

Using Meade Series 4000 Color Filters on the Moon and Planets

Meade Photo-Visual Color Filters are manufactured of high-quality optical glass, dyed-in-the-mass, and coated to increase light transmission. The clear aperture of each color filter is 25mm. Meade filters are mounted in machined cells which thread into the barrels of virtually every eyepiece with 1.25" outside barrel diameter (O.D.) available today, including all Meade 1.25" O.D. eyepieces. In addition, a second thread inside the filter cell permits stacking, or piggybacking, of two or more filters at one time, to achieve selective filtration of the visual color spectrum.

The most important purpose of color filters in astronomical applications is in the enhancement of visual detail and increase in observable contrast, on the Moon and planets. In this application, filters often provide the difference between seeing fine detail or not.

This sheet is a primer on the use of color filters in lunar and planetary observing. For each filter color listed below are its Wratten Number (e.g. #23A, #47, etc), its light transmission, and its most common applications.

#8 Light Yellow (83% transmission): Useful in observing red and orange colored phenomena in the belts of Jupiter, and in enhancing the level of observable detail of small orange-red zonal features within the belts of the planet. Increases contrast of maria on Mars. Also results in improved resolution of detail on Uranus and Neptune in instruments of 10" aperture and larger. A popular filter for the enhancement of lunar features, particularly in telescopes of 8" aperture and smaller.

#11 Yellow-Green (78% transmission): Contrasts well with the red and blue characteristics of surface features on Jupiter and Saturn. Darkens the maria visible on Mars and improves visible detail on Uranus and Neptune in larger telescopes.

#12 Yellow (74% transmission): Contrasts strongly with blue-colored features on Jupiter and Saturn, while enhancing red and orange features. Lightens red orange features of Mars, while reducing or blocking the transmission, and thereby increasing the contrast, of blue-green areas. Useful in increasing the contrast of lunar features in telescopes 6" aperture and larger.

#21 Orange (46% transmission): Reduces or blocks transmission of blue-green wavelengths. Use on Jupiter and Saturn to enhance detail in the belts and Polar regions. Sharpens boundaries between yellow-orange areas and blue-green regions on Mars, resulting in a darkening of edge detail in the maria.

#23A Light Red (25% transmission): On telescopes of 6" aperture and larger, the #23A does approximately the same functions as the #21 filter, but with stronger contrast and enhancement of marginally defined blue-green surface detail. Useful primarily on Jupiter, Saturn, and Mars. Increase contrast between Mercury and bright blue sky during daylight observations or during twilight.

#25A Red (14% transmission): The #25A filter strongly blocks the transmission of blue and blue-green wavelengths, resulting in very sharply defined contrast between, for example, blue tinted cloud formations on Jupiter and the lighter toned features of the disc. Also useful for delineation of the Martian polar ice caps in

maria. Because of its relatively low total light transmission, the #25A should be employed on telescopes of eight inches aperture and larger.

#38A Dark Blue (17% transmission): A popular filter for study of Jupiter's disk, owing to the filters strong rejection of red and orange wavelengths. Increased contrast between the reddish belt structures and enhances detail of the Red Spot. Also useful for the study of isolated phenomena, such as dust storms on Mars, as well as the belt structure on Saturn. Increases contrast of subtle cloud markings on Venus.

#47 Violet (3% transmission): Strongly rejects red, yellow, and green wavelengths; useful for the study of Martian polar cap regions, and for the observation of occasional phenomena in the upper atmosphere of Venus. Enhances contrast between the rings of Saturn. Use only on telescopes of 8" apertures and larger.

#56 Light Green (53% transmission): Excellent for observation of Martian polar ice caps as well as the yellow tinted dust storms on the Martian surface. Increases contrast of red and blue regions in Jupiter's atmosphere as well as in the cloud belts. Also useful for enhancing lunar detail.

#58 Green (24% transmission): Use on telescopes of 8" aperture and larger to reject blue and red toned structures on the surface of Jupiter and thereby increase the contrast relative to lighter parts of the disc. Also used for the enhancement of Saturn's cloud belts and polar regions. Strongly increases contrast of Mars polar ice caps and increases contrast of atmospheric phenomena on Venus.

#80A Blue (30% transmission): The most popular filter for the study of Jupiter and Saturn. Enhances contrast of rills and festoons in Jupiter's cloud belts, as well as detail of the Red Spot. Brings out detail in Saturn's belts and polar phenomena. Very useful as a contrast enhancing lunar filter.

#82 Light Blue (73% transmission): Useful on the Moon, Mars, Jupiter, and Saturn, this subtle pale blue filter enhances areas of low contrast while avoiding significant reduction of overall image brightness.

ND96 (0.9 Density; 13% transmission): This neutral density filter transmits uniformly across the entire visual spectrum. As such, it serves as an excellent filter to reduce glare and irradiation when observing the Moon with any telescope 4" and larger. The ND96 filter may also be employed in the splitting of close double stars, where one of the binary pairs significantly exceeds the other in brightness.

Important! Meade Series 4000 color filters should never be employed to observe the Sun! Instant and irreversible eye damage, as well as physical damage to the telescope itself, may otherwise result.

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