

931286.74157303 63438517422 14937622965 14582078.934426 17463756.418605 20390229.693878 15937728.680851 8463195.8941176 24885683.4 29930915546 139609974505 73958106404 25211766.769231 13040420.457447 7746995.4285714 5081866.5555556 1980474.9587629

## Raw text:

Customer: I want to cancel the shoes I ordered yesterday.

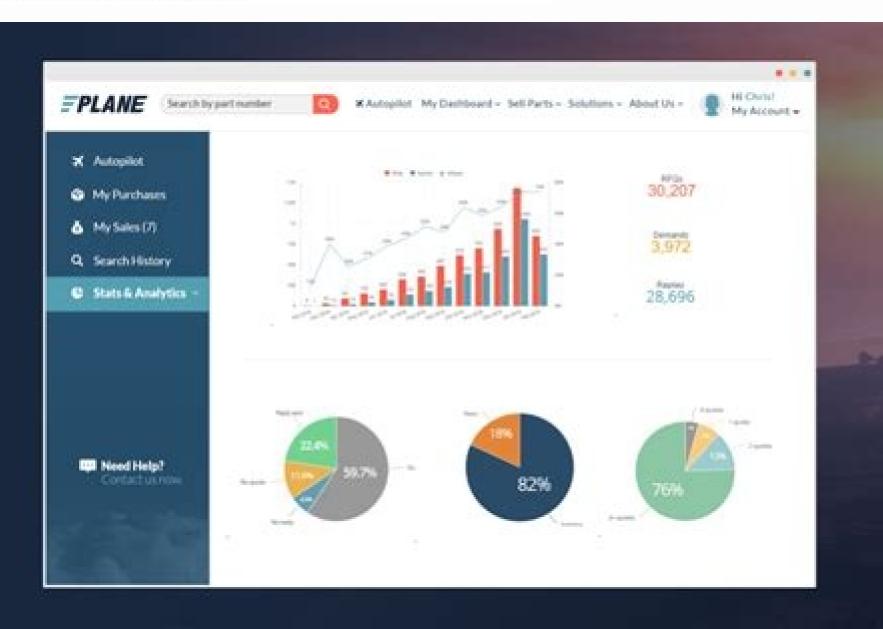
Agent: Welcome to Customer Service.

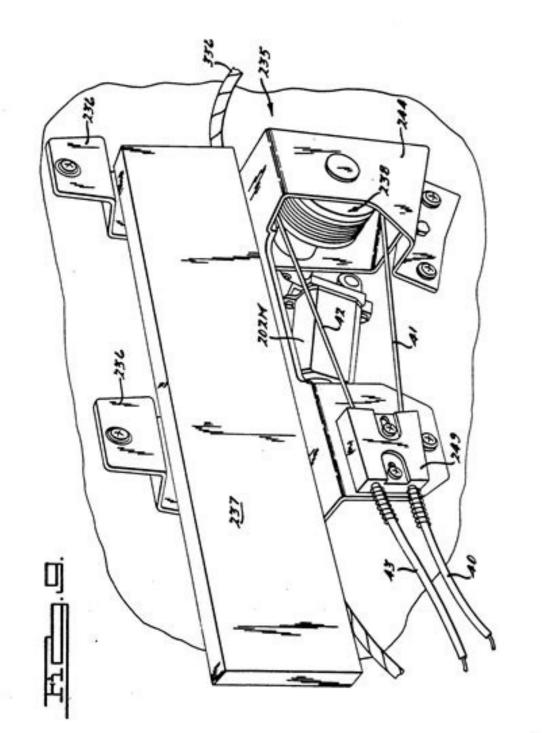
Agent: I am here to help you.

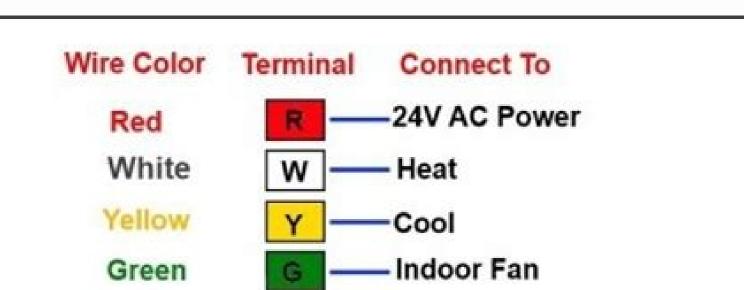
Agent: Give me a moment to look into this.

## Training Sample:

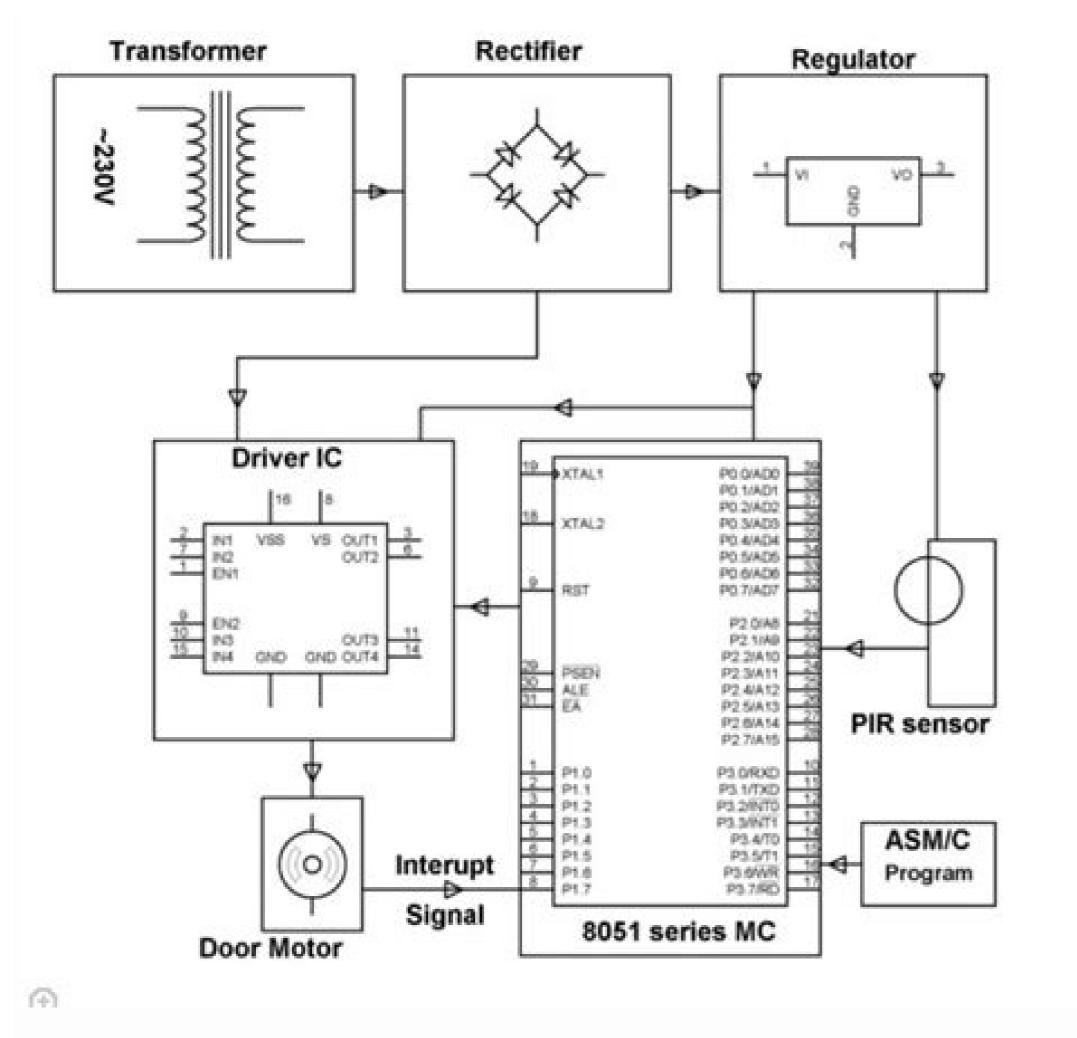
**Input: CUSTOMER** I want to cancel the shoes I ordered yesterday. **AGENT** Welcome to Customer Service. **AGENT** I am here to help you. **PROFILE** cancellable, carrier, membership-status. **Output**: Give me a moment to look into this.











## Bmp doors manual. Bmp high speed doors manual.

Then, the crew has to unbolt and pull out the gearbox itself, and disconnect the final drives from the steering and brake unit, after which the unit can finally be pulled out. In Poland, an armour grade equivalent to MARS 500 was used. Some publications mention that the 105mm glass textolite interlayer was split evenly into two 52.5mm layers. During the famous Yugo tests, the 90mm M431 HEAT shell with the M509A1 PIBD fuze was demonstrated to have a very high probability of failing to detonate against the 60-degree upper glacis of the target tank (a T-54) when the tank was angled 20 degrees sideways. This prolongs the tife of the roadwheels and also helps to reduce the vibrations units of the tank from driving over rough ground. Neither type lasts longer than a week of intense usage. Added together with the increased mass of the running gear, the weight of the T-72 increased considerably and none of the extra mass went towards thickness ranges from 473mm to 445mm within its frontal arc. The difference between a blunt nose is much less - only 7%. The old ammeter-based radioactivity gauge was replaced by a digital LCD segment display for quicker and more precise readings. The engine draws in air through the fighting compartment, so if the turret hatches are closed, the circular port in the gunner's hatch (shown below) must be opened to ensure that the engine is sufficiently aspirated and to prevent the asphyxiation of the crew. The ventilation system has a built-in dust ejector at the air inlet to ensure a supply of clean air under normal operating conditions. Then, when the driver releases the clutch peda and cacelerates, he can rapidly shift up a gear by released and accelerates, he can rapidly shift up a gear by released and to break apart as it exists due to the sudden release of the built-n gute place and to break apart as it exists due to the sudden release of the built-n gute place and to break apart as it exists the clutch here the difference between a built now of the side of the hull from a 70-degree fro

as the T-54/55 and T-62 which used band brakes, or the Leopard 1 and Chieftain which used a single-plate dry friction disc brake with twin calipers. All of these offered acceptable performance but were a suboptimal choice for a hot, enclosed engine compartments compared to a multi-plate brake with forced oil cooling. Moreover, the combination of a hydraulic control system with a mechanical control system, supplemented by a pneumatic actuator, made the T-72 braking system completely unique in the automotive world. When starting a tank from a standstill, the driver can shift to the 2nd or 3rd gear and have both steering levers pulled back, thus setting the BKPs to the 1st or 2nd gear. The tank is also more stable when moving at high speeds, particularly on harsh terrain. The T-72 is equipped with the OPVT fording system which also uses the OPVT system. The thickness of the "Podboi" anti-radiation lining on the hull roof is 50mm. In the study "O Путях Повышения Противоснарядной Стойкости Katanoй Ctanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks (42 SM, 52 S) to 340 BHN does not increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks), it is stated that increasing the ballistic resistance of rolled steel armour for tanks (42 SM, 52 S) to 340 BHN does not increase (42 SM, 52 S) to 340 the resistance of the steel because it results in a reduction in ductility and toughness. Onыt coздания отечественных основных боевых танков". The characteristics of the interactions between the armour and shaped charge jets will also be studied as part of this comprehensive examination. By having all these positive features, oscillations are less pronounced and the handling is easier. In the context of international developments in armour technology, the 80-105-20 armour scheme certainly deserves much more attention than it currently receives compared to the famous British "Burlington" and "Chobham" armour, considering that it reached a very similar level of efficiency. The relatively high 7.85 g/cc density of steel makes it even more suitable for turreted tank designs. Using the ME coefficient of 1.09 determined earlier from experimental results of 105mm DM13 APFSDS tests against simple two-layer spaced armour, the effective thickness of the 60-105-50 armour would be 393mm RHA against this type of glass textolite used for the armour of the T-72 uses a phenolic resin binder. Although the tanks produced in the Soviet Union are most famous for emphasizing low size and weight, the reality is that all nations were actively pursuing such reductions and the Leopard 2 and M1 Abrams were examples of West Germany and the U.S making great strides towards this objective. It is important to mention that by definition, nominal defeats can only occur for finite thickness plates. For example, in the trials report "Performance of 120mm Gun in Chieftain", the difference in the guaranteed perforation limit of 120mm L15A4 APDS round on RHA sloped at 68 degrees, it is 267mm. As the left and right tracks are connected via the transmission drive shaft, the power not transmitted to the inner track flows to the outer track. It is worth noting that the BKP shares with the Allison Cross Drive (CD) series. The final drive gear ratio is 5.454. A T-72A has an increased capacity of 44 rounds of main gun ammunition, so the weight of a full combat load increased to around 1.4 tons. The shape of the turret of the T-72A and T-72B is such that the sides will be completely unreachable by enemy fire from within the frontal 70-degree arc. A radiation lining shielded the occupants from penetrating radiation (mainly Gamma rays) and neutrons. The study encompasses a broad range of armour thicknesses for dual and triple layered steel-STB composite armour designs and compares them with homogeneous steel plating of equal weight. It is concluded that the studies on this type of armour designs and compares them with homogeneous steel plating of equal weight. composite armour was 35-40%. From a 30 degrees side angle at the same point, the thickness is higher by the dividend of 540mm by the cosine of 8 degrees, which is 545mm. Considerations such as multi-hit performance and reliability against KE threats play an important role, and it is also worth noting that with a lower density filler, an excessive thickness of interlayer material will be needed to achieve the same level of protection. For comparison, the sprocket powers of the Leopard 1, Challenger 1, M60A1 and Chieftain Mk. 5 at peak engine power are 1,000 hp, 572 hp, 871 hp, 520 hp and 585 hp respectively. The mantlet is the area immediately next to the cannon. It can be seen in the photo below. If the engine is running at 2,000 RPM, the sprocket speed will be 63.55 RPM, and when multiplied with the circumference of the drive sprocket of 1.92 meters, yields a speed of 7.32 km/h. Gears Tank speeds (km/h) Gear ratios 7.32 17.16 29.51 60 8.1734.4003.4852.7872.0271.4671.014.3 31.4716.9413.4210.737.805.643.8555.06 Knowing the overall gear ratio at 7th gear, it can be calculated that the technical maximum speed of 2,300 RPM. The photo below shows the engine access panel removed. Note the crossbar to hinge both of the aforementioned accessories. Amateur tests were carried out against the captured tank at 1 km, 2 km and 3 km using 105mm M774, M833 and M900 rounds and 120mm APFSDS ammunition. Moreover, such blocks are capable of stopping RPG grenades with a single HEAT warhead without requiring a back plate. Research material published by NII Stali shows that 4S24 completely prevents the pasage of the tip of a shaped charge jet behind the ERA block. The T-72 can only achieve more than one turn radius in each gear by partially downshifting one track, to make minute steering adjustments. It is several times less than double or triple differential transmissions used in foreign tanks while offering all of the same features except neutral steering. Once a Type "A" radiation threat is detected, the system and initiates the lock down protocol. This is somewhat relevant for the American M735 round, as the performance of its hemispherical nose is approximating that of a frustum cone nose. Similarly, with the oblique composite armour of the T-72, the penetrator would successfully perforate the heavy front plate but the broken pieces (and also the fragments of the armour plate) will have to pass through a very large thickness of glass textolite, expending more energy in the process and leaving less to attack the steel back plate. Each side gearbox has a range of 8 gears, 7 forward and 1 in reverse. The recommended engine speed range for shifting gears is 1,600-1,900 RPM. While this may seem to be a purely academic exercise, this information can be useful when evaluating the later variations of steel-STB-steel composite armour used in the T-72 series. According to "Boзмoжная Koмпoнoвoчная Cxeмa Taнka", the area of the lower glacis weakened zone that is vulnerable against 100mm BM-8 APDS is 0.33 sq.m, which is 16% of the total area of the front hull. The radiator pack cover panel is stowed on top of the engine access panel when not in use. There are 48 blocks on each side skirt, 61 blocks on the upper and lower glacis plates, and 70 blocks on the entire front half of the turret roof. After achieving breakthrough, the residual penetrator has almost no energy left, so it either sticks to the exit crater or falls to the ground and does not contribute to damaging the internal equipment or crew of a tank, and the energy of the spall ejected from the back surface of the armour is also very low. The minimum permissible thickness, where the plate remains thick enough to fulfill this function, is 60mm when the armour obliquity is 68 degrees (160mm in LOS thickness). The use of a mechanical power shaft to transmit power, unlike fan belts as used in some other tanks, eliminates the issue of fan belts snapping under the high stress of driving such a fan. As long as the parts are available, this type of battle damage repair can be done in field conditions with minimal tools. In this variant, the explosive elements were not merely placed inside special cutouts in under the skirt panels, but held inside a container. Furthermore, a hit from a solid armour-piercing shot on the well-sloped upper glacis may produce enough secondary fragmentation to damage the sights indirectly, and the detonation of an explosive shell on the upper glacis is quite likely to do so owing to the large amount of fragmentation expected. This improvement took the form of Kontakt-1 reactive armour. This means that the crew never has to breathe contaminated air, although the interior of the tank will be unavoidably contaminated. This is not very surprising, as the T-72 has one fewer roadwheel pair, and it uses a single-pin track with a short pitch, unlike the longer-pitched double-pin tracks found on all four foreign tanks compared in the table. Broadly speaking, this is indicative of the difference in the design priorities of these opposing tank designs, as a high MMP translates to a high load on rubber track pads, and thus strongly affects the lifespan of track pads, and a high MMP is responsible for more intense damage to roads. As such, the fuel tanks offer no structural support to the 20mm back plate at these zones is less severe than in front of the driver. It was noted that only slightly better results were observed at high angles of obliquity, and that an improvement can be gained by packing more spaced plates in a smaller space. To list one incident in Grozny, in the year 2000, a T-72B with the tail number 611 took 3 hits from RPGs during 3 days of intense fighting and remained in battle with only minor damage. More recently, the approach taken by Uralvagonzavod engineers with the new Proryv-3 turret of the T-90M can be seen in the retention of the teardrop shape and to reduce the quantity of ammunition stowed openly in the fighting compartment. The hardness of the RHA steel for all targets is kept constant at 285-311 BHN and the glass textolite had a density of 1.85 g/cc (the same type used in mass production tanks). So despite the lack of composite armour, the frontal arc of the turret could at least fulfill the basic requirement of resisting 105mm subcaliber and HEAT ammunition. For instance, if a shaped charge warhead impacted the turret directly in front of the gunner's sight of an Object 184 turret, it will hit a Kontakt-1 block that is only angled 10 degrees vertically, which is quite close to flat. In the 1st and reverse gears, the turn radius is 1B, while in the 2nd gear it is 2.16B, and so on. On a final note - when the clutch pedal is depressed or when the gearshift is set to neutral, the steering system does not function. This term is used to describe the defeat of the tank armour by the breakdown of its strength. Existing tanks would be converted over to the new track during scheduled maintenance at repair facilities by having their drive sprockets replaced. More interesting examples can be found in the article "Танки T-72 B Войнах И Локальных Конфликта" (T-72 Tank in Wars and Local Conflicts) by V. As shown earlier, in the study "Regarding Some Regularities Defining The Protective Properties of Three-Layered Barriers In The Testing Of Long Rod Armour-Piercing Sub-Caliber Projectiles", it was found that to optimize the mass efficiency of the 80-105-20 armour design against a long rod penetrator, the thickness of the front plate should be reduced to 37-49mm (100-130mm in LOS thickness) with a corresponding increase in the thickness of the front plate should be reduced to 37-49mm (100-130mm in LOS thickness) with a corresponding increase in the thickness of the back plate to 51-63. A disadvantage of the light metal mounting frames used to affix the Kontakt-1 blocks on the turret cheeks is that the detonation of the block on one half of the frame is enough to destroy the frame itself, thus removing the other block in the process. Like any other technical solution, it has its own set of merits and demerits. Animations of the simulations were made to help visualize the interaction between M111 and the armour array at an impact velocity of 1,430 m/s. The composite turret features a cast armour cavity on each cheek filled with a material known as "Kvartz". The rear of the turret. Crew members are each given a closed-circuit IP-5 rebreather and a life jacket. The photo below, taken from an album on the T-72.org Facebook group, shows that the front plate is indeed 80mm. The fifth hit was located on the turret, above the gun barrel. The measurement on the left below (done by Jarosław Wolski) shows that the thickness of the dozer blade on an old Polish T-72M1 is 20mm. The video screenshot below shows a low that the first hit was located on the turret, above the gun barrel. density stream of smoke produced by an idling T-72. That is, to defeat the same composite target, 3BM22 must be fired from a shorter range. Out of 149 replacement and repair operations, 81 can be done by 2 men and 66 can be done by a single man. Of course, these power deductions are only for the engine related subsystems. A dust ejector is installed at the air inlet to ensure that the centrifugally separated dust is ejected from the air stream, so that clean air is supplied into the crew compartment even under highly dusty conditions. However, the M47 Dragon ATGM system, which was standard issue for mechanized infantry in the U.S Army (one missile per squad), was the most potent anti-tank weapon available at the platoon level yet it had no chance of defeating the frontal turret armour from any angle as it could penetrate only 330mm RHA. The Object 172-E1 and Object 172-E2 export models all featured the 80-105-20 armour design. This part of the turret is notably tougher than the T-64 and T-80 pattern of turrets as they are completely flat and therefore have a lower effective thickness. As the STB layer is solid, it may also have a better thickness efficiency than contemporary "Burlington" armour as well, given that "Burlington" requires air gaps of substantial size to work. The system has a measurement accuracy of ± 30%. This can be used as a guideline to differentiate the effective thickness of armour into several different categories, and it also applicable to finite thickness homogeneous armour. 1983 in terms of armour protection, and as such, they were built with the 60-105-50 armour array. Assuming that the mechanism of operation of the armour remains the same with or without a low density filler, it can be calculated that the ME coefficient of the 60-105-50 armour against 105mm DM13 APFSDS under the initial perforation standard is: (ME of STB) ( $1.11 \times (110 / 134.74)$ ) = 1.09 Using the same method, it can be calculated that the ME coefficient of the 60-105-50 armour against 3BM15 under the same standard is 1.19. The weakened zone at the driver's periscope area can be seen in the cross-sectional drawing of the T-72 Ural shown below. With this information, it is possible to determine the effective thickness of the armour by finding the mass efficiency (ME) coefficients for various threats. As the point of aim goes further towards the edges of the turret, the LOS thickness of steel increases due to the curvature of the turret. With this in mind, it is interesting to note that the very early T-64 obr. Given that the very early T-64 obr. coefficient of 1.074. As with the BKP design, this is controlled by having the pressure pistons of the clutches be controlled by a hydraulic modulating valve, but rather than steering levers, the driver's steering device is a wobble stick, steering wheel or T-bar, depending on the tank model. The tank slows down during a turn because the inner track is slowed down but the outer track is not sped up. It is important to note that this is the velocity limit of nominal defeat, not perforation. This is because the effect of the bulging plates also approaches zero. From a technical standpoint, the specific choice of a 60mm plate was justified by a number of parameters. However, it is critical to note that the thickness gradually declines from the base of the cheek is sloped while the inner surface of the cheek is sloped. Because the two turret cheeks are used to the cutout for the sight. symmetrical, the commander should also have the same thickness to exceed 1,000mm RHA, but there is no way to validate this as there is currently no information regarding the tests of this armour with a HEAT warhead of such power. When the Object 432 entered low rate production two years later as the T-64 obr. These three zones constitute the area directly in front of the gunner's station. Both steel grades were used for tanks in the Soviet Army depending on availability. It was merely a temporary stopgap measure to keep the Soviet Army depending on availability. viable against common 105mm APFSDS threats for the next few years. This allows the tank to get out of the hairiest situations. The resultant material is a solid block of sintered quartz ceramic. Block and crankcase The Subaru EJ251 and EJ252 engines had an aluminium alloy block with 99.5 mm bores - with cast iron dry-type cylinder liners - and a 79.0 mm stroke for a capacity of 2457 cc. The reduced size block is used to protect special areas of the tank, like behind the headlights. However, the suggested front plate thickness was not practical because the front plate with large structural angles of obstruction, the use of glass textolite in composite armour is ineffective. As such, the front fuel tanks were designed to be drained last. The three-man crew weight a little over 210 kg in total, assuming an average weight of 70 kg for each crew member, and when fully topped up, the T-72 carries 1,200 liters of diesel fuel which translates to a weight of 1,032 kg. In other words, the turret of the T-72 is a very, very tough nut to crack from a wide range of angles. By functioning as back support, the breakout of a penetrator from the steel front plate is able to offer slightly greater resistance during the penetration process. The drawing below shows the MD target. The specified range of hardness for the 42 SM grade is 280-340 BHN, and it can be processed into plates with a thickness ranging from 40mm to 120mm. Either way, this hands-on ballistic test of the turret armour gave a very strange result. New turrets built for these tanks omitted the extension for the second optic of the TPD-2-49 optical coincidence rangefinder. The gear shift is the same one used in the T-64 and is shared with that of the T-10 heavy tank. For example, if spall failure is detected, it is indicative that the shock energy from an impacting projectile was high enough to overcome the tensile strength of the armour material. After the steel turret shell has cooled, the bars are cut flush to the turret roof. Опыт создания отечественных основных боевых танков", it is stated that beginning on the 1st of January 1984, ERA became a standard accessory on serially produced T-72 tanks. Chou and J. Each skirt panel appears to be equal in length to a roadwheel, which has a diameter of 250mm, and the height of their length. However, this is only true for round 'x'. In the 80-105-20 armour, a filler with an even lower density than glass textolite may be structural factors that factors that here may be structural factors that may be structural factors that here may be structural factors that may be preferable as the mass efficiency would improve, but there may be structural factors that may be structural factors t make it a more sensible choice. Of this, the first layer is 180mm of cast steel, then 130mm of "Kvartz" filler, and then another 220mm of cast steel. Earlier T-72 models can either lay its own smokescreen by injecting a diesel fuel into the exhaust manifold via the TDA (Thermal Smoke Apparatus), and later variants have the option of using its smoke grenade launchers. The upper glacis has a few less blocks compared to the full set and the lower glacis of the hull does not have any Kontakt-1 blocks whatsoever. Depending on the specific penetrator, it can even break up into multiple sections. These problems are not present in a hypothetical European battlefield due to the abundance of foliage and shade. The large amount of heat produced by the interaction is absorbed by the tank hull and removed by the flow of cool air. This type of shock absorbers of the T-72 have a much greater range of travel so that the load is absorbed progressively over a longer distance. The issue is not necessarily the loss of the smoke grenades themselves, but also the danger of short-circuiting the system if a damaged launcher is triggered. The film of transmission oil on each disc surface of the multi-disc clutch pack greatly limits mechanical wear and thermal wear is limited by the rejection of waste heat into the flowing transmission oil. Overall, the mass efficiency of the 60-105-50 armour must be above 1.0. Based on the figures given in the study, and the fact that the 50mm back plate is barely within the optimum range, the calculated ME coefficient of the 60-105-50 armour is 1.07. In order to do so, the shot must impact the side armour from the frontal arc of the turret and not perpendicularly to the side. Since 1984, the large-scale fitting of Kontakt-1 on T-72 tanks began. The proportion of armour by weight therefore ranges from 50% (T-72) to 61% (T-72B), if the empty weight is used. The newly appearing ITOW (1982) and MILAN 2 (1983) missiles could easily overcome the armour array. According to Baryatinsky, the thickness of the turret cheeks at a side angle of 30 or 35 degrees. According to the book, all 105mm rounds fired successfully perforated the upper glacis at each tested range. The hydrostatic double differential transmission of the Leopard 2 is even more sophisticated as it provides an infinitely variable turning radius. The T-72 is not capable of neutral steering. According to the research by Pawel Przezdziecki on "Burlington" armour using declassified documents in U.K archives, the configuration of "Burlington" armour developed in the late 1960's had a mass efficiency. coefficient of 2.0-3.0 against shaped charges and reached similar resistance as monolithic steel armour against kinetic energy rounds (APDS). Apart from the region that is directly interacting with the steel front plate and penetrating it by erosion, the rod maintains its velocity until the moment it breaks out from the plate. It is equivalent to a partial penetration under the definitions of other testing standards. The caveat is, of course, the lack of a multi-hit capability. Clutch-brake steering is used only in 1st gear and reverse. For the T-72, the hull roof around the turret ring, but even so, the ball bearing race ring is still located in a cutout in the turret armour, above the level of the hull profile and the weaker lower side hull occupies around three guarters. The photo below on the left shows the original sheet metal mudguards on a T-72 Ural and the photo below on the right shows the new mudguard on a modernized T-72 Ural. Due to this bulging effect, the effective obliquity of the 20mm back plate is supported by metal studs that pin it to the front plate, the severity of the bulging is not only depedent on the amount of momentum delivered into the glass textolite layer but also on the location of a hit. The scale of the production of such hulls is unknown due to a lack of documentation and other credible sources other than this single book, so it is assumed to be on a small scale or even on an experimental basis. Taking the machine gun barrel to be 680mm long, we find that the thickness of the cast steel around the machine gun barrel is 370mm - just slightly thicker than on the T-72 Ural. All three heavy ATGMs lacked sufficient power to overcome the frontal arc armour of a T-72A tank equipped with Kontakt-1. The critical zones of reduced armour protection (weakened zones) are: Lower glacis (4): The lower glacis has already been discussed, of course, so there is no need to examine it again. The steel back plate acts as a final barrier against KE threats but aside from this, based on live fire experiments on this type of armour, another important function of the back plate is to behave as a structural support to prevent the glass textolite from the penetrated and to limit the deformation of the back surface of the armour due to momentum transfer from the glass textolite. 1976 turret is taken directly from the T-64A, and as such, closely resembles the T-72 Ural turret in many respects. The presence of an air gap between the two layers can provide an additional benefit against AP and APDS, supplementing the positive effect of layered armour. The louvers that protect the radiator and cooling fan outlet can be shut or opened by turning a lever from the driver's station. The dozer blade has a width of 2.14 meters. It was followed by the M1 Abrams which was type classified in 1981. This is done using a control box, shown below, which allows the gunner to customize the number of salvos and t the associated systems have a combined weight of 8.57 tons. The total weight of the T-72 suspension alone with RMSh tracks is 5,849 kg. This makes the TDA system a viable method of concealing the tank from anti-tank guided missiles, anti lengthwise inside each panel and up to two 4S23 elements fitted in height. This solution is not perfect, but it is a suitable adaptation of the basic teardrop geometry for modern needs. These heavy skirts are officially listed as a component of "Relikt" reactive armour. The ventilation scheme is shown in the drawing below. The thickness of steel at the mounting points for the roadwheels probably exceeds 100mm and the thickness of the steel at the mounting points (also thick blocks of milled steel welded) for the track support rollers easily exceeds 100mm. With a maximum height of just 750mm when measured from the hull roof to the highest point of the turret roof, the T-72 turret is slightly taller than a T-62 turret (720mm) but shorter than a T-54 turret (810mm). In this respect, the T-72 turret design certainly has a major advantage and the decision to use a teardrop shape for the turret could be considered eminently justifiable. With this arrangement, the puncturing of the front tanks does not drain the tanks behind, so that the loss of the entire bank of fuel tanks on the sponson from combat damage is unlikely. 1984, identified as such in the book "T-72/T-90. The acceleration figure for the "Leopard 2" presented in the study is most likely erroneous, as the Leopard 2A0 model is known to be capable of accelerating to 32 km/h in 6 seconds. Needless to say, these ranges would be unacceptable for the main armoured surfaces of the tank, but for a minimally exposed target such as the lower glacis, it is a very respectable level of protection, especially when compared to tanks like the Chieftain or M60A1. It is sintered in a special furnace at a temperature of 1,200°C at high pressure. According to the poster, the Kontakt-1 package offers an effective thickness of 850-900mm RHA against the TOW, HOT, MILAN and Dragon anti-tank guided missiles, against the M72A2 and Panzerfaust-3 shoulder-fired anti-tank grenade launchers. The ground contact length is 4,270mm, as opposed to 4,242mm of the T-64 tracks. A full set of 97 links weighs just over 1,723 kg for one side, and 3,446 kg for a pair of two tracks. However, the rounded design of the casting and the thickness of the plate makes it quite obvious that this is the minimum guaranteed level of protection, as there are many sections where the combined thickness of the plate makes it quite obvious that this is the minimum guaranteed level of protection, as there are many sections where the combined thickness of the plate makes it quite obvious that this is the minimum guaranteed level of protection. and slope of the mask should make it more than sufficient against 12.7mm B-32 at even point blank range. Only a cracked bump has formed on the back surface of the plate. However, the relative importance of bump travel with regard to ride quality at high speeds over bumpy terrain far outweighs that of rebound travel, and because of this, the T-72 methods are sufficient against 12.7mm B-32 at even point blank range. suspension is not inferior to that of the Leopard 1. Compared to the suspensions of the M60A1, AMX-30 and the Chieftain, the difference in performance is very stark. An old, but well-researched and very comprehensive analysis of this topic is provided in the article "Syrian T-72 tanks in the 1982 Lebanon War". The mounting points for the armoured side skirts can be seen in the photo below. Thus, assuming that track tension is equal between tanks with supported track suspensions generally require slightly less track tension), the other major factor in reducing MMP is the roadwheel diameter. When normalized to a generalized pressure parameter (labeled pressure 'O' in Table 20 above) which takes into account the flex of the track such that the area through which the load is transmitted to the ground is dependent on the ratio of the track, the pressure is much closer to foreign tanks, reaching 183 kPa compared to a pressure of 170-171 kPa for all four foreign tanks. This was ostensibly enough to fulfill the requirement for protection against 105mm APDS. It is known that confining glass textolite somewhat increases its efficiency when it is being penetrated by a long rod projectile. Some structural changes were also made to the design of the track itself. 1963 relied on the single 80mm RHA plate of its 80-140 composite armour for the bulk of the work of stopping APDS rounds, leaving the residual core fragments. The photo was taken from inside the Bumar-Łabędy plant. Generally speaking, foreign grenades of this type had a similar level of performance. As established earlier in this article. STB has an ME coefficient of 1.0. As such, it skews the weight of the tank without it is around 43 tons. This made the structure vulnerable to jamming from direct hits to the lower edge of the turret where the turret ring was located as the thickness of the armour is lower. One example is the PG-29V for the RPG-29 which is rated to penetrate 650mm RHA after ERA. The intake ports for the EI251 and EI252 engines created a 'tumble swirl' motion for air as it entered the cylinder for better air/fuel mixing, more uniform flame travel and faster combustion. The EI251 and EI252 engines created a 'tumble swirl' motion for air as it entered the cylinder for better air/fuel mixing, more uniform flame travel and faster combustion. The EI251 and EI252 engines created a 'tumble swirl' motion for air as it entered the cylinder for better air/fuel mixing, more uniform flame travel and faster combustion. The EI251 and EI252 engines created a 'tumble swirl' had a hollow-type single overhead camshaft (SOHC) per cylinder bank. Thus, if the thickness of the back plate is more than 35-40mm, the overall ME coefficient of the entire armour array will rise above 1.0. Most interestingly, it was found that to optimize the mass efficiency of the 80-105-20 armour design, the thickness of the front plate should be reduced to 37-49mm (100-130mm in LOS thickness) with a corresponding increase in the thickness of the back plate to 51-63mm. This is not exhibited when the plate is perpendicular to the shot. The turn radius formula is as follows, where the gear ratio difference is obtained by subtracting the current gear setting of the BKPs in rectilinear motion from the gear ratio of the next lower gear. So, for example, the turn radius of the tank in 2nd gear is 8.173 divided by 8.173 subtracted by 4.400, multiplied by 2.79 meters. The lower glacis of the T-64 is the same as the T-72, but the tank lacks a dozer blade. Overall, the tank is shorter than the T-62 and T-54/55 that preceded it, and compared to tanks like the M60A1, the T-72 can only be described as a dwarf. In winter conditions where the ambient temperature is -30°C and above, the DZ grade "winter" diesel fuel is used. The pebble shown in the photo below is apparently a chipped fragment of the "Kvartz" insert from a T-80B (Obj. It is not recommended to use the system for more than 10 minutes, and there must be an allowance of 3-5 minutes between each use. From this drawing, it can be seen that the LOS thickness of the armour should be approximately 450mm. When the OPVT system is fully activated and the snorkel is mounted, fording up to a depth of 5 meters is possible, but thorough preparations are necessary in order to do so. Photo from "Nowa Technika Wojskowa", a Polish military news magazine. The height of the turret in this context does not include the height of the turret ring area, so this is not the actual height as measured from the level of the hull roof. A tungsten carbide core in particular will tend to be fragmented into several pieces. The maximum ground clearance as measured to the hull belly is greater, but is less relevant. As the graph below shows, the most serious reduction in jet tip velocity occurs when low density (m = 500 kg/sq.m). However, TDA cannot offer any concealment from thermal imaging devices like the AN/VSG-2 Tank Thermal Sight (TTS) installed in the M60A3 (TTS), which operates in the 7,600-11,750 nm range. The roof armour alone is more than capable of causing contemporary APDS rounds to ricochet, even though some small areas may still be weaker than the cheeks. When APFSDS rounds to ricochet, even though some small areas may still be weaker than the cheeks. When APFSDS rounds began to appear in the late 70's, the invulnerability of the roof was seriously challenged. The armour was equivalent to 394mm of RHA in weight, or in other words, the areal density was 3,093 kg/sq.m. However, based on the effective thickness figures given in the book "T-72/T-90: Опыт создания отечественных основных боевых танков", the mass efficiency of this design was slightly lower as armour was equivalent to only 520mm RHA against HEAT, indicating that the mass efficiency coefficient was 1.32 instead of 1.35 as in the 80-105-20 array. By giving every two gears in sequence a different relative ratio, one unique turn radius is obtained in each gear. The diameter of the nose of this penetrator segment is 30mm. These tracks are also heavier than the T-64A tracks which weighed just 1,450 kg. This could be solved by reducing the gearing ratio to a much smaller figure so that the overall ratio would only be around 20, but this was accepted as a calculated loss, which is a design compromise shared with the majority of other tank transmissions, as the 1st gear is usually designated as a special low range gear for bearing heavy loads. The L52 round, which used the same W-Ni-Cu alloy, was possibly a derivative of the L15 series or its parent design. This penetration mode is far less efficient for the jet, and conversely, it increases the mass efficiency of the STB and steel back plate of the same spaced armour can only be nominally defeated by a long rod penetrator, reducing the back plate thickness by 20mm will guarantee that the penetrator perforates the armour. Due to the replacement of the Object 172M-1 with the (courtesy of Vitaly Kuzmin) shows a T-72B3 with UMSh tracks and rubber track pads installed for driving on paved roads. This is thanks to the internal angling of the 4S20 explosive elements in a V-shape. The general depiction of the turret in the blueprint tracing seems to agree with the drawing taken from the T-72A manual. Alternatively, it is also possible to use generic 200-liter capacity drums, giving a smaller total capacity of 1,600 liters. On highways, the T-72 Ural and T-72A can travel 480-500 km on internal fuel alone or around 700 km with additional fuel drums. Even if an attacking projectile manages to dig into the armour, the LOS thickness of the thin side armour from the horizontal angle of the turret alone at such a steep angle of incidence is very formidable at 391mm. If the tank has the appliqué armour applied, only two ribs will be present. Determining the size of the weakened zone on the lower glacis is somewhat more straightforward although it is still fairly complex in its own right due to the overlapping of the upper glacis composite armour with the lower glacis plate. The marked red line in the drawing is positioned this way because the window of the primary sight housing is a few centimeters in front of the sight periscope head itself. This type of transmission was originally developed for the Object 430 by the Malyshev design bureau in Kharkov. The use of BKPs in the T-72 was for the unification of transmissions with the T-64, not only on the industrial level but also in terms of supply and institutional familiarity. In that case, the most important objective would be the destruction of the gunner's sights which would prevent the tank from using its weapons. Once the tank is fully stopped, the driver steps on the brake and clutch pedals, releases the steering levers, and shifts into neutral. Beginning on January 1, 1978, a pneumatic braking system was installed to the T-72. The status of export model T-72 tanks is also not completely clear due to a lack of information. Knowing that the upper glacis has a thickness of 215mm on the T-72M, the gap between the area of the lower glacis protected by the dozer blade and the area overlapping with the upper glacis is only 75mm. Compared to the case of the suspension on terrain, the suspension on hard ground exerts a high mean maximum pressure because the track tension has little effect when the track is laid flat on the ground. It is closely equivalent to the Challenger 1 which has a net engine power of 871 hp. However, the modest engine power compared to tanks like the Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower weight of the T-72, which is lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower than both the M60A1 and Leopard 2 is somewhat counterbalanced by the lower ricochets back into the STB where it is eventually stopped. 1953. These prefabricated solid ceramic blocks are then used as the casting mould, around which the molten steel is poured to form the turret itself. Offensively, the smaller overall size of the tank made it more difficult to hit when it was on the move in open terrain. The gun mask is a single solid steel casting that is bolted on the gun mounting cradle. M111 "Hetz" ammunition was acquired by the Soviet Union and extensively examined and tested after the 1982. Moreover, the surface of the turret cheeks are also vertically sloped at 30 degrees and the cut on the lower edge of the turret cheeks are vertically sloped at 50 degrees. However, even with this downside, the crew is not necessarily vulnerable to such dangers while snorkeling as each crew member must don a closed cycle rebreather system before entering water. For this reason, metal tracks penetrate into asphalt and concrete and cause severe damage. On the T-72B3 UBKh, the sides of the turret have been completely covered with an advanced ERA kit capable of defeating tandem warheads at the expense of valuable stowage space and the rear has been reinforced with slat armour. When depressed, the brake pedal actuates a pushrod which turns an input cam against an output cam in the reduction mechanism multiplying the driver's pushing force on the control rods for the No. 5 brakes in the BKPs, thereby activating the brake. The use of multi-disc brakes for this purpose is particularly appropriate owing to the high braking forces needed to stop a moving tank. Conceptually, this process is similar to the transmission replacement process of an M4 Sherman, but much less laborious and much less demanding on the load capacity of the crane. For the EJ252 engine, changes included: According to Subaru Australia, 80 per cent of engine components were redesigned; A lighter cylinder liners with improved roundness; A re-shaped intake manifold; Introduction of a 4-2-1 system with equal length header pipes; and, Electronic throttle control ('drive-by-wire'). When the turret of a tank with a long bustle is turned to the side, it becomes possible to hit the bustle from the front. For this reasonable to expect that BT-70Sh was used for Soviet T-72A tanks. When the lock is active, a red warning light on the left of the driver's TNPO-168V periscope is illuminated to warn the driver. HESH works well on homogeneous plate, but there is a limit to how thick the plate can be. hull. Furthermore, it is not valid to use a stack of plates instead of a single rolled homogeneous plate for such testing as the behaviour of various penetrators can differ on stacks of plates. Some of the power is lost by conversion into heat. Boйти: В статистику В дневники В почту Вход в дневниких Introduction Subaru's EJ251 and EJ252 were 2.5-litre horizontally-opposed (or 'boxer') four-cylinder petrol engines. The autoloader was damaged by the turret strike, but the tank survived and was sent for an overhaul. The original upper glacis armour for the Object 172M, or T-72 "Ural", is a three-layer composite consisting of a 105mm layer of glass textolite sandwiched between an 80mm RHA front plate and a 20mm RHA backing plate. Aside from the most modern APDS ammunition of the early 1970's, late 105mm APFSDS rounds from the late 1980's will penetrate around 360mm of steel at 0 degrees at 1 km and M900 penetrates around 440mm under the same conditions. Photo by Yuri Pasholok. The current Russian language version of the NII Stali website, Kontakt-1 provides an armour equivalent of 400-500mm in steel against artillery-fired HEAT shells. If a shaped charge succeeds at detonating on the upper glacis, it can be handled by the composite armour. The tank is then fully braked, only without any physical effort from the driver. It is strong enough to throw water out of the engine is idling. Type "O": When biological or chemical contaminants are detected, the response time of the system does not exceed 40 seconds. Due to the obscurity of this topic, it is rather difficult to ascertain if the T-72M and T-72M1 differed from their domestic counterparts in the thickness of the dozer blade. This is because the shape of the wedge is such that the thickness of steel increases as the LOS thickness of the upper glacis decreases, thus compensating for the reduction in the thickness of glass textolite. KH. It was immune to 105mm APDS at point blank range and immune to 120mm APDS from above one kilometer. Combined, the elimination of all three weakened zones would result in an increase in armour protection of 45% for APDS and 37% for HEAT. With T142 tracks, which began replacing the T97E2 in 1974, the acceleration to 32 km/h and 40 km/h worsened to 17.5 seconds and 30 seconds respectively. For comparison, the mass efficiency of the 70-105-40 upper glacis armour of the Object 172-2M experimental tank will only be 1.0 because the thickness of its back plate is only 40mm. A dozer blade was present on the Object 172-2M experimental tank will only be 1.0 because the thickness of its back plate is only 40mm. A dozer blade was present on the Object 172-2M experimental tank will only be 1.0 because the thickness of its back plate is only 40mm. in the two photos below), and the final Object 172M model that was accepted into service in the Soviet Army as the T-72 Ural on the 7th of August 1973 had a dozer blade. On page 2409 of the "Department of Defense Authorization for Appropriations for Fiscal Year 1983", it is asserted that the projected area of the M1 Abrams turret is equal to the M60A1, but has a lower profile. The cylinder block for the EJ251 and EJ252 engines had an open-deck design whereby the cylinder walls were supported at the three and nine o'clock positions. When a certain gear is selected, hydraulic pressure is routed to the power piston on the two corresponding clutches or brakes, engaging them and producing

