

11-07-2024 23:50:50
Gain Value: 255
Exposure Value: 29,000,000

Introduction to Sky Quality Meters and How to Use Them

By Martin Mueller



What is a Sky Quality Meter?

A meter designed by Dr. Doug Welch and Anthony Tekatch for measuring the sky's brightness.

Unit: magnitudes per square arcsecond

Magnitude in astronomy terms means “the measure of the brightness of a star.” (Britannica.com)

Arc second is “a given unit of an astronomical object’s size”. (Telescope.com)



Basic term: How bright the stars are in a selected portion of the sky



Model: Unihedron
SQM-L



Model: Unihedron
SQM

How does it work

For the SQM model the KML uses, the range is 17 to 23 magnitudes per square arcsecond. Each reader has different ranges, but still follows the same principle: **the higher the reading number is, the brighter the dark sky is (stars of different brightness are visible to the reader and there isn't any light pollution affecting the view).**

Steps to Using it

1. Point the sensor straight up and press the button
2. Wait until it is done reading (there may be a "chirping" sound indicating it is reading)
3. After reading is done (the display would show a number), record what it displays
4. Repeat Steps 1 to 3 to get multiple readings (we do 7 total for better data)
5. After getting the readings, discard the 1st reading ("prepping" the reader), and take the average reading of the other readings



When to do dark sky readings with the SQM reader

Factors for good readings: little to no clouds, open skies, do it during the New Moon phase, the sun is at least 18 degrees below the horizon, be away from direct light sources (ex. If the light is 15 feet above the ground, be at least 15 feet from it)

If you can't do it on the night of the New Moon, do the reading when the moon is below the horizon to not have the moon light affect the readings.

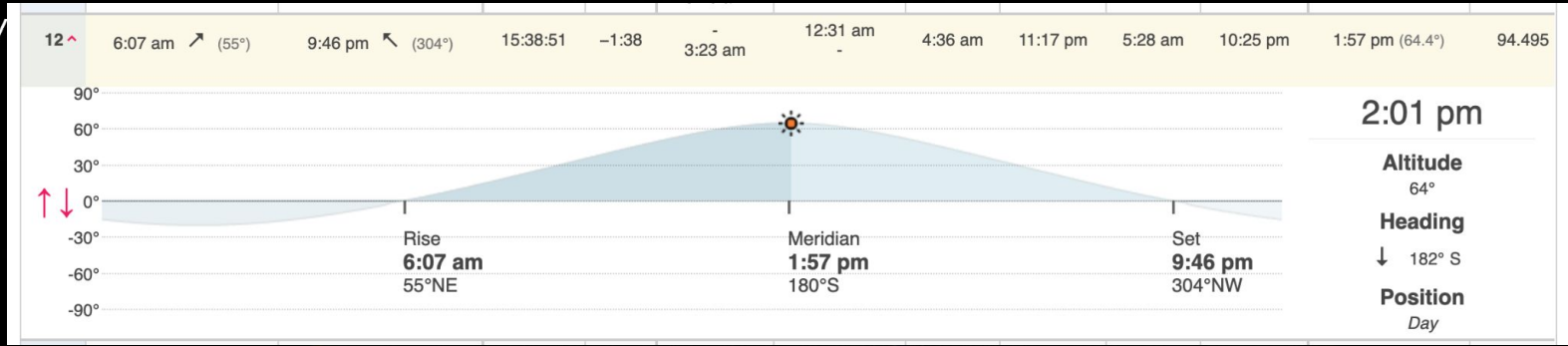
timeanddate.com is helpful in giving you the times based on your exact location. Make sure to place the correct location for the correct times of moonrise, moonset, sunrise, and sunset.



