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व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ **No.: PS-417/2358/2019**
माह/**Month: September, 2019**

THIS TEST REPORT VALID UP TO : 30th SEPTEMBER, 2026

HUSQVARNA, 323S25
ENGINE OPERATED KNAPSACK SPRAYER

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
Northern Region Farm Machinery Training and Testing Institute
ट्रैक्टर नगर, सिरसा रोड, हिसार, (हरियाणा) - 125 001
Tractor Nagar, Sirsa Road, HISAR (Haryana)-125 001
[ISO 9001:2015 CERTIFIED]

Website: http://nrfmtti.gov.in/
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x)	Suction strainer	Brass, stainless steel, plastics	Plastic	Conforms
xi)	Strainer body	Brass, plastics	Plastic	Conforms
xii)	Gasket	Rubber, PVC, fibre	PVC	Conforms
xiii)	Spray nozzles	Brass, stainless steel	Brass	Conforms
xiv)	Spray boom	Mild steel, Galvanized, iron Braided rubber	N.A.	--
xv)	Hose	Synthetic rubber, P.V.C	PVC	Conforms
xvi)	Tank	Galvanized iron, Brass, Fiber glass reinforced plastics, plastics	Plastic	Conforms
xvii)	Pipe for agitator	Galvanized iron, Brass, PVC	PVC	Conforms
xviii)	Piston (bucket) screw	Brass, stainless steel	Not applicable	--
xix)	Crank case	Aluminum alloy	Not applicable	--
xx)	Roller pump body	Nickel resistant cast iron	Not applicable	--
xxi)	Roller pump and plate	Nickel resistant cast iron	Not applicable	--
xxii)	Roller pump rotor	Nickel resistant cast iron	Not applicable	--
xxiii)	Piston pump crank shaft	Carbon steel	A quadrant gear driven by drive shaft of gear box mounted on plunger rod.	--
xxiv)	Pump inlet port end fitting	Brass	Brass	Conforms
xxv)	Piston rod guide	Brass, Aluminum alloy, Gunmetal, Nylon	Not applicable	--
xxvi)	Connecting rod	Carbon steel	N.A.	--
xxvii)	Gudgeon pin	Carbon steel	N.A.	--
xxviii)	Big end bearing	Steel coated with tin base white metal	Not applicable	--
xxix)	Small end bush	Gunmetal	Not applicable	--
xxx)	The material used for different components shall be declared by the manufacturer all the components mentioned in the table-I may not be present in a particular sprayer.		Not Declared	**Does not conform**

3. TEST FOR DISCHARGE RATE OF PUMP
[vide Clause 8.3 of IS- 11313: 2007]

1. Date of test : 20.06.2019
2. Atmospheric conditions :
   a) Temperature : 40° C
   b) Relative humidity : 31 %
   c) Pressure : 97.8 kPa

3. Data recorded

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)
7033	5	1.	7440	NIL	7410.0	7410.0	0.06
		2.	7380				
		3.	7350				
		4.	7470				
6803	10	1.	7200	NIL	7125.0	7125.0	0.12
		2.	7100				
		3.	7050				
		4.	7150				
6710	15	1.	6800	NIL	6792.5	6792.5	0.17
		2.	6780				
		3.	6820				
		4.	6770				
6308	20	1.	6500	NIL	6487.5	6487.5	0.21
		2.	6450				
		3.	6480				
		4.	6520				

Minimum discharge rate = 6487.5 ml/min at 20 kg/cm^2
Maximum discharge rate = 7410.0 ml/min at 5 kg/cm^2
Discharge at rated pressure = 7125.0 ml/min at 10 kg/cm^2

4. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP
[vide clause 8.4 of IS: 11313-2007]

Date	:	03.08.2019
Rated pressure, kg/cm^2	:	10
Engine speed corresponding to rated pressure (rpm)	:	6190
Theoretical cubic capacity of pump, ml	:	7261.41
Actual volume at rated pressure, ml	:	6537.5
Volumetric efficiency, %	:	90

Remarks : The high idle engine speed had to be set @ 7460 rpm against declared high idle 8000 rpm to obtain rated pressure at rated rpm of pump.

