



ENTAM - Test Report



Sprayer type: Mounted Air-Assisted Sprayer

Trade mark: FORRÁS

Model: 300 AXI

Manufacturer:
FORRÁS GÉPEK KFT.
H-6793 FORRÁSKÚT
Felszabadulás u. 13.

Test report: H_ENTAM_5_2011

End of testing: January 2012

Assessment table

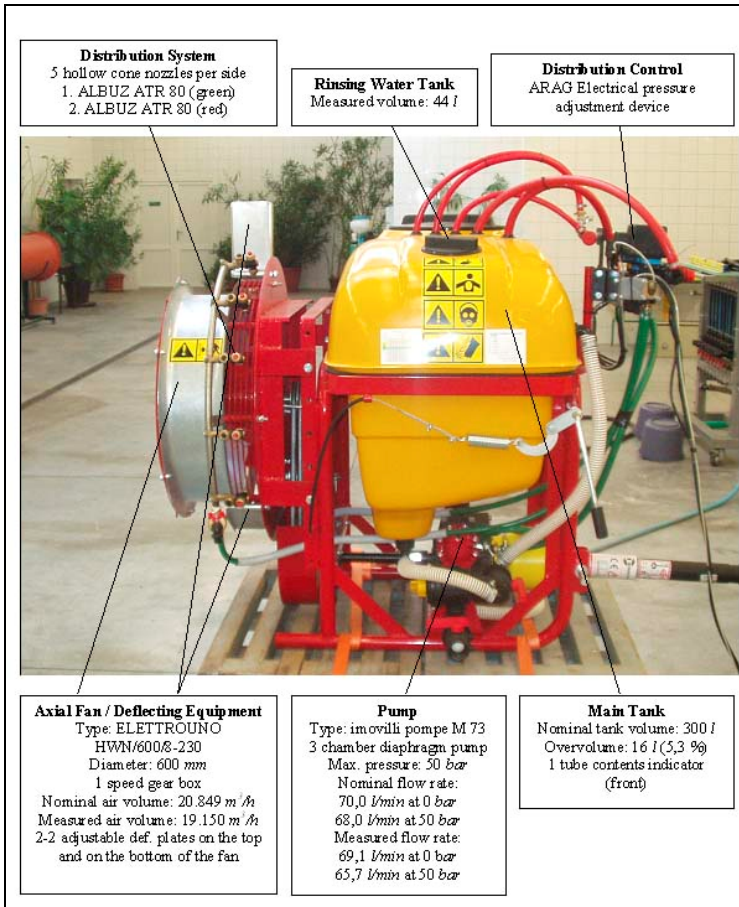
No.	Contents	Assessment
1	Spray tank surface roughness	++
2	Spray tank over volume	+
3	Volume of total residual (max. allowed: 12.0 dm ³)	++
4	Spray tank contents indicator (front) up to 20 % filling	+
5	Spray tank contents indicator (front) from 20 % filling	+
6	Agitation system (deviation of even solution)	++
7	Accuracy of pressure gauge	+
8	Pressure drop between manometer and nozzle	++
9	Deviation of single nozzle output from table	+
10	Liquid flow rate: left/right	+++
11	Rinsing water tank*	+++*

Note: The assessment keys are listed below. The detailed test results are in the following test report.

No.	unit	+	++	+++
1	µm	>70-100	30-70	<30
2	%	5-8	>8-12	>12
3	of allowed volume	>2/3-3/3	1/3-2/3	<1/3
4	%	7.5-5.0	<5.0-2.5	<2.5
5	%	5.0-4.0	<4.0-2.0	<2.0
6	%	>10-15	5-10	<5
7	bar	>0.10-0.20	>0.05-0.10	0.00-0.05
8	%	>7-10	3-7	<3
9	%	>7-10	3-7	<3
10	%	>4-5	2-4	<2
11	% of nominal tank volume*	10-12*	>12-14*	>14*

*: The rinsing water tank capacity was assessed according to the requirement of 10 % of the nominal main tank capacity.

Technical data of sprayer



Dimensions and weights:

Total length:	1400 mm
Height:	1250 mm
Width:	1260 mm
Unloaded weight:	160 kg
Total weight:	550 kg

Fig.1: Photo of sprayer with technical data

Description of sprayer

The mounted air-assisted sprayer was designed for spraying horticultural plantations (vineyard, orchard).

The fiberglass-reinforced polyester spray tank (main tank) is fixed on the frame of the machine.



Fig.2: Main tank

The filling hole of the main tank is closed by an opening lid attached to the machine. A strainer is placed in the filling hole to catch the coarse contaminants. In the strainer a chemical flushing head is placed to make the flushing and agitating of the pesticides easier. The shape of the bottom of the main tank and a suction

connection placed on the bottom of the tank helps the total discharging. The homogeneity of the spray liquid is ensured by a high performance agitating injector.



Fig.3: Agitating injector

The inner cleaning of the spray tank can be done by a fixed tank cleaning nozzle.



Fig.4: Tank cleaning nozzle

The filling level of the main tank can be seen on a tube

contents indicator placed on the front of the tank.



Fig.5: Tank contents indicator

The emptying and rinsing of the main tank can be done by using the operating elements placed on the right side of the machine.



Fig.6: Operating elements

According to the agrotechnical requirements, the machine is equipped with rinsing water and clean water tanks.



Fig.7: Rinsing water tank



Fig.8: Clean water tank

The main parts of the spraying system are the followings: the pump, the filters, the electrical distribution control, the distribution system and the axial fan with deflecting equipment.

The driving of the 3 chamber diaphragm pump is from the tractor's PTO

through a cardan axle. The pump delivers the liquid from the spray tank to the electrical distribution control through the suction filter.



Fig.9: Pump

The spraying pressure can be adjusted by an electrical operated pressure regulating valve, the value can be read on the pressure gauge mounted in the spray control unit.



Fig.10: Spray control unit



Fig.11: Pressure gauge

The 2 individual segments of the distribution system can be switched on and off by the electrical operated sectioning valves and the pressure changes that occur when switching the whole distribution system or segment(s) it can be eliminated by the mechanical throttling valves placed closed to the sectioning valves.



Fig.11: Distribution control

From the distribution control the spray liquid gets to the distribution system through the central filters (one central filter per side).



Fig.12: Central filters

The machine is produced with an axial fan with 28.849 m³/h nominal output. The fan with one gear gets it's drive from the pump.

In the multi-head nozzles there are two different type and sized individual nozzles built that can be switched by the turning of

the multi-head nozzle. The individual nozzle that is turned to the side of the spraying operates. The multi-head nozzles can be shut off by turning them 90°.



Fig. 13: Axial fan with 1 gear and adjustable fan blades and deflecting equipment

The sprayed liquid dispensed and disintegrated by the nozzles is carried to the plants by the air flow of the fan.

Result table

Part of sprayer	Tested assembly	Result (measured)	Requirement
SPRAY (MAIN) TANK	Roughness of outside surface	6,3 μm (mean)	max. 100 μm
	Roughness of inner surface	62,0 μm (mean)	max. 100 μm
	Over volume	5,3 % (16,0 dm^3)	min. 5 % of nom tank vol.
	- Max. volume of total resid. (horizontal / on 8,5° slopes; with backflow and agitation)	7,8 dm^3	max. 12,0 dm^3 (4,0 % of nom. tank volume)
	- Max. volume of dilutable residual (horizontal / on 8,5° slopes; with backflow and agitation)	6,3 dm^3	
	- Dead volume (non dilutable) (horizontal / on 8,5° slopes; with backflow and agitation)	1,5 dm^3	
	Tank contents indicator (front) – graduation marks	50 dm^3	max. 50 dm^3
	Tank contents indicator (front) – max. deviation up to 20 %	6,0 %	max. 7,5 % up to 60 dm^3
– max. deviation from 20 %	5,0 %	max. 5,0 % 60-300 dm^3	
Agitation system – max. deviation (re-agitation & emptying)	7,4 %	max. 15,0 %	
RINSING WATER TANK	Volume	44,0 dm^3	min. 10 % of nominal spray tank volume
CLEAN WATER TANK	Volume	19,7 dm^3	min. 15,0 dm^3

PRESSURE GAUGE	Scaling	0,2bar:0-20bar 2,0bar:20-60bar	0,2bar:<5bar 1,0bar:5-20bar 2,0bar:>20bar
	Accuracy – max. deviation	1-8bar:0,1bar 8-20bar:0,2bar >20bar:0,9bar	±0,2bar:1-8bar ±0,5bar:8-20bar ±1,0bar:>20bar
DISTRI-BUTION CONTROL	Constant working pressure (switching on and off sprayer; switching of individual sections) – max. deviation	0,0 %	max. 7,5 %
DISTRI-BUTION SYSTEM	Max. pressure drop between manometer and nozzles	5,0 %	max. 10 %
	Single nozzle output – max. deviation from table (ALBUZ ATR 80 -green)	5,5 %	max. 10 % from table and mean
	– max. deviation from mean (ALBUZ ATR 80 -green)	5,1 %	
	– max. deviation from table (ALBUZ ATR 80 -red)	9,9 %	
	– max. deviation from mean (ALBUZ ATR 80 -red)	5,7 %	
Liquid flow rate: left/right – max. deviation	2,0	max. 5 %	
NOZZLES	Anti drip (5 min)	0,0 ml	max. 2,0 ml
AXIAL FAN	Air volume: measured/provided–deviation	8,1 %	max. 10 %

Fig. 14: Result table

Explanation on testing

Testing takes place according to a procedure which was developed by the competent testing authorities of the European countries participating in ENTAM. This procedure 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”. The tests were conducted according to the Technical Instructions (TI) for ENTAM-Tests of Air-Assisted Sprayers (Rel.4). 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:

**HUNGARIAN INSTITUTE OF
AGRICULTURAL ENGINEERING (HIAE)
H-2100 GÖDÖLLŐ, TESSEDIK S. U. 4.
HUNGARY**



This test is recognized by the ENTAM members:

	<p>FRANCISCO JOSEPHINUM WIESELBURG BLT- Biomass/Logistics/Tecgnology (Austria)</p>	<p>013/12</p>
	<p>IRSTEA - National Research Institute of Science and Technology for Environment and Agriculture (formerly: CEMAGREF - Institut de recherche pour l'ingénierie de l'agriculture et de l'environnement) (France)</p>	<p>IRSTEA/ CEMAGREF/ ENTAM/ 12/001</p>
	<p>JKI - Julius Kühn-Institut (Germany)</p>	<p>ENT-HU- 01/12</p>
	<p>ENAMA - Ente Nazionale per la Meccanizzazione Agricola (Italy)</p>	<p>ENTAM "Rapporto di prova prestazionale" 01/2012</p>
	<p>PIMR - Przemysłowy Instytut Maszyn Rolniczych (Poland)</p>	<p>PIMR- 81/ENTAM/12</p>
	<p>CMA - Centre de Mecanització Agrària (Spain)</p>	<p>EPHP001/12</p>