

TECHNICAL INFORMATION

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Luminaires may utilize fluorescent or high intensity discharge sources that contain small amounts of mercury. New disposal labeling for these lamps includes the mercury identifier shown below to indicate that the lamp contains mercury and should be disposed of in accordance with local requirements.



Information sources regarding lamp recycling and disposal are included on the packaging of most mercury-containing lamps and also can be located at www.lamprecycle.org.

LEED & ENERGY CODES

Sustainability, Innovation, Commitment

These three simple words describe the Acuity Brands focus on reducing harmful impacts on the environment. Our commitment is clear. We demonstrate it first and foremost in how we conduct our business.

One focal point of our efforts to promote sustainability is our web site at: www.acuitybrandslighting.com/sustainability where details are provided on green standards, energy codes and our green products.

LEED® with Lighting

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is a voluntary, consensus-based standard developed by the U.S. Green Building Council (USGBC).

The LEED® rating systems define the criteria for designing and constructing high-performance, environmentally sustainable buildings, and promotes a whole-building approach to sustainability by recognizing performance in five key areas: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

Our web site at www.acuitybrandslighting.com/sustainability provides details on the standard and the availability of tools to help comply with the principles of LEED, including:

- The role that lighting plays within the LEED system is described.
- The specific lighting requirements and optional credits with LEED are described including a toolbox for each criteria that provides links to various tools and other related web sites where Acuity Brands can provide additional guidance.
- A discussion of what role lighting can play in achieving the energy goals of LEED.

Certified LEED Projects at Acuity Brands:

- New York Center for Light + Space has earned LEED-CI gold certification.
- Holophane, Granville OH, Building F facility has earned silver certification within LEED-CI.

Energy Codes and Regulatory Issues

As the need for energy efficiency grows and the various levels of government restrict our use of energy, the Acuity Brands web site can assist you in navigating through this maze of codes and regulations.

Please go to www.acuitybrandslighting.com/sustainability for information on the following topics:

- The lighting related requirements of energy codes such as ASHRAE 90.1 and the International Energy Conservation Code (IECC) are explained with tools provided to assist in meeting these requirements.
- Links are provided to web sites which track which energy codes have been adopted by the various states.
- Details are presented on EAct 2005 which provides for tax deductions for energy efficient projects in both new construction and relighting projects. Tools such as a tax benefits calculator and compliance documentation are also available. These tax deductions are currently available until December 31, 2013.
- A lighting summary of EISA 2007 (the Energy Independence and Security Act) is included.

As new energy codes and regulations are adopted, Acuity Brands will continue to provide the latest information on these developments.

Sustainability at Acuity Brands

Our commitment to environmental sustainability begins in our own operations. The Acuity Brands Sustainable Operations Council includes representatives from all our North American facilities with the goal to achieve year-over-year reductions in our use of natural resources. Some specific examples of our accomplishments include:

- Reduced our overall electricity consumption by 13.4%.
- Reduced 37% of the water used in our paint system with modifications that enabled us to reclaim water for this process at three facilities.
- Reduced our impact on landfills by 40% by establishing corporate recycling and green procurement standards.
- Our paper use has been reduced by 47% and revenue from aluminum recycling is contributed to community projects.

Our employees are directly involved with industry groups working to establish energy and environmental standards, such as the ASHRAE/IESNA Standard 90.1, US Green Building Council, Consortium for Energy Efficiency, Clinton Climate Initiative, Next Generation Lighting Industry Alliance and ENERGY STAR® programs.

NIGHTTIME™ FRIENDLY LIGHTING



Nighttime Friendly designates products with superior optical control that are consistent with the goals of USGBC LEED® and meet Green Globes™ product criteria for light pollution reduction. These products are full cutoff and no more than 10% of the lumens from the luminaire are emitted above 80 degrees from nadir.

Acuity Brands – Nighttime Friendly™ Designation

For years, Acuity Brands has been actively involved in developing products and standards focusing on minimizing the impact of electric lighting systems of the nighttime environment. Our brands are members and contribute to the International Dark-Sky Association (IDA) and we are active in various outdoor lighting committees of the Illuminating Engineering Society (IESNA). We are a member of the IDA / IESNA Model Lighting Ordinance task group. We are a member of the US Green Building Council and provide a variety of lighting solutions focused on achieving the LEED credit SS8 for light pollution reduction. Acuity Brands has some of the most experienced and knowledgeable optical designers working with our product development teams to continue to develop responsible lighting solutions.

What does Nighttime Friendly Mean?

Because there are no lighting industry standards recognizing products that minimize obtrusive nighttime lighting, Acuity Brands has established a designation with very strict requirements, based on photometric test data. Our Nighttime Friendly designation requires that the lighting product has no uplight and nor more than 10% of the total lumens between 80-90 degrees. This criterion is consistent with LEED and Green Globes guidelines for environmental sustainability. Our Nighttime Friendly designation focuses on no uplight as well as high angle brightness and requires laboratory test data based on IESNA standards. The Acuity Brands Conyers lab is NVLAP accredited, an accreditation that requires a strict quality process and 3rd party audit by the National Institute of Standards & Technology (NIST). Independent labs have not gained this accreditation.

How does Nighttime Friendly compare with other designations?

IDA Fixture Seal of Approval

The IDA Fixture Seal of Approval does not have specific, quantifiable criteria. In general, the IDA Fixture Seal of Approval focuses on products that have no uplight. Since Acuity Brands Nighttime Friendly designation is more stringent and can be verified with any commercial software, we typically do not list products with IDA.

Star View™ Compliant

Hubbell Outdoor and Spaulding brands of lighting products promote the Star View Compliant designation, used to identify full cutoff optics. This designation is not as stringent as the Acuity Brands Nighttime Friendly designation because it does not stipulate a limit on the high angle lumens that impact glare.

Are there other considerations for minimizing obtrusive outdoor lighting?

Daytime and nighttime aesthetics

Beyond considerations of uplight, there are other optical considerations to help you select a quality lighting system. Many times, the lighting system must offer both daytime and nighttime aesthetics. Traditionally, this required lighting systems that emitted a significant portion of light into the sky and emit light at high angles resulting in glare. We offer many options to address the need for daytime and nighttime aesthetics.

Light trespass

Another key aspect to consider is limiting the amount of light emitted off of the property that trespasses onto adjacent properties. This is especially important in areas where commercial and residential properties are adjacent to each other. To address this concern, lighting products should be selected to minimize high angle brightness and poles located at or near the perimeter of the site should utilize sharp cutoff optics that limit light behind the pole.

Reducing light levels late at night

Many communities encourage businesses to reduce light levels late at night when activity in those areas is minimal. In addition, some areas are encouraged to turn off the lighting, such as sporting facilities. This can be accomplished by turning off some luminaires or zones. Advanced lighting systems can even detect motion and reduce the lighting in each fixture when there is not activity.

Why should I select Acuity Brands products for applications with environmental considerations?

Acuity Brands provides many options for responsible outdoor environments. We demonstrate our commitment to the nighttime environment through our development of superior optics, our involvement in industry activities to reduce the impact of obtrusive nighttime lighting and through our corporate commitment to environmental sustainability. We provide reliable test data and have made investments in the accreditation of our Conyers testing laboratory. Our sales personnel and technical support staff stand ready to help you identify the most effective outdoor lighting solutions and validate the performance of these systems.

IESNA CUTOFF CLASSIFICATIONS			
CLASSIFICATION	DEFINITION	BENEFITS	LIMITATIONS
Full Cutoff	Zero intensity at or above horizontal (90° above nadir) and limited to a value not exceeding 10% of lamp lumens at or above 80°.	Limits spill light onto adjacent property, reduces glare. No light is emitted directly from the luminaire into the sky.	May reduce pole spacing to maintain uniformity and increase pole and luminaire quantities.
Cutoff	Intensity at or above 90° (horizontal) no more than 2.5% of lamp lumens, and no more than 10% of lamp lumens at or above 80°.	Small increase in high-angle light allows increased pole spacing.	May allow some uplight from luminaire. Typically a small overall impact on sky glow.
Semi-cutoff	Intensity at or above 90° (horizontal) no more than 5% of lamp lumens and no more than 20% at or above 80°	High-angle light accents taller vertical surfaces such as buildings. Most light is still directed downward.	Little control of light at property line. Potential for increased glare when using high wattage luminaires. Typically directs more light into the sky than cutoff.
Non-cutoff	No limitations on light distribution at any angle.	Uniform luminous surfaces such as internally illuminated signs or globes. Wattage should be limited. Suitable for sports lighting, facade, landscape or other applications where luminaires are tilted due to limitations in pole or fixture locations.	Location and aiming are critical. Most likely of all categories to produce offensive brightness and sky glow.

Notes

See www.lithonia.com/nighttimefriendly for full details.

LUMINAIRE CLASSIFICATION SYSTEM

In 2007 the IES defined a new classification system for outdoor luminaires that evaluates the photometric performance of a luminaire based on light emitted into various solid angles that impact uplight, backlight and high angle glare zones. This IES standard is available in their publication, TM-15, "Luminaire Classification System for Outdoor Luminaires".

To the right is a 3-D representation of the LCS model including the sub angles for each zone. Below that is a graphical representation of how such data for a specific luminaire is represented in the Acuity online Photometric Viewer.

The forward and backlight zones near or slightly below horizontal provide a useful analysis of high angle brightness, often relating to objectionable glare. Keep in mind however, that glare relates to other factors including the size of the source and specific intensity at discrete angles. So additional research will continue to evaluate how to best quantify glare.

Evaluation of backlight must consider where the pole is located in relation to the property line.

And finally, in considering sky glow impact, the light at or near horizontal has a greater impact on the scattering of light in the atmosphere – resulting in a higher degree of sky glow over a community.

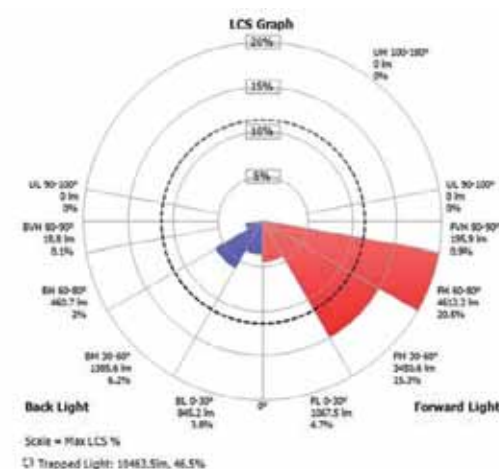
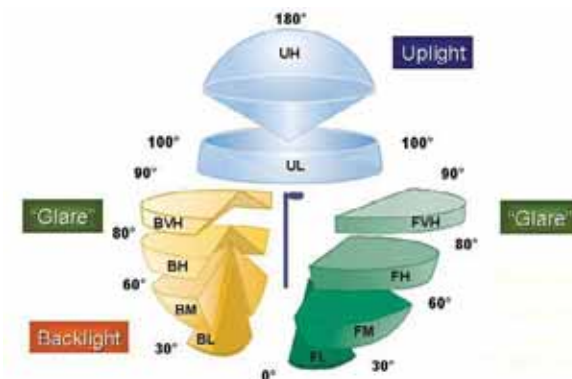
BUG Ratings

In February 2009, the TM-15 standard added zonal lumen limits defining Backlight (B), Uplight (U) and Glare (G) ratings. The zonal lumens in specific solid angles define a rating from 1 to 5 for each of three categories, with 1 being the most restrictive.

You will notice that the uplight category includes lumens that are in the very high zones below horizontal. The reason for this is because uplight – or sky glow, is impacted most by light emitted at or near horizontal because horizontal light causes the most scatter in the atmosphere as it picks up and reflects off of particulate in the air (such as dust particles, air pollution or even natural phenomena such as fog).

You will also notice there are two tables for the glare ratings. The zonal lumen thresholds are different for luminaires that have a symmetric distribution such as a Type V or Type V square from those that have a longitudinal or forward throw type of distribution such as Type I, II, III or IV.

BUG ratings for our products are available using the Acuity online Photometric Viewer.



BACKLIGHT/TRESPASS						
SECONDARY SOLID ANGLE	B0	B1	B2	B3	B4	B5
BH	110	500	1000	2500	5000	>5000
BM	220	1000	2500	5000	8500	>8500
BL	110	500	1000	2500	5000	>5000

UPLIGHT/SKYGLOW						
SECONDARY SOLID ANGLE	U0	U1	U2	U3	U4	U5
UH	0	10	100	500	1000	>1000
UL	0	10	100	500	1000	>1000
FVH	10	75	150	>150	—	—
BVH	10	75	150	>150	—	—

GLARE							
SECONDARY SOLID ANGLE		G0	G1	G2	G3	G4	G5
GLARE FOR TYPES I, II, III, IV, V and V SQUARE	FVH	10	250	375	500	750	>750
	BVH	10	250	375	500	750	>750
	FH	660	1800	5000	7500	12000	>12000
GLARE FOR TYPES I, II, III AND IV	BH	110	500	1000	2500	5000	>5000
GLARE FOR TYPES V AND V SQUARE	BH	660	1800	5000	7500	12000	>12000

TROUBLESHOOTING GUIDE

Most lighting installations provide reliable service for many years with no maintenance except for routine cleaning and lamp replacement. If a malfunction does occur, use the information below to diagnose and correct the problem. *Disconnect the power before servicing any lighting system.* Do not perform service while the fixture is engaged. Contact our Customer Service Department if you need further assistance.

The following is a list of common malfunctions, possible causes and appropriate corrective action.

Lamp Will Not Start

Incorrect lamp or ballast – Check fixture label against lamp type. Check lamp and ballast ANSI numbers to ensure they match. Check that lamp is in proper burning position (Metal Halide).

Lamp is improperly seated in socket – Back out lamp and retighten. Check pin connection with socket. HID: Check to see if center contact of socket is compressed. If so, disconnect fixture from power supply and bend contact into position with a screwdriver.

Incorrect or loose wiring – Disconnect from power. Check wiring connections. HID: Connect fixture lead marked with proper voltage to voltage supply lead. 120V, 277V and 347V: Connect lead marked COM to neutral supply. 208V, 240V and 480V: Connect lead marked COM to other voltage supply lead.

Lamp at or near end of life – Replace with new lamp. HID arc tubes will blacken near end of life. Mercury and metal halide lamps will produce low light output and may exhibit intermittent starting. Metal halide will suffer severe color changes. High pressure sodium lamps will exhibit normal starting but will turn on and off (cycle) during operation. The envelope of a high pressure sodium lamp may develop a brownish discoloration. Low pressure sodium lamps will operate at nearly full light output but starting will become impossible at end of life.

Photoelectric control defective – Disconnect button type cell from circuit or replace NEMA twist-lock cell with shorting cap; test fixture. If lamp starts, replace PE control.

Line or ballast output voltage low – Check line voltage at the fixture. Check open circuit voltage. See page 785 for HID ballasts.

Ballast burned out – Check circuit continuity. See page 785 for HID ballasts.

Starter circuit failure – Replace lamp with known good lamp. If lamp fails to start, replace starter.

Improper ambient temperature – Check ballast or fixture rating against existing environmental conditions. Fluorescent lamps experience starting problems when the ambient temperature is below 50°F. Mercury and metal halide will start above -20°F and high pressure sodium above -40°F.

Incorrect or loose wiring – Disconnect from power. Check wiring connections.

