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**भारत सरकार** /**Government of India**

**उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान**

**Northern Region Farm Machinery Training and Testing Institute**

**ट्रैक्टर नगर, सिरसा रोड, हिसार (हरियाणा)—125001 Tractor Nagar, Sirsa Road, Hisar (Haryana)- 125 001**

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**TECHNICAL SPECIFICATIONS FOR SELF PROPELLED BOOM SPRAYER/   
TRACTOR OPERATED BOOM SPRAYER**

|  |  |  |  |
| --- | --- | --- | --- |
| **1** | **General:** | | |
| Name of the machine | **:** |  |
| Type of machine | **:** |  |
| Make | **:** |  |
| Model | **:** |  |
| Brand name, if any | **:** |  |
| Serial No. | **:** |  |
| Name and address of Manufacturer/Importer | **:** |  |
| Name and address of Applicant | **:** |  |
| Year of manufacture | **:** |  |
| Recommended  Power of prime mover, kW | **:** |  |
| Output capacity (l/min) | **:** |  |
| Country of origin | **:** |  |
| **2** | **Prime Mover** | | |
| Name & address of manufacturer | **:** |  |
| Name & address of importer (if any) | **:** |  |
| Type | **:** |  |
| Make | **:** |  |
| Model | **:** |  |
| Max. PTO power (kW)  **(for tractor operated sprayer)** | **:** |  |
| **Details of prime mover (for self propelled sprayers):** | | |
| Engine Sr. No**.** | **:** |  |
| Country of origin | **:** |  |
| Year of manufacture | **:** |  |
| Whether the prime mover has already been test by authorized test centre (Yes/No) | **:** |  |
| If yes, then specify the test report No. and upload the copy of test report. | **:** |  |
|  | **Recommended engine speed setting, rpm:** | | |
| -Maximum no load speed | **:** |  |
| -Low idle speed | **:** |  |
| Max. power, kW | **:** |  |
| Speed at maximum power, rpm | **:** |  |
| Rated power, kW | **:** |  |
| Rated engine speed, rpm | **:** |  |
| Max. torque, Nm | **:** |  |
| Speed at maximum torque, rpm | : |  |
| **2.1** | **Cylinder & Cylinder Head** | | |
| Number | **:** |  |
| Disposition | **:** |  |
| Bore / Stroke, mm | **:** |  |
| Capacity (cc) | **:** |  |
| Arrangement of valve | **:** |  |
| Value clearance, mm  Inlet  Exhaust | **:**  **:** |  |
| Compression ratio | **:** |  |
| Type of cylinder liners | **:** |  |
| Type of head | **:** |  |
| Type of combustion chamber | **:** |  |
| **2.2** | **Fuel Supply System** |  |  |
| Type of fuel system | **:** |  |
| **2.2.1** | **Fuel Tank** |  |  |
| Material | **:** |  |
| Capacity of fuel tank, l | **:** |  |
| Location of fuel tank | **:** |  |
| Provision for draining of sediments/ water | **:** |  |
| Fuel filter | **:** |  |
| Fuel on/off | **:** |  |
| **2.2.2** | **Governor** |  |  |
| Make | **:** |  |
| Model | **:** |  |
| Type | **:** |  |
| Governed range of engine speed, rpm | **:** |  |
| Rated engine speed, rpm | **:** |  |
| **2.2.3** | **Carburetor** |  |  |
| Make | **:** |  |
| Type | **:** |  |
| **2.2.4** | **Fuel injection pump (if applicable)** | **:** |  |
| Make | **:** |  |
| Model/ group combination number | **:** |  |
| Serial number | **:** |  |
| Type | **:** |  |
| Method of drive | **:** |  |
| **2.2.5** | **Fuel feed pump:** |  |  |
| Make | **:** |  |
| Model/ group combination number | **:** |  |
| Serial number | **:** |  |
| Type | **:** |  |
| **2.2.6** | **Injector (if applicable)** |  |  |
| Make | **:** |  |
| Model/ group combination number | **:** |  |
| Type | **:** |  |
| Serial number | **:** |  |
| Number of holes | **:** |  |
| Injection opening pressure, kg/cm2 | **:** |  |
| Injection timing (º) | **:** |  |
| Firing order | **:** |  |
| **2.3** | **Air Intake System** |  |  |
| Pre cleaner | **:** |  |
| Make | **:** |  |
| Type | **:** |  |
| **2.3.1** | **Air Cleaner** |  |  |
| Type | **:** |  |
| Make & Model | **:** |  |
| Location | **:** |  |
| Type of element | **:** |  |
| Size (Id × Od × L), mm | **:** |  |
| Capacity, l | **:** |  |
| Recommended service schedule | **:** |  |
| Recommended grade of oil | **:** |  |
| Suction pressure at max. power, kPa | **:** |  |
| **2.4** | **Exhaust system** | | |
