. However, like all basic light sources, LEDs also experience lumen depreciation over time. So while LEDs can emit light for an extremely long period of time, MTBF is not the only consideration in determining useful life. LED lumen depreciation is affected by numerous environmental conditions such as ambient temperature, humidity and ventilation. Lumen depreciation is also affected by means of control, thermal management, current levels, and a host of other electrical design considerations.

Color Kinetics systems are expertly engineered to optimize LED life when used under normal operating conditions [ambient temperature: -4˚F to 104˚F (-20˚C to 40˚C), humidity: 0-95% non-condensing humidity, adequate ventilation and air volume] and when operated using typical color-changing effects. Long-term operation outside of these ranges or conditions, or at the upper limits of these ranges or conditions, may subject the product to further degradation of the LED source life, or in extreme cases, failure of internal components. Source life information is based on LED manufacturers' data, as well as other third party testing.

CHROMACORE® BY COLOR KINETICS

POWERCORE™ BY COLOR KINETICS

OPTIBIN® BY COLOR KINETICS

DRY

CE c UL us LISTED 13PE

ITEM# 123-000004-00

BRO143 Rev 01

Specifications subject to change without notice.

COLOR KINETICS INCORPORATED • 10 MILK STREET, SUITE 1100 • BOSTON, MA 02108 • USA
TEL 888 FULL RGB • TEL 617 423 9999 • FAX 617 423 9998 • INFO@COLORKINETICS.COM • WWW.COLORKINETICS.COM

iCOLOR COVE MX POWERCORE

PHOTOMETRIC PERFORMANCE

Photometric data is based on test results from an independent testing lab.

SOURCE SPECIFICATIONS

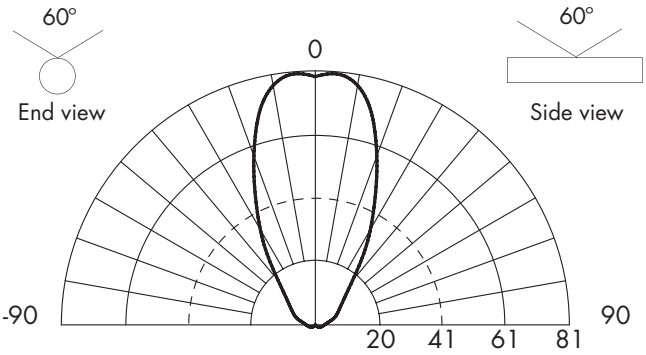
Optics:	Soft-focus polycarbonate lens
Source:	18 LEDs (6 Red, 6 Green, 6 Blue)
Beam Angle:	60° x 60° (at 50% of peak illuminance)
Distribution:	Symmetric direct illumination
CCT:	Adjustable 1,000–10,000K
CRI:	Not measurable (CIE 13.3-1995)

ILLUMINANCE DISTRIBUTION

0.3 / 3.2	0.6 / 6.5	0.8 / 8.6	0.6 / 6.5	0.4 / 4.3	0.3 / 3.2	3.0′/1.0m
0.6 / 6.5	3.1 / 33.4	5.5 / 59.2	3.5 / 37.7	0.9 / 9.7	0.4 / 4.3	
0.8 / 8.6	5.5 / 59.2	12.0 / 129.2	10.1 / 108.7	3.5 / 37.7	0.6 / 6.5	0′/0m
0.6 / 6.5	3.5 / 37.7	10.1 / 108.7	12.0 / 129.2	5.5 / 59.2	0.8 / 8.6	
0.4 / 4.3	0.9 / 9.7	3.5 / 37.7	5.5 / 59.2	3.1 / 33.4	0.6 / 6.5	
0.3 / 2.2	0.4 / 4.3	0.6 / 6.5	0.8 / 8.6	0.6 / 6.5	0.3 / 3.1	3.0′/1.0m
3.0′/1.0m		0′/0m			3.0′/1.0m	

Units: Footcandles (top)/Lux (bottom)
Location: Centered 1′/0.3m from, and perpendicular to, surface
Multipliers: 0.44 Red, 0.43 Green, 0.13 Blue
Measured on white, reflectance model: 50%

CANDLE POWER DISTRIBUTION



Measured on: White
Beam center: 81 cd
Thin dashed lined: Indicates 50% of peak
Multipliers: 0.44 Red, 0.43 Green, 0.13 Blue

ILLUMINANCE

DISTANCE	3′ / 1m	6′ / 2m	9′ / 3m	15′ / 5m
WHITE	8.1 / 87.2	2.1 / 22.6	1.0 / 10.8	0.3 / 3.2
RED	3.6 / 38.4	0.9 / 9.9	0.4 / 4.7	0.1 / 1.4
GREEN	3.5 / 37.4	0.9 / 9.7	0.4 / 4.7	0.1 / 1.4
BLUE	1.1 / 11.3	0.3 / 2.9	0.1 / 1.4	0.0 / 0.4

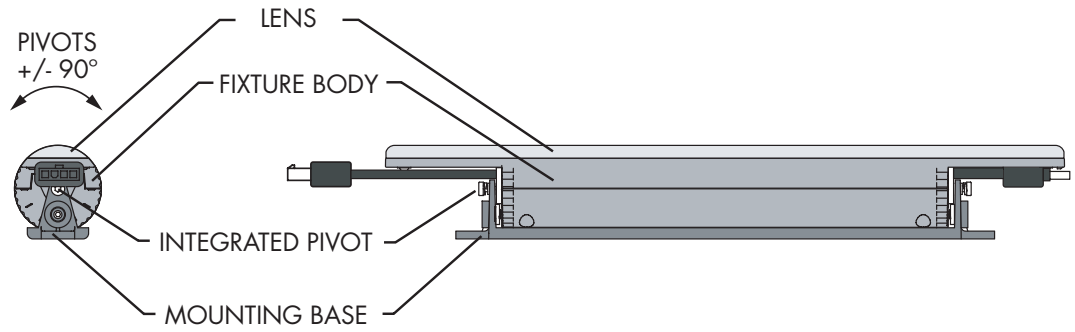
Measured in Footcandles (top)/Lux (bottom) on axis.
Measured on white, reflectance 0

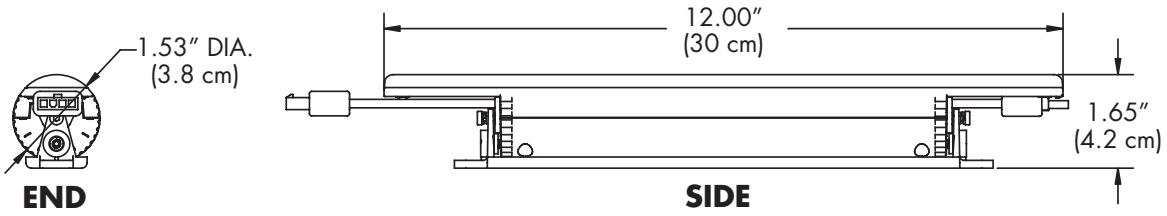
LIGHT OUTPUT

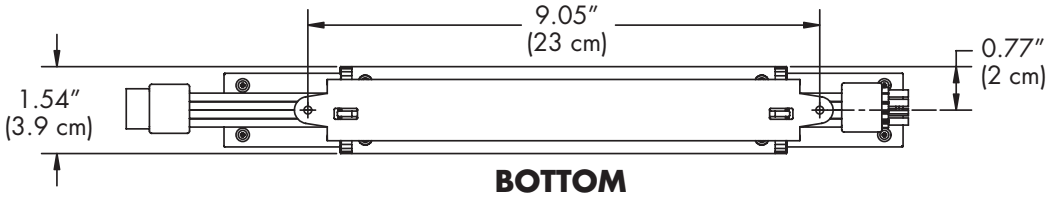
COLOR	TOTAL OUTPUT (LUMENS)	POWER (WATTS)	EFFICACY (lm/W)
WHITE	102	18.4	5.5
RED	44.9	17.5	2.6
GREEN	43.9	17.5	2.5
BLUE	13.3	17.9	0.7

iCOLOR COVE MX POWERCORE

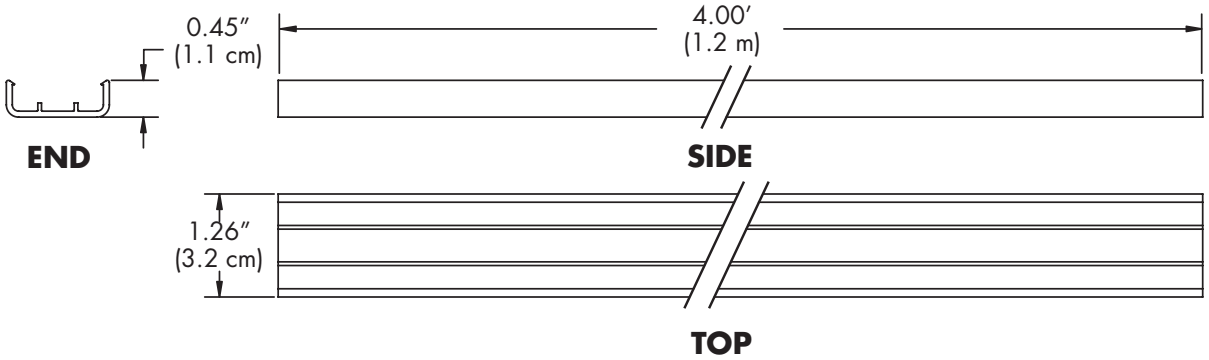
PHYSICAL DIMENSIONS







OPTIONAL MOUNTING TRACK

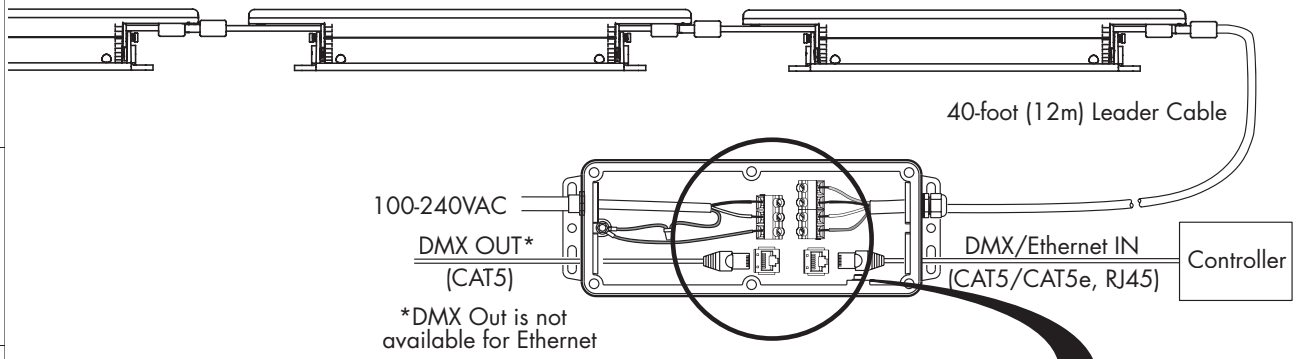


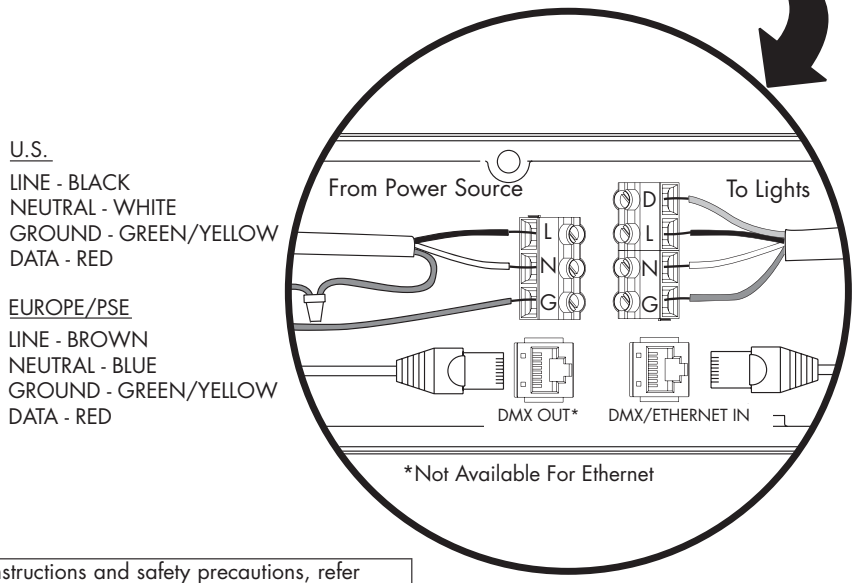
iColor Cove MX Powercore SPECIFICATIONS	
DATA/POWER CONNECTOR	Over-molded cable assembly
POWER REQUIREMENT	100-240VAC
WEIGHT	0.8 lbs (0.36 kg)

iCOLOR COVE MX POWERCORE

FUNCTIONAL FLOW DIAGRAM

End-to-End Connection
Maximum lights per Data Enabler: 60 (120VAC), 90 (220VAC) or 95 (240VAC)
To calculate the number of fixtures per Data Enabler for your installation,
refer to the *Fixture Calculation Calculator* located at
www.colorkinetics.com/support/install_tool





For complete installation instructions and safety precautions, refer to the iColor Cove MX Powercore User Guide and wiring diagrams located at www.colorkinetics.com/support.

Additional Items	
Data Device	Data Enabler (ITEM# 106-000003)
Controller	Any Color Kinetics controller or DMX512 compatible controller
Cable	Leader Cable (ITEM# 108-000021-00, US; 108-000021-02, EU)
Address Unit	Serial Addressing Software (SAS) or Zapi (ITEM# 103-000005-00/01)

OPTIBIN®

There are inherent variations in the fabrication processes of all semiconductor materials. For LEDs, this variance results in differences in the color and intensity of light output as well as electrical characteristics. Due to these differences, LED manufacturers sort production into "bins," but insuring the availability of a single bin is very difficult. To minimize this issue and achieve optimal color consistency in its products, Color Kinetics has developed and uses a proprietary technology called Optibin. Optibin is an advanced production binning optimization process that minimizes the effects of LED variance for the best possible output uniformity in the final product. Color Kinetics Optibin technology gives the most consistent control of color and intensity from product to product.

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DATA ENABLER

Color Kinetics® Data Enabler is a data formatting device specifically designed for Color Kinetics fixtures which feature Powercore™ digital power processing technology. Data Enabler's data drivers condition data supplied from Ethernet or DMX512 controllers, including Color Kinetics full line of controllers, to a format compatible with the fixtures. The integration of power and data simplifies wiring installations, and the selection of control configurations expands the versatility of the applications.

Data Enabler automatically accommodates a universal supply voltage ranging from 100 to 240 volts AC, 50/60 Hz where the maximum connected load does not exceed 20 Amps. The input and output line voltage connections are made to terminal blocks. Data Enabler is available for either DMX, for use with Color Kinetics controllers or third-party DMX512 controllers; or Ethernet, for use with Color Kinetics Light System Manager. All data connections are made using the input RJ45 terminal. For DMX applications, data can be daisy chained between multiple Data Enablers using the output RJ45 terminal.

Data Enabler is housed in a compact NEMA 4 (IP66) enclosure designed for use in wet locations and complies with National Electrical Code (NEC) requirements. Each Data Enabler features multiple conduit entries sized for 3/4-inch NPT 59/64" conduit.

FEATURES

- Economical
- Compact size
- Ease of installation
- Ethernet/DMX ready
- Wet/damp NEMA 4 housing
- Choice of intelligent data drivers

DRY

WET & DAMP

c UL us LISTED 13PE

ITEM# 106-000003-04 (DMX)
106-000003-05 (Ethernet)

DATA ENABLER SPECIFICATIONS

POWER INPUT	100-240VAC, 50-60 Hz Max. connected load should not exceed 20 Amps
INTERNAL LOAD	10 Watts
HEAT DISSIPATION	10 Watts Max.
AMBIENT OPERATING TEMP	-4°F to 122°F (-20°C to 50°C)
HOUSING	NEMA 4 enclosure: 9.7" (24.6 cm) X 3.5 " (8.9 cm) X 3.2" (8.1 cm)
CONNECTORS	Power In: 3-wire terminal block connector Power/Data Out: 4-wire terminal block connector
DATA INPUT INTERFACE	**ETHERNET**: Color Kinetics Light System Manager Ethernet **DMX**: Color Kinetics DMX controllers or DMX512 compatible
PROTECTION RATING	IP66
LISTINGS	C-UL US listed, CE listed

U.S. AND FOREIGN PATENTS AND PATENTS PENDING

BRO133 Rev 02

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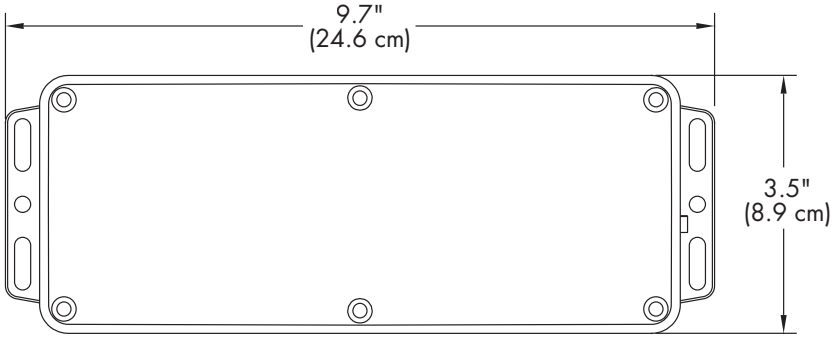
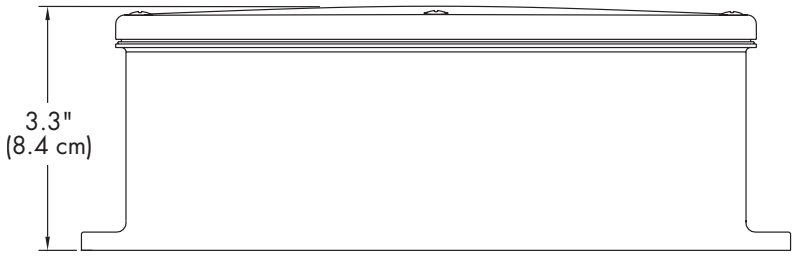
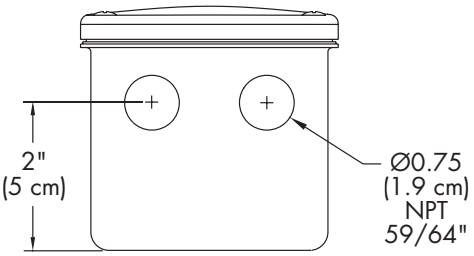
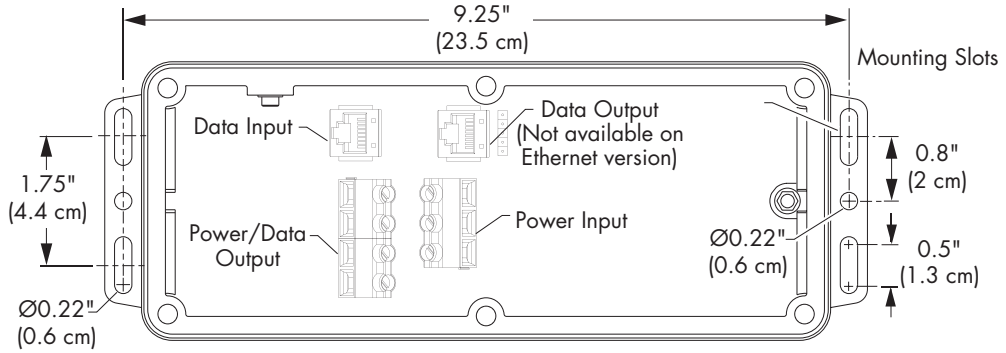
OVERALL DIMENSIONS







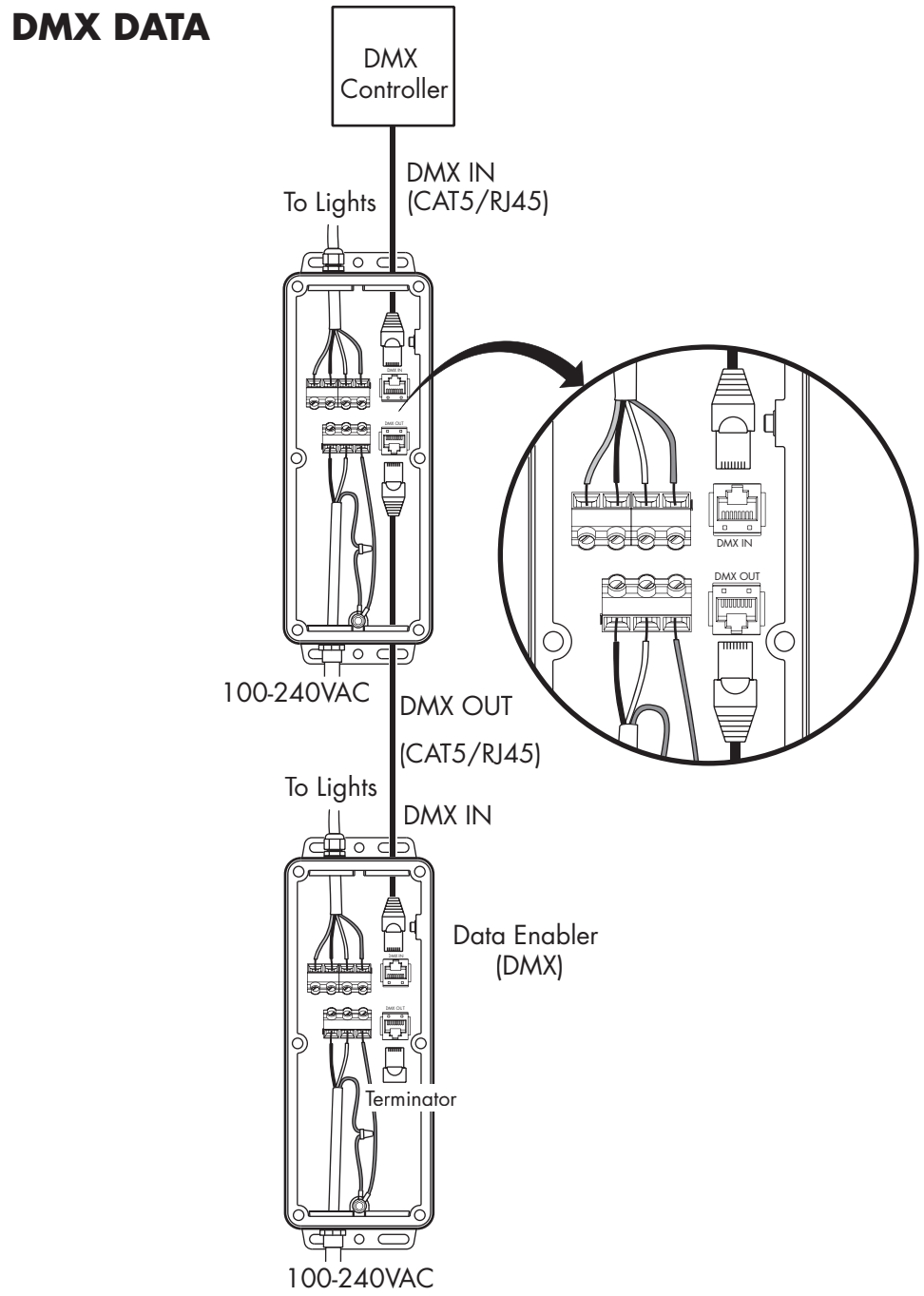
MOUNTING DIMENSIONS



DATA ENABLER ITEM# 106-000003-04/05	
DATA CONNECTOR	Input and output: RJ45
OUTPUT CONNECTOR	4-pin terminal block
SUPPLY CONNECTOR	3-pin terminal block
WEIGHT	Approx. 2.5 lbs. (2 kg)

