BARBIZON
LIGHTING COMPANY

Systems, Products, and Services
for Entertainment and Architecture

ELECTRICIAN'S HANDBOOK

Version 7.2
www.barbizon.com

Before You Continue

As a courtesy to our customers, we are providing to you this guide as a reference. However, please note that we cannot guarantee the accuracy and completeness of all information contained herein, and we accept no responsibility regarding any information contained herein which may be incorrect.

Barbizon has produced this book for the sole purpose of making the lives of technicians a little easier and efficient. We are continually updating and refining the contents, if you think something needs to be corrected, amended, or added, send an email to:

inquiry@barbizon.com

*A special note of thanks to **Roy Bickel** for his feedback and suggestions for additions and updates.*

Electrical Terms & Definitions

Unit	Symbol	Definition
Volt	V	The pressure required to force one ampere through a resistance of one ohm.
Ampere (Amp)	A	The electric current that will flow through one ohm under a pressure of one volt.
Ohm	R	The resistance through which one volt will force one ampere.
Hertz	Hz	Frequency in cycles / second.
Watt	W	One joule X per second.
Horsepower	hp	745.6999 watts.
Mired Shift		A value used in changing color temperature of a light.

Recommended Extension Cord Wire Gauge

	Rated Load (in amps)											
Length	2	3	4	5	6	8	10	12	14	16	18	20
25'	18	18	18	18	18	18	18	16	16	16	14	14
50'	18	18	18	18	16	16	14	14	12	12	12	12
100'	18	16	16	14	14	12	12	10	10	10	8	8
150'	16	14	14	12	12	10	10	8	8	8	6	6
200'	16	14	12	12	10	10	8	8	6	6	6	6
	Gauge											

Wiring Code

US	Positive	Black, Red, Blue
	Ground	Green
	Neutral	White
International	Positive	Brown
	Ground	Green/Yellow
	Neutral	Blue

Inches

Centimeters

Wire and Cable Abbreviations

S	Service (600V)
O	Oil-Resistant Jacket
OO	Oil-Resistant & Oil Resistant Conductors

W	Weather Resistant Jacket
J	Junior Hard Services (300V)
T	Thermoplastic
P	Parallel

S	Heavy-duty, rubber-insulated portable cord. Stranded copper conductors with separator and individual rubber insulation. Two or more color-coded conductors cabled with filler, wrapped with separator and rubber jacketed overall. 600V
SO	Hard-service cord, same construction as Type S, except oil resistant carolprene jacket. 600V, 60°C to 90°C
SOO	Same as SO, but inner conductor insulation as well as the outer jacket is oil-resistant
SOOW	Same as SOO, but also weather-, water- and sunlight-(UV) resistant
SJ	SJ has an all rubber construction, remains flexible at low temperatures, and is designed for indoor use with portable tools, equipment and motors. 300V
SJO	Same as SJ, but carolprene, oil-resistant compound outer jacket. Can also be made water-resistant. 300V, 60°C.
SJOO	Same as SJO but inner conductor insulation as well as the outer jacket is oil-resistant.
SJOOW	Same as SJOO but also water- and weather-resistant.
SPT-1&2	PVC insulated, extra flexible parallel cord for use in household appliances, including clocks, fans, radios, and most often, SPT-2 in lamps, also known as Zip Cord

ENTERTAINMENT CABLE

TYPE SC - Stage & Lighting Cable
Type C is a “UL designation for stage cable”
600 VOLTS · 105°C · 35°C

Applications
Portable power and lighting applications in the entertainment industry including motion picture, television, theatres, stage and similar locations.

STAGE CABLE TYPES SOOW & SJOOW

Synthetic Rubber Insulation with Oil-Resistant Thermoset Jacket SOOW 90°C

Applications
Type SOOW 90°C Designed for extra hard usage with industrial equipment, heavy tools, battery chargers, portable lights and power extensions. SOOW is sunlight, water, oil and weather resistant and suitable for outdoor applications in the United States and in Canada.

Type SJOOW 90° C Designed for hard usage with portable tools, small motors and power extensions. Type SJOOW is sunlight, water, oil and weather resistant and suitable for outdoor applications in the United States and in Canada.
600V · SJOOW 90°C (300V)

