

THIS TEST REPORT VALID UP TO : 30th April, 2030



**SHAKTI, SPS-767F
ENGINE OPERATED KNAPSACK SPRAYER,
4-STROKE**



भारत सरकार
Government of India
कृषि एवं किसान कल्याण मंत्रालय
Ministry of Agriculture and Farmers Welfare
कृषि एवं किसान कल्याण विभाग
Department of Agriculture and Farmers Welfare
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5. TEST FOR DISCHARGE RATE OF PUMP

[vide Clause 8.3 of IS- 11313: 2007]

1. Date of test : 21.03.2023
2. Atmospheric conditions
 - a) Temperature : 23.6° C
 - b) Relative humidity : 65.0 %
 - c) Pressure : 98.9 kPa

3. Data recorded

Avg. 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)	Hydraulic Power (kW)
7110	10.0	1.	8160	NIL	8170.0	8170.0	0.13
		2.	8200				
		3.	8130				
		4.	8190				
7010	12.0	1.	7980	NIL	7987.5	7987.5	0.16
		2.	8020				
		3.	7950				
		4.	8000				
6875	14.0	1.	7820	NIL	7812.5	7812.5	0.18
		2.	7800				
		3.	7840				
		4.	7790				
6710	16.0	1.	7580	NIL	7590.0	7590.0	0.20
		2.	7630				
		3.	7550				
		4.	7600				

Minimum discharge rate = 7590.0 ml/min at 16 kg/cm²
Maximum discharge rate = 8170.0 ml/min at 10 kg/cm²
Discharge at rated pressure = 8170.0 ml/min at 10 kg/cm²

6. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP

[vide clause 8.4 of IS: 11313-2007]

- Date : 21.03.2023
 Rated pressure, kg/cm² : 10
 Engine speed corresponding to rated pressure (rpm) : 7135
 Theoretical cubic capacity of pump, ml : 8346.24
 Actual volume at rated pressure, ml : 8105.00
 Volumetric efficiency, % : 97.1



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

1. Date of test : 21.03.2023
 2. Atmospheric conditions
 a. Temperature : 23.06 °C
 b. Relative humidity : 65.0 %
 c. Pressure : 98.9 kPa

3. Data recorded

Sr. No.	Working pressure(kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	10.0	NIL	NIL	--
2.	12.0	NIL	NIL	--
3.	14.0	NIL	NIL	--
4.	16.0	NIL	NIL	--

4. Resistance of different pressure: Yes

10. TEST FOR HYDRAULIC SPRAY GUN

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

- Date of test : 20.03.2023
 Type of gun : Screw type

10.1 TEST FOR DISCHARGE RATE OF SPRAY GUN

The discharge rate for fine cone spray & jet spray pattern as 4160 ml/min & 4850 ml/min at the pressure of 600 kPa was declared by the applicant. However, the discharge rate corresponding to 600 kPa pressure was observed as under

- For fine cone spray pattern : 4392.5 ml/min
 - For jet spray pattern : 5112.5 ml/min

10.2 TEST FOR SPRAY ANGLE OF SPRAY GUN

The spray angle for fine cone spray pattern at a pressure of 600 kPa was declared as 70 degree by the applicant. However, the spray angle corresponding to 600 kPa pressure was observed as 73.2 degree.

10.3 STRENGTH OF GUN

Sr. No	Details	Condition
1	Condition of nozzle tip	Closed
2	Hydraulic pressure	1500 kPa
3	Duration of pressure	5 Minute
4	Result	No leak, crack or bursting of gun was observed during test.



PS-525/2978/2023	SHAKTI, SPS-767 F ENGINE OPERATED KNAPSACK SPRAYER, 4-STROKE (COMMERCIAL)
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10.4 SPRAY GUN DESIGNATION : Marked as AG-C70 4160 J-4850

10.5 MARKING

Manufacturer's name or recognized trade mark : Marked as Shakti

Batch or code number : Marked as SAG-A

10.6 ENDURANCE TEST OF GUN (Vide clause E 3.6 of IS:3652-1995)

1. Date : 06.03.2023 to 16.03.2023
2. Total running time (h) : 48
3. Quantity of liquid collected and spray angle observed during endurance test.

