



MINIATURE HALOGEN LAMPS REFLECTORIZED LAMP TYPES

*PARABOLIC &
ELLIPTICAL*

The following technical specification tables are for the standard reflectORIZED lamp products offered by Welch Allyn. Our precision fabrication of lamps and optical components will ensure the desired results for your critical applications. We invite you to contact our experienced application engineers if a standard product does not fit your requirements.



Optical system performance often depends on much more than the lamp itself. The right reflector can increase the optical system efficiency by 300% to 500%. With more than 30 years of miniature optical system experience, Welch Allyn offers a full line of metal and glass reflectors to complement its precision lamps.

- **MR-3 to MR-11 sizes:** 9.5mm (0.375 inches) to 35.1mm (1.38 inches)
- **Precise lamp alignment** within the reflector for optimum performance
- **Complete advanced testing** for output and spot size based on your requirements
- **Single and multiple surface designs**

Welch Allyn's subminiature reflectORIZED lamp assemblies are specifically designed for applications where optical system performance is critical. Welch Allyn reflectORIZED lamps are used in various products in the following markets:

- **Flashlights/Torches**
- **Chemical and Clinical Analysis**
- **Medical and Dental Instrumentation**
- **Fiber Optic Illumination**
- **Machine Vision**
- **Microscope Illumination**
- **Industrial Safety Headlamps**

Our design and application engineers can assist you in selecting the appropriate lamp and reflector for your specifications. We invite you to contact us for your custom design requests.

WelchAllyn



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Elliptical Specifications

Lamp Number	Amps	Color Temp K°	Life Hours	Reflector Size	Spot Size (mm)	Lux @ F2 Using Aperture Diameter Of		Focal Distance (mm)	Lamp Type G=Gas H=Halogen
						1.27 mm	2.5 mm		
3.00 Volts									
7104-006	0.500	3240	20	MR4	1.27	3766	-	12.7	G
7106-006	0.500	3240	20	MR6	1.52	4304	-	19.1	G
3.50 Volts									
7103-001	0.575	3120	250	MR3	3.30	1345	-	12.7	G
7104-001	0.935	3085	300	MR4	2.03	4035	-	12.7	G
7104-004	0.575	3050	400	MR4	1.78	2044	-	12.7	G
7106-001	0.935	3085	300	MR6	2.54	5843	-	19.1	G
7106-004	0.575	3050	400	MR6	2.54	2260	-	19.1	G
3.65 Volts									
8103-002	0.980	3240	45	MR3	3.81	3701	-	12.7	H
4.25 Volts									
8104-002	1.060	3000	650	MR4	2.79	3131	-	12.7	H
8106-002	1.060	3000	650	MR6	3.30	4336	-	19.1	H
5.00 Volts									
7103-002	0.970	2800	10,000	MR3	4.57	1173	-	12.7	G
7104-002	0.970	2800	10,000	MR4	3.81	1894	-	12.7	G
7106-003	0.970	2800	10,000	MR6	3.56	2755	-	19.1	G
8208-004	2.000	2880	5,000	MR8	6.10	-	9038	25.4	H
6.00 Volts									
8208-007	1.000	3255	50	MR8	4.57	-	10545	25.4	H
6.27 Volts									
8103-001	1.440	3335	60	MR3	4.57	2152	-	12.7	H
8104-001	1.440	3335	60	MR4	3.05	8393	-	12.7	H
8106-001	1.440	3335	60	MR6	3.30	11944	-	19.1	H
12.00 Volts									
8211-002	1.670	3000	2000	MR11	6.60	-	17754	35.6	H
8211-005	1.000	3280	40	MR11	5.59	-	19906	35.6	H
8211-007	1.170	3120	200	MR11	5.59	-	19906	35.6	H
14.00 Volts									
8211-001	1.790	3200	200	MR11	6.60	-	25663	35.6	H