Typical Cable Assy Weights (in LBS)*

Cable Assembly Type	Cable Lenth (in FT)											Devices	Weight (in LBS/EA)**			Weight**	
	3	5	6	10	15	25	50	75	100	125	150		Conn.	Plug	Pnl Mnt	Cable Type	LBS/FT
DMX, 3-PIN	0.25	0.35		0.52	0.72	1.08	2.00	2.45	3.85			NC3FXX-B / NC3MXX-B	0.10	0.10		22/5 DMXPL	0.04
DMX, 5-PIN	0.25	0.35		0.52	0.72	1.08	2.00	2.45	3.85			NC5FXX-B / NC5MXX-B	0.10	0.10		22/5 DMXPL	0.04
Ethernet/Network	0.15	0.40		0.65	0.80	1.45	3.17		5.95			TDS8PCS / TDS8CVR-BK	N/A	0.05		7924A	0.03
powerCON		0.80		1.60	2.30	3.75	7.15	10.65	15.20			NAC3FCA / NAC3FCB	0.08	0.08		12/3 SJOOW	0.13
powerCON TRUE1		0.80		1.60	2.30	3.75	7.15	10.65	15.20			NAC3FX-W / NAC3MX-W	0.10	0.10		12/3 SJOOW	0.13
15A Edison		0.95		1.70	2.25	3.75	7.10		15.55			X515C / X515P	0.10	0.10		12/3 SJOOW	0.13
20A Edison		0.95		1.70	2.25	3.75	7.10		15.55			X520C / X520P	0.10	0.10		12/3 SJOOW	0.13
L520		1.20		1.95	2.50	4.00	7.35		15.80			HBL2313 / HBL2311	0.25	0.25		12/3 SJOOW	0.13
L620		1.20		1.95	2.50	4.00	7.35		15.80			HBL2323 / HBL2321	0.35	0.35		12/3 SJOOW	0.13
20A Stage Pin		1.55		2.70	3.75	5.95	11.20		22.75			2P20G-F / 2P20G-M	0.20	0.25		12/3 SOOW	0.23
60A Stage Pin		1.55		2.70	3.75	5.95	11.20		22.75			G60F / G60M	0.70	0.90		6 SC	0.15
100A Stage Pin		1.55		2.70	3.75	5.95	11.20		22.75			G100F / G100M	1.40	1.65		6 SC / 4 SC	0.15 / 0.21
19-Pin 6 Circuit 12/14				6.55	9.15	14.00	27.00	40.00	53.00	67.30	79.10	LSC19-LFC-29 / LSC19-LMC-29	0.65	0.65		12/14 TPR	0.53
19-Pin 6 Circuit 12/18						18.00	37.00	55.00	73.00	91.00		LSC19-LFC-36 / LSC19-LMC-36	0.80	0.80		12/18 TPR	0.69
Motor Cable							12.80		19.40		28.75	7PM-MCFL / 7PF-MCFL	0.35	0.25		16/7 SOW-A	0.19
4/0 W Single Conductor Feeder				15.50		20.30	40.00		80.00			16D33 / 16D24	0.75	0.80	0.55	4/0 W	0.93
2/0 Single Conductor Feeder		3.70		6.20		13.10	26.20		52.50			16D33 / 16D24	0.75	0.80	0.55	2/0 SC	0.51
#2 Single Conductor Feeder							14.00		29.05			CLS20FB / CLS20MB	0.75	0.80		2 SC	0.25
#2 x 5-Wire Feeder Set							77.60					16D33 / 16D24	0.75	0.80		2 SC	0.25
PE6/4- CS (California Style) 50A						17.00	33.20	63.55				HBLCS6364C / HBLCS6365C	1.00	1.15		6/4 SOOW	0.83
PE125-L2120 Extension						9.35	17.65	33.70				HBL2513 / HBL2511	0.25	0.25		12/5 SOOW	0.33
PE105-L2130 Extension		2.80		5.50		11.15	21.05	32.40	44.15		62.35	HBL2813 / HBL2811	0.35	0.35		10/5 SOOW	0.47

* = Table represents typical assemblies with industry standard cables and connectors, actual product weights may vary depending upon manufacturer.
** = Table represents information as detailed in manufacturer data materials

Information Courtesy of LEX

Typical Cable Assy Weights, Con't*

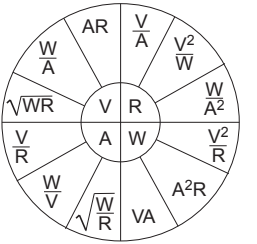
Cable Assembly Type	Cable Length (in FT)											Devices	Weight (in LBS/EA) **			Weight **	
	3	5	6	10	15	25	50	75	100	125	150		Conn.	Plug	Pnl Mnt	Cable Type	LBS/FT
TwoFer Stage Pin	1.55											2P20G-F / 2P20G-M	0.20	0.25		3123J	0.90
Twofer Edison	1.35											X515C / X515P	0.10	0.10		3123J	0.90
TwoFer L520	1.80											HBL2313 / HBL2311	0.25	0.25		3123J	0.90
TwoFer L620	1.80											HBL2323 / HBL2321	0.35	0.35		3123J	0.90
19-Pin Break In - Stage Pin	4.25		6.95									LSC19-LFC-36 / 2P20G-M	0.80	0.25		12/3 SJOOW	0.13
19-Pin Break Out - Stage Pin	4.25		6.95									2P20G-F / LSC19-LMC-36	0.20	0.80		12/3 SJOOW	0.13
19-Pin Break In - Edison	4.05		6.55									LSC19-LFC-36 / X515P	0.80	0.10		12/3 SJOOW	0.13
19-Pin Break Out - Edison	4.05		6.55									X515C / LSC19-LMC-36	0.10	0.80		12/3 SJOOW	0.13
19-Pin Break In - L520	5.00		7.60									LSC19-LFC-36 / HBL2311	0.80	0.25		12/3 SJOOW	0.13
19-Pin Break Out - L520	5.00		7.60									HBL2313 / LSC19-LMC-36	0.25	0.80		12/3 SJOOW	0.13
19-Pin Break In - L620	5.00		7.60									LSC19-LFC-36 / HBL2321	0.80	0.35		12/3 SJOOW	0.13
19-Pin Break Out - L620	5.00		7.60									HBL2323 / LSC19-LMC-36	0.35	0.80		12/3 SJOOW	0.13

* = Table represents typical assemblies with industry standard cables and connectors, actual product weights may vary depending upon manufacturer.

** = Table represents information as detailed in manufacturer data materials

Information Courtesy of LEX

Electric Formulas Wheel



V = Volts (Electro Magnetic Force)

R = Ohms (Resistance)

A = Amps (Intensity)

W = Watts (Power)

Electricity can be lethal. Please use this book as a reference. Always review local codes and laws.

