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Optical Instruments Used In Shooting

Turakhanov Akrom Abdullahakimovich

Teacher At The Military Education Faculty Of Fergana State University, Uzbekistan

Khojimatov Nodirbek Gayratjonovich

3rd Year Student Of The Military Education Faculty Of Fergana State University, Uzbekistan

ABSTRACT

This article gives a brief overview of optical devices used in shooting. This article is intended to acquaint students (students) of higher, secondary special and secondary education institutions with information about optical devices used in shooting.

KEYWORDS

Sports weapons, lens, diopter, prism, eyepiece.

INTRODUCTION

Binoculars are used in shooting practice for correction. Knowing the necessary information about the operation of these devices will allow you to improve the quality of the learning process.



Figure 1. ZRT-457 sight tube

The optical circuit of the ZRT-457 tube consists of a prism wrapping system and a two-lens lens with a five-lens eyepiece.

Structurally, the device consists of a body, lens, MPS 4x20 monocular prisms and an eyepiece. The lens is mounted on the body of the tube. The body can move along the axis with prisms and eyepieces. The tube is focused at a certain distance with a flywheel.

The magnification change is made by rotating the holder 180 ° around. In order to reduce the deterioration of the contrast of the image under the influence of light, a blender is placed in front of the lens. The three-legged tube can be rotated 360 ° in the vertical and horizontal planes.

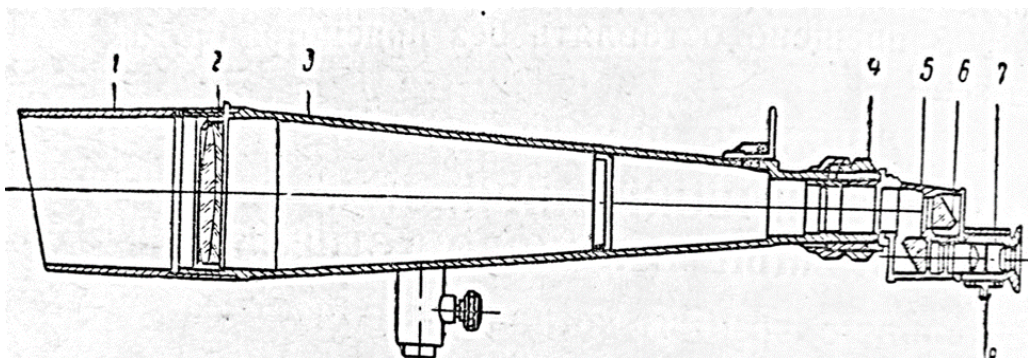


Figure 2. ZRT-457 sight tube (binoculars)

1-blend; 2-lens; 3 pipe housing; 4-flywheel; 5-prism; 6 rotation system;
7 five-cylinder eyepiece; 8 holder.

On one side of the pipe is a lens and a blender, on the other - a focusing mechanism, a prismatic winding system and an eyepiece.

The difference between the ZRT-457 sight tube is that in the ZRT-460 sight line, the distance

measurement from 10 m to infinity focuses on long objects (set to tension) by rotating the applied ring. The diopter is mounted on the eyepiece to adjust the tracking contrast.



Figure 3. ZRT-460 sight tube

Replaceable spotlight filters can be worn on the flat surface of the mirror.

The main parts of the sight tube are: objective, collective, winding system, eyepiece.

The lens is used to capture the true image and consists of three attached lenses.

A lens is a plane-collecting lens that is located close to the image given to the lens and rotates the light toward the optical axis.

A wrapped system is made up of two identical components designed to capture a direct image of an object.

The eyepiece is a symmetrical two-component eye located in front of the eye.