Slow or Erratic Starting

Lamp at or near end of life – Replace with new lamp. HID arc tubes will blacken near end of life. Mercury and metal halide lamps will produce low light output and may exhibit intermittent starting. Metal halide will suffer severe color changes. High pressure sodium lamps will exhibit normal starting but will turn on and off (cycle) during operation. The envelope of a high pressure sodium lamp may develop a brownish discoloration. Low pressure sodium lamps will operate at nearly full light output but starting will become impossible at end of life.

Line or ballast output voltage low – Check line voltage at the fixture. Check open circuit voltage. See page 785 for HID ballasts.

Line voltage varies – Check incoming voltage with recording voltmeter (if this is the problem, check other equipment on the same circuit).

Incorrect lamp or burning position – Check fixture label against lamp type. Check lamp and ballast ANSI numbers to ensure they match. Check for proper lamp operating position (metal halide).

Improper ambient temperature – Check ballast or fixture rating against existing environmental conditions. Fluorescent lamps experience starting problems when ambient temperature is below 50°F. Mercury and metal halide will start above -20°F and high pressure sodium above -40°F.

Hard-starting lamp – Replace with new lamp if delay is lengthy.

Incorrect or loose wiring – Disconnect from power. Check wiring connections.

Ballast near or at end of life – Test ballast.

Blinking, “Snaking” or Flickering (Fluorescent)

New lamp may need to be seasoned – Turn fixture on and off several times at 30-minute intervals.

Ambient temperature too low – If ambient temperature is below 50°F, change to ballast rated for conditions.

Significant air movement across lamps – Check for fans or air conditioning blowing across lamps.

Incorrect or loose wiring – Disconnect from power. Check wiring connections.

Line voltage varies – Check voltage supply.

Cycling (Lamp Turns On and Off)

Line voltage varies – Check voltage supply.

Faulty insulation detector (recessed fixtures) – Bypass to verify or move insulation if in contact. Insulation must be kept at least 3" from the side and 1/2" from the top of the fixture.

High Intensity Discharge:

Lamp at end of life or defective HPS lamp – Replace with new lamp.

PE control receives reflected light – Cover PE control and test fixture.

Incorrect lamp or ballast – Compare fixture and lamp labels for matching wattage and source. Compare fixture and system voltage rating.

Ballast output voltage low – Check line voltage at fixture. Check open circuit voltage. See page 785 for HID ballasts.

Incorrect lamp operating position (metal halide) – Check lamp specifications for proper operating position.

Fluorescent:

Incorrect or loose wiring – Disconnect from power. Check wiring connections.

Ballast is operating too hot – Check for high ambient temperatures, ventilate or suspend fixture.

Ballast near or at end of life – Test ballast.

Reduced Light Output

Improper ambient temperature – Fluorescent: Check for ambient temperature significantly above or below 77°F.

Air movement across lamps – Fluorescent: Check for fans or air conditioning blowing across lamps.

Lamp at or near end of life – Replace with new lamp. HID arc tubes will blacken near end of life. Mercury and metal halide lamps will produce low light output and may exhibit intermittent starting. Metal halide

will suffer severe color changes. High pressure sodium lamps will exhibit normal starting, but will turn on and off (cycle) during operation. The envelope of a high pressure sodium lamp may develop a brownish discoloration. Low pressure sodium lamps will operate at nearly full light output but starting will become impossible at end of life.

Incorrect or loose wiring – Disconnect from power. Check wiring connections.

Ballast near or at end of life – Test ballast. See page 785 for HID ballasts.

Short Lamp Life

Incorrect lamp or ballast – Compare fixture label against lamp type. Check lamp and ballast ANSI numbers to ensure they match. Check that lamp is in proper burning position.

Line voltage or ballast output voltage low – Check line voltage at fixture. Check open circuit voltage. See page 785 for HID ballasts.

Lamp operates less than 10 hours per start – Rated lamp life is based on 10 hours of operation per start. General rule for expected lamp life is: 50% reduction in burn time per start results in 25% reduction in lamp life.

Faulty lamp – Replace with new lamp.

Radio Interference (Fluorescent)

Interference from electronic equipment – Move electronic equipment at least 10 feet away from lamps. Install radio frequency shielding. Install radio interference filter. Improve equipment grounding. Install shielded and grounded radio antenna.

Blown Fuses or Tripped Circuit Breaker (HID)

Improper fuses installed in fixture – Check fuses to fixture manufacturer's specification. Replace if incorrect.

Overloaded circuit – Verify that total circuit load is less than circuit rating.

Shorted (grounded) fixtures – Check with shorted (grounded) test. If shorted, replace fixture. See page 785 for HID ballasts.

COMPACT FLUORESCENT

Lamp & Ballast Data

Example: F18DTT/35 4PIN GE

ORDERING INFORMATION

Lamp type/Lamp color		Pin	Manufacturer
Lamp type	Lamp color	(blank) 2-pin lamp	GE General Electric
F7TT/	27	4PIN 4-pin lamp	SY OSRAM SYLVANIA
F9TT/	30		PH Philips
F9DTT/	35		
F13TT/	41		
F13DTT/			
F18DTT/			
F18TRT/			
F26TRT/			
F26DTT/			
F42TRT/			
F57TRT/			
F70TRT/			

ADDITIONAL INFORMATION

For additional product information, visit www.lithonia.com.

WATTAGE	BASE	PIN	AVG RATED LIFE (HRS)	LUMENS				LAMP COLOR			
				INITIAL	MEAN	2700K	3000K	3500K	4100K		
7TT	G23	2	10000	400	344	■ ^{1,2,3}		■ ^{1,2,3}	■ ^{1,2,3}		
9TT	G23	2	10000	580	499	■ ^{1,2,3}		■ ^{1,2,3}	■ ^{1,2,3}		
9DTT	G23-2	2	10000	525	452	■ ^{1,2}	■ ²	■ ²	■ ¹		
13TT	GX23	2	10000	800	688	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
13TT	2GX7	4	10000	800	688	■ ²	■ ²		■ ²		
13DTT	GX23-2	2	10000	780	671	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
13DTT	G24Q-1	4	12000	900	774	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
18DTT	G24D-2	2	10000	1150	980	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
18DTT	G24Q-2	4	12000	1150	980	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
18TRT	GX24Q-2	4	12000	1164	1001	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
26DTT	G24D-3	2	10000	1710	1470	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
26DTT	G24Q-3	4	12000	1710	1470	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
26TRT	GX24Q-3	4	12000	1710	1548	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
32TRT	GX24Q-3	4	12000	2200	1850	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
42TRT	GX24Q-4	4	12000	3104	2670	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
57TRT	GX24Q-5	4	12000	4171	3587	■ ^{1,2}	■ ^{1,2,3}	■ ^{1,2,3}	■ ^{1,2,3}		
70TRT	GX24Q-6	4	12000	5200	4470	■ ¹	■ ¹	■ ¹	■ ¹		

■ = Available

LAMP TYPE	NUMBER OF LAMPS	STARTING TEMP	120V			277V			347V		
			120V, 277V, 347V	INPUT WATTS	MAX AMPS	BALLAST FACTOR	INPUT WATTS	MAX AMPS	BALLAST FACTOR	INPUT WATTS	MAX AMPS
13TT	2	0°F (-18°C)	26.00	0.22	0.98	26.00	0.10	0.98	NA	NA	NA
13DTT	1	0°F (-18°C)	18.00	0.15	1.00	18.00	0.07	1.00	18.00	0.06	1.00
	2	0°F (-18°C)	30.00	0.26	1.00	30.00	0.11	1.00	33.00	0.10	0.98
18DTT, 18TRT	1	0°F (-18°C)	20.00	0.17	1.00	20.00	0.08	1.00	21.00	0.11	1.00
	2	0°F (-18°C)	39.00	0.33	0.95	39.00	0.14	0.95	38.00	0.06	0.98
26DTT, 26TRT	1	0°F (-18°C)	29.00	0.25	1.00	29.00	0.11	1.00	31.00	0.09	1.02
	2	0°F (-18°C)	56.00	0.47	0.98	56.00	0.21	0.98	57.00	0.17	0.98
32TRT	1	0°F (-18°C)	36.00	0.31	0.98	36.00	0.13	0.98	36.00	0.11	0.98
	2	0°F (-18°C)	69.00	0.58	0.98	68.00	0.26	0.98	62.00	0.19	1.00
42TRT	1	0°F (-18°C)	46.00	0.40	0.98	46.00	0.18	0.98	42.00	0.13	1.00
	2	0°F (-18°C)	93.00	0.78	0.97	93.00	0.33	0.97	80.00	0.25	0.98
57TRT	1	0°F (-18°C)	59.00	0.52	0.94	59.00	0.21	0.94	61.00	0.18	1.00
	2	0°F (-18°C)	128.00	1.07	1.00	126.00	0.46	1.00	NA	NA	NA
70TRT	1	0°F (-18°C)	75.00	0.63	0.96	75.00	0.27	0.96	74.00	0.21	1.00

Notes

- 1 Available from General Electric.
- 2 Available from OSRAM.
- 3 Available from Philips.

T8/T5 LINEAR AND U-SHAPED FLUORESCENT LAMPS							
	LAMP TYPE	WATTAGE	NOMINAL LENGTH (IN)	INITIAL LUMENS	MEAN LUMENS	AVG RATED LIFE (HRS)	CRI
T8 800 ENERGY SAVING LAMPS	F25T8	25	48	2475	2350	24000	85
	F28T8	28	48	2725	2585	24000	85
	F30T8	30	48	2850	2675	24000	85
T8 HIGH LUMEN LAMPS	F17T8	17	24	1400	1330	30000	85
	F25T8	25	36	2200	2090	30000	85
	F32T8	32	48	3100	2945	30000	85
T8 800 LAMPS	F17T8	17	24	1350	1240	20000	82
	F25T8	25	36	2150	1975	20000	82
	F32T8	32	48	2950	2800	20000	85
	F96T8	59	96	5900	5428	15000	82
	F96T8HO	86	96	8200	7625	18000	85
T8 700 LAMPS	F17T8	17	24	1300	1170	20000	75
	F25T8	25	36	1950	1755	20000	75
	F32T8	32	48	2800	2520	20000	78
	F96T8	59	96	5700	5130	15000	75
	F96T8HO	86	96	7900	7100	18000	78
T8 U-SHAPED LAMPS 6" LEG SPACING	FB32T8	32	22.5	2800	2535	20000	82
	FB32T8	32	22.5	2650	2370	20000	75
T8 U-SHAPED LAMP 1-5/8" LEG SPACING	FB31T8	31	22.5	2725	2500	20000	82
T5	F14T5	14	22	1200	1116	20000	85
	F21T5	21	34	1900	1767	20000	85
	F28T5	28	46	2600	2418	20000	85
	F24T5HO	24	22	1750	1627	20000	85
	F39T5HO	39	34	3100	2883	20000	85
	F54T5HO	54	46	4450	4138	25000	85

T8 LINEAR FLUORESCENT BALLAST								
BALLAST	LAMP TYPE	WATTAGE	NUMBER OF LAMPS	SOUND RATING	TYPICAL INPUT WATTAGE	120V NOMINAL CURRENT	277V NOMINAL CURRENT	BALLAST FACTOR
GEB10IS	F17T8	17	1	A	15	0.12	0.05	0.81
	F17T8	17	1	A	18	0.15	0.07	0.92
	F17T8	17	2	A	27	0.25	0.11	0.81
	F17T8	17	2	A	32	0.27	0.12	0.93
	F17T8	17	3	A	40	0.33	0.15	0.80
	F17T8	17	3	A	46	0.40	0.18	0.93
	F17T8	17	4	A	52	0.42	0.19	0.81
	F17T8	17	4	A	60	0.50	0.22	0.91
	F25T8	25	1	A	22	0.17	0.08	0.78
	F25T8	25	1	A	23	0.20	0.09	0.88
	F25T8	25	1	A	32	0.27	0.12	1.20
	F25T8	25	2	A	40	0.34	0.15	0.78
	F25T8	25	2	A	46	0.39	0.16	0.88
	F25T8	25	2	A	61	0.51	0.22	1.20
	F25T8	25	3	A	59	0.50	0.21	0.78
	F25T8	25	3	A	67	0.58	0.25	0.88
	F25T8	25	3	A	89	0.75	0.32	1.18
	F25T8	25	4	A	77	0.63	0.28	0.78
	F25T8	25	4	A	88	0.74	0.31	0.88
	F32T8	32	1	A	28	0.22	0.10	0.78
	F32T8	32	1	A	30	0.26	0.11	0.88
	F32T8	32	1	A	41	0.33	0.15	1.20
	F32T8	32	2	A	51	0.44	0.19	0.78
	F32T8	32	2	A	59	0.50	0.21	0.88
	F32T8	32	2	A	78	0.65	0.28	1.20
	F32T8	32	3	A	75	0.65	0.27	0.78
	F32T8	32	3	A	86	0.72	0.31	0.88
	F32T8	32	3	A	114	0.95	0.41	1.18
F32T8	32	4	A	98	0.80	0.35	0.78	
F32T8	32	4	A	112	0.95	0.40	0.88	
F96T8	59	1	A	67	0.56	0.25	1.02	
F96T8	59	2	A	112	0.93	0.40	0.88	
GEB10RS	F25T8	25	1	A	24	0.20	0.09	0.88
	F25T8	25	2	A	46	0.39	0.17	0.88
	F25T8	25	3	A	69	0.58	0.25	0.88
	F25T8	25	4	A	92	0.77	0.32	0.88
	F32T8	32	1	A	31	0.26	0.11	0.88
	F32T8	32	2	A	59	0.50	0.21	0.88
	F32T8	32	3	A	88	0.74	0.31	0.88
	F32T8	32	4	A	118	0.99	0.41	0.88
	F96T8HO	86	1	A	95	0.78	0.36	0.96
F96T8HO	86	2	A	182	1.54	0.67	0.95	