Power Formula:
West **V**irgini**a** Formula
Watts = **V**olts x **A**mps

HMI Instrument Chart

Description	Ballast Load
200 HMI	5 amps
575 HMI	7 amps
1200 HMI	12 amps
2500 HMI	25 amps
4000 HMI	38 amps
6000 HMI	65 amps
12000 HMI	70 amps
18000 HMI	90 amps

Common Connectors

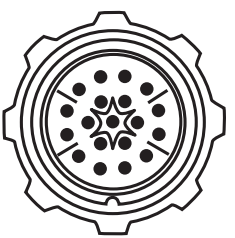
Edison 15 Amp
2 Pole, 3 Wire, 120v
Standard for residential/commercial
5-15R (socket), 5-15P (plug)

Edison 20 Amp
2 Pole, 3 Wire, 120v
Heavy-Duty tools
6-20R (socket), 6-20P (plug)

Stage Pin 20 Amp
2 Pole, 3 Wire, 120v
Standard for stage use

Twist-Lock New Style
2 Pole, 3 Wire, 120v, 20 Amp
Standard for stage use
L5-20C (socket), L5-20P (plug)

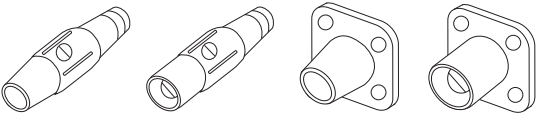
Twist-Lock Old Style
2 Pole, 3 Wire, 120v, 20 Amp
Standard for stage use
7314C (socket), 9965C (plug)



Multicable Extension
12 Pole, 19 Wire, 120v
Standard for multi cable for stage use
LSC19F (socket), LSC19M (plug)

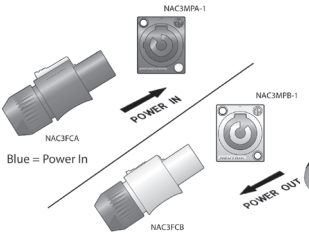
Common Connectors (cont.)

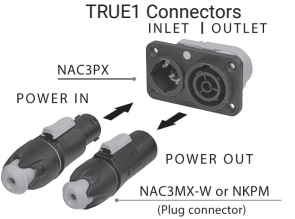
Cam Style Connectors



Socket Connector *Plug Connector* *Socket Panel Mount* *Plug Panel Mount*

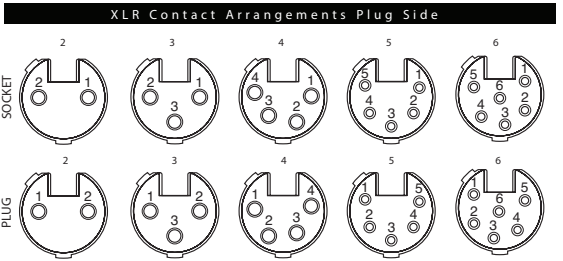
PowerCon Connectors





TRUE1 Connectors are a locking waterproof 16 A true mains connector with breaking capacity (CBC), i.e. it can be connected or disconnected under load or live.

XLR Connectors



2 Pin XLR
Standard use for battery belts
NC2FX (socket), NC2MX (plug)

3 Pin XLR
Standard for LMX & MPX data, Mic
Cable NC3FX (socket), NC3MX (plug)

4 Pin XLR
Standard for accessory data/power
cable NC4FX (socket), NC4MX (plug)

5 Pin XLR
Standard for DMX 512 data cable
NC5FX (socket), NC5MX (plug)

6 Pin XLR
Standard for Remote Focus Unit cable
NC6FXS (socket), NC6MXS (plug)

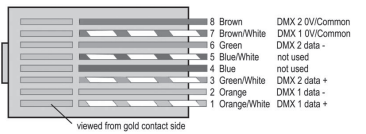
DMX XLR Data Cable Pin-Outs

Pin	Wire	Signal
1	Shield Drain	Ground / 0V
2	Inner Conductor (Black)	Data -
3	Inner Conductor (White)	Data +
4	Inner Conductor (Green)	Data - (Spare)
5	Inner Conductor (Red)	Data + (Spare)

Please be sure you are using the appropriate cable type for your application (portable v. permanent).

For more information on cable types and recommended practices refer to *"Recommended Practice for DMX512: A guide for users and installers, 2nd Edition by Adam Bennette"*

RJ-45
TIA/EIA 568B
DMX pinout
configuration



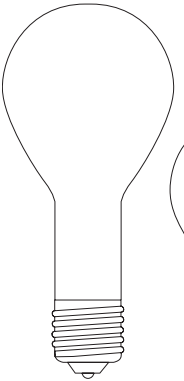
Pin (Wire) #	Wire Color	DMX512 Function	Equiv XLR Pin #
1	white / orange	data 1+	3
2	orange	data 1-	2
3	white / green	data 2+ (optional)	5
6	green	data 2- (optional)	4
4	blue	Not assigned	-
5	white / blue	Not assigned	-
7	white / brown	Common	1
8	brown	Common	1
	drain		

This chart is intended for DMX512 cabling only - NOT DMX-over-Ethernet cabling. Care must be taken to prevent the accidental connection of DMX equipment to non-DMX equipment. The connection of DMX equipment to non-DMX equipment such as Ethernet switches or telephone equipment may result in serious equipment damage and/or personal injury, as pins 4 and 5 may carry voltages of up to 48VDC or greater.

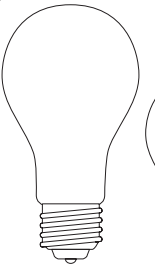
The use of RJ45 connectors for DMX equipment should be restricted to patch bays in access controlled rooms and should not be used for the direct connection of portable equipment.