the desired gear ratio via the planetary gear sets. This was quite important seeing as HESH shells were a British favourite during the upper glacis design is the effect it has on top-attack munitions. 1963, it had undergone numerous changes but the 80-140 composite armour design was kept. is completely consistent with the requirement for the armour to have an effective thickness of ~330mm RHA. The 1st, 2nd and 6th swing arm pairs are reinforced to withstand stronger dynamic loads, and thus weigh 59 kg instead of 55 kg like the 3rd, 4th and 5th swing arm pairs. It is possible that the stick was touching the penetrator remnants embedded inside the armour, implying that the round successfully penetrated the outer cast steel wall and the "Kvartz" filler, but stopped somewhere in the cast steel back plate. It is also possible that the perforation of the "Kvartz" layer pulverized the brittle ceramic such that the pulverized debris refilled the hole and gave the illusion of a shallow penetration channel. The system is able to react instantaneously to a nuclear detonation (classified as a Type "A" radiation threat) and initiate the necessary protective measures. The mass efficiency coefficient of the glass textolite is therefore 2.68. To determine the thickness of the turret armour from this measurement, the drawing of the T-72 Ural turret shown below can be used as a reference. The armour thickness at these zones is much greater than the parts of the turret ring vulnerable to BM-26 is 0.49 sq.m, which is 29% of the total surface area of the turret. Moreover, it is also worth noting that the cylindrical hole for the air sampler device will also contribute to the weakening of the armour from a side angle, further compounding the lack of reinforcement at this area. The photo above shows the B-1 instrument and control box, the B-2 sensor for gamma radiation detection, and the B-3 power supply unit. The dosimeter detects and measures gamma radiation levels. The track links are made of G13LA Mangalloy (Hadfield steel). This is mainly due to the low height of the turret, which means that a lower reverse speed is sufficient to completely hide the specifications of the Kontakt-1 kit found on the T-72S. Photo by Andrej Smirnov. A manual transmission with friction side clutches like the type installed in the T-72 has lower parasitic power losses compared to automatic transmissions. A warning lamp on the 902A or 902B control panel will light up if the gunner selects a set of smoke grenades that are experiencing technical issues. Throughout this period, the most advanced 105mm KE threat was the British L52 APDS round (1966), which was completely inadequate against this armour design. Astonishingly, the weight of a combat loaded T-72 Ural (41 tons) is even slightly lower than a combat loaded Leopard 1A1 (41.5). The main drawback of the location of the ammunition is that any fuel or hydraulic fluid leakage will inevitably pool on the floor of the hull and if an internal fire is started, it will reach the ammunition eventually. Based on this, the ME coefficient would be 1.1 against KE. Two rubber gaskets below the ball bearing race ring seal the turnet ring from water ingress. The speed difference between the two tracks causes the tank to turn around the slower track. The brake, which is mechanically assisted by a spring, is operated with the brake pedal, or the steering tillers when in the 1st gear, neutral and reverse gears. The driver's hatch mechanism itself, situated inside the upper glacis armour. Only the layout on the survey differs. As for the slat armour screens on the sides of the engine compartment, two of them are fixed in place with bolts and one screen can be folded upward. If grass or other forms of vegetation are also present, this would mean that the lower glacis of a T-72 would almost always be obscured from direct vision and would usually be physically protected by the terrain due to its low height. When modernized to the T-72A standard during scheduled repairs, older T-72 models would also receive the 902A system with the same layout, with minor changes in the position of the launchers to account for the turret geometry. Due to the limited width and capacity of the dozer blade, the tank must make a few passes when digging out a suitably sized hole for itself. In the collection of memoirs "Life Given to Tanks" dedicated to the UKBTM chief designer V.N Venediktov, published in 2010, M.I. Maresev and I.I. Terekhin write that the armour of the T-72 "Ural" was enhanced by redistributing the thickness of the steel armor plates in the upper glacis, which made it possible to increase the protection characteristics of the entire composite array as a whole and introduced the possibility of further improvements. The measurement on the right, taken from the T-72.org Facebook group, shows that the dozer blade of a T-72M is also around 15-20mm thick, although it is not possible to be sure. Due the low residual velocity, the residual penetrator can no longer penetrator. The first appearance of this armour was not on the T-64, but on the Object 167M developed at UKBTM which was informally referred to as the "T-62B". "Soft" ERA blocks were installed on the sides of the hull on top of the "Relikt" side skirts of the T-72B3 UBKh. Three different sizes were installed. If the angle of attack is increased to 45 degrees, the sides will be visible, but the angle of incidence will increase to 87 degrees - steep enough to guarantee a ricochet. Furthermore, the second paragraph confirms the previous assertion that decreasing the density of the composite armour against shaped charges) may result in less reliable protection against long rod penetrators. Overall, the calculated effective thickness figures for all three types of APFSDS ammunition are completely consistent with the nature of the respective penetrator designs. Little is known about the composition of the steel of this armoured block, but based on images showing its surface, it is safe to assume that it is a forged block of high strength steel machined to shape. The armoured block of high strength steel machined to shape. was also required to be immune to 85mm HEAT fired from an M68 cannon. This was already insufficient against a PG-7VL (1977) with 500mm of penetration would provide a relatively high amount of armour overmatch at the given angle to achieve a high probability of killing crew members or even piercing the armoured ammunition rack blast doors. 1983 in turret armour and hull armour, including the appliqué armour plate. The difference between foreign tank turrets is even more noticeable: the Centurion Mk.10 turret had a height of 956mm, the Chieftain turret had a height of 975mm, and the M60A1 turret had a height of 970mm. The rear of the turret is around 65mm thick, but varies considerably in actual protective value due to the complex shape of the roof above the gun breech is more than twice as thick, angled at between 78 to 80 degrees. After repairs, it was damaged again on January 21, 1995 during combat near the building of the Council of Ministers where it was hit with five RPG grenades. The number of hits sustained by a tank's sides were statistically significant, as shown by the analyses conducted by Dr. Manfred Held in "Warhead Hit Distribution on Main Battle Tanks in The Gulf". It was simply a necessity to meet the minimum thickness threshold of 60mm for the front plate and also have a 50mm back plate for optimal performance against long rod penetrators. The empty weight is defined as the weight of the tank with all of its equipment and weapons installed plus its full complement of tools and spare parts but without fuel, ammunition or crew. An increase in mass efficiency is expected from this, but the extent of the improvement is not well understood. The back plate continues to bulge as the penetrator approaches up to the moment of impact. Compared to its immediate foreign counterparts, the T-72 had little to no advantage in soft terrain, despite being a great deal lighter than all of its adversaries. 1989 were outfitted with a set of 227 blocks of Kontakt-1 covering the most of the hull and the forward arc of the turret as well as the turret roof. The upside of the new installation layout is that the total surface area covered by the armour increased, and the vulnerability of the light metal mounting frames to the simultaneous loss of two or more blocks to a single detonation was eliminated, but this came at the expense of reducing the effectiveness of the reactive armour significantly as the blocks are no longer installed at the optimum angle of 68 degrees. The relevant paragraphs, after omitting Tarasenko's personal opinions, are cited verbatim: "В ответ на это по завершении OKP «Отражение» на танки вышеуказанных типов в ходе капитального ремонта на ремзаводах MO CCCP на танках с 1984 года осуществлялось дополнительное усиление верхней лобовой детали. Ноwever, that does not mean that it was no longer viable by the 70's, as the design could still meet the cooling requirements of the V-46 engine in most weather conditions due to design refinements while remaining relatively compact, easy to maintain, and reasonably protected, although there are still a few drawbacks. By placing the radiator on the engine deck and exposing a large surface area, it becomes more vulnerable to napalm attacks or molotov cocktails, as the cooling fan creates a suction force that can suck in burning gels and liquids through the radiator louvers. Against HEAT warheads, the principle benefit of the high slope of the armour is that some warheads may not detonate properly. This detail can be faintly seen in the photo below (credit to livejournal user meteo), although the angle of the photo is not ideal. Some T-72M1 tanks exported by Poland or Czechoslovakia even retained the 80-105-20 armour array, while the turret was that of the T-72M1 tanks exported by Poland or Czechoslovakia even retained the 80-105-20 armour array. characteristics of each individual wheel, which is unavoidable as it is an inherent trait of a torsion bar spring. This acronym stands for armoured glass textolite; "СТБ - Стеклотекстолит Броневой". During the development of the M1 Abrams, the armour of the XM-1 prototype was tested using a standard 5.0" BRL precision shaped charge with a penetration of 636mm RHA was used. In truth, the lower effective thickness of a steel plate at high obliquity is only directly relevant for the steel back plate must absorb the remnants of a penetrator without failing whereas the other plates in an armour array are usually designed to fail in such a way that the penetrator is damaged in the process. The location of the tank as opposed to the engine compartment reduces the chances of the turret armour against contemporary APDS and kinetic energy projectiles of all sorts should still be very high, definitely high enough to resist 105mm APFSDS from well into the 1980's. The elongation limit of 25% for 43 PSM is very high compared to RHA. Since the "Kvartz" insert is commonly described as "sandbar" armour or "sand rod" armour, it may be difficult to appreciate the fact that it is actually a ceramic block, and that the armour of the T-72A turret is a simple three-layer ceramic sandwich. In it, there were two 10mm high hardness steel plates and two 20mm high hardness steel plates and two 20mm high hardness steel plates. E.g. the solid 118mm RHA upper glacis of the Centurion Mk. 7 and Mk. 8 was found to be noticeably less effective on a thickness basis compared to the uparmoured upper glacis of Centurion Mk. 3 and Mk. 5 tanks, consisting of a 44mm RHA plate welded on top of the 76mm base RHA plate. More importantly, the bent and yawing residual penetrator impacts the back plate on its side rather than head-on. Type "R" threats are detected when the tank is exposed to radiation from an irradiated environment. Due to the thickness of the Kontakt-1 blocks and the mounting angle, they project far enough to cover the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced thickness of steel to accommodate the turret ring area which is 60mm tall and has a greatly reduced the turret ring area which is 60mm tall and has a greatly reduced the turret ring area which is 60mm tall and has a greatly reduced the turret ring area which is 60mm tall and has a greatly reduced the turret ring area which is 60mm talles. The turret ring area whi barrier against shaped charge jets, it is appropriate to begin examining the 80-105-20 armour design from the perspective of HEAT protection. This phenomenon becomes more pronounced at higher obliquity because the asymmetry of forces increases with the angle of the plate. Instead, the blocks are simply mounted following the natural contours of the turret surface. Due to the low mass efficiency of the back plate (ME coefficient of 0.47), the overall mass efficiency of the entire armour array does not reach 1.0. Tests were carried out to determine the nature of the interaction between the penetrator and the back plate. The T-72B had a marginally taller turret along with slightly more ground clearance, combining to slightly increase the height of the tank to 2.23 meters. However, it should be understood that the gun mantlet weakened zone still has a formidable thickness of steel. A cautionary statement is given in the conclusion of the research paper "Definition and Uses of RHA Equivalences for Medium Caliber Targets": "The protection level of a threat vehicle cannot be defined by one RHA-e value; it depends on several factors: penetrator material, penet that the conclusions reached in this article are as accurate as possible, the armour of each T-72 model is always evaluated within a specific context unless generalizations are valid, and the threats for each effective thickness value given are always specified. By shifting one gearbox to the next lower gear in seguence, the inner track is slowed down and a turn is obtained. It is powered by a driveshaft connected to the gearbox so that it increases or decreases its power in accordance with the engine's mechanical output, thus adjusting for the engine's heat output as well. This turret was also produced under licence outside of the USSR with the same specifications, so the turrets of such tanks were also produced under licence outside of the USSR with the same specifications. practically identical to that of Soviet Army T-72 models. This would certainly improve the level of protection. The much more recent T-72B3 model weighs 45.6 tons and has the V-84M engine with the same output of 840 hp, so the P:W ratio declined to 14.86 hp/ton. But even so, this did not necessarily mean that the high slope of the upper glacis became a detriment - these matters are not so simple when composite armour is involved. Still, at least there is no doubt that the "Kvartz" composite turret would be more efficient than homogeneous steel against shaped charges. The Soviet criteria for armour protection has a specific definition that distinguishes it from the protection criterion used by foreign armies. It is not possible to compare the effective thickness figures obtained using XM579E4 with those obtained with DM13, let alone with Soviet APFSDS ammunition due to the massive differences in penetrator design. The vulnerability of the lower glacis can be reduced even further if the tank is in a hull defilade position behind a natural obstacle. The photograph on the left below shows a heavy alloy long rod penetrator passing through a two-layer composite of steel and STB, and the photograph on the right below shows the penetrator passing through a two-layer composite of around 429mm RHA. Both the gunner and driver were able to escape the tank before it eventually succumbed to the fire and exploded 20 minutes later. For a 1" thick RHA plate sloped at 70.5 degrees, the velocity limit for a tungsten alloy rod with a conical tip is 1,470 m/s. This gives the T-72 a better chance of surviving an internal fire as the fire extinguishing system will still have electrical power, and the smoke grenade launching system can still be used to obscure the tank from further attack. With a thick layer of anti-radiation lining backing it and with the storage bins (plus cargo) adding a modicum of resistance, the sides are more than enough to withstand any 20mm and 23mm shell at point-blank and any 25mm autocannon shell at the higher end of typical combat ranges (in the vicinity of 1,500 m) when hit at a perpendicular angle. The probabilities of armour defeat by 105mm APDS and HEAT fired from an L7 or M68 cannon at the frontal arc of the tank (± 35° for the turret, ± 22° for the hull) were calculated and the effect of increasing the armour protection of the level as the turret cheeks). When the thickness of the steel back plate is increased above 20-25mm, the resulting increase in mass efficiency of the entire armour array sharply rose by 2-3 times per unit thickness. It has a density of 0.83 kg/liter and has a flash point of 35°C. The influence of these weakened zones on the probability of the destruction of the tank is studied in "Влияние Ослабленных Зон На Поражение Броневой Защиты" by A.G. Komyazhenko et al. This is because of the slight offset of the roadwheels caused by the use of a torsion bar suspension. As you can see, the thickness of the slight offset of the roadwheels caused by the use of a torsion bar suspension. As you can see, the thickness of the slight offset of the slight offset of the roadwheels caused by the use of a torsion bar suspension. As you can see, the thickness of the slight offset off elements with the capability to defeat tandem warheads even on a perpendicular impact have already been demonstrated years ago. The 8.4 cm Slpsgr m/75b grenade for the Carl Gustaf has a penetration power of "more than 400mm RHA", and the Swedish AT-4 and the French LRAC F1 both have a penetration power of 420mm RHA. However, giver M111 can only achieve nominal defeat against the 16-60-105-50 armour array at a range of 500 meters (1,428 m/s) and would have to impact the reinforced armour at more than 1,450 m/s to achieve initial perforation, it is unlikely it can perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial perforate the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initial performance the basic armour at more than 1,450 m/s to achieve initia or seven hits from RPG grenades before suffering an ammunition explosion, killing its entire crew instantly. 1979. It is reported by Andrei Tarasenko that the appliqué plate is equivalent to 405mm of steel against M111. While providing supporting fire, the tanks belonging to the brigade received multiple anti-tank grenades from every direction in return for each shot fired. The inverse is also true. The overall dimensions of the T-72 did not change over time, but as the areal density of the armour increased with each successive model, so did the overall weight of the tanks. The 80-105-20 armour array of the T-72 Ural could not provide sufficient protection from APFSDS rounds in general, including domestic 115mm steel APFSDS rounds, and these new 105mm round were challenging threats. The nut is mirrored on the other side. Because the residual steel penetration calculator. It is worth noting that the side armour of many other tanks are configured in a similar way, including the Leopard 2 as shown on the right next to the T-72 on the left. It is known from an information placard provided by NII Stali at an arms exhibition that a 4S23 explosive element designed for "Relikt" has dimensions of 250x125x7 mm, and there is a stack of two elements in each cutout. When operating in the overpressure mode, the supercharger fan turns on and generates a strong inflow of air. On the whole, the difference of 10mm in effective thickness between these sources can be considered in the book "Частные Вопросы Конечной Баллистики". The restriction of fluid flow through a small opening creates a resistance to motion, converting kinetic energy into thermal energy, thus damping the force applied by the roadwheel. In the USSR, BT-70Sh steel may have been used. From this, the acceleration of the T-72 to 32 km/h should take no more applied by the roadwheel. In the USSR, BT-70Sh steel may have been used. than 10 seconds, with 5 gear shifts to bring it to 6th gear. The amount of force needed to pull the steering levers is around 16 kgf. The steerin defeated by BM-22 or BM-26 at a distance of 1.65 km. To engage the parking brake, the pedal is held in place with a hook and rack mechanism. This was sufficient protection against the 105mm gun threat, but providing security from the new 120mm guns and the new 120mm gun observed on the new German Leopard 2 tank was a more difficult task that required a further gain in protection value, which necessitated a gain in armour mass. The design was created based on the T-54 and T-62 turret designs which placed the ball bearing race ring of the turret ring above the level of the hull roof in a cutout in the turret armour In production, 42 SM steel plates are hardened to 302-311 BHN. The actual gain in armour weight was approximately 2.5 tons. The maximum distance that can be traveled underwater by snorkeling is 1,000 meters. As such, the roadwheels on the right side of the hull (starboard) are slightly closer to the drive sprocket, so the shock absorber for the sixth roadwheel had to be moved closer to the drive sprocket and angled slightly to facilitate the same range of vertical travel. Based on this, the ME coefficient of the armour is 1.2, which is not higher than the "Reflection-1" array. For a tank like the T-54, the sight aperture is located in a slit cut into the turret armour next to the gun barrel, directly at the center of mass of the tank where most shots are expected to land. The marginal increase in ME is almost negligible, but can be attributed to the high hardness of the 16mm appliqué plate. The reasoning is that the resistance of a tank to a mobility kill (M-kill) or firepower kill (F-kill). The T-90 and T-90A continue to use the new rubberized mudguards to this day. The T-72 Ural and T-72A exert 0.83 kg/sq.cm of nominal ground pressure, while the T-72B, being heavier due to its thicker armour and incorporation of ERA, put in 0.898 kg/sq.cm of nominal ground pressure. accessories, including the hydraulic control system and the lubrication system is 1,870 kg. It was noted that the tank was in a marching status prior to the attack, having the cannon locked in the travel position and the 12.7mm machine gun locked facing backwards. The enhanced performance came as a result of the switch of the core material from tungsten carbide to tungsten alloy. Colour photo available on the ointres.se website. On the other hand, the shaped charges of the heavy ATGM systems used by NATO forces in the mid to late-1970's were more likely to succeed. The photo is from the T-72.org Facebook group. This slightly degrades the structural integrity of the roof, as the weld seams can be weak points. Besides a disinclination to internal fires, the survivability of the tank was enhanced by its low profile. This is due to the asymmetric buildup of stress within the rod during penetration, which is immediately released once the rod emerges from the back surface of the plate. frontlines. This can be beneficial in some circumstances, such as when there is an imminent threat of an internal fire spreading. It has a density of 0.86 kg/liter at a nominal temperature of 20°C. This is likely due to the reduced strength of the glass fibers at increased armour obliquity. However, the suspension interchangeability between the T-72 and older medium tanks was not total, because the tank cannot use old OMSh tracks. The acceleration; a basic T-54 requires 18 seconds to reach 32 km/h on a paved road, placing it in the same class as the M48 and M60A1 in this category. The location of the gunner's sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture in the gunner's sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture in the gunner's sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank, but generally speaking, tanks with a telescopic gun sight have the sight aperture depends on the individual tank. decrease in the penetration power from a reduced impact velocity corresponding to a range of 2.5 km against RHA sloped at 68 degrees. The L52 series does not have more kinetic energy but achieves better performance on multilayered targets due to the greater toughness of its W-Ni-Cu alloys used in the late 1960's were reported to have issues with spaced armour due to its vulnerability to fracturing and fragmentation. As stated earlier, L15A4 is guaranteed to perforate a 110mm RHA at 68 degrees. The combined weight of the glass textolite layer and the steel back plate is equivalent to 119mm of steel, and as such, the two layers can be represented with a mass efficiency coefficient of 2.00. Against APFSDS ammunition, the functions of the individual components of the armour array are similar as for APDS rounds but the influence of the glass textolite interlayer is greatly reduced. Two small blocks are installed at the front of the side skirts above the first roadwheel, two medium blocks are installed to cover the rest of the hull, from above the second roadwheel. The ring of screws is also used in tank models with Kontakt-1 reactive armour as the mounting point for a metal frame holding a set of three reactive armour blocks on top of the gun mask, as shown in the photo below of a T-72AV. Based on these figures alone, the 60-10-20-20-50 armour is nominally capable of resisting DM33 at a range of around 1,000 meters. The rebreather uses the chemical reaction between potassium superoxide and carbon dioxide, activated by water from the user's breath reduce the former two to oxygen and potassium carbonate. These two identification features can be seen on the T-72 Ural-1 shown in the photo below. In the journal article "Противорадиационные защитные характеристики due to the boron content of its borosilicate glass fibers. The function of the STB interlayer in the composite armour as a whole is somewhat more complex. The penetrator core was made from the same W-Ni-Cu alloy used in the L52 series. Although the camera angle is not ideal, it can be seen that the layout of the internal spaced plates match the description. The Object 172M1-E2 export variant has the hull armour of the T-72 Ural-1 model, as signified by the 172M1 designation. Even after increasing the amount of propellant to launch the "Vant" round at its maximum permissible velocity, it was not possible to break through the armour. If the final use is the perforation range, the range at which the target is just perforated, the VL\* and the perforated (initial perforated). This improves the accuracy of the system When considering only the empty structure with the integral armour, the weight of the T-72 Ural hull is 13,381 kg and the turret weighs 7,085 kg, for a nominal overall weight of 20,466 kg. These tracks were simpler than the dual-pin tracks of the T-64A and had better traction on rocky and sandy terrain, but had worse traction in mud and other types of terrain and were not as durable. There is a simple mud scraper bolted on to the side of the hull in every T-72, just above the drive sprocket. The thickness of the T-72A turret is known, but we can use the same method employed by the CIA to determine the thickness of the T-72A turret is known, but we can use the same method employed by the CIA to determine the thickness of the T-72A turret is known. is 40mm thick, sloped at 30 degrees, and the hull belly is 20mm thick. The PT-91 reportedly accelerates to 32 km/h in 11.0 seconds, which is congruent with the acceleration figure of the lighter T-72 with a less powerful V-46 engine. The mask itself is not particularly thick - it is only rated for 12.7mm bullets. Rather, the ratios were calculated so that when upshifting at an engine speed of 1,900-2,000 RPM from the 2nd gear to a higher gear, up to the 4th gear, the engine speed will not fall below 1,600 RPM. This means that when accelerating while the tank is already in motion (not from a standstill) for short dashes from cover to cover in off-road conditions, the engine will always be in the upper end of its powerband, and it will always be delivering close to its peak power. Altogether, the bump travel varies from 43-116mm for an overall travel range of 358-370mm. This study is particularly relevant for American depleted uranium long rod penetrators from the 70's and 80's as the material used for the DU test rod is the same U-3/4% Ti alloy as used in the M774 and M833. This was explained by the anisotropic properties of glass fibers in the glass textolite. Leonard. Even though many tanks have been destroyed, often irrecoverably, many more have survived such that the tank's ability to endure severe punishment simply cannot be considered low. To convert from initial perforation to nominal defeat, a physical thickness of 10mm is added, translating to an effective thickness figure of 540mm. Knowing these gear ratios, the tank speeds in each gear can be calculated quite easily. Closing these louvers provide additional protection from aerial attack and napalm or makeshift weapons such as Molotov Cocktails. The diagram processed by the CIA is reproduced rather poorly, so an original diagram from a higher quality Soviet T-72A manual gives us a better idea of the armour profile. It was noted that turret ring designs that required a cutout in the lower part of the turret like the T-54 turret was a liability. The difference between the T-64 and the T-72 turret ring designs is apparent when they are compared. It is thinner than the side armour of the engine compartment, and even though the shock absorber unit and the drive sprocket are backed by some amount of armour, the level of protection at these zones is not equal to the engine compartment. An M833 round fired from 2 km is claimed to be responsible for one of the holes in the upper glacis in the photo above. The thickness of the center of the turret cheeks at a 38 degree side angle (III) is 540mm. If, however, the driver chooses any arbitrary lever position between full forward and full back, the tank can turn in a radius ranging from 10.23 meters to infinity. Small and precise steering adjustments are done this way, and it is also less tiring as the levers are not repeatedly pulled back all the way. Since the plate to be made from a material with a density of 5.0 g/cc. This low figure was most likely calculated based on the limit of nominal defeat of the armour against M111. For a 1" thick RHA plate sloped at 70.5 degrees, the velocity limit for a DU rod with a conical tip is 1,355 m/s. The crescent-shaped conformal fuel tank directly behind the autoloader carousel, which holds 12 propellant charges, has a capacity of 75 liters. The main focus is on finding the density of the ceramic substance, as that will allow us to determine the area of the silhouette of the turret of an M1 Abrams when it is turned (dark grey) is significantly larger than when the turret is facing straight forward (light grey). Thus, the weight of the package is only 1,200 kg instead of 1,500 kg and the exposed surface area is correspondingly higher. This was accomplished by the use of an autoloader and ammunition stored in the hull (which is expected to sustain much fewer hits). These umbrella terms describe the behaviour of penetrator rods as well as the damage inflicted onto them, including yawing, tip deformation, fracturing, and so on. I.I. Terekhin was the department head of the NII Stali branch in the UKBTM design bureau. It also provides a power takeoff for the AK-150SV air compressor, SG-10-1S starter-generator and the cooling fan. The speed of the inner track during the turn will therefore not correspond to the speed in gear, but rather to an intermediate speed. Along with nominal defeat and initial perforation, another type of armour defeat is the so-called "guaranteed perforation". In this regard, the 7-speed transmission has a positive effect on the ease of driving, as the speed margins for upshifting and even downshifting (up to the 5th gear) are very flexible. However, this is compensated by the fact that the penetrator is much more heavily deflected after perforating the steel front plate of an angled dual layer composite target and the trajectory of the penetrator inside the glass textolite layer is heavily curved, so overall, the ballistic resistance of the glass textolite is not worse than for an impact at 0 degrees. It is quite possible that in the USSR, the glass textolite plates of two different thicknesses. A third T-72A, with the tail number 531, sustained four hits from RPGs before its turret drive failed, and the tank was finally knocked out of action after an APFSDS round fired from 100 meters impacted the turret on the commander's side. The T-72 belongs in this category as the aperture of its primary sight and night vision sight are both located on the turret roof, making it less likely to be damaged by explosive shells impacting the front of the turret or the upper glacis. It is simply unfortunate that, having met the objectives for protection against 105mm APDS and HEAT, the armour configuration was not further refined; by the time the T-72 entered service in 1973, the 80-105 20 armour scheme was almost a decade old and had become obsolescent. There are several zones in the side of the hull that may not be entirely on the right below (6) shows an example of full armour perforation where fragments are ejected from the armour plate, which requires a higher impact velocity to achieve. Due to the increased impact angle, the protection offered by the upper glacis improves, as does the side aspect of the cutout. Considering that the tank crew consists of 3 men, it can be seen that the operations on multiple components can be done in parallel on each tank, or individual operations can be done by a larger workforce very quickly. On the other hand, the lack of a powered booster of any kind could make the brake pedal very heavy to depress when the tank is travelling at high speed and a high braking force is needed to stop it. According to a report on the capabilities of a testbed T-64A equipped with a new hydromechanical transmission, the basic T-64A need a brake pedal force of 50-100 kgf (490-980 N) to depress. Both the 80mm front plate and 20mm back plate of the intermediate power transfer gearbox of 50-100 kgf (490-980 N) to depress. the T-54, T-55 and T-62. This type of transmission is extremely compact, extremely durable, extremely durable, and has a very high mechanical efficiency due to its kinematic simplicity. Both use cermet discs on steel rotors (clutches) or stators (brakes). This graph is useful when simulating the interaction between a long rod penetrator and the 60-105 50 armour as it can be used as a reference when examining the calculated exchange of kinetic energy. M735 was type classified in 1978. Only the Chieftain continued using steel roadwheels (inherited from the Centurion), with aluminium roadwheels appearing only beginning with the Challenger 1. The structure of each wheel consists of two stamped aluminium discs bolted together and fastened to a steel hub. Nevertheless, it is still interesting to examine the performance of this early armour design against early armour design later. Besides that, as illustrated in zone (1), the weakened zone includes an additional area next to the driver's cutout. Larger discs are needed for multi-plate disc brakes and clutches for heavy vehicles and other high-torque industrial applications due to the higher braking torque afforded by large-diameter discs (due to the increased distance from the axle to the disc) and better heat dissipation. The clutch pedal in the driver's station is used to de-clutch both the gearboxes by de-clutching whatever clutches and brakes are currently engaged as the selected gear, and after the driver's station is used to the selected gear. gear. The fighting compartment and engine compartment of the tank is protected by heavy side skirts incorporating "Relikt" ERA elements. An FVU, or filter-ventilator unit, is used to provide both normal ventilation to the crew and to generate a filtered internal overpressure. The diagram on the right below, taken from the book "Special Electrical Equipment of the T-72" published by the military department of the Omsk State University of Technology, shows a cross section of the system. Fragments from airbursting artillery shells may also be negatively affected by the spaced armour effect created by the cover. By placing multiple layers of materials with drastically different densities and mechanical properties (including sound speed) in the path of the blast waves, the effectiveness of the array in attenuating explosions is significantly improved as compared to homogeneous materials of the same weight. The difference of 20mm RHA in defeated thickness (10mm at 60 degrees) corresponds with the guideline given in the textbook Given that the mass efficiency of the armour is mainly dependent on the back plate and not the front plate, the increase in the thickness of the front plate and a 40mm RHA back plate, sloped at 70 degrees. It is a vane type shock absorber with the vanes splitting the body into two pairs of opposing chambers, with a regulator valve in each vane opening. It was not possible to experimentally compare cast and rolled plates due to the insurmountable difficulty of producing a rolled plate with a thickness of around 400mm that can match the mechanical properties of a cast plate of the same thickness. Guaranteed armour perforation is usually accompanied by strong post-perforation is usually accompanied by strong post-perfora can be seen that the T-72 may not be significantly inferior to foreign tanks in the most relevant parameters for cross-country travel when using RMSh tracks, due to the longer track pitch of 164mm. Thus, it can be seen that there is a great deal of complexity involved in the subject, and that direct comparisons of nominal figures are usually not valid as thickness of the armour was increased to 850-900mm RHA in a 70-degree frontal arc on the turret and in a 44-degree frontal arc on the hull. This is shown in the drawing below, taken from a T-80B manual. However, at the middle of the turret cheek or near the base, the measured thickness comfortably exceeds 400mm and reaches 470-480mm or more. This figure may be referring to either the turret or the hull, but in any case, it is consistent with the estimated effective thickness of the armour based on its performance against 3BM32 in live fire tests. As the tables above show, the effects of nose shape are consistent for both depleted uranium and tungsten alloy rods. Because the peak torque of the MB 838 CaM-500 engine is developed at 1,550 RPM, it is evident that the gear ratios were calculated so that upshift close to 2,300 RPM in order to maximize the acceleration period in each gear, especially in the first few gears, but this may not be desirable during routine maneuvers for wear and tear reasons. Penetration figures for the 105mm APFSDS were taken from a Nitrochemie presentation, it is necessary for M111 to impact the armour array at a velocity of greater than 1,450 m/s for the residual penetrator to achieve initial perforation. The cover is used to seal the radiator during snorkelling operations and it is stowed on top of the engine access panel when not in use. The air inlet for the sampler and analyzer is depicted in the T-72 Ural and T-72 Ural Ural-1. The surviving tanks managed to escape by deploying a smoke screen using their built-in TDA systems (exhaust smokescreening system). The photo on the left below (a) shows the condition of an RHA plate after being subjected to an impact from an APFSDS round at the velocity of its nominal defeat. Inside the steel hub, a 142220 roller bearing and a 371 ball bearing are fitted. From all of this information, it can be deduced that the most optimal armour configuration for defeating shaped charges uses a steel front place during scheduled maintenance at repair facilities across the USSR. It is worth noting that terrain has a major impact, as skidding influences the real turn radius. Overall, the area of the frontal silhouette of the T-72 is only 4.0 sq.m, which also happens to be half of the frontal silhouette of the M60A3 (8.0 sq.m). Because the Rh105 smoothbore gun did not enter service, the 105mm DM13 APFSDS round also remained experimental. The three film stills below show drawings that superimpose the T-72 on comparable NATO tanks to illustrate the difference in the size. After perforating the thick 80mm steel front plate, a long rod penetrator or a composite penetrator will have its nose deflected downwards due to asymmetric reactionary forces. In the 2002 book "HИИ Стали - 60 лет в сфере защиты" ("NII Stali - 60 years in the field of protection"), it is detailed that tests in the early 1980's showed that when the penetrator will have its nose deflected downwards due to asymmetric reactionary forces. In the field of protection"), it is detailed that tests in the early 1980's showed that when the penetrator will have its nose deflected downwards due to asymmetric reactionary forces. equalized, 3BM22 has inferior performance against composite armour targets in practice. From a side angle, however, the relative thickness of the turret cheeks is significantly lower than 475mm, although still extremely formidable. The B-1 instrument and control panel is shown in the photo below. Various sources, including a UVZ book on the history of the T-72, state that the T-72 Ural-1 model of 1975 was mainly distinguished by improved hull and turret armour. The purpose of the modifications made to the phenolic resin in the glass textolite lose a significant amount of strength at very low temperatures where they may become susceptible to brittle failure, but phenol-based GRPs are less sensitive to lower temperatures and are generally more ductile at the cost of reduced mechanical properties compared to GRPs based on epoxide resins. For example, the Leopard 1 shown below clearly has the turret ring race ring placed below the hull roof (photo taken by T. The result corresponds to an initial perforation rather than nominal defeat. Five of the tank in the areas protected by reactive armour, one was from an RPG grenade impacting the rubber side skirt of the tank in an area unprotected by reactive armour, and one was from a fragmentation grenade (possibly a VOG-17M) impacting the rear of the engine compartment. As a further development on the "Reflection-1" concept, the heavier and more complex 60-10-20-20-50 armour works under the same operating principles against long rod penetrators, differing only in the greater number of layers and the increased complexity. The resistance experienced by the penetrator is shown in the first graph, the amplitude of normalization of the penetrator is shown in the second graph, and the change in velocity of the penetrator is shown in the second graph, and the change in velocity of the penetrator is shown in the second graph, and the change in velocity of the penetrator is shown in the first graph. accomplishment that the mass efficiency figures achieved by Soviet steel and glass textolite composite armour technology closely matched that of the most advanced "Burlington" armour technology closely matched that of the most advanced "Burlington" armour technology closely matched that of the skirt is slightly inclined, giving it a slightly rounded appearance when mounted. The DA grade is essentially a slightly heavier form of kerosene. Data from live fire testing is used for homogeneous steel targets as well as the multi-layer composite targets. As with rectilinear motion, the transmission has one degree of freedom when the tank is turning. The grenade launchers are affixed at an elevation angle of 45 degrees and all of the launchers are parallel to one another. As the graph below shows, the most serious reduction in yelocity occurring when the filler density falls below 0.3 g/cc. The rigidity of the belly plate is augmented by the lateral ribs for the torsion bars and the longitudinal embossed nubs on the belly plate. Based on its calculated ME coefficient of 1.07, the effective thickness is estimated to be anything similar to siliceous core armour. Being a traditionally weak area on most tanks, the relatively poor armour of the lower glacis is largely counteracted by its small size and low exposure to enemy fire. Broadly speaking, this is congruent with an equivalent thickness of ~530mm RHA. The upper side armour is a single rolled steel plate whereas the lower side armour is actually a part of the belly armour plate. Only the Object 172 prototype tanks created from 1968-1970 lacked a dozer blade. Based on the available information at this time, more than a thousand tanks were built with the 80-105-20 armour plate. periscope is created by the void in the upper glacis necessitated by the installation of the driver's TNPO-168V periscope as well as the need to accommodate the driver's head. This weakened zone is particularly interesting. However, the Kontakt-1 blocks themselves are not sufficiently robust, as they are relatively light and the mounting bolts do not secure the blocks securely enough against physical damage. As such, these tracks were the smoothest and most durable of the three types used by the Soviet Union's three main battle tanks. Like T-72M1 models exported with a Kontakt-1 kit such as the Indian T-72M1 "Ajeya", the T-72S has reduced reactive armour coverage on the front and sides of the hull with a total of just 165 blocks instead of the full set of 227. Unfortunately, if such a study was carried out in the USSR, it has not yet been made available to the public. This is not an issue on dirt, sand, snow or paved surfaces, but is a possibility if the tank is turned in thick clay. Complete armour arrays can be transported individually without needing to keep the layers clamped together with external means. The steel front plate of the sandwich is therefore around 7mm, and the back plate is 1-2mm. It mentions woven glass roving (rovings are woven bundles of glass fibers) and special phenolic resin as the matrix material, and the phenolic resin-based glass textolite (steklotekstolite) listed in page 24 of the document "Plastmassy v bronetankovoy tekhnike" matches the description exactly. Because of this, the 16-60-105-50 armour is probably not capable of preventing initial perforation by DM13 from below 1,000 meters. The effects of the distribution of the thicknesses of the steel layers in this type of composite armour is studied in "Regarding Some Regularities Defining The Protective Properties of Three-Layered Barriers In The Testing Of Long Rod Armour-Piercing Sub-Caliber Projectiles" published in 1976 by O. Looking at the Yugoslavian M-84 as a surrogate for a late T-72 Ural model, as it was effectively a locally designated T-72M tank, the total weight of the turret is 15 tons and the total weight of the hull is 27 tons. The V-46 engine itself was larger than the 5TDF, but the difference in dimensions was not as significant as the decision to use the conventional centrifugal fan-driven cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the same function as itself was larger than the 5TDF, but the difference in dimensions was not as significant as the decision to use the conventional centrifugal fan-driven cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the total weight of the ejection-type cooling system from the T-54 instead of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the ejection-type cooling system from the total weight of the eject predecessor, but is more user friendly. The back plate behind the glass textolite layers also gains a somewhat increased efficiency from the prior disruption of the shaped charge jet in a similar manner, but with the additional benefit of deflecting the discrete jet particles as they "splash" onto its surface due to the low-high density differential According to the information presented in the poster below, the installation of Kontakt-1 was offered for the modernization of T-72M1 tanks to the T-72M1 tanks tanks to the T-72M1 tanks housing from the side hull plate, and finally pull out the entire module with a crane. 1985 variants are not secured to the side hull plates by welding but are suspended by spacers. A new electronic control system was reportedly installed for the transmission in the T-72B3 UBKh. Very little information is available on the new system. The steering levers control the hydraulic servo units, which greatly reduces driver fatigue. These tanks had the ball bearing race ring recessed below the hull roof, and in the case of the T-10, M46 and Chieftain, the gap between the turret and the hull roof was covered by raised parts of the hull. The commander directs the driver when crossing such obstacles as the driver has no way of seeing out of the tank when the hull is completely submerged. The Eurokompozit website also states that the glass textolite used in the T-72B, it is perhaps safer to work under a conservative estimate is that BTK-1Sh steel was used. As shown in the graph, L28A1 can exceed the safety limit is nominally higher by a small margin, as it is around 81-82mm. In order to measure the true of 80mm RHA sloped at 68 degrees when the firing range range is 200 meters, but at 800 meters, but at 800 meters, but at 800 meters at 68 degrees when the firing range range is 200 meters. level of radiation outside the tank, the radiation attenuation coefficient of the armour of the tank and the anti-radiation at a different thermal signature from the surrounding environment is the heating of the steel by solar radiation at a different rate than soil and vegetation, so by covering these surfaces with netting and branches, it is possible to strongly reduce or even eliminate the thermal signature of the slat armour screens can be seen in the photo below. For a T-72 Ural, the weight of a full ammunition load (including both 125mm and small arms) is approximately 1.25 tons. According to Rolf Hilmes, the upper glacis armour of an ex-East German T-72M provided a protection level of 400mm against KE and 490mm against KE and 490mm against KE and effective thickness of the steel-reinforced rubber skirt layer must be more than 14mm. Based on the velocity difference, the MD target is equivalent to an effective thickness of the steel-reinforced rubber skirt layer must be more than 14mm. 289mm of RHA (144.5mm RHA sloped at 60 degrees) against DM13. The fasteners can be seen embedded in recesses in the back surface of the glass textolite plate in interior photos from the driver's station. This severely reduces its penetration efficiency and conversely, increases the efficiency of the back plate. models equipped with Kontakt-5 than for those with Kontakt-5 panels on the upper glacis are structurally integral to the hull. The curvier (peakier) the torque and load is reached. NII Stali claims that it can reduce the penetration power of a typical anti tank missile like the Konkurs (130mm diameter) by up to 86%, or 58% for a 125mm HEAT shell, or up to a whopping 92% for lower velocity shaped charge warheads like the one on the 66mm LAW. It is interesting to note that on page 139 of the book "T-72/T-90: Опыт создания отечественных основных боевых танков" published by the onzavod corporation in 2013, it is claimed that T-72 hulls began to be built from BTK-1 steel plates beginning in 1976. The maximum vertical travel of the first roadwheel is 315mm up (bump) to 43mm down (rebound) for a total range of 358mm, and the amount of vertical travel of the other roadwheels is variability was created intentionally by varying the angle of the swing arm installation points. The T-72 Ural entered service some time before APFSDS ammunition began to be issued to the troops, the 80-105-20 armour design it used had already been replaced and new production T-72. tanks with the improved armour greatly outnumbered the original T-72 Ural production series. This velocity corresponds to a distance of 1 km. Indeed, based on the hit distribution data from multiple conflicts during the 20th Century, the teardrop shape is mathematically ideal for conventional large scale mechanized warfare on a fundamental level. The roadwheels cover a height of around 350mm of the lower part of the hull, and thus cover the entirety of the lower hull sides as well. The B-1 instrument and control panel displays the radiation level in a range between 0.2 to 150 rads per hour. The two photos below shows the snorkel being installed during a river crossing exercise. Determining the presence of the 16mm appliqué armour plate on T-72 tanks to a substantial improvement in mass efficiency, the calculated effective thickness is 1.83 times is greater than the 80-105-20 armour. The turret is made from MBL-1 armour-grade cast steel and is assembled from two pieces. Alekseev. Only sequential upshifting is allowed by the gearboxes. Gliwice 1993" ("Casting number of the vehicles purchased by Sweden during that time are still used today as OPFOR assets for training purposes. The only problem is that the engine cannot be started electrically after it is turned off without a battery replacement, but it is still possible to start the engine with compressed air. From this, two inferences can be made: The 60-105-50 armour array has a marginally inferior mass efficiency compared to dual-layer spaced armour against these two different types of composite APFSDS ammunition, but the ME coefficient remains well above 1.0 in both cases. Of the total area of the silhouette of the tank from the front (4.0 sq.m), the area of the turret occupies a 42.5% share and the hull occupies a 52% share. It can also be defined as the minimum velocity where a given thickness of armour can be perforated. They each have their own separate fuel lines, but both connect to the same fuel pump. These fuel tanks are made from stamped aluminium with an internal bakelite coating and have internal bakelite coating to people with firsthand experience. Conical noses, for example, are rarely found on service ammunition or not at all because conical-nose rods yield the best results on perpendicular plates to justify the huge losses in performance on oblique plates. The charts below are from the study. Additional losses to the electric generator of the T-72 - its generator of the roadwheel swing arm deflects the lever arm of the shock absorber, transforming linear force into torque which is applied to the vane rotor. However, its technology was shared with the 120mm DM13 APFSDS round for the Rh120 L/44 gun, which was introduced into service in the Bundeswehr in 1979 together with the Leopard 2. For the turret, the center point of the frontal arc is placed at the center of the turret (first from right). When the effective armour protection is given for the turret, it is almost always referring to the frontal arc protection using a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being a reference side angle of 30 degrees under this frontal arc being means that if the side of the turret was shot at an angle of attack of 35 degrees, the thin sides of the turret of an ex-GDR T-72M1, purchased by Sweden in the early 90's and used for testing purposes. Alternatively, Kontakt-1 has been credited to be provide an equivalent thickness of 200-250mm RHA when struck perpendicularly. The difference is 284 m/s or 24%, which is very significant. The light ERA kit featuring 4S24 offered for the BMP-3 was advertised to guarantee at least an 80% probability of protection from RPG grenades such as the PG-7VL and even grenades with a penetration power of up to 600mm RHA within a ±90 degrees frontal arc of the BMP-3. The mechanism, and the associated modifications to the pneumatic network of the tank, was also installed in all subsequent models of the T-72 series. A tight turn is thereby obtained. If the tank enters a left turn when traveling in 3rd gear, the left BKP is shifted to 2nd gear to 2nd gear to 2nd gear (3.485 ÷ 4.4) is 0.792, and so the left track will turn at 0.792 times the speed of the right BKP remains in 3rd gear. to have been developed by a simple evolutionary process that began with an 80mm plate sloped at 68 degrees, with the following two layers added over time. Beyond these changes, however, the EJ251 and EJ252 engines are understood to have the same general attributes. Please note that this article considers the EJ251 and EJ252 engines as they were supplied in Australian-delivered vehicles; specifications for other markets may vary. This was necessary for the simple fact that most hits land on the turret and not the hull during tank combat, so it is more profitable to distribute a larger share of armour mass to the turret. Due to the very large flow rate of the air sucked through the snorkel to aspirate the engine, the crew compartment is well ventilated. This causes premature wear. The results of the tests of Object 172 tanks in the Turkestan Military District in 1968 showed that the average speed of the tanks on a paved road was 43.4 to 48.7 km/h, and the maximum speed recorded was 65 km/h, presumably achieved by driving down a straight stretch of highway. With this in mind, it is important to note that a T-72B3 reached a speed of 77 km/h on the straight dirt road track. Because it is known that the V-92S2F engine does not run at a higher speed than prior engines, it is evident that a new transmission with new gear ratios was installed to the T-72B3. It is also the method recommended in the research paper "Definition and Uses of RHA Equivalences for Medium Caliber Targets": "The final use of the RHA-e should dictate which method is used to define the protection level. Due to the nature of the type of threat, the thickness of the casting is not particularly high, as shown in the photo on the left, below. This is slightly more than the 642 hp of the M60A1, 630 hp of the M60A1, Object 172-2M, the thickened upper glacis armour can be identified by the presence of three anti-ricochet ribs instead of four. Folding the top half away as shown in the photo on the right grants access to the back of the engine compartment From a profile view, the slat armour screens comprise approximately one third of the protected area of the hull and the other two thirds are covered by the heavy Relikt skirts. Its contribution to the overhead protected area of the hull and the other two thirds are covered by the heavy Relikt skirts. indefinitely. It is guite likely that the numbers given in the Yugoimport page are for acceleration on a dirt road instead of an asphalt road, or for a tank that weighs substantially more than a basic T-72 model. The gearshift mechanism is a rotary hydraulic value key which changes the flow pathway of the hydraulic network. Also, it is important to note that the monolithic "Ural" turret was inherently difficult to harden due to its large thickness whereas the cavity walls are individually thinner, and as such, they are readily hardened. 432SB-2 upper glacis array over the Obj. The total thickness of steel is also greater than in the "Reflection-1" array. Because the frontal arc size is factored into these figures, these figures express the minimum level of protection at the outer boundaries of the frontal arc and do not represent the maximum effective thickness at the toughest parts of the tank, i.e the front of the turret cheeks and the upper glacis. As mentioned before, the M1A1HA Abrams has an effective thickness of 750mm RHA against a 127mm ATGM from a 25 degree side angle but only 380mm RHA against an 81mm grenade from a 45 degree side angle. The turret roof, for example, has a LOS thickness of only 210mm at the weakest zones. Due to the denser layout of of spaced plates inside the 60-10-10-20-20-50 armour compared to the "Reflection-1" armour, the "lip" effect further enhances the mass efficiency offered by the new armour design against shaped charges. Aside from the three main types of armour defeat, it is also necessary to note that in many cases, the effective thickness figures reported for different tanks often cannot be compared directly due to the use of different ammunition during tests. As such, some degree of uncertainty is always present in any estimation of armour effectiveness, even in the detailed examinations that are presented in this article. Two externally mounted auxiliary fuel drums can be carried on special mounts at the rear of the tank. The auxiliary fuel drums can be carried on special mounts at the rear of the tank. use. The standard drums fitted to each T-72 have a capacity of 275 liters and are connected directly to the fuel system, and both can be disconnected by the driver at the same time by the push of a button. The outlines of the protruding bars are visible in the turret below. OBJECT 184 As mentioned earlier, beginning on the 1st of January 1984, newproduction T-72 tanks were outfitted with ERA. Однако защитные свойства стеклотекстолита при соударении под углом могут быть не ниже, чем при соударении под углом могут быть не ниже, чем при соударении под углом могут быть не ниже. photo below shows the exposed glacis armour of a T-72B3 that its idler mount ripped off due to an accident during the 2015 Tank Biathlon. The photo below shows the turret of an ex-NVA T-72M1 after live fire testing in 1993. The dozer blade is suspended from the belly of the tank by four structural support rods which can be seen in the two photos above. For the original T-72, the armour weight proportion was largely the same as earlier all-steel tanks, which invariably had no more than 50% of armour, this had totally changed. Unfortunately, the exact grade of steel used for the 16mm plate is not known. Due to its periscopic construction, the sight must extend through the roof, which creates a gap in the roof armour. The cheeks become progressively thinner as it nears the edge of the front increases due to the rounded shape of the cheeks. The DM13 round was not a long rod penetrator either as it had a composite construction consisting of two partially jacketed tungsten alloy penetrators with low aspect ratios. As mentioned before, the total physical thickness of the center of the turret drawing) and 530mm (various sources). The new control panel can be seen at the right side of the screenshot below. By using the quideline given in the textbook "Частные Вопросы Конечной Баллистики" to convert from nominal defeat to initial perforation, the effective thickness of the armour would be around 332mm RHA. These positive factors enhance the protection offered by the back plate. The gun mask is connected to the co-axial infrared spotlight on the right of the gun by a set of pushrods that allows the spotlight is used at a different distance than the distance that it was previously calibrated for. Опыт создания отечественных основных боевых танков", the appliqué armour was intended to limit the effective range of M111, but no more. The website of the Eurokompozit company also gives a description of the glass textolite used in the T-72 which we can cross reference with the Soviet document. On page 77, it is stated that the composite armour of the T-64A tank provided protection from subcaliber rounds (APDS) with a penetration of 110-120mm RHA at 60 degrees (at 2 km) at a range of 0.5 km. When the gearshift is set to neutral, the steering system does not function; pulling the steering levers has no effect. Despite this, these drawings are accurate enough to gain a general impression of the difference in size. M456 is also credited with a penetration of 380mm RHA in other sources. The geometric nuances of the turret design at this location can be seen much more clearly in the photo below. Besides that, 12-15% was clay (binding material), and the remainder was an additive made from graphite or ground electrodes with water. Glass textolite is not the same as fiberglass, because glass textolites are manufactured using laminated sheets of glass matting bonded together by resin whereas fiberglass, because glass textolites are manufactured using continuous glass fibers or chopped strands suspended in resin. Of course, the L15A4 APDS round fired from the 120mm L11 with a penetration of 130mm RHA at 2 km should succeed against the lower glacis of the T-72 quite easily from any distance. By this time, the armour had been fully developed into its final configuration with an additional reinforcing steel block in front of the driver's cutout. Note that the front plate was assigned a hardness of 450 BHN. The inner wall of the turret was obviously not cut up to examine the armour, so they must have poked a stick into the shell crater until they hit solid resistance. This greatly softens the oscillation of the hull, making it a much smoother ride compared to a T-54/55 or T-62. To steer, the driver pulls the right or left steering lever back. Due to the radiation absorbing properties of fuel, it was found that the frontal fuel tanks gave the driver considerable protection from gamma radiation. The areal density increased from 2,616 kg/sg.m. The new armour gradually replaced the older design on the production line over the next three years until the T-72A entered service in July 1979. The impact velocity corresponds to a range of 1,500 meters. These external components reduce the thermal signature of the triangular wedge (one third of the height of the weakened zone), the LOS thickness of steel is 390mm. A cross-section of the T-72A is available by referring to a factory blueprint tracing, shown below. In 1961, the design was further refined with the main emphasis on increased protection. This is explained by the use of a 38mm steel front plate and two NERA panels placed parallel to the side of the mainter cheeks, the interior surface of the mantlet zone has practically no slope. It consists of six evenly-spaced roadwheels, 750mm in diameter, with three return rollers on each side of the hull. The M1 turret could have been shorter, but there was a need to have a sufficiently large internal height to accommodate a human loader and some of this height had already been sacrificed because of the short hull with a reclined driver's seat. Однако экспериментально установлено, что на комбинированных преградах со стеклотекстолитом с большими конструктивными углами не наблюдается проигрыша по стойкости по сравнению с монолитной стальной броней равной массы." Translated: "The figure shows that when the projectile is deployed at an angle of 60° at impact speeds up to 2,000 m/s, the resistance of the steel is always higher than the strength of the glass textolite. The side armour is curved at a considerable rearward angle to form a point at the very back of the turret, forming a teardrop shape. It was found that the velocity of the shaped charge jet tip emerging from the 100mm front plate tended to be lower as the filler density decreased, and the jet increased in velocity when the density of the 100mm front plate was decreased. Modern HEAT grenades with a tandem warhead can defeat Kontakt-1 and may have enough penetration power to perforate the base armour as well. Behind the starboard side fuel tank is another