Dimensions are in millimeters. 1 inch = 25.4mm

Output is in Lux: Footcandles = Lux ÷ 10.76

Table of Numerical Apertures for Elliptical Reflectors

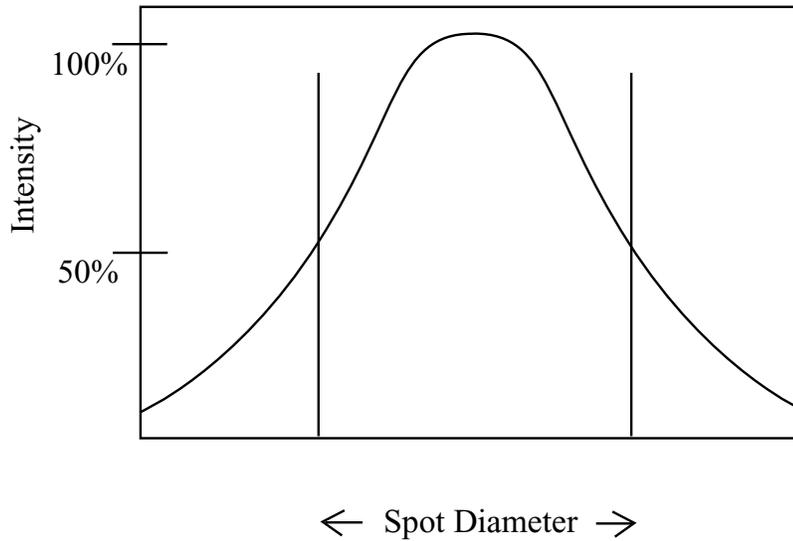
MR 3	.35
MR 4	.40
MR 6	.42
MR 8	.39
MR11	.38

Numerical Aperture (NA): The measure of the sine of the half angle of the light rays that will be accepted by a fiber optic bundle. The NA of the lamp should be less than or equal to the NA of the fiber optic bundle.

Elliptical Terms and Characteristics Explained

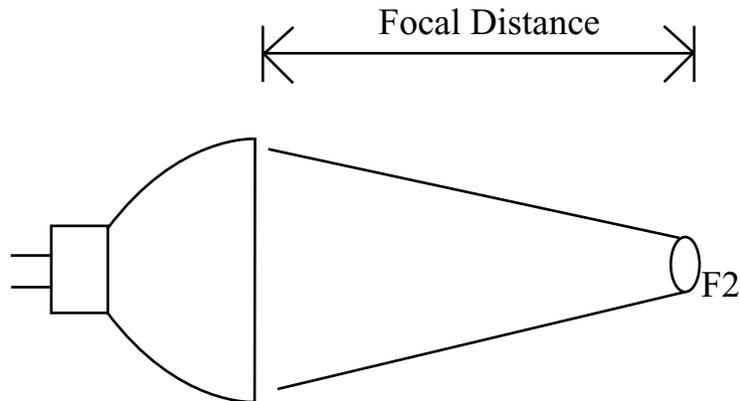
Elliptical reflectorized lamps deliver high intensity light efficiently into small apertures or fiber optic bundles.

Spot Size



For elliptical reflectors spot size is the diameter determined by the edge of the spot having 50% of the center peak intensity.

