

व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या / No.:136/2020
माह / Month: November, 2021

THIS TEST REPORT ISSUED ON: 17 NOV 2021

THIS TEST REPORT VALID UPTO: 16 NOV 2028



**SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR
ASSISTED SPRAYER**



कृषि यांत्रिकीकरण प्रभाग
भा.कृ.अनु.प.-केन्द्रीय कृषि अभियांत्रिकी संस्थान
नबीबाग, बैरसिया रोड, भोपाल-462038 (म.प्र.)

**Agricultural Mechanization Division
ICAR-Central Institute of Agricultural Engineering
NabiBagh, Berasia Road, Bhopal-462038 (M.P.)**

Telephone: 0755-2521217

Fax: 0755-2734016

136/20

**SHREEJI AGRO INDUSTRIES TRACTOR OPERATED
AIR ASSISTED SPRAYER**

COMMERCIAL

Manufacturer: M/s Shreeji Agro Industries,
Panchasar Road, Nr. Shreeji PVC Pipes, Opp. Shreeji Power
transformer, Wankaner (Morbi) Gujarat- 363621

Applicant: M/s Shreeji Agro Industries,
Panchasar Road, Nr Shreeji PVC Pipes, Opp. Shreeji Power
transformer, Wankaner (Morbi) Gujarat-363621

**SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR
ASSISTED SPRAYER**

Report No.:136/20

Month: November

Year: 2021



कृषि यांत्रिकीकरण प्रभाग
भा.कृ.अनु.प.-केन्द्रीय कृषि अभियांत्रिकी संस्थान
नबीबाग, बैरसिया रोड, भोपाल-462038 (म.प्र.)

**Agricultural Mechanization Division
ICAR-Central Institute of Agricultural Engineering
NabiBagh, Berasia Road, Bhopal-462038 (M.P.)**

Telephone: 0755-2521217

Fax: 0755-2734016

Type of test	Commercial
Name of machine	Tractor Operated Air Assisted sprayer
Test requested by	M/s Shreeji Agro Industries, Panchasar Road, Nr. Shreeji PVC Pipes, Opp. Shreeji Power transformer, Wankaner (Morbi) Gujarat- 363621
Testing Authority	ICAR-Central Institute of Agricultural Engineering, NaviBagh, Berasia Road, Bhopal – 462038 (M.P.)
Period of test	July-September 2021
This test report issued on	17 NOV 2021
This test report valid upto	16 NOV 2028

1. This test report should not be reproduced in part or full without prior permission of the Director, Central Institute of Agricultural Engineering, NaviBagh, Berasia Road, Bhopal- 462038 (M.P.)
2. The data given in the test report pertain to particular machine submitted for test by the applicant.
3. The data collected during the test do not in any way attribute to the durability of the machine.
4. The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.

SELECTED CONVERSION

S No	Units	Conversion Factor
1	Force	
	1 kgf	9.80665 N 2.20462 lbf
2	Power	
	1 hp	745.7 W 0.7457 kW
	1kW	1.35962 Ps
	1 kW	1.341 hp
3	Pressure	
	1 psi	6.895 kPa
	1 kgf/cm ²	98.067 kPa=735.55 mm of Hg
	1 bar	100 kPa/10 N/cm ²
	1 mm of Hg	1.3332 m bar

CONTENT

SR. NO.	TITLE	PAGE NO.
1	SCOPE OF TEST	5
2	TEST PROCEDURE/CODES	5
3	METHOD OF SELECTION	5
4	SPECIFICATIONS	6
5	CONFORMITY TO INDIAN STANDARD	11
6	COMMENTS & RECOMMENDATIONS	18
7	CRITICAL TECHNICAL SPECIFICATION	19
8	TESTING AUTHORITY	20
9	APPLICANT COMMENTS	20
10	ANNEXURE- I to X	21-32

