

TSRA31 BET

3" Track Spot Luminaire with Regressed Arm

3" Diameter Track spot designed for retail, hospitality and commercial spot lighting applications.

LUMENS / WATTAGE DATA

PART NUMBER	DELIVERED LUMENS*	SYSTEM WATTS	LPW
TSRA31 21L BET	2100	21	100

*Nominal Delivered Lumens

*90CRI has same delivered lumens as original 80CRI version due to use of special trigain phosphor LED diodes

FEATURES

TSRA31 fixture delivers approximately 2100 initial lumens viz precise TIR optics. Available in four distinct beam patterns. Regressed optic produces clean beam with smooth edge and is field interchangeable to other beam angles without tools. Integral flat black baffle reduces peripheral brightness. Sturdy, regressed support arm has positive friction-grip hardware that will not sag, or rotate out of aiming position over time. Clean cylindrical housing has no exposed hardware and can rotate 359 degrees with up to 90 degree aiming from nadir. Integral on/off switch for convenience.

CONSTRUCTION

TSRA31 is constructed of die cast aluminum and fabricated steel and is finished with durable powder coat finish that can be easily cleaned and maintained.

ELECTRONICS

TSRA31 has best in class LED system with 5 MacAdam ellipse binning and 90+ CRI. Integral 120V power supply is dimmable via ELV type dimming protocol control devices (contact factory for more information).

CODE COMPLIANCE

ETL listed for dry location. Manufactured and tested to UL Standards No. 1574.

WARRANTY

5 year warranty standard. L70>60,000 hours.

PROJECT: _____

QUANTITY: _____

TYPE: _____

SPEC
TRAC



PRODUCT SELECTOR GUIDE

SERIES	FAMILY	LUMENS	CCT	BEAM	DIMMING	ADAPTOR	FINISH
TS	RA31	21L			E1	BET	

EXAMPLE

TS	RA31	21L	35HK	MD	E1	BET	MW
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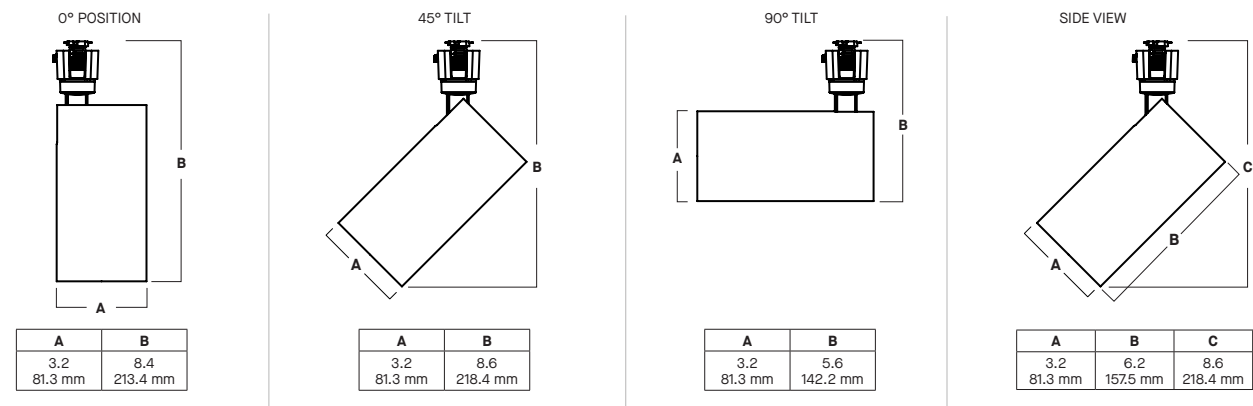
SERIES	FAMILY	LUMENS	CCT	BEAM	DIMMING	ADAPTOR	FINISH
TS	RA31	21L - 2100 Lm	90 CRI	XN - 20° ND - 28° MD - 39° XW - 60°	E1 - Electronic Driver, 120V. ELV / TRIAC Dimming.	BET - Basix 1 CIR/1 NEUT 120V	MW - Matte White MB - Matte Black

