



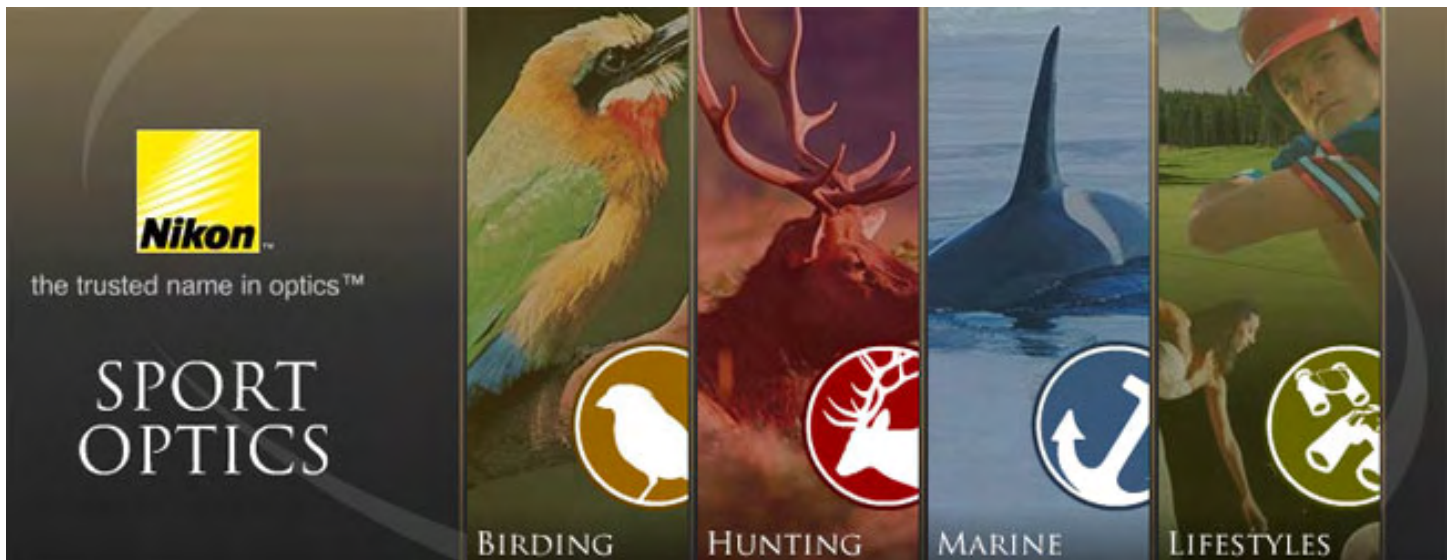
## 2013 DEALER RESOURCE

SPORT AND RECREATIONAL OPTICS



# ***Nikon Sport Optics***

***Nikon.ca***



## Binocular Uses

- Hunting
- Bird Watching
- Boating and Marine
- Star Gazing
- Surveillance
- Travel
- Opera and Theatre
- Spectator Sports
- Camping
- Photography

## Key Buying Times

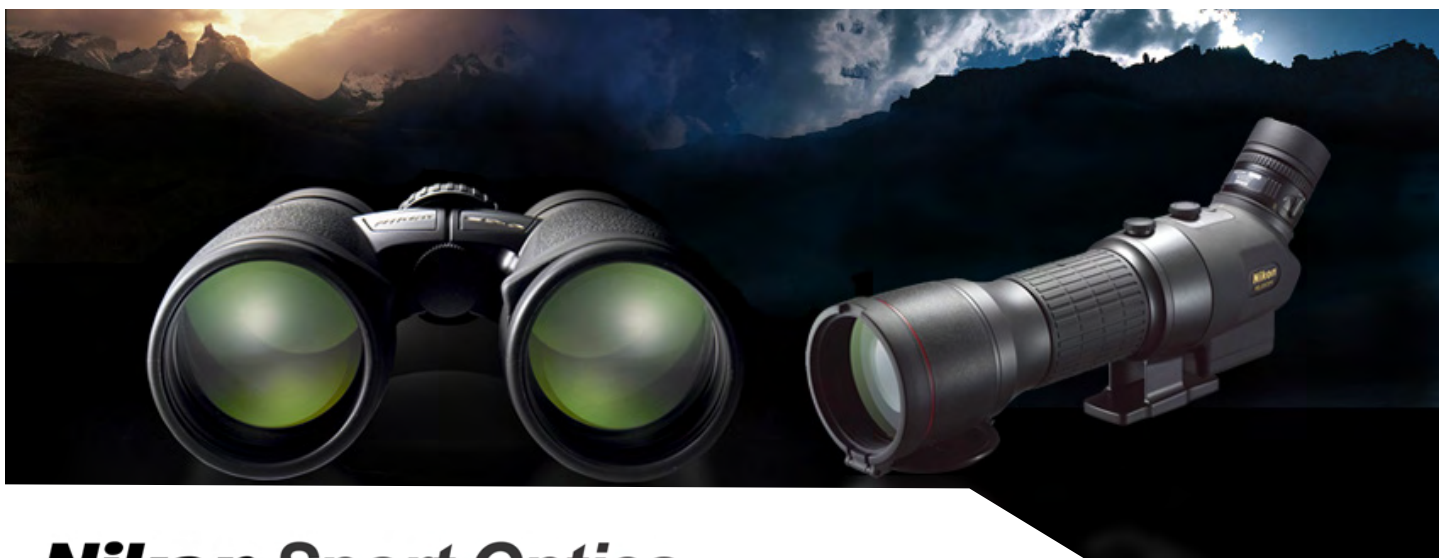
- |                    |                        |
|--------------------|------------------------|
| • Fall Hunting     | (Summer purchase)      |
| • Spring Hunting   | (late-Winter purchase) |
| • Father's Day     | (June)                 |
| • Mother's Day     | (May)                  |
| • Spring Migration | (May)                  |
| • Fall Migration   | (October)              |
| • Christmas        | (Fall)                 |



