

Optical Testing Report for 46 Lamp Sample Sets

Description of Items under Test:

46 lamp sample sets, manufactured by Marexim and marked as follows:

Sample	1.	Halogen GU10	Cool-back. GU10 240V 35W 25°. GU103525-Halogen	Marexim Pro Plus
Sample	2.	Halogen GU10	Cool-back. GU10 240V 50W 50°. GU105050-Halogen	Marexim Pro Plus
Sample	3.	Halogen MR16	Dichroic. MR16 12V 20W 36°. BAB6-P	Marexim Pro Plus
Sample	4.	Halogen MR16	Dichroic. MR16 12V 35W 36°. FMW6-P	Marexim Pro Plus
Sample	5.	Halogen MR16	Dichroic. MR16 12V 50W 12°. EXT6-P	Marexim Pro Plus
Sample	6.	Halogen MR16	Dichroic. MR16 12V 50W 24°. EXZ6-P	Marexim Pro Plus
Sample	7.	Halogen MR16	Dichroic. MR16 12V 50W 38°. EXN6-P	Marexim Pro Plus
Sample	8.	Halogen MR16	Dichroic. MR16 12V 50W 60°. FNV6-P	Marexim Pro Plus
Sample	9.	Xenon GU10	Cool-back. GU10 240V 35W 25°. GU103525 Xenon	Marexim Pro Ultra
Sample	10.	Xenon GU10	Cool-back. GU10 240V 50W 50°. GU105050 Xenon	Marexim Pro Ultra
Sample	11.	Xenon MR16	Dichroic. MR16 12V 20W 36°. BAB10-P-Xenon	Marexim Pro Ultra
Sample	12.	Xenon MR16	Dichroic. MR16 12V 35W 36°. FMW 10-P-Xenon	Marexim Pro Ultra
Sample	13.	Xenon MR16	Dichroic. MR16 12V 50W 24°. EXZ10-P-Xenon	Marexim Pro Ultra
Sample	14.	Xenon MR16	Dichroic. MR16 12V 50W 38°. EXN 10-P-Xenon	Marexim Pro Ultra
Sample	15.	Xenon MR16	Dichroic. MR16 12V 50W 60°. FNV10-P-Xenon	Marexim Pro Ultra
Sample	16.	Halogen GU10	Cool-back. GU10 240V 20W 25°. GU102025-Halogen	Marexim Pro Plus
Sample	17.	Halogen GU10	Cool-back. GU10 240V 50W 25°. GU105025-Halogen	Marexim Pro Plus
Sample	18.	Halogen GU10	Cool-back. GU10 240V 75W 25°. GU107525-Halogen	Marexim Pro Plus
Sample	19.	Halogen GU10	Cool-back. GU10 240V 75W 50°. GU107550-Halogen	Marexim Pro Plus
Sample	20.	Halogen MR16	Cool-back. MR16 12V 20W 35°. BAB6-P-Alum	Marexim Pro Plus
Sample	21.	Halogen MR16	Cool-back. MR16 12V 35W 36°. FMW6-P-Alum	Marexim Pro Plus
Sample	22.	Halogen MR16	Cool-back. MR16 12V 50W 12°. EXT6-P-Alum	Marexim Pro Plus
Sample	23.	Halogen MR16	Cool-back. MR16 12V 50W 24°. EXZ6-P-Alum	Marexim Pro Plus
Sample	24.	Halogen MR16	Cool-back. MR16 12V 50W 38°. EXN6-P-Alum	Marexim Pro Plus
Sample	25.	Halogen MR16	Cool-back. MR16 12V 50W 60°. FNV6-P-Alum	Marexim Pro Plus
Sample	26.	Xenon MR16	Cool-back. MR16 12V 20W 36°. BAB10-P-Xenon-Alu	Marexim Pro Ultra
Sample	27.	Xenon MR16	Cool-back. MR16 12V 35W 36°. FMW10-P-Xenon-Alu	Marexim Pro Ultra
Sample	28.	Xenon MR16	Cool-back. MR16 12V 50W 24°. EXZ10-P-Xenon-Alu	Marexim Pro Ultra
Sample	29.	Xenon MR16	Cool-back. MR16 12V 50W 38°. EXN10-P-Xenon-Alu	Marexim Pro Ultra
Sample	30.	Xenon MR16	Cool-back. MR16 12V 50W 60°. FNV10-P-Xenon-Alu	Marexim Pro Ultra
Sample	31.	Xenon AR111	Cool-back. 12V 35W 4°. AR111-12354-Xenon.	Marexim Pro Ultra
Sample	32.	Xenon AR111	Cool-back. 12V 35W 8°. AR111-12358-Xenon.	Marexim Pro Ultra
Sample	33.	Xenon AR111	Cool-back. 12V 35W 24°. AR111-123524-Xenon.	Marexim Pro Ultra
Sample	34.	Xenon AR111	Cool-back. 12V 35W 45°. AR111-123545-Xenon.	Marexim Pro Ultra
Sample	35.	Xenon AR111	Cool-back. 12V 50W 4°. AR111-12504-Xenon.	Marexim Pro Ultra
Sample	36.	Xenon AR111	Cool-back. 12V 50W 8°. AR111-12508-Xenon.	Marexim Pro Ultra
Sample	37.	Xenon AR111	Cool-back. 12V 50W 24°. AR111-125024-Xenon.	Marexim Pro Ultra
Sample	38.	Xenon AR111	Cool-back. 12V 50W 45°. AR111-125045-Xenon.	Marexim Pro Ultra
Sample	39.	Xenon AR111	Cool-back. 12V 75W 4°. AR111-12754-Xenon.	Marexim Pro Ultra
Sample	40.	Xenon AR111	Cool-back. 12V 75W 8°. AR111-12758-Xenon.	Marexim Pro Ultra
Sample	41.	Xenon AR111	Cool-back. 12V 75W 24°. AR111-127524-Xenon.	Marexim Pro Ultra
Sample	42.	Xenon AR111	Cool-back. 12V 75W 45°. AR111-127545-Xenon.	Marexim Pro Ultra
Sample	43.	Xenon AR111	Cool-back. 12V 100W 4°. AR111-121004-Xenon.	Marexim Pro Ultra
Sample	44.	Xenon AR111	Cool-back. 12V 100W 8°. AR111-121008-Xenon.	Marexim Pro Ultra
Sample	45.	Xenon AR111	Cool-back. 12V 100W 24°. AR111-1210024-Xenon.	Marexim Pro Ultra
Sample	46.	Xenon AR111	Cool-back. 12V 100W 45°. AR111-1210045-Xenon.	Marexim Pro Ultra

