व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ **No.: PS-420/2368/2019**
माह/**Month : October, 2019**

THIS TEST REPORT VALID UP TO : 31st October, 2026

KISANKRAFT, KK-PSP-18
ENGINE OPERATED PORTABLE 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
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[ISO 9001:2015 CERTIFIED]

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1	2	3	4	5
xxv)	Piston rod guide	Brass, Aluminum alloy, Gunmetal, Nylon	Not applicable	--
xxvi)	Connecting rod	Carbon steel	Carbon steel	Conforms
xxvii)	Gudgeon pin	Carbon steel	Carbon steel	Conforms
xxviii)	Big end bearing	Steel coated with tin base white metal	Steel coated with tin base white metal	Conforms
xxix)	Small end bush	Gunmetal	Gunmetal	Conforms
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.		Declared	Conforms

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

1. Date of test : 16.02.2019
2. Atmospheric conditions :
   a) Temperature : 19° C
   b) Relative humidity : 70 %
   c) Pressure : 99.1 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)
3625	10	1	10950	NIL	11057.5	11057.5	0.18
		2	11000				
		3	11180				
		4	11100				
3538	20	1	10350	NIL	10455.0	10455.0	0.34
		2	10600				
		3	10420				
		4	10450				
3495	30	1	10150	NIL	10150.5	10150.5	0.50
		2	10180				
		3	10170				
		4	10100				
3320	40	1	9340	NIL	9275.0	9275.0	0.61
		2	9250				
		3	9200				
		4	9310				

Minimum discharge rate = 9275 ml/min at 40 kg/cm^2
Maximum discharge rate = 11057.5 ml/min at 10 kg/cm^2
Discharge at rated pressure = 11057.5 ml/min at 10 kg/cm^2

4. TEST FOR VOLUMETRIC EFFICIENCY OF PUMP

[vide clause 8.4 of IS: 11313-2007]

Rated pressure, kg/cm^2 : 10
Engine speed corresponding to rated pressure (rpm) : 972
Theoretical cubic capacity of pump, ml : 12.22
Actual volume at rated pressure, ml : 11.38
Volumetric efficiency, % : 93

5. POWER REQUIREMENT

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 0.61 kW against the declared net power output of engine as 0.75 kW.

6. ENGINE PERFORMANCE TEST

The applicant has submitted a specification in respect of Kishankraft, KK-PE4-103 engine. The prime mover (engine) has been tested by NRFMT&TI Hisar.

S.No.	Parameter		Declaration
i	Engine Type	:	Over head valve, 4 stroke ,Air cooled, Horizontal shaft, single cylinder
ii	Bore,(mm)	:	52
iii	Stroke (mm)	:	46
iv	Displacement,(cc)	:	98
v	Net power out put	:	0.75 kW@ 3600 rpm
vi	Max Torque	:	3.2 Nm @ 2500 rpm
vii	Compression ratio	:	8.5:1

6.1 ENGINE RATING TEST & FUEL CONSUMPTION TEST

Date of test : 03.09.2019
Make/ Model of Dynamometer : SAJ AG-5
Type of Dynamometer : Eddy Current
Dynamometer Constant : 9549.305

Sr. No.	House of the day	Percentage Load (%)	Load (Nm)	Engine Speed (rpm)	Horse Power (kW)	Fuel consumption			Specific energy (kWh/l)
						kg/hr	l/hr	Specific kg/kWh	
1	2	3	4	5	6	7	8	9	10
1.	13:05	Test started							
2.	14:05	100	2.05	3608	0.77	0.499	0.679	0.648	1.134
3.	15:05	100	2.12	3599	0.80	0.499	0.679	0.624	1.178
4.	16:05	100	1.75	3610	0.66	0.501	0.679	0.759	0.972
5.	17:05	100	1.99	3613	0.75	0.492	0.667	0.656	1.124
6.	18:05	100	1.99	3613	0.75	0.503	0.682	0.670	1.100
7.	19:05	100	1.99	3619	0.75	0.499	0.677	0.665	1.108
8.	20:05	100	1.99	3620	0.75	0.498	0.675	0.664	1.111
9.	20:35	100	1.99	3612	0.75	0.498	0.675	0.664	1.111
Avg.	--		1.98	3612	0.75	0.499	0.677	0.669	1.108
10	20:35	Loaded to 110 % load							
	21:05	110	2.18	3588	0.82	0.489	0.663	0.596	1.237