Please be aware that non-standard pin-outs are also in use (i.e. Color Kinetics).

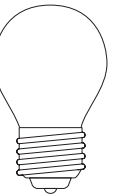
Lamp Shapes



PS
Pear



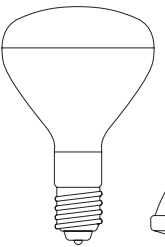
A
Arbitrary



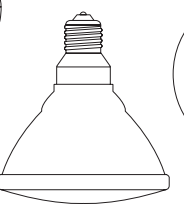
P
Pear

S
Straight

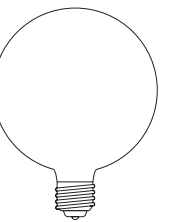
F
Flame



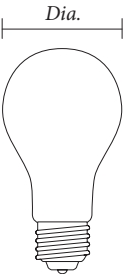
R
Reflector



PAR
Parabolic
Aluminized Reflector



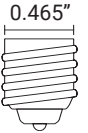
G
Globe



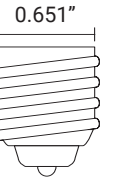
Bulb Size = $\frac{\text{Max Dia. (inches)}}{8}$

eg: Type A21 Lamp
21/8 = 2 5/8” Dia.

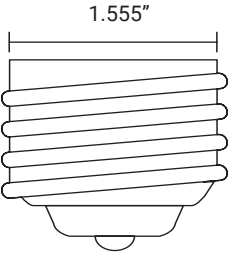
Lamp Bases



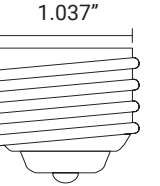
Candelabra
(screwbase)



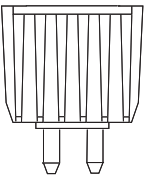
Intermediate
(screwbase)



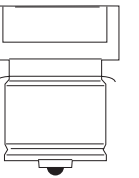
Mogul
(screwbase)



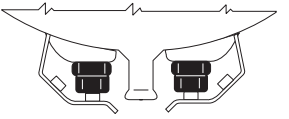
Medium
(edison screwbase)



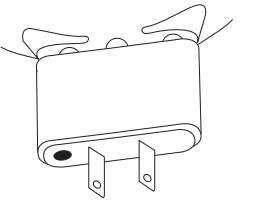
Bi-Pin



Medium Pre-focus



PAR Screw Terminal



PAR Mogul Pin

Color Temperature

Source	Color Temp (K)	MIRED's
Candle Flame or Match	1900	536
Sunlight, Dawn/Dusk	2000-2500	500-400
Household bulb	2800-2900	357-345
Tungsten halogen bulb	3200	312
Photoflood bulb	3400	294
Sunlight, 1 hour after sunrise	3500	286
Sunlight, late afternoon	4500	233
Blue glass photoflood bulb	4800	208
3200 lamp with dichroic filter	4800-5000	208-200
Sunlight, summer	5500-5700	182
HMI light	5600-6000	179 or 167
Sunlight with blue sky	6500	154
Summer, shade	7000	141
Overcast sky	7000	141
Color Television	9300	108
Skylight	10,000-20,000	100-50

Kelvin/Mired Conversion

Kelvin	+0	100	200	300	400	500	600	700	800	900
2000	500	476	455	534	417	400	385	370	357	345
3000	333	323	312	303	294	286	278	270	263	256
4000	250	244	238	233	227	222	217	213	208	204
5000	200	196	192	189	185	182	179	175	172	169
6000	167	164	161	159	156	154	152	149	147	145

The MIRED (micoreciprocal degrees) scale is used to quantify the effect of color correction gels.

To use the above table to find the MIRED value of 5600K, for example, read across on the 5000 row and down the 600 column.

Color Rendering Indexes Explained

The light sources that the various color rendering metrics use as references typically include a black body radiator for color temperatures below 5000K and and standard daylight with an overcast sky above 5000K.

Color (CCT): *Correlated Color Temperature* describes the "warmth" of a white light source. By correlated we mean that the color of the light is visually matched to a blackbody radiator whose Kelvin temperature is adjusted until it matches the test light source to the human eye. When we say tungsten balanced light, we usually mean close to 2900K, while daylight balanced light is around 5600K.

CRI (Ra): The general *Color Rendering Index* indicates, on average, how well the light source renders eight color samples to the human eye (R1 through R8) compared to the reference light source. The maximum value is 100, with 100 meaning the rendering matches the reference.

