

## *ENTAM - Test Report*



**Sprayer type:**  
**Trade mark:**  
**Model:**

**Trailed field crop sprayer**  
**Kuhn**  
**Metris 2**

**Manufacturer:**  
KUHNBLANCHARD SAS  
24 route des Nantes  
F - 44680 CHEMERE  
France

**Test report: D - 2075**

<b>Assessment table</b>
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No.	Contents	Assessment
1	Spray tank surface roughness	+++
2	Spray tank over volume	+
3	Volume of total residual (here max. allowed 93 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  
 \*\*) alternative criteria: > 10 % nominal volume = „+“

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	% or s	>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	mean devia- tion %	>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](http://www.ENTAM.net)  
 or [www.julius-kuehn.de](http://www.julius-kuehn.de)

## Technical data of sprayer

- 36 m working width.
- 9 mechanical sections.
- Pendulum range up to 10.5 °.
- Slope compensation up to 20 %.
- Infinitely variable from 480mm - 2400 mm.
- Pressure circulation system.

- 17.4 l hand wash tank.

- 4100 l tank.
- Electronic control board with contents indicator in the cabin.



Fig.1: Overview.

- Two pumps „Comet BP 280 K with together 472 l/ min at 8 bar.

- 1.8 m - 2.0 m track width.
- 750 mm ground clearance (axle) and 450 mm (drawbar) with 340/85 R 48 tyres.
- Rigid drawbar and axle for 25 km/h road speed.

### Dimensions and weights :

total length:	7100 mm
height:	3400 mm
width:	2600 mm
unloaded weight:	4050 kg



## Description of sprayer



Fig.2: Front right view of sprayer with tank contents indicator and spray lance for outer sprayer cleaning.

The framework of the sprayer is made of steel profiles with the tank situated on the top. The non-suspended rigid axle has a adjustable track width of 1.8 m - 2.0 m. It is designed for a road speed of 25 km/h. The spray tank with a nominal volume of 4100 l is made of glass fibre and build with a splash wall. He keeps an over volume of 7 % to hold back foam. For agitating of the liquid the sprayer has a return flow system with 2 return lines. The clean water tank for rinsing and diluting holds a volume of 444 l. The hand wash tank for the operator has a volume of 17.4 l.

The boom is an aluminium framework. It can be adjusted in height indefinitely between 480 mm and 2400 mm with a hydraulic lift system. The pendulum range of the boom is  $\pm 10.5^\circ$  and the slope compensation can compensate

between  $\pm 20\%$ . The outer 2.5 m segment of the boom works as obstacle give away. The boom can be equipped with ultrasonic sensors for detecting and automatically keeping the adjusted boom height over ground. If this function is active, the boom will be lifted and lowered automatically at the beginning and end of a track. Thanks to the design of the boom, the nozzles are protected in case of ground contact.



Fig.3: Right sprayer side with storage area and filters.



## Description of sprayer



Fig.4: Control centre on the left sprayer side.

With a pneumatic single nozzle switching the nozzles can be grouped together to individual spray sections, controlled by the spray computer. It is also possible to realize a GPS - controlled automatic boom section control. All necessary controls and connections for filling, inner tank cleaning or tank draining are centralized on the left sprayer side. In case of blockage, the central suction filters (right sprayer side) are easy to reach and to remove. The central pressure filter is cleaned automatically.

For filling the plant protection product into the tank and for cleaning plant protection cans the swing out induction bowl (left sprayer side) can be used. It is made of PE. In the pulled out working position the rim of the opening is approximately 80 cm high and easy to reach. It offers a hand gun spray lance for flushing in. Additionally the induction bowl is equipped with a rotating nozzle for the cleaning of plant protection cans and an additional rotating nozzle (mounted under the cover) for the inner cleaning of the bowl.

With the used spray computer / terminal (REB3) it is possible to control and adjust all functions necessary for spraying and moving the boom. It can also be switched between automatic and manual mode. By changing between different

menus, the terminal can be switched between the different functions, this includes different automatic cleaning programs for the inner sprayer cleaning which can be started individually (REB 3+).



Fig.5: Left sprayer side with swung out induction bowl.

## Description of sprayer



The functions for filling, draining and cleaning of the sprayer can also be controlled from the control centre at the left sprayer side. Therefore an electric switch is mounted on the control board to change between “Terminal”, “external filling” and “sucking from the main tank”. The wash water tank can be connected via a separate hand valve.

Fig.6: In the foreground: Display and controlboard (REB 3) and switchboard for the hydraulic functions (CH10) in the driver`s cabin.

<b>Result table</b>
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tested assembly				result (measured)	
spray tank	over volume			7.3 %	* min. 5 %
	contents gauge		graduation marks	electronical display	* max. 100 l
			deviation	4.1 %	* max. 7.5 % between 410l and 820 l.
				4.6 %	* max. 5 % between 820 l and 4100 l
surface roughness			0.027 mm	* max 0.1 mm	
rinsing tank	volume			444l	*10 % of nominal volume
	rinsing and dilution possible?			yes	
	Cleaning performance (main tank) (concentration after cleaning)			402	Min.factor 400 of concentration before cleaning
can rinsing equipment		rinsing efficiency		<0.002 %	* 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			-14.1 %	*max. 15 %
residual in l		dilutable		69 l	* max. 93 l
		non dilutable		Non, recirculation system	
spray boom	height adjustment range from - to			480 mm - 2400 mm	
	nozzle ground contact protection			yes	
	pressure loss between manometer and nozzle at 3 bar pressure			5.3 %	* 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	2.84	6.5	4.1
	transverse distribution				
		pressure (bar)	distance (cm)	coefficient of variation (%) *(max. 9 %)	
		2.0	50	8.4	
	3.0	60	8.8		
	4.0	50	5.6		
Measured with :			ALBUZ AXI 110 06		

Tab.3: Result table

\* limit

<b>Result table</b>
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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
255	-0.7	1.7
340	1.7	3.2
425	1.2	3.0
procedure	regulation speed: deviation to adjusted value after 7 s	
<u>switching on / off</u>	1.0 s***	after 7 s
<u>switching of single sections</u>	1.7 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	3.3 s	*
2.0 m/s to 2.5 m/s	1.2 s	*
2.5 m/s to 2.0 m/s	2.3 s	*
2.0 m/s to 1.5 m/s	2.1 s	*

Tab.4: Result table 2.

\* limit: &lt; 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 045/2017  
**BLT** Wieselburg  
 (Austria)



**CMA** Generalitat de Catalunya EPH 16/17  
 Centre de Mecanització Agrària (CMA)  
 (Spain)



**ENAMA** Ente Nazionale per la Meccanizzazione ENTAM „Rapporto di Agricola  
 (Italy) prova prestazionale“ 15/2017



**HIAE** (MGI) Hungarian Institute of Agricultural D-164/2017  
 Engineering  
 (Hungary)



**IRSTEA** - National Research Institute of Science IRSTEA/CEMAGREF/ENTAM/  
 and Technology for Environment and Agriculture 17/033  
 (France) (formerly CEMAGREF)



**PIMR** - Przemyslowy Instytut Maszyn PIMR-179/ENTAM/17  
 Rolniczych Industrial Institute of Agricultural  
 Engineering  
 (Poland)