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व्यावसायिक परीक्षण रिपोर्ट

COMMERCIAL TEST REPORT

संख्या/ No.: PS-414/2336/2019

माह/Month: July, 2019

**THIS TEST REPORT VALID UP TO : 31<sup>th</sup> JULY, 2026**



**ICS HKS-25  
ENGINE OPERATED KNAPSACK 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

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**3. TEST FOR DISCHARGE RATE OF PUMP**

[vide Clause 8.3 of IS- 11313: 2007]

1. Date of test : 17.05.2019

2. Atmospheric conditions :

a) Temperature : 33° C

b) Relative humidity : 47 %

c) Pressure : 98.8 kPa

3. Data recorded

Speed of engine (rpm)	Working pressure (kg/cm <sup>2</sup> )	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)	Hydraulic Power (kW)
6583	7	1.	7200	NIL	7115.0	7115.0	0.08
		2.	7000				
		3.	7210				
		4.	7050				
6470	8	1.	6860	NIL	6917.5	6917.5	0.09
		2.	6900				
		3.	6950				
		4.	6960				
6408	9	1.	6800	NIL	6807.5	6807.5	0.10
		2.	6800				
		3.	6850				
		4.	6780				
6310	10	1.	6700	NIL	6720.0	6720.0	0.11
		2.	6750				
		3.	6720				
		4.	6710				

Minimum discharge rate = 6720 ml/min at 10 kg/cm<sup>2</sup>Maximum discharge rate = 7115.0 ml/min at 7 kg/cm<sup>2</sup>Discharge at rated pressure = 7115.0 ml/min at 7 kg/cm<sup>2</sup>**4. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP**

[vide clause 8.4 of IS: 11313-2007]

Date : 02.06.2019

Rated pressure, kg/cm<sup>2</sup> : 7

Engine speed corresponding to rated pressure (rpm) : 6583

Theoretical cubic capacity of pump, ml : 7720.39

Actual volume at rated pressure, ml : 7115.0



Volumetric efficiency, % : 92

**5. POWER REQUIREMENT**

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 0.11 kW against the declared net power output of engine as 0.72 kW.

**6. ENGINE PERFORMANCE TEST**

In pursuance of Ministry's order No. 7-23/2011-M&T (I&P) dated 20.04.2011 the engine performance test has not been conducted and the specifications/performance as specified by the applicant/ declared in the manual have been endorsed.

S.No.	Parameter		Declaration
i	Engine Type	:	Single cylinder 4 stroke air cooled spark ignition engine.
ii	Bore,(mm)	:	35
iii	Stroke (mm)	:	26
iv	Displacement,(cc)	:	25
v	Net power out put	:	0.72 kW@ 7000 rpm
vi	Max Torque	:	1.0 Nm at @ 5000 rpm

**7. PRESSURE ADJUSTMENT TEST**  
(Vide clause 8.7.1 of IS: 11313-2007)

1. Date of test : 17.05.2019
2. Atmospheric conditions :
  - a. Temperature : 33 °C
  - b. Relative humidity : 47 %
  - c. Pressure : 98.8 kPa
3. 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.	7	NIL	NIL	--
2.	8	NIL	NIL	--
3.	9	NIL	NIL	--
4.	10	NIL	NIL	--

4. Resistance of pressure: Yes

**8. TEST FOR HYDRAULIC SPRAY GUN**

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

Date of test : 30.05.2019  
Type of gun : Screw type

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

The discharge rate for fine cone spray & jet spray pattern as 1700 ml/min & 5000 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 : 1905 ml/min
- For jet spray pattern : 6325 ml/min



## 17. COMMENTS AND RECOMMENDATIONS

- 17.1 The manufacturing year and serial number of sprayer is not marked. It **MUST** be looked into.
- 17.2 The manufacturing year and serial number of pump is not specified. It **MUST** be looked into.
- 17.3 The thickness of barrel does not meet the requirement of relevant code/standard. It **MUST** be looked into.
- 17.4 The discharge rate for fine cone spray pattern & jet spray pattern of gun at pressure at 600 kPa does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into for appropriate improvement.
- 17.5 The discharge rate for fine cone spray pattern jet spray of nozzle at a pressure of 300 kPa does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into for appropriate improvement.
- 17.6 The spray gun is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard. It **MUST** to be provided.
- 17.7 The spray nozzle is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard. It **MUST** to be provided.
- 17.8 The manufacturer's name or recognized trade mark and batch or code number on nozzle is not provided. It **MUST** be provided.
- 17.9 Though a pressure regulator provided but that was not in the working condition therefore its conformity IS:11313-2007 could not be ascertained. It **MUST** be looked into for creative action.
- 17.10 The strainer in nozzle is not provided. It may be considered for providing.
- 17.11 At rated pressure of 7 Kg/cm<sup>2</sup> the engine speed dropped up to 6583 rpm against the rated engine speed of 7000 rpm. This **MUST** be looked into for necessary action.
- 17.12 The pressure gauge full scale reading of 100 bar is provided, thus it does not conform to requirement of IS:11313-2007. It **MUST** be looked into.
- 17.13 The rated pressure of 7 kg /cm<sup>2</sup> the pump discharge was observed as 7115.5 ml/min against the minimum requirement of 8000 ml/min. This **MUST** be examined.
- 17.14 The percentage variation in discharge rate of pump does not meet the requirement of relevant code/standard. It **MUST** be looked into.
- 17.15 The engaged length of outlet port is not meet the requirement of relevant code/standard. It **MUST** be looked into.



- 17.16 The maximum achievable pressure does not meet the requirement of relevant code/standard. It **MUST** be looked into.
- 17.17 During the endurance test of pump the pressure gauge was found damaged and was replace with new one. It **MUST** be looked into.
- 17.18 A suitable labeling plate (not sticker) needs to be provided with, inter alia, following information;-
- Manufacturer's name
  - Make
  - Model
  - Month & year of manufacture
  - Rated speed
  - Rated pressure
  - Discharge rate
  - Power rating of engine
  - SFC of engine
- 17.19 Safety provision/safety wear
- Hand gloves, apron and gum boots **MUST** be added in 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.

- Operator's manual of sprayer with parts catalogue.
- Operator's manual of engine.

The following literature **MUST** be provided with the sprayer :-

- Service manual of sprayer.

The operator instruction manual of sprayer needs to be updated as per IS 8132-1999.

### TESTING AUTHORITY

R. K. NEMA SENIOR AGRICULTURAL ENGINEER	<i>Ren</i>
P. K. PANDEY DIRECTOR	<i>U3n- mv8y</i>

### 19. APPLICANT'S COMMENTS

No comments received from applicant