

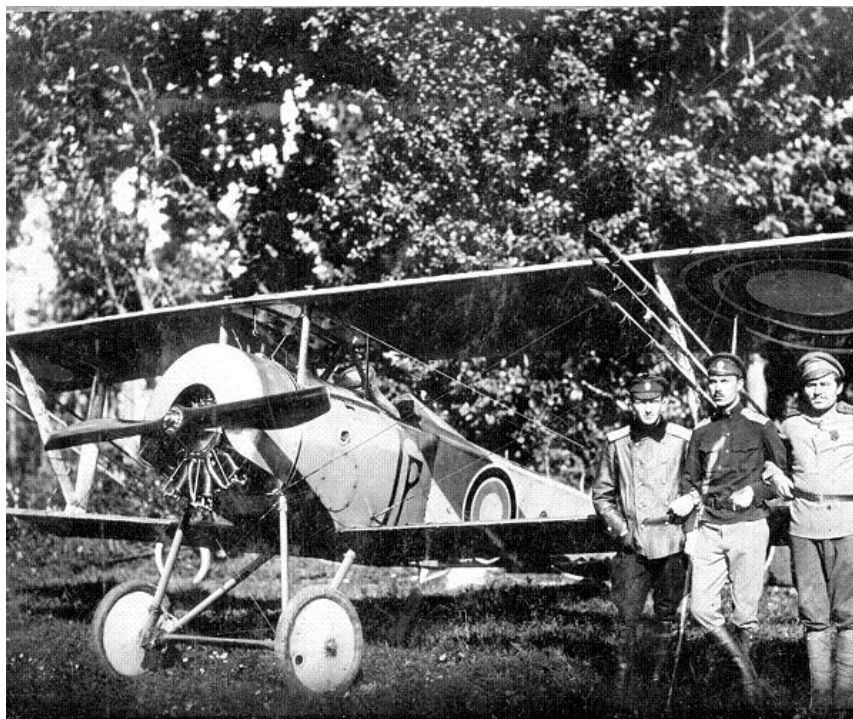
Unguided missile RS-82 (132).

Home » [Aviation Museum](#) » ENGINES and WEAPONS » Aircraft armament » USSR / RF » Air missiles. » Unguided rockets. » Unguided rocket projectile RS-82 (132).

Unguided missile RS-82 (132).

Developer: RNII
Country: USSR
Tests: 1937
Combat use: 1939

In the Russian Empire and other countries of the Entente, during the First World War, anti-aerial rockets "Le Prieur" stuffed with black powder were used. After the appearance of incendiary bullets, the relevance of this weapon faded away, only lighting rockets were in service until 1917. Since 1919, the design of rockets with engines running on smokeless powder began.



Russian fighter "Nieuport N.21" with missiles "Le Prieur". Southwestern Front. Summer 1917

In the early 1930s, the first experiments were made with 82-mm and 132-mm aircraft missiles. These calibers were not chosen by chance. The fact is that the experiments were carried out with powder bills with a diameter of 24 mm. Their size is determined by the 2 main caliber of rocket chambers - 82 mm and 132 mm, which were then preserved for a long time. If 7 sticks with a diameter of 24 mm are tightly packed into a cylindrical combustion chamber, then the inner diameter of the latter will be equal to 72 mm. The thickness of the chamber walls is 5 mm, hence the diameter, or caliber of the projectile, 82 mm. In the same way, the rocket caliber 132 mm appeared.

Naturally, the question of stabilizing missiles immediately arose. Many experiments were carried out to create turbojet missiles of 82 mm and 132 mm caliber. At the end of November 1929, ground firing of 82-mm PC-82 turbojet projectiles was carried out. A few months later, test pilot S.I. Mukhin fired TRS-82 (the first with this name) from the U-1 aircraft. The accuracy of the turbojet projectiles was unsatisfactory. In addition, with this stabilization

