

= Sd.Kfz. 10 =

The Sd.Kfz. 10 (Sonderkraftfahrzeug - special motorized vehicle) was a German half @-@ track that saw very widespread use in World War II . Its main role was as a prime mover for small towed guns such as the 2 cm FlaK 30 , the 7 @.@ 5 cm IeIG , or the 3 @.@ 7 cm PaK 36 anti @-@ tank gun . It could carry eight troops in addition to towing a gun or trailer .

The basic engineering for all the German half @-@ tracks was developed during the Weimar @-@ era by the Reichswehr 's Military Automotive Department , but final design and testing was farmed out to commercial firms with the understanding that production would be shared with multiple companies . Demag was chosen to develop the smallest of the German half @-@ tracks and spent the years between 1934 and 1938 perfecting the design through a series of prototypes .

The chassis formed the basis for the Sd.Kfz. 250 light armored personnel carrier . Approximately 14 @,@ 000 were produced between 1938 and 1945 , making it one of the most widely produced German tactical vehicles of the war . It participated in the Invasion of Poland , the Battle of France , the Balkans Campaign and fought on both the Western Front and the Eastern Front , in North Africa and in Italy .

= = Description = =

The Sd.Kfz. 10 was unique among German half @-@ track designs as it used a hull rather than a frame . Power was provided by a Maybach 6 @-@ cylinder , water @-@ cooled , 3 @.@ 791 litres (231 @.@ 3 cu in) NL 38 TRKM gasoline engine of 90 horsepower (91 PS) . It had a semi @-@ automatic Maybach Variorex @-@ transmission SRG 102128H (Schaltreglergetriebe 102128H) with seven forward and three reverse gears . The driver selected the desired gear and initiated the shift by depressing the clutch . It could attain 75 km / h (47 mph) , but the driver was cautioned not to exceed 65 km / h (40 mph) . In 1942 the Luftwaffe limited its vehicles to a non @-@ tactical speed of only 30 km / h (19 mph) to extend the life of the rubber track pads (Gummipolster) .

Both tracks and wheels were used for steering . The steering system was set up so that gentle turns used just the steerable front wheels , but brakes would be applied to the tracks the farther the steering wheel was turned . The drive sprocket had the track @-@ saving but more complicated rollers rather than the more common teeth . The rear suspension consisted of five double roadwheels , overlapping and interleaved in the Schachtellaufwerk layout , mounted on swing arms sprung by torsion bars . An idler wheel , mounted at the rear of the vehicle , was used to control track tension . The front wheels had transversely mounted leaf springs and shock absorbers , the only ones on the vehicle , to dampen impacts .

The upper body had a baggage compartment separating the driver 's compartment from the crew compartment . Bench seats on the sides of the vehicle , with under @-@ seat storage , could accommodate six men . The windshield could fold forward and was also removable . A convertible canvas top was mounted at the upper part of the rear body . It fastened to the windshield when erected . Four side pieces could be mounted to protect the crew from the weather .

= = Design and development = =

Preliminary design of all the German half @-@ tracks of the early part of the war was done by Dipl.Ing. Ernst Kniepkamp of the Military Automotive Department (Wa Prüf 6) before the Nazis took power in 1933 . His designs were then turned over to commercial firms for development and testing . Demag was assigned to develop the " Liliput " Kleinster geländegängiger Kettenschlepper (smallest cross @-@ country tracked towing vehicle) with the first D II 1 prototype produced in 1934 . It had a six @-@ cylinder , 28 horsepower (28 PS) BMW Type 315 engine mounted in the rear and only had three roadwheels per side . The D II 2 followed in 1935 and kept the same engine , but added an extra roadwheel . It weighed 2 @.@ 56 tonnes (2 @.@ 52 long tons ; 2 @.@ 82 short tons) .

While the first two vehicles were only automotive prototypes , the 3 @.@ 4 tonnes (3 @.@ 3 long tons ; 3 @.@ 7 short tons) D II 3 had a 42 horsepower (43 PS) BMW Type 316 engine mounted in

the front , 5 roadwheels and a troop compartment that could fit six . The D 4 prototype never left the drawing board . There was no D 5 . It was succeeded by eight trial series (Versuchs @-@ Serie) D 6 prototypes in 1937 . This weighed 3 @.@ 85 tonnes (3 @.@ 79 long tons ; 4 @.@ 24 short tons) , had a 83 horsepower (84 PS) Maybach NL 38 TRK engine and a different transmission , but otherwise differed only in detail from the D II 3 . Several D 6s and the D II 3 were used as prototypes for the models intended for service with the Chemical Troops (Nebeltruppen) and the Air Defense Troops (Luftschutztruppen) . A series of 60 pre @-@ production (0 @-@ serie) D 6s were ordered in 1937 from Demag , Adler and Mechanische Werke Cottbus (MWC) which differed only in details from the trial series . They were all delivered by November 1938 . On 17 March 1937 the vehicle was renamed as the leichter Zugkraftwagen 1 to (Sd.Kfz. 10) (light 1 ton semi @-@ tracked towing vehicle) .