Description of Measurements:

Luminous flux is a measurement of the **total** luminous output of the lamp over the full solid angle of 4π steradians. Luminous flux, luminous efficiency, total colour and colour temperature measurements were performed using an integrating sphere / photopically corrected photodiode / monochromator system, calibrated for luminous flux and spectral output over the visible wavelength range 380 to 780 nanometres prior to use (total spectral radiant flux standard TSRF-1000). For the luminous flux, an auxiliary lamp correction factor was applied for each different shape of lamp under test. Measurement uncertainties of $\pm 5\%$ (luminous flux and luminous efficiency), $\pm 10\text{K}$ (colour temperature) and ± 0.002 (colour) apply.

Luminous intensity is a measurement of the luminous flux emitted **in a given direction** into unit solid angle. On-axis luminous intensity measurements were performed using a goniometer onto which the lamp was fixed, together with a telephotometer / photopically corrected photodiode / picoammeter system, calibrated for luminous intensity against a luminous intensity standard (P22). NB: Photopically corrected luminous intensity is equivalent to photopic illuminance at 1m, the illuminance at other distances was calculated using the inverse square law. A measurement uncertainty of $\pm 5\%$ or 1 digit (whichever is the larger) applies to both luminous intensity and photopic illuminance.

On-axis colour and SP (scotopic/photopic) ratio measurements were performed using a goniometer onto which the lamp was fixed, together with a telephotometer / monochromator system, calibrated for spectral output over the visible wavelength range 380 to 780 nanometres prior to use (spectral radiant intensity standard SRI-100). The SP ratio was calculated from the spectral data and along with the photopic illuminance was used to calculate scotopic illuminance. Measurement uncertainties of ± 0.002 (colour) and $\pm 8\%$ (scotopic illuminance) apply.