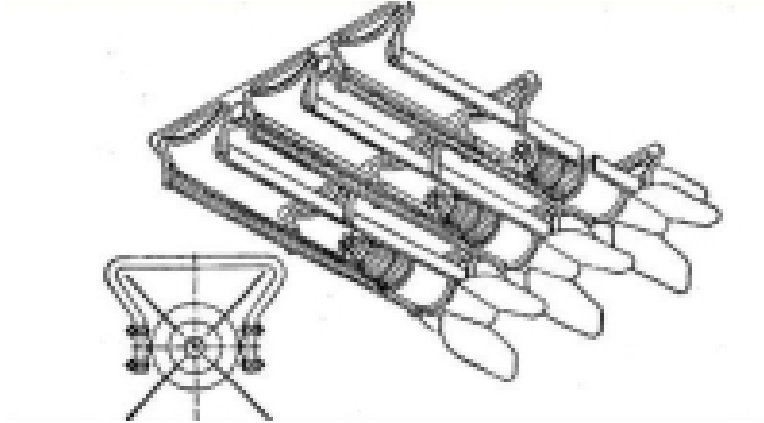
method, about 28-30% of the weight of the rocket charge was spent on the rotation of the projectile, and the forward speed and flight range as a result decreased.

In this regard, it was decided to switch to wing stabilization of missiles without their rotation. Initially, 82-mm projectiles were tested with an annular stabilizer that did not go beyond the dimensions of the projectile. However, experimental shooting and blowing in the TsAGI wind tunnel showed that it is impossible to achieve stable flight with the help of an annular stabilizer.

Then they fired 82-mm rockets with a four-bladed tail swing of 200, 180, 160, 140 and 120 mm. The result was quite definite: with a decrease in plumage, flight stability and accuracy worsened.

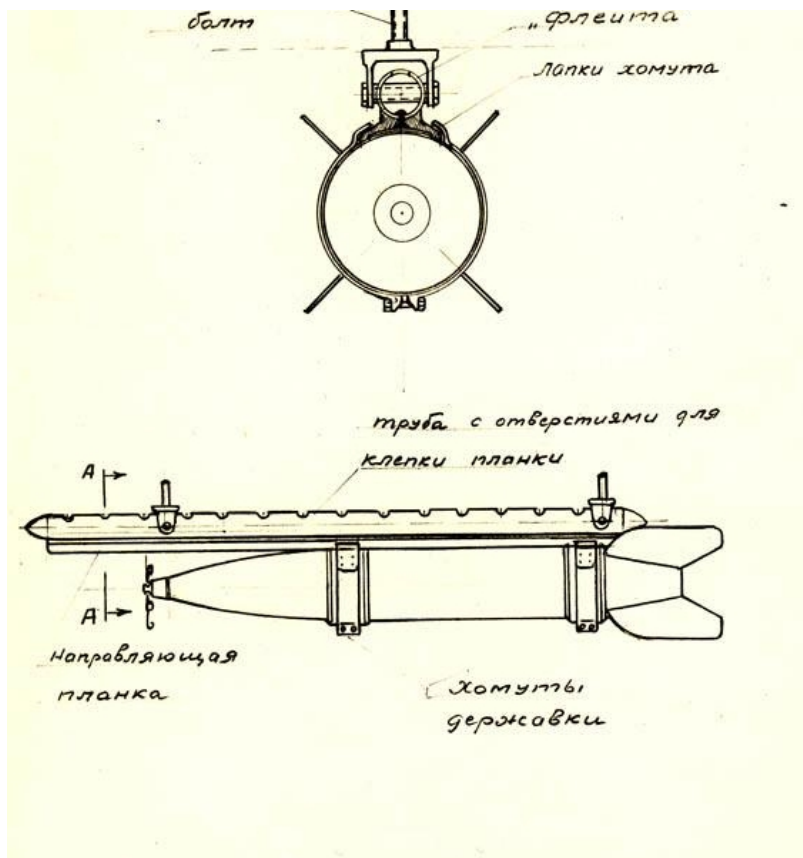
Further, during the experiments, it turned out that with a swing of less than 120 mm, stable flight did not work - the shells began to tumble right after the engine stopped working. The plumage with a span of more than 200 mm turned out to be too heavy and shifted the center of gravity of the projectile back, which also led to a deterioration in flight stability. Facilitation of the tail by reducing the thickness of the stabilizer blades caused strong vibrations of the blades up to their breakage in the air. In the end, the optimal dimensions of the stabilizers were found: a span of 200 mm for 82 mm missiles and 300 mm for 132 mm missiles.