T8/T5 LINEAR FLUORESCENT BALLAST								
BALLAST	LAMP TYPE	WATTAGE	NUMBER OF LAMPS	SOUND RATING	TYPICAL INPUT WATTAGE	120V NOMINAL CURRENT	277V NOMINAL CURRENT	BALLAST FACTOR
BILP	F25T8	25	1	A	21	0.17	0.08	0.77
	F25T8	25	2	A	39	0.33	0.14	0.77
	F25T8	25	3	A	62	0.54	0.24	0.77
	F25T8	25	4	A	82	0.72	0.31	0.76
	F28T8	28	1	A	22	0.19	0.081	0.77
	F28T8	28	2	A	43	0.36	0.16	0.77
	F28T8	28	3	A	64	0.57	0.25	0.77
	F28T8	28	4	A	86	0.75	0.32	0.77
	F30T8	30	1	A	24	0.20	0.09	0.77
	F30T8	30	2	A	45	0.38	0.17	0.77
	F30T8	30	3	A	68	0.57	0.25	0.77
	F30T8	30	4	A	90	0.76	0.33	0.77
	F32T8	32	1	A	25	0.22	0.10	0.77
	F32T8	32	2	A	49	0.42	0.18	0.77
	F32T8	32	3	A	73	0.66	0.28	0.77
F32T8	32	4	A	97	0.88	0.37	0.77	
BINP	F25T8	25	1	A	23	0.20	0.09	0.87
	F25T8	25	2	A	45	0.38	0.16	0.87
	F25T8	25	3	A	67	0.59	0.26	0.84
	F25T8	25	4	A	89	0.78	0.33	0.82
	F28T8	28	1	A	25	0.22	0.10	0.87
	F28T8	28	2	A	49	0.41	0.18	0.87
	F28T8	28	3	A	72	0.62	0.27	0.87
	F28T8	28	4	A	96	0.82	0.35	0.87
	F30T8	30	1	A	27	0.23	0.10	0.87
	F30T8	30	2	A	52	0.44	0.19	0.87
	F30T8	30	3	A	77	0.65	0.28	0.87
	F30T8	30	4	A	102	0.86	0.37	0.87
	F32T8	32	1	A	28	0.25	0.11	0.87
	F32T8	32	2	A	55	0.47	0.20	0.87
	F32T8	32	3	A	82	0.72	0.31	0.87
F32T8	32	4	A	109	0.97	0.41	0.87	
BIHP	F25T8	25	1	A	30	0.26	0.12	1.20
	F25T8	25	2	A	62	0.54	0.24	1.20
	F25T8	25	3	A	90	0.79	0.34	1.14
	F25T8	25	4	A	121	1.06	0.45	1.16
	F28T8	28	1	A	33	0.28	0.12	1.20
	F28T8	28	2	A	66	0.58	0.26	1.15
	F28T8	28	3	A	99	0.83	0.36	1.18
	F28T8	28	4	A	127	1.10	0.48	1.15
	F30T8	30	1	A	37	0.31	0.13	1.20
	F30T8	30	2	A	72	0.60	0.26	1.19
	F30T8	30	3	A	106	0.88	0.38	1.18
	F30T8	30	4	A	135	1.13	0.49	1.15
	F32T8	32	1	A	39	0.33	0.14	1.18
	F32T8	32	2	A	74	0.65	0.28	1.15
	F32T8	32	3	A	111	0.99	0.41	1.18
F32T8	32	4	A	148	1.3	0.55	1.15	
CONTRACTOR SELECT BALLAST	F32T8	32	1	A	30	0.27	0.12	0.92
	F32T8	32	2	A	57	0.50	0.21	0.88
	F32T8	32	3	A	83	0.75	0.32	0.88
	F32T8	32	4	A	111	0.94	0.40	0.88
GEB10PS	F14T5	14	1	A	17	0.14	0.06	0.99
	F14T5	14	2	A	32	0.27	0.12	1.00
	F21T5	21	1	A	24	0.23	0.09	0.99
	F21T5	21	2	A	47	0.40	0.17	1.00
	F24T5HO	24	1	A	29	0.23	0.10	1.00
	F24T5HO	24	2	A	55	0.47	0.20	1.00
	F28T5	28	1	A	32	0.28	0.12	1.00
	F28T5	28	2	A	65	3.55	0.23	1.00
	F39T5HO	39	1	A	42	0.36	0.15	1.00
	F39T5HO	39	2	A	85	0.76	0.32	1.00
	F54T5HO	54	1	A	62	0.51	0.21	1.00
F54T5HO	54	2	A	121	1.00	0.43	1.00	
F54T5HO	54	3	A	182	1.49	0.63	1.00	
F54T5HO	54	4	A	241	2.00	0.85	1.00	
GEB9S	F28T5	28	2	A	60	0.50	0.22	0.95
GEB11S	F28T5	28	2	A	73	0.61	0.26	1.15

HIGH INTENSITY DISCHARGE

Lamp Data

HIGH INTENSITY DISCHARGE LAMP DATA										
	WATTAGE	ANSI	BASE-BULB	AVG RATED LIFE HRS	INITIAL LUMENS	MEAN LUMENS	COATED	BURNING POSITION	MANUFACTURER ¹	LITHONIA CAT. NO. ²
METAL HALIDE ³	50M	M110	MED-ED17	10000	3000	1900	Y	Universal	SY,GE, PH, VE	MH50M/C/U
	70M	M98	MED-ED17	12000	4700	3100	Y	Universal	SY, GE, PH, VE	MH70M/C/U
	100M	M90	MED-ED17	15000	7900	5800	Y	Universal	SY, GE, PH, VE	MH100M/C/U
	150M	M102	MED-ED17	15000	11600	7500	N	Universal	SY, GE, PH, VE	MH150M/U
	175M	M137 or M152	MOG-ED28	15000	16000	11200	Y	Base up	SY, GE, PH, VE	MS175BU PSL
	175M	M137 or M152	MOG-ED28	15000	17500	12800	N	Base up	SY, GE, VE	MS175C/BU PSL
	200M	M136	MOG-ED28	15000	20000	16000	Y	Vertical ±15°	VE	MS200U
	200M	M136	MOG-ED28	15000	21000	16800	N	Vertical ±15°	VE	MS200C/U PSL
	250M	M138 or M153	MOG-ED28	15000	22000	17600	N	Horizontal ±75°	VE	MS250BUH PSL
	250M	M138 or M153	MOG-ED28	15000	21500	15500	Y	Base up	GE, SY	MS250C/BUH PSL
	250M	M138 or M153	MOG-ED28	15000	23000	17000	N	Base up	GE, PH, SY	MS250BU PSL
	320M	M132 or M154	MOG-ED28	20000	29000	20300	Y	Universal	PH	MS320R/C/U PSL
	320M	M132 or M154	MOG-ED28	20000	30000	21000	N	Universal	PH	MS320R/U PSL
	320M	M132 or M154	MOG-ED28	20000	33000	23000	Y	Vertical ±15°	GE, VE	MS320R/C BU PSL
	320M	M132 or M154	MOG-ED28	20000	34000	25000	N	Vertical ±15°	GE, VE	MS320R/BU PSL
	320M	M132 or M154	MOG-BT28	20000V 15000H	30000V 28000H	19700V 18400H	Y	BU-HOR	SY	MS320R/C BU PSL SY
	320M	M132 or M154	MOG-BT28	20000V 15000H	30000V 28000H	21000V 19700H	N	BU-HOR	SY	MS320R/BU PSL SY
	350M	M131	MOG-ED37	20000	35000	24500	Y	Base up	PH, GE, VE	MS350C/BU PSL
	350M	M131	MOG-ED37	20000	36000	25200	N	Base up	PH, GE, VE	MS350C/BU PSL
	400M	M135 or M155	MOG-ED37	20000	41500	29050	Y	Base up	PH, GE, SY, VE	MS400C/BU PSL
	400M	M135 or M155	MOG-ED37	20000	42600	29820	N	Base up	PH, GE, SY, VE	MS400BU PSL
	450M	M144	MOG-ED37	20000	47000	37000	Y	Vertical ±15°	VE	MS450C/BU PSL
	450M	M144	MOG-ED37	20000	50000	40000	N	Vertical ±15°	VE	MS450BU PSL
	750M	M149	MOG-BT37	16000	72000	54000	Y	Base up	GE	MS750C/BU PSL
	750M	M149	MOG-BT37	16000	82000	60000	N	Base up	GE	MS750BU PSL
	750M	M149	MOG-BT37	16000V 12000H	78000V 68000H	67000V 56000H	N	BU-HOR	SY	MS750BUH PSL
	875M	M166	MOG-BT37	20000	100000	80000	N	Base up	VE	MS875R/BU PSL
	1000M	M141	MOG-BT37	12000V 9000H	11500V 10500H	9000V 82000H	N	Universal	GE, SY	MS1000R/U PSL
	1000M	M141	MOG-BT37	12000	115000	86000	N	Base up	VE	MS1000R/BU PSL
	1500M	M48	MOG-BT56	3000	170000V 101600H	140000	N	BU-HOR	SY, GE	MH1500BUH
	1500M	M48	MOG-BT56	3000	167000	140000	N	BD	SY	MH1500BD
	PROTECTED METAL HALIDE ⁴	50M	M110	MED-ED17	10000	3400	1500	Y	Universal	GE,SY,VE
70M		M98	MED-ED17	12000	5300	3300	Y	Universal	GE,SY,VE	MP70M/C/U
100M		M90	MED-ED17	15000	8500	5900	Y	Universal	GE,SY,VE	MP100M/C/U
150M		M102	MED-ED17	15000	12000	8300	Y	Universal	GE, SY	MP150M/C/U
175M		M57	MOG-BT28	10000	12800	7800	Y	Base up	GE, SY	MP175C/BU
175M		M57	MOG-BT28	10000	14400	10200	N	Base up	GE, PH, SY	MP175BU
200M		M136	MOG-ED28	15000	19000	15200	Y	Vertical ±15°	VE	MP200C/BU PSL
200M		M136	MOG-ED28	15000	20000	16000	N	Vertical ±15°	VE	MP200BU PSL
250M		M58	MOG-BT28	10000	20500	14700	Y	Base up	GE, SY	MP250C/BU
250M		M58	MOG-BT28	10000	23000	17000	N	Base up	GE, PH, SY	MP250BU
250M		M138 or M153	MOG-ED28	15000	22600	18000	Y	Base up	VE	MP250C/BU PSL
250M		M138 or M153	MOG-ED28	15000	23800	19000	N	Base up	VE	MP250BU PSL
320M		M132 or M154	MOG-BT28	20000	27700V 32000H	19000V 22000H	Y	Base up	SY, GE, VE	MP320R/C BU PSL
320M		M132 or M154	MOG-BT28	20000	28600V 33500H	21000V 24000H	N	Base up	SY, GE, VE	MP320R/BU PSL
350M		M131	MOG-ED37	20000	33000	26000	Y	Vertical ±15°	VE	MP350C/BU PSL
350M		M131	MOG-ED37	20000	35000	28000	N	Vertical ±15°	VE	MP350BU PSL
350M		M131	MOG-ED37	20000	33400	26700	Y	Base up	SY, GE	MP350C/BU PSL
350M		M131	MOG-ED37	20000	35200	28200	N	Base up	GE, SY	MP350BU PSL
400M		M59	MOG-ED37	20000	34500	22425	Y	Base up	PH, GE, SY	MP400C/BU
400M		M59	MOG-ED37	20000	38000	26000	N	Base up	GE, PH, SY	MP400BU
400M		M135 or M155	MOG-ED37	20000	36000	23400	Y	Base up	PH, GE, VE	MP400C/BU PSL
400M		M135 or M155	MOG-ED37	20000	40000	28000	N	Base up	PH, GE, VE	MP400BU PSL
450M		M144	MOG-ED37	20000	45000	36000	Y	Base up	VE	MP450C/BU PSL
450M		M144	MOG-ED37	20000	47000	37000	N	Base up	VE	MP450BU PSL
1000M		M47	MOG-BT56	15000	102000	82000	Y	Base up	SY	MP1000C/BU
1000M		M47	MOG-BT56	15000	107000	75000	N	Base up	PH, SY, GE	MP1000BU

	WATTAGE	ANSI	BASE-BULB	AVG RATED LIFE HRS	INITIAL LUMENS	MEAN LUMENS	COATED	BURNING POSITION	MANUFACTURER ¹	LITHONIA CAT. NO. ²
METAL HALIDE PAR LAMP	70M	M98	MED-PAR38	8500	3400	NA	N	Universal	SY,VE	MP70P38S5
	70M	M98	MED-PAR38	8500	3400	NA	N	Universal	SY,VE	MP70P38F5
	70M	M98	MED-PAR38	8500	3400	NA	N	Universal	SY,VE	MP70P38W5
	100M	M90	MED-PAR38	8500	5800	NA	N	Universal	SY,VE	MP100P38S5
	100M	M90	MED-PAR38	8500	5800	NA	N	Universal	SY,VE	MP100P38F5
	100M	M90	MED-PAR38	8500	5800	NA	N	Universal	SY,VE	MP100P38W5
	150M	M102	MED-PAR38	8500	8800	NA	N	Universal	SY	MP150P38S5
	150M	M102	MED-PAR38	8500	8800	NA	N	Universal	SY	MP150P38F5
	150M	M102	MED-PAR38	8500	8800	NA	N	Universal	SY	MP150P38W5
COLOR-CORRECTED CERAMIC METAL HALIDE ³	70M	M98	MED-ED17	15000	6000	4000	Y	Universal	GE, PH	MC70M/CU
	100M	M90	MED-ED17	10000V 15000H	8700	6300	Y	Universal	GE, PH	MC100M/CU
	150M	M102	MED-ED17	20000	12500	9375	Y	Universal	PH	MC150M/CU
PROTECTED COLOR-CORRECTED CERAMIC METAL HALIDE ⁴	70M	M98	MED-ED17	20000	5400	3995	Y	Universal	PH, SY	MPC70M/CU
	100M	M90	MED-ED17	20000	7900	5925	Y	Universal	PH, SY	MPC100M/CU
	150M	M102	MED-ED17	20000	11900	8805	Y	Universal	PH, SY	MPC150M/CU
	400M	M172 or M155	MED-ED37	24000	35000	27900	Y	Vertical ±15°	PH	MPC400C/BU LP940
	400M	M172 or M155	MED-ED37	24000	36000	28800	N	Vertical ±15°	PH	MPC400/BU LP940
COLOR-CORRECTED CERAMIC METAL HALIDE PAR LAMP	39M	M130	MED-PAR20	9000	2000	NA	N	Universal	PH, GE, SY	MPC39P20S ⁵
	39M	M130	MED-PAR20	9000	2000	NA	N	Universal	PH, GE, SY	MPC39P20F ⁵
	39M	M130	MED-PAR30	9000	2200	NA	N	Universal	PH, GE, SY	MPC39P30S ⁵
	39M	M130	MED-PAR30	9000	2200	NA	N	Universal	PH, GE, SY	MPC39P30F ⁵
	70M	M98	MED-PAR30	12000	3600	NA	N	Universal	SY, GE	MPC70P30S ⁵
	70M	M98	MED-PAR30	12000	3600	NA	N	Universal	SY, GE	MPC70P30F ⁵
	70M	M98	MED-PAR38	12000	4300	NA	N	Universal	SY, PH, GE	MPC70P38S ⁵
	70M	M98	MED-PAR38	12000	4300	NA	N	Universal	SY, PH, GE	MPC70P38F ⁵
	70M	M98	MED-PAR38	12000	4300	NA	N	Universal	SY, GE	MPC70P38W ⁵
	100M	M90	MED-PAR38	10000	6500	NA	N	Universal	GE, PH, SY	MPC100P38S ⁵
	100M	M90	MED-PAR38	10000	6500	NA	N	Universal	GE, PH, SY	MPC100P38F ⁵
	100M	M90	MED-PAR38	10000	6500	NA	N	Universal	GE, SY	MPC100P38W ⁵
	HIGH PRESSURE SODIUM	35S	S76	MED-ED17	16000	2150	1935	Y	Universal	GE, PH, SY
35S		S76	MED-ED17	16000	2250	2025	N	Universal	GE, PH, SY	LU35M
50S		S68	MED-ED17	24000	3800	3420	Y	Universal	GE, PH, SY	LU50M/C
50S		S68	MED-ED17	24000	4000	3600	N	Universal	GE, PH, SY	LU50M
50S		S68	MED-ED23.5	24000	3800	3420	Y	Universal	GE, PH, SY	LU50C
50S		S68	MED-ED23.5	24000	4000	3600	N	Universal	GE, PH, SY	LU50
70S		S62	MED-ED17	24000	5800	4900	Y	Universal	SY, PH, GE	LU70M/C
70S		S62	MED-ED17	24000	6300	5350	N	Universal	SY, PH, GE	LU70M
70S		S62	MED-ED23.5	24000	5500	4900	Y	Universal	SY, PH, GE	LU70C
70S		S62	MED-ED23.5	24000	6300	5500	N	Universal	SY, PH, GE	LU70
100S		S54	MED-ED17	24000	8800	7500	Y	Universal	SY, PH, GE	LU100M/C
100S		S54	MED-ED17	24000	9500	8000	N	Universal	SY, PH, GE	LU100M
100S		S54	MED-ED23.5	24000	8800	7500	Y	Universal	SY, PH, GE	LU100C
100S		S54	MED-ED23.5	24000	9500	8000	N	Universal	SY, PH, GE	LU100
150S		S55	MED-ED17	24000	14500	12300	Y	Universal	SY, PH, GE	LU150M/C
150S		S55	MED-ED17	24000	15800	13400	N	Universal	SY, PH, GE	LU150M
150S		S55	MOG-ED23.5	24000	14000	12500	Y	Universal	SY, GE	LU150C
150S		S55	MOG-ED23.5	24000	16000	13800	N	Universal	SY, PH, GE	LU150
200S		S66	MOG-BT18	24000	22000	19800	N	Universal	SY, PH, GE	LU200
250S		S50	MOG-BT28	24000	26000	23400	Y	Universal	SY	LU250C
250S		S50	MOG-BT18	24000	27000	24300	N	Universal	PH, GE, SY	LU250
310S		S67	MOG-BT18	24000	37000	32300	N	Universal	SY, GE	LU310
400S	S51	MOG-BT37	24000	47500	40000	Y	Universal	SY, GE	LU400C	
400S	S51	MOG-BT18	24000	50000	45000	N	Universal	SY, PH, GE	LU400	
600S	S106	MOG-T15	24000	90000	81000	N	Universal	GE, SY, PH	LU600	
750S	S111	MOG-BT37	24000	105000	94500	N	Universal	SY, GE	LU750	
1000S	S52	MOG-E25	24000	130000	124000	N	Universal	SY, PH, GE	LU1000	
WHITE SON HIGH PRESSURE SODIUM	50SDW	S104	MED-BD17	10000	2350	2000	Y	Universal	PH	WS50M/C
	50SDW	S104	PG12-T10	10000	2300	2070	N	Universal	PH	WS50P
	100SDW	S105	MED-BD17	10000	4900	4170	Y	Universal	PH	WS100M/C
	100SDW	S105	PG12-T10	10000	5000	4250	N	Universal	PH	WS100P

Notes

- 1 GE=General Electric; SY=OSRAM SYLVANIA; PH=Philips; VE=Venture.
- 2 To specify a manufacturer, add manufacturer to item number. Example: MC100M/CU GE.

