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ENTAM
European Network for Testing of Agricultural Machines

ENTAM - Test Report

Sprayer type: Trailed Air assisted sprayer
Trade mark: Steiner
Model: AS Obst

Manufacturer:
Ernst Steiner
Meranerstr. 34
39011 LANA (BZ)
ITALY

Sept. 2008

JKI-Report: D - 1673

ENTAM recognition: 4/2008

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Assessment table

No.	Contents	Assessment
1	Spray tank surface roughness	+++
2	Spray tank over volume	++
3	Volume of total residual	+
4	Spray tank contents gauge up to 20% Filling	++
5	Spray tank contents gauge from 20% Filling	++
6	Agitation system	+
7	Pressure drop between manometer and nozzle	+
8	Deviation of single nozzle output from table	++
9	Accuracy of pressure gauge	+
10	Liquid flow rate left/right	+++
11	Rinsing water tank *	+

Fig.1+2: Assessment table and assessment keys of important test results

Note: The assessment keys are listed below. The detailed results are in the following test report.

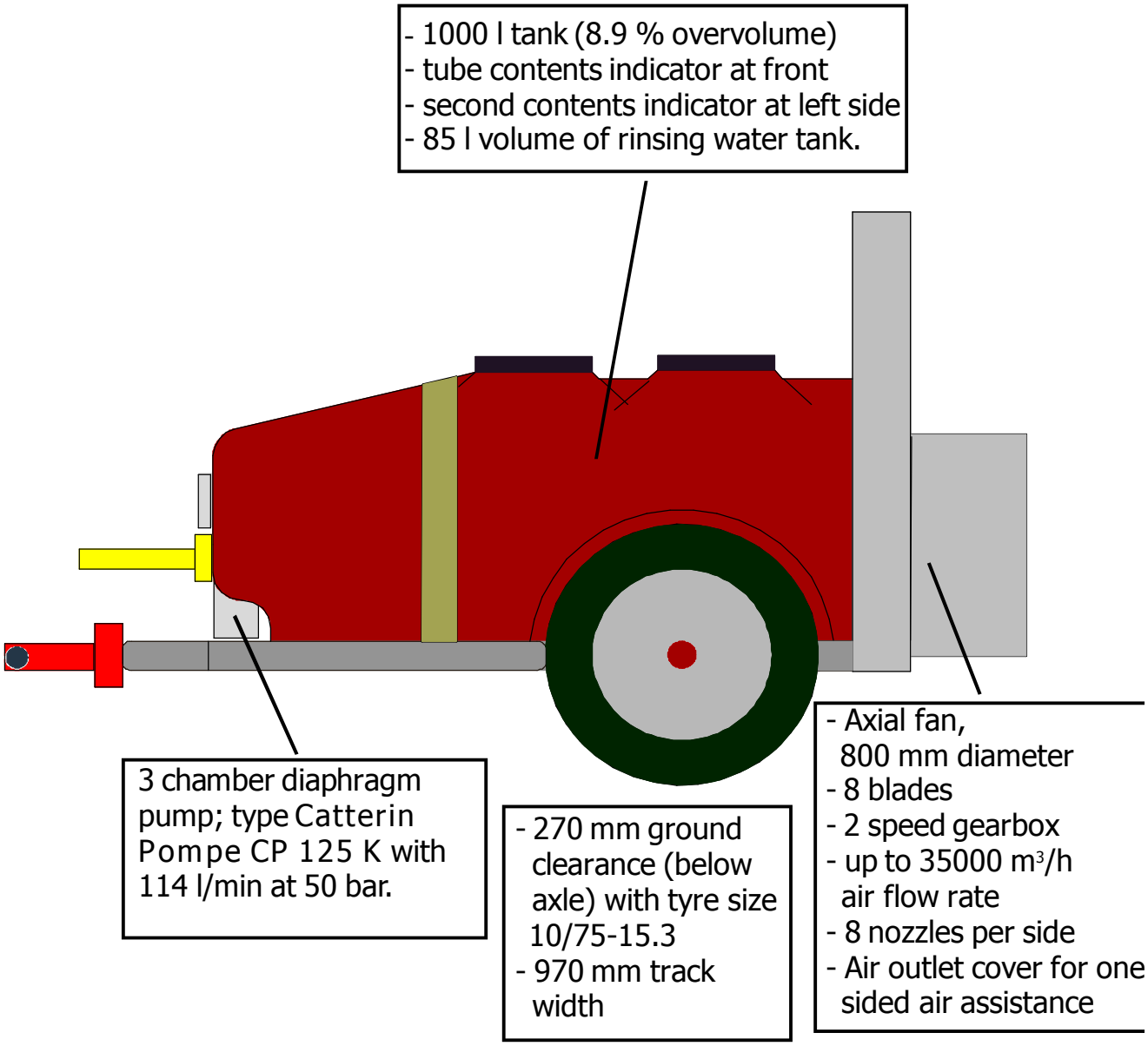
No.	unit	+	++	+++
1	µm	>70-100	30-70	<30
2	%	5-8	>8-12	>12
3	of allow. value	>2/3-3/3	1/3-2/3	<1/3
4	%	7.5-5.0	5.0-2.5	<2.5
5	%	5.0-4.0	<4.0-2.0	<2.0
6	%	>10-15	5-10	<5
7	%	>7-10	3-7	<3
8	%	>7-10	3-7	<3
9	bar	>0.10-0.20	>0.05-0.10	0.00-0.05