In 1935, the PC-82 missiles were launched from the I-5 fighter . In 1935-1936, PC-82 missiles were fired from aircraft tow-type launchers, which had high drag and significantly reduced the speed of the aircraft.

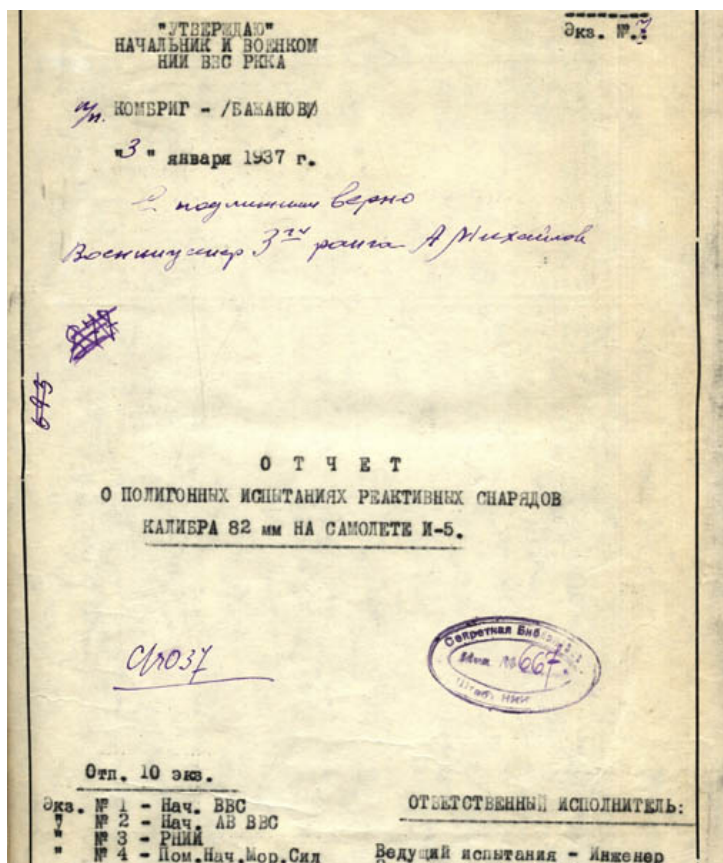


Tug-type launcher with RS-82 shells.

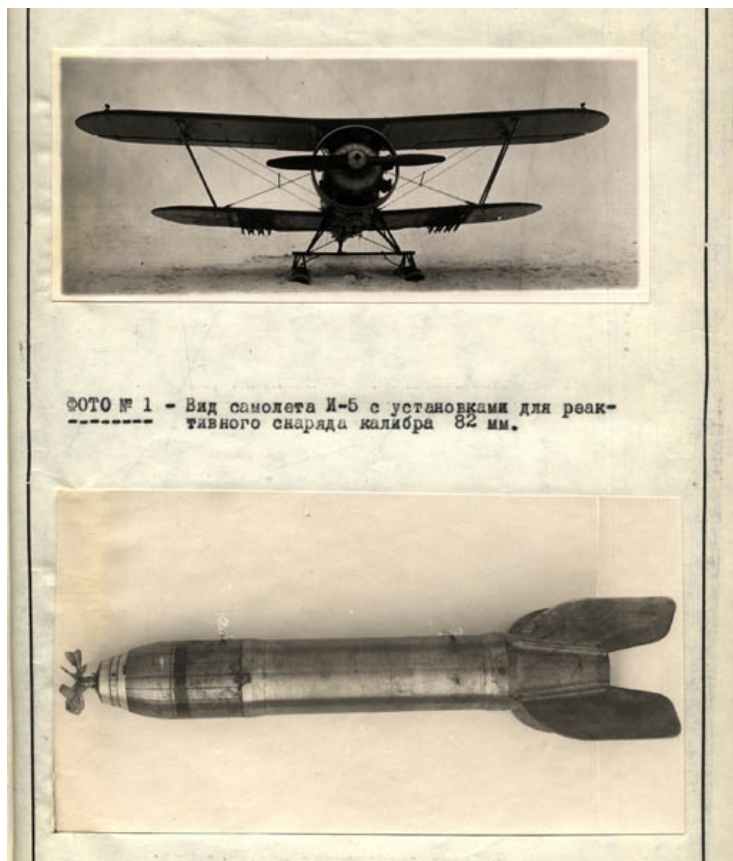
In 1937, the RNII developed a grooved-type guide with one bar having a T-shaped groove for the projectile guide pins. To increase the strength, the guide was attached to a load-bearing beam made of a pipe. This design was named "Flute".



