

ENTAM - Test Report



Sprayer type:
Trade mark:
Model:

Trailed field crop sprayer
Amazone
UX 4200 Special

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

Test report: D - 2060

June 2016

Assessment table

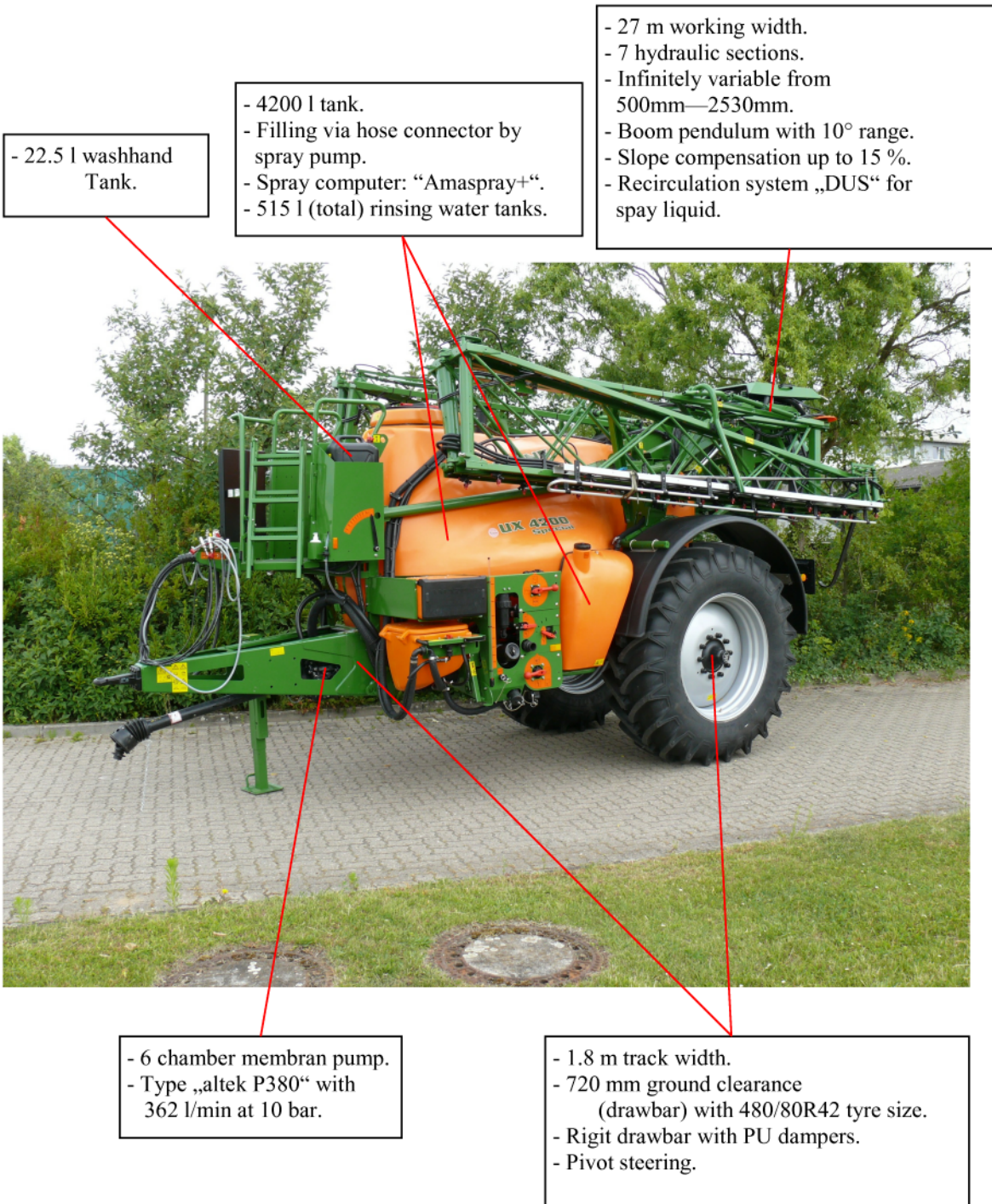
No.	Contents	Assessment
1	Spray tank surface roughness	++
2	Spray tank over volume	++
3	Volume of total residual (here max. allowed 74 l)	++
4	Spray tank contents gauge up to 20% Filling	+
5	Spray tank contents gauge from 20% Filling	+
6	Agitation system	++
7	Width of nozzle bar section	++
8	Boom height 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	++