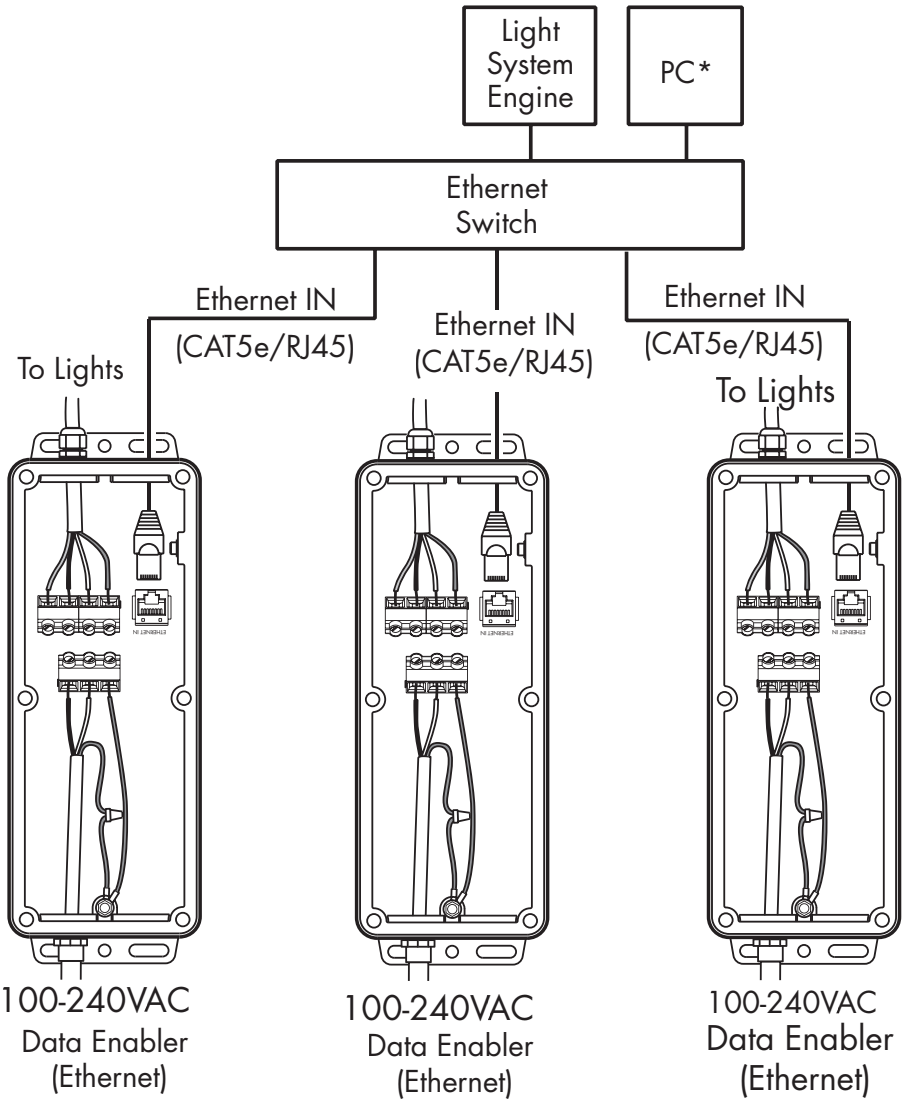
DATA ENABLER

FUNCTIONAL FLOW DIAGRAM



For complete installation instructions and safety precautions, refer to the Data Enabler User Guide and wiring diagrams located at www.colorkinetics.com/support

ETHERNET DATA



* PC used for show authoring and show control.

For complete installation instructions and safety precautions, refer to the Data Enabler User Guide and wiring diagrams located at www.colorkinetics.com/support

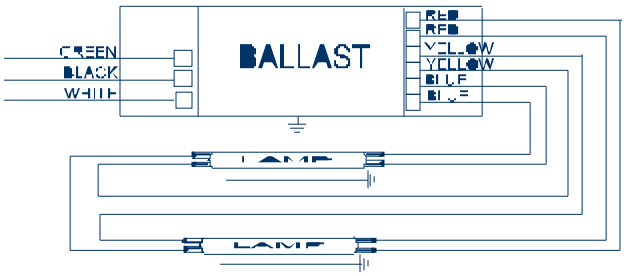
ICN-2S24@277V

Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F24T5/HO	1	0	0/-18	0.10	27	1.02	10	0.98	1.7	3.78
* F24T5/HO	2	0	0/-18	0.19	52	1.00	10	0.98	1.7	1.92
F39T5/HO	1	39	0/-18	0.15	40	0.90	10	0.98	1.7	2.25
FC12T5	1	40	0/-18	0.15	40	0.84	10	0.98	1.7	2.10
FC9T5	1	22	0/-18	0.10	27	1.02	10	0.98	1.7	3.78
FC9T5	2	22	0/-18	0.19	52	1.00	10	0.98	1.7	1.92
FT24W/2G11	1	24	0/-18	0.10	27	1.02	10	0.98	1.7	3.78
FT24W/2G11	2	24	0/-18	0.19	52	1.00	10	0.98	1.7	1.92
FT36W/2G11	1	36	0/-18	0.13	34	0.90	10	0.98	1.7	2.65
FT40W/2G11/RS	1	40	0/-18	0.17	47	1.00	10	0.98	1.7	2.13

Wiring Diagram



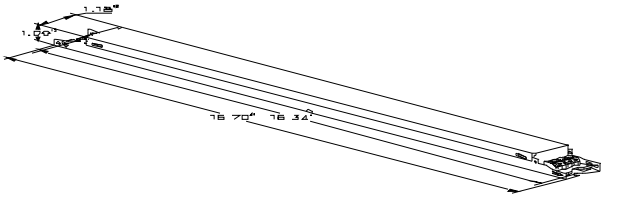
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black	0	0
White	0	0
Blue	0	0
Red	0	0
Yellow	0	0
Gray	0	0
Violet	0	0

	in.	cm.
Yellow/Blue	0	0
Blue/White	0	0
Brown	0	0
Orange	0	0
Orange/Black	0	0
Black/White	0	0
Red/White	0	0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
16.70 "	1.18 "	1.00 "	16.34 "
16 7/10	1 9/50	1	16 17/50
42.4 cm	3 cm	2.5 cm	41.5 cm

Revised 09/01/2004

Data is based upon tests performed by Advance Transformer in a controlled environment and representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

ADVANCE TRANSFORMER CO.
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Corporate Offices: Phone: 800-322-2086

ICN-2S24@277V	
Brand Name	CENTIUM T5
Ballast Type	Electronic
Starting Method	Programmed Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	50/60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Programmed Start.

2.2 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.

2.3 Ballast shall operate from 50/60 Hz input source of _____ (120V through 277V or 347V through 480V) with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.

2.4 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.

2.5 Ballast shall have a Power Factor greater than 0.98 for primary lamp.

2.6 Ballast shall have a minimum ballast factor of 1.00 for primary lamp application.

2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 20% for Standard models and THD of less than 10% for Centium models when operated at nominal line voltage with primary lamp.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of -18C (0F) or -28C (-20F) for primary lamp. Consult lamp manufacturer for temperature versus lamp characteristics.

2.11 Ballast shall provide Lamp EOL Protection Circuit.

2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.

2.13 Ballast shall have a hi-low switching option when operating (4) F54T5/HO lamps to allow switching from 4-2 lamps, 3-2 lamps or 3-1 lamp.

2.14 Four lamp ballast shall have semi-independent lamp operation.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9001:2000 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C. Ballasts with a "90C" designation in their catalog number shall also carry a three-year warranty at a maximum case temperature of 90C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance Transformer part # _____ or approved equal.

Revised 09/01/2004

Data is based upon tests performed by Advance Transformer in a controlled environment and representative of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice. All specifications are nominal unless otherwise noted.

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TELEPHONE: (847) 390-5000 FAX: (847) 390-5109

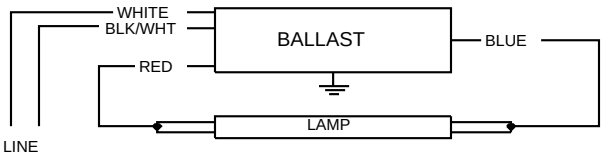
VCN-132-MC

Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F21T5	1	21	50/10	0.10	27	1.10	10	0.98	1.7	4.07
F25T8	1	25	0/-18	0.09	25	0.98	10	0.98	1.7	3.92
* F28T5	1	28	50/10	0.11	30	0.98	10	0.99	1.7	3.27
F32T8	1	32	0/-18	0.11	30	0.98	10	0.98	1.7	3.27
F32T8/ES (30W)	1	30	60/16	0.10	28	0.98	10	0.98	1.7	3.50

Wiring Diagram



Diag. 63

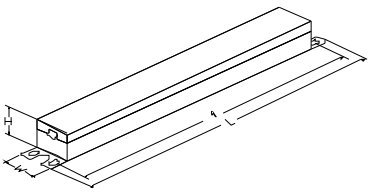
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White	25L	63.5
Blue	31R	78.7
Red	37L	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	25L	63.5
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.08 "	1.05 "	8.91 "
9 1/2	1 2/25	1 1/20	8 91/100
24.1 cm	2.7 cm	2.7 cm	22.6 cm

Revised 07/23/2004

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Customer Support/Technical Service: Phone: 800-372-3331 · Fax: 630-307-3071
Corporate Offices: Phone: 800-322-2086

VCN-132-MC	
Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Instant Start.

2.2 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.

2.3 Ballast shall operate from 50/60 Hz input source of 120V or 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast. IntelliVolt models shall operate from 50/60 Hz input source of 120V through 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.

2.4 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.

2.5 Ballast shall have a Power Factor greater than 0.98 for primary lamp.

2.6 Ballast shall have a minimum ballast factor for primary lamp application as follows: 0.75 for Low Watt, 0.85 for Normal Light Output, and 1.20 for High Light.

2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 20% for Standard models and THD of less than 10% for Centium models when operated at nominal line voltage with primary lamp.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of -18C (0F) for standard T8 lamps and 16C (60F) for energy-saving T8 lamps.

2.11 Ballast shall provide Lamp EOL Protection Circuit.

2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9001:2000 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance Transformer part # _____ or approved equal.

4.5 All products except Optanium 2.0 (IOP) models may experience lamp striations when operating 25W, 28W, or 30W energy saving T8 lamps.

4.6 Only the Optanium 2.0 (IOP) models are suitable for tandem-wiring applications operating 25W, 28W, or 30W energy saving T8 lamps.

Revised 07/23/2004

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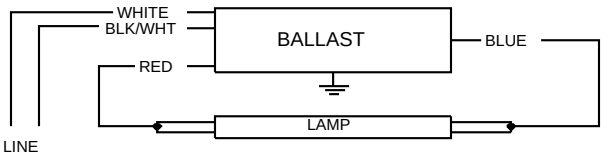
VCN-132-MC	
Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F21T5	1	21	50/10	0.10	27	1.10	10	0.98	1.7	4.07
F25T8	1	25	0/-18	0.09	25	0.98	10	0.98	1.7	3.92
F28T5	1	28	50/10	0.11	30	0.98	10	0.99	1.7	3.27
* F32T8	1	32	0/-18	0.11	30	0.98	10	0.98	1.7	3.27
F32T8/ES (30W)	1	30	60/16	0.10	28	0.98	10	0.98	1.7	3.50

Wiring Diagram



Diag. 63

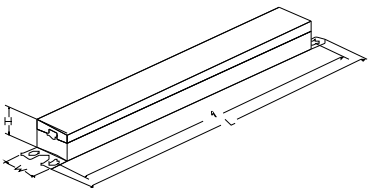
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White	25L	63.5
Blue	31R	78.7
Red	37L	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	25L	63.5
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.08 "	1.05 "	8.91 "
9 1/2	1 2/25	1 1/20	8 91/100
24.1 cm	2.7 cm	2.7 cm	22.6 cm

Revised 07/23/2004

ADVANCE TRANSFORMER CO.
O'HARE INTERNATIONAL CENTER · 10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018
Customer Support/Technical Service: Phone: 800-372-3331 · Fax: 630-307-3071
Corporate Offices: Phone: 800-322-2086

VCN-132-MC	
Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Instant Start.

2.2 Ballast shall contain auto restart circuitry in order to restart lamps without resetting power.

2.3 Ballast shall operate from 50/60 Hz input source of 120V or 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast. IntelliVolt models shall operate from 50/60 Hz input source of 120V through 277V with sustained variations of +/- 10% (voltage and frequency) with no damage to the ballast.

2.4 Ballast shall be high frequency electronic type and operate lamps at a frequency above 42 kHz to avoid interference with infrared devices and eliminate visible flicker.

2.5 Ballast shall have a Power Factor greater than 0.98 for primary lamp.

2.6 Ballast shall have a minimum ballast factor for primary lamp application as follows: 0.75 for Low Watt, 0.85 for Normal Light Output, and 1.20 for High Light.

2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 20% for Standard models and THD of less than 10% for Centium models when operated at nominal line voltage with primary lamp.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of -18C (0F) for standard T8 lamps and 16C (60F) for energy-saving T8 lamps.

2.11 Ballast shall provide Lamp EOL Protection Circuit.

2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9001:2000 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance Transformer part # _____ or approved equal.

4.5 All products except Optanium 2.0 (IOP) models may experience lamp striations when operating 25W, 28W, or 30W energy saving T8 lamps.

4.6 Only the Optanium 2.0 (IOP) models are suitable for tandem-wiring applications operating 25W, 28W, or 30W energy saving T8 lamps.

Revised 07/23/2004

ADVANCE TRANSFORMER CO.
O'HARE INTERNATIONAL CENTER - 10275 WEST HIGGINS ROAD
ROSEMONT, ILLINOIS 60018
TELEPHONE: (847) 390-5000 FAX: (847) 390-5109

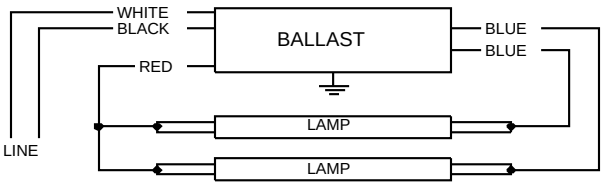
VCN-2M32-MC

Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Lamp Type	Num. of Lamps	Rated Lamp Watts	Min. Start Temp (°F/C)	Input Current (Amps)	Input Power (ANSI Watts)	Ballast Factor	MAX THD %	Power Factor	MAX Lamp Current Crest Factor	B.E.F.
F21T5	2	21	50/10	0.18	50	1.10	10	0.98	1.7	2.20
F25T8	2	25	0/-18	0.18	49	0.88	10	0.99	1.7	1.80
F28T5	2	28	50/10	0.22	60	0.98	10	0.99	1.7	1.63
* F32T8	2	32	0/-18	0.21	59	0.88	10	0.99	1.7	1.49
F32T8/ES (30W)	2	30	60/16	0.20	54	0.88	10	0.99	1.7	1.63

Wiring Diagram



Diag. 64

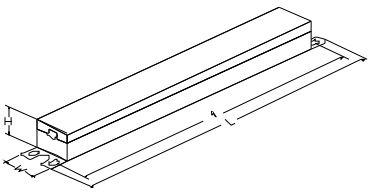
The wiring diagram that appears above is for the lamp type denoted by the asterisk (*)

Standard Lead Length (inches)

	in.	cm.
Black		0
White	25L	63.5
Blue	31R	78.7
Red	37L	94
Yellow		0
Gray		0
Violet		0

	in.	cm.
Yellow/Blue		0
Blue/White		0
Brown		0
Orange		0
Orange/Black		0
Black/White	25L	63.5
Red/White		0

Enclosure



Enclosure Dimensions

OverAll (L)	Width (W)	Height (H)	Mounting (M)
9.50 "	1.08 "	1.05 "	8.91 "
9 1/2	1 2/25	1 1/20	8 91/100
24.1 cm	2.7 cm	2.7 cm	22.6 cm

Revised 07/23/2004

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O'HARE INTERNATIONAL CENTER · 10275 WEST HIGGINS ROAD · ROSEMONT, IL 60018
Customer Support/Technical Service: Phone: 800-372-3331 · Fax: 630-307-3071
Corporate Offices: Phone: 800-322-2086

VCN-2M32-MC	
Brand Name	CENTIUM MICRO CAN
Ballast Type	Electronic
Starting Method	Instant Start
Lamp Connection	Series
Input Voltage	277
Input Frequency	60 HZ
Status	Active

Electrical Specifications

Notes:

Section I - Physical Characteristics

1.1 Ballast shall be physically interchangeable with standard electromagnetic or standard electronic ballasts, where applicable.

1.2 Ballast shall be provided with integral leads color-coded per ANSI C82.11.

Section II - Performance Requirements

2.1 Ballast shall be Instant Start.

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2.7 Ballast shall provide for a Lamp Current Crest Factor of 1.7 or less in accordance with lamp manufacturer recommendations.

2.8 Ballast input current shall have Total Harmonic Distortion (THD) of less than 20% for Standard models and THD of less than 10% for Centium models when operated at nominal line voltage with primary lamp.

2.9 Ballast shall have a Class A sound rating.

2.10 Ballast shall have a minimum starting temperature of -18C (0F) for standard T8 lamps and 16C (60F) for energy-saving T8 lamps.

2.11 Ballast shall provide Lamp EOL Protection Circuit.

2.12 Ballast shall tolerate sustained open circuit and short circuit output conditions without damage.

Section III - Regulatory Requirements

3.1 Ballast shall not contain any Polychlorinated Biphenyl (PCB).

3.2 Ballast shall be Underwriters Laboratories (UL) listed, Class P and Type 1 Outdoor; and Canadian Standards Association (CSA) certified where applicable.

3.3 Ballast shall comply with ANSI C62.41 Category A for Transient protection.

3.4 Ballast shall comply with ANSI C82.11 where applicable.

3.5 Ballast shall comply with the requirements of the Federal Communications Commission (FCC) rules and regulations, Title 47 CFR part 18, Non-Consumer (Class A) for EMI/RFI (conducted and radiated).

Section IV - Other

4.1 Ballast shall be manufactured in a factory certified to ISO 9001:2000 Quality System Standards.

4.2 Ballast shall carry a five-year warranty from date of manufacture against defects in material or workmanship, including replacement, for operation at a maximum case temperature of 70C.

4.3 Manufacturer shall have a fifteen-year history of producing electronic ballasts for the North American market.

4.4 Ballast shall be Advance Transformer part # _____ or approved equal.

4.5 All products except Optanium 2.0 (IOP) models may experience lamp striations when operating 25W, 28W, or 30W energy saving T8 lamps.

4.6 Only the Optanium 2.0 (IOP) models are suitable for tandem-wiring applications operating 25W, 28W, or 30W energy saving T8 lamps.

Revised 07/23/2004

ADVANCE TRANSFORMER CO.
O'HARE INTERNATIONAL CENTER - 10275 WEST HIGGINS ROAD
ROSEMONT, ILLINOIS 60018
TELEPHONE: (847) 390-5000 FAX: (847) 390-5109

ADVANCE™

Metal Halide Lamp Ballast

Catalog Number 71A5437J
For 150W M102
60 Hz R-HPF
Status: Active

DIMENSIONS AND DATA

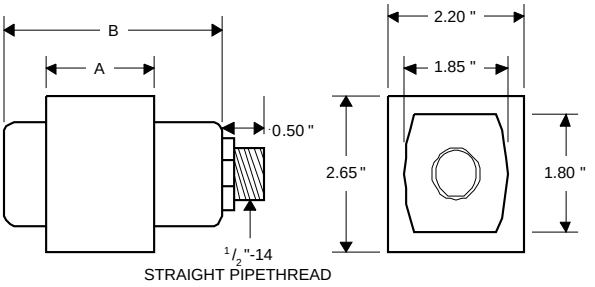
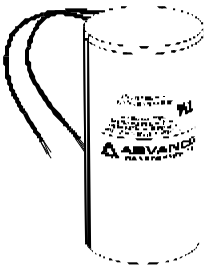


Fig. 11
J-Box Ballast

INPUT VOLTS		277					
CIRCUIT TYPE	R-HPF						
POWER FACTOR (min)	90%						
REGULATION							
Line Volts	±5%						
Lamp Watts	±10%						
LINE CURRENT (Amps)							
Operating		0.63					
Open Circuit		1.50					
Starting		0.70					
UL TEMPERATURE RATINGS							
Insulation Class	H(180°C)						
Coil Temperature Code	1029	B					
MIN. AMBIENT STARTING TEMP.	-20°F or -30°C						
NOM. OPEN CIRCUIT VOLTAGE	277						
INPUT VOLTAGE AT LAMP DROPOUT		170					
INPUT WATTS	173						
RECOMMENDED FUSE (Amps)		5					
CORE and COIL							
Dimension (A)	2.50						
Dimension (B)	4.50						
Weight (lbs.)	4.5						
Lead Lengths	12"						
CAPACITOR REQUIREMENT							
Microfarads	14.0						
Volts (min.)	280						
Fault Current Withstand (amps)							
60 Hz TEST PROCEDURES (Refer to Advance Test Procedure for HID Ballasts - Form 1270)							
High Potential Test (Volts)							
1 minute	2000						
2 seconds	2500						
Open Circuit Voltage Test (Volts)	250-305						
Short-Circuit Current Test (Amps)							
Secondary Current	2.00-2.50						
Input Current		0.50 0.75	-	-	-	-	

Capacitor: 7C140M33-R



Capacitance: 14
Dia/Oval Dim: 1.5
Height: 2.9
Temp Rating: 105°C

Ignitor: INTEGRAL

An ignitor integral to the core and coil assembly is used to start the lamp.

Ballast to Lamp Distance (BTL) = 2 feet
Temp Rating: 125°C

Wiring Diagram:

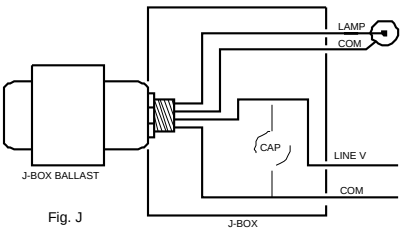


Fig. J

Ordering Information

Order Suffix	Description
500DB	Ballast With Integral Igniter and Dry Film Capacitor
600B	Ballast and Integral Igniter, No Capacitor

Data is based upon tests performed by Advance Transformer in a controlled environment and representitive of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice.