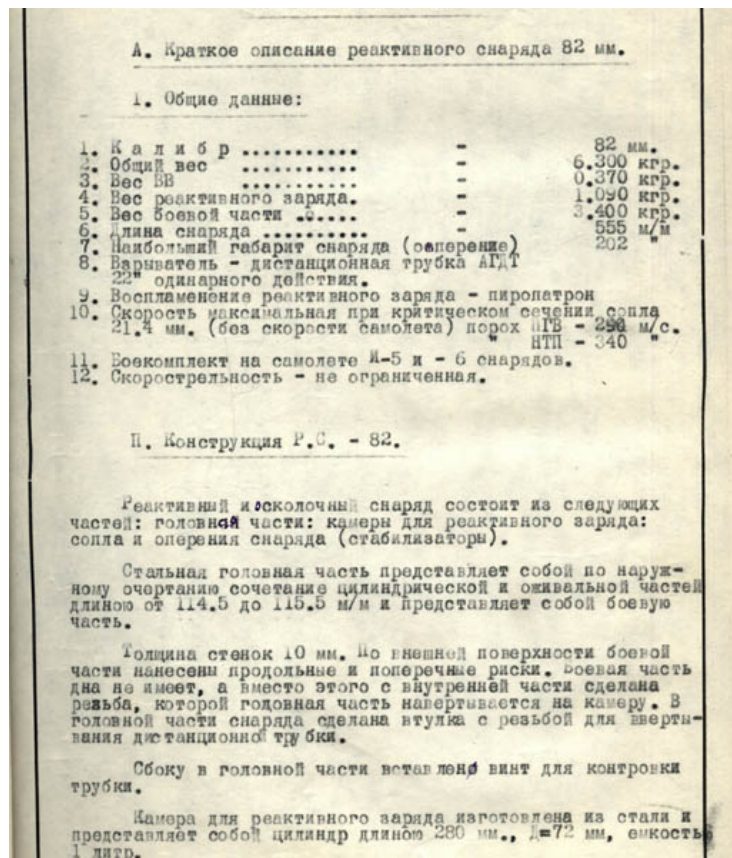
Launcher "Flute". Scheme.



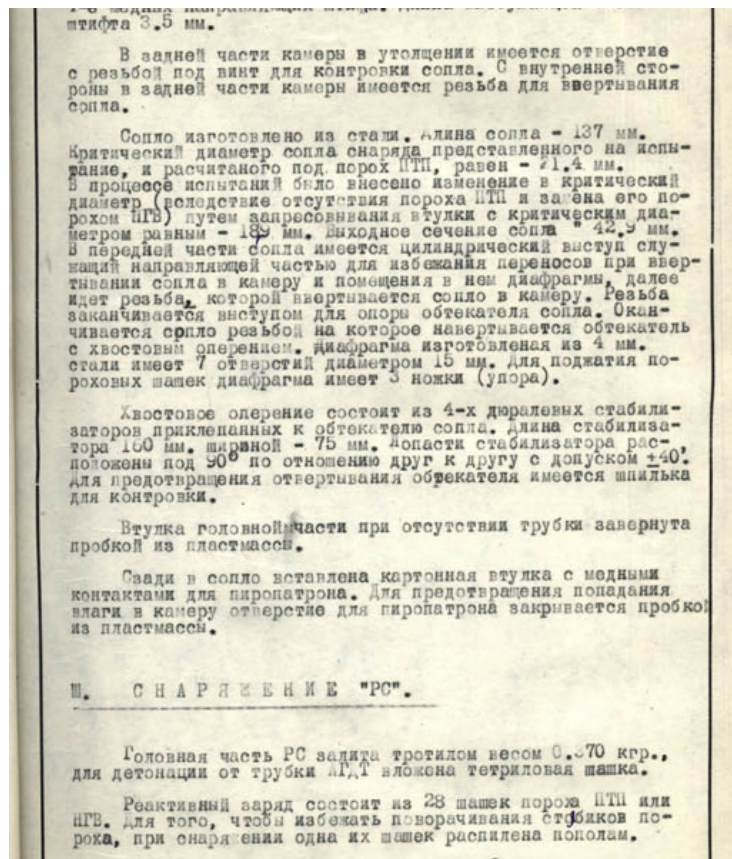
From the report of the RKA Air Force Research Institute on field tests of 82 mm rockets on I-5 aircraft. Sheet 1.