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

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	%	>7-10	>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	10-12	>12-14	>14
5	%	5.0-4.0	<4.0-2.0	<2.0	14	%	>4-6	2-4	<2
6	%	>10-15	5-10	<5	15	CV	>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					

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

Technical data of sprayer



Dimensions and weights :

total length:	6850 mm
height:	3250 mm
width:	2380 mm
unloaded weight:	3500 kg

Fig.3: Overview.

Description of sprayer



Fig.4: Left sprayer side with contents indicator and induction bowl.

The framework is made of steel profiles, with the tank situated on the top. The non suspended axle was adjusted to a track width of 1.8 m. The suspended drawbar is equipped with PU dampers to reduce the jolts from towing. The framework is designed for a maximum speed of 40 km/h. The pump (altek P380) is placed

between the drawbar profiles, it is driven by power take-off shaft. The spray tank is designed without splash walls and only a small of its base is flat due to its slim and sloping sides. The tank, with an oversize of 11.2 %, has sufficient reserves to accommodate any foam which may result. Two clean water tanks with a volume of together 515 l are mounted at the sprayer, for inner tank cleaning or for rinsing of the liquid system.

The separate hand wash tank holds 22.5 l. The pressurised agitation system can be switched off to keep the residues in the tank to a minimum. The speed of the agitation system can also be infinitely adjusted by a valve. The sprayer is equipped with a level indicator based on float gauge.

The boom is a framework construction made of steel profiles whose height can be adjusted hydraulically and infinitely by a parallelogram. It comprises a central pendulum with a pendulum range of up to 10° and hydraulic incline adjustment up to an incline of 15 %. It is also possible to work with the outer boom sections stay folded.



Fig.5/6: Mounting of the drawbar and shock absorbing PU-dampers.

Description of sprayer



Fig.7: Left sprayer side with new operating panel, filling connections and contents indicator for rinsing water tank.

The sprayer is equipped with a pressurized fluid circulation system (DUS) which assures that the full spray concentration is available for all nozzles right at the beginning of the spray. Also the fluid conducting parts of the boom can be rinsed independently. The circulation system works with a fixed liquid pressure in the pipes but it can also be completely switched off. Thanks to this (overpressure) recirculation system the amount of non delutable residual can be reduced to about 1.5 l. The spray level reading is possible manually (at the left sprayer side) or on the display. Both level indicators fulfill the accuracy requirements entirely.

By using the tank filling connection the tank can easily be filled with the pump.

The plant protection product can be flushed into the tank by using the induction bowl. For using the bowl, it has to be tilt out. For flushing in and for rinsing the bowl it is equipped with a circular pipe and 3 fixed nozzles. For the rinsing of plant protection containers an additional rotating nozzle is mounted in the bowl.

The most important functions for filling and agitating are centralised at the operator controls board on the left side of the sprayer.



Fig.8: Induction bowl.

Description of sprayer

In normal spraying mode the speed and current application rate or the liquid flow in l/min are shown on the display. But also other information like sprayed amount of liquid, sprayed area or inclination of the boom can be displayed. In this case the boom inclination is displayed by a series of LEDs.

