

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: PS-461/2631/2020
माह/Month : December, 2020

THIS TEST REPORT VALID UP TO : 31st December, 2025



**XTRA POWER, XPS-704 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

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3. RUNNING - IN

Though the applicant has not recommended running-in, with the consent of the applicant the running-in of the sprayer was conducted for one hour in order to overcome variation in initial performance. Lubrication and the adjustment of the components were done as per applicants' recommendation.

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

1. Date of test : 29/10/2020
2. Atmospheric conditions :
 - a) Temperature : 20.9 °C
 - b) Relative humidity : 54.5 %
 - c) Pressure : 99.1 kPa

3. Data recorded

Speed of Pump (rpm)	Working pressure (kg/cm ²)	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)
3933	1.0	1	2900	NIL	2880.0	2880.0
		2	2860			
		3	2890			
		4	2870			
3814	2.0	1	2280	NIL	2280.0	2280.0
		2	2290			
		3	2280			
		4	2270			
3792	3.0	1	2070	NIL	2072.5	2072.5
		2	2080			
		3	2060			
		4	2080			
3753	4.0	1	1400	NIL	1385.0	1385.0
		2	1380			
		3	1370			
		4	1390			

Minimum discharge rate = 1385.0 ml/min at 4 kg/cm²
 Maximum discharge rate = 2880 ml/min at 1 kg/cm²
 Discharge at rated pressure = 2072.5 ml/min at 3.0 kg/cm²

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

Date of test	:	02.11.2020
Rated pressure, kg/cm ²	:	3.0
Avg. discharge of water at rated pressure, ml/min	:	2072.5
Avg. discharge of water at no load, ml/min	:	3457.5
Avg. pump speed at no load, rev/min	:	4234.0
Avg. pump speed at rated pressure, rev/min	:	3792
Volumetric efficiency of pump, %	:	67 %

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

6. POWER REQUIREMENT (Vide Clause 8.5 of IS - 11313 : 2007)

Date of test	:	02.11.2020
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	:	1.10 A
3. Avg. current drawn by motor at load	:	2.04 A
4. Avg. motor operating voltage	:	12.30 V
5. Avg. observed motor power requirement	:	25.07 Watt
6. Avg. motor speed at no load	:	4234 rpm
7. Avg. motor speed at load	:	3792 rpm
8. Avg. Time required for fully discharge of battery	:	7.5 to 8.0 hr
9. Avg. No load rpm of motor after 6 hours of Operation	:	3076 rpm

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

- Date of test : 29.10.2020
- Atmospheric conditions :
 - Temperature : 20.9 °C
 - Relative humidity : 54.4 %
 - Pressure : 99.1 kPa

3. Data recorded

S. No.	Working pressure (kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	1	NIL	NIL	--
2.	2	NIL	NIL	--
3.	3	NIL	NIL	--
4.	4	NIL	NIL	--

- Resistance of pressure: Yes

9.4 MARKING ON CUT-OFF DEVICE

- a) Manufacturer's name or recognized trade mark : Not Marked
 b) Batch or code number : Not Marked
 c) Type of cut-off device : Not Marked

10. TEST FOR NOZZLE
(Vide Annex F of IS: 3652-1995)

- Date of test : 26.10.2020
 Type of Nozzle (apa) : Hollow cone type.

10.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate for fine cone spray pattern as 450 ml/min at a pressure of 300 kPa was declared by the applicant. The discharge rate corresponding to 300 kPa pressure was observed as under:-

- For fine cone spray pattern : 1220 ml/min

Remark: The discharge rate for fine cone spray pattern does not conform to the requirement of IS: 3652:1995.

10.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle of nozzle at a pressure of 300 kPa has been declared by applicant as 50 degree. The spray angle corresponding to 300 kPa pressure was observed as 53.5 degree.

10.3 ENDURANCE TEST OF NOZZLE

- i) Date : 21.10.2020 to 24.10.2020
 ii) Total running time (h) : 48
 iii) Quantity of liquid collected and spray angle observed during endurance test.