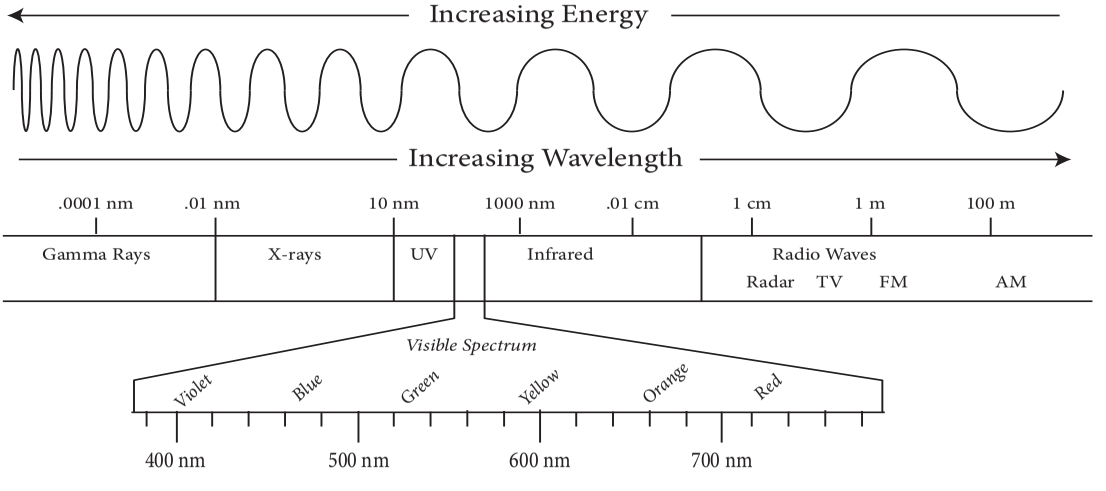
CRI (Re): The *Extended Color Rendering Index* adds six additional colors to the eight used with standard CRI, for a total of 14 colors, R1 through R14. In particular Re includes saturated colors, such as R9 which is a saturated red. The maximum value is 100, with 100 meaning the rendering matches the reference.

TLCI: The *Television Lighting Consistency Index* averages 18 colors from the MacBeth chart (which is now owned by X-Rite and is called the X-Rite ColorChecker) and compares the rendering to that of a standardized camera, rather than the human eye. The maximum value is 100, with 100 indicating that no color adjustment should be needed on camera,

CQS: The *Color Quality Scale* uses 15 color samples that more accurately span the range of normal object colors to determine its value. (The colors used are not the same colors used for CRI (Ra) or CRI (Re) and are, in general, more saturated.) The maximum value is 100, with 100 meaning the rendering matches the reference.

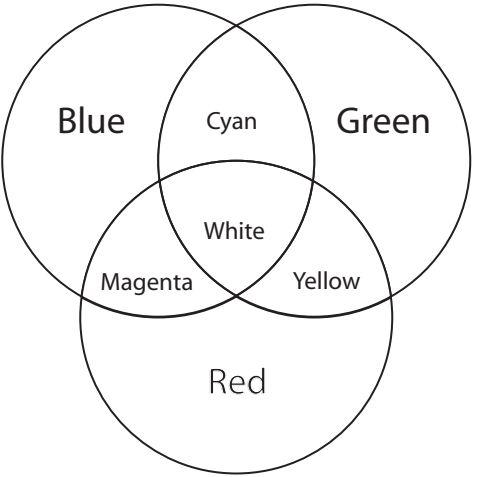
TM-30-15 (Rf and Rg). *TM-30-15* averages together the relative rendering for 99 color samples. When looking at the color vector graphic for a high quality light, the red circle should completely trace the black reference circle. An oblong red trace means the colors are skewed, something that might not be obvious when those values are averaged together to give you a single numerical value. This is why comparing the TM- 30-15 graphics are so important. The green arrows show hue-shifts in that area. Rf measures color fidelity while Rg measures the color gamut.

To simplify what fidelity and gamut are, think of ***fidelity*** *as how accurate the color appears*, while ***gamut*** *is how full or saturated the spectrum is*.

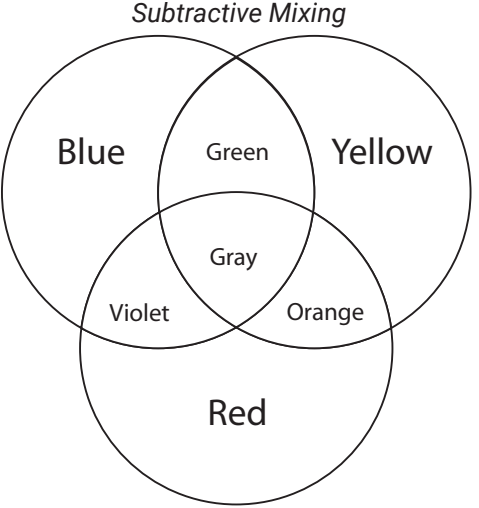

Increasing Energy
Increasing Wavelength
.0001 nm
.01 nm
10 nm
1000 nm
.01 cm
1 cm
1 m
100 m
Gamma Rays
X-rays
UV
Infrared
Radio Waves
Radar
TV
FM
AM
Visible Spectrum
Violet
Blue
Green
Yellow
Orange
Red
400 nm
500 nm
600 nm
700 nm

Color Wheels

Color Mixing in Light
Additive Mixing



Color Mixing in Pigment
Subtractive Mixing



Gel Color Corrections

Convert to Blue

Name		Lee	Gam	Rosco
Xtra CTB	3200˚K to 2600˚K	200	1520	3220
Full CTB	3200˚K to 5700˚K	201	1523	3202
3/4 CTB	3200˚K to 5000˚K	281	1526	3203
1/2 CTB	3200˚K to 4300˚K	202	1529	3204
1/3 CTB	3200˚K to 3800˚K			3206
1/4 CTB	3200˚K to 3600˚K	203	1532	3208
1/8 CTB	3200˚K to 3400˚K	218	1535	3216

Convert to Orange

Name		Lee	Gam	Rosco
Xtra CTO	10,000˚K to 2400˚K		1540	3420
Full CTO	6500˚K to 3200˚K	204	1543	3407
3/4 CTO	6500˚K to 3600˚K	285	1546	3411
1/2 CTO	6500˚K to 3800˚K	205	1549	3408
1/4 CTO	6500˚K to 4600˚K	206	1552	3409
1/8 CTO	6500˚K to 5550˚K	223	1555	3410
Full CTO + .3 ND		207	1556	3405
Full CTO + .6 ND		208	1557	3406

Gel Color Corrections (cont.)

