

ENTAM - Test Report



Sprayer type:
Trade mark:
Model:

Built on field crop sprayer
DAMMANN
DTP 4536 on carrier vehicle
DAMMANN-TRAC DT500

Manufacturer:
HERBERT DAMMANN GmbH
Dorfstrasse 17
21614 Buxtehude - Hedendorf
GERMANY
March 2009

Test report: D - 1749

Assessment table		
No.	Contents	Assessment
1	Spray tank surface roughness	++
2	Spray tank over volume	+
3	Volume of total residual (max. allowed 94.5 l)	++
4	Spray tank contents gauge up to 20% Filling	++
5	Spray tank contents gauge from 20% Filling	++
6	Agitation system	+
7	Width of nozzle bar section	++
8	Boom height adjustment range	++
9	Accuracy of pressure gauge	+
10	Accuracy of flow meter	++
11	Regulation speed	++
12	Even transverse distribution	+++
13	Rinsing water tank	+++*
14	Deviation of volume/hectare adjustment device (spray computer) from desired value	++
15	Repeatability of volume/hectare adjustment device (spray computer)	+++
16	Pressure drop between manometer and nozzle	+
17	Deviation of single nozzle output from table	+++

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

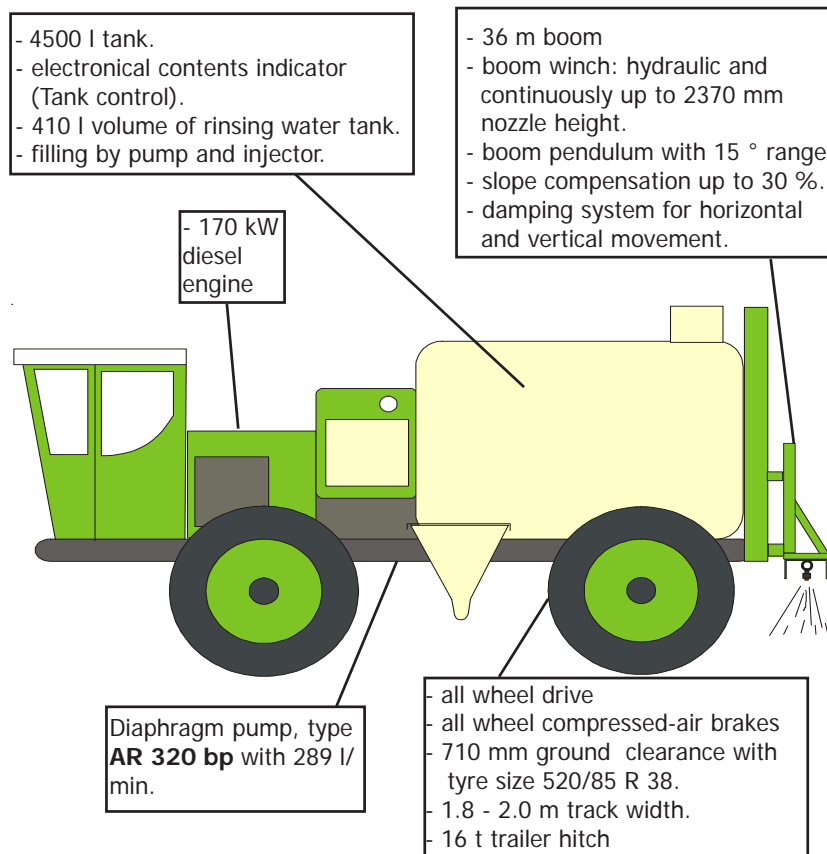
Note: The assessment keys are listed below. The detailed results are in the following test report.

