



**ENGINE OPERATED KNAPSACK SPRAYER
SHAKTI SPS-768H**



सत्यमेव जयते

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 : 12.05.2017
2. Atmospheric conditions :
 - a) Temperature :40.0 °C
 - b) Relative humidity : 37.4 %
 - c) Pressure : 97.5 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)
7223	13	1	7800	Nil	7792.5	7792.5	0.17
		2	7790				
		3	7810				
		4	7770				
7003	15	1	7520	Nil	7535.0	7535.0	0.18
		2	7550				
		3	7530				
		4	7540				
5402	21	1	5290	Nil	5280.0	5280.0	0.18
		2	5250				
		3	5280				
		4	5300				
5303	25	1	4020	Nil	4017.5	4017.5	0.16
		2	4010				
		3	4030				
		4	4010				

Minimum discharge rate = 4017.5 ml/min at 25 kg/cm²
 Maximum discharge rate = 7792.5 ml/min at 13 kg/cm²
 Discharge at rated pressure = 7535 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 : 1897
 Theoretical volume, ml : 4.07
 Actual volume at rated speed and pressure, ml : 3.97
 Volumetric efficiency, % : 97.54

15. 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) IS: 7347-1974 (Reaffirmed 2006)-Specification : **Could not be ascertained**
for performance of small size spark ignition
engines for agricultural water pumps, sprayers,
tillers, reapers and other similar applications

16. COMMENTS AND RECOMMENDATIONS



- 16.1 The sprayer serial number and year of manufacturer is not specified. It **MUST** be specified.
- 16.2 The compression ratio of engine is not specified by the applicant. It should be specified.
- 16.3 **Make, model, manufacturing year, rated speed and country of origin of pump is not specified, which obscures the very identity of pump and therefore not acceptable .This MUST be looked into.**
- 16.4 The material of piston or plunger is not as per Indian Standard. It needs to 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 discharge rate of gun for fine cone spray pattern at pressure of 600 ± 60 kPa does not conform to the requirement of IS: 3652-1995.
- 16.8 The discharge rate for fine cone spray pattern & jet 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 spray angle for fine cone spray pattern at a pressure of 300 kPa does not conform to the requirement of IS: 3652:1995. It should be looked into.

- 16.12** 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.
- 16.13** Through the regulator cum relief valve it is possible to increase pressure up to 34 kg/cm², which is more than 25% of the maximum pressure declared by the applicant. It **MUST** be looked into.
- 16.14** 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 & owner's manual 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	
P. K. PANDEY DIRECTOR	

18. APPLICANT'S COMMENTS

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