fuel tank (3) with slots for ammunition. With these drums fitted, the maximum fuel capacity of the T-72 is increased to a total of 1,750 liters. If a steel back plate will be 750 m/s. As such, even the oldest tanks were upgraded when they were sent for scheduled maintenance at repair facilities. Wilk et al., that to optimize the efficiency of a passive composite armour system to, the first layers should have the maximum energy absorption capacity. 432 design were far more nuanced than simply reducing the thickness of glass textolite and adding an additional steel back plate. At the time the "Reflection-2" project was implemented in 1983, protection from M111 was important as it was also being produced in West Germany and had entered service as the 105mm DM23 round. The total weight of the turret should be equivalent to 451mm of steel and the areal density is 3,540 kg/sq.m. In other words, the armour at 0 degrees will be very similar to the armour at 30 degrees. A very large portion of the penetration phase to contribute towards penetration phase. This is provided by just 25 blocks. These film stills were taken from archival footage from a Czechoslovakian Army training film. Original video from the VHU channel. If this anecdotal account is true, these tests echo the initial relationship between M111 "Hetz" and the T-72A, as "Hetz" was able to defeat the glacis armour at close ranges while the turret was effectively invulnerable. Photo credit to Leonid Varlamov. When the new turrets of the T-72A and T-72B succeeded the turret of the T-72 Ural, the increase in protection was mainly focused on the turret of evaluating effective thickness is used abroad. After being pulled into a repair facility, the tank was inspected and eight damage points were observed. The design of the RMSh track was adopted by the Soviet Army. As such, its mass efficiency coefficient is 1.11. Also, the commander's hatch was ajar or opened completely, so that the death of the commander was most likely caused by the combined explosion of an anti-tank grenade and the reactive armour occurring outside the tank, given that the armour was not perforated. As for the definition of "effective thickness" itself, a standard scientific method is used in each case. The glass textolite interlayer is held in place mainly by its placement between the steel front plate and steel back plate, both welded to the hull structure. Kontakt-1 is a type of explosive reactive armour. Another advantage of the light enough to be transported on existing rail platforms (the maximum cargo load limit was 55 tons), and also light enough to be compatible with the weight limit of the old MTU-55 bridge layers and TMM truck-based bridge layers, both of which were and still are present in large numbers in the Russian Army Engineers. When parked or moving on a hard surface, where the weight of the tank is applied over the single track link directly underneath each roadwheel, the mean maximum ground pressure (MMP) is obtained instead of the nominal ground pressure. This layout was placed at an angle of 68 degrees and was tested against two types of tungsten alloy long rod penetrators with equal lengths but different diameters (aspect ratios: UPE-3 = 11.0, UPE-4 = 12.0) and compared to other layouts Jarosław Wolski reports in "Anatomia pancerza. It impacts the 20mm back plate on its side, and at a velocity well below its critical velocity for erosion. Thus, the net engine power of the T-72 B is 712 hp. The lower side hull armour has a height of 250mm or 270mm if the thickness of the plate itself is included. In terms of height and overall profile size, it is beaten only by the Strv 103 which also had the upper hand in terms of overall length. However, this arrangement left the turret ring and much of the mantlet area unprotected, a problem which can be considered to be more or less "solved" on the T-72B. Both types of armour use silicon dioxide as the main ingredient, but siliceous core armour uses fused quartz and not sintered quartz. The difference is only 107 m/s or just 7.4%. The characteristics of the composite armour uses fused quartz and not sintered quartz. The difference is only 107 m/s or just 7.4%. Having an effective thickness of 450mm RHA renders the upper glacis completely immune against 105mm HEAT shells. Almost all of the armour as given, and almost all of these attempts are fundamentally incorrect. The PT-91 tank and its variants have the same armour as a T-72M1 (E5 model), being a derivative of it. The spacing between the 5th, 6th and 7th gears is also quite uniform but noticeably wider, which is responsible for the high top speed, achieved with at the expense of acceleration performance. As the chart shows, the crossover point between each gear in sequence from the 2nd to the 7th does not occur at 2,000 RPM, but rather at a speed that, when extrapolated, lies around 2,300 RPM. Thicker plates are more effective and more reliable at producing fractures because the longer duration of penetration causes a bigger buildup of internal stress in the rod, leading to a more severe fracture once the rod exits the back of the plate, but thinner plates can be used in this capacity as well. The T-72 can snorkel to a maximum depth of 5 meters. If round 'x' can also perforate 600mm RHA at a minimum velocity of 1,500 m/s, then the composite armour is equivalent to 600mm RHA against that specific round. The original source is unknown. If the target is a single plate, the fractured state of the shell, but the same phenomenon is hugely disadvantageous against multilayered armour or oblique spaced armour. Because it weighs more than a T-64A, a T-72 should be more difficult to stop and thus require more effort on the brake sis to shift into 1st gear, and then pull both steering levers back simultaneously, activate the brake on both BKPs hydraulic system directly acts upon the brake sis to shift into 1st gear, and then pull both steering levers back simultaneously. multi-disc brake packs, no force is transmitted into the mechanical brake linkages, and all resistance except the force of the return spring is removed from the brake packs are already compressed. This can be done to quickly control the brake packs are already compressed. It is the recommended way of bringing the tank to a full stop on a slope. Fundamentally, the clutch and brake are essentially the same, only their purposes differ. The only advantages of the tiller system is that it is much simpler to produce and fit into a tank, more durable, and frees up space for the driver's legs. Though the tiller steering system can be considered one of the more antiquated aspects of the T-72, it's worth noting that many of its rivals like the AMX-30, Chieftain and Challenger used the same system as well. With a total power loss of 11-11.5% before the power is transmitted to the gear boxes of the transmission, the T-72 retains a larger share of its engine power than the M60A1, Leopard 1 and Leopard 2. Because the study concerns long rod penetrators and the experiments used monobloc tungsten alloy long rod penetrators with aspect ratios representative of APFSDS rounds from the 1980's, this mass efficiency coefficient is valid against this type of ammunition. As the T-72 evolved, the different upper glacis armour designs prompted changes in the internal configuration of the armour in front of the driver's periscope area. It is worth noting that this particular implementation of ceramic component is fully confined from all three axes which ensures that the ceramic armour ensures that the ceramic armour ensures that the ceramic component is fully confined from all three axes which ensures that the ceramic armour ensures that the ceramic armour ensures that the ceramic component is fully confined from all three axes which ensures that the ceramic armour ensures are a configuration of the armour ensures that the ceramic armour ensures are a configuration of the armour ensures that the ceramic armour ensures that the ceramic armour ensures are a configuration of the armour the turret gained a composite construction. Exported tanks were specified to receive 2P plates while Soviet tanks received BT-70Sh plates. As in a normal automobile with a manual transmission, engine braking is applied by shifting to a lower gear. The idler wheel has a diameter of 520mm, and the drive sprocket has a diameter of 611mm as measured along its rim (not the tips of the teeth), which defines the point where its circumference is measured to calculate track speed. This is probably some byproduct of the teeth), which defines the point where its circumference is measured to calculate track speed. turrets for the T-62 and demonstrated the ability to produce a one-piece turret with composite armour for the log along and under them, thus forcing that section of the tracks will drag the log along and under them. something more solid to drive over. Instead, engine flexibility, which is dependent on the flatness of the torque curve, plays the primary role in minimizing the fall in engine speed. The total thickness of this array is 220mm which is only 5mm more than the 60-105-50 array of the T-72A and 6mm less than the upgraded 16-60-105-50 array, but the thickness of steel in the array is increased from 110-126mm to 170mm. Due to the curvature of the turret, the base sections of the turret cheek is less sloped than the upper sections so the claimed 10 degree vertical slope must be for the thicker 410mm section while the 25 degree vertical slope must be for the thinner 400mm section. The dozer blade has some overlap with the array which further minimizes gaps in the armour. Due to the rather long reaction time, the driver is sometimes obligated to manually switch on the chemical and biological threat protection measures when entering contaminated zones, assuming that the tank is preceded by a forward reconnaissance vehicles like the BRDM-2RKh. The location of the B-2 gamma radiation sensor can be seen in the photo below, taken from the STV Ground website. Due to the lack of erosion, the impact characteristics of the residual penetrator on oblique plates are degraded, although it is still not a trivial threat to the back plate of rolled steel, which is then stamped into a complex shape with protruding ribs for the installation of torsion bars and a depressed section in the floor to accommodate the driver. Like the earlier upper glacis armour designs, there are three anti-ricochet ribs in front of the driver's periscope. The main items of interest are the German 120mm DM13 (1979) and the Soviet 125mm 3BM15 (1972) composite APFSDS rounds. The area between the gun barrel and the co-axia machine gun is especially weak due to the gun trunnion block. As such, not only does a T-72A equipped with Kontakt-1 boast a higher level of protection in a larger frontal arc compared to the sides of the hull. The unique teardrop shape of the turret makes it possible to present a high thickness of armour across the frontal arc and, more importantly, accomplish this without adding excessive weight to the tank. The photo below, taken from a parade during the Zapad-81 exercises in the USSR, shows T-72 Ural-1 tanks with the 80-105-20 upper glacis armour and early "Kvartz" turrets. The sharp drop in protection when attacking the armour from a 25 degree side angle (65 degree angle of incidence) is not explained simply by the natural decrease in LOS thickness as this is a reduction in the obliquity of the angle of incidence of only 20 degrees, thus the LOS thickness was lower by 40.2%, but the drop in the effective thickness was in the order of 49.3%. "Kvartz" translates to "Quartz", so quartz is the main ingredient, but the exact composition of this compound is unknown. Additionally, the very similar 60-100-45 armour array of the T-80B hull is reported to have an effective thickness of 480-500mm RHA against HEAT, which strongly supports the calculated and reported protection value of the 60-105-50 array. If there is a visible cutout around the tow hooks, then the appliqué armour plate is present. Like the T-64A, T-62 and T-54/55 tanks preceding it, the hull of the T-72 was constructed from rolled 42 SM medium hardness RHA steel. At an unknown point in the production of the T-72B, the thickness of the dozer blade was increased to 25mm. In the context of such experiments, the 60-105-50 armour was not an entirely original design, merely a further refinement of the armour was not an entirely original design. sprocket Rubber track pads were not used during the career of the T-72 in the Soviet Army as such pads were found to increase the track mass by approximately 40% and are ineffective when driving over rough terrain. From this, it can be determined that the density of the glass textolite used in the T-72 is around 1.8 g/cc. Besides that, there are other sources of information that may have a larger margin of error. According to T-72 manuals, it weighs 200 kg. Moreover, Richard Ogorkiewicz writes on page 394 in "Technology of Tanks" that on average, the first 0.7 meters of a tank's height is covered by the terrain irregularities. In non-winter weather conditions where the ambient temperature is above 0°C, the DL grade "summer" diesel fuel is used. Photos of battle-damaged side skirts on M1A1 Abrams tanks confirm the presence of bulging of the turret is also equivalent to 900-1,000mm RHA in a 70-degree frontal arc, despite the higher effective thickness of the base armour (650mm instead of 500mm). 1969, and the turret was a homogeneous steel casting with a weld-on turret roof. While the side aspect of the cutout is undoubtedly thinner than the rest of the side aspect of the cutout with the same or similar protection as the upper glacis from the front. Note that the ideal penetrator model used for the Lanz-Odermatt calculation has a normalized working length of 295mm and it uses a weighted average penetrator diameter of 29.8mm. As it stands, that is the weight of a Leopard 2A4 turret with only 80mm of flat RHA steel protecting the sides of the turret bustle (4 times less protection than the sides of the T-72 turret). From external observation, the detection of nominal armour plate. It joins with the upper side plate at an angle of 32 degrees from the vertical axis. Ordnance velocities were in the range of 1,000-1,600 m/s. The 60mm steel front plate is penetrated in the hydrodynamic mode, thus behaving as a homogeneous barrier, and it serves to disrupt the jet once it is perforated. The great length of each skirt panel (~750mm) is a contributing factor in the effectiveness of the armour as the working length of the flyer plates would be very high. Warford emphasizes that typical sand is probably not used, and he speculates that the name "Kvartz" hints that quartz may be used and recalls the use of quartz gravel as an ingredient in HCR2 add-on armour kits during WWII. The armour was also sufficiently thick to prove a challenge for 105mm HEAT shells. For a steel-STB-steel composite armour, the steel front plate is penetrated by a stretching jet, but the glass textolite layer behind it will be penetrated by the scattered jet particles. Thus, it can be said that of the total thickness, 115mm is "Kvartz" and around 422mm is cast steel. At the end of the year, ERA kits began to be delivered to tank repair facilities for installation on existing tanks sent in for scheduled maintenance. On the T-72, the 1st gear is primarily meant for low speed maneuvering in restricted terrain, towing heavy loads, turning sharp corners in tight spaces, climbing obstacles, crossing trenches, climbing very steep hills, getting the tank to move if it is stuck, and any other situation where a great deal of torque is needed. The gear shifting mechanism has an interlocker that is designed to prevent the driver from downshifting in the 7th to 5th, 5th to 4th) unless the engine speed is below 1,500 RPM. The volume of the engine compartment had to be increased by 0.5 cubic meters to accommodate this new equipment, and in turn, the increased volume generated a larger surface area. The experience of creating a domestic main battle tank), it is stated that a basic T-72 tank [with the 80-105-20 armour array] was only able to resist 115mm APFSDS (of an unknown model) at an impact velocity of 1,400 m/s. The photo on the left below shows a T-72M1 belonging to the GDR, and the photo on the right shows a standard T-72A obr. All of the other blocks everywhere else on the tank were affixed onto threaded female tubes welded to the armour surfaces like all previous tank models. The maximum permissible velocity is therefore around 1,753 m/s. However, it has been experimentally established that on the composite targets with glass textolite with large structural angles, there is no loss in durability in comparison with monolithic steel armour of equal mass." It is mentioned in page 290 of "Particular Questions of Terminal Ballistics" that when monolithic steel armour of equal total thickness, ricocheting of the tip of long rod penetrators and the fracture of the rods was observed on the contacting boundaries between the two glass textolite layers. Способность низклоплотных материалов вызывать при соударении изгиб корпуса и разрушение ньоражающего элемента из тяжелого сплава подтверждена и на менее плотных материалах типа полиэтилена. The T-80 obr. This is not particularly surprising given that the greatly increased torque from the new engine would most likely require gear back of the BKP transmission, there are more gears than required to merely keep the engine running within its powerband of 1,300-2,000 RPM. Overall, the effect of replacing the RMSh tracks is very slightly longer than on the RMSh tracks - 4,290mm instead of 4,270mm. Finally, it is worth noting that if the T-72 were trapped in swamps, bogs or in deep snow, it may escape with the help of an unditching log. Being an initial perforation limit, this type of perforation limit, this type of perforation limit of the plate by a margin that only guarantees a 50% likelihood that the rear surface of plate is breached. It is very likely that high hardness armour steel grade is used for the dozer blade of a military vehicle like the T-72 because a high hardness blade can be used to shift abrasive rock and frozen soil as well as provide additional ballistic protection. The gun mask is also designed with protruding edges that overlap the gap between the gun barrel and the turret in order to limit abrasive rock and frozen soil as well as provide additional ballistic protection. the possibility of bullets and fragments potentially jamming the gun in elevation. According to measurements, the armoured side skirts on the Abrams have a thickness of 65mm, and are composed of a one inch-thick steel front plate with 38mm of "special armour" behind it. The gunner of the tank is responsible for aiming and firing the grenades by turning the turret towards the threat and aiming with his forward-facing optics. Due to the low penetration efficiency of the residual penetration against the 50mm back plate, a much higher impact velocity is needed to defeat it. This is supported by the study "Jet Penetration into Low Density Targets". The turret cheeks of the T-72 Ural offer a minimum LOS thickness of steel of 450-475mm from the direct front. 17 tanks of this type were produced, and they were not delivered to the troops. By injecting diesel into the exhaust manifold, the hot manifold evaporates the fuel instantly, and it is ejected from the exhaust manifold. perforates a LOS thickness of 552mm RHA at its muzzle velocity and a LOS thickness of 522mm RHA at 2,000 meters. The mechanism acts as a step-up gear between the engine and the BKPs, with a ratio of 0.706. This has been shown by a number of studies on the topic of layered steel targets and is additionally reinforced by the previous discussion on steel-STB-steel composite armour where it was found that increasing the hardness of the steel front plate increases the resistance of the armour against long rod penetrators. A fire was started, but fortunately, the gunner (left hand side of the turret) was only heavily concussed because the bulky breech assembly of the cannon saved him from the spall and fragments entering the turret on the commander's side (right hand side of the turret). Note the presence of a large nut in the corner of the gun mask of the T-72 models increased the effective thickness for late T-72 models increased the effective the effective thickness for late T-72 models increased the effective the effective determined that after a shaped charge with a penetration power of 450mm RHA perforates the 80mm front plate (214mm LOS) in the hydrodynamic mode, the remaining 280mm of glass textolite and 53mm of steel provides the equivalent protection of 236mm of RHA steel. Although the armour scheme of the tank is good, the fact that some parts of the tank have less armour protection than others cannot be ignored when evaluating the overall level of protection. Four of the hits were located on the sides of the hull, one of them on right side, and the other three on the left side. A T-72 model with this armour array can be identified by the presence of four anti-ricochet ribs in front of the driver's periscopes, with three small ribs and one large rib. The unditching log was demonstrated in Sweden by an ex-GDR T-72M1 in 1991 as part of a series of tests. It is preferable to avoid detonating the shell at all, of course, because the power of the explosion can still have some physiological and psychological effects on the crew even if they are not physically harmed by spalling. As such, the 475mm figure is only the minimum thickness of the turret cheeks from the front. The spacing brackets similar to the type used in the "Reflection-1" armour, but they are removed in the photo below. Newer turret designs such as the flatter turret of the T-80U and the welded turret of the T-90A are designed with APFSDS in mind, featuring much flatter roofs that are able to deflect long rod high-elongation APFSDS rounds more readily. The new armour retained a 60mm front plate and a 50mm back plate, but the size of the interstitial space was increased to 110mm. At that time, the 105mm L7 had not yet even entered service and contemporary munitions tended to have issues against highly oblique targets. Nevertheless, the most important feature - the layout - is clearly 80-105-20. Keeping these watertight covers shut and configuring the tank to draw air through the fighting compartment prevents the ingress of burning liquids at the cost of accelerating the overheating of the engine. The cooling fan itself is well protected, since it is too small to be hit by aerial weapons and it can eject any burning liquid thrown inside it. By contrast, the cooling system of the Leopard 1 may offer better protection against incendiary attack as only the cooling fan is exposed on the engine deck whereas the radiators are not, but the radiators are on the sides of the hull, making them more vulnerable to heavy machine gun fire and artillery shell splinters. According to page 4-5 the article "Anatomia pancerza. The use of a long turret bustle is not inherently bad, of course. Because the residual penetrator no longer behaves as an eroding long rod penetrator but has instead transitioned into a rigid body penetrator, it behaviour is directly analogous to an AP shot at the given velocity. The T-72 perfectly reflected their seriousness, featuring the GO-27 NBC protection system with a filtered ventilation system that is also capable of generating an overpressure. On the other hand, a Leopard 1 has a torque converter that provides enhanced starting acceleration, which can be bypassed after starting, and the driver only has to upshift twice, to the 3rd gear, but due to the wide spacing between the gears in the 4-speed transmission, the engine speed will fall well below the power band after each shift. Delivery of engine power to the tracks is therefore interrupted less than half as many times as in the T-72, but the engine is forced to work back up to its power band from a much lower speed after each gear shift, where it operates at a low efficiency due to the negative influence of turbolag. Evidently, the non-optimal circumstances faced by these two tanks balance each other out, with the outcome being that both tanks share virtually the same acceleration time to 32 km/h. The total number of elements contained within each skirt panel would be up to eighteen. The remaining three hits were recorded on the turret, one on the front, one on the front, one on the side, and one on the rear. with HEAT is around 25% at a distance of 0.5 km, falling to 20% at 1.0 km and around 11% at 1.5 km. The 16-60-105-50 armour array may be borderline acceptable for resisting a MILAN missile (530mm penetration) if the protection level is closer to the high end estimate of 550mm RHA, but the basic MILAN was an outdated threat by 1983. Reinforcing nubs were pressed into the plate between every torsion bar rib to improve the stiffness of the floor. The "Kvartz" composite turret apparently appears to be effective against 3BM15 APFSDS. Photo by VoLLanD and published on the sfw website. No explanation for the slow reverse speed on the T-72 is given in the technical manual operator's manual or any textbooks, but such a slow speed was not uncommon for tanks of WWII vintage. In the T-64 series, it is likely that the 80-140 armour was retained until 1964 for no other reason than to avoid another redesign in order to expedite the beginning of production. for the new prospective medium tank of the USSR dictated that it had to be immune to 100mm armour piercing shells fired at 1,000 m/s (muzzle velocity for 100mm AP shells fired at 1,000 m/s) and 105mm subcaliber shells fired at 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s) and 105mm subcaliber shells fired from the American M68 cannon at a distance of 1,000 m/s (muzzle velocity for 100mm AP shells fired from the American M68 cannon at a distance of 1,000 m/s opening and closing mechanism of the driver's hatch. This was inherited from the turret design of the T-64A, like so many other details of the T-72 series. Unfortunately, Tarasenko did not cite any specific source for this information. Case in point - high hardness impact resistant steels like Hardox 500 are standard for bulldozer blades and loader buckets used in mines and construction sites where large quantities of rock must be shifted, and high hardness steel dozer blades are also standard for military combat engineering vehicles. Although it was not uncommon for the smoke grenade launchers to be installed at this part of the turret, it was probably not a very wise idea since a direct hit on the turret cheeks could potentially deprive the tank of the ability to react defensively to an attack by deploying a smoke screen. This was a much safer location for the launchers, but having fewer smoke grenades was strongly depends on the 80mm RHA front plate, which not only erodes the penetrator but also damages it as the penetrator achieves breakthrough so that the following layers have an increased efficiency. The DU test rod is not a replica of the two rods since the aspect ratio is less - 10.0 vs 14.3 and 18.0 respectively - but this does not affect the nature of the effect of nose shape. On the whole, this stagnation may have been somewhat acceptable because it was counterbalanced by an equal lack of innovation in 105mm KE and HEAT ammunition during the 1960's and early 1970's. (Influence of Weakened Zones On Defeat of Armor Protection). Only brake No. 4 and No.5 have both a hydraulic power piston and a mechanical drive, allowing control by the gear shift, clutch pedal and steering levers, which are hydraulic, as well as the brake pedal mechanism, which is fully mechanical. It is stated on the NII Stali website that in 1962, the institute developed the world's first composite armour with an anti-shaped charge filler for the T-64 tank. With the upgrade from the T-72 Ural to the T-72 A, the combat weight rose by 0.5 tons but the actual increase in weight from additional armour was 0.4 tons. Like the GO-27 system, PKUZ-1A automatically executes defensive systems and alerts the crew via visual and audio signals when an NBC threat is detected. The image below shows a T-72B1 obr. This is done by a modulating rotary spool valve which can vary the clutch pressure to a quick jump to 10-11.5 kgf/sq.cm, whereupon the clutches fully engage. In this way, the turn radiuse of the hydraulic fluid, thus controlling the rate of pressure to a quick jump to 10-11.5 kgf/sq.cm. is controlled by hydraulic pressure on the clutch pistons, which in turn is controlled by the angle of the steering lever. The experience of creating domestic main battle tanks) published by the Uralvagonzavod Research and Production Corporation, gives the distance limit of initial perforation of 105mm APDS on the armour of the T-64 (Object 432) tank with the same 80-105-20 upper glacis armour configuration. However, it was still insufficient for the MILAN missile which had begun proliferating among the European NATO members in the mid-1970's. The longer turnet of an M1 Abrams or Leopard 2 will appear larger to an observer when it is turned away from his direct line to the MILAN missile which had begun proliferating among the European NATO members in the mid-1970's. of sight, thus making it easier to see. They have a diameter of 204mm. The nominal minimum ground clearance of the T-72 Ural and T-72A is 470mm and was increased to 490mm on the T-72B chassis for improved mobility. The speed difference is much smaller, and the turn radius is expanded accordingly. A simple formula can be used to calculate the speed difference is much smaller. turn radii at each gear. The small difference may be explained from minor casting imperfections. The appliqué armour plate installed on the 1983 modification of the T-72A and earlier T-72 variants is not known but it has been credited with a hardness of more than 500 BHN by credible sources. However, in practice, metal grousers provide better performance when driving cross-country across a variety of surfaces, including mud, snow, sand and soil. Newer UMSh dual-pin tracks are available, also measuring 580mm in width. Then the whole process would have to be repeated in reverse. As with the geared steering system of the T-54 and T-62 transmissions, the BKPs of the T-72 allow the tank to be steered by slowing down one track, or by de-clutching one track, or by de-clutching one track, or by de-clutching it. In total, there are twelve skirt segments and twenty four steel plates protecting the sides of the hull. The original T-72 had a height of 2.19 meters (measured up to the turret roof) and the T-72A was the same. Even so, the T-72 was still slightly shorter than the M1 Abrams and Leopard 2 which had a height of 2.39 meters and 2.48 meters respectively (measured up to the turret roof). The system capable of detecting gamma rays with energies ranging from 0.66 to 1.25 MeV. The overhang of the turret cheeks above the hull roof is also worth mentioning as a protection factor against top-attack bomblets, but for earlier models of the T-72, this consideration is only marginal. Also note that the dozer blade on the T-90 is not spaced from the lower glacis plate, or has so little spacing that it is practically irrelevant. By referring to Figure 2, it can be seen that the probability of defeat of the tank's armour in its original state with the inclusion of its weakened zones with APDS is around 40% at a distance of 0.5 km, falling to 29% at 1.0 km and 17% at a distance of 6.2 km/h at its rated engine speed of 2,200 RPM (65 km/h when the engine is at its max speed), it is immediately apparent that the gearbox had to be designed to make use of a much wider engine speed range than the 7-speed BKPs. In fact, due to the wide spacing between the gears in the 4HP 250, the engine speed will fall from 2,200 RPM to 1,200 RPM after shifting from 1st to 2nd (a wide gear spacing exists due to the high gearing ratio of the 1st gear, like all other tanks), and then to 1,400 RPM after shifting from 2nd to 3rd, and 3rd to 4th. Because a dual layered steel and glass textolite composite armour is not less than 1.0. As such, the 80mm RHA front plate and 105mm glass textolite layer alone should be equivalent to 104mm RHA sloped at 68 degrees in effective thickness (280mm RHA in LOS effective thickness) against both steel and tungsten alloy long rod penetrators. From this timeline of developments, it can be inferred that the 80-140 armour was probably an early effort developed in 1961 by NII Stali before transitioning to the final 80-105-20 design in 1962. In general, the weight of the turret on all T-72 models is around 55% of the hull weight, both empty and combat loaded. Most of the hits landed on the sides of the tank, with one rocket impacting the lower rear of the hull. 10, Book 2: Comprehensive protection) also states that the resistance of this same armour (on the T-64A) is equivalent to 305mm of RHA steel against KE threats and 450mm RHA against shaped charges (row - T-64A; column - "KC"). According to the study "The Penetration Performance of Tungsten Alloy L/D=10 Long Rods With Different Nose Shapes Fired At Rolled Homogeneous Armor" by John Zooks, the effects of nose shapes is largely independent of the penetrator material. Its weight in terms of steel was increased to 360mm due to the additional 10mm of steel thickness in its 44-degree frontal arc remains 850-900mm RHA, but the effective thickness of 900-1,000mm RHA, but the effective thickness in its 44-degree frontal arc remains 850-900mm RHA. tanks, the sides of the hull of a T-72 tank with Kontakt-1 have adequate protection from shaped charge weapons and all of its weakened zone is not necessarily the same as the dimensions of the driver's periscope area void - the triangular reinforcing wedge in the upper glacis armour in front of the driver's periscope may not only compensate for the reduced LOS thickness, but instead increase the effective armour thickness to a certain extent against APDS and APFSDS ammunition. Both sides of the turret are symmetrical, and the zone on the left of the gun constitutes a weak point on the left side of the mantlet, mirroring the cutout for unfortunately, there is no information on the specific modifications were applied to the