

Model Number	USLR-D20F-NANS	USLR-D20F-NDNN	USLR-D20F-NMNN	USLR-D12F-NANS
Smart Part Number	D5NA-NSNN-N1SR-NS00-0000	D5ND-NNNN-NNSR-NS00-0000	D5NM-NNNN-N1SR-NS00-0000	D3NA-NSNN-N1SR-NS00-0000
<b>OPTICAL PERFORMANCE SPECIFICATIONS</b>				
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5
Expected Luminance Output: cd/m <sup>2</sup>	28,000	28,000	28,000	37,500
Expected Illuminance at Port: lux	88,000	88,000	88,000	117,750
Peak Radiance: W/m <sup>2</sup> -sr-um @ 0.95 um	1086	1086	1086	1,455
Peak Irradiance @ Port: Photons/s-m <sup>2</sup> -um @ 0.95um	5.23E+21	5.23E+21	5.23E+21	7.00E+21
Minimum Resolution: lux	1.32E-03	1.20E+00	2.64E-01	1.37E-03
Number of Steps in System Range (#lamps*VA Steps)	8.80E+06	4.80E+04	4.00E+04	6.60E+06
Dynamic Range/Bits/dB	6.66e+07/25/154	7.33E+04/16/99	3.33E+05/18/109	8.63E+07/26/158
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500	>500	>500	>500
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
<b>INTEGRATING SPHERE</b>				
Coating / Material	Spectrafect	Spectralect	Spectralect	Spectralect
Sphere Internal Diameter: Inches (Meters)	20 (0.5)	20 (0.5)	20 (0.5)	12 (0.3)
Frame Type	20 in Cage	20 in Cage	20 in Cage	12 in Cage
Output Port Size: Inches (Meters)	8 (0.2)	8 (0.2)	8 (0.2)	4 (0.1)
<b>SYSTEM COMPONENTS</b>				
QTH Lamps Internal (# , Wattage)	(1) 35, (1) 75, (1) 150	(1) 35, (1) 75, (1) 150	(1) 35, (1) 75, (1) 150	(1) 35, (1) 75
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150	(1) 150
Power Supplies (# - Wattages)	(4) LPS-400	(4) LPS-400	(4) LPS-400	(3) LPS-400
Variable Attenuator	VAA-220A	VAD-012	VAM-010	VAA-220A
Monitor Detector(s)	SD-S1, SD-L1	SD-S1	SD-S1	SD-S1, SD-L1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic	Photopic
System Software	HELIOsense Remote	HELIOsense Remote	HELIOsense Remote	HELIOsense Remote
<b>STANDARD SYSTEM CALIBRATIONS (NIST Traceable)</b>				
Luminance	Yes	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes	Yes
Spectral Radiance (300-2400nm)	Yes	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes	Yes
Operational Duration of Calibration	50 hrs	50 hrs	50 hrs	50 hrs

Model Number	USRL-D12L-NANS	USLR-D12F-NDNN	USLR-D12L-NDNN	USLR-D12F-NMNN
Smart Part Number	D4NA-NSPN-N1SR-NS00-0000	D3ND-NNNN-NNSR-NS00-0000	D4ND-NNNN-NNSR-NS00-0000	D3NM-NNNN-NNSR-NS00-0000
<b>OPTICAL PERFORMANCE SPECIFICATIONS</b>				
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5
Expected Luminance Output: cd/m <sup>2</sup>	50,000	37,500	50,000	37,500
Expected Illuminance at Port: lux	157,000	117,750	157,000	117,750
Peak Radiance: W/m <sup>2</sup> -sr-um @ 0.95 um	1819	1,455	1819	825
Peak Irradiance @ Port: Photons/s-m <sup>2</sup> -um @ 0.95um	8.75E+21	7.00E+21	8.75E+21	3.80E+21
Minimum Resolution: lux	1.37E-03	1.24E+00	1.24E+00	2.73E-01
