

How to Use Binoculars

What are binoculars? Basically two telescopes mounted together and aligned so they are looking at the same place.

What do the numbers mean (i.e. 9x25 or 8x42)?

- The first number is the magnification. The image you are looking at will appear 8 times or 9 times bigger than when viewed with the naked eye.
- So, bigger is better? No. With increasing magnification, handshake becomes more evident. Past 10x and a tripod can become necessary.
- The second number refers to the diameter of the objective lens in millimeters. The higher the number, the more light gathering capabilities of the binoculars.

What is exit pupil? The size of the light beam projected by the binoculars to your eye. Dividing the objective lens by the magnification provides the exit pupil ($42 / 8 = 5.25$). An exit pupil of 5-7 mm is more suitable for nighttime viewing, while an exit pupil of 2-3 mm is fine for daylight viewing.

- If you hold your binoculars at arms length and look at the center of the eyepiece lens, you can see a small circle of light. This is the exit pupil.
- What happens to your pupils, as it gets darker outside? Your pupils dilate and get larger. Thus, as conditions become darker you'll really notice the difference in exit pupil—the smaller it is, the more distortion you will see around the image.

What types of binoculars are there? A prism is a block of glass with a triangular section having accurately polished edges that are used to reflect light.

- Porro Prism: Named for Italian inventor from the mid-1800s. There are two right angles prisms in each barrel, which gives the angled body binocular design. This style is slightly bulkier, but more affordable and it generally offers better performance.
- Roof Prism: This style is more compact and has straight barrels. They are technically more difficult to make and the glass need to be of higher quality. Thus, these can be more expensive than Porro prism.

What is eye relief? It is the distance between the ocular lens and the exit pupil. If the eye relief is too short, "blacking out" will occur around the periphery of the vision. Many binoculars require that you twist out the eyepieces for those who do not wear eyeglasses.

What is Interpupillary distance? It is the distance between the pupils of your eyes. Since it is different for each person, binoculars can be adjusted to fit different people. Open the binoculars all the way, then observe a distant object while folding them shut until a perfect circle is formed.

How do I focus my binoculars?

- Set the correct interpupillary distance.
- With your right eye closed, focus your left eye on a distant object with the center focus wheel until the targeted object is in sharp focus.
- To adjust the right eye, close your left eye and focus your right eye on the same distant object. Focus using the diopter ring until the object is sharply focused. Note the diopter setting if you are sharing your binoculars with someone.

How do I take care of these binoculars?

- Note that some binoculars are waterproof. Think of them more as water resistant and keep them above water!
- Rubber coating on binoculars is a nice feature because they inevitably get knocked around. It also makes them easier to grip in slippery situations.
- Store the binoculars with the eyecup pushed in.
- Use the rain guard and lens caps while in the field. This will minimize the amount of debris they gets on the lenses.
- Store the binoculars in the case when they are not in use.
- **Do not look directly into the sun or any other intensive light source. This could severely damage the retina and cornea of your eyes.**

How do I clean my binoculars?

- Try to keep the lens surface free of dirt, oils and dust. Use the caps.
- First, remove dust and grit from the lens with pressurized air or a soft camel's hair brush.
- Second, fog the lenses with your own breath to help clear the lens of smudges, fingerprints, etc. Then, only use a non-abrasive cloth. Do NOT use your shirt, Kleenex or toilet paper. These will scratch your lenses.