

THIS TEST REPORT VALID UP TO : 31st July, 2029



**KIRLOSKAR OIL ENGINES LTD., KPS-5030.03
ENGINE OPERATED HTP SPRAYER**



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

उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

Northern Region Farm Machinery Training and Testing Institute

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Tractor Nagar, Sirsa Road, Hisar (Haryana)-125 001

[ISO 9001:2015 CERTIFIED]

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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 No.-1 of IS:11313-2007 may not be present in a particular sprayer.		Declared by the manufacturer	--

4. RUNNING-IN

The HTP sprayer was run-in for 1 hour as recommended by the applicant before starting of test.

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

1. Date of test : 26.07.2022
2. Atmospheric conditions
 - a) Temperature : 29.6 °C
 - b) Relative humidity : 83.2 %
 - c) Pressure : 98.1 kPa

3. Data recorded

Avg. speed of pump (rpm)	Working pressure (kg/cm ²)	Test No.	Delivery from the discharge line (ml/min)	Overflow (ml/min)	Average overflow (ml/min)	Average delivery from the discharge line (ml/min)	Discharge rate of pump (ml/min)	Hydraulic Power (kW)
938	10.0	1	25100	6550	6600.0	24962.5	31562.5	0.5
		2	24950	6450				
		3	24800	6600				
		4	25000	6800				
861	20.0	1	30500	2650	2725.0	30270.0	32995.0	1.1
		2	30100	2750				
		3	30000	2700				
		4	30480	2800				
840	30.0	1	31000	NIL	NIL	31712.5	31712.5	1.5
		2	32100	NIL				
		3	31800	NIL				
		4	31950	NIL				
721	40.0	1	26750	NIL	NIL	26787.5	26787.5	1.7
		2	27000	NIL				
		3	26900	NIL				
		4	26500	NIL				

Minimum discharge rate = 26787.5 ml/min at 40 kg/cm²
Maximum discharge rate = 32995.0 ml/min at 20 kg/cm²
Discharge at rated pressure = 31562.5 ml/min at 10 kg/cm²

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

Date of test	:	26.07.2022
Rated pressure, kg/cm ²	:	10
Rated RPM of pump	:	1000
Theoretical volume, ml	:	38.15
Actual volume at rated rpm & rated pressure, ml	:	31.56
Volumetric efficiency, %	:	82.73

7. POWER REQUIREMENT

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 1.7 kW against the declared net power output of engine as 2.8 kW.

8. ENGINE RATING TEST AND FUEL CONSUMPTION TEST

Date of test	:	28.07.2022
Type of dynamometer	:	Eddy current
Model of dynamometer	:	Electrodyne AG-10
Dynamometer constant	:	9549.305

Sr. No	Hours of the day	Load (%)	Load (Nm)	Engine Speed (rpm)	Power (kW)	Fuel consumption			Specific energy (kWh/l)
						kg/h	l/h	Specific g/kWh	
	9.50	Test started							
1.	10.50	100	7.15	3600	2.66	1.249	1.653	469.72	1.609
2.	11.50	100	7.13	3599	2.66	1.249	1.652	469.40	1.610
3.	12.50	100	7.03	3599	2.65	1.242	1.643	468.62	1.613
4.	13.50	100	6.95	3599	2.64	1.216	1.609	460.76	1.641
5.	14.57	100	6.96	3598	2.62	1.205	1.594	459.90	1.644
6.	15.50	100	6.95	3599	2.62	1.192	1.576	454.79	1.662
7.	16.50	100	6.80	3601	2.56	1.214	1.606	474.20	1.594
8.	17.20	100	6.90	3601	2.62	1.201	1.588	458.36	1.650
	Avg.		6.98	3600	2.63	1.221	1.615	464.47	1.628
9.	17.50	110	7.67	3517	2.83	1.319	1.745	466.22	1.622
10.	18.00	75	5.22	3731	2.06	0.992	1.312	481.36	1.570
11.	18.10	50	3.49	3817	1.39	0.860	1.138	618.92	1.221
12.	18.20	25	1.75	3894	0.71	0.677	0.896	953.73	0.792
13.	18.30	Unloaded	0.24	3948	0.10	0.528	0.698	5277.50	0.143