Number of Steps in System Range (#lamps*VA Steps)	6.60E+06	3.60E+04	3.60E+04	3.00E+04
Dynamic Range/Bits/dB	1.15E+08/26/160	9.49E+04/16/93	1.27E+05/16/101	4.31E+05/17/111
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500	>500	>500	>500
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
<b>INTEGRATING SPHERE</b>				
Coating / Material	Spectralon	Spectrafect	Spectralon	Spectrafect
Sphere Internal Diameter: Inches (Meters)	11.5 (0.29)	12 (0.3)	11.5 (0.29)	12 (0.3)
Frame Type	12 in Cage	12 in Cage	12 in Cage	12 in Cage
Output Port Size: Inches (Meters)	4 (0.1)	4 (0.1)	4 (0.1)	4 (0.1)
<b>SYSTEM COMPONENTS</b>				
QTH Lamps Internal (# , Wattage)	(1) 35, (1) 75	(1) 35, (1) 75	(1) 35, (1) 75	(1) 35, (1) 75
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150	(1) 150
Power Supplies (# - Wattages)	(3) LPS-400	(3) LPS-400	(3) LPS-400	(3) LPS-400
Variable Attenuator	VAA-220A	VAD-012	VAD-012	VAM-010
Monitor Detector(s)	SD-S1, SD-L1	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic	Photopic
System Software	HELIOsense Remote	HELIOsense Remote	HELIOsense Remote	HELIOsense Remote
<b>STANDARD SYSTEM CALIBRATIONS (NIST Traceable)</b>				
Luminance	Yes	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes	Yes
Spectral Radiance (300-2400nm)	Yes	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes	Yes
Operational Duration of Calibration	50 hrs	50 hrs	50 hrs	50 hrs

Model Number	USLR-D12L-NMNN D4NM-NNNN-NNSR-NS00-0000	USLR-D08F-NANS D1NA-NSNN-N1SR-NS00-0000	USLR-D08L-NANS D2NA-NSNN-N1SR-NS00-0000	USLR-D08F-NDNN D1ND-NNNN-NNSR-NS00-0000
<b>OPTICAL PERFORMANCE SPECIFICATIONS</b>				
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5
Expected Luminance Output: cd/m <sup>2</sup>	50,000	60,000	80,000	60,000
Expected Illuminance at Port: lux	157,000	188,400	251,200	188,400
Peak Radiance: W/m <sup>2</sup> -sr-um @ 0.95 um	1100	2328	2910	2328
Peak Irradiance @ Port: Photons/s-m <sup>2</sup> -um @ 0.95um	5.50E+21	1.12E+22	1.40E+22	1.12E+22
Minimum Resolution: lux	2.73E-01	9.42E-03	1.26E-02	8.56E+00
Number of Steps in System Range (#lamps*VA Steps)	3.00E+04	2.00E+06	2.00E+06	2.40E+04
Dynamic Range/Bits/dB	5.75E+05/18/114	2.00E+07/24/145	2.00E+07/24/145	2.20E+04/14/86
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500	>500	>500	>500
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
<b>INTEGRATING SPHERE</b>				
Coating / Material	Spectralon	Spectrafect	Spectralon	Spectrafect
Sphere Internal Diameter: Inches (Meters)	11.5 (0.29)	8 (0.2)	7.5 (0.19)	8 (0.2)
Frame Type	12 in Cage	8 in Cage	8 in Cage	8 in Cage
Output Port Size: Inches (Meters)	4 (0.1)	2 (0.05)	2 (0.05)	2 (0.05)
<b>SYSTEM COMPONENTS</b>				
QTH Lamps Internal (# , Wattage)	(1) 35, (1) 75	(1) 35	(1) 35	(1) 35
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150	(1) 150