Sr. no.	Collection	Discharge rate ml/min		Spray angle, degree
		Fine cone spray pattern	Jet spray pattern	
a	First collection	4457.5	5140.0	73.9
b	Second collection	4407.5	5135.0	74.6
c	Third collection	4382.5	5130.0	72.6
d	fourth collection	4430.0	4895.0	73.9
e	Fifth collection	4395.0	4890.0	73.2
f	Sixth collection	4412.5	4840.0	74.6
g	Seventh collection	4405.0	4922.5	72.6
h	Eighth collection	4387.5	5017.5	73.2

- Remarks-**
- (i) Percentage variation of discharge at fine cone spray pattern from first to last collection, 1.57%.
 - (ii) Percentage variation of discharge at jet spray pattern from first to last collection, 2.38%.
 - (iii) Percentage variation in spray angle of gun at cone spray pattern from first to last collection, 0.7 degree.

11. TEST FOR NOZZLE

[Vide clause 5.15 of IS- 11313-2007 & Annex F of IS- 3652-1995]

Date of test : 20.03.2023

Type of nozzle : Solid cone type, Adjustable

11.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate for fine cone spray & jet spray pattern as 3140 ml/min & 3380 ml/min at a pressure of 300 kPa was declared by the applicant. However, the discharge rate corresponding to 300 kPa pressure was observed as under:-

- For fine cone spray pattern : 3257.5 ml/min
- For jet spray pattern : 3547.5 ml/min



11.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle for fine cone spray pattern at the pressure of 300 kPa was 60 degree declared by the applicant. However, the spray angle corresponding to 300 kPa pressure was observed as 63.2 degree.

11.3 SPRAY DISTRIBUTION PATTERN OF NOZZLE

The liquid discharge from nozzle at 300 kPa pressure was collected in glass tube of patternator. The spray pattern as per the quantity of liquid collected is represented in tabular form and in Fig. 1.

11.4 NOZZLE DESIGNATION

: Marked as AN-C-60 3140 J-3380

Provision of strainer in nozzle

: **Not provided****11.5 MARKING**

Manufacturer's name or recognized trade mark : Marked as Shakti

Batch or code number : Marked as SA-NDA

12. AIR PRESSURE CHAMBER TEST

As the air pressure chamber is not provided, this test was not conducted.



DATA OF SPRAY DISTRIBUTION PATTERNATOR TEST OF NOZZLE

No. of tube	8	7	6	5	4	3	2	1	Centre	1	2	3	4	5	6	7	8
Discharge in ml.	03	10	27	80	91	98	110	115	138	114	106	45	15	10	06	04	02