GREEN TEXT INDICATES QUICK SHIP OPTIONS

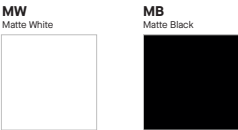


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FIXTURE DIMENSIONS



FINISH

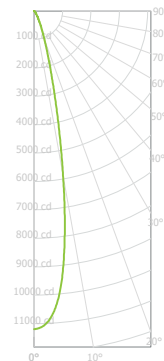


PAINT TIMES

TIER	COST	AVERAGE PAINT TIME*
Tier 1 - Standard Finishes	\$	⌚
Custom Color	Contact Factory	Contact Factory

*CONTACT FACTORY FOR SPECIFIC PRODUCT LEAD TIMES

TS - RA31 - 21L - 35HK - XN - xx - xx - MW

CANDLEPOWER CURVE TEST TSRA31-3	INTENSITY CANDELA 0° AZIMUTH	ZONAL LUMENS	SINGLE UNIT: PERFORMANCE HORIZONTAL FOOTCANDLES INITIAL DOWNLIGHT ONLY	MULTIPLE UNITS: PERFORMANCE 80/50/20% REFLECTANCES HORIZONTAL FOOTCANDLES AND WATTS/SQ FT																																																		
	0.00°	0° - 10° 823 42%	<table><tr><th>Mounting Distance</th><th>FC at Beam Center</th><th>Diameter at Beam Angle</th><th>FC at Beam Edge</th></tr><tr><td>8.0 ' 175 fc</td><td>2.9 ' 83 fc</td></tr><tr><td>10.0 ' 112 fc</td><td>3.6 ' 53 fc</td></tr><tr><td>12.0 ' 78 fc</td><td>4.4 ' 37 fc</td></tr><tr><td>14.0 ' 57 fc</td><td>5.1 ' 27 fc</td></tr><tr><td>16.0 ' 44 fc</td><td>5.8 ' 21 fc</td></tr><tr><td>20.0 ' 28 fc</td><td>7.3 ' 13 fc</td></tr><tr><td>24.0 ' 19 fc</td><td>8.7 ' 9 fc</td></tr><tr><td>28.0 ' 14 fc</td><td>10.2 ' 7 fc</td></tr></table>	Mounting Distance	FC at Beam Center	Diameter at Beam Angle	FC at Beam Edge	8.0 ' 175 fc	2.9 ' 83 fc	10.0 ' 112 fc	3.6 ' 53 fc	12.0 ' 78 fc	4.4 ' 37 fc	14.0 ' 57 fc	5.1 ' 27 fc	16.0 ' 44 fc	5.8 ' 21 fc	20.0 ' 28 fc	7.3 ' 13 fc	24.0 ' 19 fc	8.7 ' 9 fc	28.0 ' 14 fc	10.2 ' 7 fc	<table><tr><th>Ceiling Height</th><th>Fixture Spacing</th><th colspan="2">RCR 4</th><th colspan="2">RCR 6</th></tr><tr><td></td><td></td><th>FC +</th><th>W/Sq. Ft.</th><th>FC +</th><th>W/Sq. Ft.</th></tr><tr><td>14'</td><td>2'</td><td>488</td><td>5.12</td><td>460</td><td>5.16</td></tr><tr><td>18'</td><td>4'</td><td>107</td><td>1.13</td><td>128</td><td>1.44</td></tr><tr><td>22'</td><td>4'</td><td>121</td><td>1.27</td><td>104</td><td>1.17</td></tr></table>	Ceiling Height	Fixture Spacing	RCR 4		RCR 6				FC +	W/Sq. Ft.	FC +	W/Sq. Ft.	14'	2'	488	5.12	460	5.16	18'	4'	107	1.13	128	1.44	22'	4'	121	1.27	104	1.17
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0.00° 11199	0° - 20° 1535 78%	<table><tr><td colspan="2">Delivered Illuminance Rating: (DIR)</td><td colspan="2">95 FC per W/Sq. Ft.</td><td colspan="2">89 FC per W/Sq. Ft.</td></tr></table>	Delivered Illuminance Rating: (DIR)		95 FC per W/Sq. Ft.		89 FC per W/Sq. Ft.																																															
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10.00° 5868	0° - 40° 1863 95%																																																					
15.00° 2409	0° - 60° 1914 97%																																																					
20.00° 1048	0° - 80° 1926 98%																																																					
30.00° 248	0° - 90° 1931 98%																																																					
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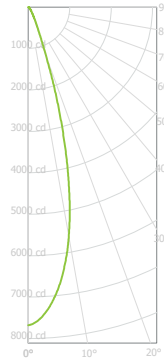
Delivered Lumens: 1963
Luminaire Watts: 20.07
LER: 97.81