| Make | **:** |  |
| Type of silencer | **:** |  |
| Location of silencer | **:** |  |
| Provision against entry of rain water | **:** |  |
| Spark arresting device, if any | **:** |  |
| Pressure at max. power, kPa | **:** |  |
| **2.5** | **Lubrication System** |  |  |
| Type | **:** |  |
| Oil capacity, l | **:** |  |
| Recommended grade of lubricant oil | **:** |  |
| Oil change period, h | **:** |  |
| Type of oil pump | **:** |  |
| Method of drive | **:** |  |
| Relief valve pressure setting, kPa | **:** |  |
| Min. permissible lube oil pressure, kPa | **:** |  |
| **2.5.1** | **Oil filters** |  |  |
| Numbers | **:** |  |
| Type | **:** |  |
| Location | **:** |  |
| **2.6** | **Cooling System** |  |  |
| Type | **:** |  |
| **Details of blower/fan (as applicable):** |  |  |
| Type | **:** |  |
| Size (mm) | **:** |  |
| Number of blades | **:** |  |
| Method of drive | **:** |  |
| **Details of water pump (if applicable):** |  |  |
| Type | **:** |  |
| Size of impeller (mm) | **:** |  |
| Number of vanes | **:** |  |
| Method of drive | **:** |  |
| **Details of Radiator (if applicable):** |  |  |
| Make | **:** |  |
| Size of radiator (H × W × T) (mm): |  |  |
| -Overall | **:** |  |
| -Effective | **:** |  |
| Type of radiator cap | **:** |  |
| Radiator cap pressure, kg/cm2 | **:** |  |
| Means of temperature control | **:** |  |
| Opening temperature (º) | **:** |  |
| Bare radiator capacity, l | **:** |  |
| Total coolant capacity, l | **:** |  |
| Type & recommended grade of coolant  (if applicable) | **:** |  |
| Coolant water ratio (if applicable) | **:** |  |
| **2.7** | **Starting System** |  |  |
| Type | **:** |  |
| Ignition system | **:** |  |
| Any other provision for easy starting | **:** |  |
| Aid for cold starting | **:** |  |
| **2.8** | **Spark plug (if applicable)** |  |  |
| Make | **:** |  |
| Model | **:** |  |
| Spark plug electrode gap, mm | **:** |  |
| **3** | **Details of power transmission (In case of self-propelled machine):** | | |
| Type | **:** |  |
| Safety against over load PTO drive shaft and guard on shaft | **:** |  |
| Guard on belt pulley drive | **:** |  |
| Recommended grade of lubricant | **:** |  |
| Capacity (l) | **:** |  |
| Oil change period (h) | **:** |  |
| **3.1** | **Front/rear differential unit:** |  |  |
| Type | **:** |  |
| Reduction ratio | **:** |  |
| Recommended grade of lubricant | **:** |  |
| Capacity (l) | **:** |  |
| Oil change period (h) | **:** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **3.2** | **Final drive:** |  |  |
| Type | **:** |  |
| Reduction ratio | **:** |  |
| Recommended grade of lubricant | **:** |  |
| Capacity (l) | **:** |  |
| Oil change period (h) | **:** |  |
| **3.3** | Nominal speed: |  |  |
|  | |  |  |  | | --- | --- | --- | | Movement/Gear | No. of engine revolution for one revolution of driving wheel | Nominal speed at rated engine speed of -------- rpm when fitted with -------------- size of tyre of ------- mm radius index (kmph) | | 1 |  |  | | 2 |  |  | | 3 |  |  | | 4 |  |  | | | |
| **4** | **Braking system:** | | |
| **4.1** | **Service brake:** |  |  |
| Make | **:** |  |
| Type | **:** |  |
| Size, mm | **:** |  |
| Method of operation | **:** |  |
| **4.2** | **Parking brake:** |  |  |
| Make | **:** |  |
| Type | **:** |  |
| Size, mm | **:** |  |
| Method of operation | **:** |  |
| **5** | **Hydraulic system:** |  |  |
| **5.1** | **Hydraulic pump:** |  |  |
| Make | **:** |  |
| Type | **:** |  |
| Number | **:** |  |
| Location | **:** |  |
| No. & type of hydraulic cylinder | **:** |  |
| Method of drive | **:** |  |
| Capacity of hydraulic tank, l | **:** |  |
| **5.2** | **Hydraulic inter cooler:** |  |  |
| Number | **:** |  |
| Make | **:** |  |
| Type | **:** |  |
| Size, mm | **:** |  |
| Number of tubes | **:** |  |
| **6** | **Steering:** |  |  |
| Make | **:** |  |
| Type | **:** |  |
| Method of operation | **:** |  |
| Outer diameter of steering control wheel, mm | **:** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **7** | **Wheel equipment:** |  |  |