5. POWER REQUIREMENT

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 0.21 kW against the declared net power output of engine as 0.75 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 2 stroke air cooled spark ignition engine.
ii	Bore,(mm)	:	33
iii	Stroke (mm)	:	30
iv	Displacement,(cc)`	:	26.2
v	Net power out put	:	0.75 kW @ 6200 rpm
vi	Max Torque	:	0.95 Nm @ 5000 rpm

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

1. Date of test : 20.06.2019
2. Atmospheric conditions
   a. Temperature : 40 °C
   b. Relative humidity : 31 %
   c. Pressure : 97.8 kPa
3. Data recorded

S. No.	Working pressure(kg/cm^2)	Fluctuation range (kg/cm^2)	Pressure drop (kg/cm^2)	Ratio
1.	5	NIL	NIL	--
2.	10	NIL	NIL	--
3.	15	NIL	NIL	--
4.	20	NIL	NIL	--

4. Resistance of pressure: Yes

8. TEST FOR HYDRAULIC SPRAY GUN
[vide Clause 7.3(b) of IS- 11313: 2007 & Annex E of IS- 3652; 1995]

Date of test : 17.07.2019
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 2125 ml/min & 5462 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 : 1720 ml/min
- For jet spray pattern : 5212.5 ml/min

Remarks – The observed discharge rate for fine cone spray pattern was not within limit specified by the relevant code/Standard.

8.2 TEST FOR SPRAY ANGLE OF SPRAY GUN

The spray angle for fine cone spray pattern at a pressure of 600±60 kPa was declared as 84 degree by the applicant. The same was observed as 81.6 degree.

16. CONFORMITY TO INDIAN STANDARDS

i)	IS:11313-2007 (Reaffirmed 2012)-Hydraulic power sprayer-specification	:	**Does not conform in toto**
ii)	Spray nozzle and spray gun as per IS:3652-1995 (Reaffirmed 2011)	:	**Does not conform in toto**
iii)	Hose and hose connection as per IS:10134-1994	:	Conforms
iv)	IS: 2643-2005-Pipe threads where pressure-tight joint are not made on the threads-dimensions, tolerance and designation	:	Conforms
v)	IS: 7347-1974 (Reaffirmed 2006)-Specification for performance of small size spark ignition engines for agricultural water pumps, sprayers, tillers, reapers and other similar applications	:	**Could not be ascertained**

17. COMMENTS AND RECOMMENDATIONS

17.1 The sprayer serial number is not specified. It **MUST** be specified.

17.2 The sprayer year of manufacture is not specified. It should be specified.

17.3 The material of pump spreader does not meet the requirement of relevant code/Standard. It **MUST** be looked into.

17.4 The thickness of the wall of barrel of gun does not meet the requirement of Indian Standard. relevant code/Standard. It **MUST** be looked into.

17.5 The diameter of connecting rod of gun does not meet the requirement of Indian Standard. It **MUST** be looked into.

17.6 The material used for different components is not declared by the manufacture. It **MUST** be declared.

17.7 The engaged length of outlet part does not meet the requirement of relevant code/standard. It **MUST** be looked into.

17.8 The spray gun is not designated and marked by identification mark. The identification mark as specified by relevant Indian Standard **MUST** be provided.

17.9 The pump manufacturing, model and year and serial No is not specified. It **MUST** be specified.

17.10 The spray nozzle is not designated and marked by its identification mark. The identification mark as specified by relevant Indian Standard **MUST** be provided.

17.11 The strainer in nozzle is not provided. It may be considered for providing

17.12 The discharge rate for fine cone spray pattern of gun at a pressure of 600 kPa does not conform to the requirement of IS: 3652-1995. It MUST be looked into.

17.13 The manufacturers name or recognized trade mark and batch or code number on nozzle is not provided. It **MUST** be provided.

17.14 The manufacturers name or recognized trade mark and batch or code number is not marked on gun. It **MUST** be marked.

17.15 The discharge rate for fine cone spray of nozzle at a pressure of 300 kPa does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.

17.16 The necessary tools are not provided. It **MUST** be provided.

17.17 At rated pressure of 10 Kg/cm^2 the pump discharge was observed as 7125 ml/min. against the minimum requirement of 8000.0 ml/min. This **MUST** be examined.

17.18 The pressure gauge with full scale reading 120 bar is provided, thus it does not conform to requirement of IS: 11313-2007. It **MUST** be looked into.

17.19 Though a pressure regulator provided but that was not in working condition therefore its conformity to IS: 11313-2007 could not be ascertained. It **MUST** be looked into for corrective action.

17.20 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

17.21 Safety provision/safety wear

i) Apron, gum boots and hand gloves **MUST** be added on safety wear.

ii) 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.

i) Instruction manual with parts catalogue of sprayer

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

i) Service manual of sprayer

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

TESTING AUTHORITY

R. K. NEMA SENIOR AGRICULTURAL ENGINEER	
P. K. PANDEY **DIRECTOR**	

19. APPLICANT'S COMMENTS

Para No	Our reference	Applicant's comments
19.1	17.1,17.2	Will be available on machine.
19.2	17.3 to 17.7	We will look in to the same.
19.3	17.8,17.10,17.13,17.14	We will insist that the supplier provide the product with the respective marking.
19.4	17.9	This marking will be available on the machine.
19.5	17.11,17.12,17.15, 17.17,17.18,17.19,17.20	We will look in to the same.
19.6	18	Operation manual shall be updated as required.