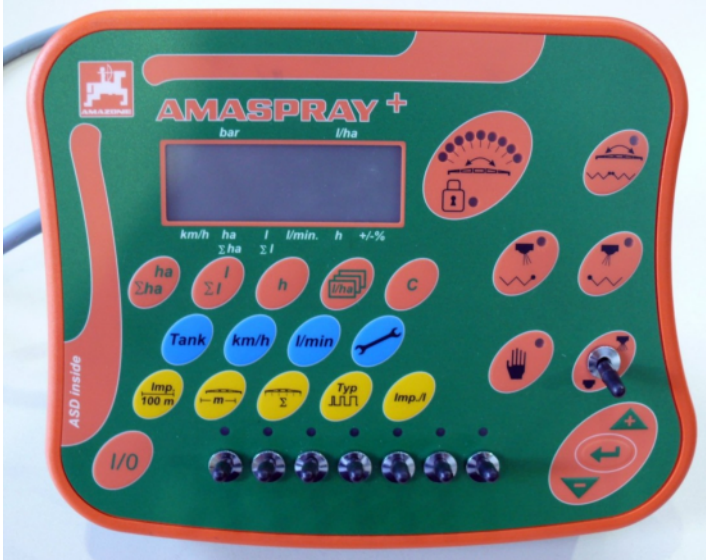


Fig.9: Spray computer and terminal "Amaspray+".

Result table

tested assembly				result (measured)		
spray tank	over volume			11.2 %	* min. 5 %	
	contents gauge		graduation marks	electronical display	* max. 100 l	
			deviation	-6.9%	* max. 7.5 % up to 840 l filling	
				4.5%	* max. 5 % between 800 l and	
surface roughness			0.052 mm	* max 0.1 mm		
rinsing tank	volume			515 l	* 10 times delutable residual on	
	rinsing and dilution possible?			yes		
	Cleaning performance (main tank) (concentration after cleaning)			2492 %	Min.factor 400 of concentration before cleaning	
can rinsing equipment		rinsing efficiency		0.01 %	* max. 0.01 %	
manometer	graduation			0.1 bar	* max. 0.2 bar	
	deviation			0.2 bar	* max. 0.2 bar	
agitation system	deviation from even concentration			8.8 %	*max. 15 %	
residual in l		dilutable		50.5 l	* max. 75 l	
		non dilutable		1.5 l		
spray boom	height adjustment range from - to			500 mm - 2530 mm		
	nozzle ground contact protection			yes		
	pressure loss between manometer and nozzle at 3 bar pressure			5.6 % (with Agrotop Air-Mix 110- 04)	* max. 10 %	
	nozzle dripping after switch off			0 ml	* max. 2 ml	
	single nozzle flow rate					
			type of nozzle: Agrotop AirMix 110-04			
		pres- sure (bar)	flow rate (l/ min)	max. deviation from table in % *(max. 10 %)	max. deviation from mean in % *(max. 5 %)	
		3.0	1.624	4.94	-3.94	
	transverse distribution					
			type of nozzle: Agrotop AirMix 110-04			
	pres- sure	distance (cm)	coefficient of variation (%) *(max. 9 %)			
	1.5	50	4.44			
	3.0	50	4.84			
	5.0	50	4.17			

Fig.10: Result table 1.

Result table		
volume/hectare adjustment device		
repeatability of adjustment		
adjusted flow rate in l/ha	deviation from desired value % CV (max. 3 % CV)	deviation from desired value % CV (max. 3 % CV)
	ascending application rate	Descending application rate
160	-3.25	0.26
240	-0.97	0.36
320	-0.98	0.36
<u>procedure</u>	regulation speed: deviation to adjusted value after 7 s	
switching on / off	3.6 %	after 7 s
switching of single sections	3.6 %	after 7 s
<u>procedure</u>	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	1.8 s	< 10 %
2.0 m/s to 2.5 m/s	1.7 s	< 10 %
2.5 m/s to 2.0 m/s	5.1 s	< 10 %
2.0 m/s to 1.5 m/s	5.0 s	< 10 %

Fig.11: Result table 2.

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:



BLT- Francisco Josephinum, Wieselburg - 016/2016
 Biomass, Logistics, Technology (Austria)



CMA Generalitat de Catalunya 016/2016
 Centre de Mecanització Agrària (CMA) (Spain)



ENAMA Ente Nazionale per la Meccanizzazione Agricola (Italy) ENTAM „Rapporto di prova prestazionale“: 04/2016



MGI Hungarian Institute of Agricultural Engineering (Hungary) D-121/2016



IRSTEA - National Research Institute of Science and Technology for Environment and Agriculture 16/007
 (France) (formerly CEMAGREF)



PIMR - Przemysłowy Instytut Maszyn Rolniczych Industrial Institute of Agricultural Engineering (Poland) PIMR-136/ENTAM/16