No.	unit	+	++	+++
10	%	5.0-4.0	<4.0-2.0	<2.0
11	multiple of residual	10-12	>12-14	>14

*) The rinsing water tank capacity was assessed according to the requirement of 10 times the dilutable residual of the main tank, measured according ISO 13440 with the sprayer in horizontal position.

Free download of the test under: *www.ENTAM.com*
or *www.jki.bund.de*

Technical data of sprayer



Dimensions and weights:

total length:	3400 mm
height:	1800 mm
width:	1240 mm
unloaded weight:	644 kg

Fig.3: Diagram of sprayer

Description of sprayer

Uniaxial chassis made of steel (hot-dip galvanised) with articulated drawbar for towing via lower links. Pin diameter 22 mm (Cat. I) The sprayer can either be equipped with a locking brake or a Bowden cable brake. The p.t.o. drive shaft can be placed on a support when the sprayer is not in use.

Fig.4: Front side with draw bar, pump, suction filter and front tank contents indicator

The rigid axle has a tread of 970 mm. The minimum ground clearance (under the tank sump) is 270 mm.

The sprayer is equipped with a 1000 l spray tank made of polyester (fibreglass-reinforced) with two direct scales at the front on the right (read via level indicator tube, volume marks from 100 to 1000 l, scale gradations of 50 l) and on the left of the sprayer in the direction of travel (direct scale through tank walls, volume markings from 100 l to 1000 l, scale gradations of 50 l). With an oversize of 8.9 %, the tank has sufficient room for any foam which may occur. The tank can be emptied using a protected valve (brass slide valve) on the left side of the sprayer. The inside of the spray tank is cleaned by a rotating cleaning nozzle (plastic) which is situated in the centre above the transmission tunnel. The sprayer has a combined pressure and return agitator. The pressure agitator consists of several injector nozzles which can be switched off. In addition, the flow of liquid from the injector nozzles is distributed along the entire length of the tank through plastic pipes with bore holes.

The return agitator also consists of a plastic pipe with bore holes which take the return flow from the control valves. The return agitator pipe is situated directly above the tank sump; the two pressure agitator pipes are situated to the right and the left of the sump. The spray is directed diagonally into various corners at the bottom of the tank. The rinsing water tank holds 85 l. It is filled using a filling hole on the top of the tank. The filling hole has a diameter of 120 mm. The pump and pipes can also be rinsed when the spray tank is full. The tank rinsing system, induction filter and pressurised agitator can be switched on and off by separate ball valves at the distributor. There is a 15.7 l clean water tank made of polyethylene with a separate tap for the operator to wash himself.

The manually operated control valves are placed on the tractor using correspondingly long hoses. It consists of a central switch for shutting off either the spray sections or for central shut-off, a pressure regulation device with handwheel and toggle (flow distribution regulator) and a pressure gauge, 63 mm in diameter (WIKA). The control valves are mounted on a plate (included) on the mudguard or any other suitable position. The return from the pressure regulation device can be switched by a valve so that it flows either into the tank or into the suction pipe leading to the pump.

Fig.5: Manually operated control valves

Description of sprayer

The fan is an axial flow fan with a rotor diameter of 800 mm; the fan unit is made of galvanised sheet steel. The upper and lower air flow limits can be set using the deflectors. The fan casing is equipped on the right with an adjustable stainless steel cover for the air exit in order to suppress air assistance on one side if required. The position of the cover can be changed by hand at the fan casing. The fan is also driven by power take-off and a mechanical 2-speed spur gearing with a neutral position. The sprayer is equipped with double swivel nozzle bodies made of brass to which the nozzle ends are attached. The nozzles are positioned in front of the air exit in the direction of travel. The distance between the nozzles is 170mm – 200 mm on delivery and can be adjusted using elongated holes. The spray nozzles can be switched off separately. The fan is relatively quiet at 83.7 dB (A) on speed I and 87.3 dB (A) on speed II (measured when driving past at a distance of 7 metres).

