भारत सरकार /GOVERNMENT OF INDIA
उत्तरी क्षेत्र कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान
Northern Region Farm Machinery Training and Testing Institute
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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	:	
	Name and address of Applicant /Importer	:	
	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/cm^2)	:	
	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 x Od x 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 x W x T) (mm):		
	-Overall	:	
	-Effective	:	
	Type of radiator cap	:	
	Radiator cap pressure (kg/cm^2)	:	
	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 x W x T) (mm)	:	
	Track width (mm)	:	
	Provision for adjusting track width	:	
7.1	**Rear wheels:**		
	Numbers	:	
	Type	:	
	Size	:	
	No. of lugs	:	
	Size of lugs (H x W x 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	:	
	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/cm^2)	:	
	Discharge rate at working pressure (l/min)	:	
	Rated pressure, (kg/cm^2)	:	
	Discharge rate at rated pressure, (l/min)	:	
	Rated speed, (rpm)	:	
	Maximum achievable pressure, (kg/cm^2)	:	
	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 x W x 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, (ml/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) (mm):**		
	-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**	**:**	

Name of the Manufacturer/ Applicant	Document No, if any Revision status	Name of the Test Agency: NRFMTTI,Hisar
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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	

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Signature : Name : Designation : Date :	Make : Model : Sheet No. _____ of _____	Signature : Name : Designation : Date :

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, g/kWh	
vi	Maximum equivalent crankshaft torque,(Nm)	
vii	Speed at maximum torque, (rpm)	
viii	**Maximum temperatures (°C):**	
	-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)	
iii	Clearance between cylinder liner and piston (mm)	
iii	Piston dia. (mm)	
iv	**Ring-end gap (mm):**	
	-Top compression ring	
	-2nd compression ring	
	-3rd compression ring	
	- Oil ring	
v	**Ring groove clearance (mm):**	
	-Top compression ring	
	-2nd compression ring	
	-3rd compression ring	
	- Oil ring	
vi	**Clearance of main bearings (mm):**	
	- Diametrical	
	Clearance of big end bearings (mm):	
	- Diametrical	
	- Axial	
vii	Crankshaft end float (mm)	
viii	Spring stiffness (kgf/mm)	
ix	**Valve guide clearance (mm):**	
	-Intake	
	-Exhaust	

Date:

Place:

Signature:

Name of signatory:

Designation:

Name & address of firm:

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Signature : Name : Designation : Date :	Make : Model : Sheet No. _____ of _____	Signature : Name : Designation : Date :