

ENTAM - Test Report



Sprayer type:
Trade mark:
Model:

Mounted field crop sprayer
Amazone
UF 2002

Manufacturer:
Amazonen-Werke H. Dreyer
Am Amazonenwerk 9 -13
49205 Hasbergen-Gaste
Germany

Test report: D - 2082

August 2017

Assessment table

No.	Contents	Assessment
1	Spray tank surface roughness	+++
2	Spray tank over volume	+
3	Volume of total residual (here max. allowed 70 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.

*) changed requirement

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					

**) alternative requirement: > 10 % of main tank = „+“

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

Technical data of sprayer

- „Super S“ boom with 30 m working width.
- 13 hydraulic sections.
- Pendulum range up to 10 °.
- Slope compensation up to 20 %.
- Infinitely lifting range 1550 mm.

- 2000 l tank.
- Electronic + visual contents indicator.
- Terminal „AMATRON 3“.
- 347 l rinsing water tank.
- 34 l handwash tank.



Fig.1: Overview.

- Quick-coupling system.

- Pump „Comet BP 280 K“ with 243 l/min at 4 bar.

Dimensions and weights :

total length:	2200 mm
height:	3180 mm
width:	2350 mm
unloaded weight:	1770 kg

Description of sprayer



Fig.2: View of the right sprayer side.

The support frame is made of angular metal profiles and standard profiles. The tested sprayer was equipped with a quick coupling system with more space between sprayer and tractor during the coupling of the PTO-shaft.

The tank with a nominal volume of 2000 l is made of polyethylene. It keeps an over-volume of 6 % to hold back foam.

The tank can be filled via the top opening or a 2" pump connection.

The level indicator has an indirect non-linear scale (floating rod with indicator scale) on the front left. The volume of liquid in the tank is also displayed on the Terminal „AMATRON 3“.

The tank is emptied via a 5-way ball valve on the left beneath the tank. For cleaning the tank inner surfaces a rotating cleaning nozzle is mounted in the centre of the tank (rotating nozzle made of plastic). The sprayer comprises a detachable, pressurised agitation system in the middle of the tank, spraying in all directions. The agitation speed can be set to one of five different settings.

The clean water tank for rinsing and diluting holds a volume of 347 l. The hand wash tank for the operator has a volume of 34 l.

The 30 m boom named "Super-S" is made from welded steel plate profiles. It is folded vertically in the back of the sprayer. The vertical lift system of the sprayer can lift and adjust the boom within a range of 1550 mm.

The pendulum range of the boom is $\pm 10^\circ$ and the slope compensation can compensate between $\pm 20\%$.



Fig.3: Level indicator with non-linear graduation.

Description of sprayer



Fig.4: Folded boom at the back of the sprayer.

The boom is equipped with a switchable pressurized recirculation system and the nozzles are controlled by single nozzle switching.

The plant protection product is introduced either via the tank opening for filling on the top of the sprayer or the induction bowl on the left. The induction bowl is made of polyethylene with a circular rinsing pipe with four nozzles for introducing the product and also for rinsing off any product residues on the sides of the bowl.

The induction bowl is equipped with a spring-loaded rotating rinsing nozzle for the cleaning of product cans.

For cleaning the outside of the sprayer, a special cleaning set is available as an extra, consisting of a hose drum with 1/2" hose

and a spray gun. The hose drum is situated behind the sprayer on the boom support. It is activated by a 5-way ball valve on the left side control centre.



Fig.5: Left sprayer side: induction bowl and control center.

Description of sprayer



Fig.6: „AMATRON 3“ terminal and switchboard for displaying and controlling the spray and hydraulic functions.

With this left side control centre the functions filling, agitation and cleaning can be controlled.

With the „AMATRON 3“ terminal in the cabin, all hydraulic and spray functions can be controlled or viewed. This includes all usual information displayed on modern spray computers.

Result table

tested assembly				result (measured)		
spray tank	over volume			5.9 %	* min. 5 %	
	contents gauge		graduation marks	electronical display	* max. 100 l	
			deviation	4.8 %	* max. 7.5 % between 200l and 400 l.	
				3.8 %	* max. 5 % between 400 l and 2000 l	
surface roughness		Inner surface	0.005 mm	* max 0.1 mm		
rinsing tank	volume			347 l	*10 % of nominal volume	
	rinsing and dilution possible?			yes		
	Cleaning performance (main tank) (concentration after cleaning)			2219	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			-0.2 bar	* max. 0.2 bar	
agitation system	deviation from even concentration			4.2 %	*max. 15 %	
residual in l		dilutable		37.3 l	* max. 70 l	
		non dilutable		Non, recirculation system		
spray boom	height adjustment range up to			- 2080 mm**		
	nozzle ground contact protection			yes		
	pressure loss between manometer and nozzle at 4 bar pressure			3.2 % ***	* 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	1.825	-0.3	2.5	
	transverse distribution					
		pressure (bar)	distance (cm)	coefficient of variation (%) *(max. 9 %)		
		1.0	50	5.7		
	3.0	50	3.3			
	5.0	50	3.0			
Measured with :			Agrotop AirMix 110-05			

Tab.3: Result table

* limit

** with 400 mm lifted by tractor

*** with Lechler ID 120-04

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
189	1.3	1.1
270	1.5	1.0
351	2.1	1.7
procedure	regulation speed: deviation to adjusted value after 7 s	
<u>switching on / off</u>	2.6 s***	after 7 s
<u>switching of single sections</u>	2.1 s***	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	2.5 s	*
2.0 m/s to 2.5 m/s	2.4 s	*
2.5 m/s to 2.0 m/s	2.4 s	*
2.0 m/s to 1.5 m/s	2.3 s	*

Tab.4: Result table 2.

* limit: < 10 % after 7 s

** limit: max. 6 %

***steady state reached

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 042/2017
BLT Wieselburg
 (Austria)



CMA Generalitat de Catalunya EPH 13/17
 Centre de Mecanització Agrària (CMA)
 (Spain)



ENAMA Ente Nazionale per la Meccanizzazione ENTAM „Rapporto di Agricola
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HIAE (MGI) Hungarian Institute of Agricultural D-161/2017
 Engineering
 (Hungary)



IRSTEA - National Research Institute of Science IRSTEA/CEMAGREF/ENTAM/
 and Technology for Environment and Agriculture 17/030
 (France) (formerly CEMAGREF)



PIMR - Przemyslowy Instytut Maszyn PIMR-176/ENTAM/17
 Rolniczych Industrial Institute of Agricultural
 Engineering
 (Poland)