

Vilpo d.o.o. | Slovenia

GENERAL DESCRIPTION

Samson was developed by the Slovenian manufacturer Vilpo and the third version, the Samson 300 (420), is quite new to the market and replaces the 200 and 260 models. The machine is designed for clearance of AP and AV mines.

The Samson 300 (420) weighs up to 11,800 kg and has a working clearance width of 2.54 m. The running gear consists of four wheels on two axles. The chassis consists of two frames coupled by a joint. This allows lateral flex and oscillation of the frames for improved manoeuvrability and adaptation to terrain. The front and back wheels run in the same track.

The flail unit or tiller is mounted in an armoured casing, ensuring the protection of all vital elements of the system (engine, hydraulics and transmission). An additional rotor flail unit of 900 mm width on a 9 m long crane arm can be mounted. It allows mine clearing work in difficult terrains.

The clearance operation is controlled manually or by remote control. The rotor housing and driver's cabin are made of armoured steel. The road speed of the vehicle is 25 km/h on most surfaces. One operator controls the vehicle. It is light weight, reducing transport difficulties.

The system is equipped with a computer-steered hydrostatic drive for the vehicle and a flail unit, which adapts the working speed automatically to ground conditions.

According to the manufacturer, operations in live minefields have led to significant improvements of the system and the variety is improved by the additional rotor attachment.



SAMSON 300 (420)

CLEARANCE METHODOLOGY

The flail unit attached to the front of the Samson machine rotates 32 chains with hammers attached, at up to 600 rpm with a stated clearance depth of at least 200 mm, depending on soil conditions.

The hammers weigh 800 g each and have a T-shape or disk profile connected to 425 mm long chains. Depending on soil conditions and the clearance depth selected, the machine operates by demining speed at up to 3 km/h.

The Samson 300 (420) can also be equipped with a tiller. Changing the flail unit and tiller is possible in less than ten minutes. The Samson 300 (420) is very operator-friendly as both the vehicle and flails (or tiller) are hydrostatically driven by a computer-controlled system, so that the operator can focus on steering the machine by a joystick integrated in the arm rest. The built-in computer steering hydrostatic prevents overloading of mechanical parts of the vehicle, rotor and diesel engine, controls the engine and optimises its work to achieve minimum fuel consumption. The power of the engine can be divided between rotor and vehicle automatically: more power can be applied to the rotor by reducing the speed of the vehicle.

These automatic functions ensure the ability of Samson 300 (420) to operate in difficult conditions (eg hot and dry climate, as in Sudan).

MACHINES IN USE TO DATE

Samson machines operate in Afghanistan, Croatia, Bosnia and Herzegovina, Namibia and Sudan where they have cleared approximately 12 million square metres. In Sudan the two machines had exceptional achievement and, to date, have suffered neither major damage nor required support from the manufacturer.

ENGINE, FUEL AND OIL

The Samson 300 has a Deutz BF6M 1013 FC diesel engine with 212 kw. Average fuel consumption is around 30 litres per hour. On request, it can also be equipped with a more powerful Caterpillar or Cummins engine giving 310 kw (420 hp). Engine and hydraulic oils are of general standard.

MAINTENANCE AND SUPPORT

Regular cleaning is required weekly and monthly; annual maintenance checks have to be done as per the operating instructions. The Samson can be supported by a mobile maintenance vehicle on the worksite. For missions outside Slovenia maintenance staff and operators are trained before deployment. The manufacturer offers a spare parts kit sufficient for one year of field work for 15,000 euros.

TESTS AND EVALUATIONS

The Samson 300 was tested by CROMAC in 2005 by following its work on a project covering 50,000 m². The trials included AP and AV mines and the efficiency of the machine. The test report is available in English at the website: www.vilpo.si. Also see: Croatian Mine Action Centre (CROMAC), Demining Machine Testing Committee: Possible Effects of Tested Demining Machines, Appendixes to CROMAC SOP 03.01: Efficiency Assessment of Technical Survey and Demining, 2007. Test report is available at the website: www.hcr.hr.