CP at 0deg (Nadir): 11199
CRI:

Beam Angle: 20.6
Spacing Ratio: 0.35

Lumen Multiplier:
CCT Multiplier:

TS - RA31 - 21L - 35HK - ND - xx - xx - MW

CANDLEPOWER CURVE TEST TSRA31-2	INTENSITY CANDELA 0° AZIMUTH	ZONAL LUMENS	SINGLE UNIT: PERFORMANCE HORIZONTAL FOOTCANDLES INITIAL DOWNLIGHT ONLY	MULTIPLE UNITS: PERFORMANCE 80/50/20% REFLECTANCES HORIZONTAL FOOTCANDLES AND WATTS/SQ FT										
	0.00°	0° - 10° 634 32%	Mounting Distance	FC at Beam Center	Diameter at Beam Angle	FC at Beam Edge	Ceiling Height	Fixture Spacing	RCR 3		RCR 5			
	0.00° 7679	0° - 20° 1525 78%	8.0 ' 120 fc	4.0 ' 55 fc	14' 4'	125	1.28	125	1.39					
	5.00° 7065	0° - 30° 1763 90%	10.0 ' 77 fc	5.0 ' 35 fc	18' 4'	117	1.20	89	0.99					
	10.00° 5621	0° - 40° 1847 94%	12.0 ' 53 fc	6.0 ' 24 fc	22' 8'	28	0.29	24	0.26					
	15.00° 3353	0° - 60° 1905 97%	14.0 ' 39 fc	7.0 ' 18 fc	Delivered Illuminance Rating: (DIR)		98 FC per W/Sq. Ft.		90 FC per W/Sq. Ft.					
	20.00° 1217	0° - 80° 1918 98%	16.0 ' 30 fc	8.0 ' 14 fc										
	30.00° 229	0° - 90° 1923 98%	20.0 ' 19 fc	10.0 ' 9 fc	2' Suspension Length to luminous aperture Square rooms used for multiple units: RCR 3: Length & Width = Ceiling Ht. - 4.5' x 3.33 RCR 5: Length & Width = Ceiling Ht. - 4.5' x 2.00 * Average Initial Footcandles at 2.5' Above Floor									
	40.00° 81	Total 1956 100%	24.0 ' 13 fc	12.0 ' 6 fc										
	50.00° 35		28.0 ' 10 fc	14.0 ' 4 fc										
	60.00° 11													
	70.00° 4													
	80.00° 4													
	90.00° 4													

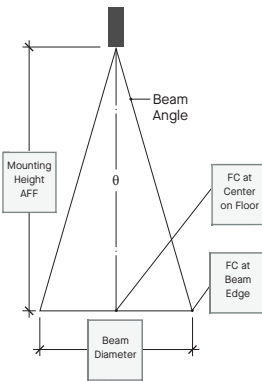
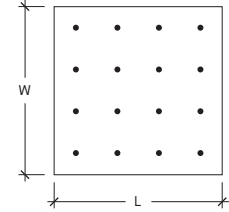
Delivered Lumens: 1956
Luminaire Watts: 20.06
LER: 97.51

CP at 0deg (Nadir): 7679
CRI:

Beam Angle: 28.03
Spacing Ratio: 0.47

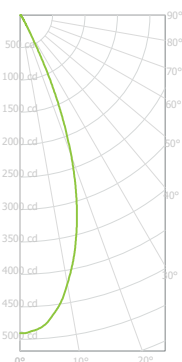
Lumen Multiplier:
CCT Multiplier:

HOW TO USE PERFORMANCE DATA

SINGLE UNIT		MULTIPLE UNITS	
	Cone of Light of a single, symmetrical beam luminaire. Direct initial illumination (FC) and Beam Angle diameter directly beneath fixture; shown at different distances from aperture to horizontal plane. Calculated using Inverse Square Law. $FC_H = CP \times (\cos \theta) \div D^2$ Beam Diam. = $\frac{1}{2}$ Beam Angle (Tan) x 2D • CP Candela at 0° (Nadir) • Cos θ Cosine of θ Angle • D Distance (Mounting Height AFF) • FC_H Footcandles, Horizontal • Beam Angle Cone of light to 50% max. CP • Beam Diam. Pattern of light at Beam Angle	Square grid layout of multiple luminaires in unfurnished, square rooms of different proportions (Room Cavity Ratios) with 80/50/20% room surface reflectances. 2' Suspension Length to aperture. Initial average illumination (FC) calculated at 2.5' above floor, using Zonal Cavity Method. W/Sq. Ft. of layout shown for each ceiling height and RCR. Delivered Illuminance Rating (DIR*): System performance indicator expressed as ratio of approximate initial FC per W/Sq. Ft. delivered to horizontal plane below, for the range of ceiling heights indicated. • To estimate FC for Fixture Spacing that is different than shown (do not exceed Spacing Ratio): $FC = \text{Chart Spacing}^2 \div \text{Different Spacing}^2 \times \text{Chart FC}$ • To estimate Sq. Ft. per fixture for a specific target FC: $\text{Sq. Ft.} / \text{Fixture} = \text{Chart FC} \times \text{Chart Spacing}^2 \div \text{Target FC}$	 To estimate Fixture Quantity in a room: $\text{Fixture Qty.} = \text{Sq. Ft. of Rm.} \div \text{Sq. Ft. per fixture}$ To estimate Watts/Sq. Ft.: $\text{W/Sq. Ft.} = \text{Luminaire Watts} \times \text{Qty.} \div \text{Sq. Ft. of Rm.}$

TS - RA31 - 21L - 35HK - MD - xx - xx -MW

CANDLEPOWER CURVE TEST TSRA31-1



Delivered Lumens: **2015**
Luminaire Watts: **20.23**
LER: **99.60**

INTENSITY CANDELA 0° AZIMUTH

0.00°
0.00° 4901
5.00° 4763
10.00° 4203
15.00° 3376
20.00° 2306
30.00° 266
40.00° 60
50.00° 25
60.00° 9
70.00° 4
80.00° 3
90.00° 5

CP at 0deg (Nadir): **4901**
CRI:

ZONAL LUMENS

0° - 10°	435	22%
0° - 20°	1350	67%
0° - 30°	1850	92%
0° - 40°	1924	95%
0° - 60°	1967	98%
0° - 80°	1978	98%
0° - 90°	1983	98%
Total	2015	100%

SINGLE UNIT: PERFORMANCE HORIZONTAL FOOTCANDLES INITIAL DOWNLIGHT ONLY

Mounting Distance	FC at Beam Center	Diameter at Beam Angle	FC at Beam Edge
8.0'	77 fc	5.6'	32 fc
10.0'	49 fc	7.0'	21 fc
12.0'	34 fc	8.4'	14 fc
14.0'	25 fc	9.8'	10 fc
16.0'	19 fc	11.2'	8 fc
20.0'	12 fc	14.1'	5 fc
24.0'	9 fc	16.9'	4 fc
28.0'	6 fc	19.7'	3 fc

Beam Angle: **38.72**
Spacing Ratio: **0.63**

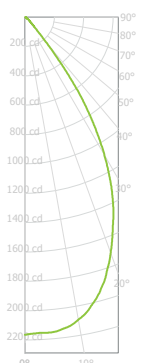
MULTIPLE UNITS: PERFORMANCE 80/50/20% REFLECTANCES HORIZONTAL FOOTCANDLES AND WATTS/SQ FT

Ceiling Height	Fixture Spacing	RCR 3		RCR 5	
		FC +	W/Sq. Ft.	FC +	W/Sq. Ft.
14'	4'	127	1.29	126	1.40
18'	6'	48	0.49	40	0.44
22'	8'	29	0.29	24	0.26
Delivered Illuminance Rating: (DIR)		98 FC per W/Sq. Ft.		90 FC per W/Sq. Ft.	
2' Suspension Length to luminous aperture					
Square rooms used for multiple units:					
RCR 3: Length & Width = Ceiling Ht. - 4.5' x 3.33					
RCR 5: Length & Width = Ceiling Ht. - 4.5' x 2.00					
+ Average Initial Footcandles at 2.5' Above Floor					

Lumen Multiplier:
CCT Multiplier:

TS - RA31 - 21L - 35HK - XW - xx - xx - MW

CANDLEPOWER CURVE TEST TSRA31-4



Delivered Lumens: **1930**
Luminaire Watts: **20.35**
LER: **94.84**

INTENSITY CANDELA 0° AZIMUTH

0.00°
0.00° 2164
5.00° 2155
10.00° 2094
15.00° 1950
20.00° 1708
30.00° 1080
40.00° 227
50.00° 40
60.00° 11
70.00° 5
80.00° 4
90.00° 4

CP at 0deg (Nadir): **2164**
CRI:

ZONAL LUMENS

0° - 10°	204	11%
0° - 20°	744	39%
0° - 30°	1384	72%
0° - 40°	1790	93%
0° - 60°	1883	98%
0° - 80°	1895	98%
0° - 90°	1900	98%
Total	1930	100%

SINGLE UNIT: PERFORMANCE HORIZONTAL FOOTCANDLES INITIAL DOWNLIGHT ONLY

Mounting Distance	FC at Beam Center	Diameter at Beam Angle	FC at Beam Edge
6.5'	51 fc	7.5'	17 fc
7.5'	38 fc	8.6'	13 fc
8.5'	30 fc	9.8'	10 fc
10.0'	22 fc	11.5'	7 fc
12.0'	15 fc	13.8'	5 fc
14.0'	11 fc	16.1'	4 fc
16.0'	8 fc	18.4'	3 fc
20.0'	5 fc	23.0'	2 fc

Beam Angle: **59.89**
Spacing Ratio: **0.91**

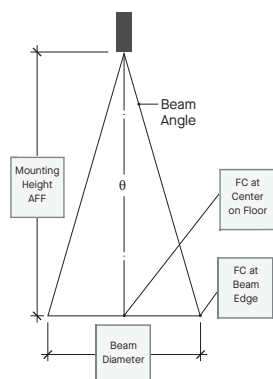
MULTIPLE UNITS: PERFORMANCE 80/50/20% REFLECTANCES HORIZONTAL FOOTCANDLES AND WATTS/SQ FT

Ceiling Height	Fixture Spacing	RCR 2		RCR 4	
		FC +	W/Sq. Ft.	FC +	W/Sq. Ft.
9'	4'	126	1.32	81	0.97
12'	6'	53	0.55	34	0.41
16'	8'	32	0.33	28	0.33
Delivered Illuminance Rating: (DIR)		96 FC per W/Sq. Ft.		84 FC per W/Sq. Ft.	
1' Suspension Length to luminous aperture Square rooms used for multiple units: RCR 2: Length & Width = Ceiling Ht. - 3.5' x 5.00 RCR 4: Length & Width = Ceiling Ht. - 3.5' x 2.50 + Average Initial Footcandles at 2.5' Above Floor					

Lumen Multiplier:
CCT Multiplier:

HOW TO USE PERFORMANCE DATA

SINGLE UNIT



Cone of Light of a single, symmetrical beam luminaire. Direct initial illumination (FC) and Beam Angle diameter directly beneath fixture; shown at different distances from aperture to horizontal plane. Calculated using Inverse Square Law.

$$FC_{\theta} = CP \times (\cos \theta) \div D^2$$

$$\text{Beam Diam.} = \frac{1}{2} \text{Beam Angle (Tan)} \times 2D$$

- CP Candela at 0° (Nadir)
- Cos θ Cosine of θ Angle
- D Distance (Mounting Height AFF)
- FC_θ Footcandles, Horizontal
- Beam Angle Cone of light to 50% max. CP
- Beam Diam. Pattern of light at Beam Angle

MULTIPLE UNITS

Square grid layout of multiple luminaires in unfurnished, square rooms of different proportions (Room Cavity Ratios) with 80/50/20% room surface reflectances. 2' Suspension Length to aperture. Initial average illumination (FC) calculated at 2.5' above floor, using Zonal Cavity Method. W/Sq. Ft. of layout shown for each ceiling height and RCR.

Delivered Illuminance Rating (DIR*):
System performance indicator expressed as ratio of approximate initial FC per W/Sq. Ft. delivered to horizontal plane below, for the range of ceiling heights indicated.

• To estimate FC for Fixture Spacing that is different than shown (do not exceed Spacing Ratio):
FC = Chart Spacing² ÷ Different Spacing² x Chart FC

• To estimate Sq. Ft. per fixture for a specific target FC:
Sq. Ft. / Fixture = Chart FC x Chart Spacing² ÷ Target FC