turret. This shows that the effectiveness of Kontakt-1 will vary wildly between 55% to 90% depending on the point of impact on the turret. This is discussed later in the "NBC Protection" section of this article. To achieve initial perforation, an additional 10mm of back plate thickness is added. Only sequential upshifting and downshifting is permitted, with a mechanical interlock to prevent the driver from skipping gears. This can be seen in the two photos below. Glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material consisting of layered sheets of glass textolite is a material constrained sheets of glass textolite sheets of useful method of providing quick concealment at the cost of 10 liters of diesel per minute of continuous operation. The change in the mass efficiency from the appliqué plate is dependent on the specific APFSDS round used against the armour array, but in general, the higher hardness and strength of HHS yields the best results for defeating KE threats especially at a high obliquity. The drawing shows the weakened zone next to the gun trunnion for the linkage on the left side of the turret, mirroring the weakened zone for the turret, mirroring the weakened zone for the turret of the turret, mirroring the weakened zone next to the gun trunnion for the linkage on the left side of the turret, mirroring the weakened zone for the turret of gap is a narrow area where there is practically no armour, but in fact, the weakened zone includes the turret roof directly around the gap. Given the large increase in effective thickness compared to the 80-105-20 armour, M735 is unlikely loss efficient design. In other words, to resist 3BM32 at its muzzle velocity, the effective thickness of the 60-10-10-20-20-50 armour must equivalent to around 540mm RHA. It is stated that the impact only formed a "slight [dinner] plate sized bulge in the armour and cast some paint flakes around the turret wall". The hull armour fared worse, but still quite respectably given the power of the ammunition tested. This also has the added bonus of providing additional protection from spall and secondary fragments during combat, especially in conjunction with the 45mm of anti-radiation lining on the hull sides, as it is generally quite unlikely for the tank to be nearly running out of fuel during combat. The result is 6.04 meters. Two of these can be seen in the photo below. The release of stress generally fractures the rod at the tip but sometimes fractures the tip but s increase in armour mass without an increase in armour thickness because of the need to add armour to protect a larger surface area. It is therefore more likely that T-72M1 tanks with the 16-80-105-20 armour array were of Czechoslovakian or Polish origin, or possibly even a local modification. Conversely, the solution implemented in the M48 Patton M60 and M103 where the turret ring was installed in a raised flange cast together with the hull was also assessed to be a non-ideal solution as it still fails to prevent the turret from being jammed by a hit to the joint between the turret from being jammed by a hit to the joint between the turret and the hull. The technology of making molds and cores - script No. 1747 of the Silesian University of Technology. It could penetrate at least 500mm RHA, making it a serious threat to a T-72 Ural-1 from the direct front. This negatively affects its resistance to the residual penetrator. This supported in the book "Kampfpanzer: Heute und Morgen" by Rolf Hilmes. Soviet tank designers were very conscious of the dangers of nuclear warfare, especially artillery-fireddates to the residual penetrator. tactical nuclear weapons. By shutting off all of the internal fuel tanks, the fuel will not leak out as energetically as it is no longer being drawn by the fuel pump or maybe even stop leaking entirely, depending on the specific location of the damage to the tanks. New production tanks would have the ERA mounts installed after final assembly at the factory, and existing tanks would be retrofitted while receiving scheduled maintenance at repair facilities across the USSR. The graph above was plotted with the assumption that the jet is already disrupted when it enters the filler. The three-layer array shown below has a 1.2:2.12:1.0 ratio of layer thicknesses with a STB interlayer, equivalent to the 60-105-50 armour layout. The average difference of 20 m/s corresponds to a range difference of (relative to the unaltered upper glacis) can be considered to span an area of 530x135mm (0.072 sq.m) - around half of the dimensions of the driver's periscope void itself. The guaranteed perforation is defined as the minimum armour thickness that can be perforated by the given penetrator at the given velocity. The relevant paragraph is shown below "На рисунке видно, что при внедрении снаряда под углом 60° при скоростях ygapa до 2000 м/с стойкость стали все время выше стойкости стеклотекстолита. This was due to the fact that the choice of gear ratios of the BKP transmission was primarily subordinated to ensuring high tractive properties in rectilinear motion, high acceleration by keeping the engine in its power band, and a high top speed, compromising the effectiveness of the turn radii at high speeds. To determine the actual value of the armour against KE attack and the context of the protection values given in various authoritative sources, it is necessary to have a deep understanding of the working principles of the armour as a system and to find out its physical characteristics. Fused quartz is a glass, not a ceramic. It eventually exploded, long after the crew escaped. It was more potent than M111 as it had a monobloc penetrator with a similar diameter and greater length. Even though it was certainly not the shortest of all Cold War era main battle tanks, it was still an impressively diminutive target. The photo below, taken from "History of the 4th Battalion, 37th Armored Regiment in Operation Desert Shield/Storm", shows an Iraqi T-72M tank which was used for target practice by the aforementioned U.S Army battalion. Soviet intelligence on the development of 105mm APFSDS ammunition during the early to mid 1970's resulted in the timely introduction of a revised composite armour scheme. From an angle of 30 degrees from the longitudinal axis, the same point on the turret had an average thickness of 530mm. In 1960, the preliminary sketch of the Object 432 featured an all-steel hull with an 80mm upper glacis plate, sloped at 68 degrees. Отсюда можно заключить, что при больших конструктивных углах преграды использование стеклотекстолита в комбинированной броне неэффективно. Examples of a T-72B obr. The main difference is that the Kontakt-1 set offered in the package includes only 155 blocks as opposed to the standard 227 blocks of the T-72AV. Similarly, if ductile fractures are detected, it is indicative that another form of structural failure has occurred. This can be done with the gear shift or by pulling both steering levers back and holding them in place until the tank has reached the bottom of the slope. The system detects contaminants in the air using a cyclone-based air sampler and analyzer. retained the 105mm glass textolite interlayer, but it now had a 60mm steel front plate and a 50mm back plate instead. In fact, specifications for RHA plates of such a thickness do not even exist. The short height of the lower side hull armour makes it statistically unlikely to be hit and the additional protection provided by the roadwheels offsets theorem exist. reduced thickness of the armour, so overall, it is not a flaw in the protection scheme of the tank. The photo below shows the profile view of completed front hull assembly. Similarly, the velocity of the penetrator drops sharply as it penetrates the steel plates but barely changes as it travels through the STB layer. However, the armour is not thick enough to reliably resist 30mm, 35mm and 40mm shells. This particular example was produced in 1977, as indicated by its turret. The clutches and brakes are engaged hydraulically, with a hydraulic system that is pressurized via an engine power takeoff from the intermediate power transfer gearbox. ("Firapa"). The table below, taken from page 62 of the book "T-72/T-90. For instance, the 1st gear is engaged by activating clutch No. 3 and brake No. 4. An additional factor to consider is the better coverage of the "Relikt" side skirts, which are symmetrical on both sides of the hull and are long enough to protect the engine compartment on both sides when hit from the 70 degree frontal arc of the tank whereas on the Abrams, the starboard side armoured skirts extend up to the port side armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit, and the port side armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit, and the port side armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts only extend up to the second up to the second roadwheel to protect the fighting compartment from a 45 degree hit armoured skirts on the second up to the se It can be surmised that during assembly, the front plate has these studs fitted, the glass textolite interlayer is slotted over them, and then the back plate is secured by welding it to the studs and to the reinforcing structure in front of the driver's cutout. space, which, in this case, is the driver's station and spaces accessible by the driver, such as cuts in the fuel tanks. The front two shock absorber is intended to assist recovery when driving through dips and bumps. If there is no force on the pedal, it will return to its original position under its spring. However, this shape does not come without drawbacks. However, Tumasov writes that the introduction of the new armour was hindered by bureaucratic red tape, which was only overcome with the intervention of chief designer Venediktov himself. 10. The best practice is for the commander to give the order to bail out and then press the master switch for the fire extinguisher system, thus greatly reducing the chances of an ammunition explosion from occurring before all crew members escape. Murakhovsky and published in the "Arsenal of the Fatherland" magazine, issue 4, 2013. This implies a mass efficiency coefficient of 0.915, which is essentially the same as homogeneous cast steel. Until this point, the most powerful ATGM among the European NATO members at the time was the HOT, which had a penetration power of 720mm RHA. Once the clutch pedal is fully depressed, hydraulic pressure in all clutches and brakes in the gearbox drop to zero, thus disconnecting the gearbox the from the power input shaft. The overlapping section between the upper and lower glacis plates combines with the dozer blade to make the lower glacis panel, the engine access panel intake, the radiator louvres and the cooling system air outlets. The EJ251 and EJ252 engines had a compression ratio of 10.1:1; the injection and firing order was 1-3-2-4. It is unlikely that the initial 80-140 armour does not matter that much as it is obvious that the thicker array is simply filled with more air than the thinner array. Again it can be clearly seen that the spaced steel plates are not welded to the side hull armour plate by looking at the photo below. This also has the change in silhouette size during the rotation of the turret will be more likely to invite the attention of watchful eyes. For an impact at an angle of 60 degrees, the residual depth of penetration was 2.5 to 3.2 rod lengths. In a relatively recent series of studies compiled in "Particular Questions of Terminal Ballistics" 2006 (Частные Вопросы Конечной Баллистики) published by Bauman Moscow State Technical University on behalf of NII Stali, a multitude of different array layouts with different ratios of layer thicknesses and the optimal obliquity. For Polish T-72M1 tanks, 2P steel was specified for the appliqué plate as it was the primary high hardness steel available for armoured vehicle production. Injection and ignition The EJ251 and EJ252 engines had multi-point sequential fuel injection and centrally located spark plugs. The same preparations include sealing the edges of all hatches and various openings and periscopes with a thick resinous waterproofing paste, as the water pressure at such depths is simply too much for rubber seals to handle. The driver must then turn on the bilge pump and remove the bilge pum Защиты Серийных Танков". The photo is a screenshot taken from this video of a T-72 turret used for ballistic tests displayed at the Parola museum. The starboard side fuel tank has a capacity of only 158 liters due to the deep cutout for the firefighting system control units, detection and control units for the firefighting system control units for the firefighting system control units. the NBC protection system, and a power supply unit. The fuel level, as displayed to the driver on his instrument panel, is measured by from these two fuel tanks, each equipped with an electronic fuel meter. The chart below (taken from Andrei Tarasenko) shows the drop in engine performance when jet fuel (grey line, TC) and low octane gasolineed to the driver on his instrument panel, is measured by from these two fuel tanks, each equipped with an electronic fuel meter. (white line, A-72) is used instead of diesel (black line, ДЛ), but more importantly, the chart shows that a T-64 (Object 432) running under normal conditions on diesel fuel accelerates from 0 to 32 km/h in 10 seconds. The T-72 Ural with the V-46 engine has a marginally higher power-to-weight ratio, better running characteristics, and identical gearboxes, only counterbalanced to some extent by the larger rotating mass in its suspension, so it must have similar acceleration characteristics as the T-64 or better, and the T-72 will also outperform the T-64A. Interestingly enough, the T-72 series was only specified to receive 16mm of additional armour without any distinction between the original 'Ural' series and the later "Ural-1" or T-72A, whereas the T-64 and T-80 series were specified to receive 30mm of additional armour. The same method of normalizing a non-uniform rod shape into a distional working length for the penetrator. The thickness of the function on the right side is covered with only four, leaving a gap to accomodate the smoke grenade launchers. Photo on the right below, courtesy of Vitaly Kuzmin, shows the welded frame constructed from hollow structural steel tubes and also shows the air gap separating the ERA block from the turret side. This is another improvement over the earlier ERA layout. Given a fixed vehicle weight, the mean maximum ground pressure is governed by the area of a track link and the number of roadwheels over which the weight is divided rather than the entire track contact area, with the number of roadwheels being the dominant factor. The velocity limit of armour perforation for the composite armour must be recorded and compared to the velocity limit of the same round for a homogeneous RHA block set at the same obliquity. The total fuel capacity of the T-72 is 1,200 liters. In the summer, the 1,200 liters of fuel carried in a T-72 weighs 1,032 kg. Two fuel tanks are located on the two front corners of the hull (flanking the driver). Coming out of the factory, all T-72B models except the obr. Work on the integration of the reactive armour with the T-72 was completed in the summer of 1982 and testing of experimental tanks with this new reactive armour kit were carried out in November 1982. The extremely favourable performance to cost ratio of this type of armour would also make the T-72M1 highly desired. Additionally, the difference in the area of the silhouette of the T-72 does not merely manifest from a frontal view, but also when the turret is turned to one side. However, the slow reverse speed would not have been an issue when firing from a hull defilade behind a reverse slope or a berm as it is quick enough for the tank to rapidly return to a turret defilade. This is in stark contrast to the 4HP 250 transmission of the Leopard 1. which has a 4-speed gearbox. From this, it is evident that the 80-105-20 armour array provides considerably less than 320mm RHA of equivalent protection against a steel long rod penetrator, so its mass efficiency is well below 1.0 given that the array weight is equal to 333mm of steel. As an additional point of reference, the below simulation shows M735 impacting the 80-105-20 armour array at an impact velocity of 1,430 m/s. This means that welding is not an issue, so high hardness steels with poor weldability can be used without structural issues. For example, the ST-10-1S generator on the T-72 generator on commander's cupola weakened zone is, of course, the cupola itself, which extends above the turret roof and cannot be armoured as thickly as the rest of the turret for obvious reasons. With 200-l drums, the range is around 670 km. Medium or light weapons could pose a threat, but they were still largely inadequate against the turret armour. Being only 80mm thick, the side armour plate could offer only a fraction of the protective value of the front armour, and this was not a trifling issue. Overall, the protection level of the 60-105-50 armour vastly overmatched all available APDS ammunition that appeared two years in the future. Additionally, it is stated on page 159 of "Боевые Машины Уралвагонзавода: Takk T-72" published by the Uralvagonzavod Production Association, the hull armour of the T-72A (the same as the Ural-1 and T-72M1) is equal to 500mm RHA against shaped charges. The electrical systems of foreign tanks are typically which is often reflected in better performance in certain aspects (quicker turret rotation speed, more powerful infrared spotlights), but also results in slightly lower net power. The simplicity of the replacement process makes it expedient to carry out repairs or replacements in field conditions. For comparison, the work of more power-nund removing, repairing and reinstalling of the transmission unit on a Sherman required 80 man-hours. The process of installing new blocks or replacing damaged mounting bolts is identical. The ability of low-density materials such as polyethylene. However, when material of sufficiently high areal density is placed in front of the STB, the form of the continuous jet is disrupted as it is broken up into discrete particles once it has perforated the steel plate and emerges from its back surface, i.e., it becomes discontinuous. It also allows the tank to be used as a tractor and a digger for general construction work when specialized vehicles are not available. The bulk density of sand is 1.2 g/cc but the density of sand is responsible for the large difference in density. The difference in general construction against shaped charges compared to Kontakt-5 is not large as NII Stal claims that Kontakt-5 improves the protection against such weapons by 1.9-2.0 times. From these dimensions, the area of the void is around 0.145 sq.m. This, however, only considers the upper glacis when struck from the direct front. 1984 include this particular tank at the Museum-Panorama at Volgograd, which was identified as such by Russian historian A.V. Karpenko. With that in mind, the vulnerability of the gun mantlet area of the T-72B against BM-22 and BM-26 does not necessarily translate to a vulnerability to contemporary 105mm APFSDS or even 120mm APFSDS like DM13 and DM23. Its thickness was more than enough to disrupt the jets of modern precision shaped charge warheads, yielding a high efficiency from the glass textolite filler. When testing this type of armour, it was observed that additional protection value was provided from the neighbouring plate and into the path of the penetrator The area of the turret from the front at a 0 degree angle is 1.7 sq.m, which is smaller than the frontal hull (2.08 sq.m). Based on this information, the choice of a modified phenol-based glass textolite for the armour and the use of a modified phenol resin is probably related to the inflexible requirement for Soviet tanks to be operable in conditions of -50°C to +50°C. This was determined with live fire tests. No interlocker is present when downshifting at the 4th to 1st gears, as the close spacing in the gears makes it very hard to overspeed the engine. At such a high obliquity, a penetration loss of over 90% can be expected for most types of HEAT weapons, making it very difficult to defeat the roof armour with any contemporary single-charge HEAT warhead. The measurements were done by Jarosław Wolski. A range of 1.5 km should be considered medium to long range, given that various studies indicated that tank combat distances in Europe can reach a maximum of only 1.8-2.0 km in certain regions, such as the relatively flat fields of Northern Germany. The T-72 turret ring is shown on the left with the interior of turret ring facing to the drawing, and the T-64 turret ring facing to the left of the drawing. The bushings reduce vibrations, reduce wear and tear and also dampen the noise levels compared to all-metal tracks. Instead, the armour was required to be immune to 105mm HEAT shells at 500 meters and 115mm HEAT shells, while the requirement to resist 105mm HEAT shells, while the requirement to resist 105mm HEAT shells at 500 meters and 115mm HEAT shells was crossed out. It is stated in the article "Anatomia pancerza Polski czołg PT-91 Twardy" by Jarosław Wolski that for the T-72M1, the addition of the 16mm appliqué armour plate provided a HEAT resistance equivalent to 500-550mm RHA. Below this velocity, eroding penetration does not occur, and the residual penetration efficiency against the steel back plate. The 80-105-20 armour design was developed by NII Stali research institute in the early 1960's, and work was completed in 1962. As such, large differences in the armour equivalence credited to the turret cannot be explained by differences in the angles of impact. The uniform coat of surface rust indicates that these are simply steel plates and not NERA panels. The two images below show another T-72B that was involved in an accident severe enough to rip off the idler mount, thus exposing the same part of the upper glacis armour. This method of steering is mechanically simple, but inferior to turning in place whereby both of the tracks is run at the desired speed while the other is run in the opposite direction. Further improvements to the tank's firing position can be done by hand with the pioneering tools carried on the tank (spades, picks). If necessary, the dozer blade can also be used to overcome anti-tank trenches by filling them in or creating a ramp. This may be the only option for regular tank units if the engineering company of a tank regiment is not available to support them for whatever reason, or if too much time would be wasted in waiting for support. The clutches are identified as (Φ) and brakes are identified as (Φ) and brakes are identified as (Φ). As a response, the "Reflection" R&D programme (OKP «Orpaæenue») was initiated. 1983. The superior target-finding capabilities of the hypothetical enemy granted by the widespread adoption of thermal imaging technology would also be negated if the tank were hull down, as the hot engine and running gear would be concealed below ground level while the turret may not be hot engine and foliage cloaks or even field expedient solutions like branches. In high gears (5th to 7th), the low controllability of the tank when using the full minimum-radius turn makes it much more effective to steer within the intermediate range. The downside to utilizing the precision steering feature is that it has a relatively low mechanical efficiency; when a clutch slips, the full sum of the torque arriving at the clutches is still delivered through the clutches even while they are slipping, but the full sum of power is not, due to the mismatch in speed between the engine and the drive sprocket (power is the product of torque and rotationanl speed). This is explained by the fact that a long rod penetrator exiting the back of a steel plate sloped at a high obliquity will be highly bent and deflected, so that a larger surface area interacts with the glass textolite, thus tearing a larger channel as it passes through and resulting in some local delamination. Cylinder head The EJ251 and EJ252 engines had an aluminium alloy cylinder head the by the hydraulic system with variable pressure, allowing variable torque capacities. The effectiveness of such clutches and brakes is proportional to their diameter; in this case, just over 600mm. This programme consisted of the "Reflection-2" research topic on a stopgap solution. Of course, the low velocity and brakes is proportional to their diameter; in this case, just over 600mm. This programme consisted of the "Reflection-2" research topic on a stopgap solution and the "Reflection-2" research topic on a stopgap solution. and arced trajectory will reduce the relative impact angle of the round if it is used at long range, but even so, it is clear that the combination of high obliquity and composite layering makes the upper glacis armour extremely resilient to HESH attack. Though it has a cutout for the driver's instrument panel, it has a voluminous capacity of 475 liters. It is interesting to note that at least one known Chinese armour simulator used to represents a T-72 threat assumed that the 20mm steel back plate was made from high hardness steel. A mechanic trained on T-64, simplifying logistics. Direct interchangeability was possible even though the 5TD series engines used in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM whereas the V-46 engine in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM whereas the V-46 engine in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the T-72 ran at a rated speed of 2,800 RPM, because the intermediate power transfer gearbox in the tra BKPs to 2,832 RPM - equal to the rated speed of the 5TDF. The low protective value of the skirts at a flat angle of attack is probably the reason for the sample function, and consequently, the back plate thickness was restricted to keep the weight of the armour under control which in turn resulted in a non-optimal array design against KE threats. The older L28A1 or M392A2 rounds had significantly worse performance on oblique armour and would certainly fail to defeat the lower glacis from 1 km or less. According to tests on homogeneous plates, the 3BM6 round can nominally defeat around 120mm of RHA sloped at 68 degrees at a velocity limit of 1,500 m/s, equal to around 320mm in LOS thickness. As an example, according to results obtained using the Lanz-Odermatt calculator, an ideal 105mm M111 APFSDS round has a perforation limit of 160mm RHA in LOS thickness) at an impact velocity of 1,359 m/s, corresponding to a range of 2 km. The bulk of the protection offered against shaped charge jet (SCJ) into a state where the STB reaches a high efficiency. Various definitions of a tank frontal arc are handily compiled in the drawing below, taken from the article "Elements of Tank Design" by Gerald A. Despite the large amount of kinetic energy that can be absorbed by a ductile back plate, its ability to pull its own weight within the armour array is inherently hamstrung by its low thickness. On page 137 of the book "T-72/T-90. It was also good compared to all foreign tanks of the 1970's, with the closest counterpart in terms of performance being the Leopard 1. Depending on the particular type used, an impact velocity of 1,400 m/s may correspond to a range of 1.5 km or up to 2.2 km, which means that the armour only provides protection against the unspecified 115mm APFSDS from these ranges. Against a long rod penetrator, the effective thickness of the 60-105-50 armour is not less than 360mm RHA (its own weight in terms of steel). The armour obliquity is 30 degrees in both examples. Wolski's numbers imply a mass efficiency coefficient of 0.85, which is somehow worse than the armour at 30 degrees. To defeat such a warhead, composite armour does not necessarily require a thick steel front plate. The chart also shows the close and uniform spacing between the 2nd, 3rd and 4th gears, where acceleration is highest. On the contrary, it was experimentally established that rubber track pads increased traction on concrete by 40%, and on dry soil by 7%. For comparison, the XM-1 reaches 32 km/h in 6.2 seconds. Interestingly enough, measuring the acceleration to 32 km/h makes for an informative comparison between the T-72 and the Leopard 1. The turret ring area is also just a homogeneous casting, and of a rather low thickness as well. fiberglass. Therefore, the thickness of the gun mantlet weakened zone of the T-72B must significantly higher, taking into consideration the reported distance limit of armour defeat (1.65 km instead of 2.0 km). The drawing below roughly illustrates the zones covered with Kontakt-1 on a T-72AV. According to the report "Propozycja Poprawy Manewrowości Czołgu Twardy" (Proposal to Improve Maneuverability of the "Twardy" Tank) from the University of Technology in Szczecin, the T-72M1 accelerates to 32 km/h in 10.5 seconds on a paved road whereas a "Leopard 2" apparently achieves this in 7 seconds on a paved road whereas a "Leopard 2" apparently achieves this in 9.5 seconds on a paved road whereas a "Leopard 2" apparently achieves this in 7 seconds and the M1A1 Abrams achieves this in 7 seconds. The armour protection of the lower glacis changed very little during the service life of the T-72. Based on the available evidence, this appears to have been a compromise to address the structural issues of the 80-140 composite armour. This part is significantly weaker, owing to the lack of reinforcement. From this, it is guaranteed that "Kvartz" will have a density of between 1.2 g/cc to 2.6 g/cc. For instance, the T-72B obr. When the angle of attack is increased to 55 degrees, the angle of incidence is still 77 degrees. Even if the obstacle does not provide enough resistance to stop an incoming projectile, the fact that it hides the lower glacis. The T-72 has proven its worth in various conflicts when placed under competent command, but the lack of media coverage on the successes does not help its case. The increase in the area of the silhouette of the turret has the effect of increasing the chance of receiving a hit on the turret. According to "Боевые Машины Уралвагонзавода: Танк Т-72", the resistance of the T-72A turret from a 30 degree side angle is equivalent to 410mm RHA against APFSDS rounds and 500mm against HEAT rounds. Together, the combination of a lower turret and hull gave the M1 a smaller overall projected area compared to the M60A1. In 1976, the armour was revised and thickened. The chart also shows that there is a steep drop off when shifting from the 1st to the 2nd gear even when the curve is extrapolated out to 2,300 RPM, so a smooth transition is not possible at all. If a higher speed is desired, the driver has to increase fuel flow to the engine with the accelerator pedal to overcome the speed reduction and maintain the same vehicle speed as before entering the turn. It is important to consider the fact that certain nose shapes perform better on semi-infinite plate at high obliquity and certain nose shapes perform worse. For example, if a hypothetical two-layer spaced armour target is guaranteed to be perforated by a long rod penetrator, adding another 20mm of physical thickness to the back plate will prevent a guaranteed penetration and instead leave the armour vulnerable only to nominal defeat. According to "Boзможная Koмпоновочная Cxeмa Taнкa" ("Possible Tank Layout Scheme") by S.A. Gusev, the gun mask of the T-72B is only rated to stop 12.7mm B-32 armour piercing rounds from a distance of 100 meters. For the sake of accuracy, it is necessary to look at the empty weights of the tanks. With an effective thickness of ~330mm, the ME coefficient of the armour is 1.0 for the 80-105-20 array. In field conditions, the crane would normally be provided by a TRM-A-70 or TRM-A-80 mobile workshop based on the ZIL-131 truck with a crane capacity of 1.5 tons. A very popularity of 1.5 tons. theory is that the ammunition came on board a captured Israeli Magach 4 tank, which was until recently on display in Kubinka. Having captured M111 "Hetz" rounds in sufficient quantity for live fire testing, it was discovered by Soviet specialists that the upper glacis of the T-72 was vulnerable. Only the information on the size of the protected frontal arc may be inaccurate. Long rod penetrators are generally capable of penetrators are generally capable of penetrators are susceptible to fracturing and deforming after perforating oblique armour plates, especially at very high angles. As such, the hardening of 42 SM steel to 340 BHN was not practiced. The explosion may also damage other parts of the tank (periscopes, sights) and render it incapable of normal operation, thus knocking out the tank without actually defeating its armour. This was the cost of ensuring that the block was installed at the optimum 68-degree angle. This not only reduces the load on the horizontal turret stabilization system when the tank is in motion over rough terrain, but a balanced turret also generates a more stable load on the stabilizer, making it easier to implement faster and more precise turret rotation angles. An effective thickness of 490-500mm RHA is only a modest improvement over the previous composite armour design, but it was already enough to resist the 120mm DM12 and M830 HEAT rounds (480mm RHA penetration) used in the future Leopard 2 (1979) and M1A1 Abrams (1985) in addition to the existing 105mm HEAT rounds. Both camshafts were driven by a single belt which had round profile teeth for quiet operation and was constructed of wear-resistant double canvas and heat resistant rubber materials with a wire core. For the EJ251 and EJ252 engines, the four valves per cylinder were actuated by shim-less type buckets (i.e. one-piece, solid valve lifters). The main difference lies in the ability of a tank to withstand direct hits on its armour and its ability to minimize the damage inflicted on the inhabitants of the tank as well as the internal equipment in case the armour fails. In this case, the two turrets are directly equivalent as there are no differences in the cannon mount. All of them are provided with watertight covers integral to the OPVT kit to seal the engine compartment during snorkelling operations. Fording a 1.8 meter-deep