From the report of the RKA Air Force Research Institute on field tests of 82 mm rockets on I-5 aircraft. Sheet 2.



From the report of the RKKA Air Force Research Institute on field tests of 82 mm rockets on I-5 aircraft. Sheet 3.

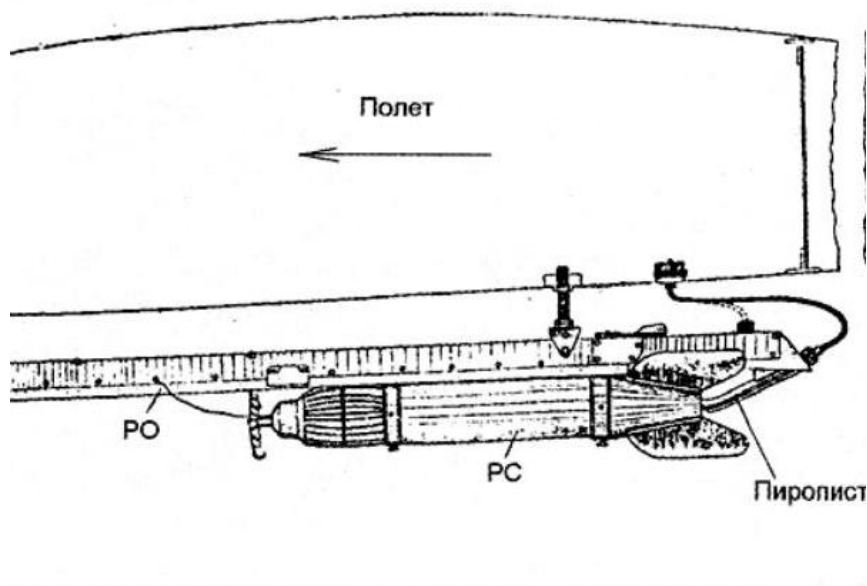


From the report of the RKKA Air Force Research Institute on field tests of 82 mm rockets on I-5 aircraft. Sheet 4.

Later, in launchers for the PC-132, the support beam-pipe was abandoned and replaced with a U-shaped profile. The use of flute-type launchers significantly improved the aerodynamic and operational characteristics of the projectiles, simplified their manufacture, and ensured high reliability of the projectile descent.

The first combat use of new missile weapons took place in 1939 on the Khalkhin-Gol River, where from August 20 to 31, the first link of missile-carrying fighters in the history of aviation successfully operated. It consisted of 5 I-16 fighters armed with RS-82 rockets. On August 20, 1939, at 16 o'clock, Soviet pilots I. Mikhailenko, S. Pimenov, V. Fedosov and T. Tkachenko, under the command of Captain N. Zvonarev, flew out to carry out a combat mission to cover the Soviet troops. Above the front line, they met with Japanese fighters. At the signal of the commander, all five fired a simultaneous missile salvo from a distance of about a kilometer and shot down two Japanese aircraft.

By 1942, the following main aircraft launchers were created: On the I-153, I-16 and Il-2 aircraft, launchers with a length of 1007 mm were used for PC-82 and RBS-82 (armor-piercing) shells. The length of their guides was 835 mm, the number of guides was 8. The weight of the entire rocket system was 23 kg. On SBaircraft, launchers with a length of 1434 mm were used for the PC-132 and RBS-132 shells. The length of their guides was 1130 mm, the number of guides was 10. The weight of the entire rocket system was 63 kg. On Il-2 aircraft, launchers with a length of 1434 mm were used for the PC-132 and RBS-132 projectiles. The length of their guides was 1130 mm. The number of guides is 8. The weight of the entire rocket system is 50 kg.



RS-82 under the wing of IL-2. Scheme.



Launcher of RS-82 shells on IL-2.

It is not for nothing that it says *"the main types of launchers"*, the fact is that the Air Force, as well as the Army and the Navy, produced a significant number of semi-handicraft launchers for 82-mm and 132-mm rockets.

