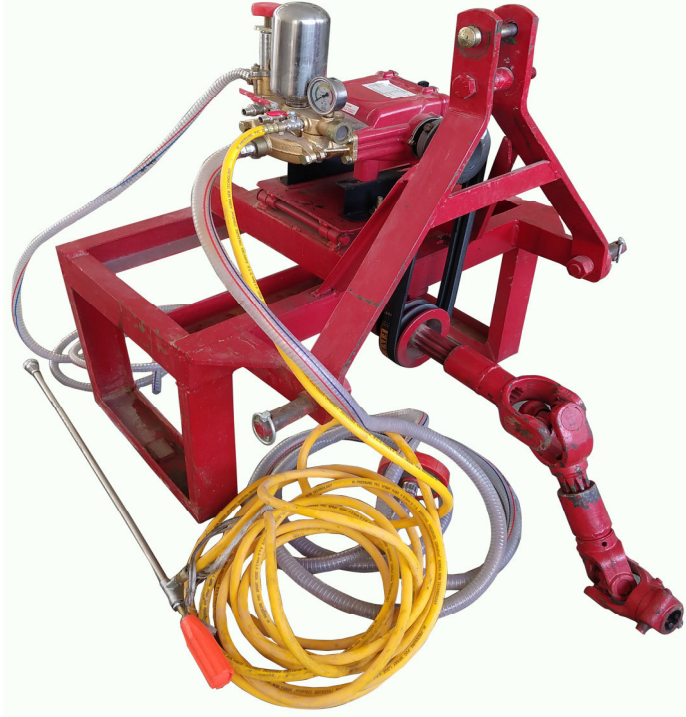


व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: PS-504/2833/2022

माह/Month: April, 2022

**THIS TEST REPORT VALID UP TO : 30<sup>th</sup> April, 2029**



**ICS, ICS-70A  
TRACTOR OPERATED HTP 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**

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

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**[ISO 9001:2015 CERTIFIED]**

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xvii)	Pipe for agitator	Galvanized iron, Brass, PVC	PVC	Conforms
xviii)	Piston (bucket) screw	Brass, stainless steel	Stainless Steel	Conforms
xix)	Crank case	Aluminum alloy	Aluminum alloy	Conforms
xx)	Roller pump body	Nickel resistant cast iron	Not applicable	---
xxi)	Roller pump and plate	Nickel resistant cast iron	Not applicable	---
xxii)	Roller pump rotor	Nickel resistant cast iron	Not applicable	---
xxiii)	Piston pump crank shaft	Carbon steel	Carbon steel	Conforms
xxiv)	Pump inlet port end fitting	Brass	Brass	Conforms
xxv)	Piston rod guide	Brass, Aluminum alloy, Gunmetal, Nylon	Not applicable	---
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	Gunmetal	Conforms
xxx)	The material used for different components shall be declared by the manufacturer all the components mentioned in the table-1 may not be present in a particular sprayer.		Declared by the manufacturer	Conforms

#### 4. RUNNING-IN

The sprayer was run-in for 1.0 hour as recommended by the applicant before starting of test.

#### 5. TEST FOR DISCHARGE RATE OF PUMP

[vide Clause 8.3 of IS: 11313-2007]

1. Date of test : 22.02.2022
2. Atmospheric conditions
  - a) Temperature : 22.8°C
  - b) Relative humidity : 61.5%
  - c) Pressure : 99.3 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. Overflow (ml/min)	Average discharge from the discharge line (ml/min)	Discharge rate of pump (ml/min)	Hydraulic power (kW)
847	15.0	1	31600	15350	15345.0	31655.0	47000.0	1.15
		2	31520	15300				
		3	31850	15480				
		4	31650	15250				
842	18.0	1	33000	10300	10190.0	32900.0	43090.0	1.27
		2	32900	9980				
		3	32900	10200				
		4	32800	10280				

