

PK-A Collimator sight with red dot

Operating Manual



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This Operator's manual is intended for the customer to study the design and operation rules of PK-A Collimator Sight with red dot (further referred to as the sight).

IN ORDER TO ENSURE SIGHT FAULTLESS OPERATION:

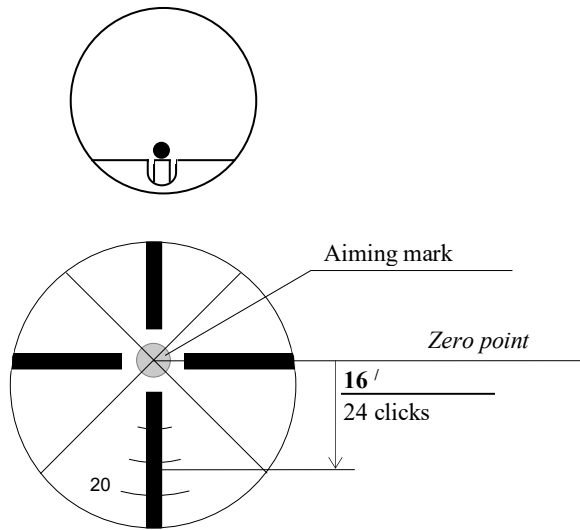
- do not dismantle the sight;
- keep the sight clean, protect it from dampness, sharp temperature drops and shocks during operation, transportation and storage;
- make sure the sight is mounted safely on the weapon;
- do not leave the sight on during intervals in work;
- withdraw batteries from the sight for the period of storage.

1 DESCRIPTION AND OPERATION OF THE SIGHT

1.1 Designation of the Sight

The sight is designed to provide accurate high-speed shooting in various types of military operations, including night ones, from weapons like AK-103, AKM and AK74N (hereinafter referred to as weapons) with a dovetail side bar for mounting of the sights.

Together with NV/G-14 night vision goggles the sight provides the possibility of shooting in low light conditions. The sight is intended for outdoor use at an ambient temperature of - 30 to + 50 ° C and an upper relative humidity of 100% at a temperature of + 35 ° C.



1.2 Technical Data

Description of Parameter	Value
Visible magnification, ratio	1
Number of brightness gradations of the aiming mark	8
Exit pupil diameter, mm, not less	20
Range of reconciliation from the zero line of aiming in horizontal and vertical directions, not less	$\pm 1^\circ$
Scale factor of adjustment mechanisms (adjustment step)	40" (2 cm at a distance of 100m)
Power source	Storage battery AA with rated voltage 1,5 V
Operation time without battery replacement, hrs.	≤ 1000
Seat on the sight	Lateral strip of the weapon of the "Dovetail" type
Overall dimensions (without protective covers), mm, max	160x85x140
Weight of the sight (without battery), kg, max	0,7
Weight of the set in the bag, kg, max	1,0

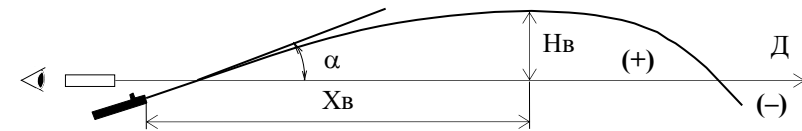


Figure A.3 – Elements of bullet trajectory

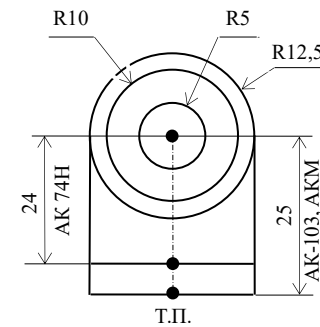
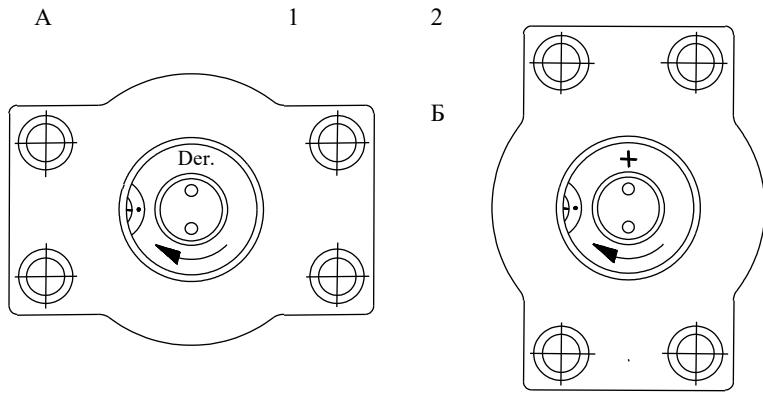


Figure A.4 – standard target dimensions in sm) for zeroing – distance 100 m, sight 3 (AK-103, AKM) or sight 4 (AK74H). For shooting AK-103, AKM, the target is bent at a distance of 25 cm from the center of the target, AK74N - 24 cm.



