

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: PS : 510/2860/2022
माह/Month: June, 2022

THIS TEST REPORT VALID UP TO : 30th June, 2027



**ESSEN AGRICULTURAL MACHINERY CHANGZHOU CO. LTD.,
MAHINDRA 3WP-500, SELF PROPELLED HIGH CLEARANCE
BOOM SPRAYER**



भारत सरकार

Government of India

कृषि एवं किसान कल्याण मंत्रालय

Ministry of Agriculture and Farmers Welfare

कृषि एवं किसान कल्याण विभाग

Department of Agriculture and Farmers Welfare

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

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[ISO 9001:2015 CERTIFIED]

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Page 1 of 36

3. Data recorded

Avg. Speed of Pump (rpm)	Working pressure (kg/cm ²)	Test No.	Delivery from the discharge line (ml/min)	Overflow (ml/min)	Avg. over flow (ml/min)	Average discharge from the discharge line (ml/min)	Discharge rate of pump (ml/min)	Hydraulic power (kW)
898	8.0	1	10550	20000	20112.5	10637.5	30750.0	0.4
		2	10750	20200				
		3	10580	20100				
		4	10670	20150				
897	10.0	1	11000	21780	21775.0	11132.5	32907.5	0.5
		2	11200	21820				
		3	10980	21650				
		4	11350	21850				
895	12.0	1	13670	23650	23677.5	13587.5	37265.0	0.7
		2	13550	23700				
		3	13700	23620				
		4	13430	23740				
891	14.0	1	14840	26820	26700.0	14772.5	41472.5	0.9
		2	14750	26580				
		3	14680	26750				
		4	14820	26650				

Minimum discharge rate : 30750.0 ml/min at 8 kg/cm²
Maximum discharge rate : 41472.5 ml/min at 14 kg/cm²
Discharge at rated pressure : 41472.5 ml/min at 14 kg/cm²

**7 TEST FOR VOLUMETRIC EFFICIENCY OF PUMP
(Vide clause 8.4 of IS:11313-2007)**

Date of Test : 18.02.2022
 Rated pressure, kg/cm² : 14
 Rated speed of pump, rpm : 900
 Theoretical Volume, ml : 51.69
 Actual volume at rated speed & rated pressure, ml : 46.08
 Volumetric efficiency, % : 89.15

**8. PRESSURE ADJUSTMENT TEST
(Vide Clause 8.7.1 of IS: 11313-2007)**

1. Date of test : 17.02.2022
2. Atmospheric conditions :
 - a. Temperature : 18.6 °C
 - b. Relative humidity : 60.0 %
 - c. Pressure : 99.0 kPa

3. Data recorded

Sr. No.	Working pressure (kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	8.0	NIL	NIL	--
2.	10.0	NIL	NIL	--
3.	12.0	NIL	NIL	--
4.	14.0	NIL	NIL	--

4. Resistance to different pressure: Yes

9. POWER REQUIREMENT

During the pump operation from minimum pressure range, the max. hydraulic power was observed as 0.9 kW against the declared net power output of engine 4.9 kW

10. ENGINE RATING TEST AND FUEL CONSUMPTION TEST

Engine rating & fuel consumption test as per IS:10000-1980, IS:12036 & IS:9935-2002 (without correction factor). Engine performance test was not required to be done at this institute as the applicant has forwarded a copy of the test report No. CDOER 0004 dated 07.01.2022 on 3TNM72-ATE Engine issued by International Centre for Automotive Technology [A Division of NATRIP implementation society (NATIS), Govt. of India.]

The excerpts of the report are given below.

Sr. No.	Load (%)	Load (Nm)	Engine speed (rpm)	Power (kW)	Fuel consumption			Specific energy (kWh/l)
					Kg/h	l/h	Specific (g/kWh)	
1	100	41.63	3599	15.69	5.93	7.18	378.0	2.19
2	100	41.69	3600	15.72	5.95	7.20	378.6	2.18
3	100	41.73	3600	15.73	5.92	7.17	376.4	2.19
4	100	41.69	3599	15.72	5.93	7.18	377.2	2.19
5	100	41.75	3599	15.74	5.98	7.24	380.0	2.19
6	100	41.74	3599	15.73	5.90	7.14	375.1	2.17
7	100	41.69	3599	15.71	5.97	7.23	380.0	2.20
8	100	41.68	3599	15.71	5.93	7.18	377.5	2.17
9	100	41.67	3599	15.70	5.95	7.20	378.9	2.19
10	100	41.72	3599	15.72	5.90	7.14	375.2	2.18
11	100	41.68	3599	15.71	5.91	7.15	376.2	2.20
12	100	41.73	3599	15.73	5.93	7.18	377.0	2.19
Avg.	100	41.70	3599	15.72	5.93	7.18	377.5	2.19

Smoke Density – 1.39 M⁻¹**11. TEST FOR NOZZLE**

[vide Clause 5.15 of IS:11313-2007 & Annex F of IS: 3652-1995]

Date of test : 11.02.2022
Type of nozzle (apa) : Fixed, Hollow cone

PS-510/2860/2022	ESSEN AGRICULTURAL MACHINERY CHANGZHOU CO. LTD., MAHINDRA 3WP-500, SELF PROPELLED HIGH CLEARANCE BOOM SPRAYER (COMMERCIAL)
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22.3 Hydraulic system

All components of the main and lateral feeding speed control hydraulic systems were inspected visually and found to be in normal working condition.

23. CRITICAL TECHNICAL SPECIFICATIONS

[Vide Ministry letter No.13-9/2019- M&T (I&P) part dated. 26.04.2019 and F.No. 9-4/2019 M&T (I&P) dated 20.8.2019]

Sr. No.	Parameters	Specification	Observation	Remarks
1	Tank capacity	Should not be less than 100 Lit.	Capacity of tank is 505 lit	Conforms
2	Provision for folding boom	Must be provided	Provided	Conforms
3	Pressure regulator	Must be provided	Provided	Conforms
4	Pressure gauge with pressure dampener	Liquid filled pressure gauge must be provided	Liquid filled pressure gauge is provided	Conforms
5	Discharge rate, ml/min	Min 8000, at rated speed and rated pressure	The discharge rate at rated speed & rated pressure is 41472.5 ml/min	Conforms
6	Strainer at filling hole	Must be provided	Provided	
7	Spray gun designation and marking	Designation, manufacturers name or recognized trade mark & batch or code number should be marked	Not applicable, as it is self propelled high clearance boom sprayer.	Conforms
8	Length of spray boom, m	6 (Min.)	Length of spray boom is 8.215 m	Conforms
9	Nozzle designation and marking	Designation, manufacturers name or recognized trade mark & batch or code number should be marked	Marked	Partially Conform
10	P.T.O. drive shaft -Safety against overload -Guard on shaft	Must be provided Must be provided	Not applicable, as it is self propelled high clearance boom sprayer	Conforms
11	Guard on belt pulley drive	Must be provided	Provided	Conforms
12	Safety wear	Mask, hand gloves, gum boots and goggles, aprons must be provided	Mask, Google and apron are provided	Partially conform

PS-510/2860/2022	ESSEN AGRICULTURAL MACHINERY CHANGZHOU CO. LTD., MAHINDRA 3WP-500, SELF PROPELLED HIGH CLEARANCE BOOM SPRAYER (COMMERCIAL)
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13	Labeling plate sprayer	Metallic labeling plate should be riveted with following information manufactures name, make, model, serial number, month, & year of manufacture, rated speed, rated pressure and recommended tractors horse power	Provided	Conforms
14	Literature	Operator manual, service manual & parts catalogue should be provided	Operator manual, parts catalogue & service manual are provided	Conforms

Note:- The implementation of critical technical specifications has been deferred till 30.09.2022 vide Ministry's O.M. No. 13-1/2021-M&T (I&P) dated 03.02.2022

24. CONFORMITY TO INDIAN STANDARDS			
i)	IS:11313-2007 (Reaffirmed 2012)-Hydraulic power sprayer-specification	:	Partially conform
ii)	Spray nozzle and spray gun as per IS:3652-1995 (Reaffirmed 2011)	:	Partially conform
iii)	Hose and hose connection as per IS:10134-1994	:	Conforms
iv)	IS: 2643-2005-Pipe threads where pressure-tight joint are not made on the threads-dimensions, tolerance and designation.	:	Partially conform

25. COMMENTS AND RECOMMENDATIONS

- 25.1** The spray angle for fine cone spray pattern (Hollow cone) & Fine cone Spray pattern (Flat Fan) of spray nozzle at the pressure of 300 kPa does not conform to the requirement of IS:3652-1995. It **MUST** be looked for further improvement.
- 25.2** The engaged threaded length of outlet port does not meet the requirement of relevant code/Standards in toto, it **MUST** be looked into
- 25.3** The spray nozzle designation is not marked. It **MUST** be looked into.
- 25.4** The necessary or special tools are not provided. It **MUST** be provided.
- 25.5** The pressure regulator to adjust the working pressure up to rated pressure is provided. Thus, it does not conform the requirement of IS: 11313-2007. It **MUST** be looked into.
- 25.6** The pressure gauge with full scale reading of 60 bar is provided. Thus it does not conform the requirement of IS:11313-2007. It **MUST** be looked into.

25.7 Safety provision/safety wear

- i) Safety instructions regarding handling poisonous agro-chemical before, during and after spraying operation should be provided on sprayer.


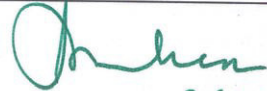
26. TECHNICAL LITERATURE

The following literatures are provided with sprayer for guidance to the user.

- i) Operator manual
ii) Service manual
iii) Parts catalogue

However, the manuals of sprayers should be updated as per IS:8132-1999.

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 24.06.2022

The draft test report is compiled by Abhishek Chourey, MTS (Technical)

27. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant Comments
27.1	25.1	M&M will take up the suggestions with supplier for improvement of spray pattern.
27.2	25.2	M&M will take up the suggestions with supplier for improvement.
27.3	25.3	M&M will ask for nozzle designation details from supplier.
27.4	25.4	M&M will take up the suggestions with supplier for addition of related special too & socket with supplier.
27.5	25.5, 25.6 & 25.7	M&M will take up the suggestion with supplier for improvement.