During the Soviet-Finnish War (1939-1940) 6 SB twin-engine bombers were equipped with launchers for PC-132 missiles. The PC-132 missiles were launched against ground targets.

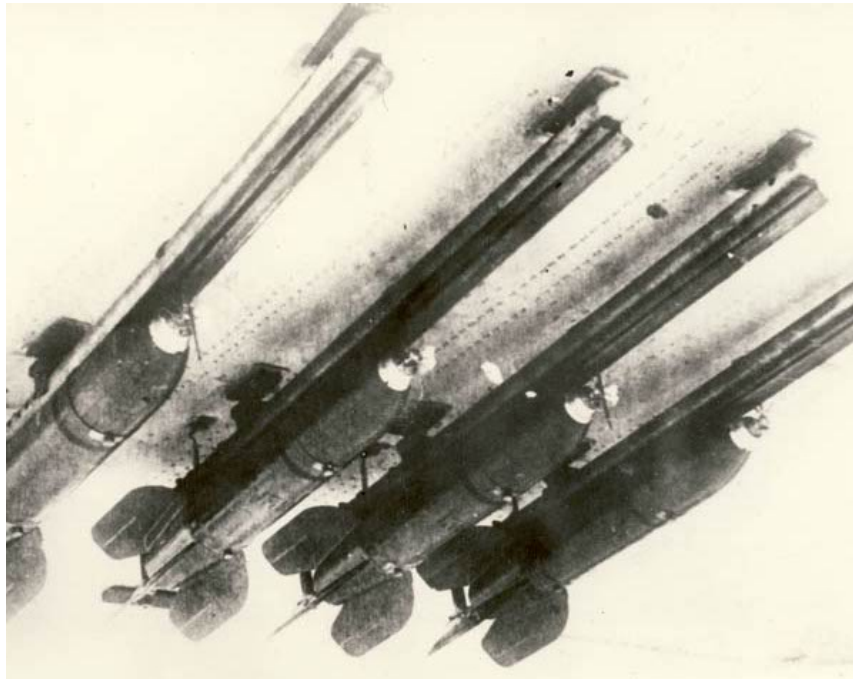
On May 28, 1940, the Resolution of the Main Military Council of the Red Army on the weapons system was prepared. Its section related to aviation read: *"To keep in service with the RS-82 and RS-132 high-explosive fragmentation aircraft, as well as the PAN-23 collimator sight for firing rockets. ... To approve, in order to ensure the prospects for the development of aviation technology, the following scheme and basic requirements for the construction of aircraft and engines for the period 1940-43."*

It was in accordance with these documents that the I-200 high-speed fighter (since December 9, 1940 - MiG-1) was armed with eight RO-82s, four pieces in a row under each wing console. To protect the sheathing of the planes from the impact of the ROS jet jet, the nose and the lower part of the consoles from the 1st to the 6th rib on the aircraft of the head series were sheathed with sheet duralumin attached to the rib shelves with screws. However, further tests showed the absence of any serious impact on the wing when the shells were fired, and starting with the aircraft of the 1st series, additional wing protection was not installed.

Missile armament was originally provided for on an improved version of the I-200 fighter (from December 9, 1940 - MiG-3), the release of which the plant No. 1 began on December 15, 1940. In accordance with the order of the NKAP No. 484 of September 12, 1940, in order to further strengthen the machine-gun armament of fighters and bombers of the Air Force of the spacecraft and to establish a unified armament system for planes manufactured in 1941, 10% of the I-200 fighters were to be equipped with 8 RO- 82. True, on February 14, 1941, the NKAP canceled the RO-82 installation. However, in the fall, the MiG-3 nevertheless replenished its arsenal with missile weapons. On the basis of GKO decree No. 708 of September 23, 1941 and NKAP order No. 1009 of September 24, 1941, starting from October 5, plant No. 1 produced six MiG-3 planes daily (a total of 217 vehicles), each armed with six jet guns.

