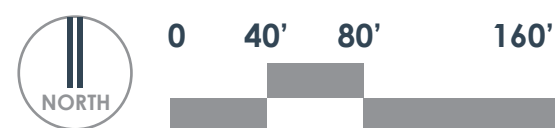


NOTE: ALL FENCING TO BE BLACK VINYL-COATED CHAIN-LINK



The City of
WAUKESHA

Lighting System

Pole / Fixture Summary

Pole ID	Pole Height	Mtg Height	Fixture Qty	Luminaire Type	Load	Circuit
S1-S4	70'	70'	9	TLC-LED-1500	13.50 kW	A
4			36		54.00 kW	

Circuit Summary

Circuit	Description	Load	Fixture Qty
A	Soccer	54.0 kW	36

Fixture Type Summary

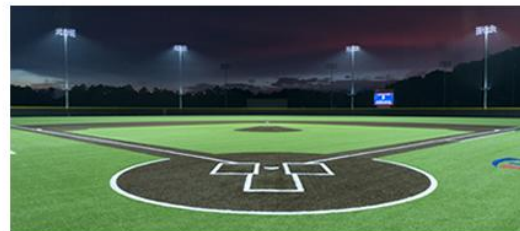
Type	Source	Wattage	Lumens	L90	L80	L70	Quantity
TLC-LED-1500	LED 5700K - 75 CRI	1500W	156,100	>81,000	>81,000	>81,000	36

Light Level Summary

Calculation Grid Summary

Grid Name	Calculation Metric	Illumination					Circuits	Fixture Qty
		Ave	Min	Max	Max/Min	Ave/Min		
150' Spill	Horizontal Illuminance	0.04	0	0.16	131.10		A	36
150' Spill	Max Candela Metric	2336	248	6479	26.17	9.43	A	36
150' Spill	Max Vertical Illuminance Metric	0.10	0.01	0.31	57.35	10.08	A	36
Soccer	Horizontal Illuminance	50.3	42	59	1.40	1.20	A	36

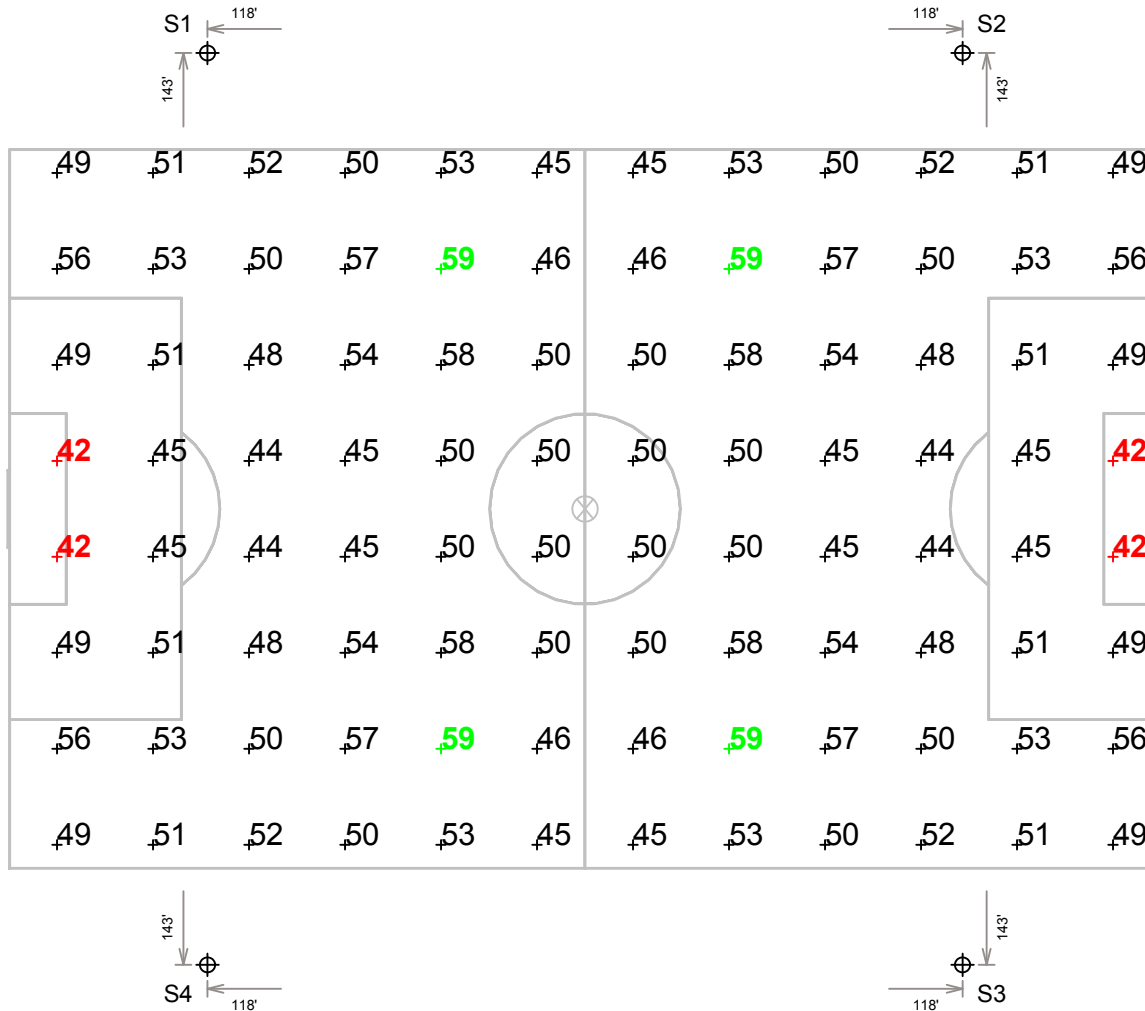
From Hometown to Professional



We Make It Happen.®

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-	70'	TLC-LED-1500	9	9	0
4	TOTALS					36	36	0



