

ENTAM - Test Report



Sprayer type:
Trade mark:
Model:

Built on field crop sprayer
DAMMANN
DTP 6036 on carrier vehicle
DAMMANN-TRAC DT 2500 S4

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

Test report: D - 2074

March 2017

Assessment table

No.	Contents	Assessment
1	Spray tank surface roughness	++
2	Spray tank over volume	+
3	Volume of total residual (here max. allowed 102 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	see no.14
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	++

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

*) measured on even ground

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	%	>7-7.5	>3-7	0-3
3	of al-low.value	>2/3-3/3	1/3-2/3	<1/3	12	CV	>7-9	4-7	<4
4	%	7.5-5.0	<5.0-2.5	<2.5	13	times amount of dilutable residual	10-12	>12-14	>14
5	%	5.0-4.0	<4.0-2.0	<2.0	14	s	>4-7	2-4	<2
6	%	>10-15	5-10	<5	15	deviation %	>4-6	2-4	<2
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					

Free download of the test under: www.ENTAM.net
or www.julius-kuehn.de

Technical data of sprayer

- Spray boom „Profi“ with 36 m working width.
- 12 hydraulic sections.
- Pendulum range up to 9 °.
- Slope compensation up to 15 %.
- Infinitely variable from 490mm - 2480 mm.
- Single nozzle illumination „Night Lux“.

- 16 l wash hand tank.

- 6000 l tank.
- Electronic contents indicator (Tank Control).
- Spray computer „Touch 1200“.
- 541 l rinsing water tank.
- 180 KW engine.



Fig.1: Overview of the spray equipment.

- 1.85 - 2.25 m track width.
- 1100 mm ground clearance with 380/90 R 46 tyres.
- all wheel steering.

- membran pump „AR500 bp“ with 460 l/min at 20 bar.

Dimensions and weights :

total length:	9350 mm
height:	3950mm
width:	2870 mm
unloaded weight:	11515 kg

Description of sprayer



Fig.2: View of the right sprayer side.

The equipment has been designed as a built-on-sprayer. It is connected to the carrier DAMMANN-TRAC DT 2500 S4 via 4 supporting points. The carrier is equipped with hydraulic 4 wheel drive and 4 wheel steering. It is full suspended and designed for a road speed of 40 km/h. A trailer hitch is mounted so trailers with up to 16 t can be towed. For better maneuvering the driver is supported by two cameras (at the front and the back end). The spray tank with a nominal volume of 6000 l is made of fiberglass and keeps an overvolume of It is designed with splash walls to prevent strong dynamic reactions because of liquid displacement in the tank. The separate tank for the 541 l cleaning and dilution liquid is also placed in the main tank.



Fig.3: Steel boom with nozzle protecting lower boom profil and ultrasonic sensors for the automatic boom height control.

Description of sprayer



Fig.4: Boom lift and central segment of the lateral folding boom.

The steel boom (outer segments made of aluminium) can be adjusted in height indefinitely between 490 mm and 2480 mm. For keeping the correct height, 4 ultrasonic sensors are mounted. The pendulum range of the boom is $\pm 9^\circ$ and the slope compensation can compensate between $\pm 15\%$. To switch the nozzles, the boom is equipped with a single nozzle switching. Additional lights on the boom for a better spray and position control for spraying under bad light conditions are mounted.

The spray liquid system in the boom is designed as a recirculation system, so all nozzles can be supplied with the correct spray solution just from the beginning of spraying and the complete liquid system can be flushed without spraying. The boom can also be used only half unfolded with a working width of 18 m.



Fig.5: Control center on the left sprayer side.

Description of sprayer

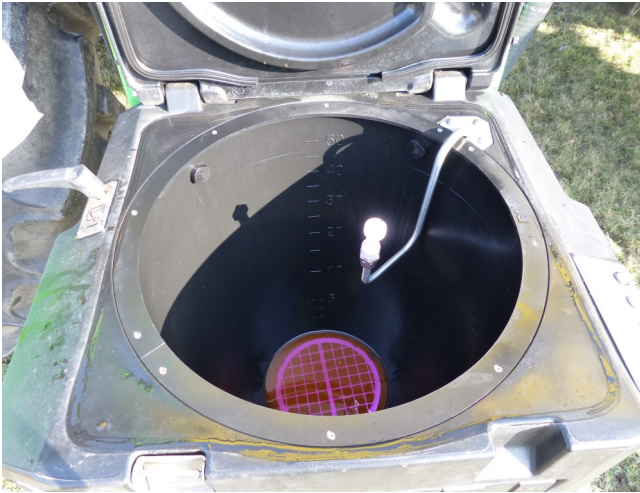


Fig.6: Induction bowl with contents indicator and rotating nozzle.