river can be done with the turret hatches open, although water may splash into the turret as the tank is only 2.23 meters tall. The three shock absorbers on each side of the T-72 suspension are additional non-linear elements that modify the linearity of the suspension system. The physical thickness of the armour array was 215mm, equal to the 60-105 50 design that came later, but the additional two degrees of slope gave it a greater LOS thickness of 629mm. This is mostly avoided in the M1 Abrams, but not entirely. This is fundamentally true for any long rod penetrator, depending on its material density. None of these tanks had reactive armour installed. However, even though the T-72 used many technologies inherited from the Object 167M, its hull was ultimately derived from the T-64A which also used the 80-105-20 upper glacis armour. The overall array is 60-10-10-20-20-50. On page 140 of the book "T-72/T-90. If the ERA weight is taken into account as part of the tank, then the T-72B has an armour weight proportion of 58.47% when combat loaded. Defensively, the low turret made it hard to detect and even harder to hit, and the armour protection of the turret could also be enhanced if the tank is on a reverse slope. Kheifits, a leading specialist in the Department of Armour at UKBTM who was appointed to the State Commission for testing the T-72B tank, describes the live fire tests against mock ups of the T-72B upper glacis and other experimental armour designs developed by the UKBTM design bureau that took place at the proving grounds of the Main Missile and Artillery Directorate (GRAU) in Donguz (in the Southern Urals). The slope of the monolithic steel turret of a former NVAoperated T-72M is 27 degrees from the vertical axis, as measured just behind the IR spotlight. The turret of tanks like the M1 Abrams or Leopard 2. The area directly next to the machine gun port is already 475mm thick, and from there, the turret only gets thicker, so even the weakest part of the turret can survive a hit from 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be largely invulnerable to any 105mm M392A2 APDS from 500 meters or less and the rest is thick enough to be lar HEAT threats compared to the spaced steel armour of the T-72B, but it is also known that early NERA designs were largely ineffective against KE threats. The findings reported by Zooks also reaffirms that tungsten alloy rods with short frustum, hemispherical, and blunt noses performed worse than a conical nose rod on a perpendicular impact but better on an oblique impact. According to page 159 of "Боевые Машины Уралвагонзавода: Танк Т-72" published by the Uralvagonzavod Production Association, the LOS thickness of the turret at a 30-degree side angle is 410mm. The small rib closest to the periscope was eliminated so that it did not increase the size of the dead zone in front of the tank by obstructing the driver's downward view, which would occur due to the periscope window. Given that only the armour itself will be evaluated, the primary metric for rating the effectiveness of the armour is its ability to resist initial perforation by a specific penetrator. The gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the base of the barrel which are designed for securing a plastic gun mask has a ring of screws around the barrel which are designed for securing a plastic gun mask has a ring of screws around the barrel which are designed for securing a plastic gun mask has a ring of screws around the barrel which are designed for securing a plastic gun mask has a ring of screws around the barrel which are designed for securing a plastic gun mask has a ring of screws around the barrel which are designed for securing a plastic gun mask has a ring of screws around the barrel which are designed for securing a plastic gun mask has a ring of screws around the barrel which are desi lever, the tank will enter a turn with a radius of 10.23 meters with minimal delay. This specific range is important, as it was a requirement that the armour should stop 105mm subcaliber rounds at 500 meters. The maximum power loss to the transmission in a T-72 at peak engine power is 70 hp, compared to an estimated 200-250 hp in a Leopard 2. Interestingly, the drawings at the bottom of the poster credit the T-72M1 hull with 500mm RHA of effective thickness in protection against shaped charges in a 44-degree frontal arc, while the turret has the same effective thickness but in a 70-degree frontal arc. All tracked tanks are equally vulnerable (more or less) to the loss of its tracks from enemy anti-tank fire, and all tanks are generally equally vulnerable (more or less) to the loss of their smoke grenade launchers; for example, the Chieftain, Challenger 1 and Challenger 2 all have their smoke grenade launchers; for example, the chieftain, Challenger 1 and Challenger 1 and Challenger 2 all have their smoke grenade launchers; for example, the chieftain, Challenger 1 and Challenge cheeks, and a large number of IFVs have their smoke grenades installed on the front of the turret. For example, while the actual area of the weakened zone on the T-72B against 125mm BM-26 APFSDS is 0.12 sq.m. This area is 5.7% of the total area of the front hull. This was a much more challenging threat. This is also a noticeably higher level of protection than the side turret armour of the Abrams series from the M1A2, as that only offers an effective thickness of 380mm RHA against an 81mm shaped charge warhead from a 45-degree side angle. Gear Turn Radius (meters) 1 and the M1A2, as that only offers an effective thickness of 380mm RHA against an 81mm shaped charge warhead from a 45-degree side angle. 2.79 2 6.04 3 13.42 4 13.93 5 10.23 6 10.1 7 8.76 R 2.79 It can be seen that the turn radius begins to tighten in 5th gear, which is counter-productive. The 68-degree obliquity of the upper glacis armour is beneficial when dealing with APDS rounds as even the most advanced models still had significantly degraded performance at higher angles of impact. Based on its performance on sloped monolithic RHA targets, L52A2 has a somewhat larger perforation margin than L28A1, but still insufficient to overcome the 20mm steel back plate even at its muzzle velocity of 1,426 m/s. The majority of interest lies in how the armour interacts with the two major threats - KE attack and HEAT attack. Logically, it can be concluded that the 60-105-50 armour would therefore have a much higher effective thickness against 3BM15 compared to 105mm DM13. Almost all of these turrets were modified from existing turrets. A layout with angled plates similar to Kontakt-1 is also possible, but not very likely. Because of its favourable design and high muzzle velocity of 1,640 m/s, it is plainly evident that the 16-60-105-50 armour array should be insufficient against this threat even from 3 km, as DM23 still retains a velocity of 1,475 m/s at this distance. For comparison, the 70-105-40 upper glacis armour of the Object 172-2M may have a effective thickness equal to its weight of 394mm RHA, which is only marginally greater than the 60-105-50 armour. It has a specified hardness range of 477-555 BHN, and it reaches a hardness of 534 BHN when processed into the thin plates. As such, the 105mm DM13 round can be used as a technological surrogate for the 120mm DM13 round. Based on this document fragment shared in this Tankarchives post, it appears that HESH shells are most effective at an impact angle of 45 degrees but drop off sharply down to 0mm of penetration at 70 degrees. It was concluded that the greatest reduction in the probability of armour defeat could be achieved with the elimination of the gun mantlet weakened zone. The low thickness of the filler in the T-72A turret indicates that it has relatively low mass efficiency (ME) but relatively high thickness of the bade itself allows it to resist deformation and thus fulfill its function even when impacted by HESH shells of a large caliber, as tests on Conqueror tanks have shown that thinner 14mm spaced plates ("burster plates") were effective at defeating 183mm HESH shells and Malkara missiles (HESH warhead). downward to 600 meters, and from this, it can be rationalized that the 80mm RHA front plate of the 80-105-20 array cannot stop L28A1 on its own at 500 meters. The T-72 can only perform a pivot turn, that is, turn by locking one of the two tracks in place while the other drives the tank around it. The plates are oilcooled by a forced lubrication system, which lubricates and removes the heat generated by friction in both the multi-plate clutches and multi-disc brakes. To summarize, the T-72 was not just a capable offensive tool but also quite formidable when used defensively. When the turret is turned to the side such as shown in the drawing below, the area of the silhouette of the turnet (dark grey) is the same as the area of the silhouette of the turnet when it is facing straight forward (light grey). The all-steel turnet was closely based on the turnet of the turnet when it is facing straight forward (light grey). almost-flat rear armour and the heavily sloped roof to house the AZ autoloader ammunition lifter and rammer mechanisms. The front end of each stud is welded to the 20mm back plate, and the rear end is welded to the 20mm back plate. itself and the uniform weight distribution on the roadwheels, and indeed, the tank is designed so that the distribution is most uniform when the turret is facing forwards. Moiseev and V. Based on this information, the "Relikt" side skirt armour on the T-72B3 should offer an effective thickness in excess of 1,000mm RHA against shaped charges in a 44degree frontal arc. There are 48 blocks mounted on the side skirts on each side of the hull, 70 blocks on the frontal arc and the roof of the turret, and 61 blocks on the drawing below, which shows the driver's hatch mechanism. Another 495 of the tracks. When processed into 80mm plates for the thickest sections of 42 SM plates is moderately high for a medium hardness steel. To achieve initial perforation, it should be necessary to strike the armour at a range of less than 2,000 meters. In most cases, the rebreather is worn inside the tank when the commander gives the order to bail out of the tank while the tank when the commander gives the order to bail out of the tank when the commander gives the tank when the commander gives the tank when tank whereas the nominally larger lower glacis weakened zone is comparatively less likely to be hit. This keeps the internal fuel tanks from being filled with air, so that the chances of an internal fire or explosion are minimized. Rather, it is much more likely that at a range of 2 km, M111 may only achieve nominal defeat against the armour array by inflicting structural back plate damage. The effect of the "Kvartz" filling on long rod penetrators is less clear, but the low density of the sintered compound compared to ceramics like alumina and silicon carbide is not encouraging. The hull belly of the T-72 is only sufficient against explosive charges with a mass of less than 10 kg detonated over the tracks and not directly under the hull. With the standard 275-l drums, a range of 730 km is possible. Each roller weighs 31 kg. Cross drive, but the turn radii was considered to range from pivot (neutral steering mechanism and lack a hydrostatic steering mechanism and lack a hydrostatic steering drive, but the turn radii was considered to range from pivot (neutral steer) to infinity, despite the fixed gearing ratio between the main drive and the steering drive. As such, it is fundamentally meaningless to compare the thickness limit of nominal defeat with thickness li serious upgrade in armour protection was already underway, thanks to prior intelligence on West German plans to install a 120mm gun on the new Leopard 2 tank. The system has different reactions depending on the rate of dosage of radiation. The areal density of the armour array is 2,616 kg/sq.m, and its weight is equivalent to 333mm of steel. Achieving nominal defeat requires significantly less kinetic energy than achieving initial perforation. The properties of the upper glacis. The presence of stowage bins made it difficult to achieve reliable penetration with such small caliber grenades, particularly when they were fully packed with spare parts and equipment, but it was not a comprehensive remedy. The LOS thickness of the side armour is therefore 118mm when viewed perpendicularly. This shape could not have been implemented effectively without restricting the turret crew to two men, and in turn, a combat effective two-man turret design could not have been implemented without an autoloader. It is worth noting that the dozer blade is not simply laid on top of the hull roof above the driver's compartment were the main factors that necessitated a cutout in the armour to accommodate the driver's head and his periscope, leading to the creation of this weakened zone, but this also meant that from above, the relative obliquity is only 22 degrees, so the LOS thickness of armour does not exceed 221mm, but to a submunition with an EFP warhead or a small shaped charge, this is a considerable level of protection. A significant thickness of composite armour exists even at the area where the armour is joined to the hull roof. This can be seen in torque-speed chart below, which shows the torque curves of the V-46 in each gear of the transmission at an engine speed of 1,000-2,000 RPM against vehicle speed. If the HESH round detonates, the high blast attenuation offered by composite armour would be beneficial to the survival of the crew. The driver activates the system while the tank is in motion by pressing and holding the brake button on the end of the left steering lever, shown in the image on the right below. As such, they function purely as support rollers, and do not assist in retaining the track. The Rh105 smoothbore gun was tested in Sweden with DM13 ammunition for evaluation purposes, and thanks the "From the Swedish archives" blog, the test data is available to the public. The high power losses suffered by the Leopard 2 are due to the low efficiency of hydrostatic double differential transmissions, particularly when steering. With a power of a T-72 is 620 hp. Paul-Werner Krapke states in "Leopard 2: Sein Werden und seine Leistung" that the Leopard 1 accelerates to 32 km/h in 10 seconds on a paved street. Additionally, according to Soviet tests and data sheets from various U.S sources, the M60A1 with the T97E2 track reaches 32 km/h in 15 seconds and reaches 40 km/h in 25 seconds. In this specific test (with an unknown impact velocity), only the last 120mm of the 436mm total length of the penetrator survived the interaction. The result is 8.76 meters. At the same time, various armour designs developed by the LKZ design bureau were also being tested at the same proving grounds, including a mock up of the T-80BV upper glacis. The tests were carried out with the 125mm 3BM-32 "Vant" monobloc DU long rod APFSDS ammunition, which was the newest ammunition of its type available in the Soviet Army in 1985. Work on the "Reflection-2" research topic concluded before the end of 1982. It is unclear how closely this Polish recipe for "Kvartz" matches the original Soviet type, and it may depend on how much technology transfer was needed to prepare for Polish production of T-72M1 turrets using local manufacturing facilities and equipment. Aside from the T-72 was equipped with the 902A "Tucha" smoke grenade system, the T-72 was equipped with the 902A "Tucha" smoke grenade system beginning with the 902A "Tucha" smoke grenade system beginning with the 7-72 was equipped with the 902A "Tucha" smoke grenade system beginning with the 7-72 was equipped with the 902A "Tucha" smoke grenade system beginning with the 902A smoke grenade system beginning gearbox weighs 710 kg, the right gearbox weighs 320 kg. The intermediate power transfer gearbox is shown below. In total, the effective thickness is 185mm RHA sloped at 60 degrees under the initial perforation standard. Tumasov (head of the Department of Armour in UKBTM) writes that since the T-72 began mass production in 1974, the redesigned hull armour was among one of the first major measures taken to modernize the tank. The cooling fan itself is barely protected from ballistic attack, but does not need to be, since there is no coolant to leak and it may still function with minor damage. It does not contact the gun barrel and does not interfere with the harmonics of the barrel, nor does it have any effect on the dynamics of the recoil stroke of the cannon. The thickness of the glass textolite interlayer is slightly thinner and the composition used is not exactly identical. At the front of the turret, the cast steel gun mask can be considered a common feature of all T-72 variants, although this is not true in the strictest sense as the gun mask is different depending on the model of cannon mounted in the tank. Quite interestingly, it appears that the high obliquity of the upper glacis also helps reduce the effectiveness of HESH (High-Explosive Squash Head) or HEP (High Explosive Plastic) rounds. However, it is important to note that a direct comparison of combat weights between T-72 models will not provide a completely accurate reflection of the weakened zones would therefore be much lower. The six screens at the back are split into a top half and a bottom half with three screens each, and the mounting frame is designed so that either half can be folded over the other half. As noted with the hull array, the composite nature of the T-72A's turret should also give it an added damping effect against high explosives and high e the radiation. As for the turret, the weakened zones are more numerous than the hull on account of the complex cast construction, although it is clear that the design of the turret can still be considered good. The side armour of the hull is more than enough to withstand 20mm armour-piercing ammunition fired from various aircraft as well as 20mm and 25mm APDS rounds from autocannons. For these tanks, the inclusion of a large bustle containing ammunition or other equipment was a convenient counterweight to the geometric center of the turret ring. However, even though the 16-60-105-50 armour offers guaranteed protection from M111 and should still be quite adequate against M774, by 1983, the U.S Army began issuing the new M833 round. The thickness of the filler is 146mm. They are often removed when not needed during peacetime so that the driver is not obstructed when his head is out of the hatch while driving. The presence of Kontakt-1 on this part of the turret, although small gaps still exist between the Kontakt-1 blocks on the T-72B turret. The mass efficiency of the array may possibly increase due to the added thickness of the heavy front plate but it is too complex to quantify the changes, not least because the mechanical properties of the plate material must be known. According to an anecdote by a pro-rebel volunteer fighting named "Kurt", the arrangement of ERA blocks on skirts of a T-72 B. Larkum). Due to the immense speed of gamma rays (very close to speed of light) and the quick reaction of the system, the tank will have reacted quick enough to be protected by the time the blast wave from the nuclear explosion arrives. At the constructional 68-degree angle of the upper glacis, the physical LOS thickness of steel in the array is 454mm. The areal density is 3,562 kg/sq.m. From its areal density alone, the armour of the Leopard 2 (~3,500 kg/sq.m), but the actual effective armour value requires the mass efficiency to be known. Blunt noses are the most popular as they offer the best performance on highly oblique plates with only slightly reduced performance on perpendicular plates, which is largely irrelevant for modern tank armour design anyway. To defend against the latest 105mm APFSDS ammunition and the emerging 120mm gun threat, a completely redesigned armour array was required. Shot No. 60, which had a muzzle velocity of 1,500 m/s and impacted the hull side at an angle of 68 degrees, only managed to produce a cracked bulge. The spaced 50-175-100 armour has an effective thickness equivalent to 165mm RHA sloped at 60 degrees under the nominal defeat standard. Each skirt segment is attached to the hull sponsons by a pair of hinges, as seen in the photo on the left below. Both drawings show that the turret cheek has a thickness of around 510mm at the edge where it joins with the manule tracing seems to indicate that the weakened zone is 410mm thick as determined from the blueprint tracing seems to indicate that the weakened zone is 410mm thick as determined from the blueprint tracing seems to the blueprint tracing seems to indicate that the weakened zone is 410mm thick as determined from the blueprint tracing seems to the blueprint tracing seems to indicate that the weakened zone is 410mm thick as determined from the blueprint tracing seems to the rod. The engine speed itself does not fall, because the governor can increase the fuel supply to compensate for the increase in the engine. The 68 degree slope of the T-72 upper glacis exceeds this in excess. Using the compound angle table on page 47 of WWII Ballistics: Armor and Gunnery, we find that a 60 degree vertical slope and 20 degree horizontal slope creates a compound angle of 62 degrees. Type "R": When the tank is exposed to a dose rate of 0.85 Rads/h and above, the response time of the system does not exceed 10 seconds. With the exception of the absence of special mounting frames on the turret cheeks, the method of mounting the Kontakt-1 blocks on the T-72A. The low number of hits recorded on the lower parts of tank hulls have been independently verified by multiple sources, as discussed previously in this article in the section on the autoloader of the T-72. The fog does not mask the tank from infrared searchlights like the AN/VSS-1 and AN/VSS-3A, which operate in the 785-1000 nm range, but it is possible to create denser smoke by driving the tank at a higher speeds to increase the fuel consumption rate by 10 times. This was demonstrated by a well-known T-72M1 turret test target in the Parola Tank Museum, located at Parola, Finland. The Challenger 1 had a hydrogas (hydropneumatic) suspension that offered an overall travel at a nominal temperature of 20°C. In terms of ease of accessibility such as routine maintenance (such as lubrication, as shown below) or the replacement of damaged wheels, the design of the roadwheels and idler wheels of the T-72 is not different than any other type. Track tension was adjusted in a manner that is familiar to most tankers; a large wrench (the "tanker bar") is fitted onto the protruding nut of a worm gear in the idler wheel housing, marked in the photo below with a white arrow. The nut is then twisted to turn the worm gear inside the housing which rotates the idler wheel around its axle, thus shifting it forwards or backwards. However, the T-72 generally falls short of the Leopard 1 in terms of steering precision, as its 4HP 250 double differential transmission provides two turn radii per gear, giving the tank a total 8 turn radii as opposed to the 7 radii available on the T-72. For the sake of convenience, such turrets are hereby referred to by the code 073SB. The hydraulic servo units on top of the gearboxes are used to actuate the clutches. The total volume occupied by the transmission assembly is 0.43 cubic meters and the volume occupied by each individual gearbox is 0.09 cubic meters. Tanks like the T-64B and T-80B used externally-stowed auxiliary equipment as counterweights with limited success. Against the Chieftain, Leopard 1 and M60A1, the T-72 Ural and T-72A fared slightly better in this respect, but the T-72B was neither better nor worse than its more modern rivals like the Leopard 2, Challenger 1, M60A3 and the M1 Abrams. As such, despite being slightly taller than the Strv 103, the T-72 manages to still present a comparatively smaller frontal projection if both tanks are travelling over open ground. The T-72M1 export models Object 172M-1-E5 (Warsaw Pact members) and Object 172M-1-E6 (3rd world countries), both cleared for export in 1983, directly corresponded with the T-72A obr. IP-5 To cross water obstacles deeper than 1.8 meters, the snorkel included in the OPVT kit is needed to supply air to the engine as the entire tank would be submerged. Откровенный разговор о проблемах танкостроения" (Main Battle Tanks of Russia. Besides these weakened zones, the mounting points for the roadwheels and track support rollers can be considered reinforced zones. The same is true even at an impact velocity far exceeding the muzzle velocity far exceeding the steel front plate and the glass textolite interlayer, the residual penetrator gains a tumbling trajectory and it has become extremely deformed - more so than 3BM6. The best solution was found on the IS-3, T-10, Chieftain, Leopard 1 and M46 Patton. As the thickness figures show, the thickness figures show, the thickness figures show a tumbling trajectory and it has become extremely deformed - more so than 3BM6. The best solution was found on the IS-3, T-10, Chieftain, Leopard 1 and M46 Patton. walls is 2.7 to 1. The protection qualities of the frontal armour depend greatly on the specific model, but there are many characteristics that were shared across all models. Because the MD target has the same areal density as the MS target and differs only in the inclusion of an air gap, it is clear that simple double-layered oblique spaced armour has a positive mass coefficient against this APFSDS penetrator design. It is stated in the book "Боевые Машины Уралвагонзавода: Танк T-72" published by the Uralvagonzavod Production Association, that when using petrol (A-72), the driving range is reduced by 20%. The fuel consumption of a T-72 Ural is 2.4 l/km when driving on paved roads, higher than the T-64A with the less powerful 5TDF engine; a fuel consumption of only 2.0 l/km was recorded during the same tests. The nature of the performance of M833. These parts of the hull are most likely constructed from the same steels used in the T-54 and T-62: 49 S grade steel for rear armour plate and the hull roof, 43 PSM grade steel for the floor. In a recent correspondence with Mr. Wolski, he revealed that the "Kvartz" substance is prepared using guartz sand. On deforming terrain, the track redistributes a significant proportion of the load between partly due to the terrain conforming to the circumference of the roadwheels and partly via track tension. Due to this, when compared to the nominal ground pressure (dashed line), the MMP is only somewhat larger. For a given amount of space between roadwheels, track tension and track pitch, increasing the diameter of the roadwheels can reduce the MMP. To fully understand the magnitude of this figure, it is necessary to take a better look at the total area of the frontal hull: The projected area of the frontal hull: The projected area of the frontal hull: The projected area of the front hull is 2.08 meters according to "Bosmoжная Cxema Taнкa" ("Possible Tank Layout Schemes") by S.A. Gusev. The light prerequisites for the production of this type of armour was probably an attractive feature for client states during the Cold War, so it is no surprise that so many second and third-world nations produced the T-72M1 under licence. The side edges of the plate were bent upward at a 30 degree angle to join with the side hull plate, thus forming a tub shape. The DM13 round available in 1979 did not have a monobloc penetrator like M111, but it was still a challenge to resist. The size of the turret was also kept to an absolute minimum in order to reduce the probability of receiving a hit, and the teardrop shape of the turret was also kept to an absolute minimum in order to reduce the probability of receiving a hit, and the teardrop shape of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was also kept to an absolute minimum in order to reduce the probability of receiving a hit, and the teardrop shape of the turret was designed such that the area of the turret was designed such that the area of the turret was also kept to an absolute minimum in order to reduce the probability of receiving a hit, and the teardrop shape of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the area of the turret was designed such that the turret was designed such that the area of the turret was designed such that the turret was designed such information, the effective thickness of turret does not fall below 410mm against KE threats in a 60 degree frontal arc. It is difficult to determine if the cast steel in this application, because of the colossal thicknesses involved. If the batteries at the front of the tank were hit by a frontal armour perforation, the tank may not necessarily lose electrical power as the generator in the engine compartment is still intact. As a side note, the POlish study also includes figures for the PT-91 "Twardy" which weighs 45.3 tons and has a modern Polish S-12U engine with a power output of 850 hp. Indeed, the 16mm plate was not only intended to immunize the tank from the new 105mm threat, but also to limit the effective range of the 120mm gun threat. The poster was taken from the private website of Russian military historian A.V Karpenko. Only a single operation requires 3 men, and only the replacement of the engine requires 4 men. The first wheel on each side of the hull is reinforced with an additional roller bearing. The T-72 Ural used the 172.50.002sb-A wheel, an 8-spoked design weighing 164.15 kg. The total weight of the Kontakt-1 kit is 1,010 kg. For our calculation, the Soviet 3UBR6 steel 30mm AP-T round is used as the reference penetrator. Fused silica armour utilizes a phenomenon described as "elastic rebound" to defeat shaped charge jets and KE projectiles alike which is only possible due to the physical properties of glass. A semi-infinite thickness armour block effectively prevents any back surface failure by its nature, and hence, it is impossible for a nominal defeat to be achieved. It is probably more than 470mm because the perspective of the photo may not allow an accurate reading from the tape rule because of parallax, and parallax from this perspective creates a bias towards a lower reading. From this, it is possible to estimate the empty weights of all three primary T-72 models. The belly plate is a large stamped piece of steel, bent into a tub shape and welded to the upper side armour. 