BHUTAN STANDARD

Knapsack Sprayer – Basic Requirements



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# **Scope**

This standard specifies the safety ,functional and operational requirement of knapsack sprayers carried on the back or shoulder. it is applicable to lever operated, compression type and engine or electric drive knapsack power sprayer intended for agriculture use.

# **2.Normative References**

The following document is indispensable for application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document

*ISO 19932-2:2013, Equipment for crop protection — Knapsack sprayers —* Part 1: Safety and environmental requirements

# **3. Definitions**

For the purposes of this standard, the definitions given shall apply

## 3.1. Knapsack sprayer

Self-contained sprayer carried on the operator’s shoulder or back by means of strap(s) that disperses liquid through a hand-held nozzle that is attached to a pressurized tank.

## 3.2. Tank nominal volume

Volume indicated by the maximum recommended filling level marked on the spray tank when placed on a level horizontal surface.

## 3.3. Rated pressure

 Pressure or pressure range that a manufacturer assigns to a specific equipment or component as the desirable pressure at which the device will function.

##  3.4 Liquid output

 Volume of liquid discharged by an appliance or device per unit of time.

## 3.5 Shut-off valve

Device enabling spray liquid supply to be shut off.

## 3.6 Pressure relief valve

Valve which opens automatically when the spraying pressure reaches a pre-determined value.

## 3.7 Types of Knapsack sprayer

Including the types defined under:

### 3.8.1 Lever operated knapsack sprayer type

Knapsack sprayer operated manually with a lever pump (diaphragm or piston pump type) to pressurize the spray liquid in the tank for application through hydraulic energy nozzle(s)

### 3.8.2 Compression knapsack sprayer

Knapsack sprayer which uses a compressed air ~~gas~~ to pressurize the spray liquid in the tank for application through hydraulic energy nozzle(s).

### 3.8.3 Engine or motor driven knapsack sprayers

Knapsack sprayer which uses engine or motor backpack power unit to generate air assistance pressure to atomize spray liquid through hydraulic energy nozzle(s).

# **4 General Requirement**

4.1 There shall be safety guard for all moving parts which are prone to injury .

4.2 Safety guard shall be placed in between the moving parts and operator at appropriate safe distance.

4.3 The guard shall have enough strength and durability under the normal operational condition and the guard which does not require to be removed, should be firmly fixed on the machine.

4.4 Safety signs and symbols must be illustrated clearly in English which are visible to operators.

4.5 The machine should be equipped with instruction manuals in English.

4.6 The hot parts of sprayer should be placed at a safe distance from fuel system.

4.7 The main components shall not be abnormal or broken.

4. 8 The operator should not have difficulty in controlling the components or adjusting parts.

4.9 The sprayer shall remain stable on an incline of 8.5° (±0.2°) in any direction, irrespective of the amount of liquid in the spray tank. In order to assure the stability of the sprayer during filling.

# **5 Structural requirements**

**5.1 Shut- off device**

The pressure line shall be equipped with a quick-acting shut-off device .it should be positioned such that it is easily reached while operating.

**5.2 Hose**

The hose needs to be flexible and length of the hose from the hose nipple to that of the spray lance hand grip shall be at least 1200 mm.

**5.3 Handle**

The distance from nozzle to the front of the hand grip shall be at least 500 mm.

# **6 Requirement of operational performance**

**6.1 Emptying**

The amount of liquid remaining in the spray tank shall not exceed 50 ml while emptying.

**6.3** **Stoppage loss**

The volume emitted within 5 s after spray shut-off shall not be more than 5 ml. (Verify)

**6.4 Pressure Test**

Pressurized parts of the sprayer shall withstand twice the maximum working pressure specified by the manufacturer.

**6.5 Drop Test**

The sprayer shall remain functional after a defined drop.

**6.6 Absorbency of carrying straps**

 The increase in mass of straps after immersion in water shall not exceed 30 % of the dry mass.

**6.7 Strap Load**

There shall be no damage on load-bearing straps and their fixation points that reduces their functionality as a consequence of the specified strap drop test.

# **7 Specific requirements for different sprayers type**

|  |  |  |  |
| --- | --- | --- | --- |
| Parameters  | Lever-operated | Compression sprayers | Engine- or motor-driven |
| Spray tanks - pressure compensation means | Required  | Not Required  | required  |
| Total volume of tank  | exceed the nominal volume by at least 5 % of the nominal volume. | exceed the nominal volume by at least 25 % of the nominal volume | exceed the nominal volume by at least 5 % of the nominal volume |
| Leakage test | Leakage volume should not exceed:* 0 ml in upright position
* 0.5 ml in 45° position
* 5ml in horizontal position.
 | not leak in any position | Leakage volume should not exceed:* 0 ml in upright position
* 0.5 ml in 45° position
* 5 ml in horizontal position.
 |
| Pressure-relief device | Required -prevents pressurization of the spray tank beyond the maximum +20% working pressure. | Not required  | Required -prevents pressurization of the spray tank beyond the maximum +20% working pressure. |
| Noise test  |  X |  X | shall not exceed 100 dB(A) |
| Vibration test  |  X |  X | not exceed 15 m/sec2 . |
| Engine emergency switch  |  X |  X | equipped with emergency engine-stopping device. it should position at easy reach by operator. |

Bibliography

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