



ENTAM - Test Report



Sprayer type: Trade mark: Model: Trailed field crop sprayer Kverneland iXtrack T4

Manufacturer: Kverneland Group Nieuw-Vennep B.V. Hoofdweg 1278 NL-2153 Nieuw-Vennep

Test report: D - 2102

April 2018

Assessment table

No.	Contents	Assessment
1	Spray tank surface roughness *	+++
2	Spray tank over volume	+
3	Volume of total residual (here max. allowed 86 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 compu- ter) from desired value	+
15	Repeatability of volume/hectare adjustment device (spray com- puter)**	+++
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.

* only inner surface ** changed requirement

1					1				1
No.	unit	+	++	+++	No.	unit	+	++	+++
1	μm	>70-100	30-70	<30	10	%	4-5	2-4	0-<2
2	% of al-	5-8	>8-12	>12	11	% or s	>7-7.5	>3-7	0-3
3	low.value	>2/3-3/3	1/3-2/3	<1/3	12	CV	>7-9	4-7	<4
						% of tank volume			
4	%	7.5-5.0	<5.0-2.5	<2.5	13		10-12	>12-14	>14
5	%	5.0-4.0	<4.0-2.0	<2.0	14	S	>4	2-4	<2
6	%	>10-15	5-10	<5	15	%	>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

- 33 m working width.
- 3 m hydraulic section width.
- 11 mechanical sections.
- Pendulum range up to 10 °.
- Slope compensation up to 18 %.
- Boom height adjustment:
- 500 mm* 2650 mm, continuously.

- 4000l tank.

- Electronical contents indicator displayed on terminal and control centre (Focus 3).ISO match spray computer "Tellus PRO".
- 618 l rinsing water tank.



Fig.1: Overview. Following pictures show the tested prototype sprayer (cover shows serial sprayer).

360mm with changed software adjustment

- 1.5 2.25 m track width.
- Axle pivot steering.
- Ground clearance 570 mm (drawbar)
 - with 520/85R38 tyres.

- Diaphragm pumps type: 2 * Altek P260 with 260 l/ min

Dimensions and weights :

total length:	8250 mm
height:	3280 mm
width:	2500 mm
unloaded weight:	4620 kg

Description of sprayer



Fig.2: Boom lift and lateral folded boom.

of 40 km/h. The sprayer has a rigid drawbar which can be delivered with different mounting systems. Track following is realized by an axle pivot steering. The spray tank with a nominal volume of 4000 I is made of polyethylene and is constructed without splash walls. The tank keeps an over volume of 7.4 % to hold back foam. The tank can be filled by the sprayer pumps with up to 520 l/min. For the inner tank cleaning two rotating nozzles are placed in the centre sec-

tion of the tank. The agitation system is realized by 6 injection nozzles and a runback line.

The runback agitation can be activated by the spray computer control board in the drivers cabin. The pressure agitation system is only active while the filling of the spraver.

The introduction of plant protection product and the rinsing of empty plant product cans can be done via a retractable induction bowl on the left sprayer side. This is equipped with a rotating cleaning nozzle, one nozzle in the outlet area and 3 nozzles at the bowl walls.

The clean water tank for rinsing and diluting holds a volume of 618 l. It is also made of polyethylene and is placed in the front of the spraver. It is equipped with a tube contents indicator without contents markings. The spray liquid pressure system of the sprayer is based on two



The framework of the sprayer is made of steel profiles with the tank situated on the top. The axle has a adiustable track width of 1.5 - 2.25 m. It is designed for a road speed

Fig.3/4: Pulled out induction bowl on the left sprayer side.

Description of sprayer

diaphragm pumps type "Altek P260" which are driven via the PTO-shaft.

The lateral folded 33 m boom is made from welded steel profiles. The boom is divided into 11 hydraulic sections (3m

each). The



 $sections \ (3m \quad \ \ {\rm Fig.5: \ } Unfolded \ boom \ with \ nozzles \ in \ protected \ positions.$

nozzle height can be adjusted indefinitely between 500 mm and 2650 mm. With readjustment in the sprayer software the nozzle position of the boom can be lowered down to 360 mm. The pendulum range of the boom is +/- 10 ° and the slope compensation can compensate between +/- 18 %. For better visual controlling of the nozzle spray in the dark, the boom is equipped with LED-lights. Ultrasonic sensors make an automatic controlled boom height adjustment possible. In those cases the boom is lifted and lowered automatically at the beginning and end of a track. If the boom is equipped with the possibility of a variable geometry, then the boom sides can be orientated independently.



Thanks to the design of the lower boom profiles, the nozzles are well protected against ground contact. All functions of the sprayer can be controlled by the terminal with touch screen display at the drivers place (except pressure agitation).