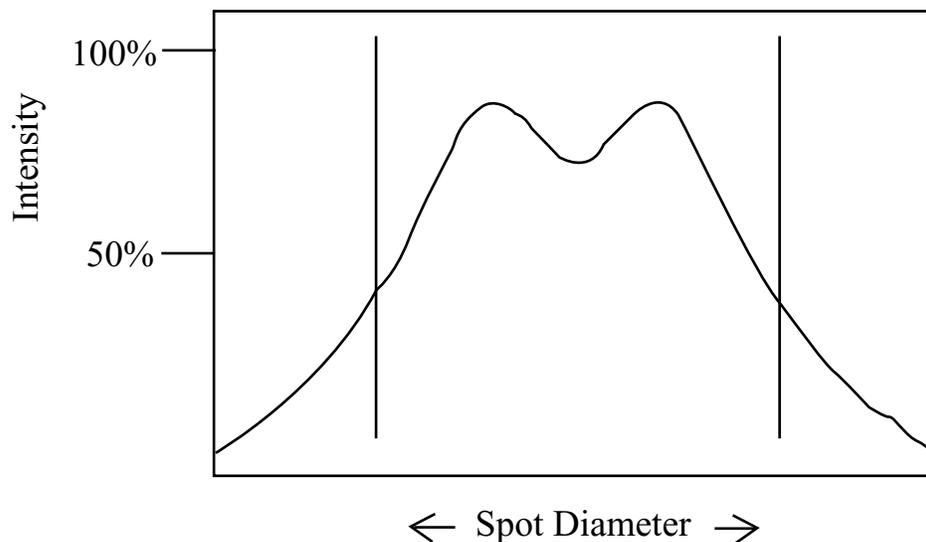
Focal Distance



Focal Distance in elliptical reflectors is measured from the rim of the reflector to the F2 spot location.

F2: The secondary focal point of an ellipse.

Spot Size for Lamps with Large Filaments



In elliptical reflectorized lamps with large filaments (8211-XXX), large spots are produced. In these cases the projected spot is not a point peak. When focused correctly the spot produced is an oblong shape with two peaks of highest intensity at each end.

Lamps with large filaments may have spots that are more oval in shape. In these cases the measured spot diameter is always the narrower diameter.

The projected spot from some elliptical reflectors may *visually* appear to be somewhat off center with the axis of the reflector. However, they are assembled to provide the specified Lux through an aperture on axis at the F2 location. This does not imply the specified Lux would be accepted into a fiber optic system due to NA consideration.

Parabolic Specifications

Lamp	Amps	Color Temp °K	Life Hours	Reflector Size	Divergence Angle ± 2°	Minimum Required Distance From Reflector Rim To Target (mm)	Lux Measured From A Distance Of		Lamp Type G=Gas H=Halogen
							0.9m	1.22m	
3.00 Volts									
7104-005	0.500	3240	20	MR4	4	360	484	-	G
7106-005	0.500	3240	20	MR6	4	360	1280	-	G
4.25 Volts									
8104-003	1.060	3000	650	MR4	9	180	334	-	H
8106-003	1.060	3000	650	MR6	7	180	968	-	H
5.00 Volts									
7104-003	0.970	2800	10,000	MR4	7	180	226	-	G
7106-002	0.970	2800	10,000	MR6	7	125	592	-	G
8208-005	2.000	2880	5,000	MR8	10	305	-	538	
6.00 Volts									
8208-006	1.000	3255	50	MR8	7	305	-	807	H
12.00 Volts									
8211-003	1.000	3280	40	MR11	6	305	-	1323	H
8208-002	1.000	3280	40	MR8	6	305	-	1065	H
8211-006	1.170	3120	200	MR11	6	305	-	1323	H
8208-001	1.670	3000	2000	MR8	9	305	-	1216	H
8211-004	1.670	3000	2000	MR11	9	305	-	1506	H
14.00 Volts									
8208-003	1.790	3200	200	MR8	9	305	-	2152	H