The D 7 was the mass @-@ production model and differed mainly from the D 6 by having different tracks and a NL 38 TRKM engine . The NL 38 TRK had proven to have too much compression for the 74 octane (OZ 74) gasoline decreed for use after 1 October 1938 and had to be modified with new cylinder heads and shorter pistons than the TRKM , but this did not change the engine 's power . Deliveries began in October 1938 with one of the first machines off the production line demonstrated for the army on 11 October 1938 . Early machines had two fuel tanks , one of 58 litres (15 US gal) and the other of 31 litres (8 @.@ 2 US gal) , but they were replaced by a single 110 litres (29 US gal) tank early in the production run . The NL 38 TRKM engine was replaced in late 1939 by the HL 42 TRKM which differed little other than it had been bored out to 4 @.@ 192 litres (255 @.@ 8 cu in) to increase its power to 100 horsepower (100 PS) . During 1940 the hull rear was reinforced to allow the vehicle to tow heavier loads like the 7 @.@ 5 cm PaK 40 anti @-@ tank gun , 15 cm sIG 33 infantry gun and the 10 @.@ 5 cm leFH 18 howitzer . An air compressor was added later for loads equipped with air brakes . These were designated as Model (Ausführung - Ausf .) B. In 1943 the semi @-@ automatic transmission was replaced by a manual transmission . During 1943 ? 44 the original metal upper bodies were replaced with wood to conserve steel .

The D 7p chassis for the Sd.Kfz. 250 light armored personnel carrier was based on that of the D 7 with a shortened suspension , but actually shared very few components with it other than the engine .

Demag was contracted to design a new version of the Sd.Kfz. 10 in 1944 with ten road wheels , a strengthened front axle , a strengthened idler crank arm , an improved track tensioner and increased ground clearance . Three prototypes were completed ; two were delivered in September 1944 , but the third was retained at the factory . Development , however , did not proceed any further . Yet another new version of the Sd.Kfz. 10 was proposed in the Emergency Development Program (Entwicklungs @-@ Notprogramm) of 20 February 1945 with armored engine and driver 's compartments that was to have had its development completed in June 1945 .

= = Production = =

Seven factories assembled the various models of the Sd.Kfz. 10 . Demag built approximately 1 @,@ 075 from 1938 to November 1942 . Adlerwerke completed 3 @,@ 414 between 1938 and December 1943 . Büssing @-@ NAG built 750 between 1938 and December 1942 . MWC assembled 4750 between 1939 and November 1944 . Mühlenbau @-@ Industrie A.G. (MIAG) completed 324 between 1939 and 1941 . Maschinenfabrik Niedersachsen Hannover (MNH) built about 600 between 1939 and November 1942 . Österreichischer Saurerwerke completed about 3 @,@ 075 from 1940 to December 1943 . Both Demag and MWC were producing the D 7p chassis for the Sd.Kfz. 250 light APC in 1945 when a shortage of armored bodies meant that 276 had to be completed with wooden upper bodies . Eighty of these are known to have been delivered by 1 March 1945 . These numbers may include 310 chassis built for Sd.Kfz. 252 armored ammunition carriers and Sd.Kfz. 253 observation vehicles .

= = Variants = =

== = Sd.Kfz. 10 / 1 == =

The Sd.Kfz. 10 / 1 was a chemical detection vehicle . Before the outbreak of World War II only ninety were intended to be delivered in 1940 ? 42 to equip the Chemical Troops (Nebeltruppen) , but the 3 May 1940 production plan mentions that was to be produced at a rate of thirty per month until a total of 400 have been built and thereafter at ten per month . The last mention is a report that MWC was to complete ten vehicles by 15 January 1943 . Production may have continued after that , but definitely not after 1943 .