The test voltage was either 12 Vd.c. or 240Va.c. (as applicable) and the stabilisation time was 5 minutes unless specified otherwise. Ambient temperature in the laboratory was recorded as being 24°C , and the measurement distance (signal to detector) was 8m (on-axis luminous intensity and colour).

Definitions:

“On-axis” measurements refer to the photometric centre of the lamp, as defined in BS EN 13032-1:2004 : Light and lighting – Measurement and presentation of photometric data of lamps and luminaires.

“Auxiliary lamp correction factor” measured as specified in NA.2.5 of BS EN 13032-1:2004 : Light and lighting – Measurement and presentation of photometric data of lamps and luminaires.

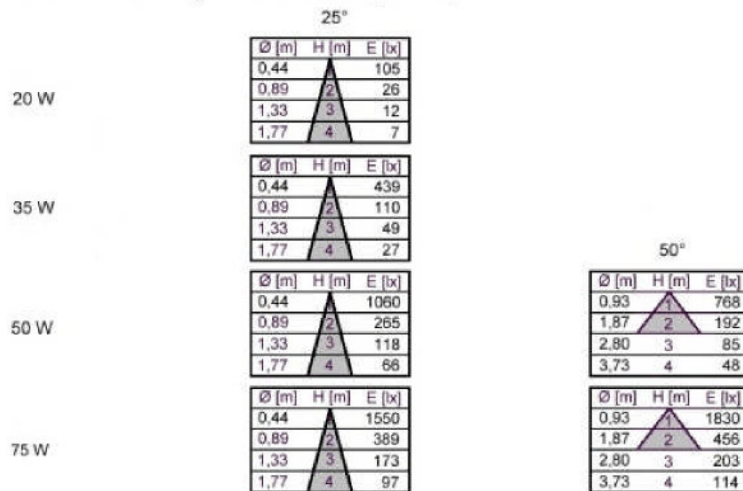
Results of Measurements:

Lamp	Luminous Flux lm	Luminous Efficiency lm/W	Colour CIE(1931) x,y	Colour Temperature K	Luminous Intensity cd	Photopic Illuminance lx	Scotopic Illuminance lx	Rated Life hrs
1 Halogen GU10 Cool-back. GU10 240V 35W 25°. GU103525-Halogen	133	4.00	x ⁻ 0.489 y ⁻ 0.418	2380	439	439	207	3000
2 Halogen GU10 Cool-back. GU10 240V 50W 50°. GU105050-Halogen	360	7.10	x ⁻ 0.470 y ⁻ 0.416	2600	768	768	404	3000
3 Halogen MR16 Dichroic. MR16 12V 20W 36°. BAB6-P	266	13.58	x ⁻ 0.453 y=0.411	2800	600	600	354	6000
4 Halogen MR16 Dichroic. MR16 12V 35W 36°. FMW6-P	540	15.55	x=0.449 y=0.410	2850	1426	1400	849	6000
5 Halogen MR16 Dichroic. MR16 12V 50W 12°. EXT6-P	871	17.74	x=0.442 y=0.408	2940	15807	16000	9400	6000
6 Halogen MR16 Dichroic. MR16 12V 50W 24°. EXZ6-P	891	18.02	x=0.441 y=0.408	2960	1922	1900	1100	6000
7 Halogen MR16 Dichroic. MR16 12V 50W 38°. EXN6-P	923	18.19	x=0.441 y=0.407	2950	1838	1800	1200	6000
8 Halogen MR16 Dichroic. MR16 12V 50W 60°. FNV6-P	926	17.96	x=0.443 y=0.408	2920	1460	1500	887	6000
9 Xenon GU10 Cool-back. GU10 240V 35W 25°. GU103525Xenon	142	4.22	x=0.489 y ⁻ 0.418	2390	460	460	221	4000
10 Xenon GU10 Cool-back. GU10 240V 50W 50°. GU105050Xenon	375	7.58	x ⁻ 0.469 y ⁻ 0.415	2610	1251	1300	662	4000
11 Xenon MR16 Dichroic. MR16 12V 20W 36°. BAB10-P-Xenon	269	13.72	x ⁻ 0.452 y ⁻ 0.410	2800	484	484	277	10000
12 Xenon MR16 Dichroic. MR16 12V 35W 36°. FMW10-P-Xenon	590	16.53	x ⁻ 0.447 y ⁻ 0.409	2880	1232	1200	736	10000
13 Xenon MR16 Dichroic. MR16 12V 50W 24°. EXZ10-P-Xenon	882	17.75	x ⁻ 0.442 y ⁻ 0.408	2950	1908	1900	1200	10000
14 Xenon MR16 Dichroic. MR16 12V 50W 38°. EXN10-P-Xenon	917	18.04	x ⁻ 0.442 y ⁻ 0.408	2950	1864	1900	1069	10000
15 Xenon MR16 Dichroic. MR16 12V 50W 60°. FNV10-P-Xenon	890	17.41	x ⁻ 0.444 y=0.408	2920	1375	1400	806	10000
16 Halogen GU10 Cool-back. GU10 240V 20W 25°. GU102025-Halogen	46	2.23	x ⁻ 0.508 y=0.417	2190	105	105	45	3000
17 Halogen GU10 Cool-back. GU10 240V 50W 25°. GU105025-Halogen	375	7.43	x=0.469 y=0.415	2610	1061	1060	560	3000
18 Halogen GU10 Cool-back. GU10 240V 75W 25°. GU107525-Halogen	673	8.91	x=0.460 y=0.414	2720	1554	1550	854	3000
19 Halogen GU10 Cool-back. GU10 240V 75W 50°. GU107550-Halogen	750	9.71	x=0.457 y=0.413	2750	1826	1830	1030	3000
20 Halogen MR16 Cool-back. MR16 12V 20W 35°. BAB6-P-Alum	230	11.78	x=0.451 y=0.410	2830	1043	1040	597	6000
21 Halogen MR16 Cool-back. MR16 12V 35W 36°. FMW6-P-Alum	453	13.13	x=0.449 y=0.41 1	2860	1875	1880	1090	6000
22 Halogen MR16 Cool-back. MR16 12V 50W 12°. EXT6-P-Alum	705	14.28	x=0.443 y ⁻ 0.408	2930	14355	14360	8540	6000
23 Halogen MR16 Cool-back. MR16 12V 50W 24°. EXZ6-P-Alum	749	15.26	x ⁻ 0.441 y ⁻ 0.408	2970	3571	3570	2150	6000
24 Halogen MR16 Cool-back. MR16 12V 50W 38°. EXN6-P-Alum	749	15.05	x ⁻ 0.443 y ⁻ 0.409	2940	2758	2760	1650	6000
25 Halogen MR16 Cool-back. MR16 12V 50W 60°. FNV6-P-Alum	819	15.93	x ⁻ 0.442 y ⁻ 0.408	2950	1106	1110	660	6000
26 Xenon MR16 Cool-back. MR16 12V 20W 36°. BAB10-P-Xenon-Alu	242	12.23	x ⁻ 0.451 y=0.410	2830	1230	1230	706	10000