Fig.6: Axial fan with 800 mm rotor

The flow of liquid through the pump is carried through a distributor with 6 outlets and the central pressure filter to the pressure regulation device. Here it is split into return flow and spray sections. The central pressure filter (designed for self-cleaning) and other ball valves for activating other functions such as the agitator, induction filter and interior cleaning system, are arranged using a distributor situated next to the pump (see Fig.4). A spray gun and a sprayer washing system can be connected to the free outlet at the pump (ball valve).

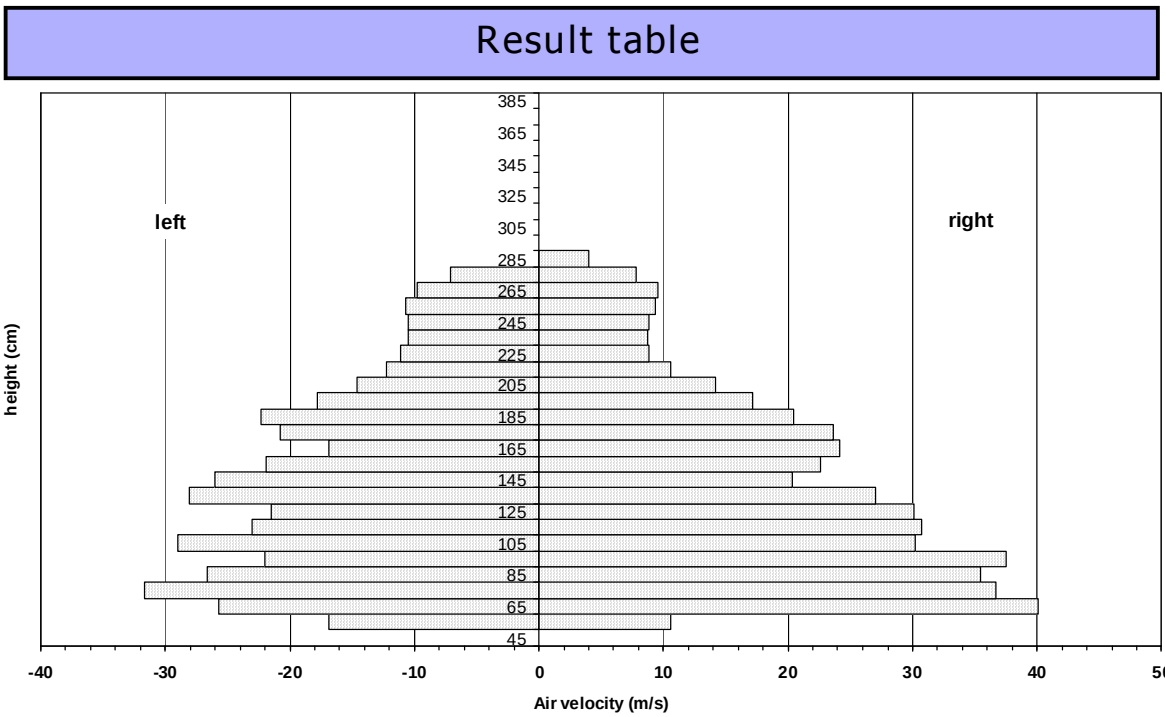


Fig.7: Result table

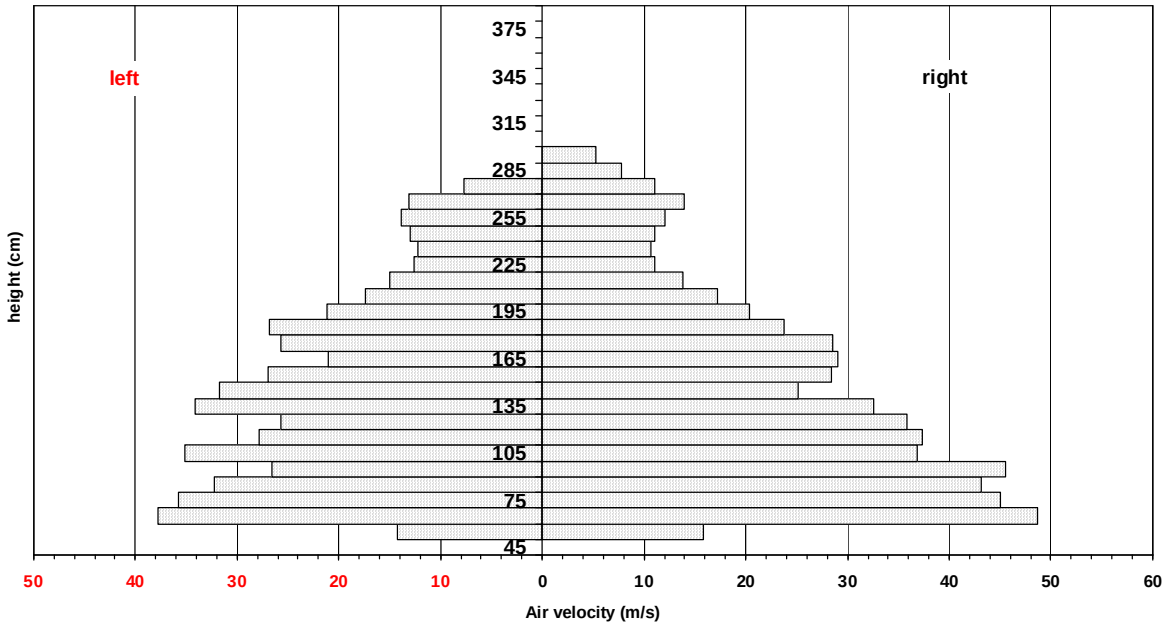


Fig.8: Result table

Result table

tested assembly		result (measured)	
spray tank	over volume	8.9%	* min. 5 %
	contents gauge graduation marks	100	* max. 100 l
	deviation	-3,80% 3,60%	* max. 7.5 % up to 200 l filling * max. 5 % between 200 and 1000 l
	surface roughness	0.02mm	* max 0.1 mm
rinsing tank	volume	85.3 l corresponding to 10.2 times the dilutable volume	* min. 10times the dilutable volume
	rinsing and dilution possible?	yes	
agitation system	deviation from even concentration	-10,54%	*max. 15 %
	pressure drop manometer - nozzle	8.3 % (at 5 bar)	* max. 10 %
	nozzle dripping after switch off	0 ml	* max. 2 ml
	deviation liquid flow rate left / right (10 bar) with AVI 80 02	0.95 %	* max. 5 %
			(*) allowed

Fig.9: Result table

Safety Tests

The sprayer is equipped with safety pictograms (stickers) and operating instructions in the native language, which include further safety information. The sprayer carries a CE-mark and a vehicle identification plate.

The CE-mark shows that a product fulfils the requirements defined for the respective EC directives and that the supplier has carried out the appropriate procedures to achieve conformity. The CE-mark is placed on the equipment by the manufacturer. The manufacturer confirms by doing so that the sprayer was designed and built in accordance with harmonised EC Directive 98/37/EEC and that standard EN 907 has been complied with.

