

ENTAM - Test Report



Sprayer type:
Trade mark:
Model:

Self propelled field crop sprayer
AGCO
RoGator RG 645

Manufacturer:
AGCO Netherlands B.V.
Horsterweg 66
5971 NG Grubbenvorst
Netherlands
June 2011

Test report: D - 1898

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	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	++

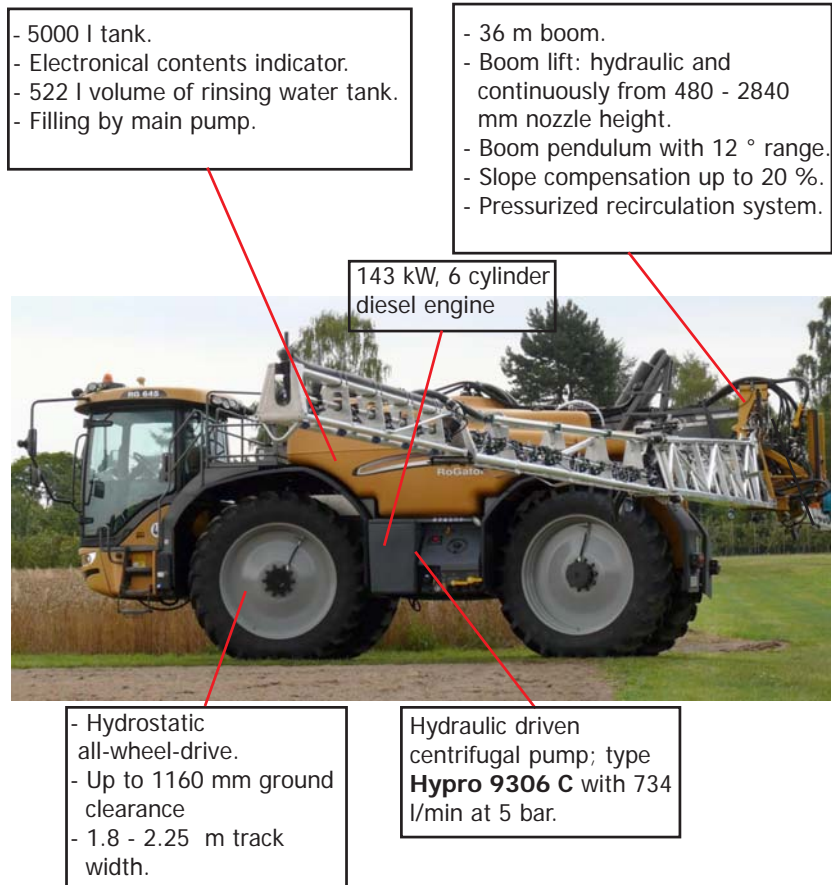
Fig.1+2: Assessment table and assessment keys of important test results.

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	0-<2.3
3	of allow.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	% of tank vol.	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	%	>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.jki.bund.de

Technical data of sprayer



Dimensions and weights:

total length:	9250 mm
height:	3980 mm
width:	2550 mm
total weight:	12060 kg

Fig.3: Diagram of sprayer.

Description of sprayer

The RoGator RG 645 is powered by a 143 kW 6 Cylinder diesel engine from SISU (tested version). Different engines from 121 KW (4 cylinder) to 160 KW (6 cylinder) are available. The wheel drive is realised by a hydrostatic all-wheel-drive.



Fig.4: The engine at the right sprayer side.

The cabin is equipped with

air conditioning, a charcoal filter is optional. The gearbox has two speed ranges „Feld“ (means „field“ with up to 20 km/h) and „Straße“ (means „street“ with up to 40 km/h). In the field modus all wheels can be steered and the track width can be adjusted hydraulically between 1.8 m and 2.25 m (during slow driving). The ground clearance of 1.16 m and a mostly smooth floor pan shall prevent plant damages. The backbone of the RoGator is formed by a tubular steel frame with a built on 5000 l polyethylene tank without splash walls. The sump is placed in the centre of the bottom section so the amount of residual is independent of the



Fig.5: The smooth floor pan with up to 1.16 m ground clearance.

direction of inclination of the sprayer. The liquid content in the tank is calculated from the measurement by a pressure sensor at the tank bottom. The measured / calculated tank content is displayed on a display in the cabin and on the control panel at the left sprayer side.

Description of sprayer



Fig.6: Left sprayer side with control panel and induction hopper.

For inner tank cleaning 6 rotating cleaning nozzles are located in the tank. The sprayer is equipped with a pressurized agitator. The agitation intensity can be adjusted between 0 % and 100 % from the control panel, for reducing the amount

of residual, the sprayer can work with switched of agitator. For diluting and cleaning purposes the sprayer is equipped with a 522 l wash water tank. The spray tank can be filled via the hydraulic driven Hypro 9206 C centrifugal pump. The pump is able to fill the tank with 920 l / min (at 3 bar). The plant protection product can be transported into the tank by an induction bowl with integrated rotating product container rinsing nozzle at the left sprayer side.