Fig.6: Control centre and induction bowl at the left sprayer side.

Description of sprayer



Fig.7: Tellus PRO terminal with switch board.

Additionally all functions concerning filling and draining of the tank or inner tank cleaning can be handled from the control centre at the left sprayer side. With the switch board and "Tellus PRO" terminal in the driver`s cabin all necessary information like for example manual or auto mode, current spray rate (I/ha), driving speed, active spray sections, flow rate, sprayed amount, sprayed area, remaining tank contents, remaining area or distance can be displayed or adjusted. The display has a large diameter of 30 cm and is also readable in direct sunlight.

For manual operations the switch board can be used. It provides the functions for: folding and unfolding of the boom, switching of single sections, spaying ON/ OFF, spray pressure, adjustment of boom height or inclination of the boom.

Result table

tested assembly				result (measured)		
spray tank over volume				7.4 %		* min. 5 %
	contents gauge		graduation marks	electronical	display	* max. 100 l
			deviation	2.8 %	,	* max. 7.5 % between 400l and 800 l
				-1.57 %	6	* max. 5 % bet- ween 800 l and 4000 l
	surface roughnes	S		0.078 mm	l***	* max 0.1 mm
rinsing tank	volume			618		* 10 % of spray tank volume
	rinsing and dilution	on pos	ssible?	yes		
	Cleaning performance (main tank) (reduction factor, concentration after cleaning)			1550		Min.factor 400 of concentration before cleaning
can rinsing e	equipment	rinsin	g efficiency	0.0013 %		* max. 0.01 % of can contents
manometer	graduation marks			0.2 ba	r	* max. 0.2 bar
	deviation			-0.1 bar		* max. 0.2 bar
agitation deviation from ev system		ven concentration		11.2 %		*max. 15 %
residu	ual in I		dilutable	ole 65.7 l		* max. 86 l
105100		non dilutable		7.8		
spray boom	height adjustmer	nt rang	je	2290 mm	ו**	
	nozzle ground co	ntact	protection	yes		
	pressure loss bet and nozzle at 4 b	ween manometer oar pressure		3.3 % (with Lechler IDKN 120-03)		* max. 10 %
	nozzle dripping a	fter switch off		0 ml		* max. 2 ml
	single nozzle flov	v rate				
		type of nozzle: Lech		ler IDKN 120-03		
		pres- sure (bar)	flow rate (l/ min)	max. deviation from table in % *(max. 10 %)	max. dev in %	iation from mean *(max. 5 %)
		4.0	1.33	- 4.4		3.3
	transverse distrib	oution				
	type of nozzle: Lech		er IDKN 120-03			
		pres-	distance (cm)	coefficient of v	ariation (%	%) *(max. 9 %)
		sure (bar)				
		3.0	50		3.2	
		4.0 6.0	40 50		<u>5.4</u> 3.2	

Tab.3: Result table 1.

Result table

volume/hectare adjustment device					
repeatability of adjustment					
	adjusted flow rate in l/ha	deviation from desi- red value % **	deviation from desi- red value % **		
		ascending applicati- on rate	descending applicati- on rate		
	147	-0.34	-1.49		
	210	-0.58	1.42		
	273	-1.93	1.09		
procedure		regulation time: time until deviation < 10 % to adjusted value			
	switching on / off	4.4 s***	max. 7 s		
	switching of single sections	1.8 s***	max.7 s		
procedure		reaching steady st varing conditior	ate after 1s (s)		
	change of driving speed by changing gears		steady state mean deviation		
	1.5 m/s to 2.0 m/s	3.7 s	< 10 %		
	2.0 m/s to 2.5 m/s	2.1 s	< 10 %		
	2.5 m/s to 2.0 m/s	5.3 s	< 10 %		
	2.0 m/s to 1.5 m/s	4.8 s	< 10 %		

Tab.4: Result table 2.

** 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.

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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:

josephinum.at	HBLFA Francisco Josephinum BLT Wieselburg (Austria)	007/2018
CMZ	CMA Generalitat de Catalunya Centre de Mecanització Agrària (CMA) (Spain)	EPH 04/18
ENTE NAZIONALE PER LA MECCANIZZAZIONE AGRICOLA	ENAMA Ente Nazionale per la Meccanizzazione Agricola (Italy)	ENTAM "Rapporto di prova prestazionale" 04/2018
GODOLLO	HIAE (MGI) Hungarian Institute of Agricultural Engineering (Hungary)	D-170/2018
irstea	IRSTEA - National Research Institute of Sience and Technology for Enviroment and Agriculture (France)	IRSTEA/CEMAGREF/ENTAM/ 18/004
	PIMR - Przemyslowy Instytut Maszyn Rolniczych Industrial Institute of Agricultural Engineering (Poland)	PIMR-185/ENTAM/18