The 50 l induction bowl (left sprayer side) offers one rotating nozzle for flushing in, for the cleaning of plant protection cans and for the inner cleaning of the bowl.

In the cabin the sprayer is equipped with a spray computer and terminal "HD 12 pad". All functions can be controlled via the terminal or the lever on the right armrest which also integrates all important hydraulic functions.



Fig.7: Drivers place with terminals for the driving and spraying functions (HD 12 pad). With monitor for the rear view camera (lower control panel).

Result table

tested assembly				result (measured)	
spray tank	over volume			5.7 %	* min. 5 %
	contents gauge		graduation marks	electronical display	* max. 100 l
			deviation	2.3 %	* max. 7.5 % between 600l and 1200 l.
				-2.2 %	* max. 5 % between 1200 l and 6000 l
surface roughness			0.054 mm	* max 0.1 mm	
rinsing tank	volume			541 l	*10 % of nominal volume
	rinsing and dilution possible?			yes	
	Cleaning performance (main tank) (concentration after cleaning)			7909	Min.factor 400 of concentration before cleaning
can rinsing equipment		rinsing efficiency		<0.01 %	* max. 0.01 % of can contents
manometer	graduation marks			0.1 bar	* max. 0.2 bar
	deviation			-0.1 bar	* max. 0.2 bar
agitation system	deviation from even concentration			7.9 %**	*max. 15 %
residual in l		dilutable		62.9 l	* max. 102 l
		non dilutable		Non, recirculation system	
spray boom	height adjustment range from - to			490 mm - 2480 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				
		pressure (bar)	flow rate (l/min)	max. deviation from table in % *(max. 10 %)	max. deviation from mean in % *(max. 5 %)
		4.0	1.188	-3.8	-3.8
	transverse distribution				
		pressure (bar)	distance (cm)	coefficient of variation (%) *(max. 9 %)	
		2.0	50	4.5	
	4.0	50	2.7		
	7.0	50	2.9		
Measured with :			Lechler IDN 120-025 POM		

Tab.3: Result table

* limit

**during spraying

Result table

volume/hectare adjustment device		
repeatability of adjustment		
adjusted flow rate in l/ha	deviation from desired value % **	deviation from desired value % **
	ascending application rate	descending application rate
210	3.9	2.7
300	3.1	2.5
390	2.5	2.1
procedure	regulation speed: deviation to adjusted value after 7 s	
switching on / off	1.5 %	after 7 s
switching of single sections	3.5 %	after 7 s
procedure	reaching steady state after varying conditions (s)	
change of driving speed by changing gears		steady state mean deviation
1.5 m/s to 2.0 m/s	4.1 s	*
2.0 m/s to 2.5 m/s	4.2 s	*
2.5 m/s to 2.0 m/s	4.1 s	*
2.0 m/s to 1.5 m/s	5.4 s	*

Tab.4: Result table 2.

* limit: < 10 % after 7 s

** limit: m,ax. 6 %

Explanation on testing:

Testing takes place according to the Technical Instructions for ENTAM-Tests of Field Crop Sprayers (Rel.5). This procedure was developed by the competent testing authorities of the European countries participating in ENTAM and is based on the standard EN ISO 16119. 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:



HBLFA Francisco Josephinum 028/2017
BLT Wieselburg
 (Austria)



CMA Generalitat de Catalunya 05/17
 Centre de Mecanització Agrària (CMA)
 (Spain)



ENAMA Ente Nazionale per la Meccanizzazione ENTAM „Rapporto di Agricola
 (Italy) prova prestazionale“ 07/2017



HIAE (MGI) Hungarian Institute of Agricultural Engineering D-152/2017
 (Hungary)



IRSTEA - National Research Institute of Science and Technology for Environment and Agriculture IRSTEA/CEMAGREF/ENTAM/
 (France) (formerly CEMAGREF) 17/020



PIMR - Przemyslowy Instytut Maszyn Rolniczych Industrial Institute of Agricultural Engineering PIMR-167/ENTAM/17
 (Poland)