1989 both weighed 44.5 tons, but the sprocket P:W ratio actually increased marginally to 15.22 hp/ton due to the 840 hp engine. The addition of this pneumatic brakes was an exceptionally modern feature at the time. The other 0.23 sq.m is presumably the area where the upper and lower glacis overlap. Externally, there seems to be no identification aid that can be used to distinguish this armour. Gliwice City 1993") on casting technology, 75-85% of the content of the "Kvartz" ceramic blocks. used in the turrets of Polish T-72M1 tanks in terms of mass was a material known as "Casting Material Sz01-III", which is a compound made from 70% quartz sand and 30% aluminum oxide are made of aluminium and not particularly thick, so this was not a true remedy but merely an unintended bonus. It provided full immunity from any 84mm HEAT grenades fired from the UKBTM design bureau of the Uralvagonzavod factory designed the Object 172 prototype using the T-64A as the foundation of their new tank, one of the modifications made was to replace the compact 5TDF opposed piston engine with the V-46 V-shaped 12-cylinder engine developed by the Chelyabinsk tractor plant (ChTZ). On a technological level, the composite steel APFSDS ammunition available in the USSR during the early 1970's is noticeably inferior to 105mm DM13 and 120mm DM13 composite tungsten alloy APFSDS when fired against similar two-layer spaced RHA targets. It has a density of 0.84 kg/liter and has a flash point of 40°C. In arctic conditions where the ambient temperature is -50°C and above, the DA grade "arctic" diesel fuel is used. Due to the length constraints imposed by Blogger, the original T-72 article was split into two parts. The study used data from live fire tests with 115mm APFSDS rounds with a long rod steel back plate has a thickness of less than 35-40mm, its mass efficiency was less than 1.0. This was because a thin plate offers significantly less resistance than its thickness implies, and significant deflection of the back plate would also be observed even in the case of a failure to perforate it owing to the lower rigidity of thinner plates. It is without a doubt that the sides of the tank were only sufficient for a very limited period of the service life of the T-72. Due to the sheer abundance of guartz sand or silica sand in the commercial market, acquiring the raw ingredients for the "Kvartz" insert will not strain the budget, and the production process itself is fairly straightforward for any country with a modest metalworking industry. However, many modern tanks now include separated ammunition storage which is something the T-72 lacks and has proven to be an issue in certain circumstances. These internal fuel tanks are made from stamped sheet steel with a bakelite coating. Needless to say, the further the distance, the greater the danger of the operation. A good indication of a tank's true survivability is its resistance to catastrophic destruction. which can refer to the tendency for a fire to start and the likelihood of that fire spreading and consuming the entire vehicle or the possibility of the ammunition exploding or the death of too many crew members for the tank to continue fighting. Armour-grade glass textolite such as the type used in the T-72 is known generically as STB. The spaced steel armour array shown below, taken from the research paper "Pancerze Pasywne" (Passive Armour), shows the penetration channel of a densely packed spaced plate array that exhibits the "lip" effect. There are three support rollers on each side, each having a single tyre on the inner side of the track center guides. Under normal conditions, the pressure in the pneumatic system should be no less than 7.4 MPa to ensure that pneumatic starting of the engine is possible, so the pneumatic starting of the should always be ready to use, and the presence of the AK-150SV air compressor allows the brake to be used in perpetuity. Before releasing the brake to be used in perpetuity. pedal, which will be depressed. However, the three next-generation NATO tanks all surpassed the T-72 in ride quality. Installation of the rack pads are rubber-lined so that the rubber rims of the roadwheels roll on a rubber surface rather than a metal one. However, the 115mm BK-4M HEAT shell with a copper liner easily overmatches 450mm of RHA equivalent armour as it has a penetration power far exceeding 500mm RHA. Prior to the Object 167M, the upper glacis armour of its parent design the Object 167 was a 100mm RHA plate sloped at 60 degrees, practically identical to that of the T-62 and T-54 preceding it. T-72 Ural (Object 172M-1) - combat weight of 41 tons and an empty weight of 39.0 tons. The thin back plate of the sandwich was removed. Halbert published in the November-December 1983 issue of the ARMOR magazine. On the most recent T-72 model, the T-72B3 UBKh, the gross P:W ratio is not known because the losses have not been disclosed. It is also stated on page 12 of the May-June 1977 issue of "ARMOR" magazine that the M60A3 reaches 32 km/h in 16 seconds, presumably also with T97E2 tracks. As it is not inhabited by the crew, the engine access panel is 20mm thick and is supplemented by a stamped steel radiator cover. Here is a video (link) demonstrating a tank unditching itself using the log. According to a well known CIA analysis of a diagram from a captured Soviet T-72 manual, the thickness of the turret at the mantlet area is 350mm. As mentioned before, the side of the turret has a physical thickness of around 80mm near the base and the curvature of the turret sides provide a minor increase in line-of-sight thickness to around 88mm when viewed perpendicularly. Photograph taken from page 290 and 291 of "Частные Вопросы Конечной Баллистики" (Particular Questions of Terminal Ballistics) published by Bauman Moscow State Technical University on behalf of NII Stali. Considering that the area of the upper glacis is approximately 1.48 sq.m and the area of the lower glacis is approximately 0.6 sq.m, the driver's periscope weakened zone seems extremely small, especially when compared to the much larger lower glacis weakened zone on the front of the total hull area), but again, it must be noted that the location of the driver's periscope at the center of mass of the tank makes it much more vulnerable than its relative size implies. Also note the centrifugal fan at the bottom left corner. An armour configuration consisting of a high hardness steel plate on top of an RHA plate at high obliquity is more effective than a solid RHA plate at high obliquity is more effective than a solid rest. Moreover, the table does not mention that the planetary gear engaged in neutral is the IV gear. Normally, the tank is started on the 2nd gear unless the ground is particularly soft, in which case the tank starts on the 1st gear. The gun mask has a width of 390mm. Both the ERA blocks on the hull and turret are most likely capable of defeating tandem HEAT warheads. The crew would have to remove the radiator pack and the roof of the engine compartment, remove the cooling fan, disconnect the oil pipes, disconnect the control rods and disengage the clutches of the gearbox drives from the power transfer case and planetary steering unit. In the U.S, the XM579E4 round with a tungsten alloy penetrator was used to simulate a future Soviet 115mm gun threat, which was the reference threat for the KE protection requirement for the M1 Abrams. On T-72 models featuring a 16mm appliqué armour plate as seen in the photo below. It is a live track. As there is no discrete transition from the frontal cheek armour to the sake of simplicity, the average thickness are simply defined as the region of the turret sides are simply defined as the region of the turret sides are simply defined as the region of the turret. of 537mm will be taken. However, the ubiquitous MILAN missile system which entered service in several major NATO armies in 1972 could guarantee the defeat of the 80-105-20 armour array, having a penetration power of 530mm RHA. It is possible to determine the increase in armour weight of each tank model with only a small margin of error by referring to the increase in the overall weight. One of the easiest ways to do so would be to simply de-track the tank, but the tank can still fight albeit from a compromised position. The back plate of the 60-105-50 array is therefore at the lower boundary of the optimum range of thicknesses, but nevertheless, it can be considered to be within the optimum range. However, because the bore diameter of the pneumatic cylinder is relatively small compared to truck brakes for the sake of compactness, a high braking force is obtained from a relatively low actuator force by having a longer piston stroke to produce more work, which goes through the input cam (9) in the reduction mechanism, shown in the image on the left below, to reduce the linkage displacement and thus amplify the actuator force. Indeed, it has been described in some Soviet engineering studies as an anti-shaped charge filler. The T-72 Ural (Object 172M), which entered service in 1973 and began mass production in 1974, inherited the hull uppe glacis armour of the T-64A obr. The merits of various turret ring protection methods are examined in the study "Некоторые Вопросы Проектирования Защиты Стыка Корпуса И Башни" by O.I Alekseev et al. According to first hand accounts on the performance of ex-East German T-72M1s during Canadian testing, found here, new experimental 105mm shells, presumably designed in the late 1980's, claimed to be "jazzed up" to match 120mm rounds in performance, failed to perforate the turret armour. The axle socket of the T-72 wheel, and in fact, the wheels of the T-72 share the same internal axle sleeve (54.12.022-2A) as T-54 wheels which ensures cross-compatibility. The old ammeter gauge display could not give an accurate reading if the tank was moving because the vibrations caused the indicator needle to jump around. Without an air return line, a fire in the fuel tanks will extinguish itself rapidly as it consumes the limited volume of oxygen available. It is also possible for the driver to shut off all internal fuel tanks, and rely on external fuel only if the situation allows it. As a rule, return rollers increase the rolling resistance of a supported track layout provided the roadwheels with much a larger range of dynamic motion, which was presumably too large for the wheels with much a larger range of a support of a suppor to accommodate unsupported tracks. Other rounds with the same penetration power on a homogeneous RHA block may fail against the same composite armour array or perforate it at lower velocities. According to Chinese research on a replica of Kontakt-1, it was found that at an impact angle of 45 degrees, the penetration depth of a shaped charge is reduced by 60% and at an impact angle of 68 degrees, it is reduced by 90%. The size of the void does not change (0.145 sq.m), but the relative weakness of the driver's periscope area depends greatly on the specific round fired at the tank as well as the specific model of the tank. The Leopard 2 had a conventional driver's seat and a taller hull, so the turrets of all models of the Leopard 2 (excluding the latest models with additional roof armour) could afford to have a reduced height of 830mm, less than the Abrams. Once removed from their mounts, the BKPs can be readily disassembled. According to technical reports from Sverdlovsk and Nizhny Tagil published in 1973-1974, the manufacture of the transmission of the T-72 requires 721 man-hours. The gearboxes are each comprised of five planetary gear sets connected to two clutches, or brakes. The difference between the Soviet figure and the Lanz-Odermatt figure and the Lanz-Odermat nominal defeat criteria, whereas the Lanz-Odermatt calculation determines the limit of initial perforation. Another indicator is the number of anti-ricochet ribs in front of the driver's periscope. By using the guideline given in the textbook "Частные Вопросы Конечной Баллистики" to convert from nominal defeat to initial perforation, the effective thickness of the armour would be around 432mm. The two photos below show an Iraqi T-72 that resisted a hit from an M47 fired by USMC infantry. The total weight of the armour kit including the additional fittings and mounting frames amounts to 1,500 kg. The nuances of this design decision are discussed further later on in this article. To do the opposite, the reverse is applied. According to the official tactical-technical characteristics, the turret is considered to have a thickness of 410mm. The port side fuel tank (18) extends from the nose of the glacis up to the driver's station. This is already enough to resist the majority of shoulder-fired HEAT weapons used by opposing armies. In addition to its more obvious role as protection from anti-tank weapons, glass textolite also has a secondary role as radiation shielding. Even at a large side angle, the turret armour was thick enough to resist the ATGM. During a turn, the engine runs at the speed set by the operator via the accelerator pedal and the speed is maintaining or replacing the radiator is quite simple, since the entire unit can be hinged open. A U.S Army technical translation of the technical document "Plastmassy v bronetankovoy tekhnike" (Plastics in Armor Materiél) originally published by the USSR Ministry of Defence in 1965 gives us some information on the glass types used in the armour screens and the heavy Relikt skirts almost completely covers the entire surface area of the sides of the hull. Needless to say, this is not a trivial achievement. The difference between a blunt nose and a frustum cone nose is much less - only 5%. For a 3" thick RHA plate placed perpendicularly, the velocity limit for a tungsten alloy rod with a conical tip is 1,333 m/s. The definition of the limit of a penetrator is the maximum armour thickness where breakthrough is possible for a given impact velocity. There are six skirt segments on either side of the hull, each with two prominent steel front plates. However, due to the smaller air gaps between each space as the epicyclic steering ack space as the epicyclic steering units in a T-54 and the gearbox connecting the two steering units in a T-54 are absent in a T-54, so the difference in the occupied volume is tremendous. However, the muzzle velocity of DM13 was 190 m/s higher, which enabled it to compensate for its other shortcomings to a large extent. The ventilator housing and the white pipe leading to the air intake can be seen tucked away in the rear corner of the fighting compartment in the photo below. Other than the two steel layers in the 80-105-20 armour array, there is the glass textolite interlayer. Old spin-stabilized HEAT shells from WWII generate an unstable jet that rapidly loses its cohesiveness partly due to imperfections in the shaped charge liner and partly from the spinning of the warhead. This implies a mass efficiency coefficient of 0.89 against KE threats, which is essentially the same as homogeneous cast steel. Zones which are not directly braced against the upper glacis, and there is a certain amount of clearance between the fuel tank and the back surface of the upper glacis, ensured by steel spacers screwed onto the upper glacis, ensured by steel spacers screwed onto the upper glacis. by Dmitry Derevyankin from the Dishmodels scale modeling website and the photo on the right below is from Yuri Pasholok. The bars are 2,310mm long and 47mm in diameter, and each weighs 31.7 kg.Both the idler wheel and drive sprocket are cast steel components. This was examined in great detail in the study "Effect of Nose Shape on Depleted Uranium (DU) Long-Rod Penetrators" by W. The hydraulic pressure on the other power pistons is zero. In 1st and reverse, the clutches and brakes are engaged at a pressure of 16.5-1.80 kgf/sq.cm. Generally speaking, the level of protection was quite formidable although some concessions were made during its development which put it slightly below the level of the T-64A. In a well known declassified document showing the "special armour" of the M1 Abrams, it is shown that the side skirts are classified as "special armour". For comparison, tests using 125mm 3BM15 rounds found that a comparable two-layer spaced target with a 50mm RHA front plate and a 100mm RHA back plate with an air gap of 175mm, all angled at 60 degrees, required a 90 m/s higher velocity to achieve the limit of nominal defeat compared to a single 150mm RHA plate sloped at 60 degrees, required an impact velocity of 1,480 m/s. It is possible to determine the thickness of the front plate by measuring it at the joint between the upper glacis and the lower glacis. If the temperature drops below 0°C during the course of an operation and DZ grade fuel is not immediately available to a tank unit, it was possible to adapt DL grade fuel for winter use in field conditions by adding kerosene. In summary, there is an abundance of evidence that establishes the effective thickness of the 80-105-20 armour array to be 450mm RHA, and with an esoteric understanding of the working mechanisms of this type of composite armour, it was possible to determine the ME coefficient of a steel back plate behind the glass textolite layer. Earlier T-72 versions with the 902A system had their smoke grenades launchers installed on the turret cheeks. To do this, the bilge pump is deactivated and the TKN-3 periscope are both pulled out of their respective ports to allow water to flood the tank. He credits the T-72M with an effective thickness of 490mm RHA against shaped charges. The hull side, hull roof, hull belly and rear armour of all T-72 models are identical, regardless of the variant. Under the reasonable assumption that the same transmission is still used, the sprocket power is around 900 hp. Because of this, precise steering can become more difficult at higher speeds (30 km/h and above) and in conditions of low traction efficiency as an average driver cannot accurately predict how much the tank will skid when turning, and the tank tends to lose more speed with each turn. However, the negative impact of this aspect of the BKP is greatly lessed by only pulling the steering lever is initially pulled back from its full forward position, the hydraulic control system instantaneously drops the pressure in the clutches for the lower gear, allowing it to slip. The sides would have been mostly resistant against 105mm APDS like the L28 round (M392 in the U.S and DM13 in West Germany) at a range of 2,000 meters within a somewhat reasonable 40-degree arc, but this arc is still relatively narrow and it limits the tank's freedom to maneuver in open spaces. In other words, the turret armour of the T-72 Ural provides protection against the most powerful APDS ammunition available in NATO when it was introduced into service, and it still offered a very respectable level of protection against the 105mm APFSDS threat of the future. Four shots were used to determine this safety limit. The explosive elements are embedded in special cutouts in the middle layers. In any case, the nose shape of the residual penetrator is deformed and has a reduced efficiency against subsequent armour layers. The use of rubber track pads for driving on paved roads also has a similar effect, as the contact patch of the track link itself. Indeed, for tracks that were designed to use rubber track pads for both on-road and off-road driving, the dependence on using the protruding track pad as a grouser can mean that the pad contact patch is only half as large as the track for the M60A1. The factor of wheel diameter is largely irrelevant when driving on paved roads, but on deforming terrain, the diameter of the roadwheels is responsible for distributing the load more evenly when the track is flexed in following the contours of the terrain. The turret front, sides and rear are cast as a single piece, but the roof is cast separately and welded on. The stress exceeded the tensile strength limit of the armour material which resulted in a spall failure but without the ejection of spall from the plate. It is desirable for a tracked vehicle to have progressively larger turn radii at higher speeds to allow effective steering without skidding and to facilitate gentler steering w beginning with the 5th gear owing to the decrease of the relative ratio between the 5th and 4th gears, 6th and 5th gears, and the 7-72M1 had a dozer blade with a thickness of 20mm, then the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, the T-72M1 had a dozer blade with a thickness of 20mm, next to the gear shift: The GO-27 system was replaced with the PKUZ-1A in the T-72B3 modernization. It may be exploited to maximize the acceleration of the tank on hard ground, but it is particularly favourable to do this when setting the tank in motion in 1st gear on a slope and in bad terrain because upshifting with this method is faster, reducing the period in which the tank can decelerate while engine power is no longer delivered to the tracks. Due to the use of a manual transmission with a high mechanical efficiency, the net power at the drive sprockets of the T-72 is actually slightly higher than the Leopard 1, and the higher low end torque output of the V-46 engine allows the tank to accelerate very quickly. Though the composition of the alloy is the same as the 45KhN2MFA alloy used in the torsion bars of the previous generation of medium and heavy tanks, 45KhN2MFAsh was processed by electroslag remelting, marked by the "Sh" suffix. Slowing down the tank with engine braking is also practical in the T-72 due to its manual ission, and is the main braking method when moving down a steep descent with the intermittent application of the brake to prevent the engine from overshooting its maximum speed. Given that the 80-105-20 configuration was developed by NII Stali in the early 1960's and first implemented in low rate production in 1964 on the T-64 obr. It is extremely likely that the museum staff only measured the depth of the straight tunnel through the outer cast steel wall, leading result. Cast monolithic steel turrets were installed on serially produced T-72 "Ural" tanks. Service life is defined as the 90% exhaustion of the total life of the unit. Besides being slower, pivot steering induces strain on the inactive track and pushes soil between it and the road wheels, creating more tension that may cause the track to be dislocated from the suspension if not alleviated by running the track, either by momentarily making the tank go forward or in reverse. After the steel front plate is perforated and when the penetrator impacts the STB itself, a different set of interactions occur. According to the study "Выбор Кумулятивных Снарядов Для Испытания Брони", the 105mm M456 HEAT round (licence-produced in Germany as the DM12) had an average penetration of 398mm RHA with a minimum of 355mm and a maximum of 434mm, while the French 105mm F1 HEAT shell (Obus-G) had an average penetration of 388mm RHA. More examples come from a World of Weapons magazine article (March 2005 issue) on tank action in Grozny containing details on multiple T-72As lost in combat. The transmission does not have a main clutch. This is because the majority of the energy of an SCJ is carried in its front part, which interacts with the target during impact and initial penetration. Flooding the tank this way takes 1.5 minutes, and after the tank is completely flooded, each members exit the tank through their own hatches. 1983, the T-72B featured additional anti-radiation cladding and had an additional stowage bin on the turret. The full ARMOR article can be read here. At a range of 200 meters, the side armour is only capable of resisting DM13 at a side angle of 17.5 degrees, so the protected frontal arc would only be 35 degrees. It may help increase the level of protection by acting as rudimentary spaced armour, although it is not particularly thick. IDF tanks were not present for the engagement, and no destroyed tanks were recovered by the IDF, which excluded the possibility of Israeli tests on captured tank hulks. This is most likely in addition to the 500mm of effective thickness provided by the same 60mm front plate as the "Reflection-1" armour and a similar spaced plate array, it is reasonable to assume that it has the same mass efficiency as its parent design. UMSh tracks were specially developed for the T-80 as a necessity because of the uniquely high average speed across rough terrain. According to NII Stali, the percentage of the surface area covered by Kontakt-1 on a T-72S is as follows: TurretHull Front Hull Sides (total) 422 kg 288 kg 300 kg Note that the figures given by NII Stali for the turret are for the entire turret, not just the frontal arc. The frontal arc of the tank is not the same for the hull and the turret. This weakened zone is very narrow as it only exists to accommodate the co-axial machine gun. The most likely explanation is that the plastic inserts merely serve as spacers to hold the 4S24 elements at the correct slope. At an impact velocity of 800 m/s to 1,500 m/s, it was found that the residual depth of penetration inside the glass textolite layer was 1.5 to 2.7 rod lengths in the case of an impact with the dual layer composite at an angle of 0 degrees. Thick rubberized rims are fitted to the discs, and steel wear plates protect the inner rims of the wheel from the friction of the track center guides. The cable that connects the grenade launchers to the launch system are also a weak point as they are only shielded with a simple metal tube, so it is possible to cut off an entire bank of grenade launchers by severing the cable tube on the turret. As such, it should be considered among the best in the world at the time it was developed. This ensures that the jet is disrupt and disperse as it emerges from the front plate, so that the low density filler performs at an optimum level. This is provided by the pre-assembly of the lower glacis to the upper glacis array as part of a single front hull block, and by steel studs which pass through the glass textolite interlayer, securing the interlayer and the steel back plate to the front plate. The depression of the hull roof around the turret ring can be seen in the photo below along with the protective collar. This is supported by the fact that the skirts are distinguished from the "soft" fabric bagged-type ERA pouches that are listed as a completely separate item. When turning the tank at high speeds on unpaved surfaces, the overload caused by the turning resistance from both the inertia of the tank and the terrain will be handled by these characteristics. Nevertheless, because of the fundamental limitations of this type of steering system as compared to a differential steering system, exacerbated by the tightening of the turn radii at gears above 4th gear, a tank with BKPs suffers a speed decrease of up to 50% during a turn relative to rectilinear motion. The above photo of the B-1 instrument and control box shows three coloured incandescent lights marked "O", "P" (R in Cyrillic) and "A". The armour on the sides of the engine compartment is 70mm thick. The origin of this particular tank is unknown. Due to its higher kinetic energy, M774 should fare better against the 16-60-105-50 armour array compared to M111, but overall, it appears that its performance should be quite similar. Polski czołg PT-91 Twardy" that the turret of a T-72M1 is equal to 400mm RHA against KE attack and 500mm RHA against shaped charge weight of the wheel increases the rotating mass of the suspension, which has a negative influence on the dynamic characteristics of the tank, namely in terms of acceleration and the suspension reaction when steering. During mine tests in the late 1970's, it was found that the single-pin RMSh track was more resistant to mine blasting compared to the tracks of the T-64 and Object 219 (T-80). Each side of the T-72 requires a set of 97 RMSh track was more resistant to mine blasting compared to the tracks of the T-64 and Object 219 (T-80). Each side of the T-72 requires a set of 97 RMSh track was more resistant to mine blasting compared to the track is worn and eventually stretches. The T-72 uses the same number of RMSh track links as the T-62. The behaviour of long rods penetrators as they perforate and emerge from behind an armour plate is termed "breakout", and the period is known as the "breakout" measure. Referring to the manual drawing, the turret measures 514mm in LOS thickness at the start of the cheek and increases to around 600mm at the area directly in front of the commander's cupola. We export PCBN insert to world wide countries, such as USA united states, Germany, UK united kingdom, Italy, France, Turkey, Russia, Saudi Arabia, United Arab Emirates, Ukraine, Israel, Canada, South Korea, Japan, Australia, New Zealand, Finland, Sweden, Norway, Danmark, Switzerland, Poland, Czech, Ireland, Poland, Sweden, Norway, Danmark, Switzerland, Poland, Czech, Ireland, Poland, Czech, Ireland, Poland, Sweden, Norway, Danmark, Switzerland, Poland, Pol The turret of a Leopard 2A4 reportedly weighs 16 tons (fully equipped), and would weigh even more if the designers had decided to provide any serious amount of protection for the sides of the turret bustle. Frank Discussions on the Problems of Tank Building) authored by E.B Vavilonskiy et al., the powertrain components in the T-72 and T-90 family of tanks was laid out with the idea of providing the maximum possibility of replacing most of the defective components in the field to expedite repairs in the field to expedite repairs in the field without the participation of special tools or resources, which may be unavailable for a variety of reasons. Based on repair manuals for the T-72M and T-72B, it can also be concluded that the replacement and repair of components was designed to be achievable with minimal manpower in the repair team. Instead, the close-up photo of the penetration cavity shown below indicates that the 3BM15 round initially created a clean, straight tunnel through the outer cast steel wall but was deflected upwards when it reached the "Kvartz" layer. The majority of export-model T-72 tanks were built with this upper glacis armour. The thickness of the armour at the holes for the installation points for the shock absorbers and the final drives is 40mm. In the gearbox, the clutches are wet multi-plate friction clutches that join two rotating assemblies together. Together with the 80mm heavy front plate which has a LOS thickness of 213mm, the first two layers of the 80-105-20 array can account for 390mm RHA of effective thickness against shaped charges. Its penetration power of 900mm RHA was nominally insufficient to overcome the armour of a T-72AV. The bump travel of the M1 Abrams and Leopard 2 suspensions is 381mm and 325-331mm respectively. When moving on roads, the average speed of a tank column can be increased by 10-15%. However, the glass textolite is not dead weight against long rod penetrators, as the composite armour did not have less ballistic resistance compared to a monolithic steel armour plate of the same mass. The skirts were originally developed and implemented on the T-90MS (Object 188MS). It is known that the armour penetration of these two rounds at a 0 degree impact angle at 2 km is between 420mm RHA, depending on the source of inefficiencies in the design of the T-72. Initially, cast turrets for the T-72 were made from MBL-1 cast armour steel with a hardness of 270-290 BHN. Of course, these advantages may be nullified under certain circumstances, such as those facing Iraqi tankers during the first Gulf War. Due to the hemispherical nose of the M735 penetrator, it has a significantly reduced performance during the impact phase with the 80mm steel front plate compared to the blunt nose of the 3BM6 penetrator, even though 3BM6 is made from steel. The high hardness armour used in the turret of the 7-72B is BTK-1Sh, a high hardness, high strength electroslag remelted (ESR) steel with a hardness of around 450 BHN. However, even though the Strv 103 is shorter than the T-72, the casemate hull is still significantly wider, especially at the top part due to the large sponsons over the tracks. At this velocity, the perforation limit is calculated to be 195mm RHA at 68 degrees (~522mm LOS). This is including the 25mm M919 APFSDS shell. However, given that T-72 tanks produced from the 1st of January 1984 to the 23rd of January 1985 "Improved T-72B" obr. It is only valid for shaped charge testing. Assuming that the turret casting has a uniform hardness throughout its entire thickness, its effective thickness would be approximately equal to RHA against shaped charges or approximately equal to 0.9 times its physical thickness against subcaliber threats. At the moment the residual rod begins to break out from the glass textolite layer, it has a velocity of just 750 m/s. It is claimed in an old catalogue produced by NII Stali that "Relikt" improves the protection against APFSDS rounds by 1.5 to 1.6 times and by 2.0 times against shaped charges. The reduction was 18% for APDS and 12% for HEAT. Kommerchan samura" (Tank Theory and Construction - Vol. For instance, the driver could safely downshift from the 4th gear to the 3rd gear at a speed of as high as 1,800 RPM without overspeeding the engine, or upshift from the 3rd gear to the 4th gear at a speed of only 1,550-1,600 RPM and still end up at 1,300 RPM in 4th gear - just within the power band. Another merit of the 7-speed transmission is that it provides the driver with enough gearing options to run the engine at its most efficient speed of ~1,600 RPM (where its specific fuel consumption is lowest) when the tank must be driven at a steady speed, such as in convoys. The unusually slow reverse speed of the T-72 is explained by the immense gearing ratio, enabling a T-72 to extricate itself if it gets stuck in a ditch. For Australia, the EJ251 engine was first introduced in the Subaru BE/BH Liberty in 1998 and subsequently offered in the BH Outback, GD/GG Impreza RS and Subaru SG Forester. For the Subaru BL/BP Liberty and BP Outback, the EJ251 was replaced by the EJ252 engine. It is possible to exploit the lack of a multi-hit capability of hit on a static tank is only 50% at 200 meters, there is no guarantee of scoring a successful hit on a tank during combat, let alone hitting the same spot twice. The drawing shows that the armour is sloped at 68 degrees and it has a cutout to accommodate the driver's periscopes, but the glass textolite layer is depicted as a single large plate and the armour lacks a reinforcing steel block in front of the driver's periscopes to compensate for the reduced armour thickness. Sergey Suvorov reports that the armour is equivalent to 500mm against shaped charges in his article "Танки Т-72: Вчера, Сегодня, Завтра", published in the July 2004 issue of the "Техника и Boopyжение" magazine. A detailed breakdown of Kontakt-1 is available in a separate article page. On the other hand, a factory blueprint would be far, far more accurate than a drawing from a manual as the former is an actual description of the specified thickness and the latter is merely illustrative. Indeed, the 80mm front plate is actually excessively thick for this purpose. Due to the installation of Kontakt-1 as standard equipment on the T-72B, the upper glacis became completely invulnerable to all of these missiles, and any other single-charge HEAT warhead. The use of tandem warheads would negate Kontakt-1 to a large extent, so missiles like the TOW-2A would be a serious threat to the upper glacis armour. In this way, the driver receives physical feedback on the magnitude of the brake pedal, and it also moves the brake pedal to a more convenient position for later use, after the tank has slowed down. The effective thickness of the 16-80-105-20 armour is unknown, but it is reasonable to expect that it is capable of limiting the effective range of M111 to around 1 km. This greatly reduces the effective range of M111 to around 1 km. later models of the T-64 series. In the total absence of natural cover, the presence of the upper glacis armour array will partly reduce the height of the lower glacis weakened zone. Due to the fact that casting imperfections should only be observed in the steel casting and not the "Kvartz" casting core, the thickness of the "Kvartz" filler should be quite consistent whereas the thickness of the steel will vary by a more appreciable amount. The reason for the switch is not entirely clear, but it is very likely that the main impetus was the greater durability of a rubber mudguard. The simulation shown below shows the 16-60-105-50 armour with a 2P appliqué plate. On the other hand, the armour designed by LKZ was perforated by "Vant" when fired from a standard propellant charge. Using the Lanz-Odermatt equation, the perforation limit of 3BM32 "Vant" at its muzzle velocity of 1,710 m/s is calculated to be 192mm at 68 degrees (~513mm LOS), with the target being medium hardness RHA (270 BHN). 219R) turret which is functionally identical to the T-72A turret. The Kontakt-1 blocks on the turret ring of the T-72B are mounted on rails and are easy to remove. For a dual-layered target composed of an RHA plate stacked with an aluminium plate each with an equal thickness of 50mm each, the residual jet emerging from an AL-RHA target, indicating that the efficiency of the layering scheme with the high density plate in front of the low density plate in front of the low density plate is higher and that the behaviour of multi-layered composite armour is anisotropic, i.e. dependent on the direction of attack. The turret ring design is shown in the two drawings below. One T-72A with the tail number 533 sustained four or five RPG grenade impacts on the engine compartment, and the tank caught fire. The mounting points for the roadwheels are especially thick as they are separate milled blocks of steel welded onto the belly plate. to acceleration, as it is important to note that when shifting from 6th to 7th gear, the engine will still be within its powerband, though only by a small margin. A raised collar prevents artillery splinters and bullets from slipping into the gap between the turret cheeks, and