GRID SUMMARY

Name: Soccer
Size: 360' x 225'
Spacing: 30.0' x 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

MAINTAINED HORIZONTAL FOOTCANDLES

Entire Grid	
Guaranteed Average:	50
Scan Average:	50.32
Maximum:	59
Minimum:	42
Avg / Min:	1.20
Guaranteed Max / Min:	2
Max / Min:	1.40
UG (adjacent pts):	1.27
CU:	0.76
No. of Points:	96

LUMINAIRE INFORMATION

Color / CRI:	5700K - 75 CRI		
Luminaire Output:	156,100 lumens		
No. of Luminaires:	36		
Total Load:	54.0 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1500	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document and includes a 0.95 dirt depreciation factor.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume $\pm 3\%$ nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

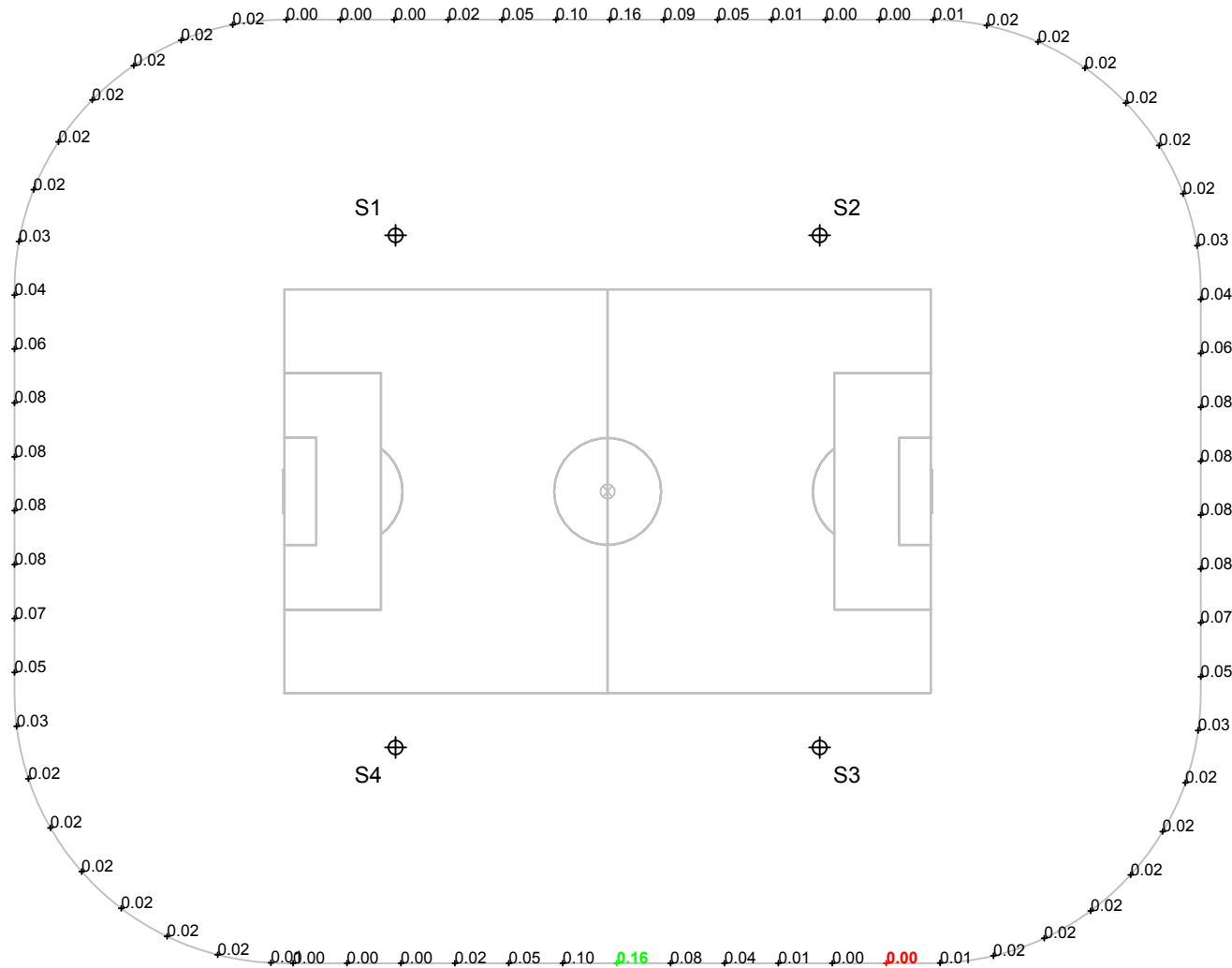


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ILLUMINATION SUMMARY

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-	70'	TLC-LED-1500	9	9	0
4	TOTALS					36	36	0