### *Sales Tip*

**BINOCULARS CAN BE USED FOR ALMOST ANY OUTDOOR ACTIVITY AND WILL ENHANCE THE USER'S EXPERIENCE.**





# ***Nikon Sport Optics***

## **About Nikon**

Nikon is the world leader in Sport Optics and is globally recognized for setting standards in product design and performance. The unique strength of the Nikon brand is attributable to the company's unwavering commitment to quality, performance, technology and innovation. Nikon Canada Inc. markets and distributes Binoculars, Riflescopes and Fieldsopes through a network of Authorized Nikon Canada Dealers.

To learn more about Nikon Canada, please visit [Nikon.ca](http://Nikon.ca)



## **Nikon Hunting**



The cutting edge in Hunting Optics. An adventurous spirit and dedication to success demands performance above all else.

## **Nikon Birding**



The world's greatest adventurers have trusted Nikon's legendary ED glass in NIKKOR® lenses to capture some of the most breathtaking imagery ever attempted.



**Sales Tip**

**HAVING THE RIGHT BINOCULARS OR FIELDSCOPE TO SUIT AN INDIVIDUAL'S NEEDS IS VERY IMPORTANT. ASK ABOUT THE USE AND SEASON TO HELP CHOOSE.**

# PROPER FOCUSING

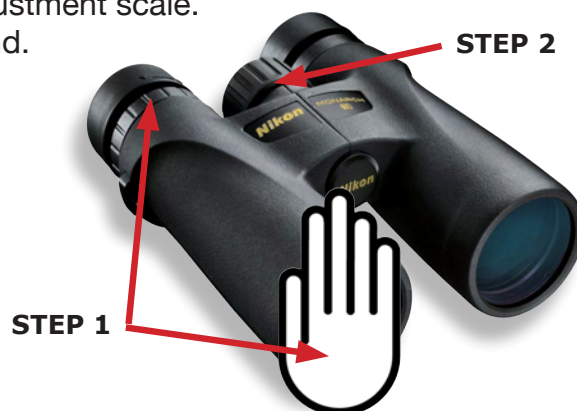
## How to properly adjust for your vision



**STEP 1:** Set the diopter ring to the centre of the adjustment scale. Cover the right objective lens with your hand.

**STEP 2:** Pick an object in the middle distance zone, about 10 - 30 metres (10 - 30 yards) away, then move the focus ring until your object is sharply focused.

**NOTE: EVEN THOUGH YOU ARE USING ONLY YOUR LEFT EYE TO FOCUS, TRY TO KEEP BOTH EYES RELAXED.**



**STEP 3:** Cover the left objective lens with your hand. Look at the same object, and turn the diopter ring to bring the object into sharp focus

**NOTE: ENSURE THE CENTRE FOCUS KNOB DOES NOT CHANGE. KEEP BOTH EYES OPEN, DO NOT SQUINT**

**STEP 4:** Remove your hand from the left objective lens

**NOTE: PLACE A MARK ON THE DIOPTER-RING SETTING NOTING THE CORRECT ADJUSTMENT. IF YOUR VISUAL ACUITY CHANGES DURING THE YEAR, YOU MAY NEED TO RESET THE DIOPTER.**



### *Sales Tip*

**PROPER BINOCULAR FOCUSING WILL ELIMINATE HEADACHES AND EYE SORENESS, AND ENSURE A BRIGHT, CRISP PICTURE QUALITY.**



# INTERPUPILLARY DISTANCE

How far apart should the eyepieces be?



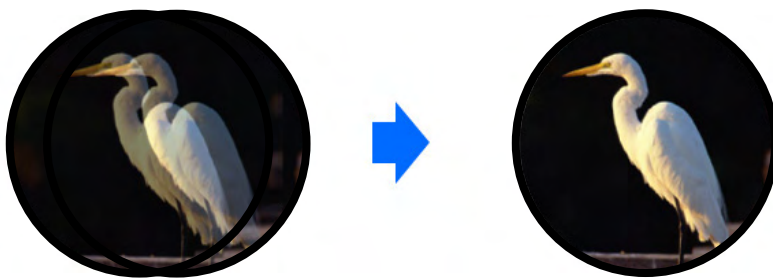
Interpupillary distance (IPD) is the distance between the pupils of your eyes measured from centre to centre when your eyes are focused on infinity. It varies from person to person. The same term applies to the distance between the centres of a binocular's exit pupils.

To take full advantage of the field of view and light from your binoculars, the binocular's IPD should be the same as your IPD. Because IPD varies between people and uses, virtually all binoculars have adjustable IPDs. In general, lower-power, smaller objective size binoculars can be set at smaller IPDs.

If you don't have the IPD correctly adjusted, you'll see only part of the scene you're looking at, as the beams of light from the eyepieces are partially missing your pupils. Adjust IPD by moving the two tubes of the binoculars towards or away from each other. Some pairs of binoculars have a scale on the centre pivot to help with the proper adjustment.