- 3 For use in enclosed rated fixtures only.
- 4 For use in open or enclosed rated fixtures.
- 5 S= Sport; F=Flood; W=Wide flood

HIGH INTENSITY DISCHARGE

Ballast Selection Guide

Metal Halide and High Pressure Sodium Ballasts

The characteristics of high pressure sodium and metal halide high intensity discharge lamps require a ballast for controlling voltage and current to operate the lamp at its proper wattage. Lamps that are not operated within the optimal performance range will not produce proper light output or experience full life. There are several ballast types to choose that will provide proper control, but offer differing lamp wattage regulation, voltage dip tolerance, watts loss and cost.

CWA – Constant Wattage Autotransformer Ballast¹

- Operates metal halide and high pressure sodium lamps
- 175W, 250W, 400W, 1000W metal halide and 100W, 200W, 250W, 400W, 1000W high pressure sodium lamps
- Input line voltage 120V, 208V, 240V, 277V, 347V, 480V
- Voltage dip tolerance; 30%
- Moderate watts loss
- Two coils with mid-size core
- Regulation $\pm 10\%$ line voltage / $\pm 10\%$ lamp wattage
- Crest factor 1.7 to 1.8
- Metal halide ballasts rated to operate mercury lamps; 175W, 250W, 400W, 1000W only
- Ideal for manufacturing and assembly type areas, general industrial, recreational and retail

CWI – Constant Wattage Isolated Ballast¹

- Operates 250W, 400W, 1000W metal halide and 150W, 200W, 250W, 400W high pressure sodium lamps
- Isolated 2-coil system meets Canadian electrical code requirements for 208V and 240V applications in Canada
- Input line voltage 120V, 208V, 240V, 480V
- Voltage dip tolerance; 30%
- Moderate watts loss
- Regulation $\pm 10\%$ line voltage / $\pm 10\%$ lamp wattage
- Crest factor 1.7 to 1.8
- Adds increased safety during lamp replacement

MRB - Magnetic Regulator Ballast

- Operates 70-400W high pressure sodium lamps
- Isolated 3-coil system meets Canadian electrical code requirements for 208V and 240V applications
- Input line voltage 120V, 240V, 277V, 480V
- Voltage dip tolerance; 50%
- High watts loss
- Excellent regulation $\pm 10\%$ line voltage / $\pm 3\%$ lamp wattage
- Crest factor 1.5
- Ideal for heavy industrial application or areas with voltage dips and spikes

HX – High Reactance

- Operates 70W, 100W, 150W metal halide and 50W, 70W, 100W, 150W high pressure sodium
- Input line voltage 120V, 277V, 347V
- Low watts loss
- Regulation $\pm 5\%$ line voltage / $\pm 12\%$ lamp wattage
- Crest factor 1.5
- HPF high power factor 90%+ (standard)
- NPF normal power factor 50%+ (available)
- Starting current higher than operating

Pulse Start Metal Halide Ballasts

Pulse start metal halide lamps provide higher lumens per watt and up to 15% better mean lumens than standard probe start lamps with an additional 15% gain in combination with electronic ballasts. These lamps have different operating characteristics that require different ballast designs with an igniter to generate a starting pulse of 2,000 to 3,000 volts. Pulse start lamps will start quicker and reach full brightness sooner during cold and hot starts.

SCWA – Super Constant Wattage Autotransformer

SCWI – SCWA Isolated Ballast

- Operates 150W, 175W, 200W, 250W, 320W, 350W, 400W, 450W, 750W, 875W, 1000W pulse start metal halide lamps
- Input line voltage 120V, 208V, 240V, 277V, 347V, 480V
- SCWI isolated 2-coil system meets Canadian electrical code requirements 400W only – 120V, 208V, 240V only
- Voltage dip tolerance; 45%
- Moderate watts loss
- Regulation $\pm 10\%$ line voltage / $\pm 10\%$ lamp wattage
- Crest factor 1.6
- Ideal for manufacturing and assembly type areas, general industrial, recreational and retail

RLB – Regulated Lag Ballast

- Operates 175W, 250W, 400W, 450W pulse start metal halide lamps (450W for 277V only)
- Input line voltage 120V, 208V, 240V, 277V, 347V, 480V
- Voltage dip tolerance; 50%
- High watts loss
- Excellent regulation $\pm 10\%$ line voltage / $\pm 3-7\%$ lamp wattage
- Crest factor 1.5
- Ideal for heavy industrial application or areas with voltage dips and spikes

HEB - Electronic Pulse Start Ballast

- Operates 320W, 350W, 400W pulse start metal halide lamps
- Auto-sensing input line voltage 200V to 277V 50/60Hz
- Voltage dip tolerance; 56%, automatically reduce lamp power 50% for dip below 180V
- Low watts loss – energy-saving ballast
- 0-10VDC dimming control 50% to 100% lamp power
- Total harmonic distortion 15% maximum
- Excellent regulation $\pm 10\%$ line voltage / $\pm 0.5\%$ lamp wattage
- Ideal for clean manufacturing and assembly type areas, institutional, recreational and retail

Notes

- 1 For metal halide 175 – 450W Shipped outside U.S. territories.

HIGH INTENSITY DISCHARGE

Ballast Testing

1. HID Open-Circuit and Short-Circuit Test Limits

BALLAST	WATTAGE	ANSI NUMBER	RMS VOLTAGE	SECONDARY SHORT CIRCUIT CURRENT AMPS
METAL HALIDE BALLASTS	70	M85	210–250	0.85–1.30
	100	M90	250–300	1.15–1.76
	150	M81	220–260	1.75–2.60
	175	M57	285–320	1.50–1.90
	250	M80	230–270	2.90–4.30
	250	M58	285–320	2.20–2.85
	400	M59	285–320	3.50–4.50
	2–400 (ILO)	2–M59	285–320	3.50–4.50
	2–400 (Series)	2–M59	600–665	3.30–4.30
HIGH PRESSURE SODIUM BALLASTS*	1000	M47	400–445	4.80–6.15
	1500	M48	400–445	7.40–9.60
	35	S76	110–130	0.85–1.45
	50	S68	110–130	1.50–2.30
	70	S62	110–130	1.60–2.90
	100	S54	110–130	2.45–3.80
	150	S55	110–130	3.50–5.40
	150	S56	200–250	2.00–3.00
	200	S66	200–230	2.50–3.70
	250	S50	175–225	3.00–5.30
LOW PRESSURE SODIUM BALLASTS	310	S67	155–190	3.80–5.70
	400	S51	175–225	5.00–7.60
	1000	S52	420–480	5.50–8.10
	18	L69	300–325	0.30–0.40
	35	L70	455–505	0.52–0.78
	55	L71	455–505	0.52–0.78
LOW PRESSURE SODIUM BALLASTS	90	L72	455–525	0.80–1.20
	135	L73	645–715	0.80–1.20
	180	L74	645–715	0.80–1.20

* Caution: Always disconnect the ignitor before measuring the output voltage of high pressure sodium ballasts. High voltage starting pulses can damage commonly used multi-meters.

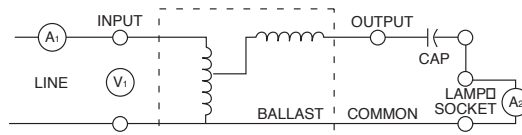
2. HID Short-Circuit Lamp Current

To ensure the ballast is delivering the proper current under lamp starting conditions, a measurement may be taken by connecting an ammeter between the lamp socket center pin and the socket shell with rated input voltage applied to the ballast. If available, a socket adapter may be used.

1. Energize ballast with proper rated input voltage.
2. Measure current with ammeter at A_1 and A_2 as shown.
3. Readings must be within test limits shown.

When using a clamp-on ammeter for this measurement, be certain the meter is not near the magnetic field of the ballast or any steel member which might distort the magnetic field.

Short-Circuit Current Test



When short-circuit lamp current test results in high, low or no reading:

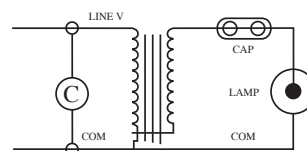
Further checks should be made to determine whether cause is attributable to improper supply voltage, shorted or open capacitor or inoperative ballast. Checks may be made as follows:

- **Supply Voltage Check**
Measure line voltage. If ballast is multi-voltage unit make certain input voltage connection is made to proper input voltage terminal or lead.
- **Capacitor Check**
Verify capacitor rating is as required and shown on ballast label.
- **Ballast Check**
Perform open-circuit voltage test to ensure operation within the RMS range shown in the table to the left.

3. HID Ballast Continuity Testing

Continuity of Primary Coil

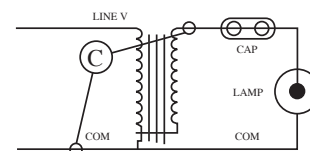
1. Disconnect ballast from power supply and discharge the capacitor.
2. Check for continuity of ballast primary coil between input leads.



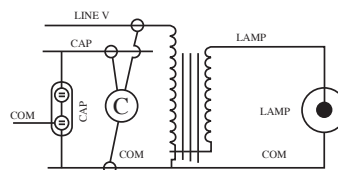
Between Common and Line Leads.

Continuity of Secondary Coil

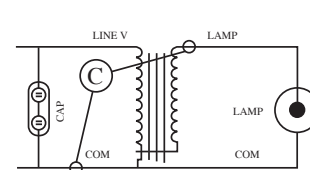
1. Disconnect ballast from power supply and discharge the capacitor.
2. Check for continuity of ballast secondary coil between lamp and common leads.



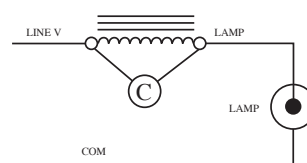
Between Common and Capacitor Leads.



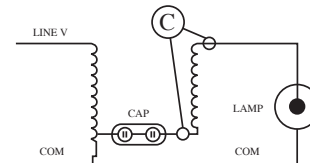
Between Line and Lamp Leads.



Between Common and Lamp Leads.



Between Common and Capacitor Leads.



Between Common and Lamp Leads.

Notes

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HIGH PRESSURE SODIUM

Ballast Data

High pressure sodium ballasts require a magnetic circuit to produce the open-circuit voltage and control the lamp operating current, and a special electronic starting circuit. The electronic starting circuit applies a high voltage pulse across the lamp to initiate the arc. The pulse continues to fire at each half cycle until the arc is established, at which time it shuts off.