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Corporate Offices: Phone: 800-322-2086

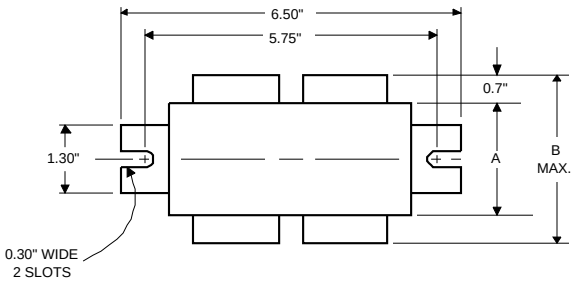
05/14/99

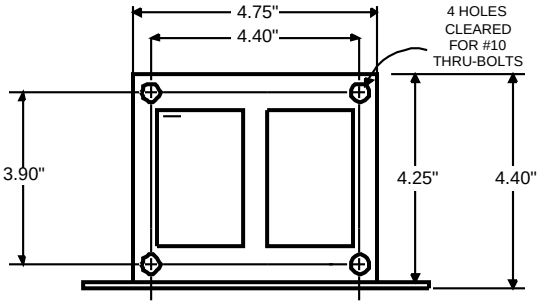
Metal Halide Lamp Ballast

Catalog Number 71A5730
For 250W M58
60 Hz CWA
Status: Active

DIMENSIONS AND DATA

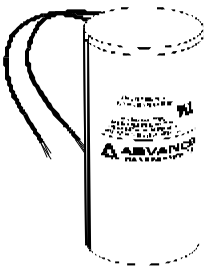
4 1/4 X 4 3/4 CORE - 2 COIL UNIT





~~INPUT VOLTS~~		277					
CIRCUIT TYPE	CWA						
POWER FACTOR (min)	90%						
REGULATION							
Line Volts	±10%						
Lamp Watts	±10%						
LINE CURRENT (Amps)							
Operating		1.10					
Open Circuit		0.75					
Starting		1.00					
UL TEMPERATURE RATINGS							
Insulation Class	H(180°C)						
Coil Temperature Code	1029	A					
MIN. AMBIENT STARTING TEMP.	-40°F or -40°C						
NOM. OPEN CIRCUIT VOLTAGE	300						
INPUT VOLTAGE AT LAMP DROPOUT		138					
INPUT WATTS	295						
RECOMMENDED FUSE (Amps)		3					
CORE and COIL							
Dimension (A)	1.50						
Dimension (B)	3.00						
Weight (lbs.)	9						
Lead Lengths	12"						
CAPACITOR REQUIREMENT							
Microfarads	15.0						
Volts (min.)	400						
Fault Current Withstand (amps)							
60 Hz TEST PROCEDURES (Refer to Advance Test Procedure for HID Ballasts - Form 1270)							
High Potential Test (Volts)							
1 minute	2000						
2 seconds	2500						
Open Circuit Voltage Test (Volts)	270-330						
Short-Circuit Current Test (Amps)							
Secondary Current	2.25-2.75						
Input Current		0.80 1.20	-	-	-	-	

Capacitor: 7C150P40-R



Capacitance: 15
Dia/Oval Dim: 1.75
Height: 3.75
Temp Rating: 105°C

Ignitor: NA

This ballast does not require the use of an ignitor.

Wiring Diagram:

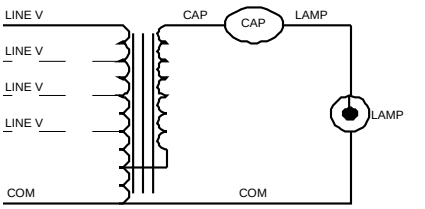


Fig. A

U.L. RECOGNIZED

Ordering Information

Order Suffix	Description
500D	Ballast with Dry Film Capacitor
510D	Ballast w/Welded Bracket & Dry Film Capacitor
600	Ballast Only, No Capacitor
610	Ballast with Welded Bracket, No Capacitor

Data is based upon tests performed by Advance Transformer in a controlled environment and representitive of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice.

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Corporate Offices: Phone: 800-322-2086

03/31/99

ADVANCE™

Metal Halide Lamp Ballast

Catalog Number 71A5237J
For 70W M98/M143
60 Hz R-NPF
Status: Active

DIMENSIONS AND DATA

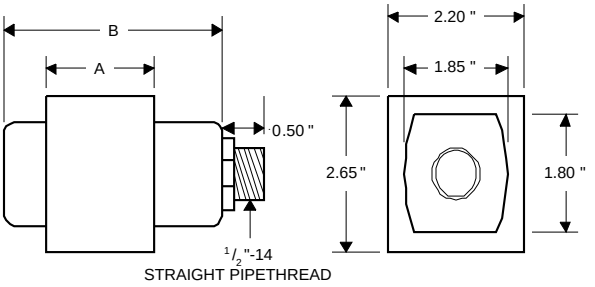

Fig. 11
J-Box Ballast

~~INPUT VOLTS~~		~~277~~				
CIRCUIT TYPE	R-NPF					
POWER FACTOR (min)	37%					
REGULATION						
Line Volts	±5%					
Lamp Watts	±10%					
LINE CURRENT (Amps)						
Operating		0.90				
Open Circuit		0.00				
Starting		1.15				
UL TEMPERATURE RATINGS						
Insulation Class	H(180°C)					
Coil Temperature Code	1029	C				
MIN. AMBIENT STARTING TEMP.	-20°F or -30°C					
NOM. OPEN CIRCUIT VOLTAGE	277					
INPUT VOLTAGE AT LAMP DROPOUT		190				
INPUT WATTS	85					
RECOMMENDED FUSE (Amps)		3				
CORE and COIL						
Dimension (A)	1.50					
Dimension (B)	3.50					
Weight (lbs.)	3					
Lead Lengths	12"					
CAPACITOR REQUIREMENT						
Microfarads						
Volts (min.)						
Fault Current Withstand (amps)						
60 Hz TEST PROCEDURES (Refer to Advance Test Procedure for HID Ballasts - Form 1270)						
High Potential Test (Volts)						
1 minute	2000					
2 seconds	2500					
Open Circuit Voltage Test (Volts)	260-290					
Short-Circuit Current Test (Amps)						
Secondary Current	0.85-1.25					
Input Current		0.85 1.25	-	-	-	-

Capacitor:

The capacitor is included as part of the potted assembly.

Ignitor: INTEGRAL

An ignitor integral to the core and coil assembly is used to start the lamp.

Ballast to Lamp Distance (BTL) = 2 feet
Temp Rating: 125°C

Wiring Diagram:

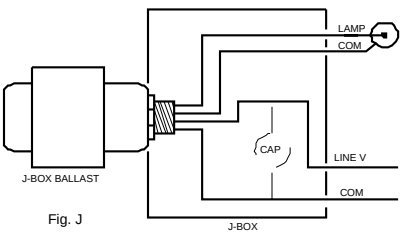

Fig. J

U.L. RECOGNIZED

Ordering Information

Order Suffix	Description
600B	Ballast and Integral Igniter, No Capacitor
610B	Ballast w/Welded Bracket and Integral Igniter, No Capacitor

Data is based upon tests performed by Advance Transformer in a controlled environment and representitive of relative performance. Actual performance can vary depending on operating conditions. Specifications are subject to change without notice.

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Corporate Offices: Phone: 800-322-2086

03/27/00

24W/835 WH Min Bipin HO UNP

Product family description
Powerful, environmentally-responsible ultra-slim lamps.

Features/Benefits

- Miniaturization: slim profile lamp and ballast.
- Operated on programmed start electronic ballasts.
- Low mercury: TCLP* compliant.
- Energy efficeint.
- Long life.
- Less mercury and fewer lamps in landfills, combined with energy efficiency reduces the impact on the environment.
- 85 CRI in 3000, 3500, 4100 and 5000K.
- 20,000 hours rated average life.

Applications

- Ideal for medium and high bay retail. Ideal for industrial applications.

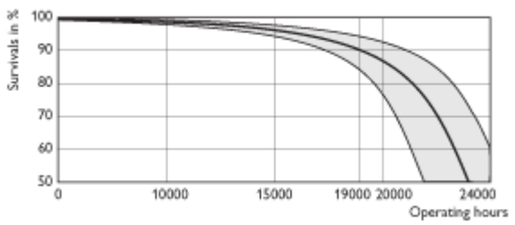
Note

- NOT compatible ith dimming ballasts.
- Silhouette™ T5 nominal lamp lengths are shorter than standard sizes. See dimension chart for details.

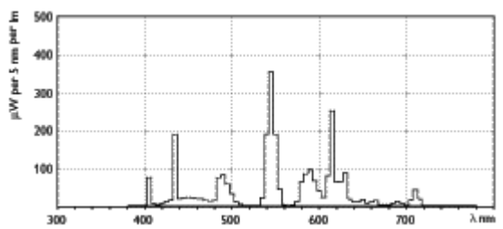
Product data	
Product Number	290205
Full product name	24W/835 WH Min Bipin HO UNP
Ordering Code	F24T5/835/HO/ALTO
Pack type	Unpacked
Pieces per pack	1
Packs per case	40
Pack UPC	046677290207
EAN2US	
Case Bar Code	50046677290202
Successor Product number	
Wattage[W]	24W
Color Code	835 [CCT of 3500K]
Base	Min Bipin [Miniature Bipin]
Bulb	T5 [16mm]
Special packing	ALTO
Packing Type	UNP [Unpacked]
System Description	High Output
Base Information	Green[Green Base]
Packing Configuration	40
Rated Avg. Life[hr]	24000
Dimmable	Yes

PHILIPS

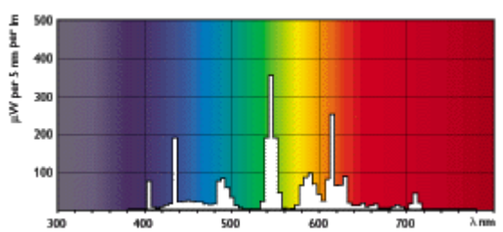
Product data	
Mercury (Hg) Content[mg]	
Color Rendering Index[Ra8]	82
Color Temperature[K]	3500
Initial Lumens[Lm]	-
Overall Length C[mm]	563.2
Diameter D[mm]	17



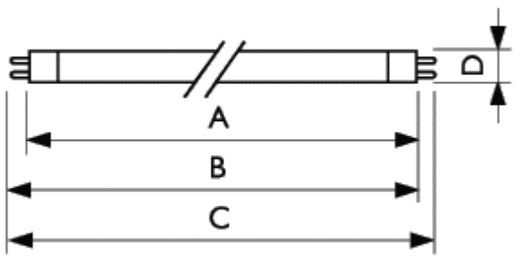
TL5



TL5/835



TL5/835



	A		B	C	D
Full product name	Max	Min	Max	Max	Max
24W/835 WH Min Bipin HO UNP	549.0	553.7	556.1	563.2	17

TL5

28W/835 Min Bipin T5 UNP

Product family description
Ultra-slim design with extraordinary light output.

Features/Benefits

- Improved optical control.
- Fixtures can be 40% smaller than T8 systems.
- Design flexibility for cove and cabinet lighting.
- Better fin in 2 x 2 and 2 x 4 grid ceilings.
- Up to 104 lumens per watt.
- 95% lumen maintenance.
- 85 CRI in 3000, 3500 and 4100K.
- High system efficacy.
- Fail-safe operation at end of life.
- 20,000 hours rated average life.

Applications

- Ideal for general, decorative and architectural lighting in offices, retail stores, hotels, schools and hospitals.

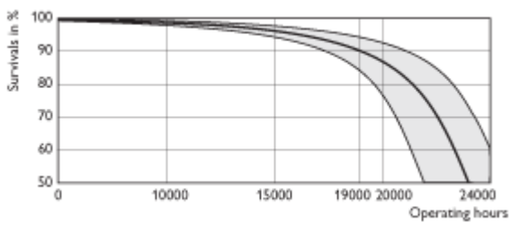
Notes

- NOT compatible with dimming ballasts.
- Silhouette™ T5 nominal lamp lengths are shorter than standard sizes. See dimension chart for details.

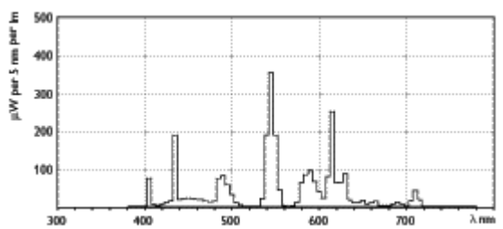
Product data	
Product Number	230854
Full product name	28W/835 Min Bipin T5 UNP
Ordering Code	F28T5/835
Pack type	Unpacked
Pieces per pack	1
Packs per case	40
Pack UPC	046677230852
EAN2US	
Case Bar Code	50046677230857
Successor Product number	
Wattage[W]	28W
Color Code	835 [CCT of 3500K]
Base	Min Bipin [Miniature Bipin]
Bulb	T5 [16mm]
Special packing	ALTO
Packing Type	UNP [Unpacked]
System Description	High Efficiency
Base Information	Green[Green Base]
Packing Configuration	40
Rated Avg. Life[hr]	24000

PHILIPS

Product data	
Dimmable	Yes
Mercury (Hg) Content[mg]	
Color Rendering Index[Ra8]	85
Color Temperature[K]	3500
Initial Lumens[Lm]	-
Overall Length C[mm]	1163.2
Diameter D[mm]	17



TL5



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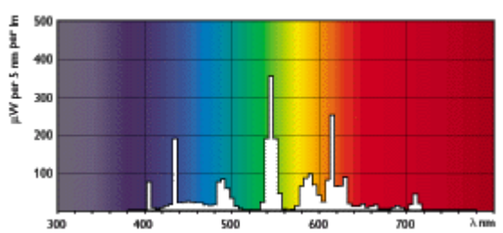

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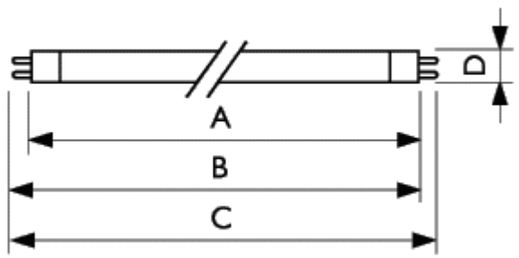


	A	B		C	D
Full product name	Max	Min	Max	Max	Max
28W/835 Min Bipin T5 UNP	1149.0	1153.7	1156.1	1163.2	17

TL5

F32T8 ADV830 48 ALTO 1LP

Product family description
High performance, long life, environmentally-responsible lamps.

Features/Benefits

- 3100 lumens is 10% more than standard T8 lamps.
- Low mercury: TCLP* compliant.
- Sustainable lighting solutions; Less mercury and fewer lamps in landfills, combined with energy efficiency and long life reduces the impact on the environment.
- HI-VISION® Phosphor combined with Philips exclusive cathode guard delivers: 95% lumen maintenance; reduced lamp-end blackening.
- Our Green End-Caps mean you are using environmentally-responsible lamps.
- 85 CRI.
- Higher lumens enables multiple system options to maximize energy saving and reduce lighting costs.
- Fully dimmable withouth burn-in.

Applications

- Ideal fot T8 applications requiring maximum light output and long life. Ideal for light harvesting.

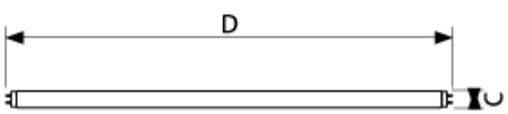
Notes

- Rated average life under specified test conditions with lamps turned off and restarted no more frequently than once every 3 operating hours. Lamp life is appreciably longer if lamps are started less frequently. (202)
- Average life under engineering data with lamps turned off and restarted once every 12 operating hours. (241)
- Approximate Initial Lumens. The lamp lumen output is based upon lamp performance after 100 hours of operating life, when the output is measured during operation on a reference ballast under standard laboratory conditions. (203)
- For expected lamp lumen output, commercial ballast manufacturers can advise the appropriate Ballast Factor for each of their ballasts when they are informed of the designated lamp. The Ballast Factor is a multiplier applied to the designated lamp lumen output. (204)
- Design Lumens are the approximate lamp lumen output at 40% of the lamp's Rated Average Life. This output is based upon measurements obtained during lamp operation on a reference ballast under standard laboratory conditions. (208)
- Design lumens rated at 3 hours per start on Instant Start ballast. (239)
- Exclusive to Philips Lighting Company.

Product data	
Product Number	139873
Full product name	F32T8 ADV830 48 ALTO 1LP
Ordering Code	F32T8/ADV830/ALTO
Pack type	1 Lamp Packed in Case Qty
Pieces per pack	1
Packs per case	25
Pack UPC	046677139872
EAN2US	
Case Bar Code	50046677139877

Product data	
Successor Product number	
Name Type	F32T8
Nominal Length [inch]	48
Feature	ALTO [ALTO®]
Packing Type	1LP [1 Lamp Packed in Case Qty]
Packing Configuration	25
Base	Medium Bi-Pin[Medium Bi-Pin]
Base Information	Green Base
Bulb	T8[Diameter: 1 inch]
Rated Avg. Life [3 hr Start][hr]	25000
Rated Avg. Life [12-Hr Start][hr]	30000
Energy Saving Product	Energy Saving
Wattage[W]	32
Mercury (Hg) Content[mg]	3.5
Color Code	Advantage 830[CCT of 3000K]
Color Rendering Index[Ra8]	85
Color Temperature[K]	3000
Initial Lumens[Lm]	3100
Design Mean Lumens[Lm]	2950

Data not (yet) available



F-T8-Adv Med Bipin

MasterColor CDM-T 150W/830 G12 T6 1CT

Product family description
Range of single-ended T6 high-efficiency ceramic metal halide lamps with a stable color over lifetime and a crisp, sparkling light.

Features / Benefits

- Excellent color rendering.
- Superior color stability over life within +- 200K.
- Lamp to lamp color consistency over life.
- Higher lumen maintenance than standard metal halide.
- Warm (3K) or fresh white (4K) color impression.
- High lamp efficacy (up to 93 lumens per watt) for energy saving and low heat.
- Universal operating position.
- Compact lamp dimensions for high beam intensities.
- FadeBlock for reduced fading risks.
- No shut off required in 24-hour-a-day/7-day-a-week operations (relamp fixtures at or before the end of rated life).
- Long lamp life compared to incandescent and halogen lamps.

Applications

- Accent and General lighting in retail, offices and public buildings. Decorative outdoor: floodlighting and pedestrian areas.

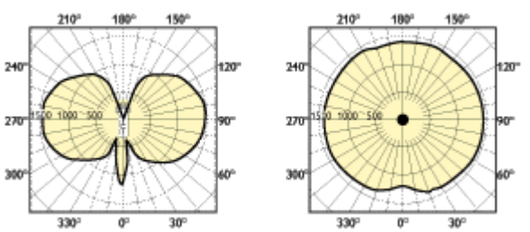
Notes

- Requires a ballast specified or approved for Philips Metal Halide lamp or one designed to the indicated ANSI Standard. A pulse ignitor is required. Sockets and wiring must withstand starting pulse. (391)
- Supply volts must be +/- 5% of rated ballast line volts for reactor type and +/- 10% for CWA or electronic ballasts. (392)
- UV filtered design (FadeBlock™). (396)
- Operate only on thermally protected ballasts (397)
- MasterColor® Metal Halide Lamps are not recommended for use on dimmers and are not warranted if used on dimmer systems. (401)
- Rated average life is the life obtained, on the average, from large representative groups of lamps in laboratory tests under controlled conditions at 10 or more operating hours per start. It is based on survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary considerably from the average. For lamps with a rated average life of 24,000 hours, life is based on survival of 67% of the lamps. (351)
- Approximate lumen values listed are for vertical operation of the lamp. (352)
- Means Lumens is the approximate lumen output at 40% of lamp rated average life. (353)
- Heat resisting glass bulb.

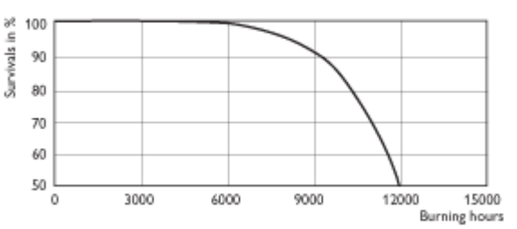
Product data	
Product Number	232728
Full product name	MasterColor CDM-T 150W/830 G12 T6 1CT
Ordering Code	CDM150/T6/830
Pack type	1 Lamp in a Folding Carton
Pieces per pack	1
Packs per case	12
Pack UPC	046677232726

PHILIPS

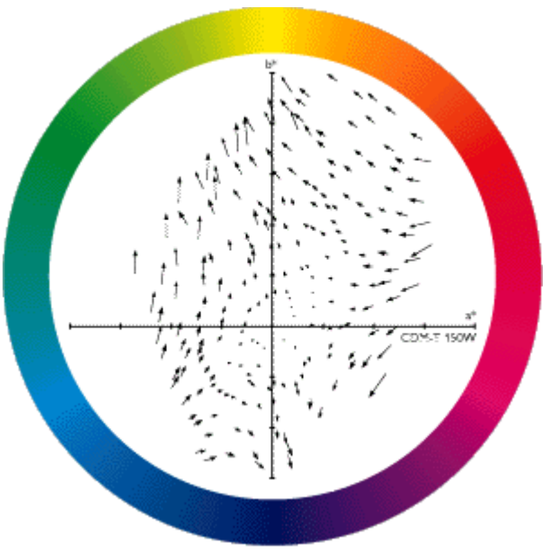
Product data	
EAN2US	
Case Bar Code	50046677232721
Successor Product number	
Wattage[W]	150W
Color Code	830 [CCT of 3000K]
Base	G12
Bulb	T6 [Diameter: .75 inch]
Packing Type	1CT [1 Lamp in a Folding Carton]
Packing Configuration	12
Bulb Finish	Clear
Operating Position	Universal[Any or Universal (U)]
Rated Avg. Life[hr]	12000
ANSI Code HID	M142/E
System Power EL[W]	167
Lamp Voltage[V]	96
Dimmable	No
Mercury (Hg) Content[mg]	
Color Rendering Index[Ra8]	85
Color Designation	Warm White
Color Description	830 Warm White
Color Temperature[K]	3000
Initial Lumens[Lm]	14000
Design Mean Lumens[Lm]	9800
Overall Length C[mm]	110
Diameter D[mm]	20
Light Center Length L[in]	2.21875
Max Overall Length (MOL) - C[in]	4.34375
Diameter D[in]	0.75



CDM-T 150W



CDM-T 70W/150W/830/942



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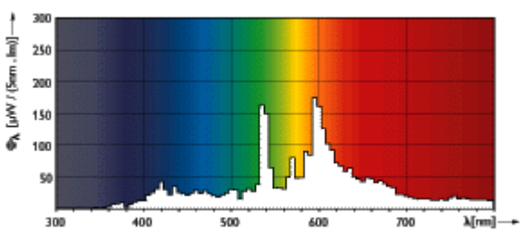

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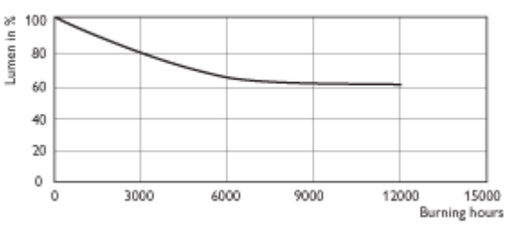

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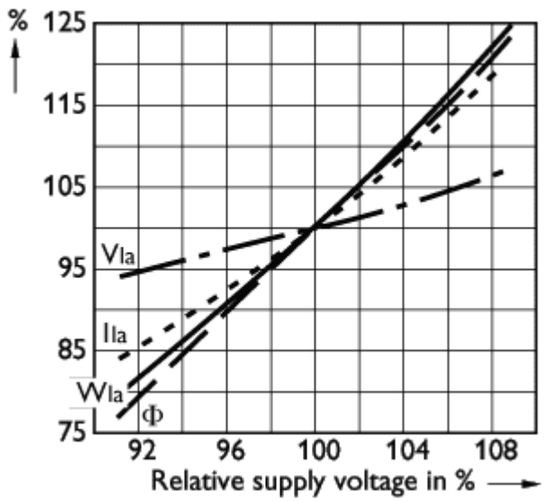
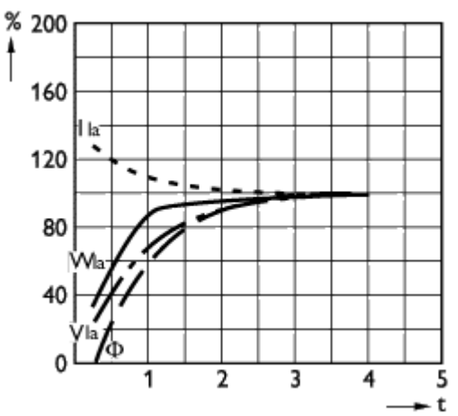
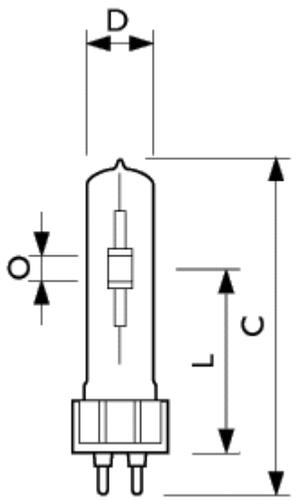


CDM-T/830



CDM-T



CDM-T

	C	D	L			O
Full product name	Max	Max	Min	Nom	Max	Min
MasterColor CDM-T 150W/830 G12 T6 1CT	110	20	55	56	57	8.67

O	
Nom	Max
9	9.33

MasterColor CDM-T 70W/830 G12 T6 1CT

Product family description
Range of single-ended T6 high-efficiency ceramic metal halide lamps with a stable color over lifetime and a crisp, sparkling light.