**NOTE: ALL BINOCULARS ARE HINGED AT THE CENTRE FOR THIS PURPOSE.**



When this adjustment is made correctly, the sight picture forms a single round circle. This indicates to the user the IPD is correctly set.

**Sales Tip**

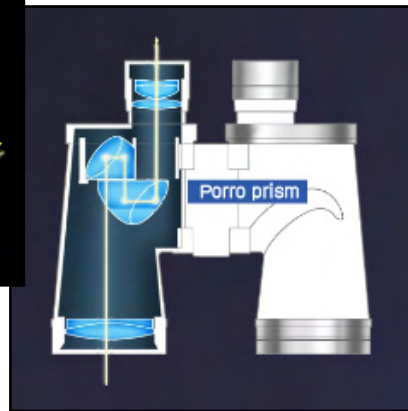
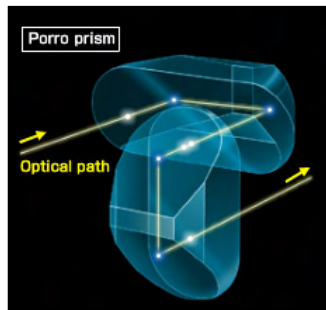
**PROPER IPD ENSURES USERS SEE ONLY A SINGLE IMAGE OF THE OBJECTS THEY ARE VIEWING WITH CRISP IMAGE QUALITY.**

# BINOCULAR TYPES

## Design differences to suit all uses

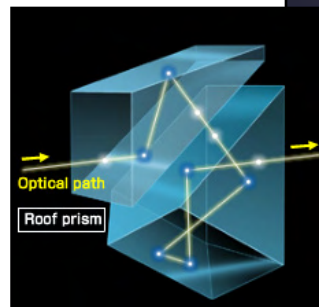
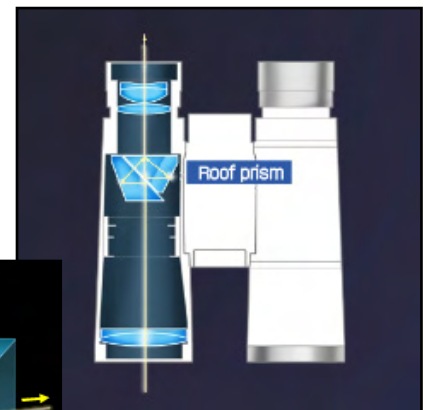
### PORRO PRISM DESIGN

The Porro prism was invented by Ignazio Porro in mid 19th century Italy. All of its reflective surfaces are completely reflective, so it loses no light and such binoculars are easy to produce. However, the optical path is bent like the letter Z. Accordingly, this prism system takes up considerable space, so that binoculars with a Porro prism are larger than those with a roof (Dach) prism.



### ROOF (DACH) PRISM DESIGN

The first prism of the roof prism system has one surface that does not feature total internal reflection, resulting in the loss of some light. To minimize this loss, it is necessary to apply a coating on the surface to raise reflectivity. Also, to produce the roof surface of the second prism so that it delivers sharp images without a double image or flare, a highly advanced technology is required that processes the edges precisely. And as the optical path of the roof prism binoculars is straight, a slim and compact body is realized.



### *Sales Tip*

**THE DESIGN OF THE BINOCULAR MUST FIT THE BUDGET AND NEEDS OF THE CUSTOMER. BE SURE TO DISCUSS THIS BEFORE MAKING ANY RECOMMENDATIONS.**

*Roof or  
Porro prism?*



## ROOF PRISM

- ✓ Slimmer Design
- ✓ Most popular style today
- ✓ Easier to waterproof (vs. Porro)
- ✓ Narrower - more compact
- ✓ Light is refracted six (6) times
- ✓ More durable than Porro
- ✓ More models available at the mid to high-end



## PORRO PRISM

- ✓ Great value - starter binocular
- ✓ Low to mid-range - typically best optical performance
- ✓ Less expensive to manufacture (vs. Roof)
- ✓ Light is refracted four (4) times
- ✓ More efficient in light transmission than Roof



**Sales Tip**

**WEIGHT AND SIZE ARE FACTORS FOR AN ALL DAY EXCURSION. SOME DESIGNS ARE BETTER SUITED FOR HIKING WHILE OTHERS ARE FOR STATIONARY VIEWING.**



## Sport Optics

Nikon offers binoculars and scopes for virtually any application, making it easy to find brilliant, impeccable optics for your own specific needs.

