COMMERCIAL TEST REPORT

HAND OPERATED KNAPSACK SPRAYER
DHARA KKS 016

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE & FARMERS WELFARE
DEPARTMENT OF AGRICULTURE, COOPERATION & FARMERS WELFARE

NORTHERN REGION FARM MACHINERY TRAINING AND TESTING INSTITUTE
TRACTOR NAGAR, SIRSA ROAD, HISAR-125001 (HARYANA)

Website: http://nrfmtti.gov.in
E-mail: fmti-nr@nic.in
6.14 Nozzle

Unless otherwise specified by the purchaser, the nozzle shall conform to the requirement as given in Annexure-F of IS: 3652-1995.

**ANNEXURE F HYDRAULIC SPRAY NOZZLES (CL 6.8.4 OF IS 3652:1995)**

**F-1 Types**

<table>
<thead>
<tr>
<th>F-1.1</th>
<th>On the basis of spray distribution the nozzles shall be of the following types:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a) Hollow cone type</td>
</tr>
<tr>
<td></td>
<td>b) Fan type</td>
</tr>
<tr>
<td></td>
<td>c) Adjustable type</td>
</tr>
<tr>
<td></td>
<td>i) Double action type</td>
</tr>
<tr>
<td></td>
<td>ii) Triple action type</td>
</tr>
<tr>
<td>Fan type</td>
<td>Conforms</td>
</tr>
</tbody>
</table>

**F-2**

On the basis of the method of attachment, the nozzles shall be of the following types:

<table>
<thead>
<tr>
<th>a) Fixed type</th>
<th>Fixed type</th>
<th>Conforms</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Swivel type</td>
<td>NA</td>
<td>--</td>
</tr>
</tbody>
</table>

**F-3 PERFORMANCE REQUIREMENTS**

<table>
<thead>
<tr>
<th>F-3.1 Rate of discharge F-3.1.1</th>
<th>The discharge rate of the nozzle shall be declared by the manufacturer. In case of adjustable nozzle, the declared value shall be for extreme adjustments for cone and jet spray patterns at a pressure of 300 kPa.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-3.1.2</td>
<td>When tested in accordance with F-7, The nozzles shall provide a rate of discharge as given in Table-3. The rate of discharge shall be within ±5 percent for fixed type and ±10 percent for adjustable type of nozzle, of the declared value.</td>
</tr>
<tr>
<td>F-3.2 Spray Angle</td>
<td>The spray angle of the nozzle shall be declared by the manufacturer. The angle, when tested in accordance with method given in F-9 shall not differ by ±3 deg. for fixed type and ±5 deg for adjustable type nozzles from the declared value.</td>
</tr>
<tr>
<td>F-3.3 Endurance test</td>
<td>The hydraulic spray nozzle when tested in accordance with F-7 and F-9 at a pressure of 300 ± 30 kPa after operating for 48 hours duration with continuous stretches of 6h, variation in discharge rate and spray angle from initial values should not be more than ±5 percent and ±3 deg, respectively.</td>
</tr>
<tr>
<td>F-4 Other Requirements F-4.1</td>
<td>If strainer is provided, the average size of any side or diameter of the apertures shall be not more than 450 µm.</td>
</tr>
<tr>
<td>F-4.2</td>
<td>At the option of the purchaser the provision shall be made for rotating the nozzle by hand to make it swivel type.</td>
</tr>
</tbody>
</table>

**F-3 PERFORMANCE REQUIREMENTS**

Conforms

**F-4 Other Requirements**

Strainer is not provided in the nozzle.

Endurance test of spray nozzle completed and variation in discharge and spray angle is 2.58% and 1.44% respectively.

NA
5. COMMENTS & RECOMMENDATIONS:

5.1 Conformity to Indian Standard
Dhara KKS 016 hand operated knapsack sprayer does not conforms the following requirements specified in Indian Standard. These should be rectified as per relevant Indian Standard.

i) Cl. 4.3 IS: 3906-1995-Declaration of material for different components in manual is not given.

ii) Cl. 6.4.2 IS: 3906-1995-Diameter of the strainer apertures of filling hole is not as per Indian Standard.

iii) Cl. 6.5 IS: 3652-1995-Threaded connections does not conforms to IS.

iv) Cl. 6.9.1 IS: 3906-1995-The gap between connecting lever and handle near pivot is not conforms to IS.

v) Cl. 6.13 Sub clause C-10, IS: 3906-1995- Cut-off device is not marked as per Indian Standard.

vi) Cl. 6.8.3 Sub Clause D-3, IS: 3652-1995-The thickness of tube wall does not conforms to IS.

vii) Cl. 6.8.3 Sub Clause D5, IS: 3652-1995-The lance is not marked as per IS.

viii) Cl. 6.14 Sub Clause F-3.1.2-Discharge rate of nozzle does not conform.

ix) Cl. 6.14 Sub Clause F-3.2-Spray angle of nozzle is not declared by the manufacturer.

x) Cl. 6.14 Sub. Clause F5 IS: 3652-1995-Nozzle designation is not provided.

xi) Cl. 6.14 Sub. Clause F (a), 11 (b) & (c) IS: 3652-1995-Nozzle marking is not provided.

xii) Cl. 7.3.2 IS: 3906-1995-The back rest cushion is not provided.

xiii) Cl. 7.3.3 IS: 3906:1995-Agitator is not provided.

xiv) Cl. 9 IS: 3906-1995-Serial number of sprayer is not specified on sprayer. Each sprayer may be provided with its serial number on it and marked as per Clause 9.

5.2 Spray distribution pattern is complying triangular distribution limit as per IS:3652:1995.

5.3 The details of manufacturer is not provided on product, packing and literature. The manufacturer’s detail & country of origin may be provided.
5.4 Safety provisions/safety wear
   i) Safety signs and hazard pictorials are not provided on the machine. It must be provided
      for the safety of the users.
   
   ii) The accessories viz mask, hand gloves and safety goggles for operator’s safety are
      provided with sprayer.
   
   iii) The safety instructions regarding handling of poisonous chemicals & first aid should be
      provided in operator’s manual.

6. TECHNICAL LITERATURE
    Operation instructions 15L-22L hand operated knapsack sprayer is provided by
    applicant for reference during the test. It should be updated with inclusion of calibration
    procedure and material of construction of various components. It should be updated and
    brought out as per IS: 8132-1999. The literature should also be provided in Hindi and
    other regional languages for user.

    TESTING AUTHORITY

    R. K. NEMA
    SENIOR AGRICULTURAL ENGINEER

    P. K. PANDEY
    DIRECTOR

7. APPLICANT’S COMMENTS

    No specific comments received from applicant.