Explanation on testing:

Testing takes place according to the Technical Instructions for ENTAM-Tests of air assisted sprayers. This procedure was developed by the competent testing authorities of the European countries participating in ENTAM and is based on the CEN standard EN 12761 „Agricultural and forestry machinery – Plant protection equipment for the application of plant protection products and liquid fertilisers". This test is only a technical performance test which takes place without an accompanying field test. The test results apply only to the tested appurtenances of the sprayer. Statements on the behaviour of the sprayer with different appurtenances cannot be derived from these results.

Responsibility and recognition

Performing competent authority:
Julius Kühn-Institute (Germany)
Institute for ApplicationTechniques in Plant Protection; Messeweg 11-12;
D-38104 Braunschweig

This test is recognized by the ENTAM members:

HIAE Hungarian Institute of Agricultural Engineering (Hungary)	D-5/2008
NAGREF National Agricultural Research Foundation (Greece)	ΑΕ/103/01/ΖΖ
ENAMA Ente Nazionale per la Meccanizzazione Agricola (Italy)	ENTAM „Rapporto di prova prestazionale" 02/2008
CMA Generalitat de Catalunya Centre de Mecanització Agrària (CMA) (Spain)	EPHP 001/08
BLT- Francisco Josephinum, Wieselburg (Austria)	BLT-Prot.-Nr. 44.08
PIMR - Przemyslowy Instytut Maszyn Rolniczych Industrial Institute of Agricultural Engineering (Poland)	PIMR - 20/ENTAM/ 08
AU/ DAE - University of Aarhus - Department of Agricultural Engineering Sciences (Denmark)	AU/DAE/ENTAM 2008-05
ART - Agroscope Reckenholz-Taenikon (Switzerland)	D-37.08
Cemagref - Institut de recherche pour l'ingénierie de l'agriculture et de l'environnement (France)	CEMA/ENT/08/002