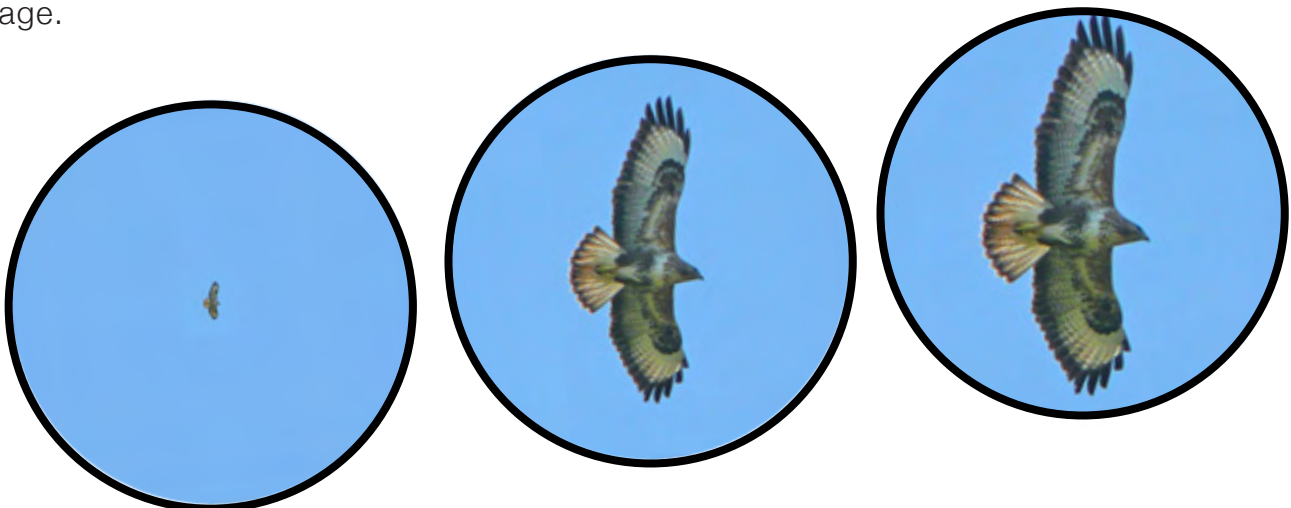


What do the numbers mean?



## MAGNIFICATION

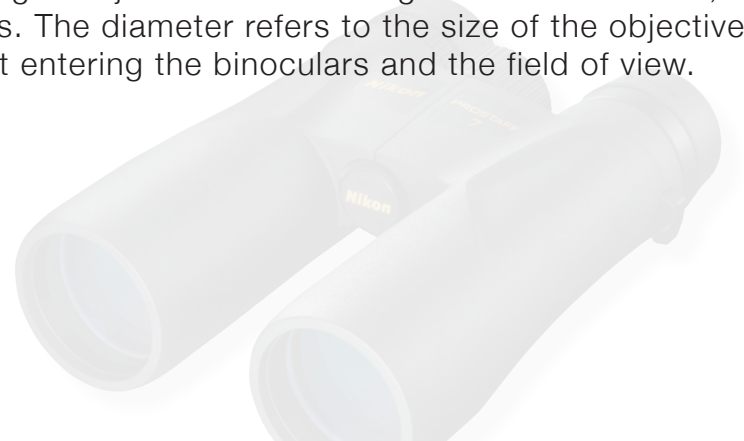
Magnification is the process of enlarging something only in appearance, not physical size. Typically magnification is related to scaling up visuals or images to be able to see more detail. In all cases, the magnification of the image does not change perspective of the image.





# OBJECTIVE DIAMETER

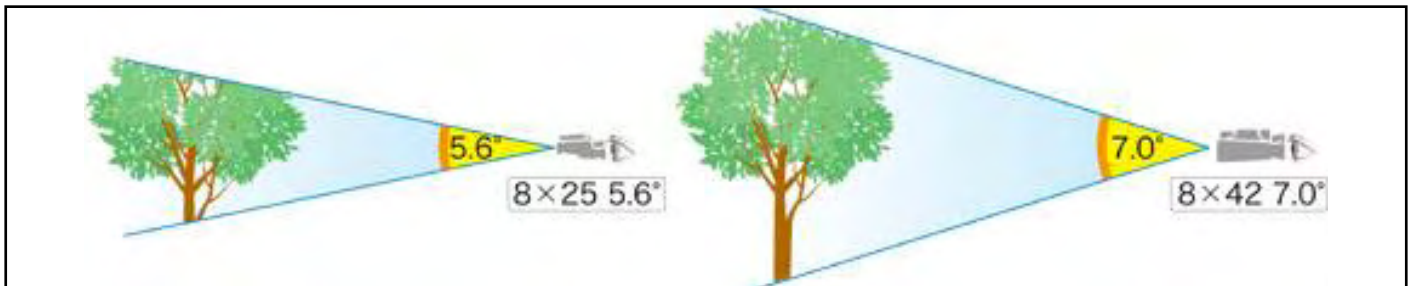
The objective is the optical element that gathers light from the object being observed and focuses the light rays to produce a real image. Objectives can be single lenses or mirrors, or combinations of several optical elements. The diameter refers to the size of the objective lens and directly affects the amount of light entering the binoculars and the field of view.



**NOTE: THE LARGER THE OBJECTIVE THE BETTER THE ABILITY OF THE OPTIC TO "GATHER" LIGHT**

# ANGLE-OF-VIEW

Angle-of-view is the breadth of a subject as seen by a binocular system. It is usually stated for the diagonal of the image, and sometimes the vertical and horizontal. A large angle shows a lot of things very small, and a small angle shows fewer things, but larger. This is a common binocular and lens specification.



