How to Choose a Spotting Scope

Daytime Viewing or Astronomy – What do you want to do with your telescope?

Telescopes can be used for either daytime viewing (bird watching, scenic views from home or while traveling, hunting, target shooting, or telephotography) or astronomy. Daytime use telescopes are often called “Spotting Scopes”. Some daytime scopes can be used for astronomy and some (not all) astronomy telescopes can be used for daytime viewing. You need to determine your purposes for using a telescope before determining which scope is right for you!

2 Designs of Spotting Scopes (Refractor and Catadioptric)

Refractor Design

Refractor telescopes are probably what most of us think of when we hear the word “Telescope”. Refractors have a tube in which light passes in a direct line from the front objective lens directly to a prism and eyepiece at the opposite end of the tube.

Catadioptric Design

Catadioptrics use a combination of mirrors and lenses to fold the light path and form the image through a shorter, more portable tube. These are a newer design in the world of telescopes (40 years) and offer greater portability for large aperture astronomy models.

Refractor or Catadioptric?

Spotting scopes are either refractors or catadioptrics. Catadioptric models generally have larger apertures (lens diameter) and longer focal lengths making them more suitable for astronomy. Typical refractor model spotting scopes are usually more compact, rugged and portable and thus better for fieldwork.

Magnifications for Daytime Viewing

Most daytime viewing is done at magnifications ranging from 15 power to 60 power. (Binoculars generally provide 7-10 power). There is a limit to how much you can clearly magnify an image during the day and that limit is a function of the clarity of the air. Heat, moisture, fog, pollution, or dust will also be magnified along with your ultimate target. Heat or fog magnified 60 times looks hotter or foggier than if it was magnified 20 times! **Higher power, therefore, does not always look as clear as lower power.**

Field of View

The angular field of view, or the size of the area viewed from side to side, is expressed in degrees. Linear field of view refers to the width of the area, in feet, that can be observed at 1,000 yards in front of you. Angular field can be converted to linear field by multiplying each degree by 52.5 feet.

Generally speaking, the lower the power, the wider the field of view. Higher magnification has a narrower field of view.

Lens Diameter – Brightness

The larger the spotting scope's objective lens (front lens), the more light it gathers and the brighter your image will be. Most spotting scopes have lens diameters ranging from 60mm to 90mm. The larger diameter models are heavier for fieldwork but will give you better, brighter performance in the dark woods or in the lowlight of dawn or dusk.

Lens Coatings – Clarity and Color Resolution

Optical coatings are important because they improve the amount of light throughput. Better coatings allow more light to pass through the instrument to your eye. Better coatings also provide for greater clarity, contrast and color resolution. Lens coating levels range in quality as follows: coated, fully coated, multicoated and fully multicoated with fully multicoated giving you the best light transmission. Terminology may vary from one manufacturer to another; some "multicoated" lenses may in fact be fully multicoated. And not all coatings are created equally: better manufacturers have proprietary, sometimes patented, coatings that give better performance.

Angled Body or Straight-Through Body

Spotting scopes are available with eyepieces set at a 45-degree angle from the scope body or in a straight line with the spotting scope. Catadioptric designs usually have 45 degree eyepiece angles (and low power auxiliary finderscopes) which is preferable if you choose to use your spotter also as an astronomical instrument.

One design is not better than the other; rather it is simply a matter of personal preference.

The straight-through eyepiece design can provide a more natural "line of sight" view, making it easier for users to properly aim the spotter at the target they are seeing with the naked eye.

Angled eyepiece designs may be more comfortable if you are sharing the instrument with users of different heights, i.e. children. The angled design is also more comfortable looking at overhead objects or views.

Tripods

Spotting scopes mount on camera or video tripods that are generally sold separately from the spotter. If you have a sturdy camera or video tripod, it may be sufficient for your spotter. The tripod must be sturdy enough to steadily hold the scope with a minimum of vibration.

If you are purchasing a tripod for a spotter, we recommend video tripods because they "pan" smoothly as you move the scope. Both camera and video tripods have a ¼" 20 standard screw on the head of the tripod that can also be used with still cameras or video cameras.

Suitability for Astronomy

Spotting scopes can be used for astronomy with varying degrees of success. We recommend a minimum of an 80mm aperture (lens diameter), an angled eyepiece and an auxiliary finderscope for that purpose. A spotting scope this size (used in dark-sky conditions) will provide excellent images of the moon and good images of Jupiter, Saturn and many bright "deep sky" objects.

Near Focus

Near focus is the distance between the instrument and the nearest object you can focus on, while maintaining a sharp image. This feature is important if you have a nearby bird feeder or if you want to do photographic work.