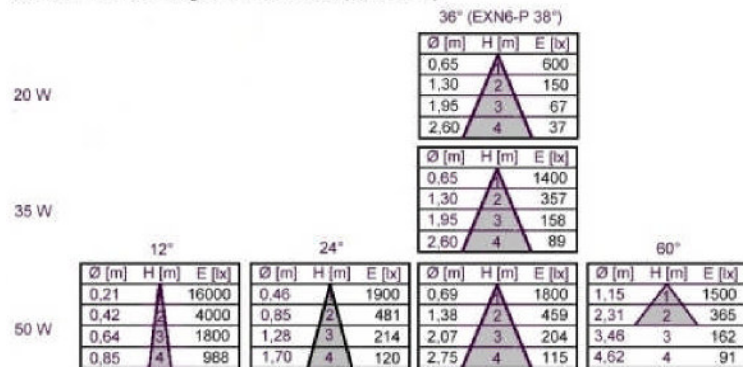
	Lamp	Luminous Flux lm	Luminous Efficiency lm/W	Colour CIE(1931) x,y	Colour Temperature K	Luminous Intensity cd	Photopic Illuminance lx	Scotopic Illuminance lx	Rated Life hrs
27	Xenon MR16 Cool-back. MR1612V 35W 36°. FMW 1 0-P-Xenon-Alu	474	13.76	x=0.447 y=0.409	2880	1939	1940	1130	10000
28	Xenon MR16 Cool-back. MR16 12V 50W 24°. EXZ10-P-Xenon-Alu	688	14.03	x=0.445 y=0.409	2910	2939	2940	1740	10000
29	Xenon MR16 Cool-back. MR16 12V 50W 38°. EXN10-P-Xenon-Alu	766	15.30	x=0.442 y=0.408	2950	2897	2900	1740	10000
30	Xenon MR16 Cool-back. MR16 12V 50W 60°. FNV10-P-Xenon-Alu	759	14.78	x=0.440 y=0.409	2920	786	786	467	10000
31	Xenon AR111 Cool-back. 12V 35W 4°. AR111-12354-Xenon.	395	11.32	x=0.450 y=0.409	2830	13862	13860	7830	10000
32	Xenon AR111 Cool-back. 12V 35W 8°. AR111-12358-Xenon.	419	11.99	x=0.453 y=0.411	2800	8744	8740	4990	10000
33	Xenon AR111 Cool-back. 12V 35W 24°. AR111-123524-Xenon	467	13.07	x=0.446 y=0.408	2880	4504	4500	2630	10000
34	Xenon AR111 Cool-back. 12V 35W 45°. AR111-123545-Xenon.	405	11.48	x=0.449 y=0.409	2840	1076	1080	632	10000
35	Xenon AR111 Cool-back. 12V 50W 4°. AR111-12504-Xenon.	590	12.02	x=0.448 y=0.408	2850	21649	21650	12610	10000
36	Xenon AR111 Cool-back. 12V 50W 8°. AR111-12508-Xenon.	643	12.83	x=0.446 y=0.408	2880	16313	16310	9550	10000
37	Xenon AR111 Cool-back. 12V 50W 24°. AR111-125024-Xenon.	701	13.97	x=0.444 y=0.407	2910	6859	6860	4070	10000
38	Xenon AR111 Cool-back. 12V 50W 45°. AR111-125045-Xenon.	572	11.49	x=0.448 y=0.409	2860	1079	1080	628	10000
39	Xenon AR111 Cool-back. 12V 75W 4°. AR111-12754-Xenon.	1035	14.33	x=0.440 y=0.406	2960	23998	24000	14100	10000
40	Xenon AR111 Cool-back. 12V 75W 8°. AR111-12758-Xenon.	1114	15.19	x=0.440 y=0.406	2970	16516	16520	9870	10000
41	Xenon AR111 Cool-back. 12V75W 24°. AR111-127524-Xenon.	1023	14.83	x=0.439 y=0.406	2970	9904	9900	6000	10000
42	Xenon AR111 Cool-back. 12V 75W 45°. AR111-127545-Xenon.	906	12.69	x=0.444 y=0.412	2940	2290	2290	1680	10000
43	Xenon AR111 Cool-back. 12V 100W 4°. AR111-121004-Xenon.	1304	13.55	x=0.440 y=0.406	2960	53056	53060	32030	10000
44	Xenon AR111 Cool-back. 12V 100W 8°. AR111-121008-Xenon.	1464	15.05	x=0.439 y=0.405	2980	41644	41640	25020	10000
45	Xenon AR111 Cool-back. 12V 100W 24°. AR111-1210024-Xenon.	1330	13.96	x=0.439 y=0.405	2980	6656	6660	4000	10000
46	Xenon AR111 Cool-back. 12V 100W 45°. AR111-1210045-Xenon.	1249	13.14	x=0.440 y=0.406	2960	2082	2080	1250	10000

Light Planning Diagrams:

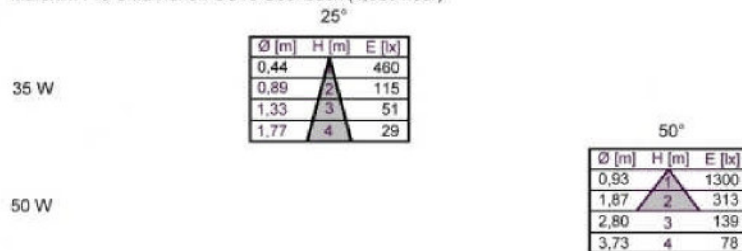
Marexim Pro Plus Halogen GU10 Cool-back (3,000 hour)