AOV, like a circle is made up of 360°, 1° is = 15.97m at 914.4m (52.4 ft at 1000 yards)

By multiplying the constant of 15.97 by the Angle of View of the binocular, we get the AOV

$15.97 \times 7 = 111.8\text{m}$ . Therefore FOV is 11.8m at 914.4m  
( $52.4 \times 7 = 366$  ft, FOV is 366 ft at 1000 yards)

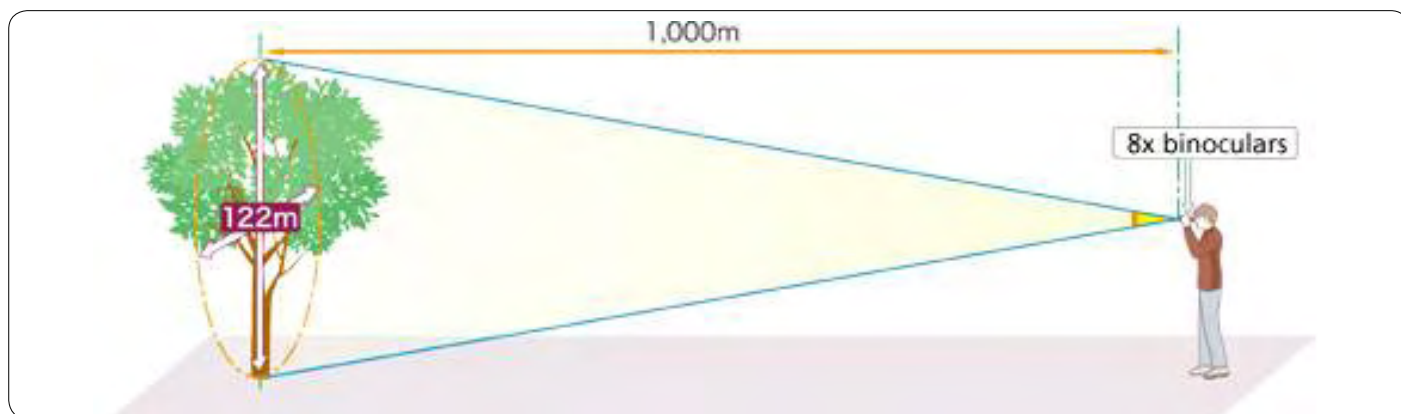
**Sales Tip**

**CONSIDER THE CUSTOMER'S USE FOR BINOCULARS. TALL SUBJECTS MAY REQUIRE A LARGER AOV TO REDUCE BINOCULAR MOVEMENT FOR FULL IMAGE VIEWING.**



## FIELD OF VIEW

FOV is the visible area seen through the binocular at a distance of 1000m  
(Riflescope FOV is measured at 91.4m or 100 yards)



**Wide Field of  
View Binoculars**

**Regular  
Binoculars**



Binoculars with a FOV greater than  
122m are considered Wide Angle





## EYE RELIEF

Eye relief is the distance from the outer surface of the eyepiece lens to the position where the exit pupil is formed (eyepoint).

**Eyepiece lens**

**Field of view cannot be fully ensured.**

If eye relief is too short, you cannot place your eye on the eyepoint, which may result in vignetting occurring in the field of view.

**Eye Relief Too Short**

**Eyepiece lens**

If eye relief is long enough, eyeglass wearers can use binoculars while wearing their glasses and observe the field of view without vignetting.

**Eye Relief OK**

Most eyeglass wearers require a minimum of 14mm

**Sales Tip**

**PROPER USE OF EYECUPS ENSURES A CUSTOMER IS SEEING THE COMPLETE VIEWING AREA OF THE LENS. IF THIS IS NOT DONE, IT WILL RESULT IN DULL IMAGES.**



## EXIT PUPIL

Exit Pupil is the circle of light seen when the binocular is held at arms length.



Example: 8 x 42 binocular  
 $42 / 8 = 5.3\text{mm}$

Exit pupil = The effective diameter of the objective lens/magnification.

### WHY IS EXIT PUPIL IMPORTANT?

Matching the exit pupil with the dilation of your eye's pupil is essential in low-light situations.



### Sales Tip

CONSIDER THE CUSTOMER'S USE. IF USING IN LOW-LIGHT, KEEP THIS CALCULATION IN MIND. REMEMBER, A HUMAN EYE DILATES TO 7MM.

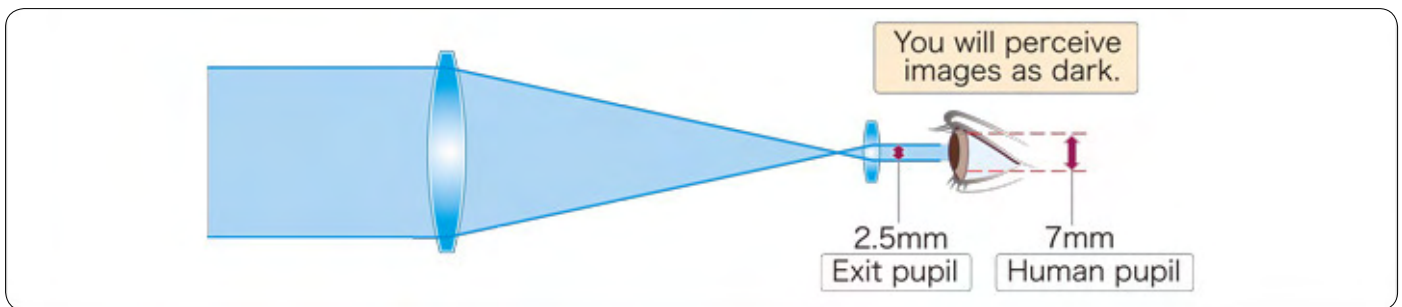


# LIGHT GATHERING

Why do both large exit pupil binoculars and small exit pupil binoculars provide the same bright images in bright conditions?

The human pupil normally opens about 2mm in daylight and 7mm in the dark.  
If you use binoculars with an exit pupil of over 2mm in daylight, you won't perceive dark images. Brightness will not vary whether you use binoculars with a 7mm or 2mm exit pupil.