GRID SUMMARY

Name: 150' Spill
Spacing: 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

HORIZONTAL FOOTCANDLES

Scan Average: Entire Grid
0.0372
Maximum: 0.16
Minimum: 0.00
No. of Points: 71

LUMINAIRE INFORMATION

Color / CRI: 5700K - 75 CRI
Luminaire Output: 156,100 lumens
No. of Luminaires: 36
Total Load: 54.0 kW

Lumen Maintenance

Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1500	>81,000	>81,000	>81,000

Reported per TM-21-11. See luminaire datasheet for details.

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume $\pm 3\%$ nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

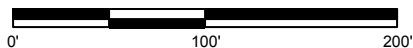


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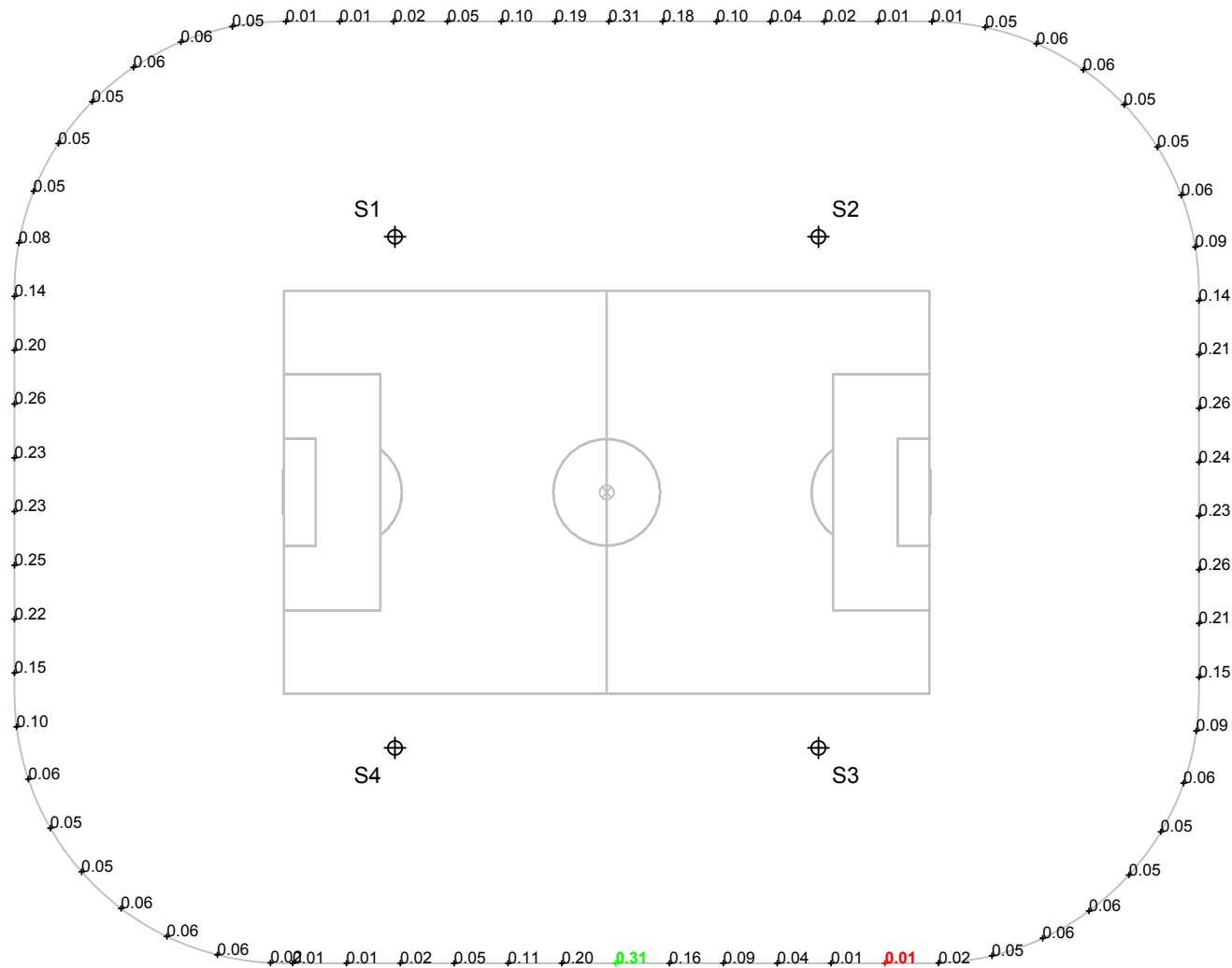
ILLUMINATION SUMMARY

SCALE IN FEET 1 : 100



Pole location(s) \oplus dimensions are relative to 0,0 reference point(s) \otimes

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-	70'	TLC-LED-1500	9	9	0
4	TOTALS					36	36	0



A horizontal bar representing a 200-foot long area. It is divided into three sections: a black section from 0' to 50', a white section from 50' to 100', and a black section from 100' to 200'. The labels 0', 100', and 200' are placed below the bar at their respective positions.