Features / Benefits

- Excellent color rendering.
- Superior color stability over life within +- 200K.
- Lamp to lamp color consistency over life.
- Higher lumen maintenance than standard metal halide.
- Warm (3K) or fresh white (4K) color impression.
- High lamp efficacy (up to 93 lumens per watt) for energy saving and low heat.
- Universal operating position.
- Compact lamp dimensions for high beam intensities.
- FadeBlock for reduced fading risks.
- No shut off required in 24-hour-a-day/7-day-a-week operations (relamp fixtures at or before the end of rated life).
- Long lamp life compared to incandescent and halogen lamps.

Applications

- Accent and General lighting in retail, offices and public buildings. Decorative outdoor: floodlighting and pedestrian areas.

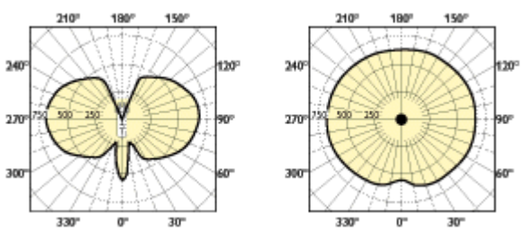
Notes

- Requires a ballast specified or approved for Philips Metal Halide lamp or one designed to the indicated ANSI Standard. A pulse ignitor is required. Sockets and wiring must withstand starting pulse. (391)
- Supply volts must be +/- 5% of rated ballast line volts for reactor type and +/- 10% for CWA or electronic ballasts. (392)
- UV filtered design (FadeBlock™). (396)
- Operate only on thermally protected ballasts (397)
- MasterColor® Metal Halide Lamps are not recommended for use on dimmers and are not warranted if used on dimmer systems. (401)
- Rated average life is the life obtained, on the average, from large representative groups of lamps in laboratory tests under controlled conditions at 10 or more operating hours per start. It is based on survival of at least 50% of the lamps and allows for individual lamps or groups of lamps to vary considerably from the average. For lamps with a rated average life of 24,000 hours, life is based on survival of 67% of the lamps. (351)
- Approximate lumen values listed are for vertical operation of the lamp. (352)
- Means Lumens is the approximate lumen output at 40% of lamp rated average life. (353)
- Heat resisting glass bulb.

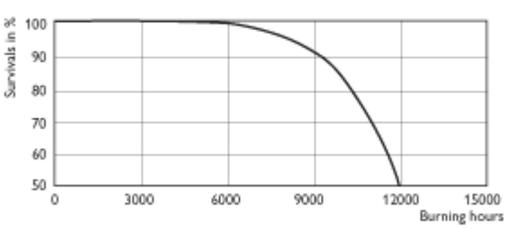
Product data	
Product Number	223370
Full product name	MasterColor CDM-T 70W/830 G12 T6 1CT
Ordering Code	CDM70/T6/830
Pack type	1 Lamp in a Folding Carton
Pieces per pack	1
Packs per case	12
Pack UPC	046677223373

PHILIPS

Product data	
EAN2US	
Case Bar Code	50046677223378
Successor Product number	
Wattage[W]	70W
Color Code	830 [CCT of 3000K]
Base	G12
Bulb	T6 [Diameter: .75 inch]
Packing Type	1CT [1 Lamp in a Folding Carton]
Packing Configuration	12
Bulb Finish	Clear
Operating Position	Universal[Any or Universal (U)]
Rated Avg. Life[hr]	12000
ANSI Code HID	M139/E
System Power EL[W]	83
Lamp Voltage[V]	88
Dimmable	No
Mercury (Hg) Content[mg]	
Color Rendering Index[Ra8]	81
Color Designation	Warm White
Color Description	830 Warm White
Color Temperature[K]	3000
Initial Lumens[Lm]	6600
Design Mean Lumens[Lm]	4950
Overall Length C[mm]	103
Diameter D[mm]	20
Light Center Length L[in]	2.21875
Max Overall Length (MOL) - C[in]	3.9375
Diameter D[in]	0.75



CDM-T 70W/830/942



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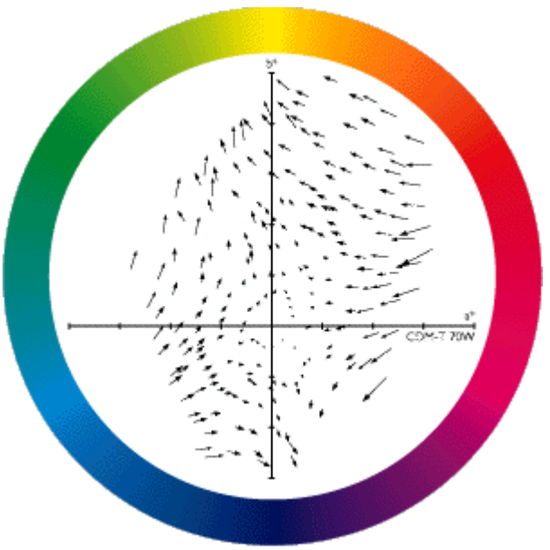

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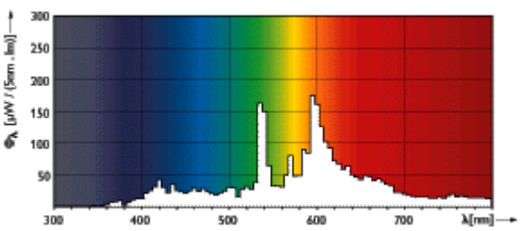

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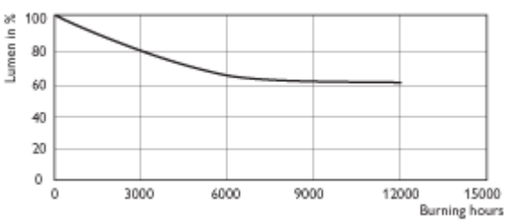

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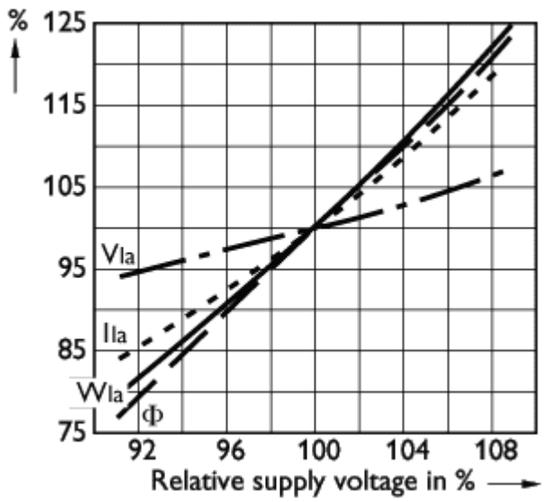

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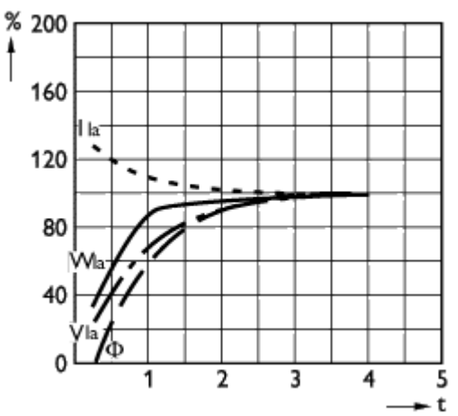
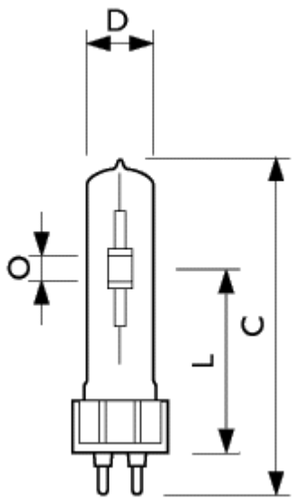


CDM-T



CDM-T

	C	D	L			O
Full product name	Max	Max	Min	Nom	Max	Min
MasterColor CDM-T 70W/830 G12 T6 1CT	103	20	55	56	57	6.67

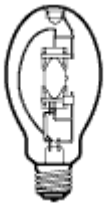
O	
Nom	Max
7	7.33

GE Lighting North America

- Incandescent
- Halogen
- High Intensity Discharge
  - CMH PAR
  - CMH Elliptical
  - CMH ELLIPTICAL OPEN-RATED
  - CMH Single Ended G12
  - CMH Double-Ended TD
  - CMH Mini's
  - High-Watt CMH SPXX
  - CMH Chromafit
  - Pulsearc Multi-Vapor Metal Halide Lamps
  - Multi-Vapor Metal Halide Lamps
  - High Output And Xho Multi-Vapor Metal Halide Lamps
  - Sports Lighting
  - Protected Multi-Vapor Metal Halide Lamps
  - Chromafit Multi-Vapor Metal Halide Lamps (Hps Retrofit Lamps)
  - I-Line Multi-Vapor Metal Halide Lamps (Mercury Retrofit Lamps)
  - Saf-T-Gard Self-Extinguishing Multi-Vapor Lamps
  - Arcstream Metal Halide Lamps
  - Standby Longlife Lucalox Lamps
  - Lucalox High Pressure Sodium Lamps
  - Ecolux Nc Non-Cycling High Pressure Sodium Lamps (Tclp Compliant)
  - Ecolux High Pressure Sodium Lamps (Tclp Compliant)
  - Deluxe Lucalox High Presure Sodium Lamps
  - E-Z Lux High Presure Sodium Lamps (Mercury Retrofit)
  - Sox Low Pressure Sodium Lamps
  - Mercury Lamps
  - Saf-T-Gard Mercury Lamps
  - E-Z Merc Self-Ballasted Lamps (Incandescent Retrofit)
  - Export Lamps - Metal Halide
  - Lucalox High Pressure Sodium
  - E-Z Lux Lucalox High Presure Sodium (Mercury Retrofit)
  - Mercury
- Fluorescent
- Compact Fluorescent
- Stage/Studio
- Miniature/Sealed Beam
- Projection
- Merchandiser

Basic LSB Images Right Light Options

17633 - Multi-Vapor Metal Halide Lamps Item Detail



General

Product Code	17633
Description	MVR250/SP30/U
Subcategory	Multi-Vapor Metal Halide Lamps

Physical

Bulb Type	ED28
Base Type	Mog
Bulb Material	Heat Resistant Glass
Max Overall Length (In.)	8.25
Max Overall Length (mm)	210.000
Nominal Length (In.)	8.25
Bulb Nominal Diameter (In.)	3.500

Photometric

Average Life in Hours	6000H/10000V
Lumens (Initial)	18000V/16600H
Lumens (Mean)	11500V/10600H
Color Temperature (K)	3000
Color Rendering Index (Ra) CRI (> or =)	70
Warm Up Time (min.) to 90%	<10
Lighted Center Length (In.)	5

Electrical

Watts	250

Luminaire

Operating Position Code	U

Ballast-related information

Minimum Ballast Open Circuit Voltage - RMS - Lag Ballast (Ballast A/B/C)	382
Minimum Ballast Open Circuit Voltage - Peak Lag Ballast (Ballast A/B/C)	540

Miscellaneous

ANSI Ballast Type	M58
Additional Information	RE730 Phosphor Coating

LSB Data Available

All values are design values or typical values when measured under laboratory condition

provided is subject to change without notice. Where applicable, values are based on guic
ANSI. For more information see Terms and Conditions in the link below.

Return to product list

Set the current view to the default view

(NOTE: Items marked with an asterisk are project specific. Consult a Visionwall Corporation sales representative for required data.).

1. GENERAL

1.1 RELATED WORK SPECIFIED IN OTHER SECTIONS

.1 Loose insulation (other than factory-applied within the curtain wall frame and spandrel panel): Section _____

.2 Caulking and sealants: Section _____

.3 Air barriers: Section _____

.4 Flashings: Section _____

.5 Caulking of joints between the curtain wall and other building components: Section _____

1.2 SCOPE OF WORK

.1 Provide high performance factory fabricated panelized curtain wall systems as manufactured by Visionwall Corporation.

.2 Provide the metal components required to connect the curtain wall to the building structure.

.3 Supply the concrete embeds required to secure the curtain wall anchors to the building.

1.3 STANDARDS AND TEST

.1 GLAZING UNIT AND FRAME (WINDOW)

a) Submit with shop drawings test data, from a recognized testing agency, that shows the following window performance characteristics:

- thermal transmission coefficient
- condensation resistance
- sound transmission loss characteristic

Tests shall have been conducted in accordance with the standards given in Item 2.4 on a representative sample of a complete window unit (frame plus glazing unit).

b) Submit with shop drawings data showing glazing unit shading coefficient and visible light transmission values. Values may be derived using recognized computer analysis programs such as the latest version of WINDOW by The Windows and Daylight Group, Building Technologies Program, Energy and Environment Division, Lawrence Berkeley Laboratory, Berkeley, CA., 94720, U.S.A.

c) Pressure test each glazing unit to verify the air tightness of all joints such as those between glass panes and spacers and air vapour barrier; submit, upon request, reports showing test results for each glazing unit.

.2 CURTAIN WALL MOCK-UP

.1 Provide laboratory testing of a ft (____mm) x ft (____mm) curtain wall section at a certified testing laboratory approved by the Architect (Owner). Testing shall be witnessed by the Architect (and Owner).

.2 Testing shall comply with and be conducted in accordance with the procedures laid out in AAMA Standard 501-83, Method of Test for Metal Curtain Walls.

.3 Test mock-up curtain wall for resistance to air infiltration, resistance to static and dynamic water penetration and structural performance under uniform loading.

.4 The mock-up curtain wall will be assumed to have passed these tests if its performance is shown to be as good as, or better than, the following:

AIR INFILTRATION (ASTM E283):	0.02 cfm/ft5 (0.10 l/s-m5) at 6.24 psf (300 Pa) pressure differential (inward)
STATIC WATER PENETRATION (ASTM E331):	No water visible on the test chamber side at a pressure differential of 20% of design load or 6 psf (287 Pa), whichever is greater.
DYNAMIC WATER PENETRATION (AAMA 501.1):	No water visible on test chamber side at an air stream velocity equivalent to 20% of design load or 6 psf (287 Pa), whichever is greater.
STRUCTURAL PERFORMANCE (ASTM E330):	Deflection shall not exceed L/200 of the clear span at a structural test load equal to the design wind pressure given in the applicable local building code.

1.4 SUBMITTALS

.1 SHOP DRAWINGS

a) Submit Shop Drawings showing the following information:
- plans, elevations and sections for all curtain wall assemblies
- details of frame sections, glazing unit-to-frame intersection, spandrel panel-to-frame intersection, anchorage assemblies, wall-to-floor intersections, wall-to-roof intersections
- metal, glass, gasket and all other curtain wall component materials type, finish and colour
- direction and magnitude of thermal expansion
- fabrication and erection tolerances
- anchor layout
- test data as noted in Item 1.3.1 and 1.3.2.

.2 CERTIFICATION (OPTIONAL)

a) Provide written certification by a Professional Engineer registered in the area having jurisdiction that the curtain wall system complies with the applicable building code and that it is suitable for use on this building.

1.5 MAINTENANCE DATA

.1 Provide operating and maintenance data for curtain walls for incorporation into manual specified in Section _____.

1.6 SAMPLES

.1 Colour Samples: Provide a minimum of 2 - 3" X 5" (75 mm x 125 mm) finished aluminum samples of each different finish.

.2 Glass Samples: Provide a minimum of 2 - 12" X 12" (300 mm x 300 mm) vision and spandrel monolithic glass samples of each different type.

1.7 WARRANTY

.1 Provide written warranty signed by an officer of the "curtain wall manufacturing company" ("curtain wall manufacturing company" being the original manufacturer of the glazing units, frame components and spandrel panels), stating that, if during the ten (10) year period from the date of manufacture there is any of the following manufacturing defects:

a) material obstruction of vision resulting from the accumulation of dust or moisture on the interior of a glazing unit (the "Unit"); or,

b) material deterioration of the film suspended within the Unit; or,

c) material discolouration of the film suspended within the Unit; or,

e) material permanent physical distortion of the film suspended within the Unit other than physical distortion located within 2 inches (50 mm) of the outside edge of the vision daylight opening of the window; or,

f) an appreciable deterioration of the thermal performance of the Unit;

then the manufacturer will, within a reasonable time, supply a replacement Unit.

2. PRODUCTS

2.1 GENERAL

.1 Factory assembled panelized curtain wall system containing fixed and operable awning window types and insulated spandrel panels all manufactured and assembled by the same company.

.2 Window glazing unit thermal performance to be based on air as the gas inside of the glazing unit.

.3 Curtain wall system constructed so that glazing unit can be removed and replaced from outside of building.

.4 Difference in length between opposite parallel sides of curtain wall panel shall be no more than:

a) 0.06 inches (1.5 mm) for panels with a diagonal measurement of 72 inches (1800 mm) or less

b) 0.12 inches (3.0 mm) for panels with a diagonal measurement of over 72 inches (1800 mm).

.5 Difference in length between the two diagonal measurements of a curtain wall panel shall be no more than:

a) 0.12 inches (3.0 mm) for panels with a diagonal measurement of 72 inches (1800 mm) or less

b) 0.18 inches (4.5 mm) for panels with a diagonal measurement of more than 72 inches (1800 mm).

2.2 FRAME CONSTRUCTION AND MATERIAL

.1 Construction:

a) thermally broken composite frame with extruded aluminum outer and inner frame members separated by synthetic material webs. Webs mechanically attached to the outer and inner extruded aluminum frame members without the use of screws, bolts, rivets or adhesives.

b) butt joints secured with screws into screw-ports and sealed with sealant.

c) complete system to act as a rain screen so as to drain to exterior any water entering the frame cavity.

d) mil finished extruded aluminum pressure plates fastened to main frame with number 10 stainless steel machine screws

e) pre-finished snap-on extruded aluminum cap

.2 Material:

a) Aluminum: Aluminum Association Alloy AA-6063-T6 or T54.

b) Webs: Glass fibre reinforced polyamide.

c) Air Seal Gasket: E.P.D.M. extrusions.

d) Compression and Wedge Gaskets: E.P.D.M. extrusions.

e) Fasteners & Keys: Aluminum, stainless steel, die cast zinc, cadmium plated steel.

f) Finish:
- Exterior:_____*
- Interior: _____*

2.3 GLAZING UNIT CONSTRUCTION AND MATERIAL

.1 Construction:

a) three element pressure equalized air filled unit consisting of outer glass pane, one internal optically clear film and an inner glass pane.

b) internal film biaxially suspended by a spring suspension system to accommodate thermally induced dimensional changes without imposing undue stress on the films.

c) synthetic, low thermal conductivity spacer complete with desiccant.

d) perimeter vapour barrier sealed to unit with butyl adhesive.

.2 Material:

a) Exterior glass:_____*

b) Interior glass:_____*

c) Setting Blocks: neoprene, 80 durometer.

d) Perimeter Vapour Barrier: type 304 annealed stainless steel.

2.4 WINDOW PERFORMANCE RATINGS

.1 Thermal Transmission Coefficient: per ASTM C236-87/AAMA 1503.1-1988; U = _____ Btu/hr ● ft^2 ● ˚F(_____* W/m^2 ● ˚C) for overall window(glazing unit plus frame).

.2 Shading Coefficient: SC = _____*

.3 Visible Light Transmission: TVIS = _____*

.4 Sound Transmission Loss Characteristic: per ASTM Std. 90-87; STC = _____*

2.5 SPANDREL PANEL CONSTRUCTION AND MATERIAL

.1 Construction

a) Spandrel Panel Glass:_____* with opacifier coat on No. 2 surface.

b) Gaskets: EPDM extrusions.

c) Insulation: Semi-rigid glass fiber,_____* inches (_____* mm) thick; U =_____* Btu/hr ● ft^2 ˚F (_____* W/m^2 ● ˚C).

d) Backpan: Minimum 22 gauge galvanized steel screw fastened to inner aluminum frame member and sealed air and water tight to frame with butyl sealing tape.

e) Air space between spandrel glass and outer face of insulation vented to exterior.

2.6 MANUFACTURER

.1 Visionwall Corporation Series M30 High Performance Curtain Wall System with 3-element glazing unit..

3. EXECUTION

3.1 INSTALLATION

.1 Erection Tolerances: Erect all component parts within the following tolerances:

a) Variations from plumb or angle shown:
- 0.125 inches (3 mm) maximum variation in storey height or 120 inches (3050 mm) run, non-cumulative.

b) Variations from level or slopes shown:
- 0.125 inches (3 mm) maximum variation in any column-to-column space or 240 inches (6100 mm) run, non-cumulative.

c) Variations from theoretical calculated position as located in plan or elevation in relation to established floor lines, column lines and other fixed elements of the structure, including variations from plumb and level:
- 0.25 inches (6 mm) maximum variation in any column-to-column space, floor-to-floor height or 240 inches (6100 mm) run.

d) Offsets in end-to-end or edge-to-edge alignment of consecutive members:
- 0.06 inches (1.5 mm) maximum offset in any alignment.