On the other hand, if you use binoculars with a small exit pupil in the dark, the image will not appear as bright as when seen with the naked eye.

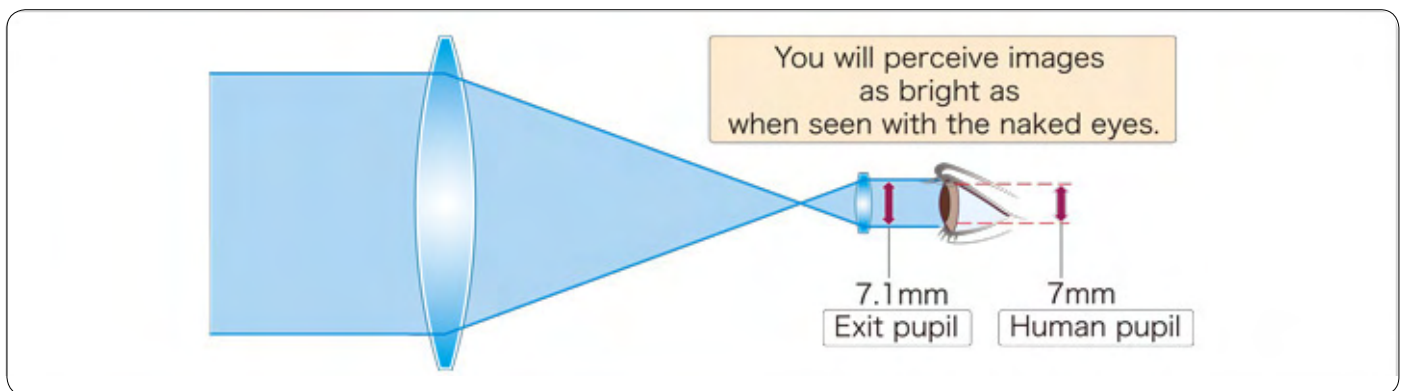


## 8x20 Binoculars:

Pupil diameter of human eye: 7mm

Exit pupil of binoculars:  $20 \div 8 = 2.5\text{mm}$

Because the 2.5mm exit pupil of binoculars is smaller than the 7mm human pupil, you will perceive images as dark.



## 7x50 Binoculars:

Pupil diameter of human eye: 7mm

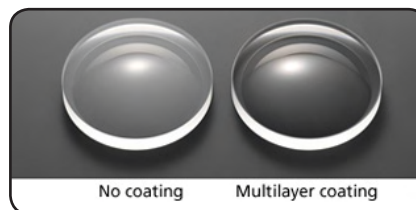
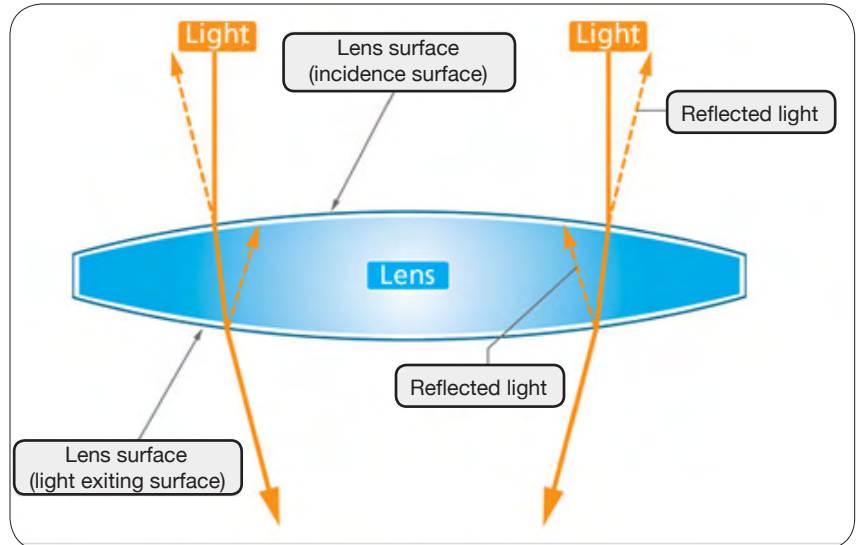
Exit pupil of binoculars:  $50 \div 7 = 7.1\text{mm}$

Because the human pupil is about the same size as the binocular's exit pupil, you will perceive images as bright as when seen with the naked eye.

# LIGHT TRANSMISSION

Light transmission is the percentage of light that hits the objective lens and passes through the lenses of the optics and exits the eyepiece to your eye.

Part of the light passing through the lens is reflected by the front (incident light) and rear (exiting light) surfaces. This reduces the amount of light passing through the lens so the image appears to be dark. Also, the reflected light may cause ghosting and flare, affecting image contrast. To minimize reflection on the lens surfaces and ensure clear, sharp images, Nikon applies anti-reflective coatings.

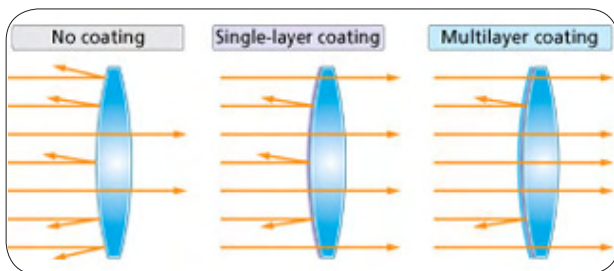


**WHAT MAKES LIGHT PASS THROUGH GLASS MORE EFFECTIVELY?**

**Multi Layer Anti-Reflective Lens Coatings**

Coatings are applied to both surfaces of the lens. There are two main types of coatings: single layer and multilayer (usually 3-5 layers). A multilayer coating effectively reduces reflected light that cannot be eliminated with a single-layer coating, and increases the transmittance of light.