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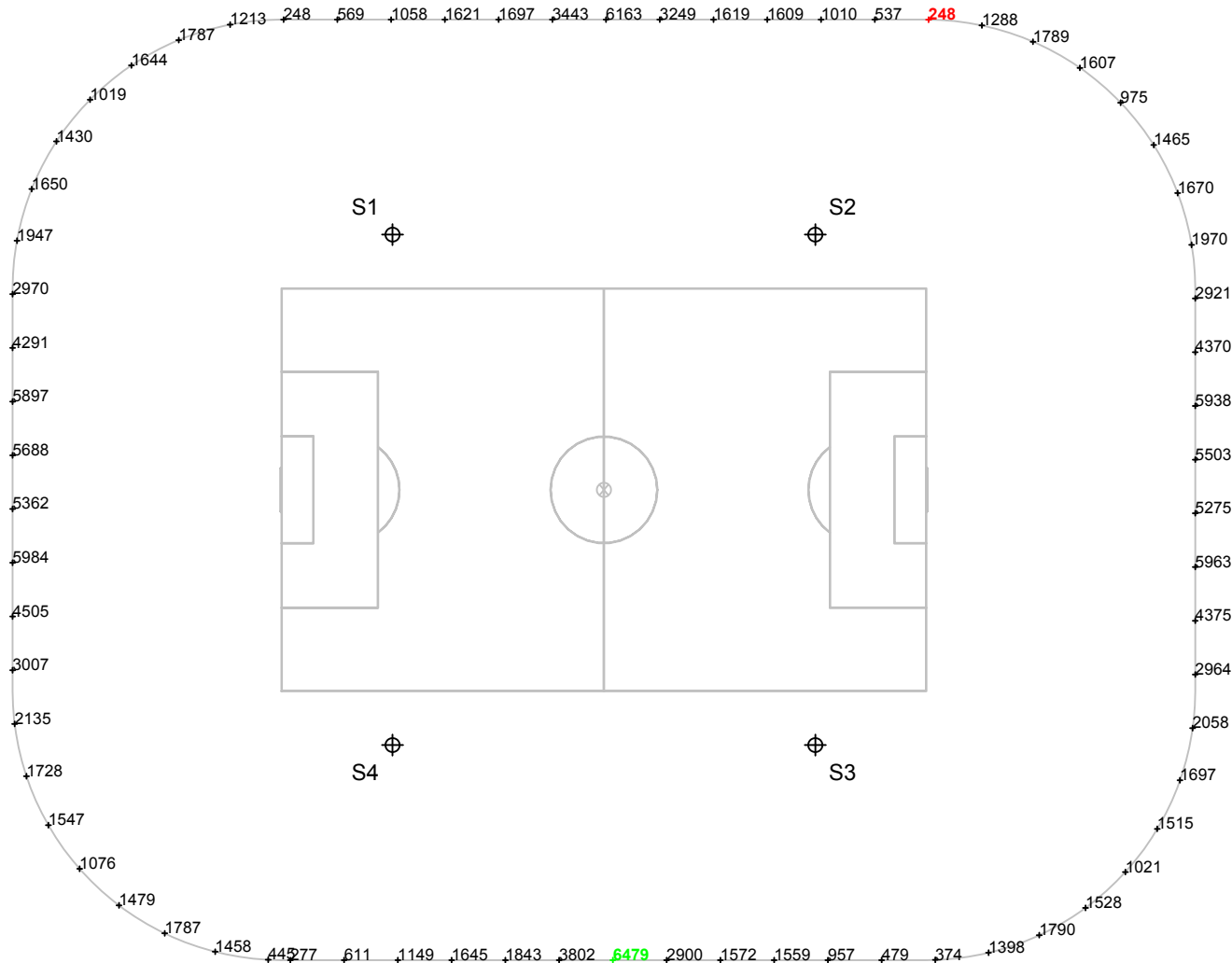
Name:	150' Spill
Spacing:	30.0'
Height:	3.0' above grade

MAX VERTICAL FOOTCANDLES				
		Entire Grid		
Scan Average:	0.1008			
Maximum:	0.31			
Minimum:	0.01			
No. of Points:	71			
LUMINAIRE INFORMATION				
Color / CRI:	5700K - 75 CRI			
Luminaire Output:	156,100 lumens			
No. of Luminaires:	36			
Total Load:	54.0 kW			
Lumen Maintenance				
Luminaire Type	L90 hrs	L80 hrs	L70 hrs	
TLC-LED-1500	>81,000	>81,000	>81,000	
Reported per TM-21-11. See luminaire datasheet for details.				