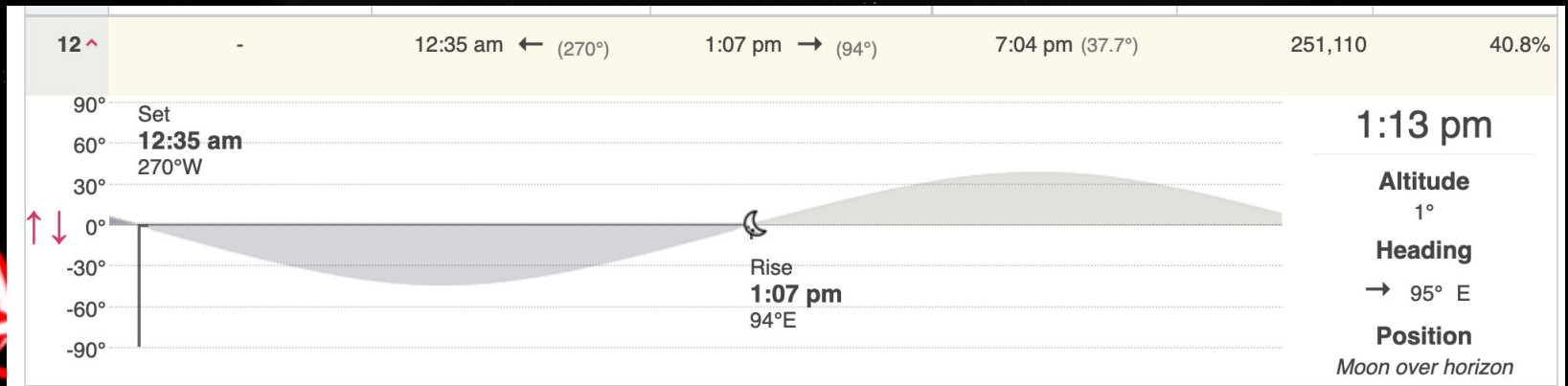
11-07-2024 23:50:50

Gain Value: 255

Exposure V



July 12th - Sun Position (Timeanddate.com)



July 12th - Moon Position (Timeanddate.com)



11-07-2024 23:50:50
 Gain Value: 255
 Exposure Value: 29,000,000

Examples of SQM Readings Taken Here

Location	Zenith Readings	Date	Time	Temp (°F)	Reading 1	Reading 2	Reading 3	Reading 4	Reading 5	Reading 6	Readings Taken By:
Hole 1 Tee Box	21.39	Avg									
	20.78	2/18/2021	12:00 AM	6 *	20.79	20.79	20.77				John Mueller
	21.11	3/6/2021	11:15 PM	13 *	21.10	21.12	21.12				Nick Niffin
	21.14	3/12/2021	9:00 PM	20 *	21.14	21.15	21.12	21.22	21.11	21.12	John Mueller
	21.51	4/3/2021	10:11 PM	47	21.53	21.42	21.53	21.54	21.53	21.49	John Mueller
	21.51	4/9/2021	10:40 PM	48	21.50	21.52	21.42	21.52	21.56	21.52	John Mueller
	21.84	5/11/2021	11:26 PM	44	21.82	21.82	21.83	21.86	21.81	21.89	Martin Mueller
	21.68	5/12/2021	11:30 PM	48	21.65	21.64	21.70	21.72	21.67	21.68	Martin Mueller
	21.31	6/8/2021	11:48 PM	60 *	21.26	21.30	21.35	21.35	21.31	21.29	Martin Mueller
	21.67	7/10/2021	12:13 AM	60	21.67	21.71	21.65	21.66	21.66	21.65	John Mueller
	21.34	8/9/2021	10:53 PM	66	21.32	21.26	21.29	21.37	21.41	21.36	John Mueller
	21.77	9/10/2021	10:32 PM	65	21.76	21.72	21.76	21.78	21.79	21.78	Martin Mueller

Total Readings from February 2021 to July 2024 (Present): 1,063

Average SQM: 21.43



Examples of SQM Readings Taken Elsewhere

Hebard Park	20.91	4/15/2021	10:08 PM	40	20.88	20.87	20.90	20.92	20.92	20.97	John Mueller
Copper Harbor State Park	21.39	4/15/2021	10:20 PM	40	21.36	21.39	21.38	21.38	21.40	21.40	John Mueller
Astor Shipwreck Park	21.49	4/15/2021	10:30 PM	40	21.64	21.47	21.39	21.41	21.31	21.71	John Mueller
Fort Wilkins State Park	21.57	4/15/2021	10:36 PM	40	21.60	21.59	21.55	21.57	21.56	21.57	John Mueller
Lake Superior at Jamsen's Bakery Dock	21.33	4/15/2021	10:43 PM	40	21.32	21.30	21.31	21.34	21.37	21.33	John Mueller
Copper Harbor Community Center	21.34	4/15/2021	10:48 PM	40	21.37	21.32	21.33	21.35	21.32	21.32	John Mueller

Note on Hebard Park: Sunlight wasn't completely gone during the reading



11-07-2024 23:50:50
Gain Value: 255
Exposure Value: 29,000,000

Questions?