== = Sd.Kfz. 10 / 2 == =

The Sd.Kfz. 10 / 2 was a chemical decontamination vehicle fitted with a 200 kg (440 lb) capacity spreader and space for eight 50 kg (110 lb) barrels of decontamination chemicals . This left room for only two crewmen who had a bench seat between the barrels in front of the rear chassis wall . Each barrel could cover an area 1 by 160 metres (1 @. @ 1 by 175 @. @ 0 yd) . The barrels were stowed on platforms over the tracks with foldable outer rails . The 10 / 2 had a significant number of differences from the standard model , including two fuel tanks totaling 86 litres (23 US gal) , one of which had a tunnel to accommodate the auxiliary driveshaft which powered the spreader . This reduced the road range to only 250 kilometres (160 mi) . The 10 / 2 was 4 @. @ 83 metres (15 @. @ 8 ft) long , 1 @. @ 9 metres (6 @. @ 2 ft) wide , and 1 @. @ 95 ? 1 @. @ 7 metres (6 @. @ 4 ? 5 @. @ 6 ft) high , depending if the top was up or down . It weighed 3 @, @ 890 kilograms (8 @, @ 580 lb) empty and 4 @, @ 900 kilograms (10 @, @ 800 lb) loaded . While spreading its top speed was only 10 ? 20 km / h (6 @. @ 2 ? 12 @. @ 4 mph) . Sixty to seventy were built in 1938 ? 39 .

== = Sd.Kfz. 10 / 3 == =

The Sd.Kfz. 10 / 3 was equipped with a 500 litres (130 US gal) tank and spray system to lay down poison gas barriers . The spray nozzle swung back and forth to cover a width of 16 metres (52 ft) . Approximately 67 were built in 1938 ? 39 . On 15 April 1942 the Army High Command (Oberkommando des Heeres - OKH) ordered the tanks on the 65 vehicles in storage dismounted , the spray system disabled and the vehicles modified to carry 216 rounds of anti @- @ tank ammunition . The vehicles were to be issued to rebuilding Nebeltruppen units . By this stage of the war they were equipped with Nebelwerfer rocket launchers and had organic anti @- @ tank guns .

== = Sd.Kfz. 10 / 4 and 10 / 5 == =

The Sd.Kfz. 10 / 4 carried the 2 cm FlaK 30 mount on a special platform with fold @- @ down side and rear panels . This platform was specifically designed for the FlaK 30 mount and could not readily accept a FlaK 38 mount or vice versa . To accommodate the gun mount the vehicle was both wider and taller than normal , namely 2 @. @ 02 metres (6 @. @ 6 ft) wide and 2 metres (6 @. @ 6 ft) and weighed 4 @, @ 075 kilograms (8 @, @ 984 lb) empty . Four folding seats were fitted on the platform for the crew . Some of these gun mounts had a gun shield fitted . The ready ammunition bins fastened to the side and rear panels (four on each side and two in the rear) contained one 20 @- @ round magazine each . It usually towed an ammunition trailer (Sd.Ah. 51 - Sonderanhänger ? special single @- @ axle trailer) with 640 more rounds , the gun 's sights and its rangefinder .

Vehicles built in 1940 (only) were fitted with removable loading ramps , cable rollers to act as pulleys , and a reinforced tail gate to allow a FlaK 30 , mounted on a Sd.Ah. 51 trailer , to be quickly dismounted . From 1940 they were fitted with rifle racks over the front fenders and from 1942 these were given sheet metal covers as protection from the weather . FlaK 38s were mounted on 10 / 4s beginning in 1941 although the platform wasn 't widened until later . As the war progressed the guns were more often fitted with gun shields .

The Sd.Kfz. 10 / 5 carried the 2 cm FlaK 38 whose mount was wider , and lighter , than that of the Flak 30 , and the platform was enlarged to accommodate it from 1942 . Vehicle width increased to 2 @. @ 156 metres (7 @. @ 07 ft) , but the height returned to that of the normal vehicle . Initially , vehicles modified with the wider platform for the Flak 38 did not have a special designation , but they were given one sometime in 1943 . The earliest known use is 1 September 1943 , but the older name lingered until 1 December 1944 . The Luftwaffe ordered 293 sets of armor plate (Behelfspanzerung) for its vehicles in 1943 . These plates covered the radiator , windshield and both sides of the driver 's compartment and were fitted to both versions .

Production began in 1939 for deliveries to the Army and Luftwaffe , although the exact numbers will never be known as they were often not broken out separately in the production reports . At any rate Adler built 1054 between 1939 and February 1943 , although some of these were completed as 10 / 5s beginning in 1942 . MWC was awarded two contracts for 975 10 / 5s to be delivered in 1943 ? 44 , but 13 of these were delivered as ordinary Sd.Kfz. 10s in 1944 .