Installation Requirements: Results assume $\pm 3\%$ nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires				
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE	THIS GRID	OTHER GRIDS
4	S1-S4	70'	-	70'	TLC-LED-1500	9	9	0
4	TOTALS					36	36	0



GRID SUMMARY

Name: 150' Spill
Spacing: 30.0'
Height: 3.0' above grade

ILLUMINATION SUMMARY

CANDELA (PER FIXTURE)			
Entire Grid			
Scan Average:	2335.8413		
Maximum:	6478.55		
Minimum:	247.58		
No. of Points:	71		
LUMINAIRE INFORMATION			
Color / CRI:	5700K - 75 CRI		
Luminaire Output:	156,100 lumens		
No. of Luminaires:	36		
Total Load:	54.0 kW		
Lumen Maintenance			
Luminaire Type	L90 hrs	L80 hrs	L70 hrs
TLC-LED-1500	>81,000	>81,000	>81,000
Reported per TM-21-11. See luminaire datasheet for details.			

Guaranteed Performance: The ILLUMINATION described above is guaranteed per your Musco Warranty document.

Field Measurements: Individual field measurements may vary from computer-calculated predictions and should be taken in accordance with IESNA RP-6-15.

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

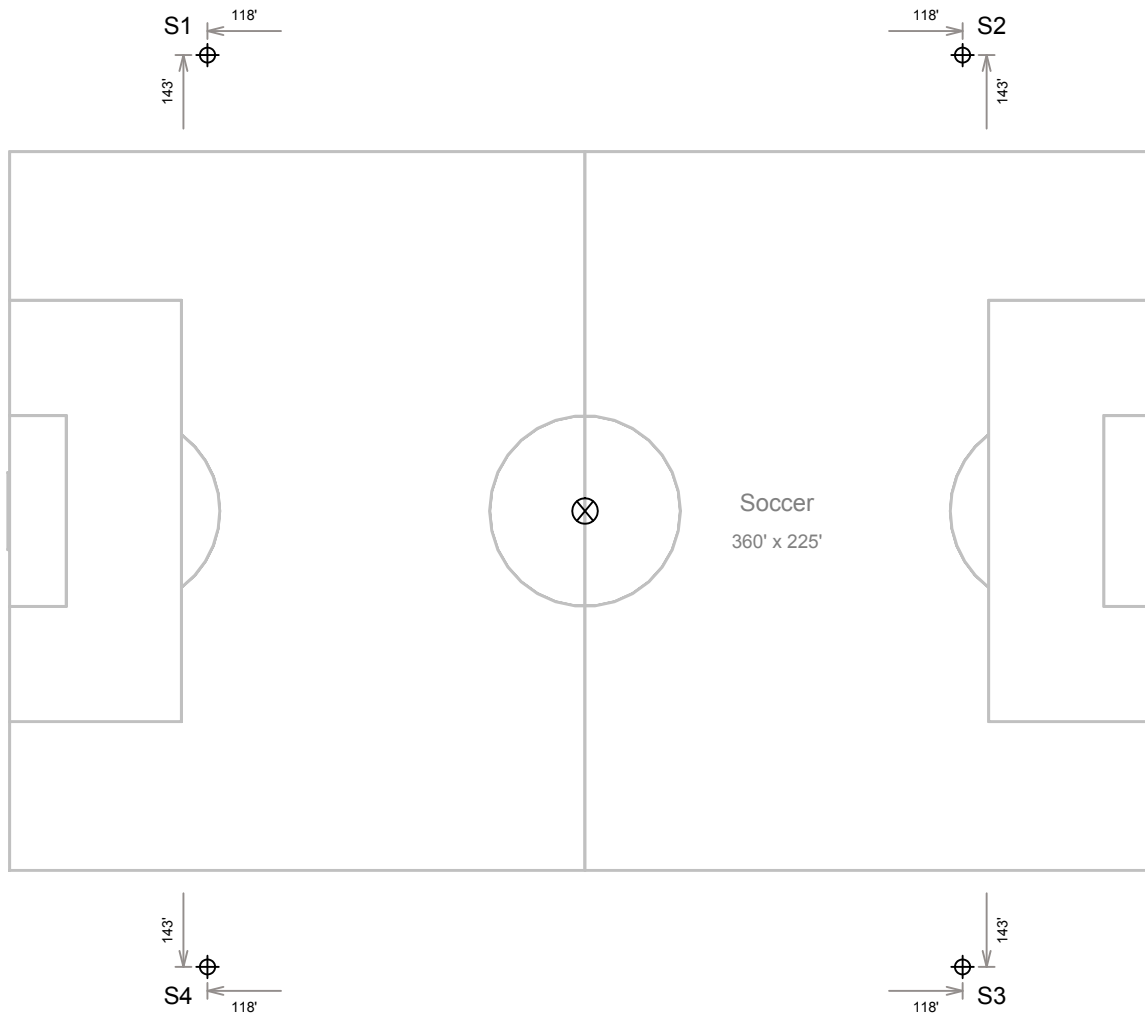
Installation Requirements: Results assume $\pm 3\%$ nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.



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ILLUMINATION SUMMARY



EQUIPMENT LAYOUT

INCLUDES:

· Soccer

Electrical System Requirements: Refer to Amperage Draw Chart and/or the "Musco Control System Summary" for electrical sizing.

Installation Requirements: Results assume $\pm 3\%$ nominal voltage at line side of the driver and structures located within 3 feet (1m) of design locations.