S. No.	No. of collection	Avg. Discharge rate, ml/min	Spray angle, degree
a)	First collection	1172.5	52.7
b)	Second collection	1200.0	54.8
c)	Third collection	1197.5	55.2
d)	Fourth collection	1192.5	53.9
e)	Fifth collection	1195.0	53.5
f)	Sixth collection	1197.5	53.1
g)	Seventh collection	1190.0	54.4
h)	Eighth collection	1187.5	53.5

Remark: i) Percentage variation in discharge rate for fine cone spray pattern from first to last collection, 1.28 %.

ii) Percentage variation in spray angle from first to last collection 1.52 %.

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xxi)	Gasket	Synthetic rubber, PVC, fibre	PVC	Conforms
xxii)	Valve seat	Brass, stainless steel, engg. plastic	Engg. Plastic	Conforms
xxiii)	valve	Brass, stainless steel, engg. plastic	Engg. Plastic	Conforms
xxiv)	Skirt/ stand	Steel, plastic	Plastic	Conforms
xxv)	Strap buckle	Steel, Engg. Plastic	Engg. Plastic	Conforms
xxvi)	Cushion	Foam rubber, foam plastic	Foam	Conforms

Materials of components of spray lance, nozzle, cut of device (as per IS 3652-1995):
Refer chapter No. 2 of this test report.

Clause No.	Specified requirement	Observations	Remarks
Cl. 4.4 IS 3906:1995	The material used for different components shall be declared by the manufacturer in the manual.	Declared by the applicant	Conforms

16. RUNNING - IN

Though the applicant has not recommended running-in, with the consent of the applicant the running-in of the sprayer was conducted for one hour in order to overcome variation in initial performance. Lubrication and the adjustment of the components was done as per applicants recommendation.

17. TEST FOR DISCHARGE RATE (Vide Clause 6.1.3 of IS 10134-1994)

1. Date of test : 25.11.2020
2. Atmospheric conditions
 - a) Temperature : 23.2°C
 - b) Relative humidity : 42.6%
 - c) Pressure : 98.8 kPa
3. Data recorded

No. of hand strokes per minute	Working pressure (kPa)	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)
16	300	1	640	NIL	632.5	632.5
16	300	2	630	NIL		
16	300	3	620	NIL		
16	300	4	640	NIL		

Average discharge rate : 632.5 ml/min at 300 kPa pressure

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18. TEST FOR VOLUMETRIC EFFICIENCY
(Vide Clause 6.2 of IS 10134-1994)

	Date of test	:	26.11.2020
Sl. No.	Details		Observation
1.	Discharge of water in 10 successive stroke	:	380.0 ml
2.	No of cycle	:	10
3.	Actual volume of water in one cycle	:	38.0 ml
4.	Inner diameter of pump cylinder	:	46.0 mm
5.	Stroke length at 300 kPa pressure	:	35.0 mm
6.	Piston displacement	:	58.14 cc
7.	Theoretical volume of water in one cycle	:	58.14 ml
8.	Volumetric efficiency, %	:	65.4 %

Remark : The volumetric efficiency of pump does not conform to the requirement of IS: 10134-1994

19. TEST FOR PRESSURE CHAMBER
(Vide Clause 7.1 of IS 10134-1994)

Date of test : 28.11.2020

Sr. No	Details	Condition
1	Test Condition	Outlet end closed
2	Pressure applied -Hydraulic pressure -Pneumatic pressure	7.5 kg/cm ² 4.5 kg/cm ²
3	Duration	1 minutes each
4	Result	No leakage, crack, deformation or breakage observed in pressure chamber during the test.

20. TEST FOR OPERATING LEVER, HANDLE & PISTON ROD
(Vide clause 7.6 of IS-10134:1994)

Date of test : 28.11.2020

Sr. No	Details	Condition
1	Test Condition	Discharge outlet closed
2	Preassure applied	7.5 kg/cm ²
3	Result	No distort, crack or break observed in handle, operating lever and piston.

21. TEST FOR HOSE AND HOSE CONNECTION
(Vide Clause 5.14.3 of IS 11313:2007 & Clause 7.2 of IS 10134-1994)

Refer Chapter 13 of this report.