HIGH PRESSURE SODIUM												
WATTAGE	ANSI CODE	BALLAST	POWER FACTOR	WIRING DIAGRAM	REGULATION LINEV=LAMPW	MINIMUM STARTING AMBIENT	PRIMARY VOLTAGE	DROPOUT VOLTAGE	STARTING CURRENT	OPERATING CURRENT	OPEN CIRCUIT CURRENT	INPUT WATTAGE
35	S76	R	NPF	H1	±5%=±12%	-40C/-40F	120	96	1.35	0.84	NIL	46
	S76	R	HPF	H2	±5%=±12%	-40C/-40F	120	96	0.78	0.38	0.68	46
50	S68	R	NPF	H1	±5%=±12%	-40C/-40F	120	96	1.80	1.18	NIL	62
	S68	R	HPF	H2	±5%=±12%	-40C/-40F	120	96	0.95	0.75	1.00	62
	S68	HX	HPF	H5	±5%=±12%	-40C/-40F	120/277	96/225	0.65/0.30	0.61/0.26	1.20/0.44	66
70	S62	R	NPF	H1	±5%=±12%	-40C/-40F	120	96	2.10	1.60	NIL	86
	S62	R	HPF	H2	±5%=±12%	-40C/-40F	120	96	0.90	0.75	1.30	86
	S62	HX	HPF	H5	±5%=±12%	-40C/-40F	120/277	96/222	0.9/0.35	0.81/0.35	1.45/0.70	91
	S62	HX	HPF	H4	±5%=±12%	-40C/-40F	208	155	0.50	0.48	0.90	94
	S62	HX	HPF	H4	±5%=±12%	-40C/-40F	240	180	0.44	0.41	0.80	94
	S62	HX	HPF	H4	±5%=±12%	-40C/-40F	347	275	0.25	0.29	0.60	94
	S62	HX	HPF	H4	±5%=±12%	-40C/-40F	480	385	0.21	0.20	0.40	94
	S62	CWA	HPF	H3	±10%=±10%	-40C/-40F	120/277	80/184	0.85/0.36	0.85/0.36	0.18/0.08	95
	S62	CWI	HPF	H6	±10%=±10%	-40C/-40F	120/240	90/180	0.50/0.25	0.86/0.43	0.5/0.25	95
	S62	CWI	HPF	H6	±10%=±10%	-40C/-40F	208	156	0.30	0.50	0.30	95
	S62	MRB	HPF	H9	±10%=±3%	-40C/-40F	120/240	85/165	0.45/0.20	0.90/0.50	0.60/0.30	103
	100	S54	R	NPF	H1	±5%=±12%	-40C/-40F	120	95	3.10	2.10	NIL
S54		R	HPF	H2	±5%=±12%	-40C/-40F	120	95	1.50	1.05	1.80	117
S54		HX	HPF	H5	±5%=±12%	-40C/-40F	120/277	96/222	1.30/0.6	1.14/0.49	2.20/0.95	130
S54		HX	HPF	H4	±5%=±12%	-40C/-40F	208	166	0.75	0.66	1.30	130
S54		HX	HPF	H4	±5%=±12%	-40C/-40F	240	192	0.65	0.57	1.10	130
S54		HX	HPF	H4	±5%=±12%	-40C/-40F	347	275	0.45	0.39	0.70	130
S54		HX	HPF	H4	±5%=±12%	-40C/-40F	480	385	0.35	0.28	0.60	130
S54		CWA	HPF	H3	±10%=±10%	-40C/-40F	120/277	90/208	0.80/0.35	1.20/0.50	0.65/0.25	138
S54		CWA	HPF	H3	±10%=±10%	-40C/-40F	480	360	0.20	0.30	0.15	138
S54		CWI	HPF	H6	±10%=±10%	-40C/-40F	120/240	90/180	0.70/0.35	1.22/0.61	0.70/0.35	130
S54		CWI	HPF	H6	±10%=±10%	-40C/-40F	208	156	0.40	0.70	0.40	130
S54		MRB	HPF	H9	±10%=±3%	-40C/-40F	120/240	75/150	1.00/0.50	1.20/0.60	0.44/0.22	138
S54		MRB	HPF	H9	±10%=±3%	-40C/-40F	277	185	0.21	0.60	0.45	138
S54		MRB	HPF	H9	±10%=±3%	-40C/-40F	480	330	0.12	0.30	0.25	138
150	S55	R	NPF	H1	±5%=±12%	-40C/-40F	120	95	4.50	3.20	NIL	171
	S55	R	HPF	H2	±5%=±12%	-40C/-40F	120	95	2.25	1.50	2.40	171
	S55	HX	HPF	H5	±5%=±12%	-40C/-40F	120/277	96/222	2.00/0.88	1.66/0.72	3.00/1.30	189
	S55	HX	HPF	H4	±5%=±12%	-40C/-40F	208	166	1.15	0.96	1.65	189
	S55	HX	HPF	H4	±5%=±12%	-40C/-40F	240	192	1.00	0.83	1.45	189
	S55	HX	HPF	H4	±5%=±12%	-40C/-40F	347	280	0.53	0.57	1.00	189
	S55	HX	HPF	H4	±5%=±12%	-40C/-40F	480	385	0.50	0.44	0.72	189
	S55	CWA	HPF	H3	±10%=±10%	-40C/-40F	120/277	90/208	0.96/0.42	1.70/0.70	0.96/0.42	190
	S55	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	360	0.24	0.50	0.24	190
	S55	CWI	HPF	H6	±10%=±10%	-40C/-40F	120/240	90/180	0.90/0.45	1.76/0.88	1.00/0.50	190
	S55	CWI	HPF	H6	±10%=±10%	-40C/-40F	208	156	0.50	1.01	0.60	190
	S55	MRB	HPF	H9	±10%=±3%	-40C/-40F	120/240	75/150	1.40/0.70	1.70/0.90	1.60/0.80	196
200	S66	CWA	HPF	H3	±10%=±10%	-40C/-40F	120	75	1.50	2.22	1.30	240
	S66	CWA	HPF	H3	±10%=±10%	-40C/-40F	208	130	0.90	1.28	0.75	240
	S66	CWA	HPF	H3	±10%=±10%	-40C/-40F	240	150	0.75	1.11	0.65	240
	S66	CWA	HPF	H3	±10%=±10%	-40C/-40F	277	180	0.65	0.96	0.60	240
	S66	CWA	HPF	H3	±10%=±10%	-40C/-40F	347	230	0.55	0.75	0.38	245
	S66	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	300	0.41	0.56	0.35	245
	S66	MRB	HPF	H9	±10%=±3%	-40C/-40F	120/240	55/110	0.80/0.40	2.20/1.10	1.50/0.75	255
	S66	MRB	HPF	H9	±10%=±3%	-40C/-40F	480	220	0.20	0.55	0.38	255

HIGH PRESSURE SODIUM												
WATTAGE	ANSI CODE	BALLAST	POWER FACTOR	WIRING DIAGRAM	REGULATION LINEV=LAMPW	MINIMUM START-ING AMBIENT	PRIMARY VOLTAGE	DROPOUT VOLTAGE	STARTING CURRENT	OPERATING CURRENT	OPEN CIRCUIT CURRENT	INPUT WATTAGE
250	S50	CWA	HPF	H3	±10%=±10%	-40C/-40F	120	90	2.00	2.50	1.70	295
	S50	CWA	HPF	H3	±10%=±10%	-40C/-40F	208	160	1.20	1.50	1.00	295
	S50	CWA	HPF	H3	±10%=±10%	-40C/-40F	240	180	1.00	1.30	0.85	295
	S50	CWA	HPF	H3	±10%=±10%	-40C/-40F	277	210	0.85	1.10	0.75	295
	S50	CWA	HPF	H3	±10%=±10%	-40C/-40F	347	260	0.75	0.90	0.70	300
	S50	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	360	0.44	0.65	0.46	310
	S50	CWI	HPF	H6	±10%=±10%	-40C/-40F	120/240	90/180	1.20/0.60	2.75/1.38	1.50/0.75	300
	S50	CWI	HPF	H6	±10%=±10%	-40C/-40F	208	156	0.70	1.60	0.87	300
	S50	MRB	HPF	H9	±10%=±3%	-40C/-40F	120/240	55/110	1.00/0.50	2.70/1.45	1.80/0.90	310
	S50	MRB	HPF	H9	±10%=±3%	-40C/-40F	277	120	0.45	1.20	0.75	310
310	S67	MRB	HPF	H9	±10%=±3%	-40C/-40F	480	240	0.25	0.70	0.45	310
	S67	CWA	HPF	H3	±10%=±10%	-40C/-40F	120	90	1.70	3.40	1.80	365
	S67	CWA	HPF	H3	±10%=±10%	-40C/-40F	208	156	0.89	1.95	1.00	365
	S67	CWA	HPF	H3	±10%=±10%	-40C/-40F	240	180	0.85	1.70	0.90	365
	S67	CWA	HPF	H3	±10%=±10%	-40C/-40F	277	208	0.75	1.45	0.80	365
	S67	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	360	0.41	0.90	0.45	365
	S67	MRB	HPF	H9	±10%=±3%	-40C/-40F	120/240	40/80	1.30/0.75	3.30/1.70	1.20/0.60	380
400	S67	MRB	HPF	H9	±10%=±3%	-40C/-40F	480	175	0.37	0.90	0.30	380
	S51	CWA	HPF	H3	±10%=±10%	-40C/-40F	120	90	3.30	3.80	2.00	464
	S51	CWA	HPF	H3	±10%=±10%	-40C/-40F	208	156	1.80	2.20	1.20	464
	S51	CWA	HPF	H3	±10%=±10%	-40C/-40F	240	180	1.60	1.90	0.95	464
	S51	CWA	HPF	H3	±10%=±10%	-40C/-40F	277	210	1.40	1.70	0.85	464
	S51	CWA	HPF	H3	±10%=±10%	-40C/-40F	347	260	1.10	1.36	0.70	465
	S51	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	360	0.75	1.00	0.60	467
	S51	CWI	HPF	H6	±10%=±10%	-40C/-40F	120/240	90/180	2.00/1.00	4.20/2.10	2.00/1.00	465
	S51	CWI	HPF	H6	±10%=±10%	-40C/-40F	208	156	1.15	2.40	1.15	465
	S51	CWI	HPF	H6	±10%=±10%	-40C/-40F	480	330	0.68	0.93	0.46	446
	S51	MRB	HPF	H9	±10%=±3%	-40C/-40F	120/240	45/90	2.00/1.00	4.20/2.10	2.20/1.10	490
600	S51	MRB	HPF	H9	±10%=±3%	-40C/-40F	277	105	0.85	1.80	0.95	490
	S51	MRB	HPF	H9	±10%=±3%	-40C/-40F	480	180	0.50	1.10	0.55	490
	S106	CWA	HPF	H3	±10%=±10%	-40C/-40F	120	65	5.20	5.50	3.00	670
	S106	CWA	HPF	H3	±10%=±10%	-40C/-40F	208	110	3.00	3.30	1.75	670
	S106	CWA	HPF	H3	±10%=±10%	-40C/-40F	240	130	2.60	2.90	2.60	670
	S106	CWA	HPF	H3	±10%=±10%	-40C/-40F	277	140	2.15	2.50	1.40	665
750	S106	CWA	HPF	H3	±10%=±10%	-40C/-40F	347	160	1.70	2.00	1.10	665
	S106	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	250	1.20	1.43	0.75	665
	S111	CWA	HPF	H3	±10%=±10%	-40C/-40F	120	90	6.30	6.75	3.00	840
	S111	CWA	HPF	H3	±10%=±10%	-40C/-40F	208	156	3.70	4.00	1.75	840
	S111	CWA	HPF	H3	±10%=±10%	-40C/-40F	240	180	3.20	3.50	1.60	840
	S111	CWA	HPF	H3	±10%=±10%	-40C/-40F	277	208	3.00	3.10	1.50	840
1000	S111	CWA	HPF	H3	±10%=±10%	-40C/-40F	347	260	2.30	2.50	1.20	840
	S111	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	360	1.65	1.78	0.90	840
	S52	CWA	HPF	H3	±10%=±10%	-40C/-40F	120	90	6.40	9.50	4.80	1100
	S52	CWA	HPF	H3	±10%=±10%	-40C/-40F	208	156	3.80	5.50	2.70	1100
	S52	CWA	HPF	H3	±10%=±10%	-40C/-40F	240	180	3.20	4.75	2.40	1100
	S52	CWA	HPF	H3	±10%=±10%	-40C/-40F	277	208	2.80	4.15	2.20	1100
S52	CWA	HPF	H3	±10%=±10%	-40C/-40F	347	260	2.20	3.30	1.10	1100	
S52	CWA	HPF	H3	±10%=±10%	-40C/-40F	480	360	1.60	2.30	0.90	1100	

METAL HALIDE

Ballast Data

Metal halide lamps are available in two varieties: PROBE START lamps, which rely on a high lamp current crest factor, a high ballast open-circuit voltage and a starting electrode to initiate the arc; and PULSE START lamps, which contain no starting electrode and rely on an ignitor in the ballast to initiate the arc.

HAZARD WARNING – USE OF METAL HALIDE LAMPS

These lamps can cause serious skin burn and eye inflammation from ultraviolet radiation if the outer envelope of the lamp is broken or punctured and the arc-tube continues to operate. Do not use where people will remain for more than a few minutes unless adequate shielding or other safety precautions are used. Certain types of lamps that will automatically extinguish when the outer envelope is broken are commercially available.



The Energy Independence and Security Act (EISA) established ballast efficiency standards for 150 – 500W luminaires. This legislation became effective January 1, 2009. For further information go to www.acuitybrandslighting.com/EISA

HIGH INTENSITY DISCHARGE/METAL HALIDE BALLAST-DATA												
WATTAGE	ANSI CODE	BALLAST	POWER FACTOR	WIRING DIAGRAM	REGULATION LINEV=LAMPW	MINIMUM STARTING AMBIENT	PRIMARY VOLTAGE	DROPOUT VOLTAGE	STARTING CURRENT	OPERATING CURRENT	OPEN CIRCUIT CURRENT	INPUT WATTAGE
50	M110	R	NPF		±5%=±12%	-30C/-20F	277	190	0.68	0.62	NIL	62
	M110	R	HPF	M5	±5%=±12%	-30C/-20F	277	190	0.35	0.22	0.55	62
	M110	HX	HPF	M1	±5%=±12%	-30C/-20F	120/277	90/208	0.60/0.25	0.66/0.28	1.00/0.45	72
	M110	HX	HPF	M1	±5%=±12%	-30C/-20F	208	150	0.51	0.35	0.67	67
	M110	HX	HPF	M1	±5%=±12%	-30C/-20F	240	175	0.47	0.30	0.57	67
70	M98	R	NPF		±5%=±12%	-30C/-20F	277	190	1.15	90.00	NIL	85
	M98	R	HPF	M5	±5%=±12%	-30C/-20F	277	190	0.50	0.32	0.80	85
	M98	HX	HPF	M1	±5%=±12%	-30C/-20F	120/277	90/208	0.55/0.25	0.85/0.37	1.90/0.80	88
	M98	HX	HPF	M1	±5%=±12%	-30C/-20F	208	156	0.30	0.49	1.00	88
	M98	HX	HPF	M1	±5%=±12%	-30C/-20F	240	180	0.25	0.42	0.90	88
100	M90	R	NPF		±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M90	R	HPF	M5	±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M90	HX	HPF	M1	±5%=±12%	-30C/-20F	120/277	90/208	1.15/0.50	1.15/0.50	2.60/1.15	130
	M90	HX	HPF	M1	±5%=±12%	-30C/-20F	208	156	0.66	0.66	1.50	130
	M90	HX	HPF	M1	±5%=±12%	-30C/-20F	240	180	0.58	0.58	1.30	130
150	M102	R	NPF		±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M102	R	HPF	M5	±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M102	HX	HPF	M1	±5%=±12%	-30C/-20F	120/277	90/208	0.80/0.35	1.20/0.50	1.05/0.45	128
	M102	HX	HPF	M1	±5%=±12%	-30C/-20F	208	156	0.66	0.66	1.50	130
	M102	HX	HPF	M1	±5%=±12%	-30C/-20F	240	180	0.58	0.58	1.30	130
175	M137	R	NPF		±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M137	R	HPF	M5	±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M137	HX	HPF	M1	±5%=±12%	-30C/-20F	120/277	90/208	0.95/0.42	1.60/0.70	3.65/1.58	185
	M137	HX	HPF	M1	±5%=±12%	-30C/-20F	208	156	0.55	0.90	2.10	185
	M137	HX	HPF	M1	±5%=±12%	-30C/-20F	240	180	0.50	0.80	1.80	185
200	M136	R	NPF		±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M136	R	HPF	M5	±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M136	HX	HPF	M1	±5%=±12%	-30C/-20F	120/277	90/208	0.80/0.35	1.20/0.50	1.05/0.45	128
	M136	HX	HPF	M1	±5%=±12%	-30C/-20F	208	156	0.65	0.55	1.25	185
	M136	HX	HPF	M1	±5%=±12%	-30C/-20F	240	180	0.55	0.90	2.10	185
250	M138	R	NPF		±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M138	R	HPF	M5	±5%=±12%	-30C/-20F	277	190	0.70	0.45	1.05	118
	M138	HX	HPF	M1	±5%=±12%	-30C/-20F	120/277	90/208	0.95/0.42	1.60/0.70	3.65/1.58	185
	M138	HX	HPF	M1	±5%=±12%	-30C/-20F	208	156	0.55	0.90	2.10	185
	M138	HX	HPF	M1	±5%=±12%	-30C/-20F	240	180	0.50	0.80	1.80	185