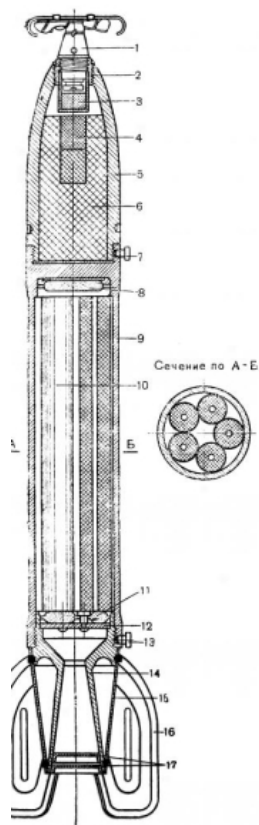
The main purpose of the ROS-82 shells was to fire at air targets, although it was also allowed at ground targets. Before departure, ammunition was equipped with contact (AM-A-RS-82) or non-contact (AGDT-A-RS-82) head fuses, and depending on their type, the scheme of using rocket weapons looked different. The time of their operation was smoothly adjusted in the range from 2 to 22 seconds and was manually set by the armament technicians on each projectile before departure. The set time required a detailed report to the pilot.

In 1940, the PC-82 and PC-132 shells were adopted by a number of aviation units of the Red Army. In 1940, the factories of the People's Commissariat of Ammunition released 125.1 thousand PC-82 missiles and 31.68 thousand PC-132 missiles.



RC-132 rockets under the wing.

With the outbreak of World War II, the USSR Air Force actively used the RS-82 and RS-132 for strikes against ground and air targets. In 1942, the PC-82 and PC-132 aircraft shells were upgraded and received the M-8 and M-13 indexes.



82-мм реактивный осколочный снаряд М-8 (разрез)

- 1 - взрыватель АМ-А (АМА-1);
- 2 - переходная втулка;
- 3 - тетриловая шашка;
- 4 - дополнительный детонатор;
- 5 - корпус головки;
- 6 - разрывной заряд;
- 7 - направляющий штифт;
- 8 - донный воспламенитель;
- 9 - реактивная камера;
- 10 - пороховой заряд;
- 11 - диафрагменный воспламенитель;
- 12 - дисковая диафрагма;
- 13 - направляющий штифт;
- 14 - крышка-сопло;
- 15 - корпус-обтекатель;
- 16 - крылья (лопасти) стабилизатора;
- 17 - картонные тарели.

Layout diagram of 82 mm M-8 missile.

Field firing with standard RS-82 and RS-132 rockets conducted at the NIP AV Air Force KA, as well as the experience of the Il-2 combat use at the front, showed the insufficient effectiveness of this type of weapon when operating on small targets due to the large dispersion of shells and, hence, low probability of hitting the target.

The average percentage of hits of the RS-82 in the tank of the aiming point when firing from a distance of 400-500 meters, shown in the materials of the report, was 1.1%, and in the column of tanks - 3.7%, while only 7 out of 186 shells fired were received direct hits. The height of the approach to the target is 100 and 400 meters, the gliding angles are 5-10 and 30, respectively, the aiming range is 800 meters. Shooting was carried out with single shells and a salvo of 2, 4 and 8 shells.

During the firing, it turned out that the RS-82 can defeat German light tanks of the Pz II Ausf.F, Pz 38 (t) Ausf.C type, as well as the Sd Kfz 250 armored vehicle only with a direct hit. A break in the RS-82 in the immediate vicinity of the tank (0.5-1 meters) does not inflict any damage on it. The smallest probable deviation was obtained in a salvo of 4 RSs at a gliding angle of 30°.

The results of the RS-132 firing were even worse. The attack conditions were the same as when firing the PC-82, but the launch range was 500-600 meters. The probable circular deviation in range of the PC-132 at the Il-2 gliding angles of 25-30° was about 1.5 times higher than for the PC-82, and for gliding angles of 5-10° - practically the same.

To defeat a light and medium German tank with a PC-132 projectile, only a direct hit was required, since when the shell burst near the tank, the latter did not receive significant damage. However, it was very, very difficult to achieve a direct hit - out of 134 PC-132 shots fired in the field conditions by pilots with varying degrees of training, not a single hit on the tank was received ...

Note that the averaging of the results of firing rocket projectiles, carried out by NIP AV Air Force specialists, without taking into account the degree of preparedness of the pilots, the number of projectiles in a salvo and the planning angles of the attack aircraft, cannot be considered correct when assessing the real effectiveness of the PC when acting on ground targets.