Dimensions are in millimeters. 1 inch = 25.4mm

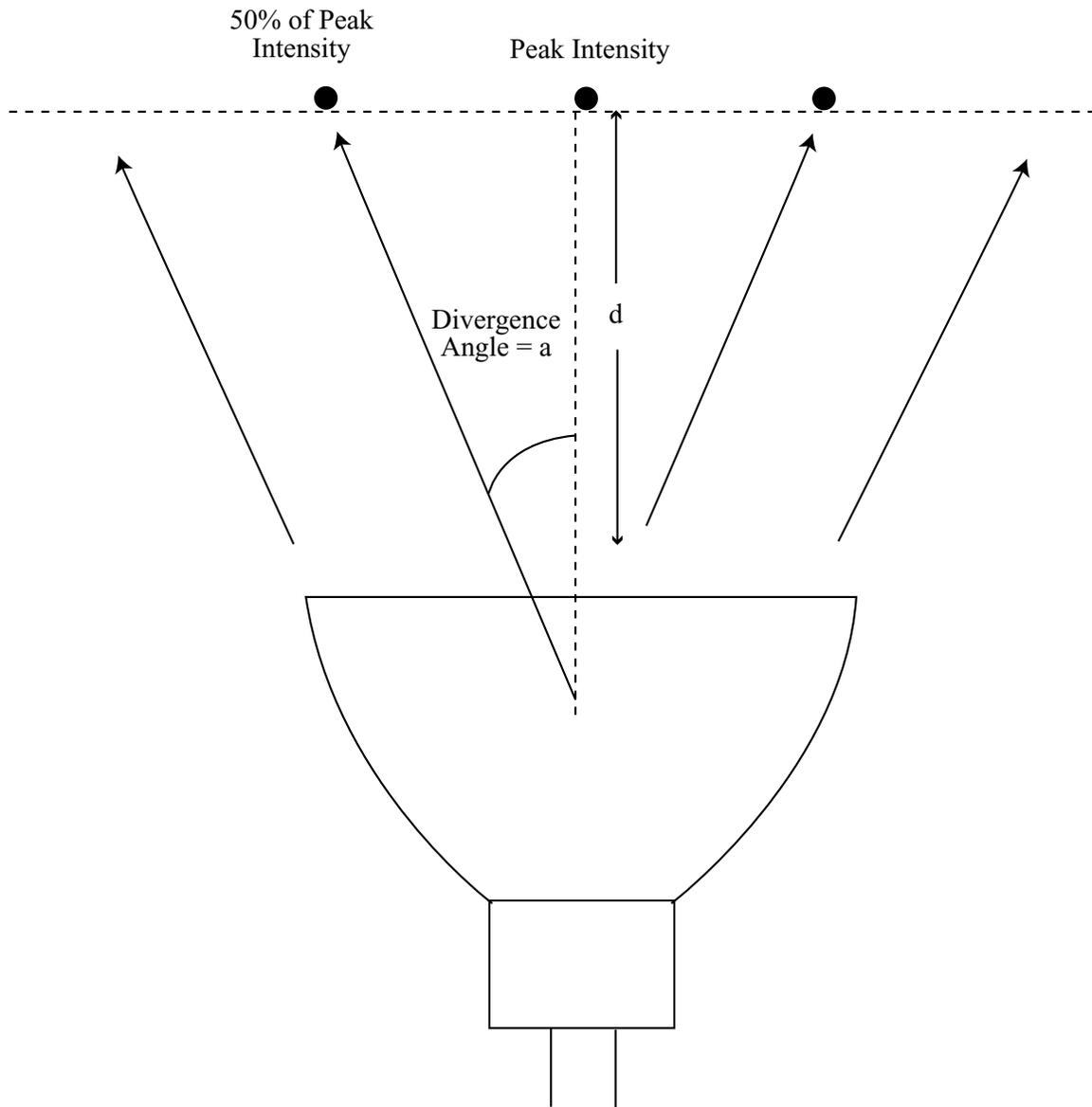
Output is in Lux: Footcandle = Lux ÷ 10.76

NOTES

- Life is the average number of hours until a lamp reaches end of life which is signified by burn out.
- Halogen lamps must be run with minimum heat sinking for optimum halogen cycle.
- Sockets are available to facilitate operation of the reflectorized lamps. For more information contact our applications engineers.
- Although halogen lamps should be run with minimum heat sinking for optimum halogen cycle, heat sinking is required so that the reflector neck temperatures of 105° are not exceeded in lamps using plastic sockets.