Color Correction

Name	Lee	Gam	Rosco
Full plus Green	244	1585	3304
1/2 plus Green	245	1587	3315
1/4 plus Green	246	1588	3316
1/8 plus Green	278	1589	3317
Full minus Green	247	1580	3308
1/2 minus Green	248	1582	3313
1/4 minus Green	249	1583	3314
1/8 minus Green	279	1584	3318
U.V.	226	1510	3314

Neutral Densities

Name	Lee	Gam	Rosco
.15 ND 1/2 Stop	298	1514	3415
.3 ND 1 Stop	209	1515	3402
.6 ND 2 Stops	210	1516	3403
.9 ND 3 Stops	211	1517	3404
1.2 ND 4 Stops	299	1518	

Color Correction

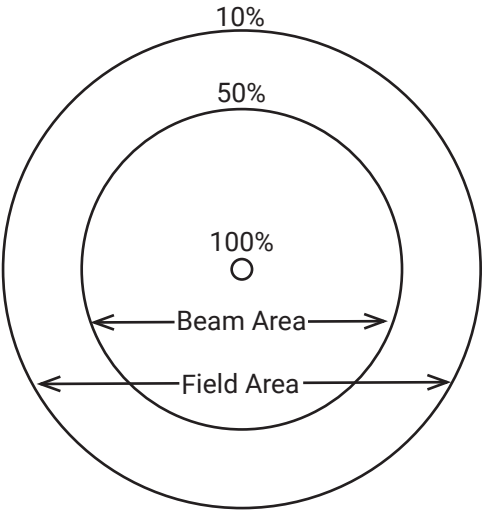
Name	Lee	Gam	Rosco
Full C.T STRAW	441		3441
1/2 C.T STRAW	442		3442
1/4 C.T STRAW	443	4040	3443
1/8 C.T STRAW	444		3444

Diffusion

Name	Lee	Gam	Rosco
White Diffusion	216	55	3026
1/2 White Diffusion	250	1060	3027
1/4 White Diffusion	251	1010	3028
1/8 White Diffusion	252	1040	
Opal	410	1055	3010
Light Opal	420	1030	3020
Spun	214	32	3006
Light 1/2 Spun	215	35	3007
1/4 Spun	229	38	3022
Hampshire Frost	253	1050	
Grid Cloth	430		3030
1/2 Grid Cloth	432		3032
1/4 Grid Cloth	434		3034
Scrim Black/Silver	270		

Beam and Field Areas

Lighting instruments with a reflector radiate a cone shaped beam where the greatest intensity is in the center. The "beam area" is where the light is at least 50% of the maximum. The field area is the entire beam of light or where the intensity is greater than 10%.



Typical Field Angles

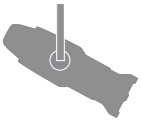
Ellipsoidal Reflector Spotlight (ERS)	Field Angle	Field Diameter (per 1' of Throw)
4-1/2 x 6-1/2	50°	.9326 ft.
6 x 9	36°	.6692 ft.
6 x 12	26°	.4802 ft.
6 x 16	19°	.2989 ft.
6 x 22	10°	.1750 ft.
8 x 8	20°	.3527 ft.
8 x 11	16°	.2811 ft.
8 x 14	10°	.1750 ft.
6" & 8" Fresnels		
Spot Focus	20°	.3527 ft.
Flood Focus	50°	.9326 ft.
Formula: diameter = 2 x (distance x tangent of half of the field angle)		

The table above gives average field angles for commonly used fixtures. Typically, the beam area is 2/3 of the field area.

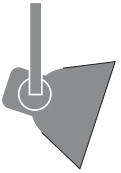
This is a *general rule* of field angles. The field angles and field diameters can vary for different manufactures. For specific fixture field angles, contact your local Barbizon office.

Fixture Guide

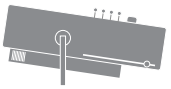
FRESNEL
The fresnel lighting fixture is a lensed instrument with a spherical reflector that provides an even, variable spot-to-flood field. Used commonly in film, video or theatrical applications for general area illumination or as key lights. Average Weight: 6-12 lbs.



ELLIPSOIDAL / PROFILE
Ellipsoidal Reflector Spotlights (ERS) are focusable spotlights with an ellipsoidal reflector, a lens system and shutters for controlling the beam. Designed for pattern projection and creating sharp beam edges, the ellipsoidal is the most commonly used type of instrument in theatrical lighting in the US.
Average Weight: 9-15 lbs.

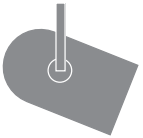


SCOOP
Ellipsoidal Reflector Floodlights (ERF) are commonly known as Scoops and create a very diffuse, soft-edged beam. They can be used in flood or cyclorama lighting for color blending or to create a smooth wash. A filter frame is provided for color media.
Average Weight: 8-13 lbs.

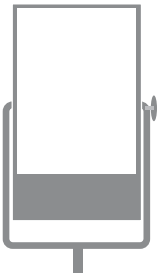


FOLLOWSPOT
Followspot is a generic term used to describe any number of lighting instruments used to highlight performers on stage. A followspot operator moves the followspot to follow the performer or to accent some action or prop, etc. They are sometimes called limes, dating back to the days of limelight. Followspots are generally much brighter than conventional lighting instruments and often use a lamp with a considerably higher color temperature.
Average Weight: 27-120 lbs.

Fixture Guide (cont.)