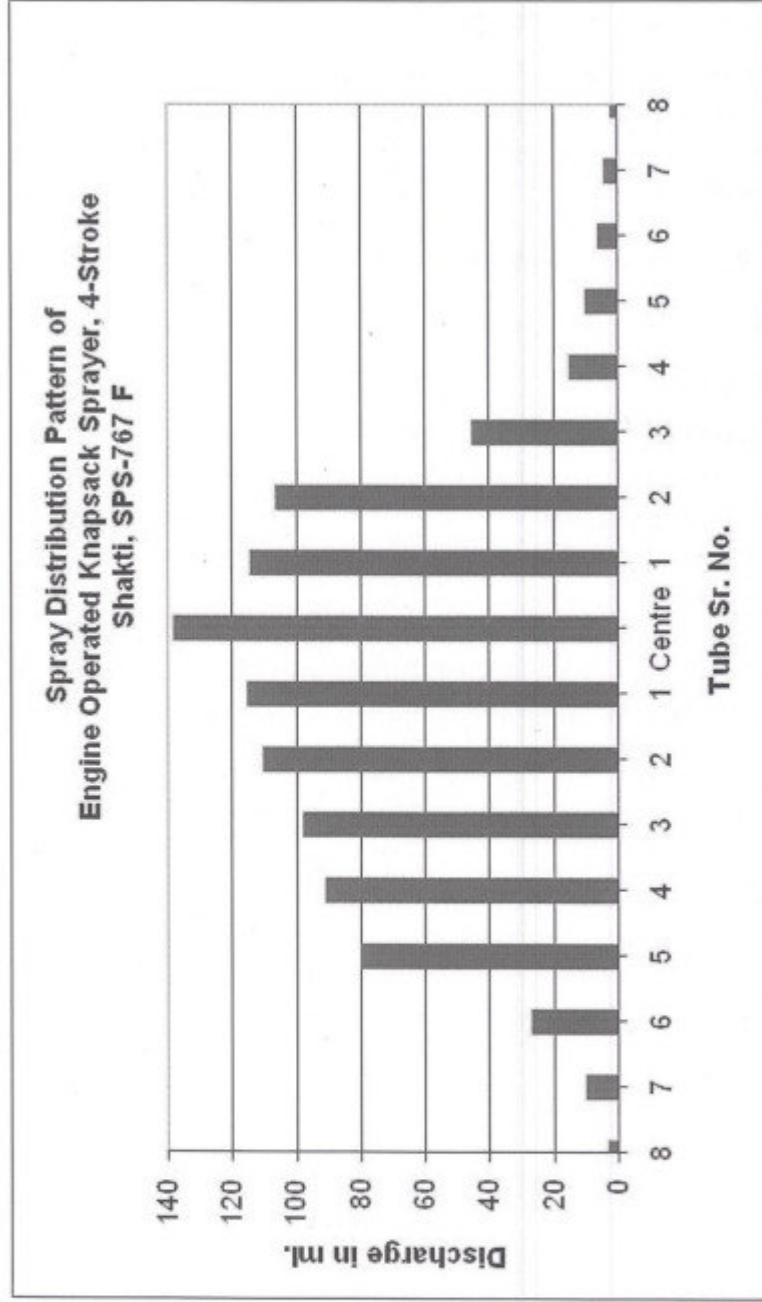


FIG. 1 : SPRAY DISTRIBUTION PATTERN



13. ENDURANCE TEST OF SPRAYER
[vide Clause 8.8 of IS- 11313: 2007]

1. Date(s) of Test : 23.02.2023 to 03.03.2023
2. Total running hours: - 50
3. Quantity of liquid Collected (ml/min.):-
 - a) First Collection - 8090.0
 - b) Second Collection - 8142.5
 - c) Third Collection - 8207.5
 - d) Fourth Collection - 8105.0
 - e) Fifth Collection - 8125.0
 - f) Sixth Collection - 8190.0
 - g) Seventh Collection - 8172.5
4. Percentage variation of discharge rate from first to last collection was observed as 1.02 %.

14. TEST FOR HOSE AND HOSE CONNECTION

[vide Clause 5.14.3 of IS 11313: 2007 & Clause 7.2 of IS- 10134: 1994]

Date of test- 20.03.2023		
Sr. No	Details	Condition
1	Test Condition	Hose outlet end closed
2	Hydraulic pressure applied	1.5 MPa
3	Duration of pressure	1 Minute
4	Result	No leak, crack or breakage observed in hose and hose connection during the test.

15. ASSESMENT OF CONSTRUCTIONAL REQUIREMENTS

Ref. Cl. No.	Specified requirements as per Indian Standard IS: 11313-2007	Observation	Remarks
Cl.5.1	The tank, if provided, its capacity shall be not less than 100 liters. The tank capacity shall be declared by the manufacturer.	Not applicable for knapsack sprayer.	--
Cl. 5.1.1	The tank when filled up to its total capacity, the tank shall not show any sign of leakage and shall not buckle.	Not applicable for this design.	--
Cl.5.2 Filling hole	A filling hole of suitable diameter shall be provided on top of the tank.	Not applicable for this design.	--
Cl. 5.2.1	The hole shall be covered with a tightly fitted cap.	Not applicable for this design.	--
Cl. 5.2.2	The suitable drain plug shall be provided at the bottom of the tank for cleaning.	Not applicable for this design.	--
Cl. 5.3 Cl. 5.3.1 Lubrication	A suitable arrangement shall be provided for lubricating the moving parts and shall be indicated by the manufacturer in the manual.	Two grease cups are provided and indicated in the manual.	Conforms