Parabolic Terms and Characteristics Explained

Elliptical reflectorized lamps deliver high intensity light efficiently into small apertures or fiber optic bundles.



Parabolic reflectorized lamps are designed with various beam divergence angles which are measured at the 50% intensity points.

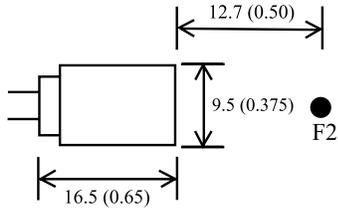
Minimum Distance Required from Reflector Rim to Target: Because the reflectors are true parabolic shapes, the hole in the back of the reflector is imaged at the center of the projected spot at distances less than the specified distance required between the reflector rim and the target.

Spot Diameter = $2 \times (d \times \tan(a/2))$ as defined in the diagram.

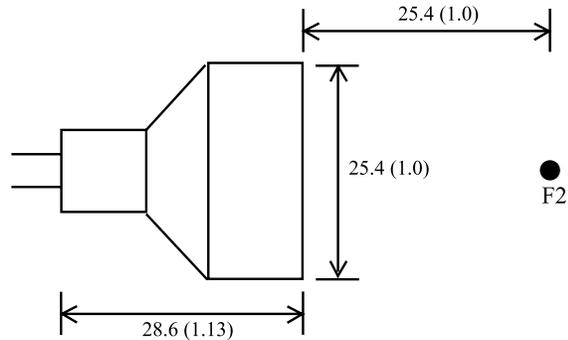
MR Reflector Dimensions in Millimeters (Inches)

Our MR reflectors are aluminum and come with a metallic coating each unit of MR is equal to 3.175mm (.125 inches)
MR3 = 3 (3.175mm).

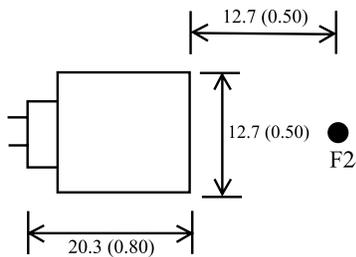
MR3 Reflector



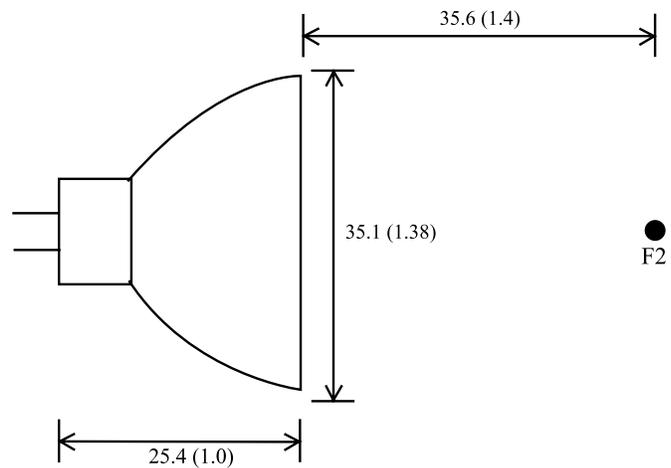
MR8 Reflector



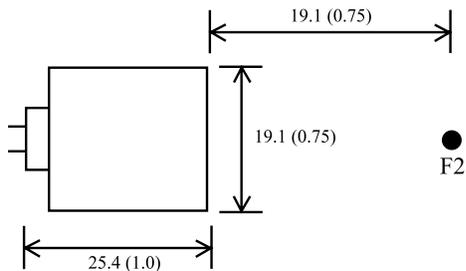
MR4 Reflector



MR11 Reflector



MR6 Reflector



F2 Applies to Elliptical Reflectors ONLY

Glass MR-11 Reflectors with dichroic coating are available upon request. Consult factory at Welch Allyn LPD.