1 – knob of elevation adjustment mechanism;
 2 - knob of azimuth adjustment mechanism; A, B – scale

Figure A.2 – view of knobs of adjustment mechanisms

1.3 Structure of the Sight

Name	Q-ty, pcs
PK-A Collimator Sight	1
Instruction	1
Eye cup*	1
Cotton cloth	1
Brush	1
Quick reference guide	1
Bag	1
Operating manual	1
* Included in the PK-A collimator sight	

1.4 Design and operation principles

The sight is an optoelectronic device (a single magnification sight), which provides the ability to observe the target with both eyes. At the same time, with the aim of the eyes, the arrow registers a luminous mark, which is formed from the radiation of the LED and is transferred by the optical system of the sight to infinity. When aiming, a strictly defined position of the eye relative to the exit window of the sight is not required. The target is observed with both eyes, while the aiming mark due to stereoscopic vision is perceived as a red spot on the target.

The sight is based on a metal case in which assemblies and parts are mounted. The appearance of the sight is shown in Figure A.1 (Appendix A).

The power supply of the LED control circuit is an AA type battery with a nominal voltage of 1.5 V. The power supply is installed in the power compartment, which is closed by a cover 12, observing the polarity marked on the sight housing.

Switching on and stepwise brightness adjustment of the aiming mark is made by turning the knob 4 with the digitized scale of the ten-position switch. In the extreme positions of the handle 4 - the number 0 opposite the index on the body - the sight is off. Positions 1 and 2 set the brightness of the aiming mark for work with night vision goggles. Intermediate positions - numbers 3-8 opposite the index on the body - correspond to different brightnesses of the aiming mark. When turning knob 4 clockwise (from 1 to 8) the brightness of the aiming mark increases, in the opposite direction - decreases.

The adjustment of the aiming line (alignment of the sight) is carried out when shooting the weapon using the azimuth adjustment mechanism 2 and the elevation adjustment mechanism 3. The adjustment knobs of the adjustment mechanisms are closed with screw caps.

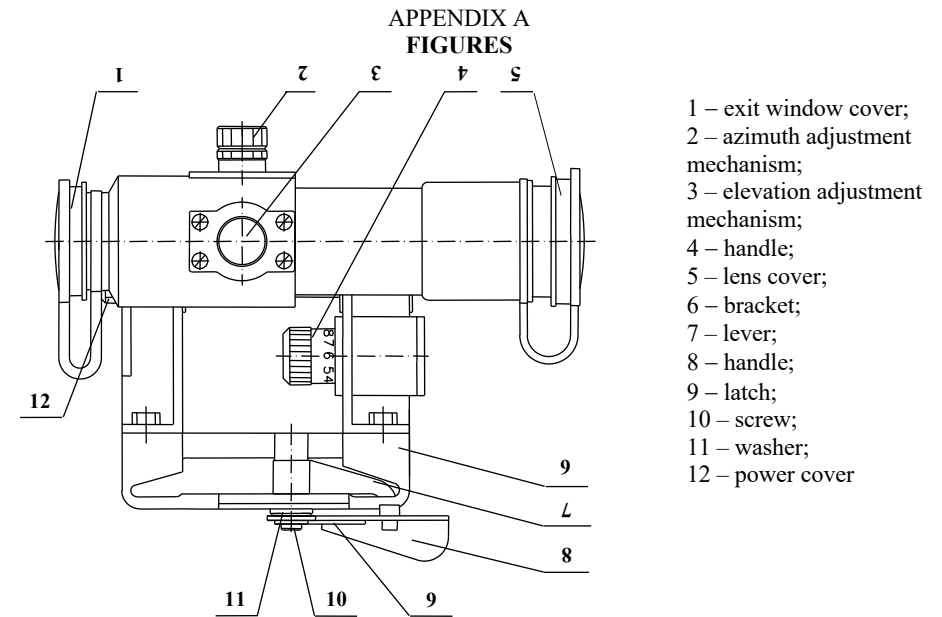


Figure A.1 – Image of the sight

4 CURRENT MAINTENANCE

Possible malfunctions and methods of their removal are shown in Table 4.1.