25. CRITICAL TECHNICAL SPECIFICATIONS

Deferred till 31.03.2021 vide Ministry's O.M.No.13-13/2020-M&T(I&P) dated 22.12.2020

26. CONFORMITY TO INDIAN STANDARDS

- i) IS: 11313:2007 Hydraulic power sprayers- : **Does not conform in toto**
specification
- ii) IS: 10134-1994-Method of test for manually : **Does not conform in toto**
operated sprayer
- iii) Spray nozzle and spray gun as per IS:3652- : **Does not conform in toto**
1995 (Reaffirmed 2011)

27. COMMENTS & RECOMMENDATIONS

- 27.1 The motor make and rated speed is not specified. It should be specified.
- 27.2 The model and country of origin of battery charger is not specified. It should be specified.
- 27.3 The country of origin of pump is not specified. It should be specified.
- 27.4 The dimension of straps does not meet the requirements of Indian Standard. It **MUST** be looked into.
- 27.5 During the strap drop test the buckle/bracket of strap assembly found failed to hold the strap in its position. It should be provided.
- 27.6 The strap cushion thickness does not meet the requirement of Indian standard. It **MUST** be looked into.
- 27.7 The average size of strainer of cut-off device does not meet the requirement of Indian Standard. It **MUST** be looked into.
- 27.8 The cut off device manufacturer's name or recognized trade mark and batch or code number is not provided. It **MUST** be provided.
- 27.9 The discharge rate of nozzle at a pressure of 300 kPa for fine cone spray pattern does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.
- 27.10 The serial number of sprayer is not specified. It **MUST** be looked into.
- 27.11 The strainer in nozzle is not provided. It should be provided.
- 27.12 Agitator is not provided in sprayer. It may be provided.

- 27.13 The manufacturer's name or recognized trade mark and nominal length of spray lance is not marked. It **MUST** be marked.
- 27.14 Time required to full charge battery with AC charger is observed as 7.5 to 8.4 hours.
- 27.15 The spraying operation time after fully charging the battery was observed as 5.0 to 6 hours.
- 27.16 The volumetric efficiency of sprayer on battery operated and hand operated mode was observed as 67 % and 65.4 % respectively, which is not within the requirement of the relevant Indian Standard.
- 27.17 Manufacturer's name or recognized trade mark, batch or code number and designation of nozzle is not marked. It **MUST** be looked into.
- 27.18 The tank capacity of sprayer does not meet the requirement of Indian standard. It **MUST** be looked into.
- 27.19 The 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 manufacturer
 - v) Rated speed
 - vi) Rated pressure
 - vii) Discharge rate
 - viii) Power rating
 - ix) Country of origin

27.20 Safety provision/safety wear

The safety instructions regarding handling poisonous agro chemical before, during and after spraying operation should be provided on sprayer.

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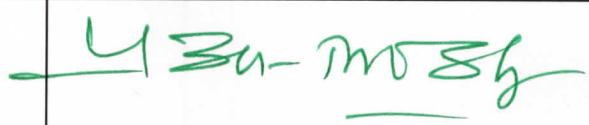
28 TECHNICAL LITERATURE

The following literature are provided with sprayer for guidance to the user:

- i) Instruction manual,

However, the manual of sprayer should be updated as per IS:8132-1999.

TESTING AUTHORITY

MAAN SINGH SENIOR TECHNICAL ASSISTANT	
SANJAY KUMAR AGRICULTURAL ENGINEER	
P. K. PANDEY DIRECTOR	

29. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
29.1	27.10	The Serial Number of sprayer will be specified
29.2	27.1, 27.3, 27.8, & 27.17	The make, model, country of origin and serial number of different components like motor, nozzle, cut-off device etc. will be provided.
29.3	27.4, 27.25, & 27.6	The dimension of straps, buckle/bracket of strap assembly and strap cushion thickness meeting the requirement of Indian Standard will be used in future.
29.4	27.7	The make of cut off device will be provided along with proper size of strainer of cut-off device.
29.5	27.9	The discharge rate of nozzle at a pressure of 300 kpa for fine cone spray pattern conforming to the requirement of IS:3652-1995 will be provided.
29.6	27.12 & 27.11	Agitator and the strainer in the nozzle will be provided.
29.7	27.16	Efforts will be made to increase the volumetric efficiency of sprayer on battery operated mode to comply with relevant Indian Standard.
29.8	27.18	The tank capacity of the sprayer meeting the requirement of Indian Standard will be manufactured in future.
29.9	27.19	A suitable labelling plate with relevant information will be provided.
29.10	27.20	The safety instruction regarding handling poisonous agro chemical before, during and after spraying operating will be provided on sprayer.
29.11	28	As per IS:8132-1999, technical literature will be updated

