



**SACHIN-13
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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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.		Not provided	Does not conform

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

1. Date of test : 20.09.2017
2. Atmospheric conditions :
 - a) Temperature : 32 °C
 - b) Relative humidity : 62 %
 - c) Pressure : 97.9 kPa
3. Data recorded

Specified 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)
851	15.0	1	32250	12240.0	32375.0	44615.0
		2	32500			
		3	32450			
		4	32300			
848	16.6	1	32900	1132.5	33082.5	44215.0
		2	32930			
		3	32900			
		4	33600			
842	18.0	1	35800	8912.5	35737.5	44650
		2	35600			
		3	35700			
		4	35850			
835	20.0	1	36450	6755.0	36662.50	43417.5
		2	36800			
		3	37000			
		4	36400			

Minimum discharge rate = 43417.5 ml/min at 20 kg/cm²
 Maximum discharge rate = 44615.0 ml/min at 15 kg/cm²
 Discharge at rated pressure = 44615.0 ml/min at 15 kg/cm²

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

Rated pressure	:	15 kg/cm ²
Rated rpm of pump	:	850
Theoretical volume, ml	:	53.99
Actual volume at rated rpm & rated pressure, ml	:	52.13
Volumetric efficiency %	:	97 %

Remarks: The volumetric efficiency conforms to the requirement of IS: 11313-2007.

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

The pump power requirement of the sprayer has been marked as 3 to 5 hp (2.21 to 3.68 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		Pump speed (rpm)	Required power (kW)	Discharge (litre/min)
		Speed (rpm)	Torque (Nm)			
1	15.0	418	36.17	851	1.42	44615.0
2	16.6	418	39.17	848	1.48	44215.0
3	18.0	414	40.67	843	1.78	43957.5
4	20.0	412	41.71	835	1.82	43417.5

Remark: The power requirement was observed from 1.42 kW to 1.82 kW throughout the range of pressure against the declaration of 3 to 5 kW.
At rated speed and pressure of pump the power requirement is observed as 1.421 kW.

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

- Date of test : 20.09.2017
- Atmospheric conditions :
 - Temperature : 32.3° C
 - Relative humidity : 62 %
 - Pressure : 97.9 Kpa
- Data recorded

S. No.	Working pressure(kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	15.0	NIL	NIL	--
2.	16.6	NIL	NIL	--
3.	18.0	NIL	NIL	--
4.	20.0	NIL	NIL	--

- Resistance of pressure: Yes

- 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 material used for different components of sprayer is not declared. It should be declared.**
- 15.2** The chemical tank provided with the sprayer **MUST** have provision for drain plug.
- 15.3** The three point linkage and power input connection dimensions does not meet the requirement of Indian Standard. It **MUST** be improved.
- 15.4** The spray angle of nozzle does not meet the requirement of Indian standard. It must be looked into.
- 15.5** The pressure gauge marking exceeds 2.5 times the declared value of pressure. Suitable pressure gauge may be provided to ensure the compliance of the relevant Indian Standard.
- 15.6** The discharge rate of nozzle does not meet the requirement of Indian standard. It must be looked into.
- 15.7** 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.
- 15.8** 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.
- 15.9** The welded joint in delivery pipe pipeline failed during test and leakage of liquid observed. The quality of welding on sprayer should be improved.
- 15.10** The propeller shaft cross at both ends broke during endurance test. The propeller shaft was replaced with new one. The propeller shaft of better quality should be supplied with the sprayer.
- 15.11** Relevant Indian Standard must be followed with regard to marking on spray gun.
- 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) The accessories viz. mask, hand gloves and safety goggles for operator's safety has not been provided with sprayer. It should be provided