Table 4.1

Type and description of malfunction	Possible cause	Method of removal
During switching on of the Device the aiming mark does not light	1 Battery is completely discharged. 2 Power source is not installed in a proper way	1 Replace the battery. 2 Install the battery observing the stated polarity p. 2.1

5. TEST CERTIFICATE

PK-A Collimator sight with red dot, serial number _____, manufactured and adopted in accordance with current technical documentation and recognized as suitable for use.

Head of quality department

stamp _____
signature

_____ date

The appearance of the knobs of the adjustment mechanisms is shown in Figure A.2. Azimuth and elevation adjustments are carried out by turning the corresponding knob (1, 2) with an index relative to the fixed scale A, B. Rotating of the knob, a step-by-step (40% per click of the alignment mechanism) provides azimuth and elevation displacement of the hit point. The arrows on the scales indicate the direction of rotation of the knobs corresponding to the displacement of the mean point of impact (MPI) upward (“+”) and to the right (Der.). The rotation of the knobs against the arrows provides corresponding reverse displacements of the MPI.

The sight is mounted on the weapon by the device consisting of a bracket 6 (Figure A.1), a screw 10, a handle 8 for turning the screw 10, a lever 7, a washer 11 and a latch 9 for mounting of the handle 8 on the screw 10. The sight is fixed on the weapon’s seat “dovetail” strap, located on the side surface of the receiver by turning the handle 8 forward (towards the lens) until the lever 7 stops in the bracket 6 and the handle 8 is fixed with a lateral latch. The clamping force is adjusted by reinstalling the handle 8 on the screw 10.

Covers 5 and 1 are designed to protect, respectively, the lens and the exit window of the sight from pollution and mechanical damages.

The sight is filled with nitrogen, which prevents fogging of the optical surfaces at a temperature difference.

The legend and serial number of the sight are engraved on the case.

1.5 Tools and accessories

A screwdriver is prescribed to remove the latch 9 (Figure A.1) when adjusting the clamping force of the bracket.

The brush is designed to remove dust from the surface of optical parts.

The cloth is designed to clean the surfaces of mechanical parts.

The user guide contains reference data for adjustment and exploitation of the sight and use in the field.

2 USE AS PER DESTINATION

2.1 Installing and the battery replacement

In order to install the batteries one should:

- open the battery compartment cover 12 (**figure A.1**);
- install the batteries, observing polarity according to the marking on the body of the sight;
- turn the cover 12 up to the stop;
- check the functioning of the sight, switch on the aiming mark with the help of handle 4;
- switch off the aiming mark.

2.2 Mounting the sight on a weapon

The sight is to be mounted on the weapon in the following order:

- turn the handle 8 towards the exit window of the sight until the lever 7 rests in the bracket 6;

3.2 Conservation

When preparing the sight for long-term storage, preserve: apply a thin layer of lubricant GOI-54p to thoroughly grease-free gasoline and dried un-painted landing surfaces of the sight bracket and wrap with KON2-10 condenser paper.

When performing re-activation the lubricant is to be removed with the help of a clean cloth slightly wetted in benzine, then the sight is to be dried in the air.

3.3 Storage

The sight in the bag is to be stored in heated and ventilated premises at a temperature from +5 to +40 °C with relative humidity of not more than 80 % at the temperature of + 25 °C, in the absence of acidic, alkaline and other aggressive impurities in the air.

Working life without re-preservation is not more than three years.

The battery should be stored separately, installing it in the battery compartment when preparing the sight for work.

3 MAINTENANCE

3.1 General instructions

Carry out timely maintenance in order to keep the sight in the state of alertness and provide its faultless operation:

-when preparing for work, inspect the sight (check for completeness, check for external damage, dust, dirt), check the operation of the sight by turning the sighting mark on and off, check the reliability of the sight mounting on the weapon;

-verify the adjustment of the sight when the sight enters the subunit, if it detects during shooting significant deviations of the centre of impact from the control point. In a combat situation, checking the adjustment of the sight should be done, if possible, periodically (after the shooting of each of four magazine cases).

