

Aperture The aperture defines the size of the telescope; it is simply the diameter of the instrument's prime optic expressed in millimetres or inches. A 200mm or 8inch reflector telescope has a 200mm-diameter mirror. In general, the larger the instrument's aperture, the brighter and clearer the image it will produce.

Astigmatism Astigmatism is an optical aberration that spreads the image out into an ellipse or line. It can be caused by poorly made or mounted optics that distort the mirror or lens.

Barlow Lens Barlow lenses, sometimes called negative lenses, increase the effective focal length of a telescope and double or triple the power of an eyepiece. A 2x Barlow will convert a 20mm eyepiece to 10mm. They are useful accessories as they effectively double the number of eyepiece power combinations.

Chromatic Aberration A characteristic of refractor instruments, chromatic aberration occurs when all the visible colours are not in focus at the same place. The result is a halo of blurred colour around bright objects.

Collimation Collimation is the adjustment to a telescope's optics to ensure they are all aligned to one another. Refractor instruments rarely need re-collimating, but most reflectors, particularly Newtonians will need adjustment at intervals in their life. Any competent owner can usually undertake collimation.

Coma Coma is an aberration affecting images away from the centre of the field of view which gives bright objects a flared appearance and comet-like tails pointing in towards the centre of view.

Contrast Contrast is the difference in brightness of an object against its background or the difference in brightness across its surface. Since most objects are inherently low in contrast anyway, any other light interference will further reduce contrast and obscure detail.

Declination

Declination is the celestial equivalent of latitude. Imagine the circular lines of the Earth's equator and northern and southern latitudes extended out into space. The equator becomes the celestial equator. Measurements are in degrees North and South of the celestial equator, the North celestial pole being +90 degrees and the South-90 degrees. The height an object appears above the observer's horizon is its declination

Diffraction Limited A term given to mean the level of performance that would be apparent if there was no atmospheric disturbance to distort the view. Unless you are beyond the Earth's atmosphere, there is always some atmospheric disturbance present.

Eye Relief Eye relief is the distance the eye must be from the eyepiece in order to be able to see the whole field of view. With all eyepieces, the higher the power, the worse the eye relief and hence the greater difficulty experienced in looking through them. Longer eye relief, of about 15mm, is desirable, particularly for spectacle wearers.

Eyepiece While the telescope's main mirror or lens gathers the light and forms the image, the eyepiece magnifies the image. The quality of the eyepiece must match that of the optics to give optimum viewing performance.

Exit-pupil The optimum size of diameter (1.7-2mm) that will illuminate individual light cones within the eye, thus exploiting the eye's maximum resolving power when adjusted to night-vision.

Field of View The Field of View is the amount of sky seen through a telescope's eyepiece. Eyepiece specifications usually express the field of view in degrees. It is generally best to choose a specification with a field of view of at least 40 degrees.

Finderscope A low-power telescope attached to the main telescope. It makes aiming the main instrument accurately much easier.

Focal Length The focal length is the length of the light path from the main lens or mirror to the focal point, the eyepiece. The longer the focal length, the higher the power the telescope will produce with any given eyepiece.

Focal Ratio Telescopes are given speed ratings similar to photographic cameras. It is the focal length divided by the aperture. So a 150mm telescope with a focal length of 750mm has a speed of f/5 ($750/150 = 5$). Low f/numbers offer lower powers and wider fields of view than the slow, higher speeds

Inverted View The optics of a telescope, particularly a Newtonian, turns the view upside-down so that North appears at the bottom and South at the top of a view.

Parabolic Mirror A mirror formed in a precise curve to cause the incoming light rays to be focused at the same point.

Reversed View Sometimes referred to as mirror reversed view, it is where the image is reversed left-to-right by the reflecting mirror of the telescope.

Rich Field Rich-Field Refractors are short focus wide field telescopes that bring all the light gathered by the objective lens to a focus that presents an exit pupil which is the same diameter as the night-adapted eye.

Right Ascension Right Ascension is the equivalent to the Earth's lines of longitude. While the Earth's zero point is defined as the Greenwich meridian, the celestial zero point is the Vernal Equinox. The right ascension of a celestial body is the angle between the meridian on which that body lies and the Vernal Equinox, as measured along the celestial equator.

Unlike the terrestrial longitude which is measured in degrees either east or west of Greenwich, the celestial scale is usually measured in units of time and is always measured eastwards from the Vernal Equinox. .

Setting Circles Most equatorial mounts have setting circles built into them, one on each axis. The polar axis has a circle scale divided into 24 equal parts each equivalent to one hour right ascension. The declination axis's circle has degrees of declination, from 90 degrees North to 90 degrees South. With the mount correctly aligned to the celestial pole, an object may be located by setting its co-ordinates on the circles.

Spherical Aberration An aberration that prevents light reflecting from the perimeter of the objective from focusing at the same point as light from the centre. The result is loss of detail and haloes of unfocused light around objects.

Star Magnitude The Star Magnitude or brightness is a rating on a scale that gives the brightest stars a low magnitude, and the faintest stars the highest number. Each step on the scale is 2.5 times difference in brightness; five steps on the scale indicate a difference of 100 times comparative brightness.

Wave Front Error Measured in fractions of a wavelength of green light, it indicates how far from a perfect surface the actual optical surface deviates. While there is no agreed industry standard by which to compare the performance of an instrument's optics, a waveform error in excess of a quarter wave is unacceptable.