| Type of drive (2WD/4WD) | **:** |  |
| **7.1** | **Front wheels:** |  |  |
| Numbers | : |  |
| Type | : |  |
| Size | : |  |
| No. of lugs | : |  |
| Size of lugs (H × W × T), mm | : |  |
| Track width, mm | : |  |
| Provision for adjusting track width | : |  |
| **7.1** | **Rear wheels:** |  |  |
| Numbers | : |  |
| Type | : |  |
| Size | : |  |
| No. of lugs | : |  |
| Size of lugs (H × W × T), mm | : |  |
|  | Track width, mm | : |  |
| Provision for adjusting track width | : |  |
| Wheel base, mm | : |  |
| **8** | **Operator’s seat:** |  |  |
| Type | : |  |
| Method of suspension | : |  |
| Method of dampening | : |  |
| **Adjustment, mm:** |  |  |
| -Horizontal | : |  |
| -Vertical | : |  |
| **9** | **Canopy:** |  |  |
| Type | : |  |
| Size, mm | : |  |
| Height from operator’s platform, mm | : |  |
| **10** | **Chemical Tank:** | **:** |  |
| Material | **:** |  |
| Size, mm | **:** |  |
| Capacity, l | **:** |  |
| Provision of cover/lid | **:** |  |
| Provision of indicating level in tank | **:** |  |
| Level graduations | **:** |  |
| Strainer at filing hole | **:** |  |
| Provision of drain plug in tank | **:** |  |
| Provision of hose reel | **:** |  |
| **10.1** | **Pump:** |  |  |
| Type | **:** |  |
| Make & model | **:** |  |
| Year of manufacture | **:** |  |
| Serial No. | **:** |  |
| Rated speed/recommended pump speed for spraying, rpm | **:** |  |
| Suction volume, l/min |  |  |
| Volumetric efficiency, % |  |  |
| Working pressure, kg/cm2 | **:** |  |
| Rated pressure, kg/cm2 | **:** |  |
| Discharge capacity at rated pressure, l/min. |  |  |
| Rated speed, rpm | **:** |  |
| Maximum achievable pressure, kg/cm2 | **:** |  |
| Power requirement of pump, kW | **:** |  |
| Plunger dia./stroke, mm | **:** |  |
| Method of drive | **:** |  |
| Speed reduction from engine to pump | **:** |  |
| Pressure regulator | **:** |  |
| Method of mounting | **:** |  |
| Size of frame (L × W × H), mm | **:** |  |
| Country of origin | **:** |  |
| **10.2** | **Filter:** |  |  |
| Type | **:** |  |
| Numbers | **:** |  |
| Size, mm | **:** |  |
| **10.3** | **Agitating device:** |  |  |
| Type | **:** |  |
| Method of working | **:** |  |
| Method of pressure regulation | **:** |  |
| **11** | **Boom assembly** | **:** |  |
| **Size of boom, mm:** |  |  |
| -Maximum length of spray boom | **:** |  |
| -Minimum length of spray boom | **:** |  |
| Nozzle Spacing | **:** |  |
| Provision for adjusting nozzle spacing | **:** |  |
| No. of nozzles | **:** |  |
| Provision for folding of boom | **:** |  |
| Provision for height and swath Adjustment | **:** |  |
| Provision for changing of direction of spray | **:** |  |
| **11.1** | **Nozzles:** |  |  |
| Type | **:** |  |
| Nozzle designation and marking | **:** |  |
| **Discharge rate at 300 kPa pressure, l/min:** |  |  |
| -Jet spray pattern | **:** |  |
| -Fine cone spray pattern | **:** |  |
| Spray angle of nozzle (º) | **:** |  |
| Spray nozzle designation and marking | **:** |  |
| **11.2** | **Discharge control unit:** |  |  |
| Type | **:** |  |
| Details | **:** |  |
| **12** | **Safety wear (for operator’s safety during operation)** | **:** |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **13** | **Overall Dimensions (Working condition/Transport condition) (mm0:** | | |
| -Length (without hose) | **:** |  |
| -Width | **:** |  |
| -Height | **:** |  |
| -No. & length of hose (m), (if applicable) | **:** |  |
| **14** | **Total mass, kg** |  |  |
| **14.1** | **Mass with all accessories and without fuel, kg** | **:** |  |
| **14.2** | **Mass with accessories and fuel tank full, kg** | **:** |  |
| **15** | **Ground clearance, mm** | **:** |  |
| **16** | **Instrumentation panel details:** |  |  |
| **17** | **Safety provisions:** |  |  |
| **18** | **Total number of lubricating points:** |  |  |
| -Greasing points | **:** |  |
| -Oiling points | **:** |  |
| **19** | Colour of machine: |  |  |
| -Tank & canopy | **:** |  |
| -Chassis | **:** |  |
| **20** | **Details of labeling plate** | **:** |  |
|  |  | | |