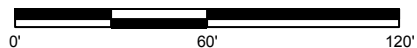
EQUIPMENT LIST FOR AREAS SHOWN

Pole				Luminaires		
QTY	LOCATION	SIZE	GRADE ELEVATION	MOUNTING HEIGHT	LUMINAIRE TYPE	QTY / POLE
4	S1-S4	70'	-	70'	TLC-LED-1500	9
4	TOTALS					36

SINGLE LUMINAIRE AMPERAGE DRAW CHART

Ballast Specifications (.90 min power factor)	Line Amperage Per Luminaire (max draw)						
Single Phase Voltage	208 (0)	220 (0)	240 (0)	277 (0)	347 (0)	380 (0)	480 (0)
TLC-LED-1500	-	-	-	-	5.4	4.9	3.9

SCALE IN FEET 1 : 60



Pole location(s) \oplus dimensions are relative to 0,0 reference point(s) \otimes



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Spectra Bond® Chain Link



Spectra Bond® Color Chain Link... made to withstand

Spectra Bond® is a step above for Master Halco's color commercial and industrial chain link fence systems. It is extruded bonded wire, which is a better alternative to simple extruded wire. The adhesive added before the wire is extruded seals the vinyl to the wire. This ensures years of attractive and reliable performance with a better protection against nature.

Ball Parks



Perimeter Fence



Tennis Courts



Our Spectra Bond® Fencing System

Premium quality fabric and framework is guaranteed for 15 years.



15 Year Warranty



Meets and Exceeds
all ASTM Standards

Features and Benefits:

- Zinc-coated steel framework is thoroughly cleaned during the pre-treatment process, then color coated with a 3 mil minimum polyester layer for protection from corrosion.
- All galvanized wire has a 15 mil minimum extruded and adhered polyvinyl chloride coating for dual protection from corrosion and the elements.
- Fittings are made of galvanized steel with a 3 mil minimum of polyester coating for added protection.



Schools



Government Facilities



High-Security Facilities



Available Colors

Choose from 3 Spectra Bond® colors that will enhance any installation and blend in beautifully with any environment.



Midnight Black



Forest Green



Sierra Brown

Available Wire Gauges (Finish and Core)

Use the core gauge number when ordering.

6 gauge finish
9 gauge core



8 gauge finish
11 gauge core



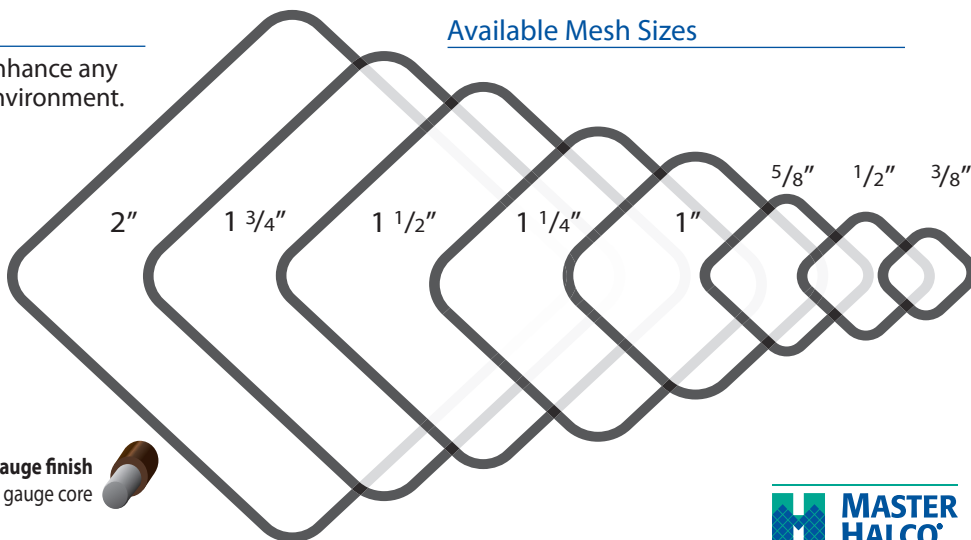
9 gauge finish
12 gauge core



11 gauge finish
14 gauge core



Available Mesh Sizes



Spectra Bond® Color Chain Link Recommendations

FABRIC

Spectra Bond® Polymer Coating Extruded and Adhered to Zinc-Coated Steel Wire per ASTM F 668 Class 2a.

Fabric Gauge	6 gauge, 9 gauge, 10 gauge, and 11 gauge core
Fabric Mesh	3/8", 1/2", 5/8", 1", 1-1/4", 1-1/2", 1-3/4", and 2"
Fabric Height	3', 42", 4', 5', 6', 7', 8', 9', 10', and 12'
Fabric Selvage	Knuckle - Knuckle (KK) for 5' and Under; for mesh sizes 1" and smaller. Knuckle - Knuckle (KK) or Knuckle - Twist (KT) for 6' and over.

FRAMEWORK - TYPE 1

Spectra® Polyester, 3 mils minimum, over galvanized steel ASTM F 1043, Group 1a, standard weight pipe, schedule 40. Hot-dipped galvanized with a minimum average 1.8 ounces per square foot of zinc-coated surface area.
Note: Heavy Mil Schedule 40 available upon request.