Power Supplies (# - Wattages)	(3) LPS-400	(2) LPS-400	(2) LPS-400	(2) LPS-400
Variable Attenuator	VAM-010	VAA-220A	VAA-220A	VAD-012
Monitor Detector(s)	SD-S1	SD-S1, SD-L1	SD-S1, SD-L1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic	Photopic
System Software	HELIOsense Remote	HELIOsense Remote	HELIOsense Remote	HELIOsense Remote
<b>STANDARD SYSTEM CALIBRATIONS (NIST Traceable)</b>				
Luminance	Yes	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes	Yes
Spectral Radiance (300-2400nm)	Yes	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes	Yes
Operational Duration of Calibration	50 hrs	50 hrs	50 hrs	50 hrs

Model Number	USLR-D08L-NDNN	USLR-D08F-NMNN	USLR-D08F-NMNN
Smart Part Number	D2ND-NNNN-NNSR-NS00-0000	D1NM-NNNN-NNSR-NS00-0000	D2NM-NNNN-NNSR-NS00-0000
<b>OPTICAL PERFORMANCE SPECIFICATIONS</b>			
Spatial Luminance Uniformity over Exit Port (f/4) - All Lamps On	+/-1.0%	+/-1.0%	+/-1.0%
Angular Uniform FOV (Full Angle) - Degrees / F# / NA - All Lamps On	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5	+/-1.5% - 60 / 1.0 / 0.5
Expected Luminance Output: cd/m2	80,000	60,000	80,000
Expected Illuminance at Port: lux	251,200	188,400	251,200
Peak Radiance: W/m2-sr-um @ 0.95 um	2910	2328	2910
Peak Irradiance @ Port: Photons/s-m2-um @ 0.95um	1.40E+22	1.12E+22	1.40E+22
Minimum Resolution: lux	1.14E+01	1.88E+00	2.51E+00
Number of Steps in System Range (#lamps*VA Steps)	2.40E+04	2.00E+04	2.00E+04
Dynamic Range/Bits/dB	2.40E+04/14/87	1.00E+05/16/99	1.00E+05/16/99
Approximate Correlated Color Temperature (QTH)	3000K +/-50K	3000K +/-50K	3000K +/-50K
Typical Lamp Lifetimes (hrs)	>500	>500	>500
Est. Lamp Degradation Over Lifetime (% & CCT Shift)	-10% & +/-200K	-10% & +/-200K	-10% & +/-200K
Est. Output Degradation over 50hrs (% & CCT Shift)	-1.0% & +/-20K	-1.0% & +/-20K	-1.0% & +/-20K
<b>INTEGRATING SPHERE</b>			
Coating / Material	Spectralon	Spectralect	Spectralon
Sphere Internal Diameter: Inches (Meters)	7.5 (0.19)	8 (0.2)	7.5 (0.19)
Frame Type	8 in Cage	8 in Cage	8 in Cage
Output Port Size: Inches (Meters)	2 (0.05)	2 (0.05)	2 (0.05)
<b>SYSTEM COMPONENTS</b>			
QTH Lamps Internal (# , Wattage)	(1) 35	(1) 35	(1) 35
QTH Lamps External (#, Wattage)	(1) 150	(1) 150	(1) 150
Power Supplies (# - Wattages)	(2) LPS-400	(2) LPS-400	(2) LPS-400
Variable Attenuator	VAD-012	VAM-010	VAM-010
Monitor Detector(s)	SD-S1	SD-S1	SD-S1
Detector Filters (in Filter Holder)	Photopic	Photopic	Photopic
System Software	HHELIOsense Remote	HELIOsense Remote	HELIOsense Remote
<b>STANDARD SYSTEM CALIBRATIONS (NIST Traceable)</b>			
Luminance	Yes	Yes	Yes
Correlated Color Temp (All lamps matched & w/VA position)	Yes	Yes	Yes
Spectral Radiance (300-2400nm)	Yes	Yes	Yes
Exit Port Spatial Uniformity	Yes	Yes	Yes
Exit Port Angular Uniformity	Yes	Yes	Yes
Operational Duration of Calibration	50 hrs	50 hrs	50 hrs