Governing test:

Sr. No.	Parameter	:	Observed value
1.	Momentary speed change in percentage of rated speed	:	10.31 %
2.	Permanent speed change in percentage of rated speed	:	9.00 %

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

1. Date of test : 26.07.2022
2. Atmospheric conditions
 - a. Temperature : 29.6 °C
 - b. Relative humidity : 83.2 %
 - c. Pressure : 98.1 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.	20.0	NIL	NIL	--
3.	30.0	NIL	NIL	--
4.	40.0	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 : 25.07.2022
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 6100 ml/min & 5750 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 : 5805.0 ml/min
- For jet spray pattern : 6115.0 ml/min

10.2 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 70 degree by the applicant. However, the spray angle corresponding to 600 kPa pressure was observed as 74.6 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 Minutes
4	Result	No leak, crack or bursting of gun was observed during test

10.4 SPRAY GUN DESIGNATION : Not marked**10.5 MARKING**

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

Batch or code number : Marked as CG-V60

10.6 ENDURANCE TEST OF GUN

- i. Date : 13.07.2022 to 21.07.2022
- ii. Total running time (h) : 48
- iii. 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	5782.5	6125.0	71.9
b	Second collection	5787.5	6100.0	73.2
c	Third collection	5787.5	6100.0	72.6
d	fourth collection	5775.0	6080.0	74.6
e	Fifth collection	5775.0	6062.5	71.1
f	Sixth collection	5742.5	6105.0	72.6
g	Seventh collection	5810.0	6122.5	73.9
h	Eighth collection	5750.0	6082.5	73.2

Remarks- (i) Percentage variation of discharge at cone spray pattern from first to last collection is 0.56 %.**(ii) Percentage variation of discharge at jet spray pattern from first to last collection is 0.69 %.****(iii) Percentage variation in spray angle of gun at cone spray pattern from first to last collection is 1.3 degree.**

11. TEST FOR NOZZLE**[Vide clause 5.15 of IS- 11313-2007 & Annex F of IS- 3652-1995]**

Date of test : 25.07.2022
Type of nozzle (apa) : Solid cone, Adjustable

11.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate for fine cone spray & jet spray pattern as 4500 ml/min & 3100 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 : 5575.0 ml/min
- For jet spray pattern : 5885.0 ml/min

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

11.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle for fine cone spray pattern at the pressure of 300 kPa was 65 degree declared by the applicant. However, the spray angle corresponding to 300 kPa pressure was observed as 66.1 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.

DATA OF SPRAY DISTRIBUTION PATTERNATOR TEST OF NOZZLE

No. of tube	5	4	3	2	1	Centre	1	2	3	4	5
Discharge in ml.	02	06	11	44	185	314	220	144	39	11	03