No.	unit	+	++	+++	No.	unit	+	++	+++
1	µm	>70-100	30-70	<30	10	%	4-5	2-4	0-<2
2	%	5-8	>8-12	>12	11	s	> 4.7	2.3 - 4.7	< 2.3
3	of allow.value	>2/3-3/3	1/3-2/3	<1/3	12	CV	>7-9	4-7	<4
						* multiple of dilutable		>12 -	
4	%	7.5-5.0	5.0-2.5	<2.5	13	residue	10 - 12times	14times	>14times
5	%	5.0-4.0	<4.0-2.0	<2.0	14	%	>4-6	2-4	<2
6	%	>10-15	5-10	<5	15	%	>2-3	1-2	<1
7	m	4.5-6	>3-4.5	3 or less	16	%	>7-10	3-7	<3
8	m	1-1.5	>1.5-2.0	>2.0	17	%	>7-10	3-7	<3
9	bar	>0.10-0.20	>0.05-0.10	0.00-0.05					

*) 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.net
or www.jki.bund.de

Technical data of sprayer



Dimensions and weights (sprayer mounted on carrier vehicle):

total length:	9010 mm
height:	3890 mm
width:	2610 mm
unloaded weight:	10070 kg
total weight:	14500 kg

Fig.3: Diagram of sprayer.

Description of sprayer

The equipment has been designed as a built-on-sprayer for the DAMMANN-TRAC DT500 and is connected to the carrier vehicle at four support points. The DAMMANN-TRAC has an all-wheel-drive, as well as all wheel compressed-air brakes and all wheel suspension by coil springs. The vehicle can be ordered with track width between 1.8 m – 2.0 m. It is driven by a 170 KW diesel engine with 40 km/h gearbox. The gears can be shifted automatically or by shift



Fig.4: Right sprayer side with lateral folded boom and ascent to the drivers cabin.

rocker. The hydraulic functions are activated manually or automatically by the spray computer „Basic Terminal TOP“. The vehicle is equipped with a trailer hitch so trailers up to 16 t with compressed-air brakes can be towed. For better manoeuvring the driver is supported by two cameras (in the front below the cabin and in the back). In the front section the undercarriage is covered with aluminium plates to provide a smooth surface which is kind to plants.



Fig.5: Aluminium plates for smooth surface.

Description of sprayer

The tank which is made of fiberglass is equipped with three splash walls and an integrated rinsing water tank and two separate pressure agitation systems. One works as heavy duty agitation system for reagitation after brakes. The other one as agitation system during spraying. In the tested version the agitator switches itself off automatically when the tank contents fall to the 300 l level in order to reduce the amount of technical residues (value is adjustable via the terminal). As preparation for overwintering all liquid lines include the pump can be flushed with compressed air so after cleaning the lines no liquid will remain in the liquid pressure circuit. The most important functions for filling are centralised at the operator controls center on the left of the sprayer. The induction bowl with the container rinsing nozzle and circular pipe can be lowered when in use. The contents of the spray tank can be seen online at the „Tank-Control“ whilst filling. The boom is a framework construction made of steel and aluminium profiles whose height can be adjusted hydraulically and infinitely variable. It comprises a central pendulum with a pendulum range of up to 15 ° and hydraulic incline adjustment up to an incline of 30 %.



Fig. 6: Spray boom and Lechler „Varioselekt“.

Description of sprayer

Optional an automatic boom control with spacing system, using ultrasonic sensors on the boom ends, can be activated. The spray system works with end-to-end stainless steel nozzle tubes with electro-pneumatic controlled single nozzle switching system (Lechler Varioselekt). The nozzles are selected manually or by the spray computer (automatic mode). The electronic pressure sensor is positioned on the boom support next to the flow meter. The pressure in the boom is consistent thanks to the generous hose diameters. In addition, the boom is rinsed constantly when the nozzles are switched off by the pressure circulation system. The inspected 36 m boom can also be used partly folded as an 18 m boom.

The decentralised control valves (standard design) consist of 8 spray sections (individual nozzle control), the main valve, the control valve (electro-pneumatic), Basic Terminal TOP (company Müller). Also a lever on the right hand armrest is mounted which integrates all the important hydraulic and spray functions. The nozzles are switched off fully by simultaneously switching off all the nozzles connected and opening of the



Fig.7 and 8: Drivers place and „Basic - Terminal“.

Description of sprayer

circulation pipe. The nozzles remain closed if the power supply fails or there is no compressed air. The control unit „Basic Terminal TOP“ works with a job counter on the boom sprayer for speed dependent control of spray application and controlling the entire sprayer.

In normal spraying mode the active spray sections, speed, spray pressure, the current application rate / tank contents are shown on the display.