The external surfaces of the optical parts must be cleaned with a cloth or a cotton swab slightly moistened with alcohol, ether or an alcohol-ether mixture (10% alcohol and 90% ether). To avoid scratches on optical surfaces, use only clean materials. Remove dust from surfaces of optical parts with a brush

ATTENTION! THE LEAKAGE OF THE POWER SOURCE MAY RESULT IN MALFUNCTION OF THE SIGHT. AT LEAST ONCE A MONTH, CHECK THE VOLTAGE OF THE POWER SOURCE. AT A VOLTAGE OF 1 V OR LESS (NO LOAD), REPLACE THE POWER SOURCE.

When replacing the power supply, observe the polarity in accordance with the marking on the sight housing.

- combine the seats of the weapon (bar) and the sight and move the sight forward until the axis of rotation of the lever 7 and the cylindrical selection on the bar are aligned;

- turn the handle 8 towards the lens as far as the lever 7 rests in the bracket 6, pull the handle 8 slightly down and turn it all the way.

For adjusting the clamping force, you must:

- using the screwdriver from the sight kit, turn the latch 9 so that the lug protrusion comes out of the fixing hole in the handle 8, slide the latch 9 until the wide part of the latch hole aligns with the screw 10 and remove it;

- if the mount is loose (the sight has pitching), rearrange the handle 8 on the screw 10, turning it in the direction of the output window of the sight, and thereby achieve normal mounting of the sight on the weapon;

- if it is necessary to loosen the mount (the lever does not rest against the bracket), rearrange the handle 8 on the screw 10, turning it in the direction of the lens, and thereby achieve normal mounting of the sight on the weapon;

- put the latch 9 on the screw 10 and install so that the protrusion of the latch 10 fits into the fixing hole in the handle 8.

2.3 Adjusting the sight on a weapon

2.3.1 Zeroing the weapon with the sight (adjustment of the sight) should be carried out after bringing a weapon with an open sight to normal combat in accordance with the instruction on a small arms case for this type of weapon.

ATTENTION! AFTER LONG-TERM STORAGE OF THE SIGHT, THERE MAY BE NO MOVEMENT OF THE SIGHTING MARK UP AND TO THE RIGHT WHEN THE KNOBS OF THE ALIGNMENT MECHANISMS ROTATE, WHICH OCCURS DUE TO THICKENING OF THE LUBRICANT. BEFORE SIGHTING A WEAPON, IT IS NECESSARY TO MAKE TWO OR THREE FULL TURNS OF THE KNOBS OF THE ADJUSTMENT MECHANISMS COUNTERCLOCKWISE, AND THEN CLOCKWISE.

2.3.2. Reference data necessary for zeroing and subsequent operation of the sight are given in the user's memo. The procedure for using this data is described below.

Figure A.3 schematically shows the relative position of the sight and the barrel of the weapon and the elements of the trajectory of the bullet are indicated: D - range; α - aiming angle;

HB - the height of the trajectory of the bullet; Xb - the distance to the top of the trajectory of the bullet. Exceeding the flight paths of bullets over the aiming line can have a positive (sign (+)) and negative (sign (-)) value.

The firing table (table 2.1) provides reference data for zeroing a weapon with the sight: P - sight - an integer number of hundreds of meters that a weapon is being aimed at; T.P. - the distance from the center of the zeroing target to the aiming point when zeroing at a distance of 100 m, cm; α - aiming angle for bore sighting;

HB - the height of the trajectory of the bullet, corresponding to a given sight P, cm;

Xb - distance to the top of the trajectory of the bullet's flight, m; excess of trajectories for different ranges D (from 50 to 500 m), cm

- close the lens with cover 5 and the exit window with cover 1;
- turn the handle 8 of the clamping device towards the exit window of the sight and remove the sight from the weapon;
- remove the power source and put it in the pocket of the bag;
- put the sight into the bag.

2.4 Operation order

Take the sight out of the bag and mount it on the weapon.

Install the power supply in the power compartment.

Remove the cover 5 (Figure A.1) from the lens and cover 1 from the exit window.

Switch on the sight and using the handle 4 set the brightness of the aiming mark that is optimal for the given lighting conditions.

Aiming is carried out by combining the aiming mark with the aim of taking into account the excess of the bullet's flight path over the aiming line for different ranges.