The boom with 36 m working width is lateral folded and made of a tubular aluminium framework, divided in 7 mechanical and 10 hydraulic (spraying) sections. The mechanical sections have a width between 2.55 m and 4.5 m.



Fig.7: Nozzle station at the boom.

Description of sprayer



Fig.8: Moving of the outer boom section because of getting in contact with obstacle.

The outer sections with a 2.55 m length can avoid damage because of obstacles by moving forward, backward or upward in case of obstacle contact. The boom height can be adjusted hydraulically and infinitely by a central lift in a range between 0.48 m and 2.84 m.

It comprises a central pendulum with a pendulum range of up to 12° and hydraulic incline adjustment up to an inclination of 20 %. The liquid circuit is equipped with a pressurized recirculation system with pneumatic single nozzle switching. The liquid tubes are made from stainless steel. The framework construction of the boom protects the nozzles from ground contact.

The sprayer is equipped with a spray computer „TOPCON“ with a separate backlit display, so spraying data and driving (machine) data can be seen at the same time.



Fig.9: „TOPCON“ backlit display.

Result table					
tested assembly				result (measured)	
spray tank	over volume			6.9 %	* min. 5 %
	contents gauge	graduation marks		electronic device, 1 l steps	* max. 100 l
			deviation	2.3 %	* max. 7.5 % up to 1000 l filling
				-1.2 %	* max. 5 % between 1000 and 5000 l
	surface roughness			0.056 mm	* max 0.1 mm
rinsing tank	volume			523 l corresponding to 10.5 % of nominal volume	* min. 10 % of nominal contents
	rinsing and dilution possible?			yes	
can rinsing equipment	rinsing efficiency				* max. 0.01 % of can contents
manometer	graduation marks			0.1 bar (electronic device)	* max. 0.2 bar
	deviation			0.05 bar	* max. 0.2 bar
agitation system	deviation from even concentration			12.9	* max. 15 %
residual in l	dilutable			68.7 l	* max. 97 l
	non delutable			0 l	
spray boom	height adjustment range from - to			480 mm - 2840 mm	
	nozzle ground contact protection			yes	
	nozzle at 3 bar pressure			0 % (with IDN 120 03 POM)	* max. 10 %
	nozzle dripping after switch off			0 ml	* max. 2 ml
	single nozzle flow rate				
	type of nozzle: Lechler IDN 120 03 POM				
	pressure (bar)	flow rate (l/min)	max. deviation from table in % * (max. 10 %)	max. deviation from mean in % * (max. 5 %)	
	3.0	1.165	4.87	3.8	
	5.0	1.487	4.90	2.35	
	transverse distribution				
	type of nozzle: Lechler IDN 120 03 POM				
	pressure (bar)	nozzle height (cm)	coefficient of variation (%) * (max. 9 %)		
	3.0	50	3.6		
	5.0	50	3.7		
	8.0	50	4.0		

Fig.10: 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 %)
		214	-1.0	0.46
		302	1.0	0.48
		389	-1.4	0.68
	procedure	% to adjusted value		
		switching on / off	2.1	* max. 7 s
		switching of single sections	1.8	* max. 7 s
		changing gears		
		1.5 m/s to 2.0 m/s	1.5	* max. 7 s
		2.0 m/s to 2.5 m/s	1.0	* max. 7 s
		2.5 m/s to 2.0 m/s	2.0	* max. 7 s

Fig.11: Result table 2.

Explanation on testing:

Testing takes place according to the Technical Instructions for ENTAM-Tests of Field Crop Sprayers (Rel.4). 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)	050/11
	AU/DAE - University of Aarhus - Department of Agricultural Engineering Sciences (Denmark)	AU/DAE/ENTAM 2011-17
	Cemagref - Institut de recherche pour l'ingénierie de l'agriculture et de l'environnement (France)	CEMAGREF/ENT/11/039
	HIAE Hungarian Institute of Agricultural Engineering (Hungary)	D-57/2011
	ENAMA Ente Nazionale per la Meccanizzazione Agricola (Italy)	ENTAM „Rapporto di prova prestazionale“ 11/2011
	PIMR - Przemyslowy Instytut Maszyn Rolniczych Industrial Institute of Agricultural Engineering (Poland)	PIMR - 77/ENTAM/11
	CMA Generalitat de Catalunya Centre de Mecanització Agrària (CMA) (Spain)	EPH 006/11
	I.A.M.C. Institute of Agricultural Machinery and Constructions (Greece)	ΛΕ/153/01/ΖΖ