

# Binoculars Buying Guide 2016



Binoculars are a pair of small identical telescopes mounted side by side, allowing the user to view distant objects through both eyes.

Deciding which binoculars to buy can be a confusing task, so we've put together a glossary of the most commonly used terms which should help you find the correct binoculars for your specific needs.



## Magnification x Objective Lens Diameter

Binoculars are most commonly described by their magnification and objective lens size, for example 7x50mm, 8x40mm, 10x26mm etc. The first number refers to the magnification power of the binoculars (how many times closer the object appears compared to the naked eye). The second number specifies the diameter of the objective lens, this determines how much light will be transmitted through the binoculars, bringing an image into focus. For example, for the PRAKTICA Discovery 8x42 binoculars the 8x refers to the magnification and 42mm is the diameter of the objective lens.



When choosing binoculars, you have to bear in mind what you are going to use them for. Most PRAKTICA binoculars have recommended uses, for example binoculars with a 26mm objective lens are compact in size, making them perfect for spectator events such as horse racing or concerts.

Larger objective lens diameters, for example 34mm or 42mm, are usually able to produce brighter images in poor light conditions making them perfect for birdwatching. The downside of having a large objective lens is generally the increased size and weight of the binoculars. Please also bear in mind that higher magnifications are likely to reduce the field of view, making fast moving objects harder to see.

## Porro Prism vs Roof Prism Design

### Porro Prism

Binoculars with a porro prism system have glass elements that are offset from one another, creating total internal reflection. This creates an image with a greater depth of perception and wider field of view. The porro prism structure has a more 'traditional' stepped shape with an angled body and are generally larger in size.



## Roof Prism

Roof prism binoculars have aligned objective lenses and eyepieces. They are generally more compact than porro prism binoculars and can be recognized by a straight-through appearance. The first internal surface of the roof prism system does not have total internal reflection, therefore additional coatings are required to create a clear, sharp image. As a result roof prism binoculars are generally more expensive than porro prism binoculars.



High end models of each design are now generally considered to be of equal optical quality, so it is down to personal preference on which style you decide to buy.

## Waterproof and Fogproof

### Waterproof

Fully waterproof binoculars and spotting scopes are completely sealed internally. This is also known as an O-ring seal which ensures that there is an air and watertight barrier between the lenses, focusing mechanism and the chassis of the binoculars. Most binoculars nowadays tend to be waterproof, which means they are suitable for use in all weathers.



### Fogproof

Exposing an optical device to rapid temperatures can cause the lenses to mist up. To protect the binoculars against this, manufacturers replace the air inside the optical barrels with nitrogen which has no moisture content and therefore does not condense. This also called nitrogen purged. Please note that if your optics are described as weatherproof it means that they are not fully waterproof or fogproof. They will have some resistance to water so can survive light rain, but can definitely not be held under water for any period of time.

## Focusing

### Focus Wheel

There are two main types of focus systems; central focusing and individual focusing. The first has one centralised wheel which enables the user to focus both barrels at the same time. They are better for watching long distance fast moving subjects. Individual focusing allows the user to focus each eyepiece separately using two focus wheels. The majority of binoculars now have central focusing systems, however for more specialist areas including marine and astronomy individual focusing can be preferred.



## Diopter Adjustment

Binoculars with a central focusing system have a diopter adjustment ring, usually located on the right eyepiece. This allows for any differences between the user's vision in their left and right eye.

The diopter adjustment is usually marked with - 0 + and can be calibrated by:

1. Firstly shut your right eye and leave your left eye open (do the opposite if the diopter adjustment is on the left eyepiece)
2. Use the center wheel to focus on an object about 8 - 10 meters away (approx 30ft) until it becomes clear
3. Open your right eye and shut your left eye
4. Now look at the same object and turn the diopter ring until it comes into focus
5. Look through the binoculars with both eyes open, and you should have a clear, crisp image



This adjustment should only be carried out once, unless you change the settings of your binoculars or share them with someone else. From then on it is only a matter of focusing on the subject using the center focus wheel.

## Interpupillary Distance

The interpupillary distance (or the distance between the pupils) varies from person to person. In binoculars it is abbreviated as IPD and is measured in mm. The IPD range indicates the distance the binoculars can be adjusted so that your binoculars are correctly aligned to your pupils.

It is important that you find a pair of binoculars which lines up perfectly with your pupils so that you can achieve a single, clear image.



## Eyecups

Eyecups maintain the distance between the oculars and our eyes and help reduce stray light while using your binoculars. Many eye-cups are made from rubber and can roll up or down depending on whether you use glasses or not.

The more advanced binoculars are built with twist-up eyecups which can be adjusted into a number of different positions (rather than just all the way up or down), so that you can find the perfect eye relief for your vision.



## Eye Relief

Eye relief is important for eyeglass wearers as it represents the distance a binocular can be held away from the eye whilst still maintaining the optimum field of view. An extended eye relief of 16mm+ allows users to wear their glasses at all times and see the entire field of view without any hassle. The PRAKTICA Pioneer 8x42mm binoculars are perfect for this function as they have an extended eye relief of 17.3mm.

## Exit Pupil

Exit pupil represents the amount of light that enters the eye, it can be determined by dividing the objective lens diameter by the magnification power. This feature is important because it can influence the binoculars performance in low light, in other words a smaller exit pupil will produce a darker image in low light whereas a larger exit pupil will help produce brighter images in low light. The exit pupil should only influence your buying decision if you plan to use your binoculars at dusk or at night.



Exit Pupil Size

## Prism Glass

Optical glass quality can vary widely amongst binoculars. BAK-4 is a high quality optical glass which transmits bright images due to low levels of peripheral light loss. BK7 is found more often in binoculars, especially in models that are of a lower price point. Although they are not the same quality as BAK-4, BK7 in most cases do still produce a satisfactory image quality.

A- Ocular Lens

B- Prism Glass

C- Focusing Lens

D- Objective Lens



Internal Structure of Binoculars

## ED Glass (Extra Low Dispersion Glass)

This type of glass eliminates chromatic aberration, therefore producing clearer, sharper images with better resolution. ED is the best quality glass and commonly found in the most expensive models of binoculars, for example the PRAKTICA Ambassador and Marquis binocular series.



## Field of View

Field of view represents the widest size of an area that can be viewed when using the binoculars. As a rule the higher the magnification, the narrower the field of view. A binocular that has a wide field of view is better for observing sporting events or following fast moving objects such as birdwatching and wildlife. Field of view is expressed in degrees or feet/meters (such as 6.5° or 140 m at 1,000 m). Roughly, 1°=17 m at distance of 1,000 m. The PRAKTICA Marquis 8x42mm binoculars are perfect for following animals or sport as they have an impressively large 7.8° angular field of view.



## Coating

Generally all good quality binoculars have a basic anti-reflection coating on their lenses which assist with light transmission and help produce brighter images with improved contrast.

### Types of coating

**Coated** - a single layer of anti-reflection coating has been applied to some lens elements in the binoculars, usually the first and last elements.

**Fully coated** - all lenses have a single layer of coating.

**Multi-Coated** - some surfaces (usually the first and the last layers) have multiple layers of anti-reflection coatings.

**Fully multi-coated** - there are multiple layers of coatings applied to all lenses. This provides users with the highest level of resolution and contrasting views.