PAR (Parabolic Aluminized Reflector)
PAR fixtures are a wash light often used for live entertainment applications. These lights are available in various beam spreads: WFL (Wide Flood), MFL (Medium Flood), NSP (Narrow Spot), and VNSP (Very Narrow Spot). HMI PAR fixtures are also available to provide a compact source of daylight when used with an electronic ballast. HMI PAR lamps are ideal for lighting outdoor and indoor sets where daylight illumination is required.
Average Weight: 7-11 lbs.

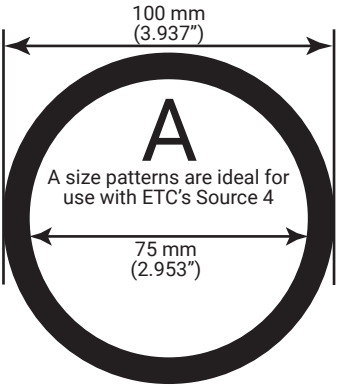


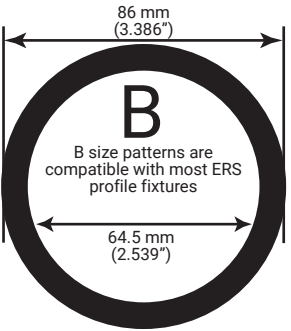
SOFTLIGHT
Softlights provide soft, virtually shadowless light over a large area. They can be used for a soft fill where shadows must be washed out. Accessories are available to modify the light such as scrims, diffusion frames and eggcrates. Fluorescent lighting fixtures, such as Balcar Fluxlites and Quadlites are ideal energy-efficient replacements for traditional tungsten softlights in broadcast applications. With their high color rendering index there are none of the unwanted color temperature problems traditionally associated with fluorescent lighting. Average Weight: 8-16 lbs.

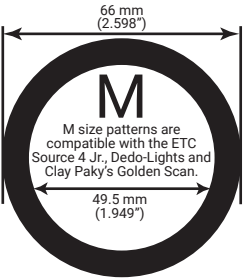
CYC LIGHT
Cyclorama lights are open, non-lensed fixtures used for lighting backdrops. They usually have a double-ended lamp fixed to the center of an asymmetrical reflector and are available in strips or individual fixtures as ground rows or sky cycs.
Average Weight: 16-38 lbs.

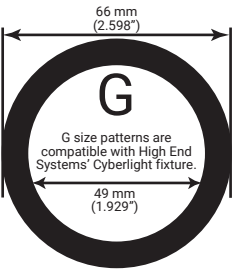
SUN-GUN
Sun-guns are ideal for use in ENG/EFP production or anywhere a highly efficient source of daylight illumination is required. These portable lights usually operate with a 12V or 30V battery belt.
Average Weight: 5-11 lbs.

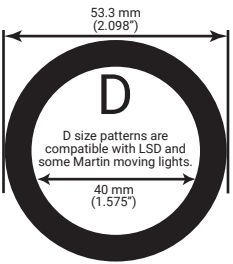
Pattern Sizes

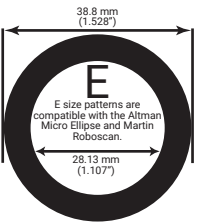












Please note that the patterns shown are not to scale. The fixture compatibility data shown here is not a complete list of all fixtures an individual size will support. Please contact your local Barbizon office for more information.

Weights and Measures

Long Measure

1 mil	.001 inch
12 inches	1 foot
3 feet	1 yard
1 mile	5,280 feet

Metric Equivalents

1 centimeter	.3937 inch
1 inch	2.54 centimeters
1 foot	.3048 meter
1 meter	1.0936 yds.
1 yard	.9144 meter
1 kilometer	.621 mile
1 mile	1.609 kilometers

Weights

1 gram	.03527 ounce
1 ounce	28.35 grams
1 kilogram	2.2046 pounds
1 pound	0.4536 kilograms
1 pound	16 ounces

Other Measure

1 dozen	12 units
1 baker's dozen	13 units
1 gross	12 dozen

Square Measure

1 sq. foot	144 sq. inches
1 sq. yard	9 sq. feet
1 sq. mile	640 acres
43560 sq. feet	1 acre

Liquid Measure

1 pint	4 gills
1 quart	2 pints
1 gallon	4 quarts
1 barrel	31.5 gallons
1 gallon of H_20	8 pounds

Average Weights of Beverages

6-Pack, cans	5 lbs
6-Pack, bottles	8.6 lbs
Keg	140 lbs

Temperature Conversions

Fahrenheit	(1.8 X degrees C) + 32
Celsius	.55556 X (degree F - 32)

Temperature Standards

Celsius		Fahrenheit
-273	Absolute Zero	-459.4
-130	Alcohol Freezes	-202
-78.5	Dry ice sublimes	-109.3
0	Ice Melts	32
8.88	Perfect Beer Temp.	48
37	Temp. of Human Body	98.6
78.5	Alcohol boils	173.3
100	Water boils	212
232	Tin melts	450
327	Lead melts	621
658	Aluminium melts	1216
1530	Iron melts	2786

Conversions

Multiply	By	To get	Converse: * by
Atmospheres	33.90	Feet of water	0.02949
Atmospheres	14.70	Pounds/sq. inch	0.06803
Board feet	144	Cubic inches	0.006944
BTUs	778.26	Foot-pounds	0.001285
Feet	12	Inches	0.0833
Feet	0.3048	Meters	3.281
Feet	0.3333	Yards	3
Footcandles	10.76391	Lux	0.0929
Horsepower	0.7457	Kilowatts	1.3410
Horsepower	745.7	Watts	0.001341
Revolutions/min.	0.01667	Revolutions/sec.	60