Alternative equipment

Apart from the inspected sprayer version, DAMMANN also offers the sprayer with an 8000 l tank and working widths of 24, 27, 28, 30 and 33 m. The 4500 l tank version can also be equipped with a 500 l pump (AR 520) which is series for the 8000 l tank version.

Result table				
tested assembly		result (measured)		
spray tank	over volume	7.93	* min. 5 %	
	contents gauge graduation marks	100	* max. 100 l	
		deviation	-2.5 %	* max. 7.5 % up to 900 l filling
		-2.0 %	* max. 5 % between 900 and 4500 l	
	surface roughness	0.036 mm	* max 0.1 mm	
rinsing tank	volume	410 l corresponding to 50 times the dilutable residual on level ground	* min. 10 times the dilutable volume	
	rinsing and dilution possible?	yes		
can rinsing equipment	rinsing efficiency	yes	* max. 0.01 % of can contents	
manometer	graduation marks	0.1 bar	* max. 0.2 bar	
	deviation	0.0 bar	* max. 0.2 bar	
agitation system	deviation from even concentration	-12.7 %	*max. 15 %	
residual in l	dilutable	max. 59 l (ascending at 6° slope)	* max. 94.5 l	
	non dilutable	28 l		
spray boom	height adjustment range from - to nozzle ground contact protection	570 mm - 2370 mm		
	nozzle ground contact protection	yes		
	pressure loss between manometer and nozzle at 5 bar pressure	7 %	* max. 10 %	
	nozzle dripping after switch off	0 ml	* max. 2 ml	
	single nozzle flow rate			
	type of nozzle: Lechler IDN 120 025 POM			
	pressure (bar)	flow rate (l/min)	max. deviation from table in % *(max. 10 %)	max. deviation from mean in % *(max. 5 %)
	4	1.15	-3.8	-3.8
	7	1.51	-4.5	-4.0
	transverse distribution			
type of nozzle: Lechler IDN 120 025 POM				
pressure (bar)	distance (cm)	coefficient of variation (%) *(max. 9 %)		
2	50	4.5		
4	50	2.7		
7	50	2.9		

Fig.9: Result table 1.

Result table		
volume/hectare adjustment device		
repeatability of adjustment		
adjusted flow rate in l/ha	deviation from adjusted value % *(max. 6 %)	CV *(< 3 %)
210	-3.9	0.57
300	-3.0	0.71
390	-2.5	0.67
procedure	regulation time (s) with deviation > 10 % to adjusted value	
switching on / off	6.5	* max. 7 s
switching of single sections	3.3	* max. 7 s
change of driving speed by changing gears		
1.5 m/s to 2.0 m/s	4.1	* max. 7 s
2.0 m/s to 2.5 m/s	4.2	* max. 7 s
2.5 m/s to 2.0 m/s	4.1	* max. 7 s
2.0 m/s to 1.5 m/s	5.4	* max. 7 s

Fig.10: Result table 2.

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 fulfills 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 Field Crop Sprayers (Rel.2 and 3). Obstacle give way device at the boom was inspected after change in 2009. 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 Application Techniques in Plant Protection
 Messeweg 11-12
 D-38104 Braunschweig

This test is recognized by the ENTAM members:

	BLT - Francisco Josephinum, Wieselburg (Austria)	041/09
	AU/DAE - University of Aarhus - Department of Agricultural Engineering Sciences (Denmark)	AU/DAE/ENTAM 2009-11
	Cemagref - Institut de recherche pour l'ingénierie de l'agriculture et de l'environnement (France)	CEMAGREF/ENT/09/022
	I.A.M.C. Institute of Agricultural Machinery and Constructions (Greece)	AE/119/01/ZZ
	HIAE Hungarian Institute of Agricultural Engineering (Hungary)	D-19/2009
	ENAMA Ente Nazionale per la Meccanizzazione Agricola (Italy)	ENTAM „Rapporto di prova prestazionale“ 14/2009
	PIMR - Przemyslowy Instytut Maszyn Rolniczych Industrial Institute of Agricultural Engineering (Poland)	PIMR - 42/ENTAM/09
	CMA Generalitat de Catalunya Centre de Mecanització Agrària (CMA) (Spain)	EPH 004/09
	ART - Agroscope Reckenholz-Taenikon (Switzerland)	D-27.09