

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या/ No.: PS- 520/2912/2022
माह/Month: September, 2022

THIS TEST REPORT VALID UP TO : 30th September, 2029



**CAM, CAM-S24
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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[ISO 9001:2015 CERTIFIED]

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xxiii)	Piston pump crank shaft	Carbon steel	Carbon steel	Conforms
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	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 No.-1 of IS:11313-2007 may not be present in a particular sprayer.		Declared by the manufacturer	--

4. RUNNING-IN

Applicant has not recommended running-in of sprayer

5. TEST FOR DISCHARGE RATE OF PUMP

[vide Clause 8.3 of IS- 11313-2007]

1. Date of test : 26.08.2022
2. Atmospheric conditions
 - a) Temperature : 31.6 °C
 - b) Relative humidity : 61.3 %
 - c) Pressure : 97.6 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)
779	5.0	1	13900	NIL	NIL	13957.5	13957.5	0.1
		2	13950	NIL				
		3	14000	NIL				
		4	13980	NIL				
769	15.0	1	13700	NIL	NIL	13737.5	13737.5	0.3
		2	13700	NIL				
		3	13800	NIL				
		4	13750	NIL				
751	25.0	1	13350	NIL	NIL	13387.5	13387.5	0.5
		2	13300	NIL				
		3	13400	NIL				
		4	13500	NIL				

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740	35.0	1	12750	NIL	NIL	12900.0	12900.0	0.7
		2	12800	NIL				
		3	13100	NIL				
		4	12950	NIL				
726	40.0	1	12400	NIL	NIL	12425.0	12425.0	0.8
		2	12450	NIL				
		3	12350	NIL				
		4	12500	NIL				

Minimum discharge rate = **12425.0 ml/min at 40 kg/cm²**

Maximum discharge rate = **13957.5 ml/min at 5 kg/cm²**

Discharge at rated pressure = **12900.0 ml/min at 35 kg/cm²**

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

Date of test : 26.08.2022
 Rated pressure, kg/cm² : 35
 Rated RPM of pump : 800
 Theoretical volume, ml : 18.24
 Actual volume at rated rpm & rated pressure, ml : 16.12
 Volumetric efficiency, % : 88.38

7. POWER REQUIREMENT

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 0.80 kW against the declared net power output of engine as 1.47 kW.

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

1. Date of test : 26.08.2022
2. Atmospheric conditions
 - a. Temperature : 31.6 °C
 - b. Relative humidity : 61.3 %
 - c. Pressure : 97.6 kPa

3. Data recorded

Sr. No.	Working pressure (kg/cm ²)	Fluctuation range (kg/cm ²)	Pressure drop (kg/cm ²)	Ratio
1.	5.0	NIL	NIL	--
2.	15.0	NIL	NIL	--
3.	25.0	NIL	NIL	--
4.	35.0	NIL	NIL	--
5.	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 : 25.08.2022
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 2300 ml/min & 3500 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 : 4567.5 ml/min
- For jet spray pattern : 6815.0 ml/min

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

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 86.2 degree.

Remarks:- The spray angle for fine cone spray pattern at the pressure of 600 kPa is not within limit specified by the relevant code/standard.

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 Basak trade mark

Batch or code number : **Not marked****10.6 ENDURANCE TEST OF GUN**

- i. Date : 02.08.2022 to 22.08.2022
- 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	4432.5	6725.0	84.5
b	Second collection	4387.5	6722.5	85.1
c	Third collection	4375.0	6760.0	84.5
d	Fourth collection	4512.5	6810.0	85.6
e	Fifth collection	4462.5	6840.0	84.5
f	Sixth collection	4490.0	6787.5	86.2
g	Seventh collection	4595.0	6825.0	83.9
h	Eighth collection	4555.0	6805.0	86.2

Remarks- (i) Percentage variation of discharge at cone spray pattern from first to last collection is 2.76 %.**(ii) Percentage variation of discharge at jet spray pattern from first to last collection is 1.19 %.****(iii) Percentage variation in spray angle of gun at cone spray pattern from first to last collection is 1.7 degree.**

11. TEST FOR NOZZLE

[Vide clause 5.15 of IS- 11313-2007 & Annex F of IS:3652-1995]

Date of test : 25.08.2022
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 2100 ml/min & 3400 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 : 2937.5 ml/min
- For jet spray pattern : 6372.5 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

