

ब्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: PS-374/2264/2018  
माह/Month : December, 2018

**THIS TEST REPORT VALID UP TO : 31<sup>st</sup> DECEMBER, 2025**



**SARASWATI SPRAY SAMRAT,  
TRACTOR OPERATED 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**

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**[ISO 9001:2015 CERTIFIED]**

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vii)	Roller pump shaft	Stainless steel	N.A.	---
viii)	Pump rollers	Nylon filled with lead	N.A.	---
ix)	Pressure regulators	Brass, stainless steel	Brass	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	N.A.	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	Brass	Conforms
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	Brass	Conforms
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	Aluminum alloy	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-I may not be present in a particular sprayer.		Not declared	<b>Does not conform</b>

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

1. Date of test : 13.12.2018
2. Atmospheric conditions :
  - a) Temperature : 19°C
  - b) Relative humidity : 61%
  - c) Pressure : 99.4 kPa



## 3. Data recorded

Speed of Pump (rpm)	Working pressure (kg/cm <sup>2</sup> )	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)
957	22	1	36630	1242.5	36445.0	37687.5	1.61
		2	36400				
		3	36550				
		4	36200				
955	24	1	38000	Nil	38312.5	38312.5	1.80
		2	38400				
		3	38450				
		4	38400				
954	26	1	37400	Nil	37415.0	37415.0	1.99
		2	37460				
		3	37500				
		4	37300				
951	28	1	37700	Nil	37632.5	37632.5	2.16
		2	37650				
		3	37660				
		4	37520				

Minimum discharge rate = 37415.0 ml/min at 26 kg/cm<sup>2</sup>

Maximum discharge rate = 38312.5 ml/min at 24 kg/cm<sup>2</sup>

Discharge at Rated pressure = 37632.5 ml/min at 28 kg/cm<sup>2</sup>

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

Rated pressure, kg/cm <sup>2</sup>	:	28
Rated rpm of pump	:	951
Theoretical Volume, ml	:	42.31
Actual volume at rated rpm & rated pressure, ml	:	39.57
Volumetric efficiency %	:	94 %

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

The pump power requirement of the sprayer has been given as 3 hp (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 <sup>2</sup> )	Dynamometer reading		Pump speed (rpm)	Required power (kW)	Discharge (litre/min)
		Speed (rpm)	Torque (Nm)			
1	22	463	32.8	957	1.61	37.69
2	24	463	36.8	955	1.80	38.31
3	26	461	40.9	954	1.99	37.42
4	28	465	44.5	951	2.16	37.63

- Remark:**
- The power requirement was observed from 1.61 to 2.16 kW throughout the range of pressure against the declaration of 3 hp ( 2.24 kW)
  - At rated speed and pressure of pump the power requirement is observed as 2.16 kW.

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

- Date of test : 13.12.2018
- Atmospheric conditions :
  - Temperature : 19 °C
  - Relative humidity : 61%
  - Pressure : 99.4 kPa
- 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.	22	NIL	NIL	--
2.	24	NIL	NIL	--
3.	26	NIL	NIL	--
4.	28	NIL	NIL	--

- Resistance of pressure: Yes

#### 7. TEST FOR HYDRAULIC SPRAY GUN

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

- Date of test : 13.12.2018  
Type of gun : Screw type

#### 7.1 TEST FOR DISCHARGE RATE OF SPRAY GUN

The discharge rate for fine cone spray & jet spray pattern as 8500 ml/min & 10000 ml/min at the pressure of 600 kPa was declared by the applicant. The discharge rate corresponding to 600 kPa pressure was observed as under

- For fine cone spray pattern : 3950.0 ml/min  
- For jet spray pattern : 8097.5 ml/min

**Remarks :- Discharge Rate for fine cone spray patter and jet spray pattern was observed not within the limit specified by the relevant code/standard.**



Cl.9			
Cl. 9.1	All the components of the sprayer shall be free from burrs, pits and other visual defects which may be detrimental for their use.	Nothing that may be detrimental for use was noticed	Conforms
Cl. 9.2	The exposed metallic parts shall have a protective coating to prevent surface deterioration.	Exposed metallic parts have the protective coating.	Conforms

**Cl.10. MARKING AND PACKING  
(Cl.10 IS:11313-2007)**

Cl.10.1 Marking	Each sprayer shall be marked with the following particulars :-			
a)	Manufacturer's name and his registered trade mark, Sl. No. and batch or code No.	SARWASWATI Krishi Udyog AN ISO 9001:2008 CERTIFIED COMPANY ASSANDH (HR) INDIA.	Name of Implement - Spray pump Make - Saraswati Model - Saraswati Spray Samrat Year of MFG. - 2018 Serial No - Test -500 Type - Tractor operated Size - 500 Ltrs Required HP - 35 HP above	Conforms

#### 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 yoke as per IS: 4931:1995 : **Does not conform in toto**  
(Reaffirmed 2009)

#### 15. COMMENTS AND RECOMMENDATIONS

- 15.1 The three point linkage and power input connection dimensions does not meet the requirement of Indian Standard. It **MUST** be improved.
- 15.2 The material used for different component are not declared. It **MUST** be provided.
- 15.3 The discharge rate for fine cone spray pattern and jet spray pattern spray gun at the pressure of 600 kPa does not conform the requirement of IS: 3652: 1955. It **MUST** be looked into for appropriate improvement.

- 15.4 Maximum achievable pressure does not meet the requirement of relevant Indian Standard. It **MUST** be looked into.
- 15.5 The spray gun provided with sprayer is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard, needs to be provided.
- 15.6 A suitable drain plug should be provided at the bottom of the tank for cleaning.
- 15.7 A suitable pressure gauge/pressure indicator needs to be provided on sprayer as per the specifications specified by Indian Standard.
- 15.8 The discharge rate for fine cone spray 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.
- 15.9 The spray nozzle is not designated as specified by relevant Indian Standard, needs to be provided.
- 15.10 The spray angle for fine cone spray pattern of spray gun at the pressure of  $600 \pm 60$  kPa does not conform to the requirement of IS : 3652-1995. It **MUST** be looked for further improvement.
- 15.11 The spray angle for fine cone spray pattern of spray nozzle at the pressure of  $300 \pm 30$  kPa does not conform to the requirement of IS : 3652-1995. It **MUST** be looked for further improvement.
- 15.12 A suitable labeling plate needs to be provided with, inter alia, following information;-
- i. Manufacturer's name
  - ii. Make
  - iii. Model
  - iv. Month & year of manufacture
  - v. Rated speed
  - vi. Rated pressure
  - vii. Discharge rate
  - viii. Recommended tractor horse power
- 15.13 **Safety provision/safety wear**
- i) Ear protector & goggle **MUST** be added in safety wear.
  - ii) Safety instructions regarding handling poisonous agro chemical before, during and after spraying operations should be provided on sprayer.



**16. TECHNICAL LITERATURE**

Operator manual and parts catalogue is provided with the sprayer.

It is recommended to provide service manual for guidance of user.

The operator manual should be updated as per IS 8132-1999.

The operator manual should contain safety instructions regarding handling poisonous agrochemical before, during and after spraying operation.

**TESTING AUTHORITY**

R.K. NEMA SENIOR AGRICULTURAL ENGINEER	<i>Ran</i>
P. K.PANDEY DIRECTOR	<i>U Bn - Mosh</i>

**17. APPLICANT'S COMMENTS**

Recommendations made will be strictly followed.