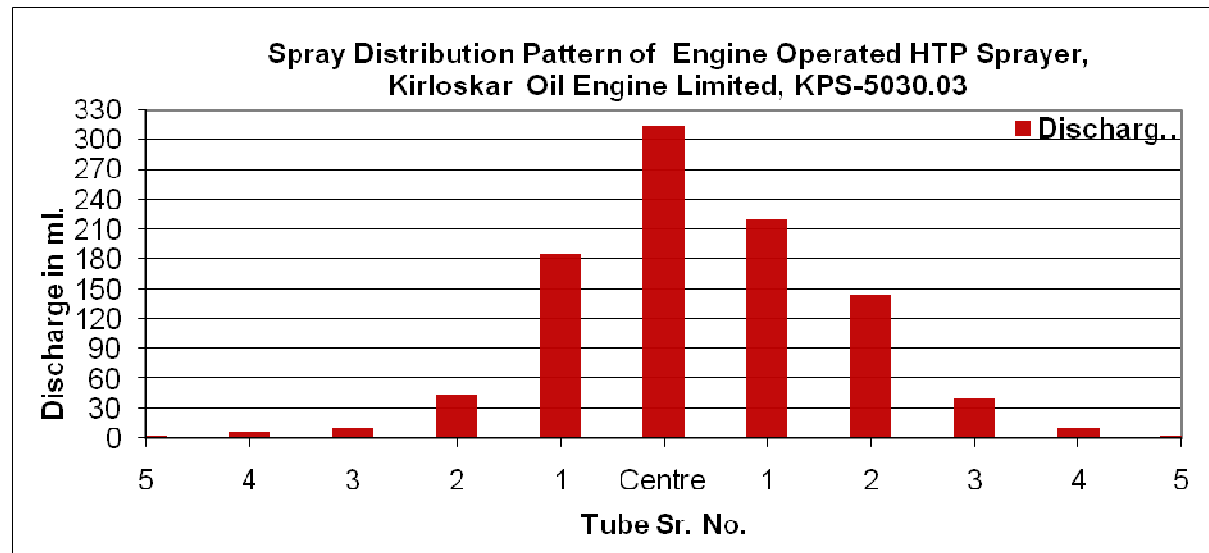


FIG. 1 : SPRAY DISTRIBUTION PATTERN

11.4 **Nozzle designation** : **Not marked**
Provision of strainer in nozzle : **Not provided**

11.5 MARKING

Manufacturer's name or : Marked as Victor
recognized trade mark
Batch or code number : **Not marked**

12. AIR PRESSURE CHAMBER TEST
[vide Clause 8.7.2 of IS: 11313-2007]

Date of Test – 26.07.2022		
Sr. No	Details	Condition
1	Hydraulic pressure	25 kg/cm ²
2	Duration of pressure	30 second
3	Result	No leakage or deformation of pressure chamber was found during the test.

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

1. Date(s) of Test: 05.07.2022 to 12.07.2022
2. Total running hours: - 50
3. Quantity of liquid Collected (ml/min.):-
 - a) First Collection - 30717.5
 - b) Second Collection - 30900.0
 - c) Third Collection - 30837.5
 - d) Fourth Collection - 31462.5
 - e) Fifth Collection - 31587.5
 - f) Sixth Collection - 31462.5
 - g) Seventh Collection - 31750.0
4. Percentage variation of discharge rate from first to last collection was observed to be 3.36 %

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- 25.07.2022		
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 leakage, crack or breakage observed in hose and hose connection during the test.

21. COMMENTS AND RECOMMENDATIONS

- 21.1 The designation of gun is not marked. It **MUST** be looked into.
- 21.2 The discharge rate for fine cone spray pattern & jet spray pattern of nozzle at a pressure of 300 kPa does not conform to the requirement of IS: 3652-1995. It **MUST** be looked into.
- 21.3 The strainer in nozzle is not provided. It **MUST** be looked into.
- 21.4 The spray nozzle is not designated by its identification mark as specified by Indian Standard. It **MUST** be Looked into.
- 21.5 Safety guard on belt pulley is not provided. It **MUST** be looked into.
- 21.6 The pressure gauge with full scale reading of 120 bar is provided. Thus, it does not conform the requirement of IS:11313-2007. It **MUST** be looked into.
- 21.7 The engaged length of outlet port of pump does not meet the requirement of relevant code/ standard. It **MUST** be looked into.
- 21.8 The necessary tools are not provided. It **MUST** be provided.
- 21.9 The safety wear is not provided. It **MUST** be looked into.
- 21.10 **Safety provision/safety wear**
- i) Safety instructions regarding handling poisonous agro- chemical before, during and after spraying operation should be provided on sprayer.

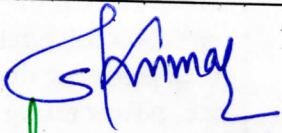
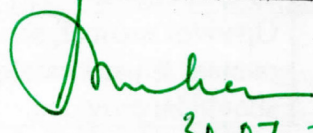
22. TECHNICAL LITERATURE

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

- i) Operators manual
- ii) Service manual
- iii) Parts catalogue
- iv) Engine user manual & part catalogue

However, the manuals of sprayer need to be updated as per IS:8132-1999

TESTING AUTHORITY

Er. SANJAY KUMAR AGRICULTURAL ENGINEER	
Dr. MUKESH JAIN DIRECTOR	 30.07.2022

The test report is compiled by Abhishek Chourey, MTS (Technical)

23. APPLICANT'S COMMENTS

No specific comments received from the applicant.