= = = Field modifications = = =

Some vehicles were fitted with a 3 @. @ 7 cm PaK 36 or 5 cm PaK 38 anti @-@ tank gun . Sometimes they had the cab and engine compartment armored as well . The Pak 36 was usually carried complete , but the Pak 38 was usually mounted without its wheels on a pivot mount . In the end of the war some vehicles were equipped with a triple @-@ mount (" Drilling " in German) of MG151 autocannon on a conical pivot . It was the same mount as was used in Sd.Kfz. 251 / 21 .

= = Deployment and use = =

Initially it was planned to use the Sd.Kfz. 10 as a towing vehicle for various light guns and trailers , but it was authorized as a substitute for the Sd.Kfz. 250 light armored personnel carrier in 1939 . The Ausf . B model saw its use broadened to tow heavier weapons like the 5 cm PaK 38 as well as their ammunition trailers . They also served in the maintenance and supply companies of motorized and tank units . Nine were delivered to Romania in 1942 as tractors for anti @-@ tank guns .

For the Chemical Troops (Nebeltruppen) each decontamination battery (Entgiftungs @-@ Batterie) was authorized six Sd.Kfz. 10 / 1 and six Sd.Kfz. 10 / 2 . Eighteen Sd.Kfz. 10 / 3 were held at the battalion level for issue to the batteries in lieu of their Sd.Kfz. 10 / 2s if needed . If necessary they could be substituted for Sd.Kfz. 11s of the appropriate type . When the decontamination units were authorized to be re @-@ equipped with heavy rocket launchers in November 1941 seven Sd.Kfz. 10 / 1s were used to tow the 28 / 32 cm Nebelwerfer 41 launchers and another was used by the platoon leader to tow an anti @-@ tank gun . Similarly decontamination units usually retained their Sd.Kfz. 10 / 2s and used them just like the 10 / 1s after removing their special equipment . However , it seems that the 10 / 3s were turned in when the unit was reorganized .

An early @-@ war Army anti @-@ aircraft company (Flugabwehr @-@ Kompanie) was organized in three platoons with a total of eighteen Sd.Kfz. 10 / 4s , twelve with guns and six carrying ammunition . When the four @-@ barrel 2 cm Flakvierling 38 was fielded in 1941 each platoon had four Sd.Kfz. 10 / 4s towing the guns and another for ammunition . Later these companies were reorganized with a total of eight Sd.Kfz. 10 / 4s carrying guns , two towing Flakvierlings and three carrying ammunition . These are just examples of some of the Army organizations which differed depending on the unit and the period . Sd.Kfz. 10 / 5s were substituted for 10 / 4s on a one for one basis . Detailed records do not survive for the Luftwaffe light anti @-@ aircraft units , but they appear to have been organized into batteries of nine or twelve guns .

= = = Usage in Sweden = = =

When war broke out in September 1939 , Sweden maintained a policy of neutrality . To support this policy a rapid upgrade of aging military equipment was necessary . Guns , vehicles and aircraft was both manufactured domestically and purchased abroad . Artillery guns , 10 @. @ 5 cm leFH 18 and

towing vehicles was purchased from Germany in the winter of 1939 / 1940 and deliveries started in 1940 . The towing vehicles were partly Klöckner @-@ Deutz A330 4x4 trucks and partly Demag D7 halftracks . The halftracks were would be used in sub @-@ arctic climate and all twelve Demags were , in the autumn of 1940 , delivered along with twelve guns to the 8th Artillery regiment (A8) in the northern city of Boden , close to the arctic -circle . Noteworthy is that the 10 @.@ 5 cm leFH 18 (" Haubits m / 39 " in Swedish terms) is a significantly heavier gun than the ones the German army towed with this vehicle . In Sweden the Demag was called " Artilleritraktor m / 40 " or " Arttrak m / 40 " for short .

Already in 1941 Sweden tried to purchase more Demags , but the ongoing war made this impossible . Orders then went to Volvo to make a " copy " (the " Artilleritraktor m / 43 " or " Volvo HBT ") , where the only specific requirement from the Swedish army was that the track links had to be interchangeable with the Demag . This Volvo was never in use at A8 .

After the war another twelve Sdkfz 10 , bought as surplus from Norway and elsewhere , were delivered to A8 . The total of 24 Sdkfz 10 were used in training gun crews all through the 1950s and early 1960s . 1966 all were sold to the highest bidders at Kalix airfield and they ended up in the villages surrounding Kalix and Boden . In the mid 1970s they were traced down and sold abroad . The last known one left Sweden in 1992 . Of the 24 sold in 1966 , as of 2014 fourteen have known locations with collectors and in museums all over the world .