## MULTI COATING...THE ONLY WAY TO GO



	Per single lens surface	10 lens and prism surfaces
No coating	96%	$(0.96)^{10}=0.66$ 66%
Single-layer coating	98.5%	$(0.985)^{10}=0.86$ 86%
Multilayer coating	99.5%	$(0.995)^{10}=0.95$ 95%

## LIGHT TRANSMISSION vs. LIGHT GATHERING

Despite many opinions to the contrary, these two terms are NOT the same. Light transmission is based upon the quality of the glass as well as the type and amount of coatings used. Light gathering is a function of the riflescope exit pupil and has NO reference to quality.

### *Sales Tip*

**LENS COATINGS ARE THE SINGLE MOST IMPORTANT CONSIDERATION. CLARITY, BRIGHTNESS AND CRISPNESS OF THE IMAGE DEPEND UPON THIS FACTOR.**



# TESTING BINOCULARS FOR QUALITY



## Choosing the RIGHT binocular is important!

### Tips:

**Lens quality:** Look for high quality glass, meticulous grinding and polishing. Take the time to compare several models of binoculars against each other using these six simple tests.

#### TEST 1: LENS DISTORTION CAUSED BY UNEQUAL IMAGE MAGNIFICATION

Focus on the top and sides of a flat image with straight edges. Bowing or curvature of the edges at the top or sides means poor correction.

#### TEST 2: EXCESSIVE CURVATURE, WHICH PREVENTS EDGE-TO-EDGE SHARPNESS

Focus on a flat image as a whole. If you are unable to focus sharply on all areas of the image at the same time, it is an indication of excessive curvature of the lenses.

#### TEST 3: INTERNAL BLACKENING TEST

Look into the binocular objective at a 45° angle. You should see darkness. If you can clearly see internal metal parts, this binocular probably has image degradation in the form of distracting glare and reduction of overall light transmission.

#### TEST 4: MISALIGNMENT OF LENS ELEMENTS, WHICH CAUSES PARTIAL IMAGE BLOCK OUT, REDUCTION OF LIGHT TRANSMISSION AND OVERALL VIEWING DISCOMFORT

Hold binocular level, looking through eyepiece lenses at arm's length. Exit pupils should be exactly in the centre of each ocular and round, not fuzzy or irregularly shaped.

#### TEST 5: UNMATCHED BARREL ALIGNMENT, WHICH CAUSES SEVERE EYESTRAIN AND HEADACHES

Focus on a reference image. When it's sharp, put binocular down and rest your eyes for a few seconds. Bring binocular back to your eyes and with one hand cover one of the front lenses, then drop your hand. Image should stay sharp; if image is out of focus then slips into focus when you drop your hand, the barrels are misaligned and your eyes are compensating.

#### TEST 6: MEASURE A BINOCULAR'S ABILITY TO DISTINGUISH FINE DETAILS. LARGER OBJECTIVE LENSES TEND TO IMPROVE RESOLUTION, SO BE SURE TO COMPARE BINOCULARS WITH SIMILAR OBJECTIVE SIZES

Start with the smallest objective you are considering - say 32mm. Focus on a test reference. Can you read the small print? How about the black and yellow reticle image? Are the lines sharp and crisp? Now try it with other binoculars with the same size of objectives. The better the glass, the better the resolution at any given objective size.

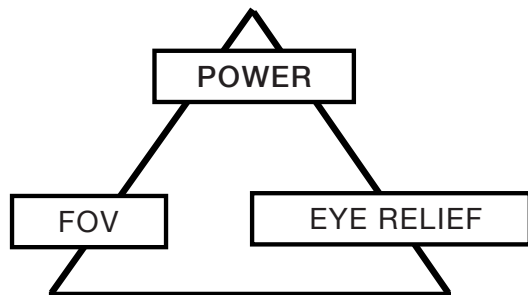
# THE OPTICAL TRIANGLE

To maintain resolution integrity, there is an optical axiom that needs to be understood.

Think of **Power**, **Eye Relief** and **Field of View** (FOV) as the three points of a triangle that balance each other out:

- Increase Power: Eye Relief & Field of View are reduced
- Increase Eye Relief - Field of View decreases - and vice versa
- Increase Eye Relief & Field of View - Power must be lower.

## AS MAGNIFICATION INCREASES FOV AND EYE RELIEF DECREASES



### BINOCULAR

8 x 42 Monarch  
10 x 42 Monarch  
12 x 42 Monarch

### FOV

100m (300ft)  
96m (314ft)  
90m (262ft)

### EYE RELIEF

19.6mm  
15.5mm  
15.4mm



## LASER RANGEFINDERS

### What do they do?

A laser rangefinder measures distance by projecting laser beams to a target and measures the time it takes the laser beam to reflect off the target and arrive back at the instrument.