HIGH INTENSITY DISCHARGE/METAL HALIDE BALLAST DATA												
WATTAGE	ANSI CODE	BALLAST	POWER FACTOR	WIRING DIAGRAM	REGULATION LINEV-LAMPW	MINIMUM STARTING AMBIENT	PRIMARY VOLTAGE	DROPOUT VOLTAGE	STARTING CURRENT	OPERATING CURRENT	OPEN CIRCUIT CURRENT	INPUT WATTAGE
320	M132	SCWA	HPF	M7	±10%±10%	-40C/-40F	120	65	2.10	3.25	2.30	368
	M132	SCWA	HPF	M7	±10%±10%	-40C/-40F	208	115	1.20	1.90	1.15	368
	M132	SCWA	HPF	M7	±10%±10%	-40C/-40F	240	130	1.05	1.65	2.30	368
	M132	SCWA	HPF	M7	±10%±10%	-40C/-40F	277	150	0.90	1.40	1.00	368
	M132	SCWA	HPF	M7	±10%±10%	-40C/-40F	347	173	0.70	1.10	1.30	370
350	M131	SCWA	HPF	M7	±10%±10%	-40C/-40F	480	280	0.45	0.85	1.00	368
	M131	SCWA	HPF	M7	±10%±10%	-40C/-40F	120	70	2.40	3.40	2.20	400
	M131	SCWA	HPF	M7	±10%±10%	-40C/-40F	208	120	1.40	2.00	1.30	400
	M131	SCWA	HPF	M7	±10%±10%	-40C/-40F	240	140	1.20	1.70	1.10	400
	M131	SCWA	HPF	M7	±10%±10%	-40C/-40F	277	160	1.05	1.50	1.00	400
400	M131	SCWA	HPF	M7	±10%±10%	-40C/-40F	347	190	0.85	1.20	1.30	400
	M131	SCWA	HPF	M7	±10%±10%	-40C/-40F	480	240	0.60	0.90	1.00	400
	M59	CWA	HPF	M2	±10%±10%	-30C/-20F	120	60	3.50	4.00	3.00	458
	M59	CWA	HPF	M2	±10%±10%	-30C/-20F	208	104	2.00	2.30	1.75	458
	M59	CWA	HPF	M2	±10%±10%	-30C/-20F	240	120	1.75	2.00	1.50	458
	M59	CWA	HPF	M2	±10%±10%	-30C/-20F	277	138	1.50	1.75	1.30	458
	M59	CWA	HPF	M2	±10%±10%	-30C/-20F	347	175	1.20	1.40	1.35	460
	M59	CWA	HPF	M2	±10%±10%	-30C/-20F	480	240	0.90	1.00	0.90	462
	M59	CWI	HPF	M3	±10%±10%	-30C/-20F	120	60	1.30	4.20	4.10	465
	M59	CWI	HPF	M3	±10%±10%	-30C/-20F	208	104	0.75	2.45	2.40	465
	M59	CWI	HPF	M3	±10%±10%	-30C/-20F	240	120	0.65	2.10	2.05	465
	M59	CWI	HPF	M3	±10%±10%	-30C/-20F	277	138	0.60	1.70	1.80	462
	M59	CWI	HPF	M3	±10%±10%	-30C/-20F	347	174	0.50	1.35	1.45	462
	M59	CWI	HPF	M3	±10%±10%	-30C/-20F	480	165	0.38	1.00	1.05	465
	M135	SCWA	HPF	M7	±10%±10%	-40C/-40F	120	60	2.85	3.90	3.05	454
	M135	SCWA	HPF	M7	±10%±10%	-40C/-40F	208	105	1.65	2.25	1.85	454
	M135	SCWA	HPF	M7	±10%±10%	-40C/-40F	240	125	1.45	1.95	1.55	454
	M135	SCWA	HPF	M7	±10%±10%	-40C/-40F	277	140	1.25	1.70	1.40	454
	M135	SCWA	HPF	M7	±10%±10%	-40C/-40F	347	174	1.10	1.35	1.40	454
	M135	SCWA	HPF	M7	±10%±10%	-40C/-40F	480	280	0.75	1.00	0.95	454
M135	SCWI	HPF	M4	±10%±10%	-40C/-40F	120	60	1.30	4.20	3.80	455	
M135	SCWI	HPF	M4	±10%±10%	-40C/-40F	208	104	0.75	2.40	2.20	455	
M135	SCWI	HPF	M4	±10%±10%	-40C/-40F	240	120	0.65	2.10	1.90	455	
M135	RLB	HPF	M6	±10%±3%	-40C/-40F	120	65	1.85	3.95	2.40	465	
M135	RLB	HPF	M6	±10%±3%	-40C/-40F	208	113	1.10	2.30	1.40	465	
M135	RLB	HPF	M6	±10%±3%	-40C/-40F	240	130	0.95	2.00	1.20	465	
M135	RLB	HPF	M6	±10%±3%	-40C/-40F	277	150	0.70	1.72	1.25	465	
M135	RLB	HPF	M6	±10%±3%	-40C/-40F	347	185	0.55	1.35	0.90	467	
M135	RLB	HPF	M6	±10%±3%	-40C/-40F	480	250	0.40	1.00	0.70	465	
450	M144	SCWA	HPF	M7	±10%±10%	-40C/-40F	120	75	3.20	4.40	3.76	510
	M144	SCWA	HPF	M7	±10%±10%	-40C/-40F	208	130	1.80	2.60	2.26	510
	M144	SCWA	HPF	M7	±10%±10%	-40C/-40F	240	150	1.60	2.20	1.90	510
	M144	SCWA	HPF	M7	±10%±10%	-40C/-40F	277	170	1.40	1.90	1.71	510
	M144	SCWA	HPF	M7	±10%±10%	-40C/-40F	347	220	1.10	1.50	0.90	505
750	M144	RLB	HPF	M6	±10%±3%	-40C/-40F	480	270	0.80	1.12	1.40	514
	M149	SCWA	HPF	M7	±10%±10%	-40C/-40F	277	110	0.70	2.00	1.25	530
	M149	SCWA	HPF	M7	±10%±10%	-40C/-40F	120	70	5.20	7.10	5.15	825
	M149	SCWA	HPF	M7	±10%±10%	-40C/-40F	208	125	3.05	4.10	2.95	825
	M149	SCWA	HPF	M7	±10%±10%	-40C/-40F	240	145	2.35	3.55	2.55	825
1000	M149	SCWA	HPF	M7	±10%±10%	-40C/-40F	277	165	2.25	3.10	2.20	825
	M149	SCWA	HPF	M7	±10%±10%	-40C/-40F	347	230	1.80	2.50	1.70	820
	M149	SCWA	HPF	M7	±10%±10%	-40C/-40F	480	310	1.40	1.80	1.10	822
	M47	CWA	HPF	M2	±10%±10%	-30C/-20F	120	84	7.80	9.00	5.65	1080
	M47	CWA	HPF	M2	±10%±10%	-30C/-20F	208	146	4.00	5.20	3.25	1080
	M47	CWA	HPF	M2	±10%±10%	-30C/-20F	240	168	3.70	4.50	2.80	1080
	M47	CWA	HPF	M2	±10%±10%	-30C/-20F	277	194	3.20	3.90	2.45	1080
	M47	CWA	HPF	M2	±10%±10%	-30C/-20F	347	243	2.50	3.20	1.80	1080
	M47	CWA	HPF	M2	±10%±10%	-30C/-20F	480	336	1.90	2.30	1.55	1080
	M47	CWI	HPF	M3	±10%±10%	-30C/-20F	208	125	1.65	5.30	3.25	1080
	M47	CWI	HPF	M3	±10%±10%	-30C/-20F	240	145	1.30	4.80	3.20	1080
	M141	SCWA	HPF	M7	±10%±10%	-30C/-20F	120	84	7.80	9.00	5.65	1080
1500	M141	SCWA	HPF	M7	±10%±10%	-30C/-20F	208	146	4.00	5.20	3.25	1080
	M141	SCWA	HPF	M7	±10%±10%	-30C/-20F	240	168	3.70	4.50	2.80	1080
	M141	SCWA	HPF	M7	±10%±10%	-30C/-20F	277	194	3.20	3.90	2.45	1080
	M141	SCWA	HPF	M7	±10%±10%	-30C/-20F	347	230	2.25	3.20	1.75	1075
	M141	SCWA	HPF	M7	±10%±10%	-30C/-20F	480	320	1.65	2.35	1.30	1080
	M48	CWA	HPF	M2	±10%±10%	-30C/-20F	120	80	6.35	14.30	9.40	1615
	M48	CWA	HPF	M2	±10%±10%	-30C/-20F	208	140	3.65	8.30	5.40	1615
	M48	CWA	HPF	M2	±10%±10%	-30C/-20F	240	160	3.20	7.20	4.70	1615
1500	M48	CWA	HPF	M2	±10%±10%	-30C/-20F	277	185	2.75	6.20	4.05	1615
	M48	CWA	HPF	M2	±10%±10%	-30C/-20F	347	230	4.60	4.80	1.70	1615
	M48	CWA	HPF	M2	±10%±10%	-30C/-20F	480	320	2.00	3.50	2.30	1625

Important Indoor Metal Halide Fixture Information

Lithonia Lighting only accepts orders for indoor metal halide products that can use either ANSI Type-E (enclosed) or ANSI Type-S (suitable) rated lamps if those fixtures also have a tempered glass lens. This means all indoor metal halide products with open reflectors or with

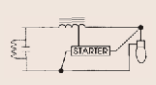
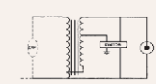

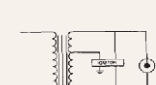

acrylic or polycarbonate lenses are only available with protected (pink) sockets. Though occurrence of non-passive lamp rupture events is infrequent relative to the large installed base of open and plastic-lensed fixtures, and can be minimized by following the lamp manufacturers'

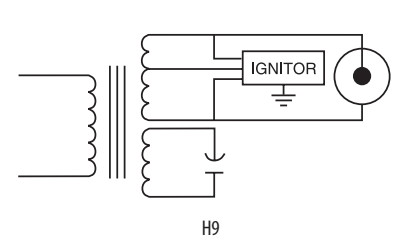
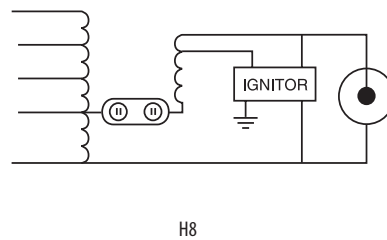
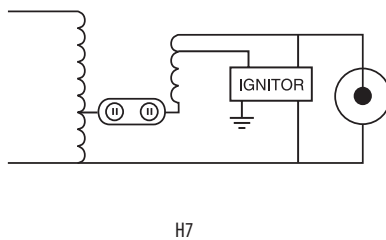
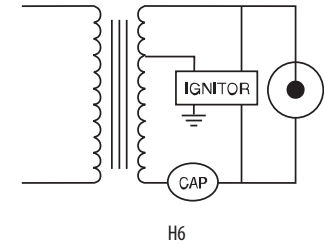
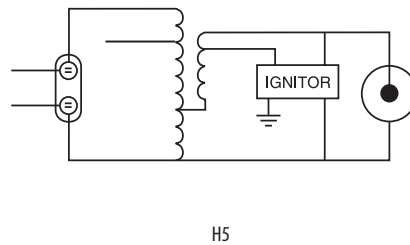
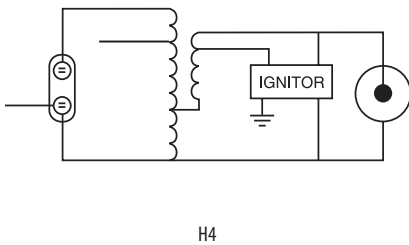
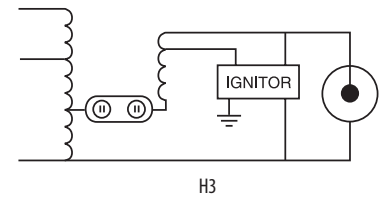
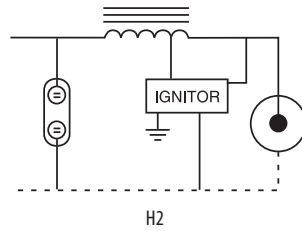
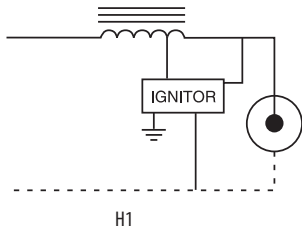
instructions, Lithonia Lighting recommends only two alternatives for indoor metal halide fixtures, including those currently installed:

1. Use a product with a tempered glass lens.
2. Use an open-rated lamp.

HIGH PRESSURE SODIUM

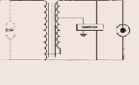
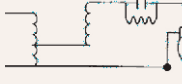

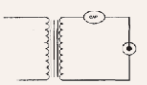
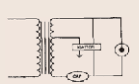
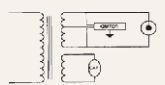
Ballast Circuit Data

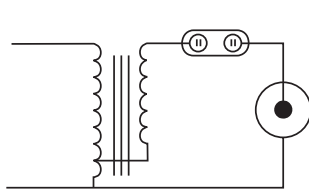
BALLAST	AVAILABLE INPUT WATTAGE & VOLTAGE	MAXIMUM INPUT CURRENT	POWER FACTOR	REGULATION (+/- INPUT VOLTAGE = +/- LAMP WATTAGE)	INPUT WATTS LOSS	CREST FACTOR	
	Reactor	50W, 70W, 100W, 150W; 120V only	Higher than operating	50% NPF Standard 90% + HPF Optional	+/-5% = +/-12%	Low	1.4 to 1.5
	High-Reactance Autotransformer	50W; 120V or 277V 70W, 100W, 150W; 120V, 277V, or 347V	Higher than operating	90% + HPF	+/-5% = +/-12%	Medium	1.5
	Constant Wattage Autotransformer (CWA)	70W, 100W, 150W; 120V or 277V 200W, 250W, 310W, 400W, 600W, 750W, 1000W; 120V, 277V, or 347V	Operating	90% + HPF	+/-10% = +/-10%	Medium to High	1.7 to 1.8
	Constant Wattage Isolated (CWI)	70W, 100W, 150W, 250W, 400W; 120V, 208V or 240V	Operating	90% + HPF	+/-10% = +/-10%	Medium to High	1.7 to 1.8
	Magnetic Regulator (MRB)	70W; 120V or 240V 100W, 150W, 250W, 400W; 120V, 240V, 277V or 480V 200W, 310W; 120V or 480V	Operating	90% + HPF	+/-10% = +/-10%	High	1.7 to 1.8



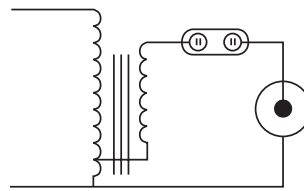
METAL HALIDE

Ballast Circuit Data

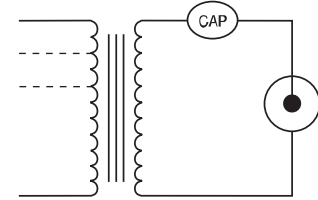
BALLAST	AVAILABLE INPUT WATTAGE & VOLTAGE	MAXIMUM INPUT CURRENT	POWER FACTOR	REGULATION (+/- INPUT VOLTAGE = +/- LAMP WATTAGE)	INPUT WATTS LOSS	CREST FACTOR
 High-Reactance Autotransformer (Pulse Start)	50W; 120V or 277V 70W, 100W, 150W; 120V, 277V, or 347V	Higher than operating	90% + HPF	+/-5% = +/-12%	Medium	1.5
 Constant Wattage Autotransformer (CWA)	175W, 250W, 400W, 1000W; 120V, 277V, or 347V	Operating	90% + HPF	+/-10% = +/-10%	Medium to High	1.7 to 1.8
 Super Constant Wattage Autotransformer (SCWA) (Pulse Start)	100W, 120V, or 177V 150W; 120V, 277V or 347V 175W; 120V, or 347V 200W, 250W, 320W, 350W, 400W, 450W; 120V, 277V, or 347V	Operating	90% + HPF	+/-10% = +/-10%	Medium to High	1.6
 Constant Wattage Isolated (CWI)	250W; 120V, 208V, or 240V 400W; 120V, 208V, 240V, 277V, or 347V 1000W; 208V or 240V	Operating	90% + HPF	+/-10% = +/-10%	Medium to High	1.7 to 1.8
 Super Constant Wattage Isolated (SCWI) (Pulse Start)	400W; 120V, 208V, or 240V	Operating	90% + HPF	+/-10% = +/-10%	Medium to High	1.6
 Regulated Lag (RLB) (Pulse Start)	175W; 120V, 277V, 347V or 480V 200W, 450W; 277V only 250W, 400W; 120V, 240V, 277V, 347V or 480V	Operating	90% + HPF	+/-10% = +/-10%	High	1.6



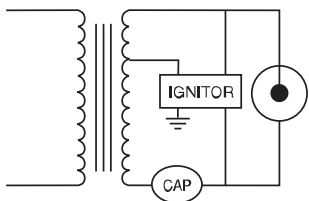
M1



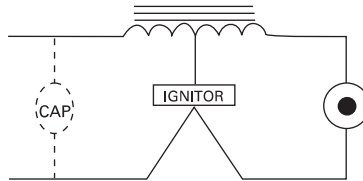
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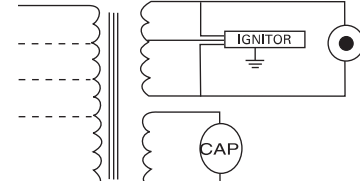
M3



M4



M5



M6

Notes

Undergrounded power distribution systems may carry transient line voltages under fault conditions. Because high transients can cause premature ballast and lamp failures, it is not recommended that luminaires be operated on any 480V or other ungrounded systems.

