

व्यावसायिक परीक्षण रिपोर्ट  
COMMERCIAL TEST REPORT

संख्या/ No.: PS-302/2056/2017  
माह/Month: October, 2017



**GREAVES GSBS 20  
BATTERY CUM HAND 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

**Northern Region Farm Machinery Training and Testing Institute**

ट्रैक्टर नगर, सिरसा रोड, हिसार, (हरियाणा) - 125 001

**Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001**

Website: <http://nrfmtti.gov.in/>

E-mail: [fnti-nr@nic.in](mailto:fnti-nr@nic.in)

Tele./FAX: 01662-276984

**3. TEST FOR DISCHARGE RATE OF PUMP**  
**(Vide Clause 8.3 of IS: 11313 - 2007)**

1. Date of test : 15.09.2017
2. Atmospheric conditions :
  - a) Temperature : 32 °C
  - b) Relative humidity : 66 %
  - c) Pressure : 97.9 kPa
3. Data recorded

Speed of Pump (rpm)	Working pressure (kg/cm <sup>2</sup> )	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)
2640	2.0	1	1750	NIL	1750.0	1750.0
		2	1760			
		3	1750			
		4	1740			
2584	2.6	1	1610	NIL	1637.5	1637.5
		2	1630			
		3	1660			
		4	1650			
2562	3.0	1	1500	NIL	1515.0	1515.0
		2	1520			
		3	1530			
		4	1510			
2548	3.3	1	1460	NIL	1442.5	1442.5
		2	1440			
		3	1430			
		4	1440			
2169	4.0	1	1340	NIL	1337.5	1337.5
		2	1320			
		3	1350			
		4	1340			

**Minimum discharge rate** = 1337.5 ml/min at 4.0 kg/cm<sup>2</sup>  
**Maximum discharge rate** = 1750 ml/min at 2 kg/cm<sup>2</sup>  
**Discharge at rated pressure** = 1515.0 ml/min at 3.0 kg/cm<sup>2</sup>



**4. TEST FOR VOLUMETRIC EFFICIENCY**  
**(Vide Clause 8.4 of IS : 11313 - 2007)**

Date of test	:	15.09.2017
Rated pressure, kg/cm <sup>2</sup>	:	3 kg/cm <sup>2</sup>
Avg. discharge of water at rated pressure, l/min	:	1.525
Avg. discharge of water at no load, l/min	:	2.815
Avg. pump speed at no load, rev/min	:	3144
Avg. pump speed at rated pressure, rev/min	:	2564
Volumetric efficiency of pump, %	:	66 %

**Remark:- The volumetric efficiency does not conform to the requirement of IS:11313-2007.**

**5. POWER REQUIREMENT**  
**(Vide Clause 8.5 of IS – 11313 : 2007)**

The power requirement of DC motor fitted on sprayer was observed as following.

1. Motor operating voltage	:	12 V
2. Avg. current drawn by motor at no load	:	0.92 A
3. Avg. current drawn by motor at load	:	1.96 A
4. Avg. motor operating voltage	:	12.70V
5. Avg. observed motor power requirement	:	24.97 Watt
6. Avg. motor speed at no load	:	3144 rpm
7. Avg. motor speed at on load	:	2169 rpm
8. Time required for fully discharge of battery	:	7.8 to 8.2 hr.
9. Avg. No load rpm of motor after 6 hours of Operation	:	2280 rpm

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

- Date of test : 15.09.2017
- Atmospheric conditions :
  - Temperature : 32 °C
  - Relative humidity : 66 %
  - Pressure : 97.9 kPa
- 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.	2.0	NIL	NIL	--
2.	2.6	NIL	NIL	--
3.	3.0	NIL	NIL	--
4.	3.3	NIL	NIL	--
5.	4.0	NIL	NIL	--

- Resistance of pressure: Yes

#### 24. CONFORMITY TO INDIAN STANDARDS

- |   |                                 |
|---|---------------------------------|
| i) IS: 11313:2007 Hydraulic power sprayers- :<br>specification  | <b>Does not conform in toto</b> |
| ii) IS: 10134-1994-Method of test for manually :<br>operated sprayer  | <b>Does not conform in toto</b> |
| iii) Spray nozzle and spray gun as per IS:3652- :<br>1995 (Reaffirmed 2011)   | <b>Does not conform in toto</b> |
| vi) IS: 2643-2005-Pipe threads where pressure- :<br>tight joint are not made on the threads-<br>dimensions, tolerance and designation | <b>Does not conform in toto</b> |

#### 25. COMMENTS & RECOMMENDATIONS

- 25.1 The sprayer serial number and year of manufacture is not marked. It **MUST** be marked.
- 25.2 The motor power and rated speed is not specified. It should be specified.
- 25.3 The battery of sprayer was observed defective after 32 hours of operation . On applicant's request it was replaced with new one. The battery of better quality **MUST** be used on sprayer
- 25.4 Make, model and country of origin of battery charger is not specified. It should be specified.
- 25.5 The model and country of origin of pump is not specified. It **MUST** be specified.
- 25.6 The dimension of straps does not meet the requirements of Indian Standard. It **MUST** be looked into.
- 25.7 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in its position. It should be provided.
- 25.8 The metallic threaded connection provided on sprayer does not meet the requirement of Indian Standard. It **MUST** be looked into.
- 25.9 The batch or code number on nozzle is not provided. It **MUST** be looked into.
- 25.10 The strap cushion thickness does not meet the requirement of Indian standard. It **MUST** be looked into.
- 25.11 The strainer area does not meet the requirement of Indian standard. It must be looked into.
- 25.12 The spray angle of nozzle at 300 kPa pressure does not conform to the requirement of IS:3652-1995. It **MUST** be looked into.



- 25.13 Percentage variation of discharge observed during endurance test in battery operating mode does not confirm to the requirement of Indian Standard . It **MUST** be looked into
- 25.14 The lance is not marked with batch or code number. It **MUST** be marked.
- 25.15 The discharge rate of nozzle at a pressure of 300 kPa for fine cone spray and jet spray pattern does not conform to the requirement of IS: 3652-1995.
- 25.16 The cut off device is not marked. It must be marked.
- 25.17 The trigger actuation force is observed more than as defined in Indian Standard. It **MUST** be examined & improved.
- 25.18 The strainer in nozzle is not provided. It should be provided.
- 25.19 Agitator is not provided in sprayer. It may be provided.
- 25.20 The batch or code number and type of cut-off device is not marked. It **MUST** be marked.
- 25.21 Time required to full charge battery with AC charger is observed as 10.1 to 11.1 hours.
- 25.22 The spraying operation time after fully charging the battery was observed as 7.8 to 8.2 hours.
- 25.23 **The volumetric efficiency of sprayer on battery operated mode was observed as 66%, which is not within the requirement of the relevant Indian Standard.**
- 25.24 The sprayer does not conform to the relevant standard in toto. It **MUST** be looked into.
- 25.25 The nozzle is not marked. It should be marked.
- 25.26 During the pump chamber hydraulic test the motor stopped beyond 5.0 kg/cm<sup>2</sup> pressure against the pressure requirement of 7.5 kg/cm<sup>2</sup>. Thus the sprayer does not meet the requirement of Indian Standard.
- 25.27 A suitable labelling 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
  - ix. Country of origin
- 25.28 The tank capacity of sprayer does not meet the requirement of Indian Standard. It **MUST** be looked into.