FRAMEWORK - TYPE 2

Spectra® Polyester, 3 mils minimum, over galvanized steel ASTM F 1043, Group 1c, with a minimum yield strength of 50,000 PSI. Protective coating per ASTM F 1043, external coating type B, zinc with organic overcoat, 0.9 ounces per square foot minimum zinc coating with chromate conversion coating and verifiable polymer film.
Note: Heavy Mil Schedule 40 available upon request.

Top Rail	1-5/8" O.D. Polyester Standard Weight Pipe (0.140" wall thickness, 2.27 lb./ft.)	1-5/8" O.D. Polyester Deluxe Quality (DQ) Pipe (0.111" wall thickness, 1.83 lb./ft.)
Line Posts	2-3/8" O.D. Polyester Standard Weight Pipe (0.154" wall thickness, 3.65 lb./ft.)	2-3/8" O.D. Polyester Deluxe Quality (DQ) Pipe (0.130" wall thickness, 3.12 lb./ft.)
Terminal Posts	2-7/8" O.D. Polyester Standard Weight Pipe (0.203" wall thickness, 5.79 lb./ft.)	2-7/8" O.D. Polyester Deluxe Quality (DQ) Pipe (0.160" wall thickness, 4.64 lb./ft.)

Gates

Fabric	Same Gauge and Mesh as Chain Link Selected
Frame	Same as Top Rail Selected

Fittings

Tension and Brace Bands	Polyester Coating, 3 Mils Minimum, Over Hot-Dipped Galvanized Pressed Steel
Caps, Eye Tops, Rail Ends	Polyester Coating, 3 Mils Minimum, Over Hot-Dipped Galvanized Pressed Steel or Aluminum
Sleeves	Polyester Coating, 3 Mils Minimum, Over Hot-Dipped Galvanized Steel
Tie Wires	Polyester Coating, 3 Mils Minimum, Over Zinc-Coated Steel Wire

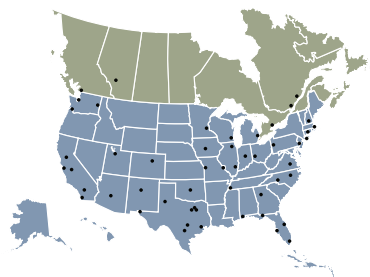
Slats - Privacy

Material Composition	Polyethylene Thermoplastic
Colors	Green, Black, Brown, Gray, Redwood, Blue, Desert Sand

MasterHalco.com | 888-MH-Fence

Branch service centers are located throughout North America.

MH Digital ©9/18



Available from:



BACK-UP NET SYSTEMS

- ♦ Take advantage of our 20+ years of experience designing back-up net systems for a variety of sports including; soccer, golf, baseball, softball, football & lacrosse.
- ♦ Each Keeper Goals back-up net system is custom designed.
- ♦ Two independent structural engineers created our back-up net design program used to determine the thickness, diameter and bury depth of your posts as well as the post spacing based on the systems height and width. You don't have to rely on guesswork.
- ♦ We employ a full-time structural engineer and offer design support to help you make the best decisions for your system taking into account the intended use of the system, existing structures, wind load in the area, other environmental factors and your budget.
- ♦ Once we have the needed data we will design the most cost effective solution for your needs.



Contact us for a free consultation. M-F 8 am - 5 pm CST or by appt.

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KEEPER GOALS
Your Sporting Goods Equipment Experts

BACK-UP NET SYSTEMS

Tension Net Systems



- ◆ Tension nets go up and down quickly & easily.
- ◆ Ideal for a facility where nets need to be put up and taken down frequently.
- ◆ Tension net systems can be customized to meet the needs of your facility taking your budget into account.

Tie-Back Net Systems



- ◆ Minimizes sight restrictions for spectators
- ◆ Puts support poles out of the way
- ◆ Allows you to work around existing structures such as a pressbox.
- ◆ Raise or lower the net and adjust the tension easily from the ground.
- ◆ Tie-back net systems can be custom designed to meet the needs of your facility taking your budget into consideration.

Free Standing Back-up Net Systems



- ◆ Nets can be removed and the posts moved.
- ◆ Ideal for multi-use facilities where permanent back-up nets aren't an option.
- ◆ Hoistable net system
- ◆ Weighted bases
- ◆ Free-standing back-up nets can be custom designed for your facility taking your budget into consideration.

Contact us for a free consultation. M-F 8 am - 5 pm CST or by appt.

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KEEPER GOALS
Your Sporting Goods Equipment Experts

LIGATURF ROOTZONE 3D3 BLEND

LigaTurf is the world's pre-eminent family of turf systems designed specifically for soccer performance. LigaTurf has a large footprint around the globe and can be found at the most elite facilities in Europe, including Bayern Munich, Liverpool and FIFA's World Headquarters.

LigaTurf is now offered in the United States exclusively by AstroTurf Corporation and its partners. The latest LigaTurf systems have emerged as the result of global collaboration of our Research and Development teams across the world, who have focused on polymer chemistry, biomechanics, ball roll, energy restitution and more.

Breakthrough technologies ensure that LigaTurf systems exceed all FIFA standards. And full control over the manufacturing, construction and installation chain ensures that our soccer customers receive the best fields in the industry.