1. SCOPE OF TEST

Test scope of the test was to check and assess the following:-

- 1) General :-
 - a) Checking of specifications
 - b) Checking of Material
- 2) Short Run Test :-
 - a) Spraying Performance
 - i. Discharge rate
 - ii. Spray Distribution
 - a. Spray Pattern
 1. Vertical Patternator Test (Sprayer Static)
 2. Horizontal Patternator Test (Nozzle)
 - iii. Agitation Performance
 - iv. Pressure Adjustment
 - v. Visual observations
- 3) Long Run Test
 - a) Wear of nozzles
 - b) Visual observations

2. TEST PROCEDURE

The following test codes of sprayer were referred for guidance:-

1. IS: 15919:2012 – Equipment for crop protection – test method for air assisted sprayer for bush and tree crop
2. IS:11313:2007 (Reaffirmed 2012)- Hydraulic Power Sprayer Specifications
3. IS 4931:1995 – Agricultural Tractor – Rear Mounted PTO
4. IS:3652-1995(Reaffirmed 2011)- Crop protection equipment- foot sprayer specification
5. IS:7417-1982 Specification of hydraulic spray nozzles for pest control equipment.
6. IS:8548-1977, (Feb. 2007) Test code of power operated hydraulic sprayer.
7. IS:4468-1997 (Reaffirmed 2012) Agricultural wheeled tractors rear-mounted three-point linkage.
8. IS 7347-1974 (Reaffirmed 2006) Specification for performance of small size spark ignition engines.

3. METHOD OF SELECTION

The sample is directly submitted by manufacturer in Central Institute of Agricultural Engineering, Bhopal. This test report is not covered under of BIS certification. Therefore, applicant cannot market the sprayer under the BIS certification mark.



[Handwritten signature]
17/11/21

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

4. SPECIFICATIONS

4.1 General		
Name and Address of the applicant	:	M/s Shreeji Agro Industries, Panchasar Road, Nr. Shreeji PVC Pipes, Opp. Shreeji Power transformer, Wankaner (Morbi) Gujarat- 363621
Name and Address of manufacturer	:	M/s Shreeji Agro Industries, Panchasar Road, Nr. Shreeji PVC Pipes, Opp. Shreeji Power transformer, Wankaner (Morbi) Gujarat- 363621
Name of machine	:	Tractor Operated Air Assisted sprayer
Type	:	Air Assisted Sprayer
Make	:	Shreeji Agro Industries
Model	:	Jet-buster
Batch No./Code No.	:	077
Capacity of Sprayer, L	:	1000
Serial No	:	077
Recommended working pressure, kg/cm ²	:	20
Output capacity, l/min (approx.)	:	Annex.II
Year of Manufacture	:	2021
Optional connection	:	NA
4.2 Recommended Source of Power:		
Prime Mover Used	:	Tractor 18 to 75 HP
4.2.1 Propeller shaft		
Type	:	Telescopic
Maximum length of shaft, mm	:	1250
Mass of shaft, Kg	:	8.00
Provision of locking	:	Two spring loaded , locks provided

(Handwritten signature)



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

Shaft Profile Dimension, mm as per IS 4931:1995			
Specification	As per IS: 4931-1995	As Observed	Remarks
D ϕ	34.79 \pm 0.06	34.73	Conform
d ϕ	28.91 \pm 0.05	28.91	Conform
W	8.53 to 8.60	7.41	Does not conform

4.3	Pump Description		
Make of pump	:	Comet	
Type	:	Diaphragm	
Diaphragm material	:	Rubber	
Pump body material	:	Aluminium	
Piston	:	3	
No. of Plunger	:	3	
Recommend pump speed for spraying, rpm	:	540	
Suction Volume, l/min	:	71.3	
Rated pressure for spraying, bar	:	50	
Pump, hp (kW)	:	10 (7.4)	

4.4	Nozzle		
Make	:	Italian-T	
Type	:	Hollow cone	
Designation	:	NA	
Recommended Kg/cm ² operating pressure,	:	0 to 20	
Discharge rate, lit/min	:	Refer annex. X	
Arrangement of nozzle	:	Mounted on circular aluminum casting disc	
No. of nozzles	:	10 (5 nozzles each side)	

