



**ENGINE OPERATED PORTABLE SPRAYER
SHAKTI SPS-P768**



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

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

1. Date of test : 12.07.2017
2. Atmospheric conditions :
 - a) Temperature : 31.7 °C
 - b) Relative humidity : 66.8 %
 - c) Pressure : 97.1 kPa
3. Data recorded

Specified speed of engine (rpm)	Working pressure (kg/cm ²)	Test No.	Delivery from the discharge line (ml/min)	Overflow (ml/min)	Average delivery from the discharge line (ml/min)	Discharge rate of pump (ml/min)	Power consumed by pump (kW)
6546	13	1	7600	Nil	7552.5	7552.5	0.16
		2	7550				
		3	7560				
		4	7500				
6512	15	1	7000	Nil	7037.5	7037.5	0.17
		2	7100				
		3	7050				
		4	7000				
6384	21	1	6400	Nil	6395.0	6395.0	0.22
		2	6450				
		3	6350				
		4	6380				
6343	25	1	6000	Nil	6025.0	6025.0	0.25
		2	6100				
		3	5950				
		4	6050				

Minimum discharge rate = 6025.0 ml/min at 25 kg/cm²
Maximum discharge rate = 7552.5 ml/min at 13 kg/cm²
Discharge at rated pressure = 7037.5 ml/min at 15 kg/cm²

4. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP [vide clause 8.4 of IS: 11313-2007]

Rated pressure, kg/cm² : 15
 Pump speed corresponding to rated speed of engine : 1764
 Theoretical volume, ml : 4.07
 Actual volume at rated speed and pressure, ml : 3.98
 Volumetric efficiency, % : 98



15. CONFORMITY TO INDIAN STANDARDS

- i) IS:11313-2007 (Reaffirmed 2012)-Hydraulic power sprayer-specification : **Does not conform in toto**
- ii) Spray nozzle and spray gun as per IS:3652-1995 (Reaffirmed 2011) : **Does not conform in toto**
- 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) IS: 7347-1974 (Reaffirmed 2006)-Specification for performance of small size spark ignition engines for agricultural water pumps, sprayers, tillers, reapers and other similar applications : **Could not be ascertained**

16. COMMENTS AND RECOMMENDATIONS

- 16.1 The sprayer serial number and year of manufacture is not specified. It **MUST** be specified.
- 16.2 The engine serial number is not specified. It **MUST** be specified.
- 16.3 **Make & model, manufacturing year, serial number and country of origin of pump is not specified which obscures the very identity of the pump and therefore not acceptable. This MUST be looked into.**
- 16.4 The discharge rate of spray gun for fine cone spray pattern at 600 ± 60 kPa is not within the limit. It **MUST** be improved.
- 16.5 The spray gun is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard, **MUST** to be provided.
- 16.6 The spray nozzle is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard, **MUST** to be provided.
- 16.7 The length of spray gun is less than the value specified in the relevant Indian Standard. It **MUST** be improved.
- 16.8 The discharge rate for fine cone spray pattern at a pressure of 300 kPa does not conform to the requirement of IS: 3652:1995.
- 16.9 The pressure gauge marking exceeds 2.5 times the declared value of pressure. Suitable pressure gauge **MUST** be provided to ensure the compliance of the relevant Indian Standard.
- 16.10 The diameter of connecting rod is less than the value specified in the relevant Indian Standard. It **MUST** be improved.
- 16.11 The discharge rate of sprayer at the rated pressure and rated speed does not conform to the requirement of IS: 11313:2007. It needs to be improved.

- 16.12 Ignition timing of engine is not specified. It should be specified.
- 16.13 The spray angle of nozzle at 300 kPa does not conform to the requirement of IS:3652-1995.
- 16.14 Through the regulator cum relief valve it is possible to increase pressure up to 30 kg/cm², which is more than 25% of the maximum pressure declared by the applicant. It **MUST** be looked into.
- 16.15 The strainer in nozzle is not provided. It should be provided.
- 16.16 A suitable labeling plate (not sticker) 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. Power rating of engine
 - ix. SFC of engine

17. TECHNICAL LITERATURE

Though an specification sheet of engine and sprayer was provided, the same was, however, found inadequate, as all necessary information required was not there. It needs to be updated as per IS:8132-1999, with the inclusion of safety instructions regarding handling poisonous agro-chemical and first aid.

TESTING AUTHORITY

R. K. NEMA SENIOR AGRICULTURAL ENGINEER	<i>Rn</i>
P. K. PANDEY DIRECTOR	<i>PKP - 10/08/17</i>

18. APPLICANT'S COMMENTS

We will follow the comments and recommendations mentioned at para 16.1 to 16.14 of the report.