The ballast serves for basic functions:

- 1 Transforms the line voltage to the required lamp operating voltage.
- 2 Limits the lamp operating current.
- 3 Provides the open-circuit starting voltage characteristics required to start the lamp.
- 4 Regulates the lamp wattage for a variation in power supply input voltage.

For M7 Super CWA Pulse Start Circuit Diagram, see H7 HPS Circuit Diagram.

Ingress Protection

The IEC (International Electrotechnical Commission) uses the term "International Protection" or IP to define the environmental protection of an enclosure. This is described in IEC Standard 529. The IP rating system designates, by means of a two-digit number, the degree of

protection against ingress of dust and moisture. The first digit defines the level of protection against solid objects, while the second digit defines the level of protection against moisture. The higher the digit, the greater is the level of protection.

FIRST DIGIT: DEGREE OF PROTECTION AGAINST SOLID OBJECTS	SECOND DIGIT: DEGREE OF PROTECTION AGAINST WATER
0 Non-protected	0 Non-protected
1 Protected against a solid object greater than 50mm such as a hand	1 Protected against water dripping vertically
2 Protected against a solid object greater than 12mm such as a finger	2 Protected against dripping water when incident up to 15° from vertical
3 Protected against a solid object greater than 2.5mm such as a wire or a tool	3 Protected against water spraying at an angle of up to 60°
4 Protected against a solid object greater than 1.0mm such as a wire or thin strip	4 Protected against water splashing from any direction
5 Dust-protected. Prevents ingress of dust sufficient to cause harm	5 Protected against jets of water from any direction
6 Dust-tight. No dust ingress.	6 Protected against heavy seas or powerful jets in harmful quantities
	7 Protected against harmful ingress of water when immersed between a depth of 150mm and 1 meter
	8 Protected against submersion. Suitable for continuous immersion in water

Protection Against Moisture

UL and CSA define several levels of protection against moisture damage to a luminaire. These definitions describe the space in which the luminaire is intended to operate without damage to the electrical or mechanical components from the environment. These definitions cover pure water protection only, not damage protection from acidic or alkaline conditions.

Dry Location – A location not normally subject to dampness, but may include a location subject to temporary dampness as in the case of a building under construction, provided that ventilation is adequate to prevent an accumulation of moisture.

Damp Location – An exterior or interior location that is normally or periodically subject to condensation of moisture in, on, or adjacent to electrical equipment, and includes partially protected locations.

Wet Location – A location in which water may drip, splash, or flow on or against electrical equipment. A wet location fixture is constructed so that water cannot enter or accumulate in the wireway, lampholders or other electrical parts. Wet location does not mean *hosedown*. A rating for low-pressure (100psi) or high-pressure (200psi) hosedown is an additional option.

Hazardous Areas

Hazardous areas are locations where atmospheres may be exposed to the release of flammable dusts, vapors or gases in explosive concentrations. The National Electrical Code requires that these areas be classified and sets rules for the types of luminaires that may be installed in them. Luminaires are typed in Article 500 of the NEC as Class I, Class II and Class III locations.

All electrical equipment must be tested and listed (or approved) by class, division and group for use in each respective area. The hazardous materials defined in each of these classifications are:

Class I, Flammable gases or vapors; Class II, Combustible dust and Class III, Combustible fibers or flyings. Each class is subdivided into two divisions depending on the likelihood that the hazard will be present. Division 1 applies to an area where the hazardous condition would normally exist, while Division 2 applies to an area where there is a potential for the hazardous condition to exist.

Each classification also is subdivided by groups representing the types of gas or dust that will or might be present. Gases fall into Groups A, B, C or D. Dusts fall into Groups E, F or G. There is no group subdivision for fibers or flyings.

Environmental Constraints

Lighting equipment must be chosen from the listing for the class, group and division of the hazardous material present in the areas where they are to be used. Improper application of a luminaire can result in fire or explosion, which could cause serious injury or death to the occupants. Classification of these areas within a plant must be made prior to selection of the light source and luminaire type.

CLASS	DIVISION	GROUP
I GAS	1. Area where gases or vapors are normally present	A. Acetylene
	2. Area where gases or vapors are handled or stored but are normally confined	B. Hydrogen C. Ethyl ether, etc. D. Gasoline, natural gas, etc.
II DUST	1. Area where combustible dust is always present	E. Metal dust
	2. Area where combustible dust may be present	F. Carbon black, coal dust, etc. G. Flour or grain
III FIBERS	1. Production areas 2. Handling or storage areas	Atmospheres containing wood, textile or synthetic fibers

Food Processing

Sanitation is a critical part of the food processing industry. Because of this, a thorough cleaning and sanitizing program must be incorporated into the food production process. High-pressure wash-down with hot water and/or sanitation chemicals may approach 1000-psi nozzle pressure. Lighting fixtures must be designed and manufactured so as not to leak, corrode, harbor bacteria, or cause fires or electrical problems. Lamps must be protected so if they break, glass or other materials shall not contaminate the food production area.

The National Sanitation Foundation (NSF) is a not-for-profit, independent, third-party certifier of products and systems for conformity with consensus and official regulations and specifications, industry standards, and product-specific test protocols. NSF requires that all materials, which could come in contact with food products, meet the stringent requirements of the Federal Food, Drug, and Cosmetic Act (FDA). In order to determine its suitability for use in food processing and food handling areas, the equipment and the manufacturer must pass a stringent series of tests. NSF performs all tests in their own laboratories.

Lighting equipment falls under the NSF C-2 listing procedure (Special Equipment and/or devices). The C-2 procedure has protocols that analyze the physical design of, the specific properties of each substance used in the manufacture of, and the fabrication of the fixture. In addition, NSF investigates the reliability of the manufacturer and the manufacturing process as it relates to the listed product.

There are three certifiable locations for equipment used in food processing.: Non-food Zone, Splash Zone and Food Zone. Only the first two are applicable to lighting fixtures. These zones are defined in the following NSF table:

NSF CERTIFICATION	DESCRIPTION OF LOCATION/USE AND COMMENTARY	TYPICAL LIGHTING APPLICATIONS
NON-FOOD ZONE	Areas where direct contact with food products during normal operations would not be expected. Equipment is located outside the normal wash-down area. There is a concern that the fixture will add contamination to the protected space or food product (i.e. cleanability – will the finish withstand cleaning, chipping paint, deteriorating paints or finishes, lens impact resistance, lamp glass breakage, etc.)	Kitchens; food storage; dry process areas; damp process areas – no drip possibility.
SPLASH ZONE	Areas where direct contact with food products during normal operations would not be expected; however, the fixture may be situated such that liquids used in the processing or cleaning procedures, may splash, spill or otherwise soil – either intentionally or inadvertently – the surface of the fixture. Then there is the potential for dripping or draining onto other surfaces or even the process. Since these fixtures often are used in wash-down areas, a wet-location listing is not sufficient. Fixtures must be tested to withstand high-pressure hose wash-down. The concerns of non-food zone also apply.	Wet or damp process areas; high pressure purging or decontamination used in the process; area using hose wash-down.
FOOD ZONE	Areas where direct contact with food products is normally expected and surfaces from which the food may drip, drain, or splash back onto surfaces normally in contact with food. Equipment other than lighting fixtures typically require this certification (i.e. work tables, cutting boards, other direct contact equipment).	Category not typically used for lighting.

Cleanrooms

A cleanroom is a room in which the concentration of airborne particles is controlled to specified limits. These particles can be in the form of dust, spores, vapors, skin flakes, hair fragments etc. If present in a sensitive environment, they can destroy or severely alter products being manufactured. To keep contamination to a minimum, a cleanroom must be designed and constructed according to very strict guidelines, and the lighting fixtures selected need to maintain the integrity of the space.

Cleanrooms are classified according to the number and size of particles found in a given cubic measure of space. Particle limits are set forth by Federal Standard 209E and, more recently, by ISO standards 14644-1 and 14644-2. Because these ISO standards are international

in scope and are directly impacted by ISO 9000 and ISO 14000 certification criteria, they often are accepted as replacing Federal Standard 209E classes. Both of these standards refer to the maximum allowable number of particles of a given diameter per cubic area of measure, but differ in describing both the size particle and the area of concentration. Also different under each system are procedures for testing and measuring these environments, both initially and for ongoing conformance.

In order to achieve a Class 1 or Class 10 (Federal Standard 209E) or ISO Class 3 or Class 4 level, laminar airflow design is incorporated into the cleanroom. Laminar airflow moves all air in a vertical or a horizontal pattern through the space. With vertical airflow, the entire

ceiling system consists of high-efficiency particulate air (HEPA) filters or ultra-low penetration air (ULPA) filters, which screen out 99.995% and 99.999% of the particles respectively. All incoming purified air moves in a vertical pattern through the ceiling, down to a raised, ducted floor, and back up through the outer walls. With horizontal laminar flow, the same principle is used with a horizontal pattern and filtered walls.

As the process in the cleanroom becomes less critical, greater quantities of particles may be present in the air without causing problems in the manufacturing process. Thus, the class of the cleanroom may be higher. Federal Standard 209E will determine the class of cleanroom required for the activity to be performed.

ISO Classification

Selected ISO airborne particulate cleanliness classes for cleanrooms and clean zones.

CLASSIFICATION NUMBER	MAXIMUM CONCENTRATION LIMITS (PARTICLES/M ³ OF AIR) FOR PARTICLES EQUAL TO AND LARGER THAN THE CONSIDERED SIZES BELOW					
	0.1 MICRONS	0.2 MICRONS	0.3 MICRONS	0.5 MICRONS	1.0 MICRONS	5.0 MICRONS
ISO 1	10	2	—	—	—	—
ISO 2	100	24	10	4	—	—
ISO 3	1,000	237	102	35	8	—
ISO 4	10,000	2,370	1,020	352	53	—
ISO 5	100,000	23,700	10,200	3,520	832	29
ISO 6	1,000,000	237,000	102,000	35,200	8,320	293
ISO 7	—	—	—	352,000	83,200	2,930
ISO 8	—	—	—	3,520,000	832,000	29,300
ISO 9	—	—	—	35,200,000	8,320,000	293,000

Federal Standard 209E

CLEANROOM CLASS		AIRBORNE PARTICLE SIZE/LIMITS									
		0.1 MICRONS		0.2 MICRONS		0.3 MICRONS		0.5 MICRONS		5.0 MICRONS	
English	SI	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)	(ft)	(m)
1	M1.5	35	1,240	7.5	265	3	106	1	35	—	—
10	M2.5	350	12,400	75	2,650	30	1,060	10	353	—	—
100	M3.5	—	—	750	26,500	300	10,600	100	3,530	—	—
1,000	M4.5	—	—	—	—	—	—	1,000	35,300	7	247
10,000	M5.5	—	—	—	—	—	—	10,000	353,000	70	2,470
100,000	M6.5	—	—	—	—	—	—	100,000	3,530,000	700	24,700

ACRYLIC ENVIRONMENTAL COMPATIBILITY

Not Acceptable

Certain chemicals that may exist in end-user locations release airborne contaminants that can impact the integrity and safety of key fixture components that contain acrylic material. Immediate damage may occur such as crazing, cracking, permeation losses and mechanical failure. Products with visually noticeable deterioration have diminished integrity and must be replaced immediately with a more suitable product for the application.

The following tables identify the most common chemicals and is not intended to be all-inclusive. Exposure to compounds identified as "Not Acceptable" will void all warranties associated with the product. Acrylic components should not be used in areas where these chemicals are used and where these chemicals become mists or airborne vapors. Ensure that chemical interactions are considered when selecting fixtures. For additional information please consult an authorized factory representative.

NOT ACCEPTABLE		
Acetaldehyde, 100%	Cloves	Methyl Naphthalene
Acetates	Coffee	Methyl Salicylate
Acetic Acid, Glacial, 100%	Cosmoline Removers	Methylamine
Acetic Anhydride	Cresol	Methylene Dichloride
Acetone	Cyclohexane	Mineral Oil
Acetonitrile	Cyclohexanone	Motor Fuel Mixture, with Benzene
Acetophenone	Cyclohexene	Nail Polish
Acrylic paints	Detergent Solution	Naphtha
Alcohol, Allyl	Diacetone Alcohol	n-butyrac Acid, 100%
Alcohol, Amyl	Diamyl Phthalate	Nitric Acid, 40%
Alcohol, Benzyl	Dibutyl Sebacate	Nitric Acid, 70%
Alcohol, Ethyl, 100%	Diethyl Ether	Nitrobenzene
Alcohol, Ethyl, 50%	Dimethyl Formamide	n-Octane
Alcohol, Isopropyl, 100%	Dioctyl Sebacate	Paint Removers
Alcohol, Methyl, 10%	Dioxane	Paint Thinner
Alcohol, Methyl, 100%	Ether	Perchloroethylene
Alcohol, Methyl, 50%	Ethyl Acetate	Petroleum Ether (100-120C)
Alcohol, n-butyl	Ethyl Alcohol, Concentrated	Phenois
Amyl Acetate	Ethyl Bromide	Phenol, Aqueous, 5%
Aniline	Ethyl Butyrate	Phosphoric Acid, 95% @ 20C
Aviation Fuel (100 Octane)	Ethylene Bromide	Phthalates
Bathroom Cleaners	Ethylene Dibromide	Pyridine
Benzaldehyde	Ethylene Oxide (Moist)	Soap Solution
Benzene	Glass Cleaners	Sodium Carbonate, 2%
Benzoic Aldehyde	Glycol	Sodium Carbonate, 20%
Brake Fluid	Hydrogen Peroxide, 28%	Sodium Phosphate
Bromine Gas	Hydrogen Peroxide, 3%	Sulfur Dioxide, Liquid
Butanol	Iron Perchloride	Sulfuric Acid, 98%
Butraldehyde	Isoctane	Sulfurous Acid, Concentrated
Butyl Acetyl Ricinoleate	Isopropyl alcohol	Tea
Butyl Stearate	Lacquer Thinner	Tincture of Iodine, 5%
Carbolic Acid	Lactic Acid Butyl Ester	Toluene
Carbon Disulfide	Mercury Chloride	Transformer Oil
Carbon Disulfide	Meta-Cresol	Trichloroethane
Cellulose Paints	Methanol, 15%	Trichloroacetic Acid
Chlorinated Hydrocarbons	Methanol, Concentrated	Trichloroethylene
Chlorinated Solvents	Methyl Benzoate	Turpentine
Chlorine Gas	Methyl Chloride	Unleaded Gasoline
Chlorophenol	Methyl Cyclohexanol	Vegetable Oil
Chromic Acid, 40%	Methyl Ethyl Ketone	Xylene