841	21.0	1	35340	5580	5532.5	44205.0	40912.5	1.40
		2	35400	5500				
		3	35300	5600				
		4	35480	5450				
840	25.0	1	36930	3600	3670.0	37057.5	40727.5	1.66
		2	37100	3750				
		3	36950	3630				
		4	37250	3700				

Minimum discharge rate = 40727.5 ml/min at 25 kg/cm<sup>2</sup>

Maximum discharge rate = 47000.0 ml/min at 15 kg/cm<sup>2</sup>

Discharge at Rated pressure = 47000.0 ml/min at 15 kg/cm<sup>2</sup>

## 6. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP

[Vide clause 8.4 of IS: 11313 -2007]

Date of test	:	24.02.2022
Rated pressure, kg/cm <sup>2</sup>	:	15
Rated rpm of pump	:	850
Theoretical Volume, ml	:	62.69
Actual volume at rated rpm & rated pressure, ml	:	55.29
Volumetric efficiency, %	:	88.19%

## 7. PRESSURE ADJUSTMENT TEST

[Vide Clause 8.7.1 of IS: 11313-2007]

1. Date of test : 22.02.2022
  - a. Atmospheric conditions
  - b. Temperature : 22.8 °C
  - c. Relative humidity : 61.5 %
  - d. Pressure : 99.3 kPa
2. 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.	15.0	NIL	NIL	--
2.	18.0	NIL	NIL	--
3.	21.0	NIL	NIL	--
4.	25.0	NIL	NIL	--

3. Resistance to different pressure: Yes

## 8. TEST FOR HYDRAULIC SPRAY GUN

[Vide Clause 7.3 (b) of IS: 11313-2007 & Annex E of IS: 3652- 1995]

Date of test	:	21.02.2022
Type of gun	:	Screw type

**8.1 TEST FOR DISCHARGE RATE OF SPRAY GUN**

The discharge rate for fine cone spray pattern & jet spray pattern as 2350 ml/min & 7200 ml/min at the pressure of 600 kPa was declared by the applicant. The discharge rate corresponding to 600 kPa pressure was observed as below

- For fine cone spray pattern : 4632.5 ml/min
- For jet spray pattern : 7640.0 ml/min

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

**8.2 TEST FOR SPRAY ANGLE OF SPRAY GUN**

The spray angle for fine cone spray pattern at a pressure of 600 kPa was declared as 85 degree by the applicant. The spray angle corresponding to 600 kPa pressure was observed as 83.9 degree.

**8.3 STRENGTH OF GUN**

Sr. No	Details	Condition
1	Condition of nozzle tip	Closed
2	Hydraulic pressure	1500 kPa
3	Duration of pressure	5 Minutes
4	Result	No leak, crack or bursting of gun was observed during test

**8.4 SPRAY GUN DESIGNATION** : Marked as AG-C85 2500-J 7500

**8.5 MARKING**

Manufacturer's name or recognized trade : Marked as ICS mark

Batch or code number : Marked as OCT/2021-22

**8.6 ENDURANCE TEST OF GUN**

- i) Date : 09.02.2022 to 17.02.2022
- ii) Total running time (h) : 48
- iii) Quantity of liquid collected and spray angle observed during endurance test

Sr. No	Collection	Avg. discharge rate, ml/min		Spray angle, degree
		Fine cone spray pattern	Jet spray pattern	
a)	First collection	4717.5	7650.0	82.7
b)	Second collection	4777.5	7635.0	84.5
c)	Third collection	4700.0	7627.5	83.9
d)	Fourth collection	4685.0	7635.0	82.7
e)	Fifth collection	4655.0	7705.0	83.3
f)	Sixth collection	4617.5	7697.5	82.7
g)	Seventh collection	4687.5	7635.0	82.1
h)	Eighth collection	4675.0	7597.5	83.9

**Remarks : (1) Percentage variation of discharge rate at fine cone spray pattern from first to last collection is 0.90%.**