So, if an AK-103 or an AKM with the sight is shot at sight 3, then when shooting at a chest target at a range of up to 100 m, the aiming point is selected at the bottom of the target; at a distance of 100-200 m - aiming point 5 cm below the target; at a distance of 300 m, the aiming point coincides with the center of the target; at a distance of 350 m - 30 cm above the target's head.

If AK74N with a sight is shot at sight 4, then when shooting at a chest target at a range of up to 100 m, the aiming point is selected at the bottom of the target; at a distance of 200-300 m - aiming point 10-20 cm below the target; at a distance of 400 m, the aiming point coincides with the center of the target; at a distance of 500 m - 30 cm above the target's head.

- fire three shots, aiming on the point marked on the shield;
 - identify the centre of impact and measure the deviations of the centre of impact from the reference point in elevation and azimuth directions in centimeters. The resulting numbers (taking into account the adjustment step) correspond to the values of the corrections necessary to combine the centre of impact with the control point, expressed in the number of clicks of the adjustment mechanism (scale divisions);
 - introduce the calculated corrections by rotating the scales of adjustment mechanisms;
 - check the adjustment with the help of a series of shots.
- The THIRD stage** of zeroing in (the range of 100 m on standard target (figure F.4) or on chest target):
- mark an aiming point on the shield taking into consideration table 2.1 in accordance with the installed sight P for a range of 100 m. So, for AK-103 and AKM for sight 3, range 100 m, the aiming point is 25 cm below the center of the shield; for AK74N for sight 4, range 100 m - 24 cm below the center of the shield;
 - fire four shots, aiming on the point marked on the shield;
 - identify the centre of impact and measure the deviations of the centre of impact from the reference point in elevation and azimuth directions in centimeters. The resulting numbers should be divide by 2 cm (taking into account the adjustment step), it corresponds to the values of the corrections necessary to combine the centre of impact with the control point, expressed in the number of clicks of the adjustment mechanism (scale divisions);
 - introduce the calculated corrections by rotating the scales of adjustment mechanisms;
 - check the adjustment with the help of a series of shots.

2.3.4 At the end of the shooting: turn off the sight;

Table 2.1 – The firing table

Type of weapon	P	T.P., sm	α	H _B , cm	X _B , m	Exceeding average trajectories (cm) for various ranges D								
						50	100	150	200	250	300	350	400	500
AK-103, AKM	3	25	16'	34	162	13	25	31	30	20	0	-77	-	-
AK74H	4	24	16'	40	217	11	24	33	38	37	32	20	0	-65

A standard zeroing target is shown in Figure A.4. The aiming point is located in the middle of the lower edge of the target. When zeroing a weapon, the target is bent along the corresponding line - according to the set sight P and the distance from the center of the target to the aiming point (see table 2.1).

To derive the midpoint of hitting the center of the target, it is necessary to remember the step of adjustment of the sight - 2 cm per click of the adjustment mechanism, corresponding to one division of the scale, at a distance of 100 m.

Criteria of zeroing in for the weapon are listed in table 2.2.

Table 2.2 – Criteria of zeroing in

Zeroing criteria AK-103, AKM, AK74H		Fire type / Number of shots
The radius of the zone of dispersion of holes on the target, cm	$\leq 7,5$	Single shots /4
Deviation of the centre of impact from the reference point, cm	≤ 5	Single shots /4

2.3.3 Zeroing at a selected distance should be produced by one of the methods:
for the mechanical sight of the weapon - see 2.3.3.1, for the bore sight collimator (BSC) - see 2.3.3.2, for the sequential zeroing method - see 2.3.3.3.

2.3.3.1 **Alignment** of the sight should be carried out **according to the mechanical sight** of the weapon mounted on sight 3 (AK-103, AKM) or sight 4 (AK74N), for which:

- rigidly fix the weapon with a sight mounted on it;
- remove the covers from the knobs of the reconciliation mechanisms 2, 3 (Figure A.1);
- remove the covers 5, 1 from the lens and the output window;
- by moving the eye relative to the exit window to achieve the location of the rear sight and fore sight of the mechanical sight in accordance with Figure A.5 (i.e., “take a straight fore sight”);
- by alternately rotating the knobs of the azimuth and elevation adjustment mechanisms, combine the image of the aiming mark with the fore sight, as shown in Figure A.5.

Perform zeroing on the chest target at a distance of 100 m. Combine the STP with the center of the target, given that one click of the adjustment mechanisms moves the STP on 2 cm.

