OPTRONIC®
LABORATORIES

STELLAR MAGNITUDES

The brightness of celestial bodies is usually measured in magnitudes. The scale of magnitudes is adjusted so that a star of magnitude +1.00 *(first Magnitude)* gives a luminous flux of 0.832 X 10^{-10} lumen cm^{-2} at a point outside the atmosphere of the earth.

The relation between the visible light received from two stars and their magnitudes is expressed by the formula:

$$\log_{10}\frac{/_1}{/_2} = 0.4(m_2 - m_1)$$

$$\text{or} \quad m_2 = m_1 + 2.5\log_{10}\left(\frac{.832\times10^{-10}}{/_2}\right)$$

$$\text{or} \quad /_2 = \frac{0.832\times10^{-10}}{10^{0.4(m_2-1)}}$$

where $/_1$ = illuminance (.832 x 10^{-10})
m_1 = magnitude (1.0)

M_2 (MAGNITUDE)	$/_2$ (lumens / cm^2)	M_2 (MAGNITUDE)	$/_2$ (lumens / cm^2)
-11	0.525 x 10^{-05}	1	0.832 x 10^{-10}
-10	0.209 x 10^{-05}	2	0.331 x 10^{-10}
-9	0.832 x 10^{-06}	3	0.132 x 10^{-10}
-8	0.331 x 10^{-06}	4	0.525 x 10^{-11}
-7	0.132 x 10^{-06}	5	0.209 x 10^{-11}
-6	0.525 x 10^{-07}	6	0.832 x 10^{-12}
-5	0.209 x 10^{-07}	7	0.331 x 10^{-12}
-4	0.832 x 10^{-08}	8	0.132 x 10^{-12}
-3	0.331 x 10^{-08}	9	0.525 x 10^{-13}
-2	0.132 x 10^{-08}	10	0.209 x 10^{-13}
-1	0.525 x 10^{-09}	11	0.832 x 10^{-14}
0	0.209 x 10^{-09}	12	0.331 x 10^{-14}

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