beginning with the introduction of the "Kvartz" composite turret, the relative weakness of the gun mantlet area became exaggerated as it was still only homogeneous steel, thus making it comparatively more vulnerable to shaped charge attacks. However, on the T-72B, the Kontakt-1 blocks on the turret cheeks were fitted without a special mounting to shaped charge attacks. frame like on the T-72A or on the T-80B and T-64B. In the normal driving gears, which are the 2nd to 7th gears, the clutches and brakes are engaged at a pressure of 10-11.5 kgf/sq.cm. To prevent the clutch from slipping, stronger thrust is provided by the hydraulic clutch pack pistons, as, with a given coefficient of friction, the torque capacity of a friction clutch increases with the normal force pressing the clutch discs together. However, outside of the USSR, a light anti-tank grenade with a similar capability was not available until the end of the sides of the cutout are not reinforced, having a wall thickness of only 20mm. The ignition knock control system had 'fuzzy logic' that enabled the maximum ignition advanced angle to be used without detonation since the programme continually adapted to changes in environmental conditions and fuel quality. At the same time this is occurring in the BKP of the inner track, the pressure in the clutches and brakes of the overtaking track is raised from 10-11.5 kgf/sq.cm to 16.5-18.0 kgf/sq.cm in a stepwise manner. This is likely referring to the British 105mm L28A1 and L52A2 APDS rounds. Testing of captured ammunition in the USSR found that L28A1 and L52A2 perforate 110mm and 120mm RHA respectively at 60 degrees at a range of 2 km. It comprises a watertight, form fitting gas mask, a chemical respirator chamber containing potassium superoxide (KO2), and a flotation collar. These values are based on technical drawings. Other cases involving older models such as the T-72A more often ended on a sadder note, but in general, it took several hits from anti-tank grenades and missiles to reduce the combat capacity of a T-72 and at least half a dozen hits on the weakened zones (sides, rear) are usually required for the ammunition to detonate or a fire to start in the tank. Given that 3BM22 decelerates at a much higher rate of 105 m/s per kilometer compared to M111 which decelerates at a rate of 44 m/s per kilometer, the performance gap between the two projectiles is narrower at close range, but even so, it is very likely that the 16-60-105-50 armour array is immune to 3BM22 at point blank range. The tanks were caught in the open while travelling in a convoy. This suspension, inherited from the Object 167, was a departure from the unsupported tracks of the preceding T-54 and T-62 tanks. This was achieved by using a new and improved steel grade with greater wear resistance and strength. The ME coefficient of the back plate is therefore around 1.13. This is steep enough that many shaped charge warheads will fail to fuse and APDS projectiles are very likely to ricochet. A large amount of effort was spent to reduce turret heights in the West, resulting in the turret of the M1 Abrams (and all variants thereof) having a height of 900mm. The weakest part of the glacis. All taken together, it is easy to understand why conical noses are never found on any long rod penetrator. It is claimed that the turret was equal to 410mm of armour, without more details given. Type "A": In the event that the tank is exposed to a gamma ray flux with a dose rate of 4 Rads/s and, the response time of the system does not exceed 0.1 seconds. This includes the side armour, hull rooffic armour, hull r armour, and others. This is nominally enough to resist 120mm APDS rounds and indeed, considering that the unaltered upper glacis armour of the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's periscope "weakened zone" for the T-72 Ural is only equivalent to 305mm RHA against long rod APFSDS, the driver's certain zones against KE threats, although it is undoubtedly still weaker in terms of HEAT resistance. Gunner's primary sight aperture (5): The gunner's primary sight aperture (5): The gunner's primary sight aperture (5): The standard TOW and Dragon anti-tank missiles would not be effective against this armour, but they were also ineffective against the original 80-105-20 array so the up-armoured design did not provide any real qualitative improvement. The ease of installing and replacing the blocks meant that the entire modification could be carried out as part of regular scheduled maintenance and blocks lost to battle damage can be easily replaced. Unlike the T-64, the Kontakt-1 blocks for the hull sides of the T-72 are mounted directly to the textile side skirt, as seen on this T-64BV. Testing with 3BM6 showed that for a two-layer spaced armour target with a 20mm steel from plate and a 70mm steel back plate, angled at 65 degrees, the mass efficiency is 4.2-5.7% less than homogeneous steel if the air gap is 70mm or 130mm, or in other words, the ME coefficient is around 0.94-0.96. Bearing in mind that cast homogeneous steel armour can be considered to offer the same resistance as RHA against shaped charges, 380-400mm of penetration is far too low to go through the 475mm turret cheek in a head-on attack and it has a low chance of success on a shot from the side at an angle of 30 degrees where the LOS thickness of the turret is 410mm. Tag (5) in the photo below marks the impact of a 3BM15 shell into the left turret is 410mm. armour, but also reinforced with Kontakt-1 ERA, given an anti-neutron cladding, new mudguards, a new 2A46M gun, smoke grenade launchers, new stowage bins, and more, thus bringing them up to the standard of a T-72A obr. Both drawings are taken from "Kampfpanzer: Die Entwicklungen der Nachkriegszeit" by Rolf Hilmes. A technical drawing of the Object 167M, dated May 1962, shows the familiar 80-105-20 armour array, but with some notable differences. Wolski also states that from the front at a 0 degree angle, the armour is equivalent to 480mm RHA against KE and 600mm RHA against shaped charges where the physical LOS thickness is 650mm. Moreover, although it is characterized by much higher power loss compared to steering with engaged clutches, steering by clutch slippage is still regenerative. The T-72 continued to use the same sheet metal mudguard design until the T-72B variant, when it was replaced by a T-80-style rubber mudguard design. HEAT rounds of a modest caliber would not face any difficulties in defeating the lower glacis armour, but against HESH, the physical separation of the dozer blade from the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the lower glacis fulfills the essential role of preventing the transmission of stress waves to the transmission of stress waves to the lower glacies fulfills the essential role of preventing the transmission of stress waves to transmission of stress waves to the tr possibilities: Given that T-72M1 tanks directly correspond to T-72A tanks, Soviet T-72A tanks, Soviet T-72A tanks also received 2P appliqué plates. According to Kheifits, the tests of the T-72B armour designed by UKBTM were successful. The PKUZ-1A analyzes the air outside the tank using an ionizing system. Converting to nominal defeat, the effective thickness of the armour would be around 550mm RHA. To the contrary, the side hull plating had to be thinned down to 80mm from 85mm in order to put the weight gain in check. With a combat weight of 46.5 tons, the sprocket P:W ratio of the T-72B3 UBKh is around 19.35 hp/ton. A "Kvartz" turret with an anti-neutron cladding (introduced in October 1983) has the product code of 172.10.073SB. The specific grade of STB used in the armour of the T-64 and T-72 is STB-3-02. The track measures 580mm in width and 137mm in pitch. There are 80 track links per side. Another effective method of eliminating the combat capability of a tank would be to destroy its observation devices. For instance, the turret of a basic T-72A weighs 12 tons (including the weapons and a full set of standard equipment) and its center of the turret ring. This is not consistent with the increased complexity of the armour array, but nevertheless, it is supported by some evidence. The upper glacis is angled at 68 degrees from the vertical axis, producing a total LOS thickness of 547mm. The volume of smoke produced when the engine is idling is not useful concealment. By not including the mounting frames on the turret cheeks, the total weight of the armour set also decreased somewhat, although it is unclear what the total weight is. There are two types of Kontakt-1 blocks - full sized and reduced size. Therefore, the void at the driver's periscope area occupies around 7.0% of the total weight is. case of the T-72 Ural is only 3.4% of the total area. In all likelihood, L52A1 or M728 APDS with a penetration of 130mm at 60 degrees at 2 km may fail to defeat the lower glacis from a range of approximately 1.5 km and more. Additionally, this advantage is non-trivial in a defensive scenario where both tanks are hull down, dug-in and concealed. It is known that the higher penetrators on high obliquity plates is caused by the asymmetry of forces acting on the back of the plate as the penetrator passes through, but the impact and breakout effects for a finite thickness plate are often ignored. If the limit of nominal defeat is reached ("пределе кондиционного поражения"), this is enough for the armour to be considered defeated, and the impact velocity at which the reference threat achieves this is referred to as the velocity limit of nominal defeat, "Vпкп" (Vpkp). To supplement this, it was concluded in the research paper "Research of protective multilayer titanium and aluminum"), this is enough for the armour to be considered defeated, and the impact velocity at which the reference threat achieves this is referred to as the velocity at which the reference threat achieves this is referred to as the velocity at which the reference threat achieves the velocity at which the reference threat achieves this is referred to as the velocity at which the reference threat achieves the velocity at which the velocity at which the reference threat achieves the velocity at which the reference threat achieves the velocity at which the reference threat achieves the velocity at which the velocity at which the reference threat achieves the velocity at which system for cumulative jet" by Z. Before crossing water obstacles, the ventilation system is deactivated and the air intake is closed to prevent damage to the electric motor. Опыт создания отечественных основных боевых танков" published by the Uralvagonzavod Research and Production Corporation, the effective armour thickness is considered to be the same as the LOS thickness of 410mm from a 30-degree side angle. According to a placard underneath the turret at the Parola museum, the shell was stopped completely after digging only 170mm through the multilayer armour. skirts, flat top combustion surfaces and reduced top land to cylinder clearance. Fuel from the sponson tanks are drained sequentially, beginning with the last tank while the first tank is connected to an air line. The trunnion block is highlighted below: This is not the actual trunnion of the gun itself, but an armoured block that connects the gun trunnion to the turret. It was more sophisticated than the contemporary 105mm M735 composite tungsten alloy APFSDS round, featuring a teardrop-shaped penetrator with a hemispherical tip. Aside from 105mm guns, the Rh120 L/44 gun of the Leopard 2 in the early 1980's was also a serious threat. For the composite steel-STB target, it was observed that the tungsten alloy penetrator was fractured and bent as it exited the severity of the damage experienced by the penetrator. The beginning of the turret cheek to the immediate right of the co-axial machine gun measures approximately 514mm, which is 8.2% thicker than on the Ural turret. The addition of the armour array to 3,161 kg/sq.m. The physical thickness of the armour array was increased to 231mm, and the LOS thickness was increased to 617mm. When viewed from the high-pressure chamber to the opposing low-pressure chamber via the vane opening. To determine the effective thickness of the wide variety of composite armour designs implemented in the T-72 series, the limit of initial perforation against the armour is compared with the limit of initial perforation against RHA placed at the same angle, which may be flat, as in the case of some parts of the turret, or may reach 68 degrees, as on the upper glacis. Unlike the T-54, T-55 and T-62 transmission which only offers a single turning radius of 8.91 meters regardless of the selected gear (with the additional option of a clutch-brake turn with a radius. It is known that a similar armoured side skirt sandwich design was experimentally built and tested during the late 1990's on an early prototype of the Object 199, a vehicle now known as the BMPT. Russian Patent RF 2238508 contains a description of this type of armour as well as two fairly detailed cross sectional drawings showing a similar sandwich configuration with two metal plates sandwiching two inner sheets. Based on this information, it is possible to gain a more accurate perception of the 60-105-50 armour design against two types of composite armour array has its own special purpose such that all of the individual layers added together would be more than the sum of its parts Although from this perspective it appears as if the upper glacis ends with a flat surface behind the mechanism, the drawing actually does not show the area behind the cylindrical hatch mechanism but rather the side of the driver's cutout in the upper glacis. Because the weight increase is negligible - less than 80 kg - the installation of UMSh tracks did not noticeably increase the weight of the tank. Again, it should be noted that statistics on the hit distribution on combat-damaged tanks during WWII showed that 90% of hits were recorded one meter above the ground, as reported by Sergey Gryankin on pages 12-13 in his article "T-54", published in the "Tехника-молодёжи" magazine (Technology of the Youth). The deductions from the electrical systems of the tank are not yet considered. The remaining energy in the residual penetrator is naturally very low. By the 1970's, the RMSh track was the most common type in the Soviet Army. The system allows the gunner to launch the smoke grenades individually or in salvos of up to four grenades. It should be II and IV. In 1979, the first next-generation of tanks on paved roads, it can be seen that the sprocket power-to-weight ratios offer a more accurate reflection of the comparative acceleration performances of tanks, and indeed, it is a far better point of comparison than the gross power-to-weight ratios. It is worth noting that some small discrepancies in the sprocket P:W ratio and the acceleration from a standstill. Mann states that the armour protection of the T-72M1 exhibited protection equivalent to 420-480mm of rolled homogeneous armour when tested against modern 105mm and 120mm ammunition from West Germany. The larger range of travel is depicted in the drawing below by the dotted lines. It is worth noting that if Hilmes' figure is correct, then the weakest part of the T-72 hull is nominally more resilient than the frontal armour of a T-54 and is on the same level as the turret armour of the chieftain tank, especially after the slope of the armour is considered. Regardless of the early 1980's. It is important to note that positive ME obtained by increasing the back plate thickness in steel-STB-steel armour is limited to the upper boundary of the optimal thickness range. Rather, strong evidence has indicated that at best, of the limited number of Syrian T-72s that were deployed, nine tanks were destroyed in one ambush where multiple TOW anti-tank teams mounted on M151 MUTT Jeeps and Cobra helicopter gunships armed with TOW missiles attacked from several directions. As the table shows, it is considered outright impossible for 105mm APDS to defeat the upper glacis armour or the frontal turret armour at any range, but 120mm APDS is considered capable of achieving initial perforation on the upper glacis armour at a maximum range of 1,000 meters. It is a riveted aluminium fan with a diameter of 655mm and a width of 205mm, with twenty evenly spaced vanes. It occupies less than 20% of the total area of the front hull. This figure is confirmed by Rolf Hilmes in his book "Kampfpanzer: Technologie Heute und Morgen" where he states that the turret is 355mm thick. The gap between the hull roof and the turret sis considered the turret sis considered the turret sis considered the turret sis considered the turret sis 255mm thick. 423 that the effectiveness of the glass textolite interlayer was very low at an angle of 68 degrees - its resistance was around 20 times lower than steel, and it had a negligible impact on the dynamics of the penetrator as it travels through the armour. As such, this part of the gun mantlet is only slightly thicker than the turret of the T-72 Ural at the same location and can be considered an additional weakened zone when compared to the turret cheeks. The turret has just 65 blocks instead of the steel layers is studied in "Regarding Some Regularities Defining The Protective Properties of Three-Layered Barriers In The Testing the thicknesses of the steel layers is studied in "Regarding Some Regularities Defining The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Properties of Three-Layered Barriers In The Testing The Protective Prote Of Long Rod Armour-Piercing Sub-Caliber Projectiles" published in 1976 by O.I. Alekseev and I.I. Terekhin. In 1978, the American 105mm M735 round and the West German DM23 (a licence-produced clone of the Israeli M111 "Hetz") entered service and began production. Or in other words the ERA provides the advertised protection even upon a perpendicular impact. For example, the damage from grenades, shells, bombs and other high-explosive ordnance may be reduced by the standoff distance created by the s to deformation but higher resistance to rupturing compared to high strength and high hardness steels. The turret ring of the T-72 is a simplified form of the T-72 is is 7%. The "Tucha" system can launch several types of caseless 81mm grenades - the 3D6, 3D17, or the 3D6M. When installed inside the engine compartment, each BKP is seated in their proper position by a drum-shaped steel case, which also provides mechanical protection. Even so, 390mm of solid steel is still more than enough to resist the grenade of an M72 LAW or other grenades with similarly small and light warhead, to list just a few. The M47 Dragon ATGM, which was issued to every mechanized infantry squad in the U.S Army, was also inadequate against the 80-105-20 armour as it had a similar penetration power of 430mm RHA. It is therefore necessary to instead determine the performance of such ammunition against targets that behave similarly to the 60-105-50 armour in principle. However, this detail might be explained by a slight asymmetry of the turret. According to Rolf Hilmes, the 105mm glass textolite interlayer was split into 60mm and 45mm plates as shown in the drawing below, although it is worth mentioning that the photo itself does not support his data. Each layer is a collection of multiple smaller panels. Using steel-STB composite targets at different angles it was found that the armour set at an angle of 30 degrees stopped long rod penetrators of a variety of different diameters at a higher velocity limit than the same armour at 60 degrees. Being entirely separated from each other, the driver is able to shut off and isolate the internal and external fuel tanks from his station. With the appearance of Kontakt-1 on tanks like the T-72AV and T-72B, the 902A was exchanged for the 902B system. 65% compared to the depth at a normal impact. The photo above shows the engine access panel and armoured cover hinged open. This enabled smoother and more precise steering without the reduced efficiency of other steering mechanisms. For example, if the tank enters a left turn when traveling in 2nd gear, the left BKP is shifted to 1st gear while the right BKP remains in 2nd gear. The ratio of the 2nd gear. The ratio of the 2nd gear to 1st gear (4.4 ÷ 8.173) is 0.538, and so the left track will turn at 0.538 times the speed of the right track, which is a large difference. According to "Kampfpanzer: Technologie Heute und Morgen by Rolf Hilmes, the thickness of the roof plate is 45mm and the angle is 80 degrees at the peak of the roof. The lack of any change in the silhouette of a T-72 turret as it rotates renders it harder to notice. This serves to illustrate the limitations of the penetrator against the 80mm front plate of the 80-105-20 array, particularly when the structural support of the glass textolite layer is taken into account. It is important to note that these muzzle velocities exceed the actual muzzle velocities exceed the actual muzzle velocity of 1,478 m/s rated for L28A1 and all of its foreign clones produced under licence. If attacked perpendicular to its hull, the side armour of any Abrams variant from the M1 up to the M1A2 would fail against practically all postwar HEAT weapons unless an ERA package is fitted. The drive sprocket does not work with the OMSh track, and there is no pin retention ramp built into the sides are augmented with hydraulic rotary shock absorbers. According to a Soviet study, the 105mm M456 HEAT round and its West German licence-produced clone DM12 had an average penetration of 398mm RHA with a minimum of 355mm and a maximum of 434mm. Note that in the first photo, the cut in the armour plate above the shock absorber is angled whereas the same cut is perfectly horizontal in the second photo. Isolated fuel tanks will be left to sit. Only crews that have passed a water obstacle crossing training programme and have taken part in exercises are allowed to undertake such maneuvers. The engine does not stall when both steering levers are used for braking in 1st gear or reverse gear, because the BKPs are automatically de-clutched. The T-72 transmission that is sometimes referred to as a geared dual transmission system, but more generically known as a transmission with side gearboxes, or BKPs. The two gearboxes are connected by a driveshaft which transmits power from the engine via the intermediate power transfer gearbox. The variables used for the calculation are as follows: Caliber: 30mm Mass: 0.375 kg (steel penetrator only) Velocity: 817 m/s (velocity at 700 meters) Penetration: 20mm (at 60 degrees) The variables, the calculated penetrator are as follows: Caliber: 31mm Mass: 0.6 kg Velocity: 750 m/s With these variables, the calculated penetrator tends to be yawing at the moment it impacts the 20mm back plate, whereas a DeMarre calculation assumes that the reference penetrator and target penetrator are impacting a surface with the same attitude. However, even with an imprecise estimate, it can be seen that the 20mm back plate of the 80-105-20 armour array would be reliably defeated by the residual penetrator at the given initial impact velocity of the 3BM6 rod. The T-80B has the same dozer blade installed. The entire penetrator then became embedded inside the turret cheek. The photo below, taken from the militaertechnik-der-nva website, shows a T-72 Ural that received such a modification. It is unlikely that the 16-60-105-50 armour can withstand this round within normal combat ranges. During the development of the Leopard 2, the armour of the Leopard 2AV was tested the same 5.0" BRL shaped charge was also used but with a slightly smaller standoff distance so that it yielded 600mm RHA of penetration. At the same time Kontakt-1 was accepted into service, the TOW-2 missile (1983) also appeared. This was especially exaggerated in the T-72B variant due to the larger and thicker turret cheeks, which earned it the humorous "Super Dolly Parton" moniker. According to Mikhail Baryatinsky in his book "T-72: Ural versus NATO", the T-72 began to receive the "Kvartz" turret from 1977 onward, which would mean that all of these turrets went to the T-72 Ural-1 model as the production life of the Ural-1 was from December 1975 to July 1979. A frustum cone is a reasonable representation of the ogived nose shape used in APFSDS rounds like the M774 and M833. The T-64A has an equivalent monolithic turret (434.10.2.30sb-1SB), for which technical drawings with sectional thicknesses are available. The reduction in turret height was a objective worth achieving even if the projected area is not reduced. This high level of redundancy contributes to a high level of survivability as the tank can still continue to fight after sustaining serious damage. Then, velocity equalization occurs and the rod travels at a much lower velocity at the moment it begins to penetrate the glass textolite layer. Because of this, the cast steel of the "Kvartz" turret should offer a somewhat higher resistance against KE attack. The two mudguards retrofitted during regular scheduled overhauls. It had a service life of up to 10,000 km. As such, the ME of the cast steel itself may be higher against KE threats. From the T-72A to the T-72A, the gain in the empty weight was a whopping 2.6 tons, but the actual gain in armour weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain in the empty weight was a whopping 2.6 tons, but the actual gain gain gain gain gain gain g had completely shifted to the 60-105-50 armour design. One of the structural characteristics of the 60-105-50 array is the omission of steel study to secure the back plate can photo below. However, the assembly process for the hull front did not change, and the armour array was still a self-contained pack which could be transported individually. To keep the three layers (or more accurately, four, given that the glass textolite interlayer is in two layers) are joined along the sides with welded frames. The physical thickness increased to 215mm, and the LOS thickness increased to 574mm. However, by 1983, the new DM23 had already appeared and had begun to supplant DM13. For this, the velocity limit of initial perforation (and the range corresponding to the velocity) is the main concern. A more conclusive answer could be obtained if more details of this test were known, but unfortunately, the range (simulated or otherwise) at which the shot occurred is not known, and there is no explanation about how they determined the depth of penetration. The width of the tank between the centerline of the tracks is 2.79 meters, and so the turn radius is 2.79 meters. It is noted in the margins that the data on the performance of the M68 was estimated and was subject to change, which may explain the revision of the protection requirement from immunity from 1,000 m to immunity from 500 meters. This is confirmed by ergonomics studies on manual loading and by autoloader optimization studies done in the USSR. The use of a centrifugal cooling fan is one of the many conservative design features of the T-72, and in fact, the entire cooling system is fundamentally the same as the design used in the T-54. Finally, shot No. 62, having a muzzle velocity of 1,495 m/s and an impact angle of 70 degrees, also successfully perforated the armour. Drawing taken from the book "Kampfpanzer: Die Entwicklungen der Nachkriegszeit" by Rolf Hilmes. The tank on the left is a T-72M1 (formerly Iraqi) and the tank on the right is a T-72M1 (formerly Iraqi) and the tank on the left is a T-72M1 (formerly Iraqi) and the tank on the right is a T-72M1 (formerly Iraqi) and the tank on tan roadwheels which add a modicum of spaced armour. This was around half the cost of a SACLOS guided missile such as the 9M113 "Konkurs". Note that the three distinct types of armour defeat, initial perforation, guaranteed perforation - are all important metrics and the relationship between each type must be understood to make sense of how effective thickness is calculated for tank armour. The interlocker was needed because shifting down at an engine speed of 2,300 RPM. However, this armour design has a significant drawback. Its first contribution to the overall resistance of the armour is its role as a backing material to support the back surface of the steel front plate, as it is a highly incompressible material. Because the system is a relay for a powered hydraulic drive, the effort needed on the clutch pedal is minimal. The STB layer in the 80-105-20 armour achieves similar performance, with an ME coefficient of 2.68 against shaped charges and an ME coefficient of 1.0 against long rod penetrators, or more than 1.0 against APDS rounds. The ventilator draws air from a port on the hull roof, located just behind the turret ring. Other than the fact that the container is a fabric bag instead of a metal box, little is known about these "soft" ERA blocks except that 4S24 explosive elements are used and special plastic inserts are contained within. The factory drawing confirms the validity of this photo, as shown by the thickness ratio between the "Kvartz" filler and the cast steel walls. A purchase agreement memo published in 2015 by the Uralvagonzavod company in accordance with the purchase of the T-72B3 UBKh lists the agreed-upon upgrades and gives the following details: "бортовых экранов корпуса." Which translates to: "Side screens of the hull with integrated modules of dynamic protection of the type "Relikt" and slat screens on the side projections of the engine compartment." A recently released episode of the show "Boennas npuenka" on the T-90M "Proryv" published by TV Zvezda confirms that these side skirts contain explosive elements. The simulations and experiments detailed in the study involved a 100mm plate of variable density placed in front of the show "Boennas" on the T-90M "Proryv" published by TV Zvezda confirms that these side skirts contain explosive elements. a filler of variable density to find the most optimal combination. On all variants of the "Tucha" system, the grenade launchers covered by protective rubber caps which are removed before combat. This level of protection was also sufficient against light shoulder-fired HEAT grenades. Type "O" threats are airborne biological or chemical threats. This heavily implies that splitting the single 140mm glass textolite into two layers on production model T-64 tanks had the effect of improvements of the 3BM6 round after breaking through an 80mm RHA front plate and the 105mm glass textolite layer, sloped at 68 degrees. Однако такой эффект наблюдается не всегда и зависит в основном от качества сплава, из которого изготовлен сердечник." Translation: "Thus, in the case of an impact at an angle of 60°, the depth of penetration increases by approximately 15 ... The so-called "maximum permissible velocity" is assumed to be the muzzle velocity of "Vant" at a charge temperature of +40°C, which is listed as the maximum temperature of +40°C, which is models. Nevertheless, owing to the low thickness - and therefore low rigidity - of the back plate, the plate bulges considerably before impact occurs. The ANSYS explicit dynamics analysis test shown below, originally shared by Roman Mashinyan (Poman Mashinyan), is a simulation of 3BM6 defeating an 80-105 target at an impact velocity of 1,500 m/s It is only designed to prevent machine gun bullets and autocannon shells from entering the gap and potentially jamming the gun. In terms of acceleration, the T-72 was clearly superior to tanks like the M60A1/M60A3 and was on par with the Leopard 1, but was undoubtedly inferior to the new generation of NATO tanks, i.e, the Leopard 2 and M1 Abrams. A full set of Kontakt-1 for the T-72A consists of 227 blocks. The installation of Kontakt-1 blocks only requires that there are two threaded posts of the correct specifications. A single anecdote is not good enough to form a conclusion, of course, but it is plausible that mounting the Kontakt-1 blocks directly on the flexible skirts is more resistant to damage because the skirt will flex if the tank hits something, thus limiting the damage to the blocks and to the skirt itself. In terms of weight, the estimated density of 207 kg/sq.m. The cast steel of the turret weighs the same as its thickness indicates, of course, and the areal density is 3,313 kg/sq.m. In total, the weight of the turret is equivalent to 448mm of steel and the areal density is 3,520 kg/sq.m. From a 0 degree frontal angle at the same point on the turret face (III), the geometry of the turret reduces the thickness of steel but not the "Kvartz" filler. The T-72AV and the T-72B used the 902B "Tucha" system which has the same operating characteristics as the 902A variant but differs in that it includes only eight grenades. To form true dual hardness armour (DHA), it is necessary to roll-bond two plates until they form a strong metallurgical bond, unlike a weld-on plate where there is only static friction on the contact surface between it and the base armour. For angled and flat three-layer glass textolite target blocks, it was recorded in all cases that the tungsten alloy penetrator was bent and fractured by the time it reached the back of the block. The velocity limit of armour perforation, "пределе сквозное поражение", is expressed as "Vпсп". The latter factor is perhaps the most obvious, as on asphalt or concrete, the surface of a metal track, which is grousered, does not distribute the load onto a surface that is directly equal to the surface area of a single track link, but onto the ends of the grouser protrusions, which naturally translates to a very high mean maximum pressure. More contemporary sources repeat that the acceleration of the M1 Abrams to 32 km/h as 6.2 seconds. It should not be forgotten that the turret of the T-64 (Obj. Shot No. 61, having a muzzle velocity of 1,497 m/s and an impact angle of 67.5 degrees, successfully perforated the armour. Based on this result, it is self-evident that the 305mm RHA of effective thickness offered by the 80-105-20 armour was insufficient protection from APFSDS could pose a serious threat. A low pressure propulsion system is used to launch the grenades, which will detonate at varying ranges depending on the grenade model. is analogous to the pneumatic brake used in heavy trucks and buses, but it is more powerful and provides no fine control over the braking force, as it is either turned on or off. This is shown in the diagram below, from the engineering textbook "Pacчет И Конструирование Гусеничных Машин", edited by Professor N. Of course, the downside to having ammunition stowed in the bustle is that the turret is statistically more likely to be hit so that ammunition stowed inside is also more likely to be hit if the turret armour is defeated, and this is quite an important consideration to make. The clutch mechanism is a hydraulic relay switch, functioning as a pressure release for the entire gearbox. This is a particularly noteworthy issue when comparing Soviet tanks to foreign tanks with composite armour, as the ammunition used by the respective nations differed wildly. This causes the side gearbox on the corresponding side of the hull to downshift instantaneously and thus reduce the track speed, or brake if the transmission is in the 1st gear or reverse gear setting. The formidable armour of the tank is the most obvious major factor in reducing the casualty rate of its crew and ensuring the success of a combat mission, but the criteria for knocking out a tank does not only depend on defeating its armour. According to several studies, the density of sintered quartz increases as the sintering temperature increases whereas the porosity decreases. Polski czołg PT-91 Twardy, Nowa Technika Wojskowa" ("Anatomy of Armour. The increase in the proportion of the T-72 can be attributed to two interrelated factors: the appearance of long rod APFSDS and the obsolescent design of the turret itself On dry soils, the actual obtainable turn radii closely correspond to the tabular values, but the actual turn radii tend to be somewhat larger when driving on other surfaces due to skidding, particularly at high speeds. Based on the reported performance of the T-64, the turn radius can be around 1.3-1.8 times higher than the values on dry soils. The thickness of the hull belly plate is comparable to tanks like the M60 series and is slightly thicker than the 16mm belly plate of the turret, leaving the frontal arc of the turret clear for the Kontakt-1 blocks. From the front at a 0 degree angle, the thickness of the turret increases from 564mm at (III) to more than 700mm as the edge of the inhabited space of the turret. 1985 and T-72B obr. The tank commander and gunner exit the tank and continuously guide the driver during this process. The behaviour of dual and triple layers of steel-STB composites as well as monolithic glass textolite plates were tested against scale model VNZh-90 tungsten alloy long rod penetrators with an aspect ratio of 10 and 12.5 As the photo on the left shows, the glass textolite layer behind the steel plate was delaminated in the area immediately surrounding the penetration channel, but the three glass textolite, no steel front plate) shown in the photo on the right show no such damage. The upper glacis is a multi-layered armour array angled at 68 degrees. The image below shows the hydraulic control system and the pinhole, both of which are hexagonal. The presence of four anti-ricochet ribs in front of the driver's periscope indicates that this T-72M was built with the old 80-105-20 armour array. This section is under renovation. The height of the T-72 turret from the turret ring level up to the top edge of the turret cheek is shown in the photo below to be 380mm. In fact, it is not only possible to disable a tank without perforating its armour plating, but also quite common. On a typical T-72 from the 1980's, a few parts of the tank such as the steel-reinforced rubber side skirts, the plastic gun mask cover, and the anti-radiation cladding on the turret are thermal insulators by design, particularly the anti-radiation cladding as it is designed to resist the heat flash from a nuclear blast. The measured dimensions are congruent with the given weight of 200 kg. It lead to the development of high hardness appliqué armour plates tailored to each of the Soviet Army's main battle tanks - the T-64, T-72 and T-80. This is supplemented by the fact that even completely flat targets will often be attacked at some angle during real tank battles. With the armour having the same weight as 454mm of steel, this implies that the mass efficiency coefficient of the armour is only 1.18 which is less than the 1.2 coefficient of the "Reflection-1" array. Moreover, the rod has lost so much of its body length that it no longer qualifies as a long rod penetrator, so the residual penetrator has effectively become a blunt-tipped AP shot with a diameter of 31mm. Instead, the cross drive transmission design simply uses the slipping of the left and right steering left and right respectively. Note that this table does not differentiate between the clutches and brakes, labelling all of them interchangeable as clutches. From this, the ME coefficient of the 50-175-100 spaced armour against 3BM15 is 1.23. Each track pin has a diameter of 30mm, and the eyelets for the pins have an external diameter of 38mm. The side armour is thickest at the top half and thins down to just 20mm at the lower quarter of the side hull profile. The protection figure provided by Hilmes implies that APFSDS and thins down to just 20mm at the lower quarter of the side hull profile. was used to test the armour rather than ammunition with monobloc penetrators like 105mm DM23 or 120mm DM23. This part covers the second half of the article. Nosov. The extent of track flexion is exaggerated in the drawing to illustrate the effect. An interesting exceptionally contract flexion is exaggerated in the drawing to illustrate the effect. large overall wheel travel range of 379-543mm, but gave an unusually bumpy ride (likened to that of a camel ride in a British evaluation) as the vehicle was unstable due to its short track base and the fact that it had just four roadwheels on each side. These grades of steel were first used in the T-54 obr. By this metric, the T-72 is significantly inferior to its foreign counterparts, as shown in the table below, with a T-72 having an MMP of 430 kPa as compared to the M60A1 (335 kPa), Leopard 1 (344 kPa), and so on. The relevant paragraphs are shown below: "Таким образом, при соударении под углом 60° глубина внедрения возрастает примерно на 15...65% по сравнению с глубиной при соударении по нормали. This is accomplished by an electronically controlled actuator on the gear shift lever which mechanically locks the lever against the selector frame until the engine speed is below the minimum threshold. The penetrator experiences large destabilizing effects inside the steel front and back plates, but remains almost completely steady inside the STB interlayer. Like the front wall of the cutout, the side walls are reinforced, but only along the front half, which has the largest projected area from the side. In 1978, new production T-72 Ural-1 tanks began receiving TPD-K1 sights with an integrated laser rangefinder. Due to the geometry of the turret, the maximum physical thickness of the cheeks of around 475mm is not replicated anywhere other than the area immediately beside the gun mantlet. In the USSR, the production of "Kvartz" turrets only continued for exported T-72M and T-72M1 tanks. The gear ratio to the air compressor is 0.934. The service life of the intermediate power transfer gearbox was 11,100 km while the side gearboxes and the final drives had a service life of 10,800 km. Not shown is the combination of brake No. 5, which engages the brake in the gearbox and brake No. 5, which engages the brake No. optimal performance, such that it caused some complications during the manufacture of T-72M tanks in Warsaw Pact nations because the grade of glass textolite used in the USSR could not be easily replicated for mass production and it could not be easily replicated for mass production and it could not be substituted for inferior types. Израильский щит ковался в... This is almost the same as the ME coefficient of 1.07 calculated for the 60-105-50 armour. The slope of the upper glacis is interrupted by the periscope, and the composite armour of the upper glacis. The upper glacis armour of the T-72B was a further development of the "Reflection-1" project, which had been implemented on T-72 tanks since 1983. 432) turret that was conceptualized and developed during the late 1950's. Given that 105mm APFSDS did not exist for several years after the introduction of the T-72 Ural, the Chieftain was the only credible threat in 1974. However, the protective properties of glass textolite in an angled impact can not be lower than in a normal impact due to a more intensive curvature of the trajectory and deflection of the element [author's note: "element" refers to the penetrator] along the barrier layers, which was observed under laboratory conditions. High density smoke is opaque light in the 400-3000 nm wavelength range, making it effective at concealing the tank from active infrared imaging systems. This is because the transmission is a classical twin-transmission system, whereby each track is provided with its own gearbox, mechanically identical to the other. When used on BMPs, the ERA blocks behave as flotation aids when swimming and the foam fulfills the additional function of being an insurance mechanism preventing the blocks from taking on water if perforated by bullets and shell splinters. The change in the number of nuts is related to the upgrade to the upper to the upgrade to the upper to the uppe reason is not known. Like T-72M1 tanks with a Kontakt-1 kit, the surface area covered by reactive armour on the sides of the T-72S was heavily trimmed down to just 32%. For this article, a model of the 16-60-105-50 armour and M111 were created and then numerical simulations were run to determine the critical velocity of initial perforation, based on the reported result at 1,428 m/s. Assuming that this refers to the Ballistics Research Laboratory (BRL) standard 81mm shaped charge would be around 350mm RHA, so the level of protection would have to be equivalent to above 350mm RHA when hit at a 45 degree angle. The EJ251 and EJ252 engines had two ignition coils (one for each pair of cylinders, i.e. 1-2 and 3-4) which fired the spark plugs directly twice per cycle. For comparison, the M60A1 with the CD-850-6 transmission experiences a speed decrease of only around 15%. Clutch-brake steering is the only method of steering on the 1st and reverse gears. The clutch-brake turn produces a turn radius equal to the width of the tank between the centerline of the tracks, expressed as "B" in the table below, taken from the Polish textbook "Budowa pojazdów gasienicowych" (Construction of Tracked Vehicles). The front two wheel housings are affixed to the hull with reinforced bolts to withstand additional stresses when the tank is driven on uneven ground or into ditches. According to Vasily Chobitok in "Xogobas Yacts Tankob" (The Running Gear of Tanks), the torsion bars of the T-72 are made from 45KhN2MFASh steel alloy. Besides long rod penetrators, it is also necessary to look at the performance of composite penetrators A Type "R" radiation threat is a much less serious situation. Such statistics directly influenced Soviet tank designers in determining the optimal height of the lower glacis. To put the level of protection against KE attack, which is incongruous with the combined LOS thickness of the lower glacis and dozer blade on their own (only around 208mm). A direct measurement of a T-72 turret is available courtesy of the T-72.org Facebook group. It is confirmed to have an initial perforation limit of 20mm in RHA sloped at 60 degrees from a range of 700 meters, and like the 3BM6 penetrator, it is made from a high hardness steel albeit a softer grade. A variant of this side skirt design was used on the T-80U and several modernized T-64 models as part of the skirts. Due to the lack of armour protection for the grenade launchers, a direct hit from any type of ordnance with more power than a heavy machine gun bullet is practically guaranteed to put the smoke grenade out of commission. 1976) stripped of much of its internal equipment and its co-axial machine gun. The table below, taken from from page 260 of the book "Частные Вопросы Конечной Баллистики", shows that STB-3-02 is a grade of glass textolite with a density of 1.80-1.85 g/cc, which coincides with the previously established densities of the glass textolite used in tank armour. On snow, it can take as little as 5 minutes, but conversely, it takes much longer to self-entrench on frozen dirt. During live fire testing of the frontal hull armour of a T-72B, it was found that the driver's periscope area weakened zone could be defeated by BM-22 or BM-26 at a distance of 1.7 km at the midpoint of the zone. Although the composition of the zone. Although the composition of the zone. It had an empty weight of 41.6 tons. The amount of vertical sloping is relatively minor as the turret is built with a heavy emphasis on horizontal shaping; the side of the turret. By its nature, the effective thickness of 305mm given in these two authoritative sources is almost based on the velocity limit of nominal defeat, rather than initial perforation. Together with the large air gap between the side skirts and the side skirts and the side skirts and the suspension in the way), this combination of features innately improves the effectiveness of the armour. Looking closely at the photo below, you will notice that the turret is rusted on the surfaces of the cut, but the filler retains its original colour and some amount of it has fallen out of the cavity. Moreover, medium hardness steel treated to this hardness also exhibits unsatisfactory resistance at a temperature of -40°C in some cases. The interior surface of the upper side hull armour is coated in a 45-50mm layer of "Podboi" antiradiation lining, which can help absorb spall and other secondary penetrator fragments or even stop residual penetration from less energetic projectiles. This was the objective of the "Reflection-1" research topic. The 131 Separate Motor Rifle Brigade (OMSBR) tasked with capturing the Grozny rail station sustained many casualties during combat, losing a total of 157 men, 22 tanks, 45 infantry fighting vehicles, 37 cars and all 6 of the Tunguska anti-aircraft systems operated by the joint coздания отечественных основных боевых танков" (T-72/T-90. Turret ring area (3): The turret ring area is simply an inherent weakness created by the joint between the turret and hull. The reaction of the system includes visual and audio signals to alert the crew. This corroborates the findings regarding the ME of the 60-105-50 armour design presented earlier in this article. The snorkel is fitted with two floating markers during the ME of the crew. teams locate the tank if it has stopped underwater. However, the geometry of the lower glacis was changed at an unknown time and became even thinner at the area in front of the torsion bars, as shown in the drawing on the right (T-90). 1984, depending on the right (T-90). itself heavier, which is undesirable as well. This is beneficial against AP and APDS ammunition. On the other hand, Kontakt-1 still ensures a 55% reduction in penetration power when hit at a perpendicular angle. While inefficient, it is permissible to slip the clutches in the BKPs thanks to the fact that they are wet clutches with forced lubrication, and use cermet friction pads with high thermal stability. The diagram is shown below. At a high impact velocity on a steel-STB composite target at a high obliquity, it was observed that the contribution of glass textolite layer was very little compared to the steel plate. below the hull belly and is level with the roadwheel swing arm housings. Against such formidable threats, the primary function of the armour is reduced to simply limiting the post-perforation effect and hopefully reduce crew casualties. It is important to note that the grenades from a light handheld anti-tank weapon normally have a rather small explosive charge, and are generally incapable of affecting more than two ERA blocks with a single hit. Needless to say, it is not a trivial accomplishment that Kontakt-1 could boost the protection of a T-72A tank above the level of the most heavily armoured NATO tanks of the mid-1980's, namely the M1A1HA Abrams and late-model Leopard 2A4 tanks (batch 6 and 7, delivered in 1988-90), especially in terms of side protection. The resistance of this part of the armour is also higher than the unaltered upper glacis armour is also higher than the unaltered upper glacis armour is also higher than the unaltered upper glacis armour block, it avoids the issue of asymmetric forces causing the premature failure of a sloped armour plate. The total LOS thickness is at least 210mm. Drawing taken from "Kampfpanzer: Die Entwicklungen der Nachkriegszeit" by Rolf Hilmes. In Chapter 5.11 of the book "Частные Вопросы Конечной Баллистики", it is noted that utilizing multiple alternating layers of steel and STB can increase the resistance of the armour against SCJs, but only to a limited extent. The most obvious advantage of steep angling is that the penetration power of earlier APDS rounds will be drastically reduced and some HEAT warheads may even fail to fuse on impact, but there may be side effects stemming from the ability of long rod penetrators to perforate more armour at higher angles up until the critical ricochet angle, which is usually around 80 degrees and above and depends on the aspect ratio of the penetrator rod as well as the shape of its tip. During assembly of the complete tank hull, the 80-105-20 array is first assembled as a self-contained sandwich before welding to the tank hull belly, side, and roof plates. The T-72B carried 45 rounds of main gun ammunition, so the weight of a full combat load was around 1.43 tons. The appliqué plate was changed from 2P to BT-70Sh. All other variables were left unchanged. For labour-intensive procedures such as engine replacement, the crew assists the repair team assigned by the repair and maintenance battalion. The side gearboxes are coupled to the final drive as a single module. Tanks with a periscopic gun sight usually have the gun sight aperture located on the turret roof or some other part of the turret roof and the commander's cupola that is vulnerable to BM-26 is 0.26 sq.m, which is 15% of the total surface area of the turret. Furthermore, the trajectory of the penetrator changes during penetrator hydraulic pressure in the BKPs. SPEED AND ACCELERATIONAccording to the manuals for the T-72A and T-72B and the book "Main Battle Tank" (Основные Боевые Танки) published by Arsenal Press in 1993, the tank speeds (at 2,000 RPM) and gear ratios are presented in the table below. All tanks are combat-loaded in this comparison. This appears to be the only published figure on the armour value of the lower glacis. The freshly produced oxygen gas is mixed into the previously exhaled breath to replenish its oxygen content for rebreathing. The first two letters of the name stand for epoxyphenol binder; "30 Эпоксифенольное связующее". Against the backdrop of the earlier experiments with the Object 172-2M in 1972-74, it is clear that a backlog of research data was already available and the 60mm front plate, as the appliqué plate is only attached to the upper glacis by welding it along its edges. Together with the swing arm and torsion bar, the complete wheel unit has a nominal weight of 265 kg, similar to the individual wheel weight of a T-54, T-55 and T-62. From this, it can be estimated that the 60-10-10-20-20-50 armour is nominally capable of resisting M829 at a range of around 500 meters and above. Currently, there is not a large amount of direct information pertaining to the thickness of the turret available to the public. It was noted in a test report that an inexperienced driver could cause the tank to lose some of the blocks on the side skirts by scraping the hull against obstacles such as This does not necessarily mean that the arrangement on the T-72 is inferior. An entire set of tracks weighs 1,760 kg and the combined weight of a pair of tracks is just under 3,520 kg. It is worth noting that the UVZ plant was responsible for the ERA were designed, produced and supplied by NII Stali. In an emergency, if any other tank is damaged, 90-100 liters of diesel in the left front fuel tank is only a fraction (20-30%) of the difference in nominal MPP. Due to this, it can be referred to as initial perforation, which distinguishes it from more energetic cases of armour perforation where a large amount of residual energy is retained after breaking through the armour. Operationally, however, the capability to cross large water obstacles was indispensable. Adding Kontakt-1 to these areas immunizes them from the vast majority of shaped charge weapons, especially considering that the slope of the roof is 78 degrees which is very steep indeed. The penetrator had a teardrop shape that it shared with the later 105mm M735 round, and it represented a level of technology far below that of long rod penetrators. Like the roadwheels of the preceding T-54, T-55 and T-62 tanks, forged aluminium stampings are used in their construction, helping to save weight and reduce roling resistance. It has a hardness of 170-217 BHN. Still, the curvature of the turret cheeks remedies this shortcoming to some extent by introducing a horizontal slope. For a tungsten alloy rod with a density of 17.6 g/cc, the velocity of the residual penetrator must be at least 945 m/s for eroding penetration to occur. The turret of the T-72B has even heavier frontal armour and is even more unbalanced, and the addition of explosive reactive armour on the frontal arc further exacerbates the issue. The difference in armour protection between the area containing the mechanism and the unaltered upper glacis armour array is more difficult to guantify due to the relatively small size of the mechanism and the fact that the mechanism is constructed from steel, with several telescoping concentric cylinders within that form a nearly solid barrier, so it still contributes to stopping a penetrating projectile. For tanks without compartmentalized ammunition and blowout panels like the M60A1, the thin side armour makes it comparatively easy to perforate the bustle armour compared to the frontal arc. When tested against a NATO Medium Single (MS) target (a 130mm RHA plate sloped at 60 degrees) the 105mm DM13 round was able to perforate the target at an impact velocity limit of 1,209 m/s. Against a NATO Heavy Single (HS) target (a 150mm RHA plate sloped at 60 degrees), the DM13 round was able to perforate the target at an impact velocity limit of 1,329 m/s. Against a NATO Medium Double (MD) target (40mm RHA back plate spaced apart by 150mm, sloped at 60 degrees), the DM13 round was able to perforate the target at an impact velocity limit of 1,287 m/s. The main results of the interaction between the penetrator mass is largely eroded, yaw is induced into the residual penetrator, the residual penetrator is slightly bent, and it has a damaged nose. Contrary to a widespread myth, there is little evidence that IDF tanks with M111 "Hetz" ammunition destroyed Syrian T-72 tanks (Object 172M-E1) were destroyed during the war. The physical and mechanical properties of the particular form of sintered guartz used in the "Kvartz" insert is difficult to ascertain, not only due to the lack of detailed information on the production process of the material itself, but also because of the lack of information on the production process of the material itself. 15-50) that was used for the "Improved T-72A" tanks from 1983 and 1984 yielded a very modest gain in weight compared to the 16-60-105-50 armour array, but due to the higher efficiency against KE threats, the effect is that the new armour array approaches or reaches 500mm RHA in effective thickness, which is very good. The T-72 requires the driver to start from 1st gear, which is not optimal for acceleration, and then shift up 5 times to reach the 6th gear. A. Engine braking also serves as a means of slowing down from high speed on level ground. The effort needed on the pedal is mechanically reduced by a pair of coil springs and a reduction mechanism, shown in the image below. In comparing the raw data, the residual penetration into the 60 degree target was 15-65% higher than in the 0 degree target, apparently showing that the composite is less effective at a high angle of obliquity. It is interesting to see that in page 3 of the report "Performance of 120mm Gun in Chieftain", it is stated that the 120mm APDS ammunition for the Chieftain was "the first high velocity shot of its type which effectively defeats multiple targets", which may be referring to the NATO Heavy Triple target. As it penetrates the glass textolite, the residual penetrator experiences a mild deceleration and is slightly eroded. disrupt and disperse jets than continuous jets. It is worth noting that M774 is credited with the ability to defeat 180mm RHA at 60 degrees at 2 km in Russian textbooks. The walls, base, the bulge for the commander's cupola and some parts of the turret roof are formed from a single casting, onto which the cast roof is welded, 1964 tanks. As mentioned earlier, the blocks on the T-72A are mounted on special metal frames to form a wedge shape around the circumference of the turret cheeks, allowing the reactive armour to perform up to its maximum potential at a high obliquity. The device is compact and relatively light, each filled shock absorber assembly having a weight of 66.6 kg Under normal operation, the ventilator acts as a simple blower to supply the crew compartment with air, performing no air conditioning whatsoever. Comparing the diagram used by the CIA and the diagram from the T-72A manual, we can clearly see that the 73SB turret is thicker. The photo on the left shows the gun mask of an early T-72 Ural. The photo in the center by Stephen Sutton shows a T-72M1, analogous to the T-72A. The photo below shows a convoy of Syrian T-72s. As the tape rule in the photo shows, the thickness of the turret cheek at the edge of the roof is only 310-320mm due to the cutout made on the inner surface of the cheek to accommodate the sight. Needless to say, hitting this part of the lower glacis is extremely challenging. The long service life of these units ensured that failures were rare and tank availability rates could be kept consistently high. The weight of the transmission including the intermediate power transfer gearbox for the radiator fan, pumps, and the ST-10-1S starter-generator is 1,635 kg. The weight discrepancy doesn't manifest in this regard, but it becomes much more apparent when we consider the infrastructure of Eastern Europe at the time, especially the bridges - both permanent and temporary ones - which had stricter weight restrictions. The scale appears to be slightly exaggerated in favour of the T-72 in these drawings; the height of the M60A1 seems to be warped as the turret is depicted is too short. According to the study "Методический Подход К Выбору Характеристик Динамической Бронезащиты Танка", the resistance of a T-72M1 or T-72A tank to attacks using all types of HEAT ammunition is increased by an average of 1.8 times with Kontakt-1 and the size of the protected frontal arc was expanded. Furthermore, the dug-in tanks and infantry fighting vehicles. Soviet tanks did not use track pads, and did not rely on road networks for long-distance travel, which apparently gave the suspension designers far a much larger allowance in the permissible MMP limit compared to their NATO counterparts. There are, however, mitigating factors which are not addressed by direct comparisons, which are the wheel diameter and the track surface itself. The T-90 and T-90A are verified to feature this thickened dozer blade. The dent in the back plate and the subsequent bulge on its rear surface corresponds to nominal defeat under the Soviet criteria, matching the reported result. The dozer blade can be used for self-entrenchment or to augment existing cover with additional concealment. perform a few safety tasks, like switching on the emergency lighting in the tank, switching off the battery system, releasing the parking off their helmets (if IP-5 is not already worn prior to entering the water). Different grades of diesel may be used depending on the weather conditions. It can be seen from the drawing above that the height of the void is roughly equivalent to the width of the void is roughly equivalent to the width of the driver's hatch (530mm). The HOT-2 had a penetration power of 850mm RHA. Against long rod penetrators made from heavy alloys such as tungsten or depleted uranium, the function and influence of glass textolite (STB) as a part of a multi-layered composite armour array is nuanced. The shock absorber itself has a casing made from heavy alloys such as tungsten or depleted uranium, the function and influence of glass textolite (STB) as a part of a multi-layered composite armour array is nuanced. protection on its own, and the final drive is protected by the drive sprocket and the drive sprocket hub. In the book "Боевые машины Уралвагонзавода - T-72", it is stated on page 109 that the protection of the Syrian T-72M tanks used during the 1982 war in Lebanon had a level of protection that corresponded to the Object 172M, which has the 80-105-20 armour array. A translated excerpt from the interview with "Kurt" is available on this, it is stated in the book "Боевые Машины Уралвагонзавода: Танк T-72", it is stated that the upper glacis armour of the T-72A is equivalent to 360mm RHA against APFSDS threats. Based on this, DM33 should perforate a LOS thickness of 565mm RHA and 500mm RHA against armour set at 68 degrees at 200 meters and 2,000 meters respectively. The rear of the turret, however, is only sufficient against 20mm autocannons unless it is attacked at a considerable angle of incidence, although the rear armour is actually somewhat pointed due to the teardrop shape of the turret. The reduction in LOS thickness is also apparent if the cutout is attacked from a side angle. Simple bump stops are affixed to the sides of the hull for each swing arm to prevent the arm from overextending beyond the deflection limit of the torsion bar and shock absorber. This type of bump stops are affixed to the sides of the swing arm without damping the shock forces as a hydraulic or volute spring bump stops. A cross section of the shock absorber is illustrated below. Considering that the 120mm L15A5 APDS round penetrates 355mm of steel at 0 degrees at 914 m, it can be estimated that the L15A5 round does not defeat the armour at any distance. Initially, this model retained the 80-105-20 armour array as indicated by the presence of four anti-ricochet ribs in front of the driver's periscope, visible in the photo shown above. Although the simulation ends before the residual penetrator has perforated the back plate, it is clear that the armour array is perforated at this impact velocity. Combining the cast steel of the turret with the trunnion block, the total physical thickness amounts to only 320mm at the most. The diagram appears to show that only the turret cheek on the right has a thickness of 475mm, and the turret cheek on the left appears to be substantially thinner, but both cheeks are equally thick. It will continue to do so as long as the load applied has not reached or exceeded the engine's torque curve, but once a torque overload occurs, the governor ceases to maintain engine speed. The only drawback was the slow reverse speed which prevents the tank from quickly withdrawing from a compromised position and performing an effective tactical retreat. Because the hatch can be simply swung open, installing the snorkel is not difficult. The PT-91 and its variants have three antiricochet ribs instead of four. Protection was focused on the frontal arc of the hull. 1979 with the appliqué armour. The remaining 5.5% share is presumably occupied by the tracks. This remaining 5.5% share is presumably occupied by the tracks. ventilation for all three crew members as well as the engine. It is worth noting that the drawing appears to show two thin bulging sandwiches separated by a small air gap behind the steel front plate, with one of them being attached directly to the steel front plate so that there is only one in-pursuit bulging plate. This was a holistic breakdown of the influence of Kontakt-1 on the armour perforation probability data. From the perspective of the Soviet state, the addition of reactive armour vastly was extremely valuable as it improved the survivability of existing tanks against the most powerful shaped charge weapons appearing in the first half of the 1980's, and more importantly, could do so at an extremely low cost; the cost of installing Kontakt-1 on a tank amounted to only 1,600 Rubles. Air is taken in by the fan, flows through the air booster, and exits through the outlet (21). Overall, the upper glacis armour of the T-72 Ural provided good protection against the tank guns of the expected enemy forces. Furthermore, all models of the T-72 series were ordered to have 16mm of appliqué armour welded onto the upper glacis beginning in July 1983. It is possible for the tank to ford streams with a depth of 1.2 meters without any preparations, but crossing water obstacles with a depth of 1.8 m or more requires additional preparation: the fighting