**MATERIAL OF CONSTRUCTION OF COMPONENTS OF SPRAYER**

**[**As per Table No.-1of IS: 11313-2007]

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Components** | **Materials**  **(As per IS:11313-2007)** | **Material of the component** |
| 1. | 2. | 3. | 4. |
| i) | Pump cylinder | Brass, stainless steel |  |
| ii) | Pressure chamber | Brass, stainless steel |  |
| iii) | Piston rod | Stainless steel, |  |
| iv) | Piston or plunger | Gunmetal, stainless steel, plastics, Rubber, vegetable tanned leather, chrome tanned leather |  |
| v) | Spreader | Brass, stainless steel, plastics |  |
| vi) | Valve assembly | Brass, Stainless Steel, Plastics |  |
| vii) | Roller pump shaft | Stainless steel |  |
| viii) | Pump rollers | Nylon filled with lead |  |
| ix) | Pressure regulators | Brass, stainless steel |  |
| x) | Suction strainer | Brass, stainless steel, Plastics |  |
| xi) | Strainer body | Brass, plastics |  |
| xii) | Gasket | Rubber, PVC, fibre, Leather |  |
| xiii) | Spray nozzles | Brass, stainless steel |  |
| xiv) | Spray boom | Mild steel, Galvanized, iron Braided rubber |  |
| xv) | Hose | Synthetic rubber, P.V.C |  |
| xvi) | Tank | Galvanized iron, Brass, Fiber glass reinforced plastics, plastics |  |
| xvii) | Pipe for agitator | Galvanized iron, Brass, PVC |  |
| xviii) | Piston (bucket) screw | Brass, stainless steel |  |
| xix) | Crank case | Aluminum alloy |  |
| xx) | Roller pump body | Nickel resistant cast iron |  |
| xxi) | Roller pump and plate | Nickel resistant cast iron |  |
| xxii) | Roller pump rotor | Nickel resistant cast iron |  |
| xxiii) | Piston pump crank shaft | Carbon steel |  |
| xxiv) | Pump inlet port end fitting | Brass |  |
| xxv) | Piston rod guide | Brass, Aluminum alloy, Gunmetal, Nylon |  |
| xxvi) | Connecting rod | Carbon steel |  |
| xxvii) | Gudgeon pin | Carbon steel |  |
| xxviii) | Big end bearing | Steel coated with tin base white metal |  |
| xxix) | Small end bush | Gunmetal |  |

|  |  |  |
| --- | --- | --- |
| **Sl. No** | **Declaration of Engine parameter and Discard limit of Engine Critical Components** | |
| **A** | **Engine parameter** | **Declaration** |
| i | **Recommended engine speed setting (rpm):** |  |
| -Low idle speed |  |
| -High idle speed |  |
| -Rated speed |  |
| ii | Max. power, kW |  |
| iii | Speed at maximum power, rpm |  |
| iv | Rated power, kW |  |
| v | Specific fuel consumption corresponding to maximum power, kg/kWh |  |
| vi | Maximum equivalent crankshaft torque, Nm |  |
| vii | Speed at maximum torque, rpm |  |
| viii | **Maximum temperatures (ºC):** |  |
| -Engine oil |  |
| -Coolant (water)/liner wall |  |
| ix | Lubricating oil consumption, g/kWh |  |
| x | Coolant consumption (% of total Coolant capacity) (if applicable) |  |
| xi | Smoke level (Bosch No.) |  |
| **B** | **Discard limit of Critical Engine Components:** | **Discard limit** |
| i | Cylinder bore dia., mm |  |
| ii | Piston dia. , mm |  |
| iii | **Ring-end gap (mm):** | |
| -Top compression ring |  |
| -2nd compression ring |  |
| -3rd compression ring |  |
| - Oil ring |  |
| iv | **Ring groove clearance (mm):** | |
| -Top compression ring |  |
| -2nd compression ring |  |
| -3rd compression ring |  |
| - Oil ring |  |
| v | **Clearance of big end bearings (mm):** | |
| - Diametrical |  |
| - Axial |  |
| vi | Crankshaft end float, mm |  |
| vii | Spring stiffness, kgf/mm |  |
| viii | **Valve guide clearance (mm):** | |
| -Intake |  |
| -Exhaust |  |

Date:

Place: Signature:

Name of signatory:

Designation:

Name & address of firm: