

व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ No.: PS-486/2748/2021

माह/Month: August, 2021

**THIS TEST REPORT VALID UP TO : 31<sup>st</sup> August, 2028**



**KHINDA, K-500  
TRACTOR OPERATED BOOM SPRAYER**



सत्यमेव जयते

भारत सरकार

**Government of India**

कृषि एवं किसान कल्याण मंत्रालय

**Ministry of Agriculture and Farmers Welfare**

कृषि, सहकारिता एवं किसान कल्याण विभाग

**Department of Agriculture, Cooperation and Farmers Welfare**

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

**Northern Region Farm Machinery Training and Testing Institute**

ट्रैक्टर नगर, सिरसा रोड, हिसार, (हरियाणा) - 125 001

**Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001**

**[ISO 9001:2015 CERTIFIED]**

Website: <http://nrfmtti.gov.in/>

E-mail: [fmti-nr@nic.in](mailto:fmti-nr@nic.in)

Tele./FAX: 01662-276984

5. TEST FOR DISCHARGE RATE OF PUMP  
[vide Clause 8.3 of IS:11313-2007]

1. Date of test : 16.08.2021
2. Atmospheric conditions
  - a) Temperature : 34°C
  - b) Relative humidity : 57.3%
  - c) Pressure : 97.8 kPa
3. Data recorded

Avg. Speed of Pump (rpm)	Working pressure (kg/cm <sup>2</sup> )	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)
798	15	1	41000	15100	14800.0	41350.0	56150.0	1.38
		2	41500	14800				
		3	41200	14500				
		4	41700	14800				
797	18	1	46800	9600	9150.0	46325.0	55475.0	1.63
		2	46100	9000				
		3	46400	8700				
		4	46000	9300				
795	21	1	50000	6000	5950.0	49850.0	55800.0	1.92
		2	49700	6200				
		3	49500	5900				
		4	50200	5700				
793	25	1	55100	Nil	Nil	55150.0	55150.0	2.25
		2	55300	Nil				
		3	54800	Nil				
		4	55400	Nil				

Minimum discharge rate : 55150.0 ml/min at 25 kg/cm<sup>2</sup>  
 Maximum discharge rate : 56150.0 ml/min at 15 kg/cm<sup>2</sup>  
 Discharge at Rated pressure : 55150.0 ml/min at 25 kg/cm<sup>2</sup>

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

Date of Test : 16.08.2021  
 Rated pressure, kg/cm<sup>2</sup> : 25  
 Rated speed of pump, rpm : 800  
 Theoretical Volume, ml : 77.17



Actual volume at rated speed & rated : 68.94  
pressure, ml

Volumetric efficiency % : 89.34

### 7. PRESSURE ADJUSTMENT TEST (Vide Clause 8.7.1 of IS: 11313-2007)

1. Date of test : 16.08.2021
2. Atmospheric conditions :
  - a. Temperature : 34 °C
  - b. Relative humidity : 57.3 %
  - c. Pressure : 97.8 kPa

#### 3. Data recorded

S. No.	Working pressure(kg/cm <sup>2</sup> )	Fluctuation range (kg/cm <sup>2</sup> )	Pressure drop (kg/cm <sup>2</sup> )	Ratio
1.	15	NIL	NIL	--
2.	18	NIL	NIL	--
3.	21	NIL	NIL	--
4.	25	NIL	NIL	--

4. Resistance to different pressure: Yes

### 8. TEST FOR NOZZLE

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

Date of test : 13.08.2021  
Type of nozzle : Adjustable, Solid cone

#### 8.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate for fine cone spray & jet spray pattern as 3000 ml/min & 7000 ml/min at a pressure of 300 kpa was declared by the applicant. The discharge rate corresponding to 300kPa was observed as under :-

- For fine cone spray pattern : 1229.84 ml/min
- For jet spray pattern : 1952.97 ml/min

Remarks:- Discharge rate for fine cone spray pattern and Jet spray pattern is not within the limit specified by the relevant code/standard.

#### 8.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle for fine cone spray pattern at the pressure of 300 kPa was 45 degree declared by the applicant. However, the spray angle corresponding to 300 kPa pressure was observed as 69.1 degree.

Remark: Spray angle of nozzle at 300 kPa pressure does not conform to the requirement of IS: 3652-1995.



**8.3 ENDURANCE TEST OF NOZZLE**

1. Date of test : 05.08.2021 to 13.08.2021
2. Total running hours : 48
3. Quantity of liquid collected and spray angle observed during endurance test.

Sr.No.	No. of Collection	Avg. discharge, ml/min.		Spray angle, degree
		Fine cone spray pattern	Jet spray pattern	
a)	First collection	19285.0	31067.5	66.9
b)	Second collection	19732.5	31712.5	68.3
c)	Third collection	19817.5	31580.0	69.8
d)	Fourth collection	20030.0	31382.5	67.6
e)	Fifth collection	19685.0	31090.0	69.1
f)	Sixth collection	19982.5	31350.0	70.1
g)	Seventh collection	20060.0	31325.0	69.1
h)	Eight collection	19707.5	31410.0	67.9

**Remark:**

- i) Percentage variation of discharge at fine cone spray pattern from first to last collection is 2.19 %
- ii) Percentage variation of discharge at jet spray pattern from first to last collection is 1.10 %
- iii) The variation in spray angle of nozzle at fine cone spray pattern from first to last collection is 1 degree.

**8.4 SPRAY DISTRIBUTION PATTERN OF NOZZLE**

The liquid discharge from nozzle at 300 kPa pressure was collected in glass tube of alternator. The spray pattern as per the quantity of liquid collected is represented in tabular form and in Fig. 5.

- 8.5 NOZZLE DESIGNATION** : Not Specified  
Provision of strainer in nozzle : Not Provided

**8.6 MARKING**

Manufacturer's name or : Not Marked  
recognized trade mark  
Batch or code number : Not Marked

**9. AIR PRESSURE CHAMBER TEST**

[vide Clause 8.7.2 of IS:11313-2007]

8.1 Date of test : 14.08.2021		
Sr. No	Details	Condition
1.	Hydraulic pressure	62.5 kg/cm <sup>2</sup>
2.	Duration of pressure application	30 Second
3.	Result	No leakage or deformation of pressure chamber was found during the test

**10. ENDURANCE TEST OF SPRAYER**

[vide Clause 8.8 of IS:11313-2007]

1. Date(s) of Test: 28.07.2021 to 04.08.2021
2. Total running hours:- 50
3. Quantity of liquid Collected (ml/min):-
  - a) First Collection - 55050.0
  - b) Second Collection - 55050.0
  - c) Third Collection - 54400.0
  - d) Fourth Collection - 54750.0
  - e) Fifth Collection - 54950.0
  - f) Sixth Collection - 55500.0
  - g) Seventh Collection - 55775.0
4. Percentage variation of discharge rate from first to last collection was observed to be 1.32%.

**11. TEST FOR HOSE AND HOSE CONNECTION**

[vide Clause 5.14.3 of IS:11313-2007 &amp; Clause 7.2 of IS:10134-1994]

Date of test – 13.08.2021		
Sr. No	Details	Condition
1	Test Condition	Hose outlet end closed
2	Hydraulic pressure applied	1.5 MPa
3	Duration of pressure	1 Minute
4	Result	No leakage, crack or breakage observed in hose and hose connection during the test.

**12. ASSESMENT OF CONSTRUCTIONAL REQUIREMENTS**

Ref. Cl. No.	Specified requirements as per Indian Standard IS: 11313-2007	Observation	Remarks
Cl.5.1	The tank, if provided, its capacity shall be not less than 100 litre the tank capacity shall be declared by the manufacturer.	Capacity of tank is 500 litre and declared by the manufacturer	Conforms
Cl. 5.1.1	The tank when filled up to its total capacity, the tank shall not show any sign of leakage and shall not buckle.	No sign of leakage & buckling of tank was observed when filled up to its total capacity	Conforms
Cl.5.2 Filling hole	A filling hole of suitable diameter shall be provided on top of the tank.	Filling hole of 177 mm dia. is provided on top of the tank.	Conforms
Cl. 5.2.1	The hole shall be covered with a tightly fitted cap.	Hole is covered with a tightly fitted cap.	Conforms

**16. COMMENTS AND RECOMMENDATIONS**

- 16.1 The three point linkage and PIC yoke bore dimensions does not meet the requirement of Indian Standard. It **MUST** be improved.
- 16.2 Safety guard on PTO drive shaft is not provided. It **MUST** be looked into.
- 16.3 The discharge rate for fine cone spray pattern and jet spray pattern of nozzle at the pressure of 300 kPa does not conform to the requirement of IS:3652-1995. It **MUST** be looked into.
- 16.4 The spray angle for fine cone spray pattern of nozzle at a pressure of 300 kPa does not conform to the requirement of IS:3652-1995. It **MUST** be looked into.
- 16.5 The spray nozzle is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard needs to be provided.
- 16.6 The engaged threaded length of outlet port does not meet the requirement of relevant code/Standards. It **MUST** be improved.
- 16.7 The necessary tools are not provided. It **MUST** be provided.
- 16.8 The strainer in nozzle is not provided. It may be considered for providing.
- 16.9 The scale with graduation outside the tank is provided for indicating level in tank, which cause difficulty for maintaining actual level of liquid in tank, The transparent tube with graduations outside the tank may be provided for indicating level in the tank.
- 16.9 **Safety provision/safety wear**
- i) Safety instructions regarding handling poisonous agro-Chemical before, during and after spraying operation should be provided on sprayer.

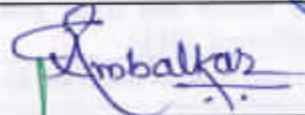

**17. TECHNICAL LITERATURE**

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

- i) Operator's Manual  
ii) Service Manual

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

**TESTING AUTHORITY**

G.R AMBALKAR AGRICULTURAL ENGINEER	
DR. MUKESH JAIN DIRECTOR	 23.08.2021

The test report compiled by Er. Maan Singh, Sr. Technical Assistant

**18. APPLICANT'S COMMENTS**

We will make improvement in the machine as per the recommendations.