The negative experience of the combat use of PCs at the front is mainly due to the increased (600-700 meters) ranges of shells and not using the entire PC set in one salvo.

The engineering and technical staff of some combat aviation units, trying to increase the combat effectiveness of the Il-2, carried out on their own the completion of the attack aircraft, providing the suspension of an increased number of PCs on the aircraft. For example, at the beginning of 1942, on the North-Western Front, two serial Ila were equipped with 8 PC-82 and 8 PC-132 suspension by local craftsmen and then successfully tested in battles. In addition, in combat units there were variants of "humpback" with a suspension of 24 PC-82. Despite the increase in the combat effectiveness of the attack aircraft modified in this way, the installation of an increased number of PCs on the Il-2, due to a significant decrease in the aircraft's flight speed, was soon abandoned.

To combat tanks in 1942, the RNII developed RBS-82 and RBS-132 aviation armor-piercing missiles. These shells were based on the PC-82 and PC-132 and are equipped with armor-piercing warheads. In addition, the RBS-82 had a more powerful engine, its weight increased to 15 kg. The armor penetration of the RBS-82 projectile was up to 50 mm along the normal, and the RSB-132 - up to 75 mm. The attack aircraft were armed with RBS-82 and RBS-132 shells.

In the Il-2 arsenal, along with the RBS-132 missiles, which had an armor-piercing warhead, the ROFS-132 missile was firmly entrenched by this time as a means of combating German armored vehicles with improved accuracy compared to RBS-132 or PC-132 shooting.

The warhead of the ROFS-132 projectile ensured through penetration (with a direct hit) of the armor of medium and heavy German tanks.

When the ROFS-132 burst near the tank at a distance of 1 m from it at an elevation angle of 30, the kinetic energy of the fragments was sufficient to penetrate German tank armor up to 15 mm thick. At an elevation angle of 60, the ROFS-132 rupture at a distance of up to 3 meters from the tank ensured penetration by fragments of tank armor 30 mm thick, the dimensions of the holes in this case were equal on average (20-25) x (35-80) mm.

If ROFS-132 directly hit the side of, for example, the StuG IV assault gun (or the side of the Jgd Pz IV / 70 tank destroyer), 30-mm armor penetrated, and the gun, equipment and crew inside the tank, as a rule, were disabled. ROFS-132 hitting the Pz. IV led to the loss of the tank.

Unfortunately, despite the increase in the accuracy of the ROFS-132 firing, their effectiveness when firing at tanks and other armored vehicles in dispersed battle formations, to which the Germans everywhere had passed by this time, was still unsatisfactory. The ROFS-132 gave the best results when firing at large area targets - motorized columns, railway trains, warehouses, batteries of field and anti-aircraft artillery, etc.



RS-82 in the museum exposition.



RS-82 in the museum exposition.

Modifications:

RS-82 - the basic modification of the 82-mm rocket, put into service in 1937.

RBS-82 - an armor-piercing version, adopted for service in 1942. Armor penetration up to 50 mm normal. They were in service with the IL-2.

ROS-82 - rocket fragmentation projectile.

ROFS-82 - a variant with a high-explosive fragmentation warhead.

ZS-82 - incendiary RS.

RS-132 - the basic modification of a 132-mm rocket, entered service in 1938.

RBS-132 is an armor-piercing version, adopted for service in 1942. Armor penetration up to 75 mm normal. They were in service with the IL-2.

ROFS-132 - a variant with a high-explosive fragmentation warhead.

ROS-132 - rocket fragmentation projectile.

ZS-132 - incendiary RS.

TTX srnyad RS-82 and RS-132 model 1942:

Снаряд	РС-82	РС-132
Калибр, мм	82	132
Длина снаряда, мм	82	132
Вес ВВ, кг	0,34	0,9
Вес ракетного толкача, кг	1,1	3,8
Полный вес снаряда, кг	1,8	23,0
Максимальная скорость снаряда (без учета скорости носителя), м/с	340	350
Максимальная дальность, км	6,2	7,1
Радиус сплошного поражения осколками, м	6-7	8-10
Расстояние при стрельбе по наземным целям, тысяча дальности	14-16	14-16

...

...

List of sources:

A.B. Shirokorad. The history of aviation weapons.

Aviation and Time. E. Arseniev, N. Semirek. Jet armament of MiGs.