### Sales Tip

**RANGEFINDERS CAN BE USED TO ACQUIRE THE DISTANCE OF MANY TYPES OF TARGETS.**





- Golf
- Surveying
- Hiking/Backpacking
- Military
- Hunting
- Target Shooting
- 3D Modeling
- Forestry
- Steel Industry - Inventory
- Real Estate
- Construction/Renovation

If you are golfing, hunting or conducting a forestry survey, knowing the right distance is essential. Known industry-wide for superior optical technologies and cutting-edge design capabilities, Nikon takes pride in delivering innovative, high-quality products. Nikon's Laser Rangefinder lineup extends from a high-spec model with angle measurement functions to models exclusively designed for golfing and hunting, each perfectly suited to its particular purpose.

## RANGEFINDER TECHNOLOGY

- Traveling at the speed of 300,000 km/second. A laser beam could travel around the earth 7.5 times in one second.
- Laser beams can travel great distances without dispersing, creating pin-point accuracy.
- When taking a measurement, an LRF emits hundreds of laser beams in approximately half a second to boost accuracy.
- This can greatly improve accuracy as a single laser beam could miss a target that is too small to pin-point which is why Laser Rangefinders were developed with this technology.



### Class -1 Laser Beam

- Class-1 Laser-Beam is used for all consumer Laser Rangefinders.
- Safe for the eyes - human and animal.
- Military sometimes use greater than Class-1 Lasers, but these are for specialized work and not available for consumer use.

# TRU-TARGET TECHNOLOGY

## FIRST TARGET PRIORITY MODE

Allows confident ranging of smaller targets that are often ignored by conventional rangefinders by relaying the distance to the very first target the pulses hit, regardless of size.



## DISTANT TARGET PRIORITY MODE

Displays range to the furthest target among the targets measured by the series of pulses. This mode allows for accurate ranging in normal hunting conditions where the target can be partially obscured by brush.



# ACTIVE BRIGHTNESS CONTROL VIEWFINDER



Automatically detects brightness of FOV and utilizes an improved LCD display with an LED backlighting that allows selection of the mode that contrasts best against subject and background.

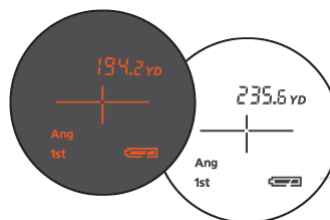


# ID TECHNOLOGY

Nikon's advanced ID (Incline/Decline) Technology compensates for various incline or decline shooting angles—up to an incredible +/- 89 degrees (nearly vertical up or down).

# WHY CHOOSE NIKON RANGEFINDERS

- Ease-of-Use (one number in the display, uncluttered)
- Accuracy (to tenth of a yard, 0.1 measurement)
- Single Button Control
- Active-Brightness Reticle
- Speed - Best in Class
- Accuracy on Soft Targets
- Waterproof/Fogproof



## Sales Tip

**RANGEFINDERS HELP TO ENSURE THE FIRST SHOT IS THE RIGHT SHOT. NIKON RANGEFINDERS ALSO WORK AS A 6X MONOCULAR.**



Fieldsopes, classified as one type of terrestrial telescope, are used for viewing magnified images of distant objects. Unlike binoculars, a Fieldscope only requires viewing with a single eye for observation. It is always used with an eyepiece, the choice of which determines the magnification. It is designed to produce an erect image with prisms and can be used to observe wild animals or birds, for astronomical observation or for target confirmation in archery or shooting. Generally, a Fieldscope's magnification is higher than binoculars and is usually used attached to a tripod.

## TWO TYPES OF FIELDSCOPES



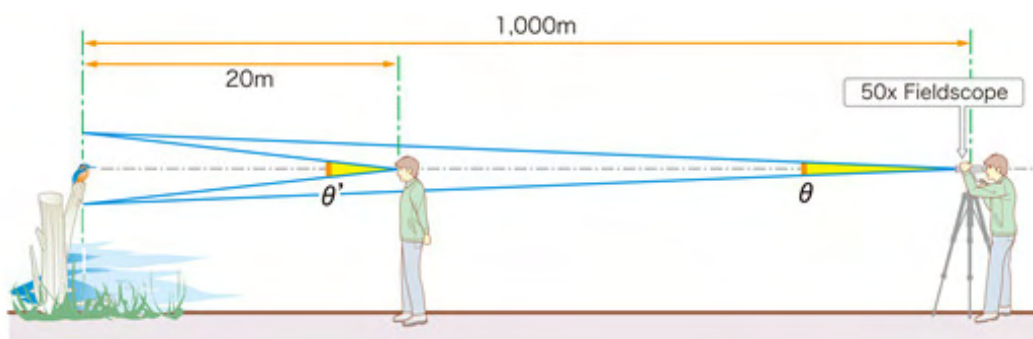
A Fieldscope has a body and eyepiece arranged parallel or in a straight line. It is easy to capture a subject inside the Field of View and is recommended for observing several subjects.



A Fieldscope with an eyepiece that mounted at an angled position is recommended for observing subjects at higher positions such as in a tree with elevation angle posture, with several people, or while seated.



NOTE: FIELDSCOPES MAY ALSO BE KNOWN AS SPOTTING SCOPES.



Above is an example of the ratio of the apparent size of an object in comparison with what a viewer sees with the naked eye. For instance, an object 1,000m away viewed through a Fieldscope with 50x eyepiece looks about equal in size to an object 20m away viewed with the naked eye. The magnification can be changed with a mounted eyepiece.

*Sales Tip*

**GENERALLY, A FIELDSCOPE'S MAGNIFICATION IS HIGHER THAN A BINOCULAR AND IS USUALLY USED ATTACHED TO A TRIPOD.**





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