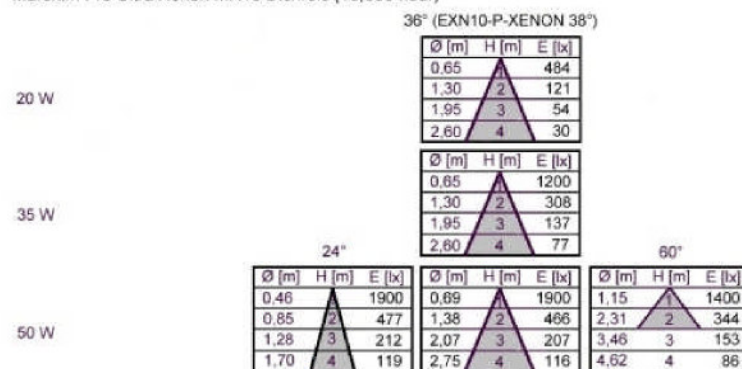
Marexim Pro Plus Halogen MR16 Dichroic (6,000 hour)



Marexim Pro Ultra Xenon GU10 Cool-back (4,000 hour)

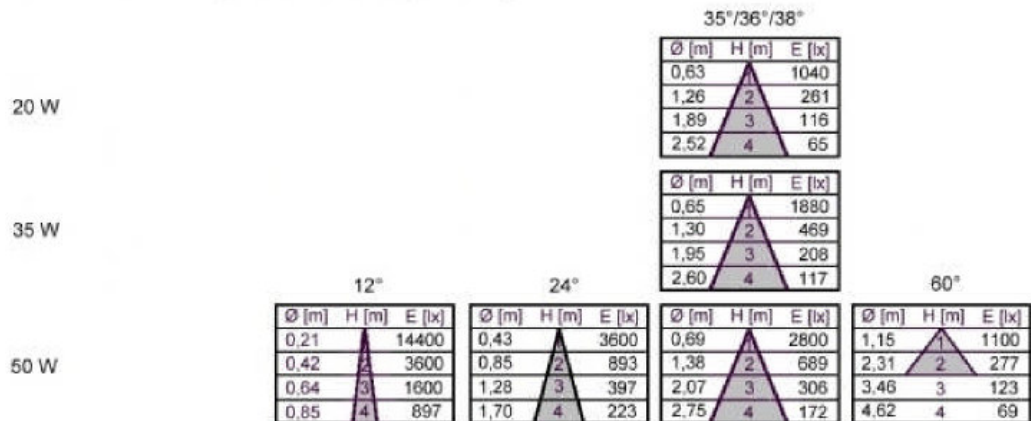


Marexim Pro Ultra Xenon MR16 Dichroic (10,000 hour)

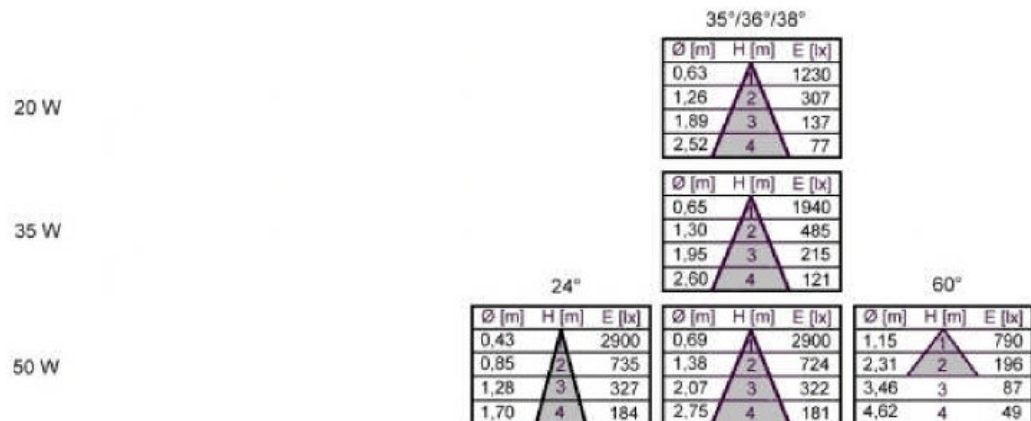


Light Planning Diagrams Ctd:

Marexim Pro Plus Halogen MR16 Cool-back (6,000 hour)



Marexim Pro Ultra Xenon MR16 Cool-back (10,000 hour)



Marexim Pro Ultra Xenon AR111 Cool-back (10,000 hour)