.2 Attach and seal building air-vapour barrier to curtain wall frame as detailed on drawings to maintain continuity of building envelope air-vapour barrier.

3.2 CLEAN-UP

.1 Remove all excess and scrap material and equipment involved in this installation.

SHORTFORM SPECIFICATION FOR USE IN PROJECT MANUAL WITH GLAZING CHART SHOWING GLASS TYPES (AT END OF SECTION) AND GLAZING SCHEDULE SHOWING GLASS LOCATIONS ON DRAWINGS.

NOTE:

The following sample specification is provided as a guideline only.

Pilkington assumes no responsibility for the accuracy or applicability of this document to any particular project.

To incorporate this information into a specification, either copy and paste it into a document, or save it as an html file and import it into your finished specification, adding, deleting, or revising sections as necesary.

SECTION 08800

GLAZING

PART 1. - GENERAL

1.1 SUMMARY:

A. Provide glass and glazing, complete.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS:

DELETE SECTIONS REFERENCED BELOW THAT DO NOT APPLY TO THIS PROJECT. CHANGE SECTION NUMBERS BELOW, IF DIFFERENT FROM NUMBERS USED IN PROJECT MANUAL.

A. Steel Doors and Frames; Section 08110.

B. Wood Doors; Section 08200.

C. Glass and glazing for aluminum entrances and storefront; Section 08410, except requirements are specified in this section.

D. Glass and glazing for aluminum windows; Section 08520, except requirements are specified in

this section.

E. Glass and Glazing for skylights; Section 08631, except requirements are specified in this section.

F. Curtain Walls: Section 08920.

G. Sloped Glazing: Section 08960.

1.3 QUALITY ASSURANCE:

A. Provide safety glass (tempered, laminated) complying with requirements of ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings -- Safety Performance Specifications and Method of Test.

B. Label each piece of glass designating type and thickness of glass. Do not remove label prior to installation.

C. Permanently identify each unit of tempered glass. Etch or ceramic fire identification on glass; identification shall be visible when unit is glazed.

D. Warranty: Provide manufacturer's standard 10 year warranty, including include replacement of sealed glass units exhibiting seal failure, interpane dusting or misting.

1.4 SUBMITTALS:

DELETE PARAGRAPH BELOW IF SUBMITTALS SECTION IS NOT USED. REVISE NUMBER IF NUMBER OTHER THAN 01300 IS USED.

A. Comply with Section 01300.

B. Product Data: Submit copy of manufacturer's specifications and installation instructions for each type of glass and glazing material. Include test data or certification substantiating that glass complies with specified requirements and manufacturer's warranties.

C. Samples: Prior to ordering, submit minimum 6" x 6" sample of each type and thickness of glass required for review by Architect.

D. Submit manufacturer's standard 10 year warranty for insulated glass units.

1.5 DESIGN AND PERFORMANCE REQUIREMENTS:

A. Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials, and other defects in work.

PART 2. - PRODUCTS

2.1 INSULATED GLASS MATERIALS:

A. Acceptable Manufacturer: Pilkington; P.O. Box 799, 811 Madison Avenue, Toledo, Ohio 43697-0799; Telephone: 419-247-4926. Internet Address: www.pilkington.com/sunmanagement.

DELETE PARAGRAPH "C" BELOW, IF SUBSTITUTIONS WILL NOT BE CONSIDERED.

C. Equivalent products of other manufacturers meeting performance and aesthetic characteristics will be considered. The Architect reserves the right to reject materials solely on the basis of color.

D. Refer to Glazing Chart at the end of this section for glass types and performance characteristics not specified in this article.

2.2 GLAZING ACCESSORIES:

A. Provide materials with proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black, and of profile and hardness required to maintain watertight seal.

D. Glazing Tape: Provide glazing tape appropriate for indicated installation complying with AAMA 800.

E. Setting Blocks: Neoprene or other resilient blocks of 70 to 90 Shore A durometer hardness.

F. Spacers: Elastomeric blocks, or continuous extrusions, with a 50 to 60 Shore A durometer hardness.

G. Compressible Filler Rods: Closed-cell or waterproof-jacketed foam of polyethylene, butyl rubber, neoprene, polyurethane or vinyl.

PART 3. - EXECUTION

3.1 INSTALLATION - GENERAL

A. Comply with recommendations of glass manufacturers and manufacturers of sealants and other glazing materials, unless otherwise indicated or specified, including preparation of surfaces.

B. Clean channel surfaces and prime as recommended by sealant manufacturer.

C. Cut glass to size as required for measured opening, provide adequate edge clearance and glass bite all around. Cut prior to tempering.

D. Do not install sheets which have edge damage or face imperfections.

E. Miter-cut and bond (weld) ends of channel gaskets at corners to provide a continuous gasket.

F. Seal face gaskets at corners with liquid elastomeric sealant to close openings and prevent withdrawal of gaskets from corners.

G. Remove and replace glass which is broken, chipped, cracked, abraded or damaged during construction period.

3.2 CURING:

A. Cure glazing sealants and compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.

3.3 PROTECTION:

A. Protect glass surfaces and edges at all times during the construction period. Keep glass free from contamination by materials capable of staining glass.

GLASS CHART

Refer to schedule on Drawings for location of each type of glass.

INSERT GLAZING NUMBER TO MATCH GLAZING SCHEDULE ON DRAWINGS, AND DELETE ANY UNUSED ROWS.

Glazing	No. __	No.__	No.__	No.__
Type	Insulated			
Total Thickness	1" 24 mm			
Space Filler	Argon-Filled			
Outboard Lite	1/4" Pilkington Solar E™ Solar Control Low-E			
Inboard Lite	1/4" Pilkington Optifloat™ Clear Float Glass			
Reflective Surface	2nd			
Low-E Surface	2nd			
Heat Strengthened				
Tempered				
Visible Light Transmittance (%)	53			
Visible Lite Exterior Reflectance (%)	10			
Visible Lite Interior Reflectance (%)	15			
Total Solar Energy Transmittance (%)	33			
Total Solar Energy Reflectance (%)	9			

U-V Transmittance (%)	31			
U-Value - Summer	0.27			
U-Value - Winter	0.28			
Solar Heat Gain	0.43			
Shading Coefficient	0.49			

END OF SECTION

- Go to Long Form Version
- Go to Drawing Notes Version
- Help with Using Specifications

Specifications:

Craftsman tempered glass conforms to Federal Specifications ASTM C 1048 (Heat-strengthened and Fully Tempered) and C 1036 (Flat for Glazing, Mirrors and Other Glass); ANSI Z97.1 certified by SGCC (Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings), and meets The Consumer Product Safety Commission Standard 16 CFR 1201, Category I & II (Safety Standard for Architectural Glazing Materials).

Craftsman insulated glass units are certified by the IGCC, SIGMA, and IGMA and are in compliance with ASTM E 773/E 774 (Seal Durability Specification).

Craftsman laminated glass conforms to Federal Specifications ASTM C1172 (Laminated Architectural Flat Glass) and meets Category I & II of the CPSC 16CFR 1201, and ANSI Z97.1

PPG CFP
CERTIFIED FABRICATOR™ PROGRAM

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Fabricated Glass Products

Tempered | Insulated | Architectural Glass Doors and Wall Systems | Resin Laminated | Heavy Glass Bath Enclosures |

CraftSman FABRICATED GLASS INCORPORATED

Craftsman Fabricated Glass is an industry leader in the fabrication of tempered, insulated, and all flat glass products.

Committed to excellence, Craftsman sets the standard for providing an extensive array of quality commercial and residential products, manufactured with state of the art equipment, and unparalleled customer service before and after the sale.

Houston Texans Reliant Stadium
All upper areas: Pilkington 1/4" tempered Blue Green

Heat Treated Glass

Tempered Glass... Fully tempered glass is a safety glass, generally four times stronger than the same thickness of ordinary annealed glass. Taking ordinary glass to a tempered state involves heating the glass in a special furnace to approximately 1260° Fahrenheit, then setting a permanent tension between the glass "core" and surfaces by rapidly cooling the glass in a high pressure quench. When fully tempered glass is broken, the release of tension between these surfaces initiates a cascade of much smaller glass fragments than ordinary annealed glass. While a person can still get cut by this safety glass, the objective is to eliminate as much of the dangerously long shards of glass raining down within the broken debris as possible. Fully tempered safety glass is usually recognized by the "ANSI – Z97.1" corner logo, permanently sandblasted or stamped with a fired-on ceramic frit that includes the fabricator identification. Please refer to back cover for specification and certification language.

Ideal applications for fully tempered glass are those in which safety is a priority. Such applications include code mandated shower and bath enclosures, sliding and swing glass doors, and glass adjacent to pedestrian traffic. Other tempered applications include windows, skylights, atriums, as well as glass used in motor vehicles and appliances such as refrigerator shelving, microwave ovens, etc.

Edgework... For tempered glass with exposed edges, Craftsman provides "brilliant" cerium polished, optical quality edgework, including the thin beveled aris's, the standard offering for all of Craftsman's frameless glass applications. Brilliant edgework provides a very subtle elegance to frameless doors and sidelites.

Polish Edging Machine

Heat-Strengthened Glass (HS)... HS glass is used in applications where additional durability is required, but with less surface compression than fully tempered glass. HS is typically twice as strong as annealed glass; but it is NOT a safety glazing material. When produced with lower compression levels, HS glass will break in larger fragments, similar to annealed glass; the attraction to HS glass is that the larger glass fragments are more likely to stay in the opening than fully tempered glass. HS glass is ideal for tinted or coated glasses that are subjected to stress by heat buildup from sunlight, or to stress from unusual sun/shade exposure, and for applications demanding additional wind load resistance.

Convection Tempering Furnace

Horizons II, Austin, Texas
Insulated PPG Solargray / Solarban 60 & Insulated Spandrel

Tempering... Craftsman heat treats its glass in a new technology convection tempering furnace specifically developed to temper the new generations of high performance and low-emissivity glass with superior quality. The furnace will thru-put glass up to 84" x 182", from 1/8" to 1" thick. The benefit of using a furnace that tempers high performance reflective and Low-e glass efficiently is that the quality in ordinary glass is even more visually attractive.

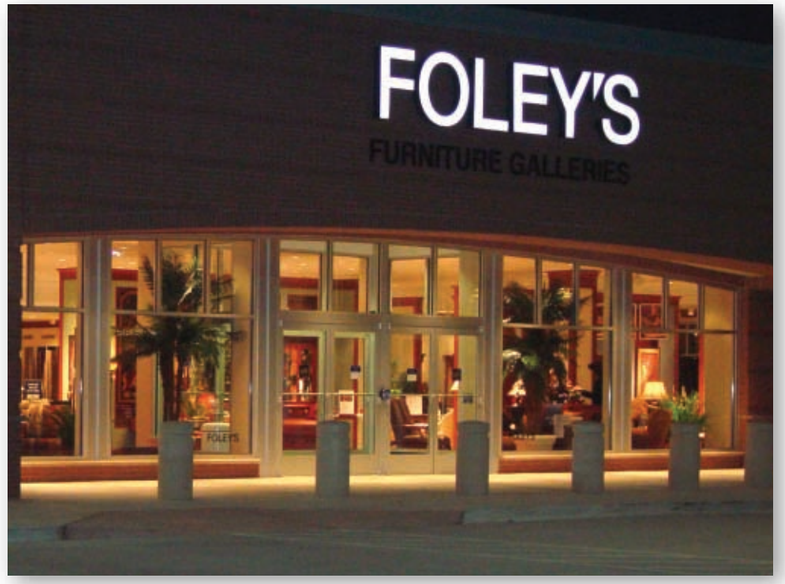
IBM Employee Federal Credit Union
PPG Insulated Solexia / Solarban 60

Optical Quality: Tempered and heat-strengthened glass possesses the fundamental optical qualities of annealed glass. Because glass is heated and cooled through a furnace, the induced stress will sometimes produce a bow or warp in glass lites, or the glass may have slight-to-heavy surface wave from being very near melting temperature while conveyed over the furnace's ceramic rollers. This "roller wave" can be detected when viewing reflected images from a distance, and is inherent with heat treated glass. Craftsman's convection heating is much more efficient compared to older technology furnaces that rely solely on radiant heat, so glass processed with the benefit of convection heat is typically better quality and more consistent.

Iridescence or strain pattern is related to the stresses introduced in the cooling process of tempered or heat-treated glass. This looks very similar to the "shadow spots" in glass you might see in vehicle back lites through polarized sunglasses. This iridescence is usually not visible at normal viewing angles, but may become visible under certain light conditions, at sharp angles or through polarized lenses. This phenomenon is normal in heat treated glass and is not a defect.

Insulated Glass

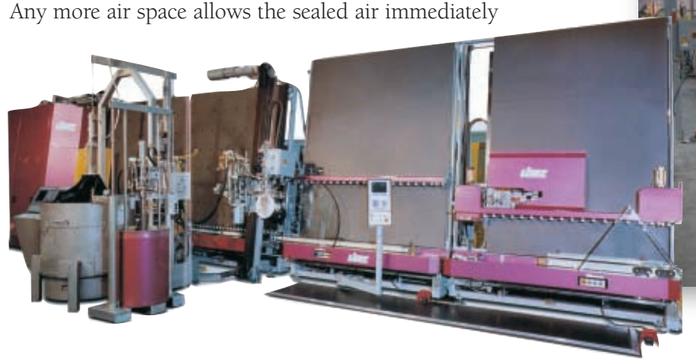
To reduce heat gain or loss through glass, two or more lites are used to create dead air space that inhibits the transmission of heat and cold between the lites of glass. Insulated glass is typically fabricated using very special sealants and a metal spacer at the perimeter of the glass- creating a hermetically sealed insulated glass (IG) unit. Glass used in IG units can be annealed, heat-strengthened or fully tempered.



Foley's
Insulated PPG Starphire / Starphire for ultra clear vision

Air Space... The ideal air space between lites in an insulated unit is approximately 1/2"-5/8". Any less air space reduces the "U" value performance. Any more air space allows the sealed air immediately adjacent to the warmer lite to rise from absorbing heat, while air next to the cooler lite seeks to replace the rising air, presenting a performance reducing convection condition within the unit.

Benefits of IG units include enhanced thermal performance and a reduction in room drafts, heating/cooling loss, external noise, condensation, etc. These benefits are greatly enhanced when units include glass with new technology low-emissivity (Low-e) high performance coatings that block much of the high frequency ultraviolet light. The newest technology solar-control Low-e glass allows very high visible light transmission while also blocking low frequency radiated heat: heat that is absorbed and re-radiated such as heat from a parking lot full of cars, concrete sidewalks, etc. Additionally, Low-e glass greatly reduces the damage ultraviolet light does to fabrics, paint, carpet, etc., caused by direct sunlight. Best of all, people feel much more comfortable when occupying space near this type of glass.



Glass Options: Craftsman fabricates glass made by all major primary float glass manufacturers: PPG, Guardian, Pilkington, AFG, Visteon, etc. This versatility allows Craftsman to offer a large variety of glass combinations by primary glass manufacturers to satisfy creative architectural color and performance criteria.Craftsman is a Certified Fabricator for PPG and Guardian Industries.

Gas Filled Units: Argon or Krypton gas can be substituted in the sealed air space to further enhance "U" value performance. Craftsman is one of a few manufacturers capable of making gas substitution in the primary press, immediately before the final seal. With both lites held apart, Argon or Krypton is pressured through a special bottom conveyer belt inside the press. After the conversion is completed, lites are pressed together, trapping the gas inside the unit and creating the first and most important primary seal. The secondary seal is then applied by automated robot for a clean dual seal unit.

South Post Oak Baptist Church
Insulated PPG Solarban 60/Clear

Continuous Spacer Frames... To keep two or more lites separated in an insulated glass unit, an aluminum spacer is typically used. For an IG unit to fail, the seal between the glass lites must fail. The leading cause of seal failure, aside from units sitting in water for extended periods, are leaks through corner connections between vertical and horizontal spacer frame parts. Craftsman eliminates this potential leak with a CNC bender that processes continuous spacer frames with bent corners. The spacer is drawn into the bender, then bent; and ends are connected by a straight key at least 2" from the corner. The spacer is then filled with a sufficient amount of desiccant to absorb any moisture trapped at the time of fabrication, or for normal infiltration during the life of the unit.

Warm-Edge Technology... Another new technological development is a spacer made of stainless steel. Stainless spacers are both structurally strong as well as warm-edge: ideal for high performance commercial applications. Warm-edge technology can best be described this way: the IG unit insulates interior and exterior environments best where the glass is separated by air space. However, a "bridge" of temperature transmission is created between these environments where glass is bonded to the spacer. Although aluminum spacers still offer performance, stainless conductivity is less than 10% of aluminum. IG units utilizing warm-edge spacers and Low-e glass assist in reducing condensation within the structure around the windows, which can lead to mold or other problems if condensation is not properly weeped.

Dual Seal... Insulated glass has the best opportunity for extended service as a dual seal unit. A polyisobutylene primary sealant is applied to the spacer frame, serving as an impervious barrier to air and moisture penetration between the spacer frame and glass lites. A secondary sealant is then applied, providing additional sealing and rigidity to the unit. Craftsman offers only dual seal units. Two options are available for the secondary sealant: a two-part polysulfide or silicone. Although polysulfide performs better as a moisture barrier, silicone is used to provide additional structural support for commercial installations. Craftsman IG units also meet high performance Canadian specification requirements for insulated glass: CAN/CGSB.12.8-M.

Offset Units... Occasionally, architects desire buildings to have the appearance of an all glass look, with minimal space between units, and with no vertical framing visible from the exterior sight plane. To do this, the interior glass and spacer is positioned further from the exterior glass edge, allowing space for the structural framing to support the insulated unit from behind the exterior lite. The space between "butting" lites is sealed with structural silicone. Today, Craftsman is one of the few U.S. manufacturers capable of producing offset insulated glass on the automated robotic line, giving a more quality, clean look desired for the building exterior.

Performance… More states are adopting the ***International Energy Conservation Code*** for glazing performance guidelines. Pages (8 & 9) identify a reasonable cross section of products made by PPG, Guardian, Pilkington, and Visteon that are typically specified for use. These pages show the most common glass combinations that can be provided by Craftsman Insulated, and should be helpful in determining how these combinations perform. In some cases there will need to be a minimum order.

Support... Craftsman's technical service staff will be happy to assist with selecting the best glazing for your application. Color, appearance, visible light transmission, shading coefficient and solar heat gain coefficient (SHGC), safety and code requirements, strength, and special "easy-cleaning" coatings are only a few of the considerations a client will want to discuss.

To the Wary Customer... With a more conversational than technical presentation used for this brochure, we are attempting to communicate the intricacies of glass products. Additionally, we are trying to convey that with better fabrication technology and equipment, there are often

Houston Astros Minute Maid Park
3/8" Tempered & Annealed Pilkington Blue Green

significant differences in quality, as was addressed in edgework and tempering furnace. Glass specifications were written many years ago when fabrication technology was not as advanced as they are today. Standards are now being updated, but for standards that are still in place, discriminating customers and architects should know there are higher levels of quality available ***now***!

Craftsman's commitment is to invest in the best production equipment in the world, and to provide technically advanced, quality products that are more visually attractive and durable. It is our promise to provide this service... not cheaply, but at the most economical price possible.

CraftSmart Performance Comparisons for Insulated Glass

Unless otherwise noted, based on 1-inch (25mm) units with 1/2-inch (13mm) airspace and two 1/4-inch (6mm) lites			Solar Heat Gain Coefficient	Light to Solar Gain (LSG)	Shading Coefficient	Transmittance			Reflectance		U-Value (Imperial)	
* Glass Type	Outboard Lite * Manu-facturer	The Look				Ultra-violet %	Visible %	Total Solar Energy %	Visible Light %	Total Solar Energy %	Winter Nighttime	Summer Daytime
Clear												
1/8" Clear + 1/8" Solarban 60 (3/8" Air Space)	PPG	Clear	.40	1.78	.46	16	71	35	12	33	.32	.33
1/8" Clear + 1/8" Energy Advantage (3/8" Air Space)	Pilkington	Clear	.65	1.15	.75	46	75	58	17	15	.36	.37
1/8" Clear + 1/8" Clear Glass (3/8" Air Space)	Commodity	Clear	.75	1.08	.88	59	81	69	16	13	.50	.53
3/16" Clear + 3/16" Solarban 60 (3/8" Air Space)	PPG	Clear	.39	1.79	.46	15	70	34	12	29	.32	.33
3/16" Clear + 3/16" Energy Advantage (3/8" Air Space)	Pilkington	Clear	.63	1.17	.73	42	74	55	17	15	.36	.37
3/16" Clear + 3/16" Clear Glass (3/8" Air Space)	Commodity	Clear	.75	1.07	.84	53	80	64	15	12	.50	.52
1/4" Clear + 1/4" Solarban 60	PPG	Clear	.38	1.82	.45	14	69	33	12	27	.29	.28
1/4" Clear + 1/4" Energy Advantage	Pilkington	Clear	.62	1.18	.72	38	73	52	16	14	.33	.33
1/4" Clear + 1/4" Clear Glass	Commodity	Clear	.70	1.13	.81	50	79	61	15	12	.47	.50
Sun-Guard LE-40 + Clear Glass	Guardian	Neutral	.31	1.29	.36		40	24	18	12	.33	.36
1/8" Starphire + 1/8" Solarban 60 (3/8" Air Space)	PPG	Ultra Clear	.40	1.80	.47	17	72	37	12	33	.32	.33
1/8" Starphire + 1/8" Starphire (3/8" Air Space)	PPG	Ultra Clear	.83	1.01	.97	78	84	82	15	15	.50	.53
3/16" Starphire + 3/16" Solarban 60 (3/8" Air Space)	PPG	Ultra Clear	.40	1.78	.46	16	71	36	12	29	.32	.33
3/16" Starphire + 3/16" Starphire (3/8" Air Space)	PPG	Ultra Clear	.82	1.02	.96	76	84	81	15	14	.50	.52
1/4" Starphire + 1/4" Solarban 60	PPG	Ultra Clear	.39	1.82	.45	16	71	35	11	27	.29	.28
1/4" Starphire + 1/4" Starphire	PPG	Ultra Clear	.82	1.02	.95	74	84	80	15	14	.47	.50
Tinted												
Solarbronze + Solarban 60 (3)	PPG	Warm Bronze	.31	1.32	.36	7	41	20	8	17	.29	.30
Solarbronze + Energy Advantage (3)	PPG	Warm Bronze	.46	.96	.54	16	44	33	9	9	.33	.33
Solarbronze Tinted + Clear Glass	PPG	Warm Bronze	.50	.96	.58	21	48	39	9	8	.48	.57
Solargray + Solarban 60 (3)	PPG	Gray	.28	1.25	.32	6	35	17	7	13	.29	.31
Solargray + Energy Advantage (3)	PPG	Gray	.40	.93	.47	15	37	28	8	8	.33	.33
Solargray Tinted + Clear Glass	PPG	Gray	.45	.89	.52	20	40	33	7	7	.48	.57
Solexia + Solarban 60 (3)	PPG	Solex/Green	.36	1.67	.41	8	60	24	11	11	.29	.30
Solexia + Energy Advantage (3)	PPG	Solex/Green	.45	1.42	.52	19	64	33	14	9	.33	.33
Solexia Tinted + Clear Glass	PPG	Solex/Green	.49	1.41	.56	25	69	39	13	8	.48	.57
Super Tinted												
Optigray 23 + Solarban 60 (3)	PPG	Medium Gray	.18	1.00	.21	2	18	9	5	6	.29	.31
Optigray 23 + Energy Advantage (3)	PPG	Medium Gray	.24	.79	.28	5	19	13	6	5	.33	.33
Optigray 23 Tinted + Clear Glass	PPG	Medium Gray	.28	.75	.33	6	21	16	5	5	.48	.58
Graylite + Solarban 60 (3)	PPG	Dark Gray	.17	.65	.20	2	11	8	5	8	.29	.31
Graylite + Energy Advantage (3)	PPG	Dark Gray	.28	.39	.33	4	11	16	5	6	.33	.33
Graylite Tinted + Clear Glass	PPG	Dark Gray	.33	.36	.38	6	12	20	5	5	.48	.58
Atlantica + Solarban 60 (3)	PPG	Emerald Green	.30	1.73	.35	4	52	20	10	8	.29	.30
Atlantica + Energy Advantage (3)	PPG	Emerald Green	.35	1.60	.41	10	56	25	12	7	.33	.33
Atlantica Tinted + Clear Glass	PPG	Emerald Green	.39	1.54	.46	13	60	29	11	7	.48	.57
EverGreen Tinted + Solarban 60	Pilkington	Green	.30	1.73	.35	4	52	20	9	7	.29	.28
EverGreen Tinted + Energy Advantage	Pilkington	Green	.35	1.57	.41	9	55	25	11	7	.33	.33
EverGreen Tinted + Clear Glass	Pilkington	Green	.40	1.48	.47	12	59	28	10	6	.47	.50
Caribia + Solarban 60 (3)	PPG	Aqua Green	.30	1.73	.35	6	52	20	9	7	.29	.31
Caribia + Energy Advantage (3)	PPG	Aqua Green	.34	1.53	.39	26	52	24	12	7	.33	.33
Caribia Tinted + Clear Glass	PPG	Aqua Green	.38	1.58	.44	19	60	27	11	7	.48	.57
Blue-Green Tinted + Solarban 60	Pilkington	Blue-Green	.37	1.59	.43	8	59	25	10	12	.29	.28
Blue-Green Tinted + Energy Advantage	Pilkington	Blue-Green	.46	1.35	.54	20	62	35	13	9	.33	.33
Blue-Green Tinted + Clear Glass	Pilkington	Blue-Green	.51	1.31	.59	27	67	40	12	8	.47	.50
Azuria + Solarban 60 (3)	PPG	Aqua Blue	.30	1.73	.35	10	52	20	9	7	.29	.31
Azuria + Energy Advantage (3)	PPG	Aqua Blue	.34	1.53	.39	26	52	24	12	7	.33	.33
Azuria Tinted + Clear Glass	PPG	Aqua Blue	.38	1.58	.44	34	60	27	11	7	.48	.57
Versalux Blue + Solarban 60	Visteon	Blue	.33	1.33	.38	9	44	21	8	13	.29	.28
Versalux Blue + Energy Advantage	Visteon	Blue	.44	1.07	.51	21	47	32	9	8	.33	.33
Versalux Blue + Clear Glass	Visteon	Blue	.49	1.04	.57	27	51	37	9	7	.47	.50
Versalux Blue 2000 + Solarban 60	Visteon	Blue	.26	1.27	.30	4	33	15	6	7	.29	.28
Versalux Blue 2000 + Energy Advantage	Visteon	Blue	.32	1.09	.38	9	35	21	7	6	.33	.33
Versalux Blue 2000 + Clear Glass	Visteon	Blue	.39	.97	.44	11	38	25	7	6	.47	.50