ACRYLIC ENVIRONMENTAL COMPATIBILITY

Acceptable

ACCEPTABLE		
2-Ethylhexyl Sebacate	Glycerol	Potassium Dichromate, 10%
Acetic Acid, 5%	Heptane	Potassium Hydroxide @ 20C
Ammonia-based Cleaners	Hexane	Potassium Permanganate
Ammonia Gas	Hydrochloric Acid, 38%	Potassium Sulfite
Ammonium Hydroxide, 28%	Kerosene	Power Steering Fluid
Ammonium Nitrate	Lactic Acid	Propylene
Ammonium Phosphate	Metal Carbonates	Pure-oil Paints
Aniseed, Bay leaves, Nutmeg	Metal Chlorides	Silicone Oil
Anti-freeze	Metal Sulfates	Silver Nitrate
Beer	Methane gas	Soap Suds
Bleaching Powder Paste	Milk	Soda
Bleaching Powder Solution, 2%	Milk, Chocolate	Sodium Chloride, 10%
Calcium Hypochlorite	Motor Fuel Mixture, without Benzene	Sodium Cyanide
Car Wash Detergent	Motor Oil	Sodium Fluoride
Carbon Dioxide Gas	Natural Gas	Sodium Hydroxide, 60%
Carbon Monoxide Gas	Nitric Acid, 10%	Sodium Nitrate
Caustic Potash	Nitrogen Dioxide Gas	Sodium Thiosulphate, 40%
Chlorine Based Cleaners	Nitrogen Monoxide Gas	Stearic Acid
Chlorine, Aqueous, 2%	Olefric Carbolic Acids	Sulfur Dioxide, Dry Gas
Citric Acid, 10%	Oleic Acid	Sulfuric Acid, 30%
Coffee	Olive Oil	Sulfurous Acid, 5%
Cooking Oil	Oxalic Acid, 100%	Tararic Acid, 50%
Cottonseed Oil	Oxygen Gas	Transmission Fluid
Diethylene Glycol	Ozone Gas	Tricresyl Phosphate
Epoxy Adhesives	Paraffin, Medicinal	Triethyl Amine
Ethyl Alcohol, 15%	Pepper, Cinnamon, Onions	Vinegar
Ethylene Glycol E	Phosphoric Acid, 10% @ 20C	Water, Mineral Water
Ethylene Oxide (Dry)	Photographic Baths	Wax Polish
Ferric Chloride, Aqueous, 10%	Polishing Compounds	White Spirit
Formaldehyde, Aqueous, 40%	Potassium Chlorate	Whitewash
Fruit Juice	Potassium Cyanide	Wine

The statements, technical information and recommendations obtained herein are believed to be accurate as of June 1, 2009. Since the conditions and methods of use of the product and of the information referred to herein are beyond our control, Acuity Brands Lighting expressly disclaims any and all liability. NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE GOODS DESCRIBED OR THE INFORMATION PROVIDED HEREIN. The user should thoroughly test any application before commercialization.

Rating is based on visual appearance at ambient temperature 68°F, 50% humidity.

Consult factory where applicable.

All technical information is believed to be accurate as of June 1, 2009.

ARCHITECTURAL COLORS

Lithonia Lighting has expanded its Architectural Color offering. With over 200 colors to choose from, you are sure to find a color that will fit your aesthetic criteria. This broad selection offers both smooth and textured finishes.

Current powder coating technology provides polyester-based compound combining the flexibility, impact resistance and corrosion protection of epoxies with the weather resiliency normally associated with brittle acrylics. Series 49 RAL colors are weather resistant TGIC polyester powder coatings. The finish is smooth glossy with an 80-90+ gloss level. Series 38 or other RAL finishes such as mattes or metallics will be considered custom-blended colors.

Additionally, Lithonia Lighting can match any custom color to a sample paint chip. A sample of the custom-blended finish will be provided by Lithonia for final approval. Lead times for these colors will be extended due to the custom match and approval process.






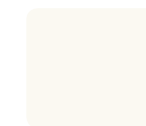

New, enhanced ordering logic now applies to architectural colors. To specify any of the colors indicated in this chart, simply add the Lithonia Lighting nomenclature or RAL number (i.e. RAL 3016) to your fixture nomenclature.



LITHONIA STANDARD COLORS

Notes

These colors were reproduced to give a representative sample of finished product color. Some colors, however, may vary slightly from actual appearance due to printing variations and limitations. Please always contact a Lithonia Lighting representative for an accurate paint chip sample.

 DBLG RAL 7016 Anthracite Grey	 PQU	 DBLH RAL 7021 Black Grey	 PQV	 DBNF RAL 7022 Umbrage Grey	 PTT	 DMCN RAL 7023 Concrete Grey	 PUQ	 DSPD TEXTURED Dark Grey	 P77	 DBLJ RAL 7024 Graphite Grey	 PQW	 DGC LITHONIA Charcoal Gray	 P32	 DBLK RAL 7026 Granite Grey	 POX
 DBNK RAL 7030 Stone Grey	 PBL	 DMCP RAL 7031 Blue Grey	 PUR	 DCRN RAL 7032 Pebble Grey	 PGE	 DMCQ RAL 7033 Cement Grey	 PUS	 DCRP RAL 7034 Yellow Grey	 PWC	 DGYL RAL 7035 Light Grey	 PGH	 DNA LITHONIA Natural Aluminum	 P07	 DGYB RAL 7036 Platinum Grey	 PSX
 DMCR RAL 7037 Dusty Grey	 PFU	 DMCS RAL 7038 Agate Grey	 PUT	 DBNL RAL 7039 Quartz Grey	 PTW	 DGYG RAL 7040 Window Grey	 PTE	 DSPA RAL 7042 Traffic Grey A	 PUR	 DCGL RAL 7043 Traffic Grey	 PE7	 DCRH RAL 7044 Silk Grey	 PRU	 DCPS RAL 7045 Telegrey 1	 PC6
 DCPT RAL 7046 Telegrey 2	 PC7	 DCGJ RAL 7047 Telegrey 4	 PLZ	 DBNN RAL 8000 Green Brown	 PQC	 DBNP RAL 8001 Ochre Brown	 PNX	 DBNQ RAL 8002 Signal Brown	 PQJ	 DBNR RAL 8003 Clay Brown	 PQK	 DBNS RAL 8004 Copper Brown	 PNL	 DSPF TEXTURED Rust	 P79
 DBNT RAL 8007 Fawn Brown	 PQL	 DBNU RAL 8008 Olive Brown	 PQM	 DBNV RAL 8011 Nut Brown	 PQN	 DBNW RAL 8012 Red Brown	 PQP	 DBNE RAL 8014 Sepia Brown	 PTS	 DBNM RAL 8015 Chestnut Brown	 PTX	 DBNX RAL 8016 Mahogany Brown	 PQQ	 DBNB RAL 8017 Chocolate Brown	 PTN
 DBLL RAL 8019 Grey Brown	 PQY	 DBNH TEXTURED Bronze	 P74	 DDB LITHONIA Dark Bronze	 P50	 DBLM RAL 8022 Black Brown	 PQZ	 DMCT RAL 8023 Orange Brown	 PUU	 DMCU RAL 8024 Beige Brown	 PUV	 DMB LITHONIA Medium Bronze	 P11	 DMCV RAL 8025 Pale Brown	 PUW
 DMCW RAL 8028 Terra Brown	 PUX	 DCRB RAL 9001 Cream	 PRM	 DWHD RAL 9002 Grey White	 PRD	 DCRK RAL 9003 Signal White	 PWK	 DBLC RAL 9004 Signal Black	 PQR	 DBLA RAL 9005 Jet Black	 PTY	 DCRJ RAL 9010 Pure White	 PZG	 DWH LITHONIA White	 P21
 DBLD RAL 9011 Graphite Black	 PNT	 DBL LITHONIA Black	 P13	 DCRW RAL 9016 Traffic White	 PWB	 DBLE RAL 9017 Traffic Black	 PQS	 DCRL RAL 9018 Papyrus White	 PGQ						

LITHONIA STANDARD COLORS

															
DCRT RAL 1000 Green Beige	PWP	DCRU RAL 1001 Beige	PWQ	DCRV RAL 1002 Sand Yellow	PWR	DYLC RAL 1003 Signal Yellow	PFS	DYLD RAL 1004 Golden Yellow	PWY	DYLE RAL 1005 Honey Yellow	PWW	DYLF RAL 1006 Maize Yellow	PWX	DYLA RAL 1007 Daffodil Yellow	PRW
															
DCRW RAL 1011 Brown Beige	PWS	DYLG RAL 1012 Lemon Yellow	PWY	DSRG RAL 1013 Oyster White	PWS	DSS LITHONIA Sandstone	P12	DCRX RAL 1014 Ivory	PWT	DCRH RAL 1015 Light Ivory	PWU	DY LH RAL 1016 Suifer Yellow	PWZ	DORB RAL 1017 Saffron Yellow	PXC
															
DYLL RAL 1032 Broom Yellow	PXR	DORD RAL 1033 Dahlia Yellow	PXE	DORE RAL 1034 Pastel Yellow	PXF	DORK RAL 1037 Sun Yellow	PCS	DORF RAL 2000 Yellow Orange	PXG	DRDF RAL 2001 Red Orange	PXQ	DRDG RAL 3002 Vermillion	PXR	DORH RAL 2003 Pastel Orange	PXJ
															
DRDH RAL 2004 Pure Orange	PFD	DORJ RAL 2008 Bright Red Orange	PXK	DORG RAL 2009 Traffic Orange	PC1	DORT RAL 2010 Signal Orange	PXL	DORL RAL 2011 Deep Orange	PXM	DORM RAL 2012 Salmon Orange	PXU	DRDB RAL 3000 Flame Red	PSG	DRDC RAL 3001 Signal Red	PFY
															
DBRW RAL 3002 Carmine Red	PC3	DRDJ RAL 3003 Ruby Red	PXS	DBR LITHONIA Bright Red	P34	DSPH TEXTURED Light Red	P80	DRDK RAL 3004 Purple Red	PPS	DRDD RAL 3005 Wine Red	PEY	DRDE RAL 3007 Black Red	PSE	DRDL RAL 3009 Oxide Red	PGB
															
DRDM RAL 3011 Brown Red	PFL	DRND RAL 3012 Beige Red	PXT	DRDP RAL 3013 Tomato Red	PXU	DRDQ RAL 3014 Antique Pink	PXV	DRDR RAL 3015 Light Pink	PXW	DRDS RAL 3016 Coral Red	PQD	DRDT RAL 3017 Rose	PQE	DRDU RAL 3018 Strawberry Red	PQF
															
DORN RAL 3020 Traffic Red	PXP	DRDV RAL 3022 Salmon Pink	PXV	DRDW RAL 3027 Raspberry Red	PQG	DRDX RAL 3031 Orient Red	PQH	DSPG TEXTURED Dark Red	P81	DPUC RAL 4001 Red Lilac	PUY	DPUD RAL 4002 Red Violet	PVZ	DPUE RAL 4003 Heather Violet	PVA
															
DPUA RAL 4004 Claret Violet	PMD	DPUF RAL 4005 Blue Lilac	PUA	DPUJ RAL 4006 Traffic Purple	PUD	DPUB RAL 4007 Purple Violet	PME	DPUG RAL 4008 Signal Violet	PUB	DPUH RAL 4009 Pastel Violet	PUC	DBRX RAL 4010 Telemagenta	PC4	DBUE RAL 5000 Violet Blue	PCH

LITHONIA STANDARD COLORS

DBUF RAL 5001 Green Blue	PX1 DBUG RAL 5002 Ultramarine Blue	PSL DBUA RAL 5003 Sapphire Blue	PXZ DBUH RAL 5004 Black Blue	PLD DBUJ RAL 5005 Signal Blue	PYA DBUK RAL 5007 Brilliant Blue	PVB DBUL RAL 5008 Grey Blue	PYC DBUM RAL 5009 Azure Blue
PSM DBUB RAL 5010 Gentian Blue	PD2 DBUN RAL 5011 Steel Blue	PD3 DBUP RAL 5012 Light Blue	PD4 DBUQ RAL 5013 Cobalt Blue	PSQ DBUR RAL 5014 Pigeon Blue	PBQ DBUS RAL 5015 Sky Blue	PMC DBUV RAL 5017 Traffic Blue	PZ DGRJ RAL 5018 Turquoise Blue
PSP DBUD RAL 5019 Capri Blue	PKZ DGRL RAL 5020 Ocean Blue	PGK DGRK RAL 5021 Water Blue	PD5 DBUT RAL 5022 Night Blue	PC9 DDBB RAL 5023 Distant Blue	PML DBUU RAL 5024 Pastel Blue	PGG DGRD RAL 6000 Patina Green	PD6 DGRM RAL 6001 Emerald Green
PMW DGRN RAL 6002 Leaf Green	PLH DGRP RAL 6003 Olive Green	PGL DGRF RAL 6004 Blue Green	PC8 DGYR RAL 6005 Moss Green	PD7 DGRQ RAL 6006 Gray Green	P33 DTG LITHONIA Tennis Green	PD8 DGRR RAL 6007 Bottle Green	PD9 DGRS RAL 6008 Brown Green
P78 DSPE TEXTURED Green	PKA DGRG RAL 6009 Fir Green	PE1 DGRT RAL 6010 Grass Green	PE2 DGRU RAL 6011 Reseda Green	PKM DGRH RAL 6012 Black Green	PE3 DGRV RAL 6013 Reed Green	PVG DGRW RAL 6014 Yellow Olive	PE4 DGRX RAL 6015 Black Olive
PPF DMCA RAL 6016 Turquoise Green	PUE DMCB RAL 6017 May Green	PUF DMCC RAL 6018 Yellow Green	PUG DMCD RAL 6019 Pastel Green	PUH DMCE RAL 6020 Chrome Green	PFW DGRC RAL 6021 Pale Green	PNV DMCF RAL 6022 Olive Drab	PUJ DMCG RAL 6024 Traffic Green
PUK DMCH RAL 6025 Fern Green	PUL DMCJ RAL 6026 Opal Green	PUM DMCK RAL 6027 Light Green	PGW DGRE RAL 6028 Pine Green	PUN DMCL RAL 6029 Mint Green	PUP DMCM RAL 6032 Signal Green	PD1 DGAN RAL 6033 Mint Turquoise	PVH DBUW RAL 6034 Pastel Turquoise
PNG DGYN RAL 7000 Squirrel Grey	P76 DSPJ TEXTURED Light Gray	PGR DGYM RAL 7001 Silver Grey	PE5 DGYP RAL 7002 Olive Grey	PE6 DGYQ RAL 7003 Moss Grey	PGX DCGK RAL 7004 Signal Grey	PSZ DGYC RAL 7005 Mouse Grey	PC2 DGY5 RAL 7006 Beige Grey
PAJ DGYT RAL 7008 Khaki Grey	PTR DBND RAL 7009 Green Grey	PYZ DGYU RAL 7010 Tarpaulin Grey	PQA DGYV RAL 7011 Iron Grey	PPV DGYW RAL 7012 Basalt Grey	PQB DGYX RAL 7013 Brown Grey	PQT DBLF RAL 7015 Slate Grey	P49 DSB LITHONIA Steel Blue

LITHONIA STANDARD COLORS