Pipe Sizes

Nominal Size	Outside Dia.	Schedule 40 Standard (STD)		Schedule 80 Extra Strong (XS)2	
		Thick	Lbs./Ft.	Thick	Lbs./Ft.
1/8”	.405	.068	.24	.095	.31
1/4”	.540	.99	.42	.119	.54
3/8”	.675	.091	.57	.126	.74
1/2”	.840	.109	.85	.147	1.09
3/4”	1.050	.113	1.13	.154	1.47
1”	1.315	.133	1.68	.179	2.17
1-1/4”	1.660	.140	2.27	.191	3.00
1-1/2”	1.900	.145	2.72	.200	3.63
2”	2.357	.153	3.65	.218	5.02

1. Standard Pipe, when 10” or less in diameter, is the same as Schedule #40

2. Extra Strong Pipe, when 8” or less in diameter, is the same as Schedule #80.

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Is Open
365 Days
8,760 Hours
525,600 Minutes
31,536,000 Seconds
A Year

Truss Loading for 12" x 12" Light Duty Truss*

	Maximum Allowable Uniform Loads						Maximum Allowable Center Point Loads					
	Load Pounds			Max Deflection (in.)			Load Pounds			Max Deflection (in.)		
Span Feet	Thomas	TomCat	TS**	Thomas	TomCat	TS**	Thomas	TomCat	TS**	Thomas	TomCat	TS**
10	6140	4460	3619	.276'	.14"	.111"	4497	2231	1214	0.315"	0.11"	.060"
20	3100	2120	2894	1.10"	.54"	.727"	1550	1063	1158	1.10"	0.44"	.475"
30	1726	1290	1837	2.21"	1.22"	1.636"	864	650	919	2.21"	1.01"	1.336"
40	855	840	933	2.96"	2.16"	2.235"	428	426	467	2.96"	1.85"	1.874"

* Truss connected with grade 8 bolts

** TS = Total Structure

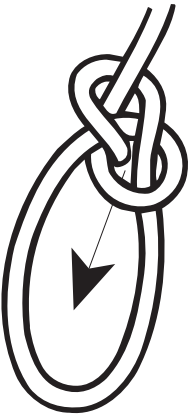
Truss Loading for 20.5” x 20.5” Medium Duty Truss*

	Maximum Allowable Uniform Loads						Maximum Allowable Center Point Loads					
	Load Pounds			Max Deflection (in.)			Load Pounds			Max Deflection (in.)		
Span Feet	Thomas	TomCat	TS**	Thomas	TomCat	TS**	Thomas	TomCat	TS**	Thomas	TomCat	TS**
10	5741	8390	6149	1.06”	0.08”	0.055”	2870	4744	5638	1.06”	0.07”	0.08”
20	5741	4600	5549	1.06”	0.34”	0.401”	2870	2306	2774	1.06”	0.27”	0.322”
30	3715	2910	3600	1.57”	0.76”	0.902”	1858	1464	1800	1.57”	0.62”	0.73”
40	2643	2040	2596	2.44”	1.36”	1.603”	1322	1021	1298	2.44”	1.13”	1.31”

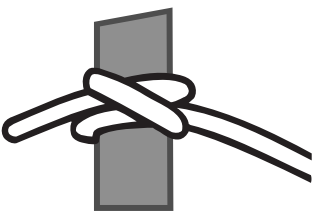
* Truss connected with grade 8 bolts

** TS = Total Structure

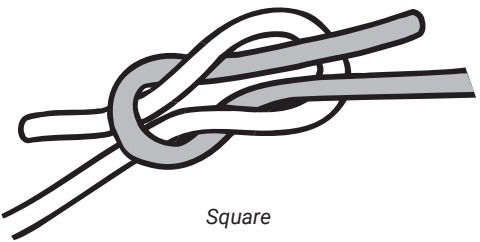
Knots



Bowline



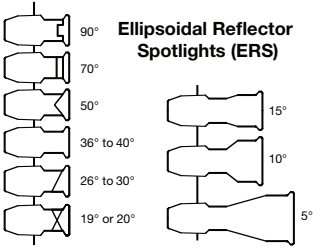
Clove Hitch



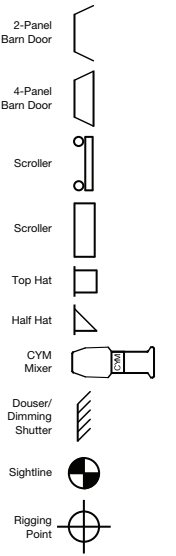
Square

USITT Lighting Symbols

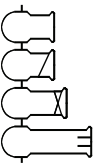
Ellipsoidal Reflector Spotlights (ERS)



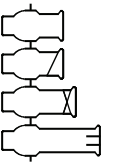
Accessories/ Ancillary Symbols



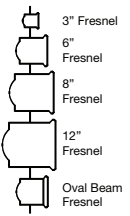
Radials



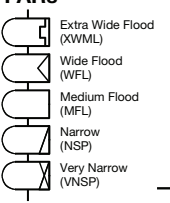
Axials



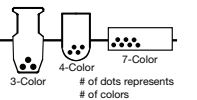
Fresnels



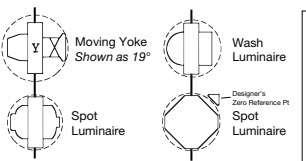
PARs



LED Luminaires



Automated Luminaires



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