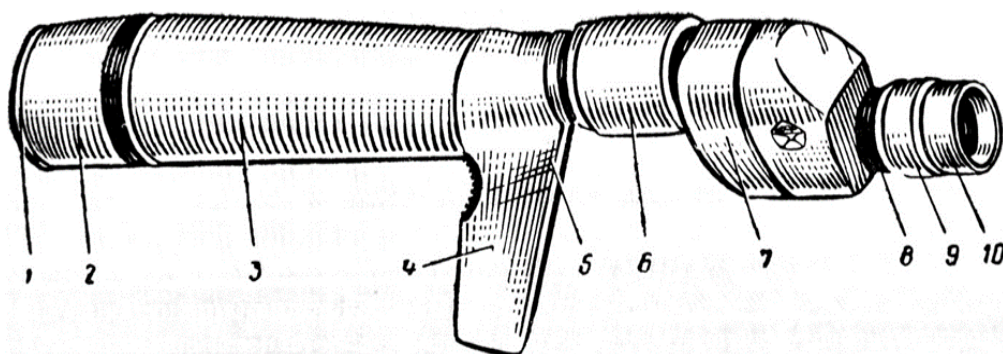


Figure 4. ZRT-460 sight tube (binoculars)

1 - cover; 2 - blenda; 3 - pipe body; 4 - holder; 5 - screw; 6 - ring;
7 - prism-coated housing system; 8 - eyepiece; 9 - coupling; 10 - mirror.

Table 1
Technical data of the binoculars

Data Pipes	Tubes		
	ZRT-457	ZRT-460	«Tourist-3»
Zoom in, plural	Interchangeable 29,8; 58,8	20	20
Viewing angle, degree	1°10; 0°49	3°12	2
Tolerance limit, angular, s	4,5	3,6	3,5
Focusing range, m	25 to	10 to	25 to
Overall dimensions, mm:	470	380	515
a) length	90	63	59
b) diameters	1,2	0,8	0,63
c) weight, kg			

Use of binoculars and take care of them

Like any optical instrument, vision tubes require clean and careful handling.

Disassembly of the pipe is strictly prohibited, as this will lead to distortion of the alignment and a sharp deterioration in image quality.

It is recommended to protect the pipe from rain, snow, dust, humid air (especially when

breathing in winter) and sudden changes in temperature.

The pipe must be clean to use.

Rules for cleaning optical devices

Cologne, then wipe with a dry clean batiste napkin, then carefully wipe the surface with a cotton swab moistened with a mixture of alcohol and ether, in the case of removing dust

with a clean surface, with light and smooth movements.

The optics cannot be cleaned with a dirty cloth because the solid dust particles scratch the optical surface and over time it becomes covered with a non-removable coating.

To maintain the appearance of the appliance, it is recommended to clean the painted surfaces with a lightly oiled flannel cloth.



Depending on the light transmittance "g" and the thickness of the glass "d", the following brands of neutral glass are installed.

Colored glass light filters, in addition to dimming the brightness, absorb light in the spectrum depending on the wavelength. According to the color transition, all colored windows are divided into groups: ultraviolet (US), blue (B), blue (BB), blue-green (BG), green (G), yellow-green (YG), yellow (Y),

Traffic filters

Traffic filters are flat parallel plates made of colored glass. The light that passes through the filter filters changes its brightness and color. Brightening attenuating light filters are called equally neutral, gray, or achromatic in the spectrum of 400 to 760 nm. They are made of neutral glass (NG).



The larger the number, the denser the glass. BP and YG light filters absorb the blue-purple area of the spectrum well and are used to increase the contrast of the image in the presence of smoke or fog in uncomfortable observation conditions.

Recently, polarized and interfering traffic lights are widely used.

Table 2

Brands of neutral bottles

r, %	d, mm					Purpose of use
	1,8	2,2	3,5	5	8	
50	-	NB7	-	NB6	-	To observe objects in the background of scattered light
10	NB9	-	NB8	-	NB7	
1	-	NB10	NB9	-	NB8	To observe objects facing the sun
0,1	NB11	-	NB10	NB9	-	
0,01	-	NB11	-	NB10	NB9	

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