Two test reports are available at the ITEP website:

1. Republic of Croatia Croatian Mine Action Centre - Centre for Testing, Development and Training, "Samson 300 Demining Machine Testing Report," Croatia, 2005:
www.vilpo.si/images/stories/proizvodi/Samson/Samson_testing_report.pdf
2. Geoff Coley, Machine Demonstration Analysis and Preliminary Results, International Symposium "Humanitarian Demining 2007" 24 - 27 April 2007, Šibenik, Croatia, 2007:
www.itep.ws/pdf/MachineDemoSibenik2007_Coley.pdf

REPORTED LIMITATIONS AND STRENGTHS

Limitations

- > As with all flail systems, the machine tends to create lots of dust during operations.

Strengths

- > The system offers a variety of uses because of the additional flail unit on a crane arm.
- > Combined system, flail or tiller can be attached.
- > Variety of uses because of the additional flail unit on a crane arm.
- > Good manoeuvrability.
- > Effective cooling system, which helps work in hot conditions.
- > A roller behind the flail reduces the risk of missed mines.
- > Small, therefore reducing transport problems.
- > Operator friendly.



SAMSON 300 (420) in Sudan

DIMENSIONAL DATA

1. Length without attachment	6,100 mm 6,400 mm
2. Length total	7,800 mm 8,100 mm Transport length: 9,100 mm 9,400 mm
3. Width without attachment	2,300 mm Transport width 2,300 mm
4. Width total	3,400 mm
5. Clearing Working width	2,530 mm Additional flail unit on crane-arm 900 mm
6. Height Overall	2,900 mm
7. Mass Basic vehicle	8,100 kg 8,600 kg
8. Mass Detachable unit(s)	2,700 kg
9. Mass Overall	10,800 kg 11,300 kg

OPERATIONAL DATA

10. Wheels Tracks (description)	4 standard tyres Nokia TRS-LS 16 PR-steel foam filled
11. Ground Bearing Pressure (kPa)	0.62 kg/cm ²
12. Hill climbing ability (in degrees)	45°
13. Number of Chains Chisels Tools	32
14. Beat pattern (hits per m ²) at different operating speeds	Vehicle speed 0.8 km/h and 650 rpm of flail unit is 5 x 8.6 mm
15. Length of Chains Tools	425 mm
16. Diameter of drum	1,300 mm
17. Rotation Speed	Up to 650 rpm
18. Clearance Working depth in varying terrain	Min. 200 mm
19. Working Speed (m ² /h)	
> Light Soil Medium Vegetation	2,600 m ² /h 3,800 m ² /h
> Medium Soil Medium Vegetation	Not given
> Heavy Soil Dense Vegetation	1,200 m ² 2,200 m ² /h
20. Control of Clearance Working depth	Automatically
21. Additional attachable working tools	Additional flail unit on crane-arm
22. Armour	6 mm ARMOX, bullet proofed glass
23. Remote controlled	Yes
> greatest distance	1,000 m
24. Transportation	Self driven up to 25 km/h or on a ordinary truck
> short distances	
> long distances	
> sea transport	
> air transport	

SYSTEM STATUS AND DEPLOYMENT

25. Machines in use	Not given
26. Other types	Samson 420
27. Location of use	Afghanistan, Bosnia and Herzegovina, Croatia, Namibia, Sudan
28. Totally cleared so far (m ²)	More than 12,000,000 m ²

ENGINE | FUEL | OIL

29. Engine	DEUTZ diesel engine with 212 kw or Cumings with 420 hp (Samson 420)
30. Engine power at the flywheel	Hydrostatic drive
31. Sufficient power supplied to working tool	Computer steered
32. Fuel capacity	240 l
33. Fuel consumption	30 l/h 50 l/h
34. Separate engine for working unit	No
35. Cooling system	Water Cooling
36. Oil capacity (both engines)	Not given
37. Hydraulic oil capacity (both engines)	130 l

COSTS

38. Cost of system	350,000 - 430,000 euros depending on the configuration
39. Other costs	
> training	10 days training is included
> spare part set chains belts	
> repair costs for one year	The manufacture offers a spare part kit sufficient for one year field work for 15,000 euros
40. Availability for hire	Yes

OTHER

41. Operator comfort	Upholstered cabin, air conditioning, seat with pneumatic springs-control, drive and flail control with joy-stick on arm rest
42. Air conditioning	Yes