2.3.3.2 **Alignment of BSC** should be carried out according to the operation manual on the Bore Sight Collimator of the optical sights (further BSC).

ATTENTION! TO ENTER THE AIMING ANGLE α (IN ACCORDANCE WITH THE INSTALLED SIGHT P, SEE TABLE 2.1), ROTATE THE KNOB OF THE VERTICAL ADJUSTMENT MECHANISM 2 TO BRING THE AIMING MARK FROM TOP TO BOTTOM TO THE CENTER OF THE BSC GRID, AND THEN START COUNTING ON THE GRID SCALE. THE AIMING MARK TYPE ON THE BACKGROUND OF THE BSC GRID IS SHOWN IN FIGURE A.6.

The correctness of the adjustment (see table 2.2) should be checked by standard target shooting (Figure A.4) at a distance of 100 m.

2.3.3.3 **Consecutive zeroing** should be performed in 2-3 stages, starting from a range of 25 m, along a shield of at least 50 x 50 cm in size

The FIRST stage of zeroing (at a distance of 25 m):

- mark a reference point with diameter of 1—2 cm in the centre of the shield;
- remove the covers 5 and 1 (Figure A.1) from the lens and the output window, unscrew the covers from the knobs of the adjustment mechanisms 2, 3;
- * from the prone position using a rest (a bipod) or from the kneeling position fire three shots, combining an aiming mark with the control point marked on the shield;
- * identify the centre of impact and measure the deviations of the centre of impact from the reference point in elevation and azimuth directions in centimeters. The resulting numbers, multiply by 4 and divide by 2 cm (taking into account the adjustment step), it corresponds to the values of the corrections necessary to combine the centre of impact with the control point, expressed in the number of clicks of the adjustment mechanism (scale divisions);
- * introduce the calculated corrections by rotating the scales of adjustment mechanisms;
- * check the adjustment with the help of a series of shots. If necessary, introduce corrections.

The SECOND stage of zeroing in (the range of 50 m):

- mark an aiming point on the shield taking into consideration table 2.1 in accordance with the installed sight P for a range of 50 m. So, for AK-103 and AKM for sight 3, range 50 m, the aiming point is 13 cm below the center of the shield; for AK74N for sight 4, range 50 m - 11 cm below the center of the shield;

Коллиматорный прицел с красной точкой РК-А

Памятка пользователя
7543.80.00.000 РЭ1

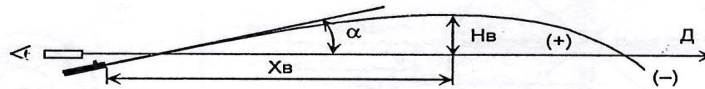
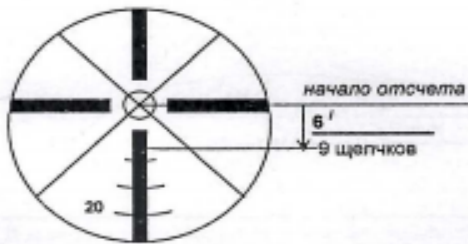


Таблица стрельбы

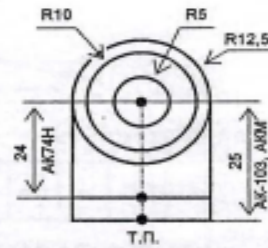
Вид оружия	П	Т.П.	α	Нв	Хв	Превышение траектории (см) для различных Д									
						50	100	150	200	250	300	350	400	500	
АК-103, АКМ	3	25	6'	34	162	13	25	31	30	20	0	-77	-	-	
АК74Н	4	24	6'	40	217	11	24	33	38	37	32	20	0	-65	

П – прицел;
Т.П. – точка прицеливания, см;
 α – угол прицеливания;
Нв – высота траектории, см;
Хв – дальность до вершины траектории, м;
Д – дальность, м

Холодная пристрелка по КХП



Мишень для пристрелки (размеры в см) Д=100 м; П-3 (АК-103, АКМ) или П-4 (АК74Н)



Шаг выверки
прицела
2 см
на щелчок
при Д=100 м

Критерии пристрелки АК-103, АКМ, АК74Н	Вид огня/Число выстрелов
Радиус зоны рассеивания пробойн на мишени, см	$\leq 7,5$ / Одноточный /4
Отклонение средней точки попадания от контрольной точки, см	≤ 5 / Одноточный /4