PPG CFP
CERTIFIED FABRICATOR™ PROGRAM

Performance data is based on representative samples of factory production. Actual values may vary slightly due to variations in the production process. Figures may vary due to manufacturing tolerances. All tabulated data are based on NFRC methodology using LBL's Window 5.1 software (some values were derived from manufacturer's publications that may have been calculated with different software).

CraftSmart Performance Comparisons for Insulated Glass

Unless otherwise noted, based on 1-inch (25mm) units with 1/2-inch (13mm) airspace and two 1/4-inch (6mm) lites			Solar Heat Gain Coefficient	Light to Solar Gain (LSG)	Shading Coefficient	Transmittance			Reflectance		U-Value (Imperial)	
* Glass Type	Outboard Lite * Manu-facturer	The Look				Ultra-violet %	Visible %	Total Solar Energy %	Visible Light %	Total Solar Energy %	Winter Nighttime	Summer Daytime
Reflective												
Solarban 80 (2) + Clear Glass	PPG	Light Silver	.23	2.04	.27	12	47	19	32	40	.29	.29
Sun-Guard-20 on Clear + Solarban 60	Guardian	Silver	.15	1.07	.18	5	16	8	32	29	.29	.28
Sun-Guard-20 on Clear + Energy Advantage	Guardian	Silver	.19	.89	.22	13	17	11	32	28	.32	.32
Sun-Guard-20 on Clear + Clear Glass	Guardian	Silver	.21	.86	.24	17	18	12	32	28	.40	.41
Sun-Guard-32 on Clear + Solarban 60	Guardian	Silver	.21	1.19	.25	6	25	12	22	20	.29	.28
Sun-Guard-32 on Clear + Energy Advantage	Guardian	Silver	.27	.96	.31	17	26	17	22	19	.33	.32
Sun-Guard-32 on Clear + Clear Glass	Guardian	Silver	.30	.93	.35	22	28	19	22	18	.42	.44
Sun-Guard Platinum (2) + Solarban 60	Guardian	Platinum	.17	1.06	.20		18	9	27	25	.29	.30
Sun-Guard Platinum (2) + Energy Advantage	Guardian	Platinum	.21	.90	.24		19	12	27	25	.32	.35
Sun-Guard Platinum (2) + Clear Glass	Guardian	Platinum	.24	.88	.27		21	14	27	24	.41	.47
Sun-Guard Pewter-30 (2) + Solarban 60	Guardian	Pewter	.20	1.15	.23		23	11	19	19	.29	.30
Sun-Guard Pewter-30 (2) + Energy Advantage	Guardian	Pewter	.25	1.00	.29		25	15	20	18	.33	.35
Sun-Guard Pewter-30 (2) + Clear Glass	Guardian	Pewter	.28	.96	.32		27	18	20	18	.41	.48
Solarcool (2) Bronze + Solarban 60	PPG	Warm Bronze Reflective	.18	.89	.20	2	16	9	14	18	.29	.31
Solarcool (2) Bronze + Energy Advantage	PPG	Warm Bronze Reflective	.29	.62	.34	5	18	17	14	13	.33	.33
Solarcool (2) Bronze + Clear Glass	PPG	Warm Bronze Reflective	.33	.58	.38	6	19	21	14	12	.48	.58
Solarcool (2) Gray + Solarban 60	PPG	Medium Gray Reflective	.16	.88	.19	2	14	7	11	14	.29	.31
Solarcool (2) Gray + Energy Advantage	PPG	Medium Gray Reflective	.26	.58	.30	5	15	17	11	10	.33	.33
Solarcool (2) Gray + Clear Glass	PPG	Medium Gray Reflective	.30	.53	.35	6	16	18	11	10	.48	.58
Solarcool (2) Graylite + Solarban 60	PPG	Dark Gray Reflective	.12	.33	.14	1	4	4	5	10	.29	.32
Solarcool (2) Graylite + Energy Advantage	PPG	Dark Gray Reflective	.21	.24	.24	1	5	9	5	7	.33	.33
Solarcool (2) Graylite + Clear Glass	PPG	Dark Gray Reflective	.25	.20	.29	2	5	12	5	6	.48	.59
Solarcool (2) Solexia + Solarban 60	PPG	Green Reflective	.19	1.26	.21	2	24	10	24	15	.29	.31
Solarcool (2) Solexia + Energy Advantage	PPG	Green Reflective	.26	.96	.30	6	25	15	24	13	.33	.33
Solarcool (2) Solexia + Clear Glass	PPG	Green Reflective	.30	.90	.35	7	27	19	24	12	.48	.58
EverGreen Eclipse (2) + Solarban 60	Pilkington	Green Reflective	.18	1.33	.21	1	24	9	25	13	.29	.28
EverGreen Eclipse (2) + Energy Advantage	Pilkington	Green Reflective	.23	1.13	.26	2	26	13	26	12	.33	.33
EverGreen Eclipse (2) + Clear Glass	Pilkington	Green Reflective	.28	1.00	.32	3	28	15	26	12	.47	.50
Sun-Guard-20 on Green + Solarban 60	Guardian	Silver/Green	.14	.93	.16	2	13	6	24	13	.29	.28
Sun-Guard-20 on Green + Energy Advantage	Guardian	Silver/Green	.16	.88	.14	6	14	7	24	13	.32	.32
Sun-Guard-20 on Green + Clear Glass	Guardian	Silver/Green	.19	.84	.22	7	16	8	24	13	.40	.41
Sun-Guard-32 on Green + Solarban 60	Guardian	Silver/Green	.17	1.24	.20	3	21	8	17	10	.29	.28
Sun-Guard-32 on Green + Energy Advantage	Guardian	Silver/Green	.20	1.10	.23	8	22	11	17	10	.33	.32
Sun-Guard-32 on Green + Clear Glass	Guardian	Silver/Green	.24	1.00	.27	10	24	12	17	10	.42	.44
Sun-Guard-52 on Green + Solarban 60	Guardian	Silver/Green	.24	1.42	.27	4	34	14	11	8	.29	.28
Sun-Guard-52 on Green + Energy Advantage	Guardian	Silver/Green	.28	1.29	.32	10	36	17	12	8	.33	.33
Sun-Guard-52 on Green + Clear Glass	Guardian	Silver/Green	.32	1.22	.37	13	39	20	12	8	.45	.47
Solarcool (2) Azuria + Solarban 60	PPG	Aqua Blue Reflective	.16	1.25	.18	3	20	8	19	10	.29	.31
Solarcool (2) Azuria + Energy Advantage	PPG	Aqua Blue Reflective	.20	1.10	.23	8	22	10	20	10	.33	.33
Solarcool (2) Azuria + Clear Glass	PPG	Aqua Blue Reflective	.24	1.00	.27	10	24	12	19	10	.48	.58
Solarcool (2) Caribia + Solarban 60	PPG	Aqua Green Reflective	.16	1.25	.18	2	20	8	19	10	.29	.31
Solarcool (2) Caribia + Energy Advantage	PPG	Aqua Green Reflective	.20	1.10	.23	8	22	10	20	10	.33	.33
Solarcool (2) Caribia + Clear Glass	PPG	Aqua Green Reflective	.24	1.00	.28	6	24	12	19	10	.48	.58
Sun-Guard Royal-20 (2) + Solarban 60	Guardian	Royal Blue	.17	1.00	.19		17	8	19	17	.29	.30
Sun-Guard Royal-20 (2) + Energy Advantage	Guardian	Royal Blue	.21	.90	.24		19	12	20	17	.32	.36
Sun-Guard Royal-20 (2) + Clear Glass	Guardian	Royal Blue	.23	.87	.27		20	14	19	16	.41	.48
Versalux Blue 2000T (2) + Solarban 60	Visteon	Bright Blue Reflective	.21	1.10	.24	3	23	11	12	11	.29	.28
Versalux Blue 2000T (2) + Energy Advantage	Visteon	Bright Blue Reflective	.27	.93	.31	7	25	16	12	10	.33	.33
Versalux Blue 2000T (2) + Clear Glass	Visteon	Bright Blue Reflective	.32	.84	.37	9	27	19	12	9	.47	.50
Versalux Blue RC + Solarban 60	Visteon	Blue/Medium Reflectance	.17	.88	.20	2	15	8	14	14	.29	.28
Versalux Blue RC + Energy Advantage	Visteon	Blue/Medium Reflectance	.25	.64	.29	6	16	14	14	11	.33	.33
Versalux Blue RC + Clear Glass	Visteon	Blue/Medium Reflectance	.31	.55	.35	7	17	17	14	10	.47	.50

Important Note: 1. Second (2) surface heat-absorbing reflective glass, or heat-absorbing glass matched with a third (3) surface Low-e product will normally require heat-strengthening of the outboard lite, and, in some instances, heat-strengthening of both lites. • **2.** Meets IECC minimum Solar Heat Gain Coefficient of .40 • Meets minimum recommended DOE Light to Solar Gain of 1.25 • **3.** This information is collected for the purposes of comparison. Some items listed are not normally stocked; as a result, orders of some combinations may be subject to minimum quantity/purchases. • **4.** Columns with asterisks (*) denote trademarked or registered product names of the manufacturers listed in the same line space; they also apply to products referred to throughout the brochure, and are used by permission.

Craftsman Architectural Systems

Craftsman Architectural Systems caters to the needs of more creative commercial glass and architectural professionals. **Craftsman Architectural Systems** marries glass, aluminum, hardware and exotic metals to manufacture finished products for use in the commercial building trade.

Pictures of fabricated products installed around the country best describe the creative uniqueness of this division. Included in the product mix are Glass Balcony and Frameless Glass Handrail Systems, high quality commercial Craftsman Tempered Glass Doors (swinging, top hung, and bottom rolling sliders), Custom Cladding of aluminum doors and entrances with brushed or mirror polished stainless, brass, oil rubbed bronze and other finishes.

Craftsman is a fabricator/distributor of Vistawall Aluminum Glazing Systems. Other Vistawall products offered include Moduline Window Systems, Naturalite Skylight Systems and Skywall Translucent Systems. With energy code emphasis growing across the United States, options such as the Series 3000-S Thermally Improved System for insulated glass provides for effective Solar Heat Gain Resistance and affordability.

Kinkaid Middle School
Tempered Glass Doors with etched stripe design

Craftsman H.Q. - Houston, Texas
1/2" Tempered Saten Decor with sliding glass door

Craftsman H.Q. - Houston, Texas
3/4" tempered, Frameless Glass Handrail System

Craftsman's Vision Wall

offers glazing contractors and their customers two excellent options for vision panels of frameless glass: a great look with multiple finishes, and the opportunity to close-in openings more quickly than can be done with 1/2" poured-shoe glass panels. The system is designed to be glazed at the jobsite by using dry gaskets to secure the glass in place. Vision Wall is perfect for glass conference walls, and for sidelites to tempered glass doors. 1/2" clear tempered glass is the choice for glass in the majority of applications; however, Craftsman Fabricated Glass offers many standard and custom options for 1/2" privacy glass with excellent light transmission. Please refer to pages 17, 18 & 20 for glass options that will provide a dynamic Vision Wall privacy look.

Craftsman H.Q. - Houston, Texas
Craftsman Vision Wall™ with 1/2" Tempered etched glass panels for privacy

Craftsman's Engineered Point Supported Wall Systems provide a way to express truly unique creativity in exterior and interior frameless glass applications. One application used the Craftsman point loaded system adjacent to shopper escalators for a multi-story, diode lighted accent wall. Another application created truly unique (and quite beautiful) work stations for an office. Another was a glass enclosed walkway between buildings at the Pentagon.

Liberty Corporation H.Q.
Resin Laminated patterned glass

For exterior uses, and for most interior applications that are supported or stiffened by glass, the Point Supported Wall System must be engineered. The system is designed to move with the building, and move with wind loading. Applications include glass walls that are suspended from above, from the base, or with cables and rods.

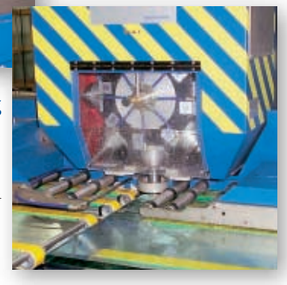
The Craftsman Architectural Systems professionals are available to assist in the design and construction of your project.

Bloomingdale's - Orlando, Florida
Laminated patterned glass set in engineered Point Supported Wall System, with diode back-lighting

Hole drilling and milling… A Point Supported Glass Wall System must have precisely located countersunk holes; drilled holes must be finished with minimal oystering or edge defects. To accomplish this objective, hole-drilling and countersinking is done with water cooled diamond bits on a CNC drilling and milling machine specifically designed for this purpose. The programming is done during order entry; thus eliminating the need to have machine operators interpret drawings, and program instructions in the shop.

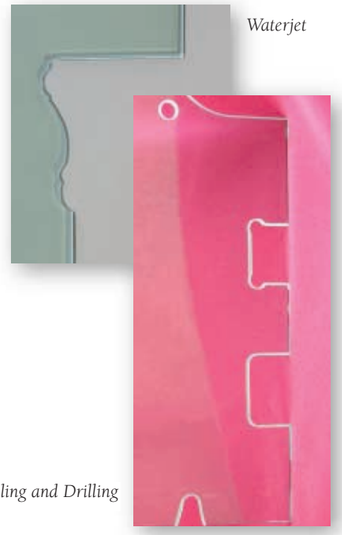
The same precision drilling and milling equipment is used with glass destined for heavy glass frameless bath enclosures. Just as important, holes in bath enclosures must be precisely located for proper mounting of hinges and pulls, and for edge mounted clips that require holes and notches. With programming done at order entry, the prospect of having holes located an inch too close or far apart is reduced dramatically. Large runs of repetitive glass sizes with identical hole locations can be accomplished with little opportunity for errors, which can occur more often when done manually.

Consistent and repetitive workmanship in hole locations is provided by state of the art CNC hole drilling and milling equipment



CNC Controlled Waterjet Cutting opens opportunities for creative uses of glass, marble, granite, mirror, metals, and many other substrates. A special cutting garnet is introduced into a stream of water that is pumped through a .007" orifice at ~50,000 lbs. per square inch of pressure. At that point, the water is moving at a faster velocity than a 22 caliber bullet, so virtually all items that can be inserted under the jet stream can be cut into intricate shapes. This cutting capability gives professionals the opportunity to create marble and tile medallions in floors, wall mounted art or signage with glass, and many more applications.

Craftsman Architectural Systems Brake Metal division provides Shear and Brake services for stainless, aluminum, brass, with mirror, satin and special textured patterns, as well as mill, anodized (architectural grade only) and painted finishes, offering fast turn-around for one-or-a-quantity of lengths to 12'. Applications include: glazing and storefront trims, column covers, fascia at entrance ways, corner guards, kick plates, flashing, framing, sign panels, access panels and sub-sill applications along with many other items.



Waterjet

CNC Milling and Drilling

Frameless Heavy Glass Bath Enclosures

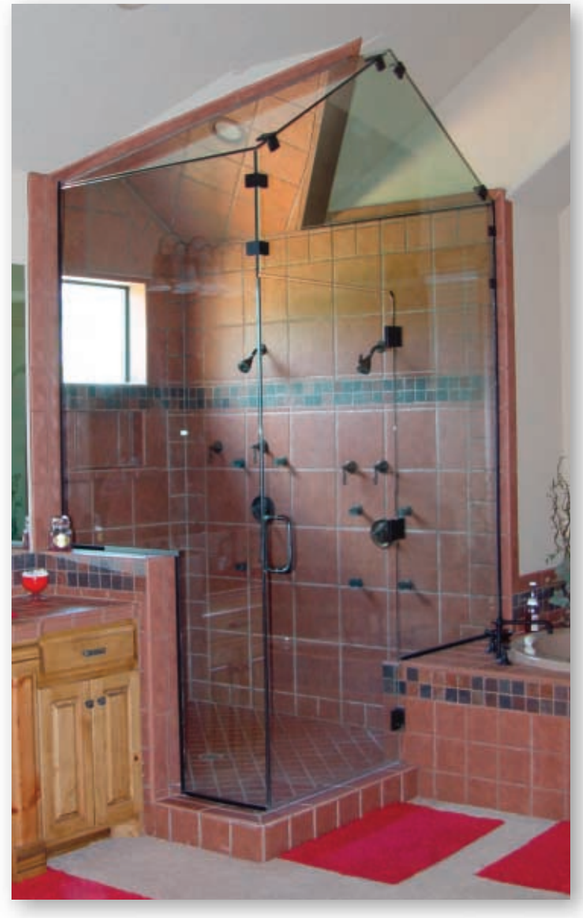
Glass bath enclosures are taking the custom homebuilding trade by storm. Builders are learning that distinguishing prospective buyers demand a showcase master bath where they will spend much of their time. So master baths are getting quite a lot more attention; they are larger, and there is no better way to elegantly state its dramatic appeal than with frameless heavy glass bath and shower enclosures. Additionally, after spending a relative *fortune* on finishes, owners of more upscale homes certainly want to showcase their fixtures, marble, tile and granite.

Advantages Bath Enclosure Companies can expect of this Craftsman division:

- A well prepared team with extensive knowledge of materials, installation requirements and expertise to handle the more creative demands of customers.
- Excellent glass versatility… Combining one of the nation's most extensive inventory of clear glass, patterned and etched glass with versatile fabrication and tempering capabilities gives customers a great abundance of immediate choices.
- Custom etching is available to customers desiring truly unique bath enclosures.
- Brilliant cerium polished edgework is provided on heavy frameless tempered safety glass. Once installed, notice the subtle flashing of the aris as the door is opened… customers can't quite put their finger on why their enclosure looks "so special" until they are reminded of the brilliant edgework.
- Comprehensive stock of hardware finishes and prompt fabrication of glass offers customers excellent order-to-ship service.

Residence
Etched pattern to compliment wallpaper on 3/8" Frameless Tempered Glass

Residence
1/2" Frameless Tempered Bath Enclosure



Craftsman Etching and Design

The Etching and Design department represents the most artistic side of our business. Etching glass in shapes and patterns is done using a CNC pneumatic sandblasting line. New for 2003 is the ability to computer control the fade density from 100% to 0% within the same lite of glass. For glass offices, this means that the patterns can be faded in and out of areas where privacy is an issue, or simply to get a nice effect.

Glass Awards and 3-D Models are manufactured and assembled in this unique department. Included is a picture of a glass hunting rifle, and past accomplishments include a 30" model glass stadium that was presented to the owner of Minute Maid Park in Houston. Having already provided the exterior tempered 3/8" Pilkington Blue Green glass for the “full size” stadium made this an exceptional twist of fate.