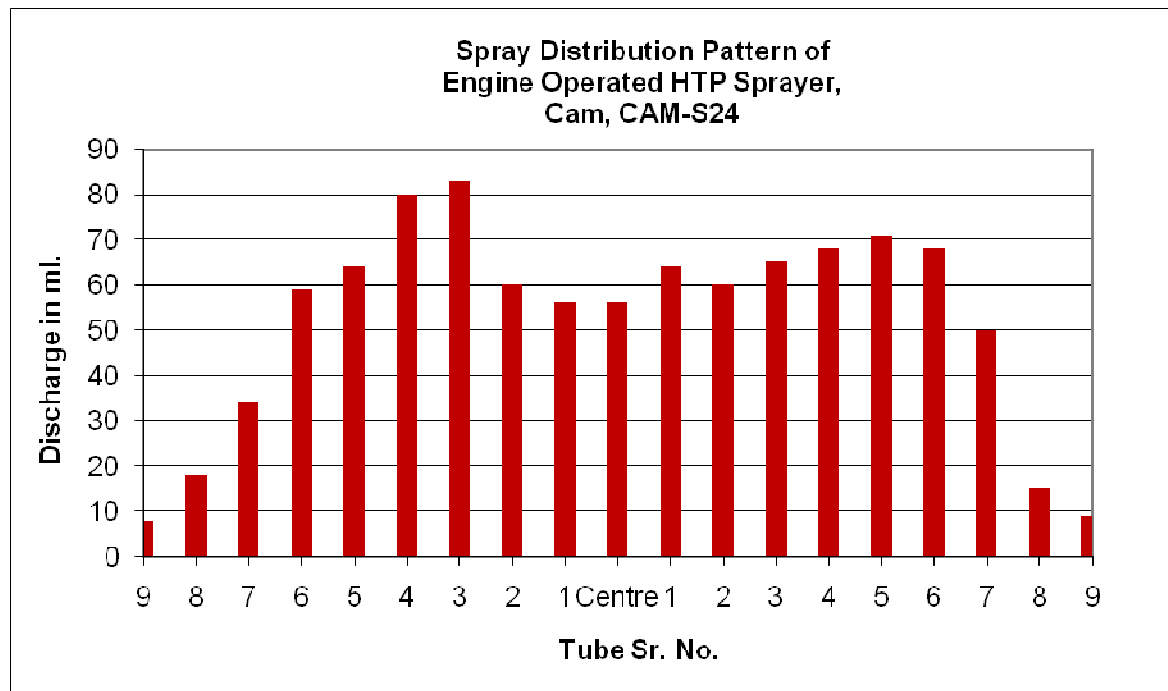
The spray angle for fine cone spray pattern at the pressure of 300 kPa was 80 degree declared by the applicant. However, the spray angle corresponding to 300 kPa pressure was observed as 82.7 degree.

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	9	8	7	6	5	4	3	2	1	Centre	1	2	3	4	5	6	7	8	9
Discharge in ml.	08	18	34	59	64	80	83	60	56	56	64	60	65	68	71	68	50	15	09

**FIG. 1 : SPRAY DISTRIBUTION PATTERN**

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- 11.4 Nozzle designation : Not marked**
 Provision of strainer in nozzle : **Not provided**
- 11.5 MARKING**
 Manufacturer's name or : **Not marked**
 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 -26.08.2022		
Sr. No	Details	Condition
1	Hydraulic pressure	87.5 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: 25.07.2022 to 01.08.2022
2. Total running hours: - 50
3. Quantity of liquid Collected (ml/min.):-
 - a) First Collection - 12762.5
 - b) Second Collection - 12675.0
 - c) Third Collection - 12575.0
 - d) Fourth Collection - 12707.5
 - e) Fifth Collection - 12875.0
 - f) Sixth Collection - 12862.5
 - g) Seventh Collection - 13062.5
4. Percentage variation of discharge rate from first to last collection was observed to be 2.35 %

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- 25.08.2022		
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 pump serial number, country of origin & year of manufacture are not specified. It **MUST** be specified.
- 21.2** The discharge rate for fine cone spray pattern and jet spray pattern of spray gun at the pressure of 600 kPa does not conform the requirement of IS: 3652-1995. It **MUST** be looked into for appropriate improvement.
- 21.3** The spray angle for fine cone spray pattern of spray gun at the pressure of 600 kPa does not conform to the requirement of IS:3652-1995. It **MUST** be looked for further improvement.
- 21.4** The spray gun is not designated and marked by identification mark. The identification mark as per specified by Indian Standard. It **MUST** be looked into
- 21.5** 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.
- 21.6** The spray nozzle is not designated by its identification mark as specified by Indian Standard. It **MUST** be Looked into.
- 21.7** The strainer in nozzle is not provided. It **MUST** be looked into.
- 21.8** The pressure gauge with full scale reading of 100 bar is provided. Thus, it does not conform the requirement of IS:11313-2007. It **MUST** be looked into.
- 21.9** The engaged length of outlet port of pump does not meet the requirement of relevant code/standard. It **MUST** be looked into.
- 21.10** The necessary tools are not provided. It **MUST** be provided.
- 21.11** The diameter of connecting rod of the gun does not meet the requirement of Indian Standard. It **MUST** be looked into.
- 21.12** The safety wear is not provided. It **MUST** be provided.
- 21.13** A suitable labeling plate (not sticker) needs to be provided with “Interlia” following information.
- (i) Manufacturer’s name
 - (ii) Make
 - (iii) Model
 - (iv) Month & year of manufacturer
 - (v) Rated pressure
 - (vi) Rated speed
 - (vii) Discharge rate
 - (viii) Power rating of engine
 - (ix) SFC of engine

21.14 Safety provision/safety wear

- i) Safety instructions regarding handling poisonous agro- chemical before, during and after spraying operation should be provided on sprayer.


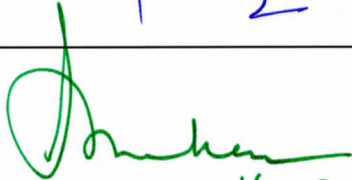
22. TECHNICAL LITERATURE

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

- i) Operators manual
- ii) Service manual
- iii) Parts 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	 16.09.2022

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

23. APPLICANT'S COMMENTS

We will update our product as per the comments