The system boasts the RootZone technology. The RootZone is a system of texturized fibers that curl down to create a net-like matrix that encapsulates infill – dramatically reducing infill spray during play and infill migration over time.

With three unique fibers – the RootZone, Legend-shaped monofilament fibers and ultra-durable slit film fibers— the LigaTurf RootZone 3D3 Blend offers exceptional durability, player protection and aesthetics.

LIGATURF ROOTZONE 3D3 BLEND

The world's pre-eminent family of turf systems designed specifically for soccer performance.



"We are confident in our selection of AstroTurf for the new playing surfaces on Smith Field and Coaches Field. The technology behind their products is impressive and the emphasis on player protection and safety was paramount in our decision-making process."

Michael Thomas, Athletic Director, Boys' Latin School

- ◆ Exclusive, precise fiber masterbatch formulations with cutting edge ultraviolet and heat stabilizers
- ◆ Trionic monofilament fibers featuring a proprietary co-polymer blend of Polyethylene and Nylon in a single fiber
- ◆ Extremely durable slit film fibers for resistance to wear
- ◆ Entanglement technology, wherein we entangle molecular side chains to reinforce the fiber and prevent splitting

- ◆ RootZone infill stabilization system
- ◆ Multi-layer woven primary backing
- ◆ The latest polyurethane technology to enhance tuft lock, dimensional stability and fiber adhesion, with polymer formulations engineered in Germany and applied in our own American factory



Aviara Park - Carlsbad, CA



Beverly Vista School - Beverly Hills, CA



Boys' Latin School - Baltimore, MD



Fore Kicks Soccer Complex - Taunton, MA

FINISH FABRIC	VALUE	ASTM TEST METHOD
Face Yarn Type	Trionic Polyethylene/Nylon blend Monofilament, Polyethylene Slit Film and RootZone	N/A
Yarn Denier	15,800 (6 ends/1,800 per end for Mono, 10,000 per end for Slit Film and 8 ends/675 denier per end for RootZone)	D-1577
Yarn Thickness	330 microns for Mono, 115 microns for Slit Film and 100 microns for RootZone	D-3218
Pile Weight	52 oz per SY	D- 5848
Finished Pile Height	2.0"	D-5823
Standard Field Color	Field Green, Lime Green	None
Construction	Tufted	None
Turf Density	936 oz/yd ³	HUD 44d
Gauge	3/8"	D-5793
Primary Backing	8 oz per SY Multilayer Polypropylene/Polyester	D- 5848
Secondary Backing	20 oz per SY Polyurethane	D- 5848
Total Carpet Weight	80 oz per SY (+/- 5%)	D-5848
Turf Roll Dimensions	15' wide by custom lengths up to 220'	N/A
Perforations	3/16" holes on staggered 4" (approximate) centers	N/A
Turf Permeability	> 30" +/- per hour	F-1551
Tuft Bind	> 8 lbs	D-1335
Grab Tear Strength (Average)	> 200 lbs	D-5034
Lead Content	< 50 ppm	F-2765
Elongation to Break	> 50%	D-2256
Yarn Breaking Strength	> 20 lbs	D-2256
Yarn Melting Point	248° F	D-789
Flammability	TEST PASSED	D-2859

Some of our installations include:

Anne Arundel County Schools (MD)
 Appleton Area School District (WI)
 Arizona Cardinals Practice Field (AZ)
 Austin ISD (TX)
 Bethlehem Area School District (PA)
 Beverly Hills Unified School District (CA)
 Boston College (MA)
 Brother Rice High School (MI)
 UCLA (CA)
 Cheyenne Mountain School District 12 (CO)
 College of Idaho (ID)
 Corpus Christi ISD (TX)

Davenport University (MI)
 University of Delaware (DE)
 DePauw University (IN)
 East Rochester High School (NY)
 El Paso Gridley High School (IL)
 Evangel University (MO)
 Fore Kicks Soccer Complexes (MA)
 Global Premier Soccer (NH)
 Grand Canyon University (AZ)
 Greensboro College (NC)
 Hutchinson Community College (KS)
 Kansas State University (KS)

Los Angeles Unified School District (CA)
 Liberty University (VA)
 The McCallie School (TN)
 Mississippi State University (MS)
 Montoursville High School (PA)
 Moreau Catholic High School (CA)
 North Broward Prep (FL)
 The Ohio State University (OH)
 University of Oklahoma (OK)
 Paramus Catholic High School (NJ)
 Penn State University (PA)
 Saint John Bosco High School (CA)

Salina High School (KS)
 Sam Houston State University (TX)
 Silverlakes Equestrian & Sports Park (CA)
 Starfire Sports Complex (WA)
 Texas A&M University (TX)
 Texas Tech University (TX)
 Tulane University (LA)
 University Liggett School (MI)
 Utah State University (UT)
 The Village School (TX)



Note: 1.31.19 SS. Valid through 12/31/2019. Any change from the specified values is considered a special product that will require confirmation from manufacturing prior to ordering. All values are ± 5%. AstroTurf® has the right to modify technical specifications on the above-mentioned product. Delivered products can slightly differ from the technical data. AstroTurf® guarantees the technical quality of the proposed article.



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 www.astroturf.com @AstroTurfUSA