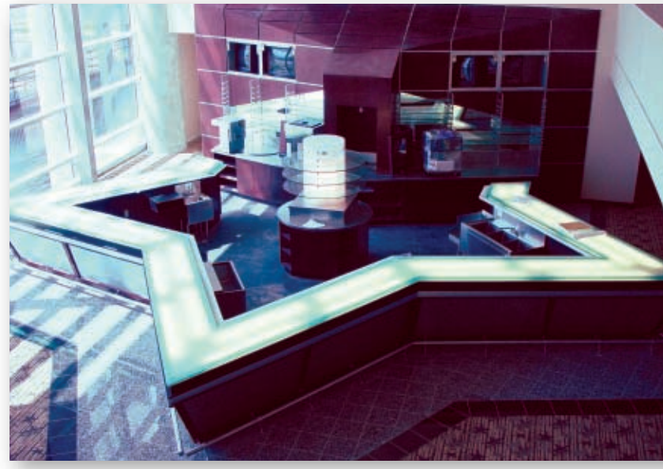
First United Methodist Church
Deep Carved 1" Glass Tablet "Moses Parting the Red Sea"

Houston Texans Donor Wall
Weeding to expose names of Donors prior to etching

Hunting Rifle
Waterjet cut and Bonded PPG Starphire that is ground and polished to a full size replica

Pintail Hunting Club - Texas
Ducks logo captured in the Glass Door Insert

Planet Ford - Spring, Texas
Epoxy paint-filled etching on Tempered Glass Doors with special Handles



Star Bar - Houston Texans Reliant Stadium
Milk white Laminated PPG Starphire bottom-lit Bar Top

Resin Poured Laminated… Resin Poured Laminating offers cost effective opportunities to mix-in more exotic patterns or shapes in glass that would otherwise be difficult to laminate. Conventional laminated glass production is appropriate for float glass substrates; however, choices are normally limited to clear glass with clear or very limited choices in colored vinyl. Resin Poured Lamination gives Craftsman the opportunity to offer many more options in colors, stained, rolled, cast, and etched patterned glass, spandrel and exotic glass. Fabrication is more easily done on glass before lamination, so products requiring holes, notches and countersinking are also easier to process.

Premium Series Custom Etched Glass

Premium Etched “Sand”
Available in 3/8", 1/2", 3/4", 1" thicknesses.

Premium Etched “Skin”
Available in 3/8", 1/2", 3/4", 1" thicknesses.

Premium Etched “Swept”
Available in 3/8", 1/2", 3/4", 1" thicknesses.

Patterned Glass

Custom Etched “Dashes”
Available in all thicknesses.

Custom Etched “Diamonds”
Available in all thicknesses.

Custom Etched “Dots”
Available in all thicknesses.

Custom Etched “Fleur De Lis”*
Available in all thicknesses.

Custom Etched “Plaid”*
Available in all thicknesses.

Custom Etched “Squares”*
Available in all thicknesses.

Custom Etched “Weave”*
Available in all thicknesses.

Custom Etched 20% Obscure*
Available in all thicknesses.

Custom Etched 50% Obsure*
Available in all thicknesses.

SatenLux • 70% Obscure*
Available in 1/4" thickness.

SatenGlas • 100% Obscure*
Available in 1/4", 3/8", 1/2" thicknesses.

SatenDecor*
Available in 1/2" thickness.

Patterned Glass

Saten Acapulco
Available in 3/16" thickness.

Saten Fantasia
Available in 3/16" thickness.

Saten Granada
Available in 1/8" thickness.

Saten Miami
Available in 3/16" thickness.

Saten Mil Rayas 2mm x 2mm
Available in 1/8", 1/4" thicknesses.

Saten Mil Rayas 10mm x 10mm
Available in 1/4" thicknesses.

Aquatex (Rolled)
Available in 3/16" thickness.

Everglade (Rolled)
Available in 5/32" thickness.

Flemish (Rolled)
Available in 5/32" thickness.

Flutex (Rolled)
Available in 3/16" thickness.

German Antique (Rolled)*
Available in 1/8", 1/4", 3/8" thicknesses.

Gluechip
Available in 1/8", 1/4" thicknesses.

Patterned Glass

Mastercarre (Rolled)*
Available in 1/4", 3/8" thicknesses.

Masterligne (Rolled)
Available in 1/4" thickness.

Masterpoint (Rolled)
Available in 1/4" thickness.

Masterray (Rolled)
Available in 1/4" thickness.

Narrow Reeded (Rolled)
Available in 5/32" thickness.

Pattern 62 (Rolled)
Available in 1/16", 3/8", 3/16", 1" thicknesses.

Rain (Rolled)*
Available in 1/8", 3/16", 3/8", 1/2" thicknesses.

Reeded (Rolled)
Available in 3/16" thickness.

Seeded (Cast)
Available in 1/8" thickness.

Sycamore (Rolled)
Available in 5/32" thickness.

Taffeta (Rolled)
Available in 1/8" thickness.

*Available in heavy glass thicknesses for frameless bath enclosures.

Credits:

Front Cover & Pg. 6
Job: South Post Oak Baptist Church
Architect: Morris Architects • Houston, Texas
Glazing contractor: Lakeview Glass & Mirror • Houston, Texas

Page 1 & Pg. 2
Job: Houston Texans Reliant Stadium
Architect: H.O.K. • Kansas City, Missouri
Glazing contractor: Standard Glass & Mirror, Inc.• Houston, Texas

Page 3
Job: Horizons II, Austin, Texas
Architect: Sixth River Architects • Austin, Texas
Glazing contractor: Binswanger Glass - Austin, Texas

Page 4
Job: IBM Employee Federal Credit Union
Architect: Venture Resource Associates, Architects • Franklin Park, Illinois
Glazing contractor: Austin Glass & Mirror • Austin, Texas

Page 5
Job: Foley's
Architect: KVELL CORCORAN ASSOCIATES PC. • Washington, D.C.
Glazing contractor: Spring Glass & Mirror, Inc. • Houston, Texas

Page 7
Job: Houston Astros Minute Maid Park
Architect: H.O.K. - Kansas City, Missouri
Glazing contractor: Standard Glass & Mirror, Inc. • Houston, Texas

Page 10
Stairway
Job: Craftsman H.Q. • Houston, Texas

Vision Wall with slider
Job: Craftsman H.Q. • Houston, Texas

Page 11
Job: Kinkaid Middle School
Architect: Kirksey Architects •Houston, Texas
Glazing contractor: Duke Glass, Inc. • Houston, Texas

Vision Wall squares
Job: Craftsman H.Q. • Houston, Texas

Page 12
Job: Liberty Corporation H.Q.
Architect: The Boudreaux Group • Columbia, South Carolina
Glazing contractor: Gratec • Ft. Mill, South Carolina

Page 13
Job: Bloomingdale's • Orlando, Florida
Architect: T.S.R. New York
Glazing contractor: Gratec / Glass America • Orlando, Florida

Page 15
Job: Residence
Glazing contractor: Glass World, Inc. • Conroe, Texas

Job: Residence
Glazing contractor: Katy Glass & Mirror, Inc. • Katy, Texas

Page 16
Job: First United Methodist Church,
Architect: JKL International, Inc. Janita Lo, Designer;
Artist: Jim Le Blanc, Craftsman

Job: Pintail Hunting Club • Texas
Glazing contractor: Northwest Glass & Mirror, Inc • Houston, Texas

Job: Texans Donor Wall
Architect: James Turner Architect • Houston, Texas
Glazing contractor: Roy Shugart Glass & Mirror, Inc. • Houston, Texas

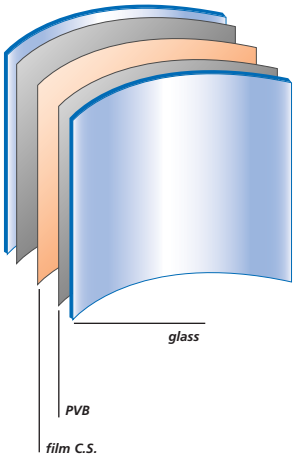
Job: Hunting Rifle
Artist: Jim Le Blanc, Craftsman

Page 17
Job: Planet Ford • Spring, Texas
Architect: Gant - Barnard Architects • Houston, Texas
Glazing contractor: Binswanger Glass • Houston, Texas

Job: Star Bar • Reliant Stadium
Architect: Hermes Reed Architects • Houston, Texas
Glazing contractor: Lakeview Glass & Mirror, Inc. • Houston, Texas

Crisunid California

Clear laminated glass for solar control



Crisunid California is a high-technology laminated glass with a solar control film (50 µ thick) that is placed between two interlayers of PVB.

Its main feature is the way it selectively controls infrared solar energy, while giving high visible-light transmission.

Advantages

- Over 70% light transmission.
- Over 50% solar heat reflection.
- 99% ultraviolet protection.
- Soundproofing properties.
- Safety and impact resistance.
- The reflecting surface is protected against any external attack.
- The same security level with less thickness, if compared with a current laminated glass (example: 66/3= 666/2).

Savings

- Energy savings through reduced air-conditioning requirements.
- Savings of electric light costs.
- Savings in solar control accessories, such as curtains, blinds, awnings, etc.
- Savings in glass thickness.

Applications

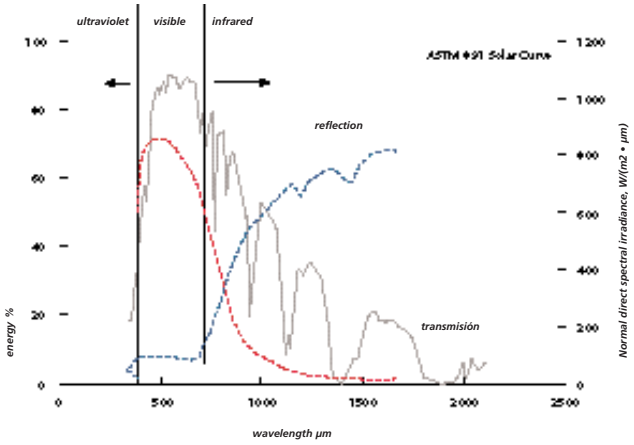
For all glazing work exposed to sunlight. Suitable for both flat and curved applications.

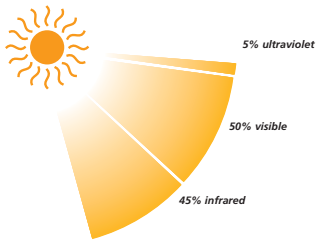
- Curtain walls.
- Shop windows.
- Windows.
- Glass domes.
- Lattice windows, skylights.
- Sloped glazing.
- Automotive, railway and nautical glazing.

Dresden Airport

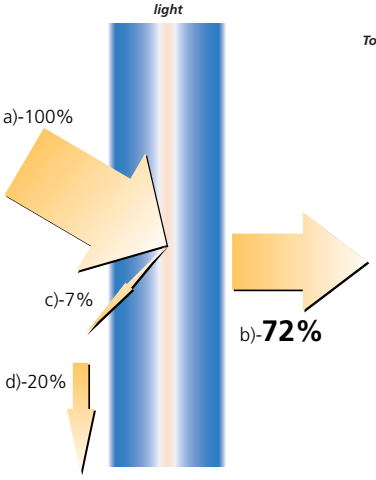
The spectral distribution of solar energy

Transmission and reflection with Crisunid California 33/3.

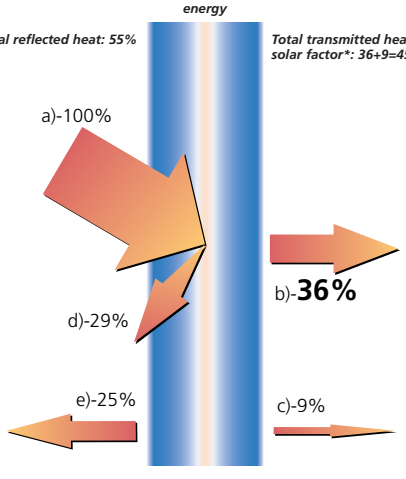




Energy breakdown of direct sunlight



a) Incident sunlight.
b) Transmitted sunlight.
c) Reflected sunlight.
d) Absorbed sunlight.



a) Incident solar energy.
b) Directly transmitted energy.
c) Energy absorbed to the inside.
d) Directly reflected energy.
e) Energy absorbed to the outside.

** The solar factor of glazing is the ratio of the quantity of heat entering a given area through the glazing to the intensity of the incident solar radiation. It is equal to the sum of the solar energy directly transmitted to the interior plus the energy released to the interior by the glazing as a result of the heat building up in that glazing through energy absorption.*

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Crisunid California

Deutsches Historisches Museum, Berlin

Soundproofing table

Hertz	100	200	400	630	800	1000	2000	4000	5000	STC
Laminated	25	27	30	34	35	35	35	43	46	35
Crisunid California	29	27	31	34	35	36	33	43	46	35

Test certifications

UNE 108/131/86 p. 2

Level	Reference	Thickness	Weight kg/m²	Certification
A	A-7C	8,8 mm.	20	DBT 8001
B	B-13C	12,8 mm.	30	DBT 8001

ESCWA, Beirut

Performance data

Glass	PVB	C.S.	PVB	Glass	TL	RL	TS	RS	AS	FS
FLOAT **[1]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[1]** 3 mm.	72	8	35	31	34	44
FLOAT **[1]** 4 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38	FLOAT **[1]** 4 mm.	70	8	33	28	39	43
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[1]** 6 mm.	68	8	30	22	48	42
FLOAT **[2]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[2]** 3 mm.	73	8	35	37	28	42
FLOAT **[2]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[2]** 6 mm.	72	8	35	34	31	42
FLOAT **[1]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[3]** 3 mm.	64	9	30	31	39	37
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[3]** 6 mm.	61	8	27	22	50	36
FLOAT **[1]** 4 mm.	**[1]** 0.38 mm.	XIR 70	**[4]** 0.38 mm.	FLOAT **[1]** 4 mm.	59	7	29	28	43	40
FLOAT **[1]** 4 mm.	**[1]** 0.38 mm.	XIR 70	**[5]** 0.38 mm.	FLOAT **[1]** 4 mm.	46	6	23	27	50	36
FLOAT **[1]** 4 mm.	**[1]** 0.38 mm.	XIR 70	**[6]** 0.38 mm.	FLOAT **[1]** 4 mm.	57	7	29	29	42	40
FLOAT **[1]** 4 mm.	**[1]** 0.38 mm.	XIR 70	**[7]** 0.38 mm.	FLOAT **[1]** 4 mm.	34	6	18	27	55	32
FLOAT **[1]** 4 mm.	**[1]** 0.38 mm.	XIR 70	**[8]** 0.38 mm.	FLOAT **[1]** 4 mm.	41	7	20	28	52	34
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[4]** 6 mm.	44	6	20	22	58	35
FLOAT **[1]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[5]** 3 mm.	53	7	25	31	44	37
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[5]** 6 mm.	40	6	18	21	61	33
FLOAT **[1]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[6]** 3 mm.	67	8	28	31	41	39
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[6]** 6 mm.	59	7	23	22	55	37
FLOAT **[1]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[7]** 3 mm.	49	7	24	31	45	36
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[7]** 6 mm.	33	6	16	22	62	32
FLOAT **[1]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[9]** 3 mm.	62	7	24	30	46	37
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[9]** 6 mm.	50	6	18	21	61	34
FLOAT **[1]** 3 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[10]** 3 mm.	63	8	25	31	44	37
FLOAT **[1]** 6 mm.	**[1]** 0.38 mm.	XIR 70	**[1]** 0.38 mm.	FLOAT **[10]** 6 mm.	53	7	19	21	60	35

[1] *clear*
[2] *extraclear*
[3] *low emissivity*
[4] *blue*
[5] *bronze*
[6] *green*
[7] *grey*
[8] *translucent*
[9] evergreen
[10] azurlite

TL=*LIGHT TRANSMISSION*
RL=*LIGHT REFLECTION*
TS=*SOLAR TRANSMISSION*
RS=*SOLAR REFLECTION*
AS=*SOLAR ABSORPTION*
FS= *SOLAR FACTOR, ratio of the quantity of heat entering a given area through the glazing to the intensity of the incident solar radiation.*

Processed data with Windows 4.0 software (ambient conditions NFRC/ASHRAE).

Technical data

Basic compositions
33/3, 44/3, 55/3, 66/3.
Maximum dimensions
2000 x 5800 mm. (78 x 228").
• Glass tempering not required due to clearness of laminated glass.
• The outer glazing component (glass, PVB) must be clear.
• Crisunid California is supplied in cutted sizes, with special silicon edge seal.

Combinations
• Clear laminated glass.
• Coloured laminated glass.
• Coloured PVB.
• Reflective glass.
• Low-emissivity glass.
• Toughened glass.
• Wire glass.
• Double glazing (air space).
• Polycarbonate bullet-proofing.
• Others, upon demand.

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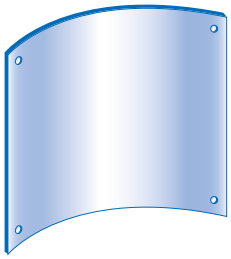
AENOR ER Registrada
ISO 9001 IQNet

CriTemp

Curved tempered architectural glass



Curved tempered glass is achieved through a process of heating, bending and a fast cooling stage.

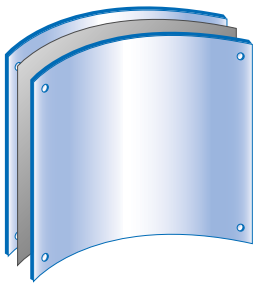
The result is the formation of high compressive stresses on the glass surfaces. This effect produces a greater resistance to any mechanical and thermal stress.

Types and compositions

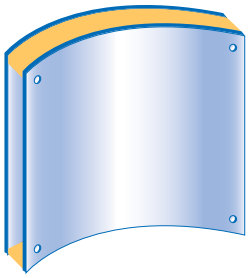
Types
- Clear and tinted float.
- Extra-clear.
- Reflective solar control glass (pyrolytic glass only).
- Low-E (pyrolytic glass only).
- Screen printed.
- Rolled glass.

Possible compositions
- Curved tempered monolithic glass.
- Curved tempered laminated glass.
- Double glazing.
- Combinations of laminated and double glazing.
- Heat strengthened laminated glass.
- Combinations of heat strengthened laminated and double glazing.

Heat Soak Test (HST)
- Optional.



Curved tempered laminated glass.



Curved tempered double glazing.

Technical data

Curved tempered glass (mm)

Thickness	Maximum girth	Maximum height	Curved shapes	Maximum angle	Minimum radius	Maximum radius
6 (1/4”)	2200 (86”)	3500 (137”)	cylindric	5º	400 (15”)	20000 (780”)
8 (1/3”)	2200 (86”)	3500 (137”)		85º	400 (15”)	20000 (780”)
10 (2/5”)	2200 (86”)	3500 (137”)		85º	400 (15”)	20000 (780”)
12 (1/2”)	2000 (78”)	3500 (137”)		85º	400 (15”)	20000 (780”)
15 (3/5”)	1600 (62”)	3500 (137”)		85º	700 (27”)	20000 (780”)
19 (3/4”)	1200 (47”)	3500 (137”)		70º	1000 (39”)	20000 (780”)

Curved heat strengthened glass[2] (mm)**:** slower cooling process.

Thickness	Maximum girth	Maximum height	Curved shapes	Maximum angle	Minimum radius	Maximum radius
5, 6, 8, 10 (1/5, 1/4, 1/3, 2/5”)	2200 (86”)	3500 (137”)	cilíndrica	85º (15”)	400 (780”)	20000

Tolerances (mm)

Nominal thickness	Size <1000 (39”)	Size >1000 (39”)	Radius	Twisting[3]	Straight edges[3]
				mm/linear meter.	mm/linear meter.
5 , 6 (1/5, 1/4”)	± 1 (1/32”)	± 2 (1/16”)	± 3 (1/8”)	5	3
8 (1/3”)	± 2 (1/16”)	± 2 (1/16”)	± 4 (1/6”)	5	3
10 (2/5”)	± 2 (1/16”)	± 2 (1/16”)	± 5 (1/5”)	5	3
12 (1/2”)	± 2 (1/16”)	± 3 (1/8”)	± 6 (1/4”)	5	3
15 (3/5”)	± 2 (1/16”)	± 3 (1/8”)	± 7 (2/7”)	5	3
19 (3/4”)	± 4 (1/6”)	± 4 (1/6”)	± 9 (1/3”)	5	3
25 (1”)	± 4 (1/6”)	± 4 (1/6”)	± 9 (1/3”)	5	3

International standards for tempered and heat-strengthened glass

ANSI Z97.1 ASTM C1048-92 EN 12150 EN 1863

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CriTemp

Manufacturings

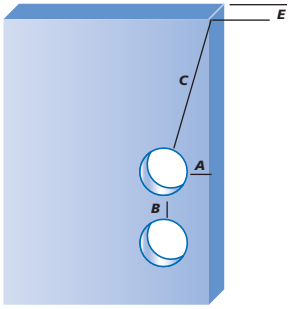
British Petroleum, Madrid

Glass edges
• Always polished.

Tolerance
• Standards EN 12150 and EN 1863

Slots
• Always polished.
Discuss with the technical department for the correct position.

Holes
• Diameter glass nominal thickness.
• Both sides of the hole → well grounded.
• The distance between the hole edge and the glass edge twice the glass nominal thickness.
• The distance between the edges of 2 holes twice the glass nominal thickness.
• The distance between a hole edge and the nearest corner 6 times the glass nominal thickness.



A 2E B 2E C 6E

E= glass thickness
A= distance between the hole edge and the glass edge
B= distance between the edges of 2 holes
C= distance between a hole edge and the nearest corner

Characteristics

• Smaller risk of breakages due to thermal shock.
• Greater resistance to any mechanical stress (wind, snow loads, etc.)
• Suitable for plannar system.
• It is considered safety glass because it breaks into small pieces.
• Top-optical quality glass in reflection and refraction.
• Glasses don't have tong marks.
• Tempered glass physical properties (Young modulus, optical properties, thermal conductivity, specific heat, linear coefficient of thermal expansion, etc.) remain the same.

Mechanical resistance (annealed glass=1)
Annealed glass=1
Heat-strengthened glass=2
Tempered glass=4-5

Thermal shock resistance (°C)
Annealed glass=40-50
Heat-strengthened glass=100
Tempered glass=200

Typical values of surface compression (MPa)
Annealed glass=0
Heat-strengthened glass=24-69
Tempered glass=100

Applications

• Façades,
• skylights,
• doors,
• spandrels,
• shopfronts,
• partitions,
• balustrades.

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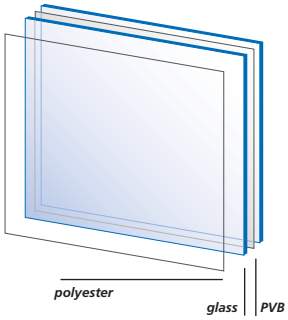
Other products



Crisunid Spallshield®

This safety glass has a sheet of 0.18mm thick polyester laminated onto its inner face; in the event of impact, this sheet retains any splinters that might otherwise injure people behind the glass.

Thanks to it, the weight and thickness of the glass can be reduced while increasing the degree of protection afforded. It can also be applied to non-laminated plate glass to enhance safety, preventing the glass from shattering when hit.

Glass manufacturing options
Single plate, laminated, tempered, double glazed and curved.
Maximum size
1500 x 4500 mm. (59 x 177")
Thickness
Any standard laminated-glass composition.

Cri-Fusing

It is a decorative glass whose surface is moulded using a fusion process. This makes three-dimensional design possible, forming various relief patterns on the surface of the glass. Each design entails manufacturing a specific mould.