1	2	3	4	5	6	7	8	9	10
11.	21:05	Loaded to 75 % load							
	21:15	75	1.49	3702	0.58	0.450	0.611	0.776	0.949
12.	21:15	Loaded to 50 % load							
	21:25	50	0.99	3762	0.39	0.411	0.557	1.054	0.700
13.	21:25	Loaded to 25 % load							
	21:35	25	0.49	3786	0.19	0.350	0.475	1.842	0.400
14.	21:35	Unloaded							
	21:45	0	0.28	3819	0.08	0.326	0.442	2.964	0.249

6.2	**Governing test:**		
Sr. No.	Parameter	:	Observed value
1.	Momentary speed change in percentage of rated speed.	:	6.10
2.	Permanent speed change in percentage of rated speed	:	5.94

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

1. Date of test : 16.02.2019
2. Atmospheric conditions
   a. Temperature : 19 °C
   b. Relative humidity : 70 %
   c. 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.	10	NIL	NIL	--
2.	20	NIL	NIL	--
3.	30	NIL	NIL	--
4.	40	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 : 16.02.2019
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 1800 ml/min & 5500 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 : 2245 ml/min
- For jet spray pattern : 3580 ml/min

Remarks : The observed discharge rate for fine cone spray pattern & jet spray pattern were not within limit specified by the relevant Indian Standard.

17. COMMENTS AND RECOMMENDATIONS

17.1 The manufacturing year of sprayer and serial no. is not specified. It **MUST** be specified.

17.2 The manufacturing year of pump is not specified. It should be specified.

17.3 The material for Pump is let port end fitting does not meet the requirement of relevant code/standard. It **MUST** be looked into.

17.4 The material for spreader does not meet the requirement of relevant code/standard. It **MUST** be looked into.

17.5 The material for pump in let port end fitting does not meet the requirement of relevant code/standard. It **MUST** be looked into.

17.6 The discharge rate for fine spray pattern and jet spray pattern of nozzle at a pressure of 300±30 kPa does not conform to the requirement of IS : 3652-1995. It **MUST** be looked into.

17.7 The pressure gauge marking exceeds 2.5 times the declared value of pressure. Suitable pressure gauge **MUST** be provided to ensure the compliance of the relevant Indian Standard.

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

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

17.10 The discharge rate for fine cone spray pattern and jet spray pattern of gun at a pressure of 600 kPa±60 does not conform to the requirement of IS:3652-1995. It **MUST** be looked into.

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

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

17.13 The Spray Angle for Fine Cone spray pattern of spray Gun at a pressure of 600 kPa $\pm$ 60 does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.

17.14 The Spray Angle for Fine Cone spray pattern of Spray Nozzle at a pressure of 300 kPa $\pm$ 30 does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.

17.15 The Batch or Code number is not Marked on Spray Gun. It **MUST** be looked into.

17.16 The Manufacture's Name or recognized trade mark and Batch or Code number is not marked on spray nozzle. It **MUST** be looked in to.

17.17 Through a pressure regulator provided but that was not reach working pressure and rated pressure therefore its conformity to IS: 11313-2007 could not be ascertained. It **MUST** be looked into for corrective action

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

17.19 The suction strainer aperture size does not meet the requirement of relevant code/standard. It **MUST** be looked into.

17.20 The engaged threaded length of outlet part does not meet the requirement of relevant Indian Standard. It **MUST** be looked into.

17.21 Labeling plate :

Not a labeling plate but only a sticker is provided on pump & engine that too without mentioning all the information, thus it defeats the purpose. Hence to 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

17.22 Safety provision/safety wear

i) The safety wear are not provided during the test. It **MUST** be provided.
ii) Safety instructions regarding handling poisonous agro-chemical before, during and after spraying operation should be provided on sprayer.

18. TECHNICAL LITERATURE

The following literatures are provided with sprayer for guidance to the user.
i) User manual of sprayer & engine.
ii) Part's catalogue of pump
The User manual of sprayer should 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	We will mention the manufacturing year and Serial number on Machine. We will improve it in future
19.2	17.2	We will mention the manufacturing year on pump. We will improve it in future.
19.3	17.3,17.6,17.7 17.8,17.9,17.15,17.16	We will improve it at production level
19.4	17.4, 17.5,17.10	We will take corrective action to meet the requirement of Indian Standard.
19.5	17.11, 17.12, 17.13,17.14,17.17	We will follow up with the issue with manufacturer and we will take corrective action to meet the requirement of Indian Standard.