**(2) Percentage variation of discharge rate at jet spray pattern from first to last Collection is 0.69 %.**

**(3) The variation in spray angle of gun at fine cone spray pattern, from first to last collection is 1.2 degree.**

**15. 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	Specifications	Observed	Remarks
1	Tank capacity, l	100 (Min.)	Not applicable for this design	--
2	Pressure regulator	Must be provided	Provided	Conforms
3	Pressure gauge with pressure dampener	Full scale reading of pressure gauge should not be more than 2.5 times and not less than 1.5 times the rated pressure.	Provided	Conforms
4	Discharge rate, ml/min	Min. 8000 at rated speed and rated pressure.	The discharge rate at rated pressure is 47000.0 ml/min.	Conforms
5	Strainer at filling hole	Must be provided	Not applicable for this design	--
6	Hose length (m)	100 (Min.)	10.0 m provided	<b>Partially conform</b>
7	Provision of hose reel	Must be Provided	<b>Not provided</b>	<b>Does not conform</b>
8	Spray gun designation and marking	Designation, manufacturers name or recognised trade mark & batch or code number should be marked	Marked	Conforms
9	Length of spray gun	Should not be less than 500 mm	880 mm	Conforms
10	Nozzle designation and marking	Designation, manufacturers name or recognised trade mark & batch or code number should be marked	Marked	Conforms
	Nozzle Material	Brass / nylon/ hardened / Stainless Steel / tungsten Carbide, ceramic	Stainless steel	Conforms
11	Mass of spray gun	Must be less than 1.6 kg	0.380 kg	Conforms
12	Provision of drain plug in the tank	Must be Provided	Not applicable for this design	--
13	Safety against overload P.T.O. drive shaft and Guard on shaft	Must be Provided	<b>Not provided</b>	<b>Does not conform</b>
14	Guard on belt pulley drive	Must be Provided	<b>Not provided</b>	<b>Does not conform</b>
15	Safety wear	Mask, Apron, hand gloves, Gum boots and goggles must be provided.	Provided	Conforms

16	Marking/labelling of machine	The labelling plate should be riveted on the body of machine having Name and address of manufacturer, Country of origin, Make, Model, Year of manufacturer, Serial number, Type, size, required size of prime mover (kW)	Provided	Conforms
17	Literature	Operator manual, service manual & parts catalogue must be provided in English, Hindi, Local language.	Provided	Conforms

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

### 16. 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. : **Conforms**
- v) Three point linkage hitch as per IS: 4468 (Part:1): 1997(Reaffirmed 2012) : **Partially conform**
- vi) Dimensions of PIC yoke as per IS: 4931:1995 (Reaffirmed 2009) : **Partially conform**

### 17. COMMENTS AND RECOMMENDATIONS

- 17.1 The three point linkage, power input connection and PIC yoke bore dimensions do not meet the requirement of Indian Standard. It **MUST** be improved.
- 17.2 The discharge rate for fine cone spray pattern of spray gun at the pressure of 600 kPa does not conform the requirement of IS: 3652-1995. It **MUST** be looked into for appropriate improvement.
- 17.3 Safety guard on P.T.O. drive shaft and belt pulley is not provided. It **MUST** be looked into.
- 17.4 The safety against over load P.T.O drive shaft is not provided. It **MUST** be looked into.
- 17.5 The strainer in nozzle is not provided. It may be provided.
- 17.6 The discharge rate for fine cone spray pattern and Jet 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.

- 17.7 The spray angle for fine cone spray pattern 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.
- 17.8 The pressure gauge with full scale reading of 120 bar is provided. Thus does not conform the requirement of IS:11313-2007. It **MUST** be looked into.
- 17.9 **Safety provision/safety wear**  
Safety instructions regarding handling poisonous agro chemical before, during and after spraying operations should be provided on sprayer



### 18. 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 sprayer should be updated as per IS:8132-1999

### TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 01-04-2022

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

### 19. APPLICANT'S COMMENTS

Para No.	Our reference	Applicant's comments
19.1	17.1, 17.2, 17.3. 17.4, 17.5, 17.6, 17.7, 17.8 & 17.9	With immediate effect we consider yours comments & recommendations & we undertake the corrective actions in future supply of material.