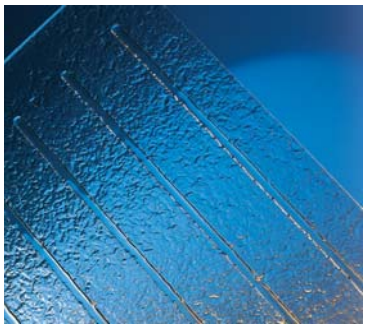
Manufacturing options
Single plate, tempered, laminated tempered, curved and double glazed.
Maximum size
2900 x 1900 mm. (114 x 74")

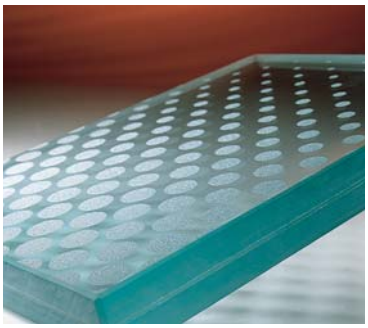
Thickness
12, 15, 19 mm. (1/2, 3/5, 3/4")
colourless float.

Crisunid Sand

This is a floor-ready laminated glass with a non-slip layer deposited on the upper sur-face, forming various geo-metric shapes - lines, circles, squares etc. - which further enhance the effectiveness of the treatment.

Manufacturing options
Tempered laminated
Maximum size
3210 x 1800 mm.
(126 x 70")


Cri-Fusing exemple


Crisunid Sand: antislip laminated glass

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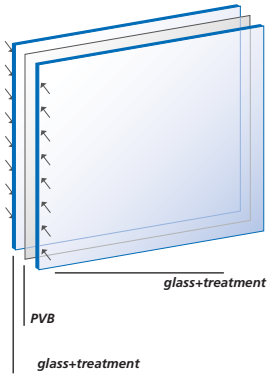
Crisunid Non-reflect



Definition

Crisunid Non-reflect is a laminated safety glass that cuts down optical reflection from the glass and thus gives better vision through windows glazed with it.

Conventional laminated glass reflects 8% of light falling vertically on it, this figure rising to 15% in the case of glass with an air chamber.

Crisunid Non-reflect reduces this reflection down to 1% thanks to fine coatings deposited on the surface of the glass, giving clear visión without dazzling.

Applications

Reflection of the glass is always higher on the side receiving most light.
Crisunid Non-reflect enhances visión through the glass in daytime from outside in, and from the inside out at night.

The commonest applications are:
- shop windows
- shop counters
- glass cases
- surveillance posts
- control rooms
- cash desks
- motorway cabins etc.

Cleaning instructions

Normal dirt can be removed using water, a sponge, a cloth or a piece of chamois leather, though neutral detergents must be added to the water.

To remove dirt, using suitable solvents is recommended - never metallic objects, razor blades or scourers.

Decorative stickers should not be stuck on.

Technical data

Maximum size
3600 x 2400 mm. (141 x 94")

Basic compositions
4+4, 4+4+4, 4+5+4, 4+6+4, 4+8+4, 4+10+4

Car dealership, inside

Car dealership, outside

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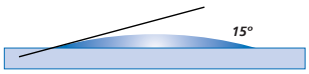
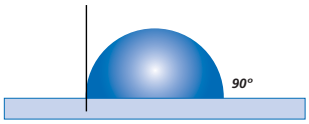
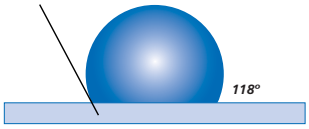
Cricursa Shield (DFI)®



Untreated glass



Glass treated with Cricursa Shield DFI® (stage 1)



Glass treated with Cricursa Shield DFI® (stage 2)

Definition

Cricursa Shield DFI® is a hydrophobic treatment that makes glass surface water repellent and more resistant to stains, graffiti, scratches and abrasion. As a consequence, it considerably reduces cleaning and maintenance costs of facades.

Cricursa Shield DFI® is a patented process that in two stages changes the surface of the glass to increase its contact angle, that is, the degree of water repellence. A water drop adheres less at a greater angle. Then, it easily slides down, behaving like a mercury droplet.

With Cricursa Shield DFI®, water slides quickly down the surface of the glass, depositing less sediment, thus, providing reduced maintenance by making the treated glass easier to clean. The glass is protected for years.

How it works

Cricursa Shield DFI® smoothes the glass surface by first filling in its microscopic valleys. Then, it 'caps' them to ensure greater durability and repellence.
This ensures a longer protection that is optically transparent, easy to clean and more resistant to weathering.

Crisunid Acoustic

Definition

Crisunid Acoustic is a laminated glass made up of 2 or more pieces of float glass sandwidched with one or more layers of PVB offering both properties of acoustic reduction and safety.

Noise Reduction
44/2 Crisunid Acoustic
Rw= 37 dB
44/2 Standard
Rw= 34,5 dB

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ShadeCloth Selection Guide

Glazing Group A
High Transmittance Glass
HA Glass (clear, low "E" green and blue)
60-90% visible light transmittance

	Privacy Weaves		Visually Transparent					
	0900 Series (0-1% Of)	3000 Series (1-2%)	1000 Series (2-3%)	1800 Series (15%)	1300 Series (5%)	2100 Series (10-12%)	5300 Series (5%)	6000 Series (3%)
North Orientation	✓+	✓+	✓+	✓	✓+	✓	✓+	✓+
South Orientation	✓+	✓	✓	NO	NO	NO	NO	✓
East Orientation	✓+	✓	✓	NO	NO	NO	NO	✓
West Orientation	✓+	✓	✓	NO	NO	NO	NO	✓

Glazing Group B
Mid-Transmittance Glass
HA Glass (solar grey, solar bronze)
35-50% visible light transmittance

	0900 Series (0-1% Of)	3000 Series (1-2%)	1000 Series (2-3%)	1800 Series (15%)	1300 Series (5%)	2100 Series (10-12%)	5300 Series (5%)	6000 Series (3%)
North Orientation	✓+	✓+	✓+	✓	✓+	✓	✓+	✓+
South Orientation	✓+	✓+	✓+	NO	✓	NO	✓	✓+
East Orientation	✓+	✓+	✓+	NO	✓	NO	✓	✓+
West Orientation	✓+	✓+	✓+	NO	✓	NO	✓	✓+

Glazing Group C
Low Transmittance Glass
Coated Glass (green, aqua and thin coated tinted)
22-30% visible light transmittance

	0900 Series (0-1% Of)	3000 Series (1-2%)	1000 Series (2-3%)	1800 Series (15%)	1300 Series (5%)	2100 Series (10-12%)	5300 Series (5%)	6000 Series (3%)
North Orientation	✓+	✓+	✓+	✓	✓+	✓+	✓+	✓+
South Orientation	✓+	✓+	✓+	NO	✓+	✓	✓+	✓+
East Orientation	✓+	✓+	✓+	NO	✓+	✓	✓+	✓+
West Orientation	✓+	✓+	✓+	NO	✓+	✓	✓+	✓+

Glazing Group D
Very Low Transmittance Glass
Reflective Coated Glass
60-90% visible light transmittance

	0900 Series (0-1% Of)	3000 Series (1-2%)	1000 Series (2-3%)	1800 Series (15%)	1300 Series (5%)	2100 Series (10-12%)	5300 Series (5%)	6000 Series (3%)
North Orientation	✓+	✓+	✓+	✓	✓+	✓+	✓+	✓+
South Orientation	✓+	✓+	✓+	✓	✓+	✓+	✓+	✓+
East Orientation	✓+	✓+	✓+	✓	✓+	✓+	✓+	✓+
West Orientation	✓+	✓+	✓+	✓	✓+	✓+	✓+	✓+

KEY		
	✓+	Exceeds shading criteria, used especially for VDT/CRT applications where extra density is needed
	✓	Meets minimum shading criteria
	NO	Not recommended for this application

SECTION 12494

ROLLER SHADES

Display hidden notes to specifier by using “Word”/”Preferences”/“View”/”Hidden Text”.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Manually operated sunscreen roller shades.

B. Manually operated room-darkening shades.

C. Manually operated double-roller sunscreen and room-darkening shades.

D. Electrically operated sunscreen roller shades.

E. Electrically operated room-darkening shades.

F. Electrically operated double-roller sunscreen and room-darkening shades.

G. Local group and master control system for shade operation.

H. Local group and master control system for shade operation with addressable motors.

1.2 RELATED SECTIONS

A. Section 06100 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.

B. Section 09260 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.

C. Section 09510 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.

D. Division 16 - Electrical: Electric service for motor controls.

1.3 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 70 - National Electrical Code.

C. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Submit Environmental Certification and Third Party Evaluation per Section 1.5 Qualifications.

C. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
   3. Storage and handling requirements and recommendations.
   4. Mounting details and installation methods.
   5. Typical wiring diagrams including integration of motor controllers with building management system, audiovisual and lighting control systems as applicable.

D. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, wiring diagrams and relationship to adjacent work.
   1. Prepare shop drawings on Autocad or Microstation format using base sheets provided electronically by the Architect.

E. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

F. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

G. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

H. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Electrical Components: NFPA Article 100 listed and labeled by either UL or ETL or other testing agency acceptable to authorities having jurisdiction, marked for intended use, and tested as a system. Individual testing of components will not be acceptable in lieu of system testing.

E. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

F. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified below. Initial submittals, which do not include the Environmental Certification, below will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.

G. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.

H. Recycling Characteristics: Provide documentation that the shade cloth can and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and recycling into the same quality yarn and woven into new material, without down cycling. Certify that this process is currently underway and will be utilized for this project.

I. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.

J. Mock-Up: Provide a mock-up (manual shades only) of one roller shade assembly for evaluation of mounting, appearance and accessories.
   1. Locate mock-up in window designated by Architect.
   2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.8 WARRANTY

A. Roller Shade Hardware, Chain and Shadecloth (except EcoVeil™): Manufacturer's standard non-depreciating twenty-five year limited warranty.
   1. EcoVeil standard non-depreciating 10-year limited warranty.

B. Roller Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five-year warranty.

C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: MechoShade Systems, Inc.; 42-03 35th Street, Long Island City, NY 11101. ASD. Tel: (718) 729-2020. Fax: (718) 729-2941. Email: info@mechoshade.com, www.mechoshade.com.

B. Substitutions: Not permitted.

C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

D. Alternates: The following products and manufacturers may be bid as an alternate product in accordance with Section 01030. Any pricing for alternate products shall be listed separately from the base bid specified product. Any alternate pricing must include line-by-line compliance or non-compliance with the specifications. If the alternate product is acceptable to the Architect, the specified manufacturer will be given the opportunity to provide an equivalent proposal.
1. Suburban/2 Shade System by MechoShade Systems, Inc.
2. ((List other manufacturer or product here.))

2.2 APPLICATIONS/SCOPE

A. Roller Shade Schedule:
1. Shade Type 1: Manual operating, chain drive, sunscreen roller shades in all exterior windows of rooms and spaces shown on the Drawings.
2. Shade Type 2: Manual operating interior, chain drive room darkening roller shades with blackout fabric in all exterior windows of rooms and spaces shown on Drawings, and related mounting systems and accessories.
3. Shade Type 3: Manual operating interior, chain drive "double" solar and room darkening blackout roller shades, operating independently of each other, in all exterior windows of rooms and spaces shown on Drawings, and related mounting systems and accessories.
4. Shade Type 4: Motorized interior solar roller shades in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.
5. Shade Type 5: Motorized interior room darkening roller shades with blackout fabric in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.
6. Shade Type 6: Motorized interior “double”, solar and room darkening blackout roller shades, operating independently of each other, in all exterior windows of rooms and spaces shown on Drawings, and related motor control systems.

2.3 SHADE CLOTH

A. Visually Transparent Single-Fabric Shadecloth: MechoShade Systems, Inc., ThermoVeil group, single thickness non-raveling 0.030-inch (0.762 mm) thick vinyl fabric, woven from

0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl, in colors selected from manufacturer's available range.

1. Open Linear Weave: "1800 series", 15 percent open, linear-weave pattern.
2. Dense Linear Weave: "1000 series", 3 percent open, dense linear-weave pattern.
3. Extra - Dense Linear Weave "0900 series", 0-1 percent visually translucent linear weave pattern.
4. Open Basket Weave: "2100 series", 10 percent open, 2 by 2 open basket-weave pattern.
5. Dense Basket Weave: "1300 series", 5 percent open, 2 by 2 dense basket-weave pattern.
6. Dense "3000 Satin Texture", "3200 Diamond Pastel", and "3300 Diamond Earthtone series" visually translucent, twill-weave pattern all at 2 percent open.
7. Color: Selected from manufacturer's standard colors.

B. Visually Transparent Single-Fabric Shadecloth: MechoShade Systems, Inc., EuroVeil "5300" or EuroTwill "6000" Series: 0.010 diameter (0.254 mm) non-raveling vinyl/polyester yarn, fabric thickness 0.025 inches (0.635 mm).

1. Dense Basket Weave "5300 series, 5 percent open.
2. Extra Dense Twill Weave "6000" series, 2-3 percent open.
3. Color: Selected from manufacturer's standard colors.

C. Vinyl Room Darkening Shadecloth (Single-Fabric): MechoShade Systems, Inc., "0700 series", blackout material, washable and colorfast laminated and embossed vinyl coated fabric, 0.012 inches thick (0.30 mm) blackout material and weighing 0.81 lbs. per square yard, with a minimum of 62 threads per square inch in colors selected from manufacturer's available range.

1. Color: Selected from manufacturer's standard colors.

D. Room darkening (PVC Free) Shadecloth with opaque acrylic backing: MechoShade Systems, Inc., "Equinox 0100 series", .008 inches thick (.19 mm) blackout material and weighing .94 lbs. per square yard, comprising of 53% fiberglass, 45% acrylic, 2% poly finish.

1. Color: Selected from manufacturer’s standard colors.

E. Environmentally Certified Shadecloth: MechoShade Systems, Inc., EcoVeil group, 1350 Series, fabricated from TPO for both core yarn and jacket, single thickness, non-raveling 0.030 inch (0.762 mm) thick fabric.

1. Weave: 5 percent open 2x2 basket weave.
2. Color: Selected from manufacturer's standard colors.

2.4 SHADE BAND

A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.

1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
2. Shade band and Shade Roller Attachment:
    a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less

than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.

b. Provide for positive mechanical engagement with drive / brake mechanism.

c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.

d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.

e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.5 SHADE FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:

1. Bottom hem weights.
2. Concealed hemtube.
3. Exposed hemtube.
4. Exposed blackout hembar with light seal.
5. Exposed blackout hembar with polybond seal.

C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

D. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.

E. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.

F. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in a integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.

1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any

see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

2.6 COMPONENTS

A. Access and Material Requirements:
1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
3. Use only Delrin engineered plastics by DuPont for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

B. Motorized Shade Hardware and Shade Brackets:
1. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel, or heavier, thicker, as required to support 150 percent of the full weight of each shade.
2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
3. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor (multi-banded shade, subject to manufacturer's design criteria).

C. Manual Operated Chain Drive Hardware and Brackets:
1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
4. Provide shade hardware system that allows for operation of multiple shade bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.
5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
8. Drive Bracket / Brake Assembly:
   a. MechoShade Drive Bracket model M5 shall be fully integrated with all MechoShade accessories, including, but not limited to: SnapLoc fascia, room

darkening side / sill channels, center supports and connectors for multi-banded shades.

b. M5 drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.

c. The brake shall be an over -unning clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.

d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.

e. The entire M5 assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.

D. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.7 SHADE MOTOR DRIVE SYSTEM

A. Shade Motors:

1. Tubular, asynchronous (non-synchronous) motors, with built-in reversible capacitor operating at 110v AC (60hz), single phase, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.
2. Conceal motors inside shade roller tube.
3. Maximum current draw for each shade motor of 2.3 amps.
4. Use motors rated at the same nominal speed for all shades in the same room.

B. Total hanging weight of shade band shall not exceed 80 percent of the rated lifting capacity of the shade motor and tube assembly.

2.8 MOTOR CONTROL SYSTEMS

A. IQ/MLC: Specifications and design of shade motors and motor control system are based on the IQ/MLC motor logic control system manufactured by MechoShade Systems, Inc. Other systems may be acceptable provide that all of the following performance capabilities are provided. Motor logic control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.

1. Motor Control System:
   a. Provide power to each shade motor via individual 3 conductor line voltage circuits connecting each motor to the relay based motor logic controllers (IQ/MLC).
   b. Control system components shall provide appropriate (spike and brown out) over-current protection (+/- 10 percent of line voltage) for each of the four individual motor circuits and shall be rated by UL or ETL as a recognized component of this system and tested as an integrated system.
   c. Motor control system shall allow each group of four shade motors in any combination to be controlled by each of four local switch ports, with up to fourteen possible "sub-group" combinations via local 3 button wall switches and all at once via a master 3 button switch. System shall allow for overlapping switch combinations from two or more local switches.

d. Multiple "sub-groups" from different IQ/MLC control components shall be capable of being combined to form "groups" operated by a single 3 button wall switch, from either the master port or in series from a local switch port.
e. Each shade motor shall be accessible (for control purposes) from up to four local switches and one master switch.
f. Control system shall allow for automatic alignment of shade hem bars in stopped position at 25 percent, 50 percent, and 75 percent of opening heights, and up to three user-defined intermediate stopping positions in addition to all up / all down, regardless of shade height, for a total of five positions. Control system shall allow shades to be stopped at any point in the opening height noting that shades may not be in alignment at these non-defined positions).
g. Control system shall have two standard operating modes: Normal mode allowing the shades to be stopped anywhere in the window's opening height and uniform mode, allowing the shades to only be stopped at the predefined intermediate stop positions. Both modes shall allow for all up / all down positioning.
h. Control system components shall allow for interface with both audiovisual system components and building fire and life safety system via a dry contact terminal block.
i. Control system components shall allow for interface with external analog input control devices such as solar activated controllers, 24 hour timers, and similar items; via a dry contact terminal block.
j. Reconfiguration of switch groups shall not require rewiring of the hardwired line voltage motor power supply wiring, or the low voltage control wiring. Reconfiguration of switch groups shall be accomplished within the motor control device (IQ/MLC).

2. Wall Switches:
a. Three-button architectural flush mounted switches with metal cover plate and no exposed fasteners.
b. Connect local wall switches to control system components via low voltage (12V DC) 4-conductor modular cable equipped with RJ-11 type connectors supplied, installed and certified under Division 16 - Electrical.
c. Connect master wall switches to control system components via low voltage (12V DC) 6-conductor modular cable equipped with RJ-12 type connectors supplied, installed and certified under Division 16 - Electrical.

B. I·CON Control System (Software, two way communication): Specifications and design are based on the I·CON motor control system as manufactured by MechoShade Systems, Inc. Other systems may be acceptable provided that all of the following performance capabilities are provided. Motor control systems not in complete compliance with these performance criteria shall not be accepted as equal systems.
1. Upper and lower stopping points (operating limits) of shadebands shall be programmed into motors via a hand held removable program module / configurator.
2. Intermediate stopping positions for shades shall be 4 predefined intermediate positions, for a total of 6 defined and aligned positions. All shades on the same switch circuit with the same opening height shall align at each intermediate stopping position.
3. Motors shall be addressable through a 2 motor bus interface module via a hand-held removable program module and shall be capable of responding to a minimum of seven different user defined stored addresses including multiple overlapping sub groups and three reserved control input addresses for use by building management systems, life safety systems and other emergency inputs.

4. The BI and I·CON controller system shall have the capability of two-way communication with the motors. Each I·CON controller, (bus Interface or BI) shall allow for a unique address message to be received from the hand held configurator and/or a PC controller or switch.
    a. Bus line shall consist of 2 twisted pair of 16 ga low voltage wire.
    b. Shade motor control components (bus interfaces, wall switches, bus supplies, auxiliary control input devices, and similar items) shall be connected in series via the low voltage (12VDC) two way digital communication bus line.
    c. Bus line shall be capable of being installed in a free topology to provide maximum flexibility for installation and future maintenance.
    d. Low voltage (12VDC) digital bus line shall be powered by a bus supply transformer, requiring 115VAC (220 - 230 VAC) input drawing a maximum current of 1 amp. A minimum of one bus supply shall be required for every 400 linear feet of bus line. Final bus supply spacing shall be reviewed with the system manufacturer after the number of nodes per 400 ft (120 meters) run of bus line has been determined.
5. Wall Switches:
    a. Shades shall be operated by 4 button low voltage standard switches or programmable intelligent switches [IS]. Standard switch shall be wired to a bus interface and the bus interface will be programmed to transmit an address for the local switch.
    b. Intelligent switches may be installed anywhere on the busline. Each IS shall be capable of storing one control level address to be broadcast along the busline.
    c. An address that is transmitted by either a switch or central controller shall be responded to by those motors with the same address in their control table.
    d. IS shall provide for interface with other low voltage input devices via a set of dry contact terminals located on the switch.
    e. Standard switch or IS may control an individual, sub-group or group of motors in accordance with the address in each motor/BI unit.

2.9 ACCESSORIES

A. Roller Shade Pocket for recessed mounting in acoustical tile, or drywall ceilings as indicated on the Drawings (for Shade Type ??).
    1. Provide either extruded aluminum and or formed steel shade pocket, sized to accommodate roller shades, with exposed extruded aluminum closure mount, tile support and removable closure panel to provide access to shades.
        a. Provide "Vented Pocket" such that there will be a minimum of four 1 inch (25.4 mm) diameter holes per foot allowing the solar gain to flow above the ceiling line.

B. Fascia (for Shade Type ??):
    1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
    2. Fascia shall be able to be installed across two or more shade bands in one piece.
    3. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
    4. Provide bracket / fascia end caps where mounting conditions expose outside of roller shade brackets.
    5. Notching of Fascia for manual chain shall not be acceptable.

C. Room Darkening Side and / or Sill Channels (for Shade Type ??):
    1. Extruded aluminum with polybond edge seals and SnapLoc-mounting brackets and with concealed fastening. Exposed fasting is not acceptable. Channels shall accept

one-piece exposed blackout hembar with vinyl seal to assure side light control and sill light control.

a. MechoShade side channels, 1-15/16 inches (49.2 mm) wide by 1-3/16 inches (30.1 mm) deep, two-band center channels, 2-5/8 inches (66.6 mm) wide by 1-3/16 inches (30.1 mm) deep. The 2-5/8-inch (66.6 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. MechoShade side channels 2-5/8 inch (66.6 mm) may be used as center supports for ElectroShades; shadebands up to 8 high. For shadebands over 8 feet (2438 mm), provide ElectroShade side channels.
b. ElectroShade side channels, 2-1/2 inches (63.5 mm) wide by 1-3/16 inches (30.1 mm) deep; two-band center channels 5 inches (127 mm) wide by 1-3/16 inches (30.1 mm) deep. The 2-5/8-inch (66.6 mm) double-center channels may be installed at center-support positions of multi-band-shade ElectroShades. MechoShade side channels 2-5/8 inches (66.6 mm) may be used as center supports for ElectroShades. Also provide for use with manually operated room darkening MechoShades over 8 feet (2438 mm) in height.
c. Color: Selected from manufacturer's standard colors.
d. Color: Custom color as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

B. Turn-Key Single-Source Responsibility for Motorized Interior Roller Shades: To control the responsibility for performance of motorized roller shade systems, assign the design, engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and their authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacturer. Coordinate the following with the roller shade installer/dealer:

1. Main Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer’s requirements, as indicated on the mechanical and electrical drawings.

2. Main Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
3. Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
4. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/ control locations designated by the Architect. All above-ceiling and concealed wiring shall be plenum-rated, or installed in conduit, as required by the electrical code having jurisdiction.
5. Main Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.

C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

D. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

E. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION