

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: PS-439/2534/2020
माह/Month : September, 2020

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



**HAI-HTP 50
TRACTOR OPERATED BOOM SPRAYER**



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

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[ISO 9001:2015 CERTIFIED]

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viii)	Pump rollers	Nylon filled with lead	N.A.	---
ix)	Pressure regulators	Brass, stainless steel	Stainless steel	Conforms
x)	Suction strainer	Brass, stainless steel, plastics	Stainless steel	Conforms
xi)	Strainer body	Brass, plastics	Plastic	Conforms
xii)	Gasket	Rubber, PVC, Leather, fiber	PVC	Conforms
xiii)	Spray nozzles	Brass, stainless steel	Brass	Conforms
xiv)	Spray boom	Mild steel, Galvanized, iron Braided rubber	Mild Steel	Conforms
xv)	Hose	Synthetic rubber, P.V.C	PVC	Conforms
xvi)	Tank	Galvanized iron, Brass, Fiber glass reinforced plastics.	Plastics	Conforms
xvii)	Pipe for agitator	Galvanized iron, Brass, PVC	PVC	Conforms
xviii)	Piston (bucket) screw	Brass, stainless steel	NA	---
xix)	Crank case	Aluminum alloy	Aluminum alloy	Conforms
xx)	Roller pump body	Nickel resistant cast iron	N.A.	---
xxi)	Roller pump and plate	Nickel resistant cast iron	N.A.	---
xxii)	Roller pump rotor	Nickel resistant cast iron	N.A.	---
xxiii)	Piston pump crank shaft	Carbon steel	Carbon steel	Conforms
xxiv)	Pump inlet port end fitting	Brass	Cast Iron	Does not conform
xxv)	Piston rod guide	Brass, Aluminum alloy, Gunmetal, Nylon	N.A.	---
xxvi)	Connecting rod	Carbon steel	Carbon steel	Conforms
xxvii)	Gudgeon pin	Carbon steel	Carbon steel	Conforms
xxviii)	Big end bearing	Steel coated with tin base white metal	Steel coated with tin base white metal	Conforms
xxix)	Small end bush	Gunmetal	Gun metal	Conforms
xxx)	The material used for different components shall be declared by the manufacturer all the components mentioned in the table-I may not be present in a particular sprayer.		Declared by the applicant	Conforms

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

1. Date of test : 09.03.2020
2. Atmospheric conditions :
 - a) Temperature : 25.2°C
 - b) Relative humidity : 54%
 - c) Pressure : 99.3 kPa
3. Data recorded



Speed of Pump (rpm)	Working pressure (kg/cm ²)	Test No.	Delivery from the discharge line (ml/min)	Overflow (ml/min)	Average discharge from the discharge line (ml/min)	Discharge rate of pump (ml/min)	Hydraulic power (kW)
550	10	1	22570	Nil	22540.0	22540.0	0.38
		2	22450				
		3	22640				
		4	22500				
551	15	1	22300	Nil	22387.5	22387.5	0.56
		2	22350				
		3	22400				
		4	22500				
546	20	1	21750	Nil	21787.5	21787.5	0.73
		2	21800				
		3	21750				
		4	21850				
539	25	1	21800	Nil	21825.0	21825.0	0.91
		2	21900				
		3	21700				
		4	21900				

Minimum discharge rate = 21787.5 ml/min at 20 kg/cm²
Maximum discharge rate = 22540.0 ml/min at 10 kg/cm²
Discharge at Rated pressure = 22540.0 ml/min at 10 kg/cm²

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

Date of Test : 22.09.2020
 Rated pressure, kg/cm² : 10
 Rated rpm of pump : 550
 Theoretical Volume, ml : 22731.6
 Actual volume at rated rpm & rated pressure, ml : 21590.0
 Volumetric efficiency % : 95

5. POWER REQUIREMENT (Vide Clause 6.3 of IS – 11313 : 2007)

The pump power requirement of the sprayer has been Marked as 2 to 3 hP (1.47 to 2.24 kW). The test for power required for operating the sprayer was conducted as per clause 8.5 of IS: 11313-2007 and data recorded is reported herewith.



Test No.	Pressure (kg/cm ²)	Dynamometer reading		Required power (kW)
		Speed (rpm)	Torque (Nm)	
1	10	275	49.7	1.44
2	15	272	56.0	1.62
3	20	272	64.0	1.84
4	25	270	82.7	2.36

- Remark:**
- i) The power requirement was observed from 1.44 to 2.36 kW throughout the range of pressure against the declaration of 2 to 3 hP (1.47 to 2.24 kW)
 - ii) At rated speed and pressure of pump the power requirement is observed as 1.44 kW.

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

1. Date of test : 09.03.2020
2. Atmospheric conditions :
 - a. Temperature : 24.8°C
 - b. Relative humidity : 54.0%
 - c. Pressure : 99.4 kPa

3. Data recorded

S. No.	Working pressure(kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	10	NIL	NIL	--
2.	15	NIL	NIL	--
3.	20	NIL	NIL	--
4.	25	NIL	NIL	--

4. Resistance of pressure: Yes

7. TEST FOR NOZZLE

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

- Date of test : 23.09.2020
Type of nozzle : Hydraulic, Adjustable

7.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate for fine cone spray & jet spray pattern as 3152.5 ml/min & 3417.5ml/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 : 2388.7 ml/min

- For jet spray pattern : 3685.9 ml/min

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



7.2 TEST FOR SPRAY ANGLE OF NOZZLE

As the spray angle for fine cone spray pattern at the pressure of 300 kPa was 70.9 degree declared by the applicant. However, the spray angle corresponding to 300 kPa pressure was observed as 60.8 degree.

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

7.3 ENDURANCE TEST OF NOZZLE

1. Date(s) of test : 28.02.2020 to 07.03.2020
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	14895.0	21485.0	61.1
b)	Second collection	15550.0	21637.5	59.1
c)	Third collection	15592.5	21557.5	68.8
d)	Fourth collection	15035.0	21632.5	62.4
e)	Fifth collection	14960.0	21687.5	60.1
f)	Sixth collection	14282.5	21722.5	60.8
g)	Seventh collection	14500.0	21857.5	62.4
h)	Eight collection	14482.8	21797.5	60.1

Remark:

- i) Percentage variation in discharge rate for fine cone spray pattern from first to last collection, 2.77 %
- ii) Percentage variation in discharge rate for jet spray pattern from first to last collection, 1.45 %
- iii) Percentage variation in spray angle from first to last collection, 2.5%

7.4 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.

7.5 NOZZLE DESIGNATION : Not specified

Provision of strainer in nozzle : **Not provided**

7.6 MARKING

Manufacturer's name or : Marked as PMT
recognized trade mark
Batch or code number : **Not marked**



CI.10. MARKING AND PACKING (CI.10 IS:11313-2007)			
CI.10.1 Marking	Each sprayer shall be marked with the following particulars :-		
a)	Manufacturer's name & his registered trade mark, Sl. No. and batch or code No.	Just sticker and not proper labeling plate is provided on the sprayer with following information.	Conforms
		Type : Tractor Operated Make : HINDUSTAN AGRICULTURE IMPLEMENT Model : HAI-HTP-50 Serial No : HAIB005 Month & Year : 01 & 2020 Rated Speed (rpm) : 550 Rated Pressure(Kg/cm ²) : 10 Required size of prime Mover : 24 HP & above Country of Origin : MADE IN INDIA HINDUSTAN AGRICULTURE IMPLEMENTS DHARMAVARAM CROSS ROAD S.V.PURAM (P), ANANTHAPURAMU-515003(AP)	

13. CRITICAL TECHNICAL SPECIFICATIONS

(Deferred till 31.12.2020 vide Ministry O.M. No 13-13/2020 M&T, (I&P) dated 24.04.2020)

14. CONFORMITY TO INDIAN STANDARDS

- i) IS:11313-2007 (Reaffirmed 2012)-Hydraulic : **Does not conform in toto**
power sprayer-specification
- ii) Spray nozzle and spray gun as per IS:3652-1995 : **Does not conform in toto**
(Reaffirmed 2011)
- iii) Hose and hose connection as per IS:10134-1994 : **Conforms**
- iv) IS: 2643-2005-Pipe threads where pressure-tight : **Conforms**
joint are not made on the threads-dimensions,
tolerance and designation.
- v) Three point linkage hitch as per IS: 4468 : **Does not conform in toto**
(Part:1): 1997(Reaffirmed 2012)
- vi) Dimensions of PIC&PIC yoke as per IS: : **Does not conform in toto**
4931:1995 (Reaffirmed 2009)

15. COMMENTS AND RECOMMENDATIONS

- 15.1 The serial No. and year of manufacturer of pump is not marked. It **MUST** be looked into.
- 15.2 The drain plug at the bottom of the chemical tank is not provided for cleaning. It **MUST** be looked into.
- 15.3 The material pump cylinder and pump inlet port end fitting does not meet the requirement of relevant code/standards. It **MUST** be looked into.
- 15.4 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.



- 15.5 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.
- 15.6 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.
- 15.7 The nozzle batch or code number is not marked on nozzle. It **MUST** be looked into.
- 15.8 The guard on belt pulley drive is not provided. It **MUST** be provided.
- 15.9 The necessary tools are not provided. It **MUST** be provided
- 15.10 The strainer in nozzle is not provided. It may be considered for providing.
- 15.11 Through a pressure regulator provided but that was not in working condition therefore its conformity to IS: 11313-2007 could not be ascertained. It **MUST** be looked into for corrective action.
- 15.12 The pressure gauge with full scale reading 120 bar is provided, thus it does not conform to requirement to IS:11313-2007. It **MUST** be looked into.
- 15.13 **Safety provision/safety wear**
- i) Safety instructions regarding handling poisonous agro-Chemical beore, during and after spraying operation should be provided on sprayer.


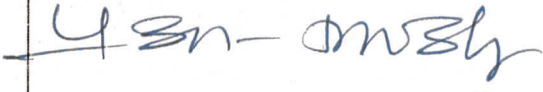
16. TECHNICAL LITERATURE

Literatures are provided with sprayer for guidance to the user..

- i) Operation, maintenance manual and part's catalogue

The operation manual of sprayer needs to be updated as per IS8132-1999

TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
P. K.PANDEY DIRECTOR	

17. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
17.1	15.1 & 15.9	We will take care of Serial No. and year of manufacture of pump, Maintaining the check list for necessary tools
17.2	--	We will follow your recommendations

