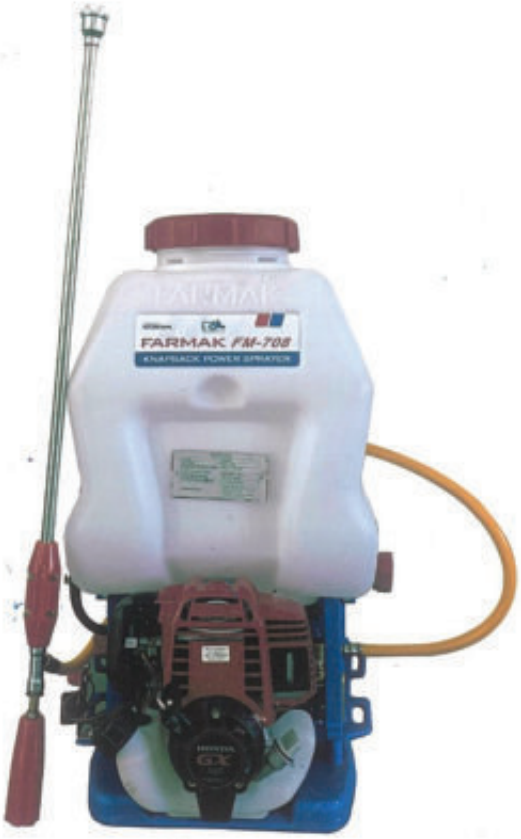
व्यावसायिक परीक्षण रिपोर्ट संख्या/ No.: PS-535/3066/2023

**COMMERCIAL TEST REPORT (FIRST BATCH)** माह/Month: August, 2023

**THIS TEST REPORT VALID UP TO : 31st August, 2028**




# FARMAK, FM-708
# ENGINE OPERATED KANPSACK SPRAYER

सत्यमेव जयते

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**

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/

E-mail: fmti-nr@nic.in Tele./FAX: 01662-276984

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

1. Date of test : 07.06.2023
2. Atmospheric conditions
   a) Temperature : 37.2 °C
   b) Relative humidity : 31.7 %
   c) Pressure : 97.7 kPa

3. Data recorded

| Avg. 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) |
|---|---|---|---|---|---|---|---|
| 5487 | 8.0 | 1 | 6200 | Nil | 6207.5 | 6207.5 | 0.08 |
| | | 2 | 6220 | | | | |
| | | 3 | 6180 | | | | |
| | | 4 | 6230 | | | | |
| 5427 | 10.0 | 1 | 6150 | Nil | 6075.0 | 6075.0 | 0.10 |
| | | 2 | 6000 | | | | |
| | | 3 | 6100 | | | | |
| | | 4 | 6050 | | | | |
| 5372 | 12.0 | 1 | 5780 | Nil | 5730.0 | 5730.0 | 0.11 |
| | | 2 | 5700 | | | | |
| | | 3 | 5750 | | | | |
| | | 4 | 5690 | | | | |
| 5330 | 14.0 | 1 | 3650 | Nil | 3650.0 | 3650.0 | 0.08 |
| | | 2 | 3640 | | | | |
| | | 3 | 3680 | | | | |
| | | 4 | 3630 | | | | |

**Minimum discharge rate = 3650.0 ml/min at 14 $kg/cm^2$**
**Maximum discharge rate = 6207.5 ml/min at 8 $kg/cm^2$**
**Discharge at rated pressure = 6207.5 ml/min at 8 $kg/cm^2$**

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

| | | |
|---|---|---|
| Date | : | 07.06.2023 |
| Rated pressure, $kg/cm^2$ | : | 8 |
| Engine speed corresponding to rated pressure (rpm) | : | 5510 |
| Theoretical cubic capacity of pump, ml | : | 6445.44 |
| Actual volume at rated pressure, ml | : | 6245.00 |
| Volumetric efficiency, % | : | 96.89 |

## 7. POWER REQUIREMENT

During the pump operation from minimum to maximum pressure range, the max. hydraulic power was observed as 0.11 kW against the declared net power output of engine as 0.72 kW.

## 8. ENGINE RATING TEST AND FUEL CONSUMPTION TEST

Date of test : 29.03.2023
Type of dynamometer : Electrodyne
Model of dynamometer : EC-4 kW
Dynamometer constant : 9950