compartment ventilation system must be turned off, the driver's hatch must be closed, the blower valves in the ventilation system must be installed in the drainage port, the air pressure valve for the driver's periscope cleaning system must be closed, the engine exhaust outlet must be replaced with a special outlet with valves (shown below on the right), and all open ports on the engine deck must be shut with their respective sealing covers. This is rather strange as this would mean that the shell successfully penetrated the outer cast steel wall but then stopped after penetrating only an inch into the "Kvartz" layer. According to the test results for a T-72A equipped with Kontakt-1 reported in the article "Динамическая защита. These figures appear to match quite closely with the 530mm figure claimed by the Uralvagonzavod book as well as other sources by independent Russian historians, who alternately attribute the turret with a thickness of either 530mm or 540mm. The driver should not shift gears when the TDA is in action if he wants to maintain a continuous curtain of fog, as the change in engine load will affect the volume of fog produced. Gun mantlet area (2): The gun mant gun and the mechanical linkages that connect the gunner's primary sight to the cannon. Technically, the effective thickness of up to 500mm RHA, the armour of a T-72AV can be equivalent to up to 1,000mm RHA against HEAT, especially if measured in a frontal arc of 60 degrees instead of 70 degrees as per the Soviet specifications. The 120mm L15A5 APDS round could pose a threat at a range of under 1 km to the older 80-105-20 armour, but should be unable to defeat the 60-105-50 armour even at point blank range. The steel to filler ratio of 2.7 to 1 is somewhat unusual compared to the distribution of thicknesses in the turret of the T-64 and T-64A, which had almost the same thickness of filler as the steel walls of the hull, just 40 blocks on each side skirt, only 25 blocks are installed, and instead of 55 blocks on the upper glacis and the lower glacis of the hull, just 40 blocks cover the upper glacis and the lower glacis and the lower glacis of the hull, just 40 blocks cover the upper glacis and the lower glacis of the hull, just 40 blocks cover the upper glacis and the lower glacis are installed. is left completely unprotected. Many T-72M and T-72M1 tanks were dug-in and hull-down, but were easy to see due to the featureless terrain of the gun mask changed slightly during the evolution of the T-72. The disadvantage in nominal MPP, which is between 25-38%, translates to a real difference of only 7.6% on terrain when this parameter is considered. It is also not very tall. This is most likely designed to facilitate access to the roadwheels. The photo below shows an Iraqi T-72M1 with the 80-105-20 armour plate. Presently, the relatively new T-72B3 UBKh modernization shifted more weight to the rear of the turret when reactive armour blocks were added to the sides of the turret, but again, the effect is still limited simply due to the massive allocation of armour mass to the turret cheeks. In December 1975, the T-72 Ural-1 was accepted for service in the Soviet Army. The work is done by a pneumatic cylinder located in the engine compartment, connected to the brake linkages via the input cam of the cast armour above the machine gun port weakened zone was increase did not correspond directly with the increase in thickness of the turret cheeks with the "Kvartz" filling. Additional armoured plates protecting the sponsons were added for this purpose. The photos below (left photo courtesy of Stephen Sutton) shows the thickness of the front plate of the upper glacis array by the seam joining it to the lower glacis plate so that you can visualize the approximate reduction in the size of the weakened zone. Also, as the armour block in front of the driver's periscope was unchanged, the outline of driver's cutout around the periscope became much more visible as the new armour is slightly raised above the amour block in the cutout, which is also due to the composite armour array being 10mm thicker than the original design. The upper and lower sides are not the same plate. Taking the 1st gear as an example, it can be calculated that the torque is multiplied 31.47 times and the angular speed is reduced by 31.47 times. The brake pedal mechanism is fully mechanism which is engaged by the steering lever (in 1st gear and reverse). The glass textolite used in the armour of the T-72 is often referred to as "STEF". Alone, therefore not boosted by the steering lever (in 1st gear and reverse). 80mm front plate can be considered to be a challenging target as it is almost enough to stop early 105mm APDS on its own, leaving them with almost no energy left after perforation is achieved. The Leopard 1 had a bump travel of 227-279mm and a rebound travel of 128-156mm, giving a larger overall travel range of 383-407mm. Disregarding the BMP-3, the ERA itself guarantees an 95% probability of defeating a shaped charge jet. A major feature of the explosion of the ERA block and the anti-tank grenade, achieved by with a special damping foam inside the ERA block. It began to be replaced by the HOT-2 missile in 1985. Of course, this is a context-specific example and the previous T-72 models do not necessarily have the same weakness when viewed in the appropriate context. The three armour-piercing cylinders at the tip of the projectile were normalized into additional working length for the penetrator. Steering in higher gears is regenerative, as power is delivered to both tracks. If the driver adheres to all of the guidelines, the system can theoretically be used for an infinite number of times (until something eventually breaks). Indeed, this so-called "weakened zone" would still be highly resilient to 105mm DM23 and DM33, as well as 105mm M833 and 120mm DM13 and DM23. In the memoirs "Life Given to Tanks" dedicated to the UKBTM chief designer V.N Venediktov, published in 2010, V. According to page 159 of "Boebue Mamunu Ypanbarousaboga: Tank T-72" published by the Uralvagonzavod Production Association, the LOS thickness of the T-72A turret from a side angle of 30 degrees is 530mm. The crankcase for the EJ251 and EJ252 engines had five main bearings and the flywheel housing was cast with the crankcase for increased rigidity. From a perpendicular angle of attack, the turret cheeks can still offer a respectable defence due to the large thicknesses of steel, but the sides of the turret over the crew stations provide only a modicum of protection from light shoulder-fired HEAT grenades weapons like the M72 LAW. T-72M1 tanks exported from the USSR directly corresponded to the T-72A obr. This sends an electric signal to two EK-48 electro-pneumatic valves connected in series, releasing a flow of pressurized air to the pneumatic cylinder, turning the linkage for the brake control rods and thus engaging the brakes. The difference in size can be seen in the drawing below, and the drawing below it comparing the Strv 103 with the M60A1 gives a reference point. While it is true that the share of T-72 Urals in the Soviet Army tank fleet was relatively small due to the short period of mass production (1974-1975), it did not matter as the scope of the "Reflection" R&D programme included all T-72 models. The poster also states that the Kontakt-1 package offers 730-750mm RHA of effective thickness against artillery-fired HEAT rounds, but based on other evidence, this may be referring to tank-fired HEAT shells and there is some slight confusion in the claims. This information is corroborated by official marketing information provided by NII Stali, the developers and manufacturers of Kontakt-1. Officially, the T-72A with Kontakt-1 was considered to have an effective thickness value of up to 900mm RHA against HEAT because it could successfully stop this threat on its upper glacis and the turret cheeks, which had a base protection of 490mm and 500mm RHA respectively against shaped charges. Because a HEAT warhead with a penetration power of above 900mm RHA. Given that the 80-105-20 armour offers an effective thickness of ~330mm RHA against APDS rounds, L15A4 fails to guarantee perforation of the armour at 1,000 meters, but as described in the table, it is possible to achieve initial perforation. In effect, this essentially duplicates the function of a semi-automatic transmission for one upshift or downshift, and it can be done at any gear setting. T-72B (Object 184) - combat weight of 44.5 tons with Kontakt-1 or Kontakt-5 ERA, and a combat weight of 43 tons without ERA. It is worth noting that the lower thickness of the steel cavity walls compared to the monolithic steel cavity walls cavity walls compared to the monolithic steel cavity walls redundant system that can function regardless of the condition of the engine or hydraulic systems, which is an important safety feature for bringing the tank parked when the engine is off, and braking a broken-down tank while being towed with a towing cable. Foster, from which the drawing below was taken. Needless to say, this is highly problematic for a turret that is theoretically immune to not only BM-26 but also much more powerful rounds. The "Kvartz" turret of the T-80B is very similar and even has the same average thickness, but it differs in the ratio of armour elements. In order for the L15A4 round to guarantee perforation - that is, deliver lethal fragmentation behind the armour - the firing range must be 500 meters or less. The insufficient protection of this armour array against modern ATGMs was a clear weakness that may have required applying a pair of clutches or brakes on sets of planetary gears, which produces the desired gearing ratio. With highly tensioned tracks, the tracks deform less and can hold the wheels in compression excessively, which negatively affects off-road mobility. The "Kvartz" composite turret should have a mass efficiency greater than the homogeneous cast turret of the T-72A's predecessor although the coefficient may not necessarily be more than 1.0, and this is an important distinction to make due to the fact that the previous homogeneous turret was made from cast steel and not RHA, giving it a mass efficiency coefficient of around 0.9. Whether the numbers credited to the turret are relevant for long rods or APDS remains to be seen, as there is literally no scientific literature in the public domain that describes "Kvartz" armour in the relevant perspective. In terms of effective thickness, this means that under the initial perforation standard, the 16-60-105-50 armour is equivalent to more than 405mm RHA. The same work on the left and right BKP units require just 21 and 16 man. hours respectively, making it practical to carry out repair work at lower levels of organization. To replace the steering and brake unit on a T-54, T-55 or T-62, the process was vastly more laborious, though no special skills or tools were needed other than a crane. appears that it may not even be enough to cause the 80mm or 60mm steel front plate of the T-72 composite armour to spall. Due to the combination of yaw and the bending of the residual penetrator, a larger cross sectional area is exposed against the STB interlayer which slightly increases the resistance it experiences while travelling through it When the warhead is set up on a static rig, a LOS thickness of 848mm RHA (290mm RHA target sloped at 70 degrees) is needed to stop it. The scraper helps to prevent loss of traction from excess soil on the tracks, especially sticky mud like clay. of the pedal is returned to the driver, so he must step on it to ensure the tank continues to remain braked. Based on an ARMOR journal article penned by James Warford, the armour of captured Iraqi T-72M1 tanks was thoroughly analyzed in the U.S but the composition of the filler has not yet been disclosed to the public. For the original T-72 Ural model, the reduction in thickness was a necessity because the torsion bars for the first pair of roadwheels are in the way, as you can see in the drawing on the left below (T-72 Ural). As with all automobiles, fuel efficiency decreases significantly while driving cross-country because the amount of engine power needed to overcome dynamic resistance increases as the harshness of the terrain increases, and so does fuel consumption. Because of the T-72's relatively large fuel capacity and high fuel efficiency, refueling the T-72 isn't even necessary for short continuous operations. Subsequent models with increased weight used the reinforced 172.50.001sb-A wheel with 6 spokes, featuring a different, reinforced roller bearing. If the original requirement for protection against 115mm HEAT shells with a copper liner was met, the armour would have been sufficient to resist the MILAN missile. In the armour would have been sufficient to resist the MILAN missile. Вооружение" magazine, it is stated on page 14 that the protection of the 1985 model of the T-72B is equivalent to more than 550mm RHA against APFSDS rounds. The air outlet for the ventilator in the normal operating mode is marked (21). In the textbook "Частные Вопросы Конечной Баллистики" (Particular Questions of Terminal Ballistics), it issues a contract of the textbook "Частные вопросы Конечной Баллистики" (Particular Questions of Terminal Ballistics), it is stated on page 14 that the protection of the T-72B is equivalent to more than 550mm RHA against APFSDS rounds. stated that the rule for converting from the limit of nominal armour defeat to the limit of armour perforation is to subtract 10mm RHA thickness was determined by practical experience. M. It is mentioned in page 14 of the November 2006 issue of the "Техника и Boopyжение" magazine that in 1993, a report published in the specialized magazine "German Airspace" by A. In general, photos of destroyed T-72 tanks cannot be said to be proof of the low survivability of the tank, but are instead often indicators of the sheer ferocity of the fight that led to its destruction. The merits include better turret balance (because the long bustle behaves as a counterweight to the heavy gun and armour at the front of the turret), and quicker loading speed for both manually loaded tanks and tanks with autoloaders if ammunition is stowed in the bustle. However, these figures were corrected on the very same page. As such, only two small ribs and one large rib area present on the reinforced upper glacis. In fact, the velocity limit for the MD target is closer to the velocity limit for the HS target than to the esections for stowage. The 140mm glass textolite plate, which had a number of pre-drilled holes, was installed by fitting it over metal studs welded to the 80mm front plate and then securing it in place with fasteners. All T-72 variants have a total internal fuel tanks. As part of this protocol, the cooling fan outlet vanes on the engine deck are automatically closed to prevent blast and debris damage, the turret traverse is braked to lock in place to better withstand the blast wave, and more. The most optimal configuration is to have a front plate of high density. The redistribution of thicknesses of the steel plates in steel-STB-steel armour was done to improve the mass efficiency of the array against long rod penetrators by eliminating the structural deficiencies of a thin back plate. On its own, the lower glacis plate is highly vulnerability is greatly reduced by the aforementioned factors. I. TankSprocket P:W ratio (hp/ton)Acceleration to 32 km/h (s) Leopard 218.136.0 Leopard Mk. 510.6319.0 The T-72 has independent suspension using full-length torsion bars, with each bar running across the full width of the hull. It is only safe to assume that the total weight is slightly less than 1,500 kg. Similarly, the KE protection requirement of the Leopard 2 was formed using DM13 APFSDS ammunition fired from a domestic 105mm Rheinmetall smoothbore gun as the reference threat. It is worth noting that the weight proportion of the turret is very high relative to the hull, despite the fact that all T-72 models had two-man turrets. The thickness of the side armour of the turret (80mm thick) varies between 395mm to 440mm at a side angle of 20 to 25 degrees. 2. You can view the first half here. It is presumed that if the residual long rod penetrator reaches a hypothetical steel back plate behind the glass textolite layer, the deflected penetrator will improved track from the beginning of its service in the Soviet Army, and the improved track was also issued as the new standard for T-55 and T-62 tanks. The non-linearity of the system has a positive effect on ride quality. The ranges of travel are listed in the drawing below. One of them is taken from an after-action report on the death of a tank commander in a T-72 after an attack by RPG-type weapons. 115mm APFSDS rounds with a steel penetrator were used. If, for some reason, the 60-105-50 armour array is not attacked with a long rod penetrator or DM13 but is instead attacked with the 3BM15, the ME coefficient can be taken as 1.19, as established earlier. As such, it is reasonable to expect the mass efficiency of the armour to exceed 1.2. Based on the available information the armour would be sufficient against practically all handheld antitank weapons, tank-fired HEAT shells, as well as most older anti-tank missile (550mm penetration), but only by a small margin. Ventilation is controlled from the KUV-11-5-1S ventilation and filtration management box. It is worth mentioning the requirements for the side armour over the crew compartment (both hull and turret) in the XM-1 that ended up proceeding into production as the M1 Abrams was rated for an 81mm (3.2") HEAT charge at a 45 degree angle. When shooting at the turret cheeks from a 30 degree side angle, the cheeks can be considered equivalent to 410mm RHA against KE threats. By its thickness alone, it is reasonable to expect the 16-60-105-50 armour array to resist M111 at point blank range, given that M111 may achieve initial perforation against the basic 60-105-50 armour array to resist M111 at point blank range, given that M111 may achieve initial perforation against the basic 60-105-50 armour array to resist M111 at point blank range, given that M111 may achieve initial perforation against the basic 60-105-50 armour array to resist M111 at point blank range, given that M111 may achieve initial perforation against the basic 60-105-50 armour array to resist M111 at point blank range, given that M111 may achieve initial performance initial performa can be seen in the photo below. From the 5th gear to the 7th gear, the spacing between the gears is expanded so that the when upshifting at an engine speed will fall to 1,300-1,400 RPM. With the same ME coefficient of 1.35, the effective thickness of the 60-105-50 armour against shaped charges is 490mm RHA. For instance, the roof of the T-72 Ural would not be vulnerable to 105mm APDS thanks to its high slope and the physical thickness of steel present at the gun mantlet zone would also be enough for 105mm APDS from certain distances. Relative to their EJ Phase I predecessors, the pistons for the EJ251 and EJ252 engines had reduced piston pin offset and a molybdenum coating to reduce friction. On the T-72B, there are four nuts arranged at each corner of the gun mask. It is an integral component of the composite armour design and functions mainly as a low-density filler to resist shaped charge jets. Rastopshin, candidate of technical sciences and a former academician employed by NII Stali, wrote in the article "Наши танки в реальной войне oбречены?" (Are our tanks doomed in a real war?) testing in the USSR showed that the 60-105-50 armour was "pierced" from the armour. The second greatest reduction was achieved with the elimination of the turret ring area weakened zone, to the order of 15% for APDS and 12% for HEAT. This can be seen in the image below, which shows the front hull assemblies for the PT-91. Although tracks, and this form of steering is called skid-steering for this reason, skidding of the entire tank is undesirable for controllability and safety reasons. The main alternative is BT-70Sh, as it was widely available in the early 1980's and it was readily weldable. The T-72S is a T-72B model for export. After the delivery of Kontakt-1 kits to repair facilities, the upgrading of tanks began. The main alternative is BT-70Sh, as it was widely available in the early 1980's and it was readily weldable. first T-72AV tanks entered service in 1985 after their scheduled overhauls in late 1984, and after 1985, most T-72AV tanks had received ERA during scheduled repairs. By the end of the year, a supply of Kontakt-1 kits had been established to tank repair facilities across the USSR to upgrade existing tanks of all models, and the first T-72AV tanks entered service in 1985 after their scheduled overhauls in late 1984. By the time the T-72 entered service, this had become a standard practice among major tank builders, with the U.S first using aluminium tank roadwheels beginning with the M60, and both Germany and France followed suit with the Leopard 1 and AMX-30. At that location (referring to the "Wiedzmin" turret drawing), the thickness of the crew is at least assured. TankGross engine power-to-weight ratio (hp/ton)Sprocket power-to-weight ratio (hp/ton) Leopard 227.2018.13 T-72 Ural19.0015.12 Leopard 120.7514.30 Challenger 119.3514.05 M60A115.7610.5 Chieftain Mk. 513.6410.63 During the evolution of the T-72, the sprocket power-to-weight ratio remained at the same approximate level despite the gradual increase in weight of each new model. It is also stated that for composite armour, 20mm of additional physical thickness on the back plate is required to ensure a transition from guaranteed armour perforation to nominal armour defeat. Based on our earlier research, a V-shaped ERA design like Kontakt-1 reduces the penetration of a shaped charge jet by 55% at a perpendicular impact angle, so the armour is far from useless, but in comparison with the 90% penetration reduction achieved with a Kontakt-1 block angled at 68 degrees, it is a sizable downgrade. As part of the "Reflection-2" programme, new-production T-72A tanks received a layer of appliqué armour on the upper glacis during hull construction at the factory and the T-72M1 export variant was created on the basis of this model in the same year. It is quite the opposite for NATO tanks like the M60A1, Chieftain, Leopard 2, M1 Abrams, AMX-30, and even the Leopard 1 to some extent. The main advantage of larger diameter wheels is that rolling resistance is reduced, but due to the heavier powertrain and reduced traction from the RMSh track design compared to the dual-pin RMSh track of the T-64, the advantage is small. The photos below give a good view of the T-54 and the 750mm roadwheels of the T-72 were designed to work with both types of wheels, it is ostensibly possible to convert a T-72 to use the older type. The only subcaliber ammunition available for the 105mm L7 at that time was APDS with tungsten carbide cores, so this was the reference KE threat used at the time. Early batches of turrets had the "Kvartz" armour but also had the extension for the second optic of the TPD-2-49 optical coincidence rangefinder. It was found that the ME coefficient of the back plate of a steel-STB-steel array reaches 1.0 only if its thickness is 35-40mm. Besides quartz sand, however, the compound contains the normal ingredients for a casting mould such as binding clay and some additives. This was confirmed in combat in 1991. Of course, that is not to say that they do not come with any benefits. In the next zone, several Kontakt-1 blocks are angled 67 degrees horizontally and 30 degrees vertically (compound angle of 70 degrees). As far as the T-72 is concerned, HESH is no more deadly than any other high explosive round, which is to say that the turret is completely immune. armour" developed and tested by the U.S Army in the late 1950's. For example, according to the standards set by the MIL-DTL-12560 specifications, the maximum thickness of RHA is merely 6.0 inches (152.4mm). The turn radius of the tank in 7th gear is 1.467 divided by 1.467 subtracted by 1, multiplied by 2.79 meters. The middle layers appear to be the same type of steel-reinforced rubber that was used for the side skirts found on the T-72 since the mid to late 1970's. The system is capable of measuring gamma radiation at dose rates of 0.1 to 500 rads/hour, making it somewhat more versatile than the GO-27. The simple mounting system allowed the ERA to be easily installed even in field conditions, deprived of special tools. The tank was a T-72B1 built in December 1985 in Uralvagonzavod. For comparison, the heavy ballistic skirts found on the M1 Abrams depend on NERA to achieve a modest level of protection. This is explained in pages 292 and 293. On the other hand, the statement on the placard can be interpreted to mean that the shell defeated the outer cast steel wall, passed through the "Kvartz" layer and penetrated 170mm into the inner cast steel wall, where it stopped. CCCP?" ("ERA: Israeli Shield was forged in... With the dozer blade, the T-72 can be used to build a tank trench for itself in 15-20 minutes on soil. However, the T-72 achieved better performance during offroad driving - the fuel consumption was 2.6-4.5 l/km, whereas a figure of 3.0-4.5 l/km was recorded for the T-64A.Thanks to improvements in fuel alone or 800 km with external fuel alone or the photo below, taken from the T-72.org Facebook group. As the internal turret ring diameter of the tank is 2,162mm, the area of this weakened zone occupies 7.64% of the total area of the turret. The roof of the turret is angled at around 78-80 degrees, so when the tank is on a gentle reverse slope and the gun is laid at the maximum depression angle of -6 degrees, the angle of the turret roof becomes 84-86 degrees (critical ricochet angle for virtually all long rod APFSDS) and the projected area commander's cupola is partly hidden behind the turret cheek armour, thus minimizing the weakened zones of the turret and making the tough frontal the turret even tougher. The M1 Abrams and Leopard 2 both offered excellent damping with much larger overall travel ranges of 481mm and 470mm respectively, though it is important to keep in mind that the difference in rebound travel is disproportionately higher than the bump travel. The MILAN (530mm RHA provided the second s have been able to reliably overcome the turret armour from any angle of attack. For a 3" thick RHA plate placed perpendicularly, the velocity limit for a DU rod with a blunt tip is 1,239 m/s. With all this in mind, it also important to understand that the effective thickness of composite armour is implicitly contextual. The overall gear ratio can be found by multiplying the 0.706 gear ratio of the intermediate power transfer gearbox with the selected transmission gear ratio and the final drive gear ratio of the intermediate power transfer gearbox with the selected transmission gear ratio and the final drive gear ratio. the crew and improves the accuracy of the weapons while firing on the move, at the expense of slightly increasing the rolling resistance. As a result, the mine resistance of the new RMSh track was 1.5 times better than the old OMSh track. A 38mm-caliber APFSDS round was developed for an experimental Rheinmetall 105mm smoothbore gun with the same technology and similar characteristics as the 120mm DM13 round. Rather, the actual effectiveness of any composite armour (not just the armour of the T-72) in terms of RHA can only be determined by actual live fire testing of specific rounds against the armour of a simulacrum of it to determine its mass efficiency. Needless to say, the three-layer arrangement of the armour will help it attain greater standards of protection than homogeneous armour of the resistance felt by the driver. The following table shows the various combinations of clutches and brakes used to actuate the side gearboxes. In principal, the mass efficiency is unchanged but the effective thickness will be higher due to the increased areal density of the armour. It can also be used when towing another tank if success cannot be achieved with the 1st forward gear. The sides of the turret were also uparmoured with ERA blocks. Moreover, it is also worthwhile to delve into this topic because a large number of exported T-72 models featured this armour design. Prior to 1978-1979, the most advanced ammunition available to any NATO nation operating a 105mm gun was the British L52 series, which has already been established as being utterly deficient against the older three-layer armour of the T-72 Ural earlier in this article. According to Swedish trials, 120mm RHA at 2,000 meters, converted from its perforation limits on armour sloped at 60 degrees. The elimination of the driver's periscope weakened zone resulted in a reduction of the probability of armour defeat of 12-13% for both ammunition types. 120mm APDS on a steel target at a 68 degree obliquity is around 110mm at 1,000 yards (914 m) and around 100mm at 2,000 yards (1,828 m), so it is obvious that the penetrator core will still have a large amount of kinetic energy after perforating the 80mm front plate of the upper glacis array. It is probably made from a high hardness abrasion-resistant or armour grade steel. Like other EJ Phase II engines, the crankshaft thrust bearing was positioned at the rear of the crankshaft to reduce the transfer of natural engine frequencies to the transmission and driveline. Officially, each wheel is listed as having a weight of 177 kg, presumably representing the complete wheel unit with the hubcap installed. Interestingly, in the book "T-72/T-90. All taken together, the zones of the 172.10.077SB turret that are vulnerable to BM-26 constitute 61% of the total area. The only mitigating factor is that it is a smal area. Twelve grenades are available to the T-72A as part of the 902A system. The lower glacis is reported by some sources to be 80mm plate sloped at 60 degrees according to "Kampfpanzer: Technologie Heute und Morgen" by noted German armour expert Rolf Hilmes. Pistons The EJ251 and EJ252 engines had cast aluminium pistons. The total length of the water obstacle does not warrant the installation of the full snorkel. The high obliquity of the glacis armour presents a mixture of advantages, but the composite nature of the armour much more nuanced than it appears at first glance. Air is sucked into the fighting compartment of the tank and into the engine via an air intake fan duct which draws air from the crew compartment. The arrangement of blocks on the T-72B provides better coverage of the turret compared to the t It is also claimed that Kontakt-5 increases the side protection of a T-72M1 tank by 600mm RHA against shaped charges, presumably when attacked at a side angle of 22 degrees. Frustrum-nosed rods, and for this reason it has found some usage, although it is not nearly as widespread as blunt noses. This shows that when the armour obliquity is increased from 60 degrees to 68 degrees, the mass efficiency of monolithic RHA plates increases by around 5%. In particular, the T-72A was equipped with an additional plate with a thickness of 16 mm, which provided [the armour with] the equivalent thickness of 405mm of steel from M111 APFSDS at the velocity limit of nominal defeat of 1428 m/s." The phrasing used by Tarasenko is a non sequitur because the velocity of nominal defeat is 1,428 m/s The armour is equivalent to 405mm RHA According to firing tables for M111, an impact velocity of 1,428 m/s corresponds to a distance of 500 meters under standard testing conditions with a propellant charge temperature of 15°C. The area of the turret. Regardless, the protection level of the T-72 was remarkably high for its time as a result of its combination of thick armour and low silhouette and the low placement of ammunition in the hull reduced the chances of the ammunition suffering a direct hit. A substantial improvement in the mass efficiency was required to achieve a sufficient level of protection from these threats as well as against future threats without encumbering the tank too much. The acceleration of the T-64 with the 5TDF opposed-piston engine (700 hp). Taking the simplest approach, the LOS thickness of the appliqué plate is simply added on top of the known effective thickness of the original 80-105-20 and 60-105-50 armour arrays, which yields a total effective thickness of 493mm RHA for the former and 532mm RHA for the latter. The tow hook area is a good indicator. In the book "Боевые Машины Уралвагонзавода: Танк Т-72", it is stated on page 159 that the armour of the Object 172 and Object 172M are both equivalent to 305mm RHA against subcaliber shells, and the table below from the textbook "Teopus И Koncrpykuus Tanka: T. Although 90mm guns were obviously obsolete in the face of the T-72, the newer 105mm M456A2 HEAT shell also uses the M509A1 PIBD fuze, so the results of the Yugo tests imply that M456A2 will also struggle to properly fuze on the upper glacis of the T-72. Some acceleration potential will naturally be lost during the upshift. At 500 meters, L28A1 barely perforates the 80mm front plate, but with such a low perforation margin at this distance, the fragments of the tungsten carbide core can be completely stopped within the 105mm glass textolite layer. The turret sides becomes negligibly thinner towards the roof, but the curvature of the turret enables to be maintained along the entire height of the sides. The low thickness of the flange also results in a low level of armour protection. The remaining 60mm RHA of effective thickness is provided by the 20mm steel back plate, which evidently has an increased efficiency against the disrupted shaped charge jet given that the LOS thickness of the plate itself is 53mm; somewhat less than 60mm. The appearance of 105mm APFSDS rendered the side armour completely inadequate as protection against contemporary anti-tank firepower. The hull roof is 30mm thick, while the thickness of the hull roof around the turret ring is 20mm. After the tungsten alloy core of an APDS round breaks through a highly oblique plate of large thickness, it exits in a thoroughly damaged state. The PKUZ-1A system comes with a new instrument and control box. The drawing on the left shows the rear of the T-72 turret and the drawing on the right shows the front. The cover is meant to prevent rain from ingressing the tank through the gap between the ingress of NBC contaminants. The photo below by Thomas Voigt shows the gun mask of a T-72M with a plastic cover. The RMSh tracks compare unfavourably to the T142 tracks of the M60A1. The areal density of the cheek (475mm) is 3,729 kg/sq.m. The gun barrel and the turret (depicted in the drawing below), but it is not large enough to be useful against serious antitank munitions. Polish tank PT-91 Twardy, New Military Technology magazine") published in April 2018 by Jarosław Wolski, the filler used in the T-72M1 turret is sintered quartz. Based on Soviet studies and modern Russian textbooks, this method was used and is appropriate for the purpose. All other clutches and brakes have only a hydraulic drive and are controlled by the gear shift, clutch pedal and steering levers exclusively. The planetary gears engaged by the aforementioned clutches and brakes are shown below. This was possible due to the ductility of 43 PSM steel, which is a soft annealed steel and cannot be considered equivalent to RHA. Overall, the 16-60-105-50 armour fulfilled the requirement to ensure comprehensive security against the 105mm gun threat with common APFSDS ammunition, but as a stopgap solution, it was inherently limited in its scope. Despite the availability of the 80-105-20 armour design in 1962, the T-64 series only began to implement this armour after undergoing an evolutionary process over a fouryear span from 1960 to 1964. The dozer blade is a very thick and heavy steel plate. The gear ratio to the fluid coupling of the starter-generator is 0.693. It has a capacity of 237 liters. It is worth noting that according to Russian historian Mikhail Pavlov mentions that the lower glacis plate of an Object 432 (T-64) can be nominally defeated by 105mm "subcaliber shells with a muzzle velocity of 1,475 m/s" at a distance of 2,500 meters, which is the same distance limit given for the lower glacis of the T-55 and 1984 when the turret is not visible. The prolific BGM-71 TOW, which was a heavy anti-tank system issued at the company level in the U.S Army, would have a good chance of breaking through the armour as it could penetrate around 430mm RHA, even though it may not be able to generate much of a post-perforation effect. Also note that the 6th gear is incorrectly labeled as using only planetary gear IV. This is all compounded by the fact that the shape of the individual core fragments after exiting an oblique steel plate is very poor for penetration, especially since the residual velocity of the fragments exiting the heavy front plate will be greatly reduced. This is a very sizable difference of 267 m/s or 24.5%, meaning that a conical rod of the same mass and aspect ratio would need to have 24.5% higher impact velocity to defeat the same target. The two photos below show high-volume, dense smokescreens produced by mobile tanks. Transmission losses may also reduce the power available from the engine, the tank readily accelerates from a standstill in 2nd gear, as long as the tank is not on a steep slope or the ground is hard enough that it does not offer high resistance. Acceleration from a standstill is done like in any automobile with a manual transmission; according to the manual, bringing the tank into motion is done by releasing the clutch pedal and depressing the accelerator pedal simultaneously. As the engine idles at 800-900 RPM, its speed rises above 1,000 RPM very quickly and it should reach its operating speed of 1,300 RPM by the time the clutch pedal is fully released. According to the book "OchoBHOM to the springs of the pressure plate, so the torque capacity is fixed. As such, certain portions of the so-called "weakened zone" are not actually weak when compared to the unaltered upper glacis armour, especially for the earlier armour designs incorporating glass textolite as the interlayer material. Photo credit to Vitaly Kuzmin The side and rear aspects of the engine compartment are protected with slat armour screens installed over the preexisting textile side skirts. This, in turn, will allow us to compare the technological level of the turret armour. There were efforts to improve the effectiveness of steel-STB-steel composite armour in the early 1970's, at least before 1972. This protects the internal components and the crew from the blast wave itself as well as from exposure to fallout after the initial blast wave. The 001sb-A wheel weighs 169.28 kg. Further decreasing the front plate thickness with an accompanying decrease in back plate thickness may decrease the ME of the array rather than increase it. Against shaped charges, the additional LOS thickness of the appliqué plate does not necessarily translate to the same value in effective thickness. Besides these structural and material factors, there is still the underlying factor that with residual penetrators in general, it can be expected that they tend to be deflected more dramatically by the high obliquity of the back plate because they possess much less momentum. Under the Soviet definition, the term "кондиционного поражения" or "nominal defeat" is used. This grade of steel was first used in the turret of the T-62. When the dozer blade is unlocked and released, these support rods retract backwards into special troughs to orient the dozer blade at the proper angle for digging. They could pose a serious threat to the turret from a side angle of 30 degrees. This was a large improvement compared to the 224mm of overall travel offered by the T-54/55 or T-62 suspensions, and it was achieved by producing the torsion bars using a new steel alloy alongside the increased length of the torsion bars (2,310mm vs 2,180mm). Thus, the turn radius will range from the tabular values to infinity. This is different from perforating defeat) is used. 2P has a maximum hardness of 477 BHN. The crew must put on the life jacket before beginning the snorkeling operation as a precautionary measure, but the IP-5 may or may not need to be worn prior to entering water. It can be seen from close-up photos of the heavy armoured skirts that they are constructed from steel-reinforced rubber skirt material sandwiched between steel plating. The armour design was only upgraded to the 80-105-20 design in 1964 and it was implemented in production with T-64 obr. On the hull, the reactive armour layout is identical to the T-72A. The blade secured by two rotating latches which are turned with a wrench to release the dozer blade. As mentioned before regarding the turret of the T-72 Ural, the CIA determined the thickness of the turret by scaling it against the known length of the barrel of the co-axial machine gun. In the case of the 80-105-20 armour, the areal density of RHA is high. Protection was also provided from a limited number of ATGMs, the most prominent being the original TOW missile (1970) which would have also been insufficient against the T-72 as it had only 430mm RHA of penetration. However, the 20mm steel back plate, which contributes a LOS thickness of 53mm. When a monolithic STB plate is tested against a monolithic structure and equivalent weight with a shaped charge, the SCJ penetrates the STB in the hydrodynamic mode just as it does with steel and thus, the mechanism of jet penetration into STB can be described with the hydrodynamic penetration model. This is mainly due to the reduced effectiveness of the Kontakt-1 on the T-72B turret because the blocks located at the same point of the turret are only sloped at 30 degrees instead of 68 degrees. As discussed earlier in the section regarding the ERA armour on the T-72A, each block can reduce the penetration of a shaped charge warhead by an average of 55% at 0 degrees, by 80% when angled at 60 degrees, and by up to 90% at 68 degrees. This is only marginally compensated by the presence of optional watertight covers. The lack of a composite filling in the turret is disadvantageous when the tank has to deal with HEAT and HESH ammunition, but this is compensated to a large extent by the extreme thickness of the steel. On the T-72AV, special light metal mounting frames are welded to the turret cheeks with threaded holes for bolts, but everywhere else on the tank, threaded female tubes are simply welded to the surface of the armour and the blocks are mounted onto them with bolts. As such, only a limited thickness of turret armour is present in front of the race ring, which poses a problem if an armour piercing round impacts the joint between the turret and the hull as it is much more likely to defeat the armour and jam the turret ring or enter the tank and cause internal damage. The recommended pressure in the tank's pneumatic system for using the brakes for commercial heavy veicles, almost 10 times higher. The long reaction time of the system to this type of threat is offset by the low danger of minor irradiation. For example, if a KE round can achieve nominal defeat on 150mm RHA sloped at 60 degrees, it only achieves armour perforation on 140mm RHA sloped at 60 degrees. The KE protection requirement for these two tanks were formed using composite APFSDS ammunition as reference threats and not monobloc rods. In the USSR and in Russia, STEF (CT $\exists \Phi$ ) is a particular grade of glass textolite with good electrical engineering, but it is not the specific grade used for armour. Depending on the situation, the crew may have to bail out of the tank while it is underwater. For comparison, the old 80-140 configuration used in the Object 432 design from 1961 to 1963 ostensibly fulfilled the demanded protection requirements as it provided protection requirements as it provided protection equal to 450mm of RHA against shaped charges. From this, it is immediately clear that the glass textolite interlayer and the back plate in the 80-105-20 array behave differently and cannot be generalized into a single coefficient. As a result, the actual powers imply. The difference in the level of KE protection is even greater - the homogeneous cast armour at this zone of the T-72 turret would offer between half as much to twice as much protection at 55 degrees based on the calculated thickness efficiency coefficients of the Abrams turret side armour, and the protection provided at 45 degrees is infinitely higher because the angle of incidence is simply too high (87 degrees) whereas the side of the Abrams turret would offer only around 200mm RHA in effective thickness. On the T-72, the roadwheels on the left side of the hull (port) are displaced slightly forward from the roadwheels on the right side (starboard). The cutout for explosive elements can be seen in the photo below, taken from the "Олдфаги TM" VK group. The air outlet from the filtration system drum is indicated by a red arrow. However, in official Soviet era technical documentation and in modern Russian textbooks, M111 is credited with a penetration of 170mm RHA. These two factors are irrelevant for the T-72 tank, and this explains the absence of foam inserts in the bagged ERA. It is only safe to assume that the ME coefficient of the armour is somewhat above 1.2. In the memoirs "Life Given to Tanks" dedicated to the UKBTM chief designer V.N Venediktov, published in 2010, G. The extremely shallow penetration channel implies that the ceramic "Kvartz" filler somehow destroyed the entire penetrator by interface defeat, but this is rather absurd. An older catalogue, also from NII Stali, states that Kontakt-1 provides an armour equivalence figures or RHA equivalence figures or RHA equivalence figures. For the hull the Soviet definition of the frontal arc places the center point of the arc at the centerline off the hull (first from left). The main disadvantage is that the snorkeling. It is interesting to note that the Soviet Army began fielding the 93mm PG-7VL grenade for the RPG-7 beginning in 1977. The new Object 432 design incorporated a 140mm glass textolite layer behind the 80mm upper glacis plate, forming a two-layer composite armour. The glacis armour is to the left of the driver's hatch mechanism, and the right wall of the driver's hatch mechanism. proportions depicted in the drawing, the side wall of the driver's cutout is a 20mm plate. Whether the effective thickness declines drastically when the upper glacis is struck from a side angle will depend on the context. This conclusion is reinforced by other studies on the topic of shaped charge jet penetration into multi-layered targets such as "Theory Of Penetration By Jets Of Non-Linear Velocity And In Layered Targets" by P. Together with the air gap of more than 400mm RHA. It replicates the results obtained by the Soviet live fire tests. To put it more succinctly, for every millimeters. As you can see, the tank is not disabled by the fire with effective armour thickness increases by 2-3 millimeters. As you can see, the tank is not disabled by the fire with effective armour thickness added to the steel back plate, the effective armour thickness increases by 2-3 millimeters. the fire extinguishers carried inside the tank. This is confirmed by this drawing of the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 showing that the side turret and side hull armour of the M1A2 (unchanged from the M1A2 showing that the side turret and side hull armour of the M1A2 showing that the side turret and side hull armour of the M1A2 showing that the side turret and side hull armour of the M1A2 showing that the side turret and side hull armour of the M1A2 showing that the side turret and side hull armour of the M1A2 showing that the side turret are side bars are built into the prefabricated blocks. As discussed previously in Part 1 of this article in the section regarding the AZ autoloader, the turret of the T-72 is generally tougher than the front hull armour. On page 553 of the textbook "Частные Вопросы Конечной Баллистики", it is stated that in practice, the difference between nominal defeat and initial perforation when testing multilayered armour is 10mm of additional back plate thickness). Measurements on the right, below. When Kontakt-1 was tested on experimental T-72A tanks in 1982, the most powerful HEAT charge available at the time was the 140mm 3N18 warhead of the 3M11 "Falanga" missile. This justifies the increase in obliquity from preceding tanks like the T-54 and T-62. The gun mask is not meant to stop serious anti-tank weapons, but is instead simply a protective cover for the base of the gun barrel to protect the barrel and breech block from bullets and fragments and blast damage from shells impacting the turret. Nevertheless, the tiller system is inherently less ergonomic than a steering bar or wheel in terms of steering bar or wheel in terms of steering effort. As such, the addition of the 16mm appliqué plate on the 60-105-50 armour array provided full immunity to this round under standard testing conditions. Due to momentum transfer from the rod into the glass textolite layer from the penetrating rod, the steel 20mm back plate becomes bulged, as it lacks sufficient rigidity to fully contain the regions closer to the edges where the armour array is welded to the tank hull's roof, bottom and sides. This is because the gap is a structural weakness that may cause the roof armour to fail when impacted by a kinetic energy penetrator. Because these new armoured skirts are not laid over the existing skirts like the Kontakt-5 panels of earlier T-72 models with Kontakt-1 and Kontakt-5. In a hull-down position where the height of the turret matters more than the tank's full silhouette, the small turret of the plates are in contact with each other, whereas the plates of the damaged T-72B3 seen in the photo above clearly show uniform spacing between the plates. The main feature that distinguishes the 60-105-50 armour array from the NATO Medium Double target is the inclusion of a STB interlayer instead of an air gap. The surface area of the sides of the hull that are covered was 2.3 times less than on a standard T-72AV. On the T-72, the installation of the reactive armour blocks does not differ between tanks that had the 16mm appliqué armour place on the upper glacis and those that lacked it. According to a Polish document "Odlewnictwo: Technologia wykonywania form i rdzeni - skrypt nr 1747 Politechniki Sląskiej. This is because the regenerative action of the steering system recirculates power to the overtaking track in the form of torque (since the track speed is fixed), so the BKP of the overtaking track has its clutches and brakes from slipping due to torque overload. When steering by clutch slip, the turn radius will therefore be variable between a minimum, which will be fixed turn radius of the selected gear gear settings, and no turn, which is rectilinear motion. It is likely that BT-70Sh high hardness ESR steel was used, as it is treated a hardness estings, and no turn, which is rectilinear motion. It is likely that BT-70Sh high hardness estings, and no turn, which is rectilinear motion. It is likely that BT-70Sh high hardness of around 534 BHN when produced in thin plates and is readily weldable. raph was created using live fire test data. The same principle is true for turreted tanks with long bustles like the M60A1 and the Leopard 2. If natural cover is not available and a static defensive position must be created, it is possible to for any T-72 model to self-entrench using the integral dozer blade installed on the lower glacis. In 1964, the RMSh track (613.44.22sb) began replacing the older OMSh track for T-54, T-55 and T-62 tanks. In the main table, it is written that the required resistance level of the armour was ~330mm RHA against KE threats and ~450mm against HEAT threats. In this sense, the T-72 stands on equal footing with many of its contemporaries and surpasses some of its rivals due to a combination of sturdy armour, a rational internal layout, shock damping mounts for internal lay the same location. In 1980, the M774 APFSDS round was type classified and began to be issued in the utoloader and in the stabilizer system, as the driver and the gunner were still alive at the end of the ordeal and the gun could still be fired using the manual controls. It is likely that unlike sheet metal, the rubber flap of the new design could flex and deform elastically under adverse conditions while still maintaining enough rigidity to perform its primary function as a mudguard. The video below shows a T-72B in Grozny retreating with some of its external sponson fuel cells alight. However, the effective thickness of the armour would not be less since the T-72M1 is functionally identical to the T-72A. The technology was tested on the first prototype of the Object 172-2M experimental tank, an offshoot of the Object 172, first created in 1972 and then tested in 1972-1974. On top of that, the swing arm for each roadwheel weighs 87.87 kg. West German testing of captured T-55 tanks with 105mm DM13 rounds (L28A1 produced under licence) allowed a graph of the safety limits of the safety armour perforation yields a very weak post-perforation effect. They are coated with a layer of varnish and then wrapped in a protective insulating tape for scratch protection and to prevent corrosion. The dust particles in the air are separated from the air are se in other words. It is extremely efficient in the distribution of armour mass because it can provide a very high level of protection in its frontal arc with comparatively little armour compared to heavier turrets, but because the vast majority of the mass is disproportionately allocated to the front, the turret also became unbalanced. During the breakout phase, where the penetrator has almost perforated the plate due to the different relative thickness of metal above and below the penetrator cause the part of the plate due to the different relative thickness of metal above and below the penetrator cause the part of the plate below the penetrator to buckle, resulting in the early structural failure of the plate compared to a vertical plate. A full examination of Kontakt-5 will be posted as a separate page accessible from this article and from the tool bar at the top of the screen. Ideally, the driver should downshift at 1,300 RPM or less. As explained on page 139 of the book "T-72/T-90. Shot No. 59, having a muzzle velocity of 1,502 m/s and an impact angle of 70 degrees, also only managed to produce a cracked bulge. This is fully supported by other Soviet and Russian sources. As the diagram above shows, the external and internal fuel systems are not interconnected. Evidently, the protection requirement for 115mm HEAT was met, but the requirement for 115mm HEAT was met, but the requirement for 115mm HEAT was met, but the requirement for 105mm HEAT was met assembly against the casing of the gearbox, which may be done to stop the ring gear of a planetary gear set to change its gear ratio. The thinner 105mm glass textolite interlayer had a weight of 66mm, and by applying the same ME coefficient of 2.68, it is determined that it is equivalent to 177mm of RHA. When triggered, the valve opens to allow the pressurized air from the tank's pneumatic system to actuate a pneumatic servomotor which switches the airflow pathway in the ventilator unit to the HEPA filter unit. This means that after a shaped charge with a penetration power of 450mm RHA perforates the front steel plate (214mm), the remaining 374mm of glass textolite provides the equivalent protection of 236mm of RHA steel, despite having a weight equivalent to only 88mm of steel. When any one of the threats is reacted upon, the driver is instantly informed of the type of threat by the colour of the light. В частности на T-72A устанавливалась дополнительная плита толщиной 16 мм, что обеспечивало эквивалентную стойкость 405 мм от ОБПС M111 при скорости предела кондиционного поражения 1428 м/с." This translates to: "In response to this, after the completion of the USSR, since 1984 an additional reinforcement of the upper glacis was carried out. The most dangerous threats were the 84mm Slpsgr m/75b grenade for the Carl Gustaf and the French LRAC F1 as both have a penetration of just over 400mm RHA. It is unsurprising, then, that the more advanced 105mm APFSDS ammunition appearing in the late 1970's and early 1980's could reliably defeat the 80-105-20 armour at any practical range. The colloquial use of the term "STEF" to refer to glass textolite armour appears to have originated from books authored by Steven Zaloga before this information became publicly available. This is a good way of distinguishing the T-72A obr. The main modification would be to add a few more track links to accommodate the larger diameter. The difference in effective thickness between these two figures is minimal and may be explained by possible variations in discrete T-72 models, but the angle of the lower glacis is marked as 61.5 degrees in thickness to the T-64A). Looking at this design solution from the perspective of mass efficiency against shaped charges, the efficiency of the armour clearly decreased because the effective thickness offered by the new configuration against shaped charges remained at 450mm RHA but the replacement of 35mm of glass textolite with 20mm of steel yielded a net increase in weight of 31mm of steel. 1982 from the T-72A obr. The high obliquity was an advantage against APDS ammunition, HEAT ammunition, HEAT ammunition, HEAT ammunition, HEAT ammunition, became commonplace in the 1980's due to the increased performance of long rod penetrators on highly oblique armour. In the neighbouring zone, several Kontakt-1 blocks are angled 48 degrees). In another example, a T-72B1 from the 276 Motor Rifle Brigade with the tail number 221 was penetrated twice in combat during the battle for the Grozny hospital in January 16, 1995. The use of sintered quartz as the casting mould is only natural given that silica sand is already a standard type of casting steel, and using prefabricated blocks allows the dimensions of the composite armour to be easily controlled. The particular alloy used in the L52 series had a density of 17 g/cc. However, reaching the technical maximum speed requires a paved road, because the engine power drops off beyond its rated speed due to a steep decline in torque, making it difficult for the tank to overcome the resistance of rough terrain. 43 PSM has a yield strength of 400 MPa, a tensile strength of 600 MPa, and a hardness of 180-250 BHN. Alternatively, it is also possible to switch from diesel to TS-1 kerosene (jet fuel) as all T-72 engines have a multifuel capability. By comparison, the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition, and having a "bullpup" configuration gave the Strv 103 had a height of only 1.9 meters when the suspension is in the travelling condition. length without compromising gun barrel length such that its ability to maneuver through dense forests could be better than other tanks. The 3rd gear is engaged by clutch No. 3 and brake No. 6. The gun mantlet area and the turret ring area have been identified as the most critical weakened zones due to their location at the center of mass of the tank. Air enters the piston chamber via the inlet indicated by the red arrow in the drawing below, and the piston rod (14) is pushed out of the explined into the input cam. Because the brake pedal linkage is splined into the input cam, the activation of the pneumatic cylinder also causes the brake pedal to be depressed. In terms of working length, it is not particularly impressive as the combined length of its two-part tungsten alloy penetrator was similar to M111 and its diameter was much smaller. The T-72A was outfitted with this turret for five more years until 1984. It is stated in the document that the term "special armour" refers to a tri-plate arrangement which is understood to be simple NERA of the bulging plate armour elements placed behind it. The compressed air cylinders are refilled by an engine-driven compressor, so the tank can remain fully autonomous indefinitely without batteries if necessary, as long as it has fuel. The radiator can be disconnected from the coolant pump quite easily, as the two components are only connected by inflow and outflow hoses. The number of ribs is an excellent identification feature as it is often possible to see the outlines of the ribs in old low guality photos, particularly photos in digitized documents where the excessive contrast would wash out most other details. The total number of blocks did not change compared to the T-72AV (Object 172M-1), so the total weight of the armour set is similar. However, it is possible for some doubt to arise regarding these acceleration figures for the T-72 as the acceleration of a generic T-72 model from 0 to 32 km/h is claimed to be 14 seconds in this promotional webpage for the PP1000 powerpack upgrade for the T-72. However, all of this is only true if the incoming projectile impacts the middle section of the lower glacis, as the lower part of the lower glacis has a reduced thickness. Referring to the table of material properties, the specific type of glass textolite used in the armour has a tensile strength of 274.6 MPa, compressive strength of 294.2 MPa, flexural strength of 294.2 MPa, flexural strength of 294.2 MPa, flexural strength of 274.6 MPa, compressive strength of 294.2 MPa, flexural strength of 294.2 Furthermore, the study "O Hekotopus Закономерностях, Определяющих Защитные Свойства Трехслойных Преград При Обстреле Сплошными Onepenhumu Chapядами" originally published in 1976 describes the glass textolite of the T-64 as having a density of 1.85 g/cc but does not mention the designation or the grade of the glass textolite. From the side, the projected area of the M1 turret is stated to be approximately 6% smaller than the M60A1 turret. The bilge pump expels water from the tank through drainage ports in the belly of the hull at a rate of 100 liters per minute when operating with a back pressure of 4 meters of water, which ensures that the tank is not flooded by minor leaks when snorkelling at a depth of 5 meters. However, this effect is not always observed and depends mainly on the quality of the always from which the core is made." In other words, the depth of the armour, so the increased channel depth is irrelevant. The 80-105-20 armour array provides a guarantee of total immunity against this threat and even extends the scope of the protection level to include 120mm APDS, which emerged as a new threat with the appearance of the PKUZ-1A was first used in the T-90A, and features improved detection and reaction time to chemical, biological and nuclear threats. Similarly, the difference between nominal defeat and guaranteed perforation is 20mm of additional back plate thickness). The T-72 turret ring design belongs somewhere in between the first and third categories as the ball bearing race ring is still installed in a cutout in the lower part of the turret, but the height of the race ring is reduced compared to the T-54 and T-62. With this in mind, an increase in armour thickness and weight over the 80-105-20 armour was clearly unavoidable. The blower is quite powerful, having a MV-67 fan motor rated for a power of 800 W and spinning at 7,000 RPM. When locked down, the overpressure generated inside the crew compartment is 343.23 Pa, or 35mm of water column. The supercharger is activated via an EK-48 electropneumatic valve, which is triggered by an electric signal from the tank's automatic NBC protection system, firefighting system, by the electric triggers of the gun and coaxial machine gun, as well as by a manual backup switch.

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