| Sr. No. | Hours of the day | Load (%) | Load (Nm) | Engine speed (rpm) | Power (kW) | Fuel consumption (kg/h) | Fuel consumption (l/h) | Fuel consumption Specific (g/kWh) | Specific energy (kWh/l) |
|---|---|---|---|---|---|---|---|---|---|
| | 11:29 | Test started | | | | | | | |
| 1. | 12:31 | 100 | 0.83 | 7001 | 0.61 | 0.248 | 0.335 | 408 | 1.80 |
| 2. | 13:31 | 100 | 0.88 | 6994 | 0.64 | 0.253 | 0.341 | 393 | 1.90 |
| 3. | 14:30 | 100 | 0.86 | 6999 | 0.63 | 0.257 | 0.347 | 409 | 1.80 |
| 4. | 15:30 | 100 | 0.86 | 7004 | 0.63 | 0.259 | 0.349 | 410 | 1.80 |
| 5. | 16:30 | 100 | 0.84 | 7010 | 0.62 | 0.261 | 0.352 | 423 | 1.80 |
| 6. | 17:31 | 100 | 0.86 | 7024 | 0.63 | 0.263 | 0.355 | 415 | 1.80 |
| 7. | 18:30 | 100 | 0.84 | 6989 | 0.61 | 0.262 | 0.353 | 426 | 1.70 |
| 8. | 19:01 | 100 | 0.85 | 7006 | 0.62 | 0.259 | 0.350 | 417 | 1.80 |
| | **Avg.** | **100** | **0.85** | **7003** | **0.62** | **0.258** | **0.348** | **413** | **1.80** |
| 9. | 19:31 | 110 | 0.94 | 6753 | 0.66 | 0.258 | 0.347 | 388 | 1.90 |
| 10. | 20:00 | 75 | 0.64 | 7991 | 0.54 | 0.287 | 0.387 | 537 | 1.40 |
| 11. | 20:10 | 50 | 0.43 | 8634 | 0.39 | 0.291 | 0.391 | 748 | 1.00 |
| 12. | 20:20 | 25 | 0.22 | 8887 | 0.20 | 0.274 | 0.368 | 1337 | 0.60 |
| 13. | 20:30 | Unloaded | 0.17 | 9008 | 0.16 | 0.274 | 0.369 | 1712 | 0.40 |

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

1. Date of test : 07.06.2023
2. Atmospheric conditions
   a. Temperature : 37.2 °C
   b. Relative humidity : 31.7 %
   c. Pressure : 97.7 kPa

3. Data recorded

| Sr. No. | Working pressure($kg/cm^2$) | Fluctuation range ($kg/cm^2$) | Pressure drop ($kg/cm^2$) | Ratio |
|---|---|---|---|---|
| 1. | 8.0 | NIL | NIL | -- |
| 2. | 10.0 | NIL | NIL | -- |
| 3. | 12.0 | NIL | NIL | -- |
| 4. | 14.0 | 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 : 06.06.2023

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 1900 ml/min & 2600 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 : 1835.0 ml/min
- For jet spray pattern : 4585.0 ml/min

**Remarks: Discharge rate for jet spray pattern is not within the 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 kPa was declared as 75 degree by the applicant.** However, the spray angle corresponding to 600 kPa pressure was observed as 77.2 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 trade mark : Marked as Farmak

Batch or code number : **Not marked**

### 10.6 ENDURANCE TEST OF GUN (Vide clause E 3.6 of IS:3652-1995)

1. Date : 21.04.2023 to 28.04.2023
2. Total running time (h) : 48

## 21. COMMENTS AND RECOMMENDATIONS

**21.1** The ignition timing of engine is not specified. It **MUST** be looked into.

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

**21.3** At rated pressure of 8 kg/cm$^2$, the pump discharge was observed as 6207.5 ml/min. against the minimum requirement of 8000.0 ml/min. This **MUST** be examined.

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

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

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

**21.7** The spray gun is not designated and marked by its identification mark. Identification mark as specified by Indian standard should be provided.

**21.8** The strainer in nozzle is not provided. It may be provided.

**21.9** The diameter of connecting rod of spray gun does not meet the requirement of relevant code/standards. It **MUST** be looked into.

**21.10** The safety wear for operator is not provided. It **MUST** be provided.

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

**21.12** The observed power was 0.62 kW against the declaration of 0.72 kW which is approximately 14% less.

**21.13** **Safety provision /safety wear.**

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

## 22. TECHNICAL LITERATURE

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

i) Operator's manual
ii) Service manual
iii) Part's catalogue

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

| Sr. No. | Parameters | | Previous Sample (As per test report No. PS-136/1667/2014, November, 2014) | Present Sample |
|---|---|---|---|---|
| 1 | 2 | | 3 | 4 |
| | Model no. | : | Farmak, FM-708 with Honda GX-25, Agriculture sprayer | |
| | MRP Rs. | : | 19500 (Encl. of all takes) | |
| | Quantity packed | : | One | |
| | Month & Year of manufacturer | : | **Not specified** | |
| | Origin country | : | **Not specified** | |
| | Grass/net weight, kg | : | 10.5 kg (Nw), 12.5 kg (GW) | |
| **23.2.3** | **Present Sample** | | | |
| | Make | : | Farmak | |
| | Model | : | FM-708 | |
| | Serial no. | : | GCALT-4541992 | |
| | Year of manufacturer | : | February-2023 | |
| | Engine make & model | : | Honda / GX-25 | |
| | Engine power rated, kW | : | 0.72 kW @ 7000 rpm | |
| | Manufacturer | : | VR Agro Equipments<br>7-299/A, Koilakuntla Road, Allagadda,<br>Distt. Kurnool-518543 (Andha Pradesh) | |
| **23.2.4** | **Technical literature** | : | Instruction manual & parts catalogue | Operator manual, service manual and parts list. |

## TESTING AUTHORITY

| | |
|---|---|
| **Er. SANJAY KUMAR**<br>**AGRICULTURAL ENGINEER** | |
| **Dr. MUKESH JAIN**<br>**DIRECTOR** | 22.08.2023 |

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

## 24. APPLICANT'S COMMENTS

We will take corrective action in our future production.