[Handwritten Signature]
17/11/21



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

4.5	Tank		
	Shape	:	Aerodynamic Oval
	Dimensions(L× W ×H), mm	:	1575×1110×1010
	Capacity, L	:	1000
	Material	:	HDPE
	Method of Mounting	:	Mounting on rectangular frame fabricated from MS channel

4.6	Main Frame		
	Type	:	Rectangular
	Size (Length × Width), mm	:	2325×710

4.7	Three point linkage:				
	Sl. No.	Notation	As per Is:4468-1997 (Cat-I/Cat-II) (mm)	As measured Cat-II (mm)	Remarks
	I Upper hitch point				
	a)	Diameter of hitch pin hole	19.3 +0.2/25.7 + 0.2	Not Applicable	
	b)	Width between outer faces of yoke	69/86 (Max.)		
	c)	Width inner faces of yoke	44.5/52 (Min.)		
	II Lower hitch points-				
	a)	Lower hitch point spans	683±1.5/ 825 ±1.5	Not Applicable	
	b)	Diameter of hitch pin hole	22 - 0.2/ 28-0.2		
	c)	Linch pin hole distance	39/49 (Min.)		
	III Dia .of hitch pin -				
	a)	Upper hitch pin	12.0 (Min)	Not Applicable	
	b)	Lower hitch pin	12.0 (Min)		
	c)	Mast height	460±1.5/ 610±1.5		

[Handwritten Signature]
17/11/21



4.8	Wheel		
	No. of wheel	:	2
	Tyre size with ply rating	:	6.00 & 16
	Track width , mm	:	1140
4.9	Axle		
	Material	:	M.S
	Length, mm	:	800
	Size, mm (w×h)	:	45×45
4.10	Drawbar hitch		
	Material	:	M.S
	MS rectangular section, mm	:	80×80
	Total length, mm	:	1210
4.11	Eye bolt		
	Material	:	Cast Iron
	Dia., mm	:	Inn. Dia.=31, Out. Dia.=80
4.12	Agitation Device		
	Make	:	Italian-T
	Type	:	Mixer
	Nos. of agitation device	:	02

4.13	Fan description		
	Type of fan	:	Radial
	Material	:	MS
	Size of fan, mm (dia)	:	620
	No of blades	:	10
	Safety guard	:	Provided
	Height of fan axis from ground, mm	:	1140



[Handwritten Signature]
17/11/21

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

4.14	Gear box details	
	Ratio of gear box	
	No of teeth on 1st gear	: 25
	No of teeth on 2ndgear	: 50
	Ratio	: 1:2
	No of teeth on 3rdgear	: 24
	No of teeth on 4thgear	: 72
	Ratio	: 1:3
4.15	Belt Pulley Drive Details	
	Size of driven pulley, mm	:
	Size of driving pulley, mm	:
	Ratio	:
	Type of Belt	:
	Belt Specification	:
	Safety guard	:
Not Applicable		
4.16	Filter	
	Make	: Italian-T
	Mesh size, mm	: 336
	Size, (dia.) mm	: 40.7
	Arrangement	: Provided near the inlet pipe of pump
4.17	Screw Jack/Stand	
	Material	: MS
	No of jack	: 01
	Size,(dia.) mm	: 40×40
	Height, mm (max.)	: 500
	Method of attachment	: Fitted with screw on frame
4.18	Accessories	
	For operators safety against pesticides	: Provided
	Tool kit	: Provided
	External accessory	: NA

[Handwritten Signature]
17/11/21



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

4.19	Overall dimensions (Fig. 1), mm		
	Length (without hose), mm	:	3680
	Width, mm	:	1250
	Height, mm	:	1790
	Ground clearance, mm	:	370
	Colour	:	Orange

4.20	Mass with all accessories and without fuel and chemicals, kg	:	580
4.21	Mass with all accessories, fuel and chemicals tank, kg	:	1580
4.22	Application/Area of Use	:	Crop protection equipment
4.23	Marking/Labeling:		
	Sr.No.	Parameters	Details
	1	Make	Shreeji Agro Industries
	2	Model	Jet Buster
	3	Sr No	077
	4	Tractor power required	18-75HP
	5	Year of manufacture	2021
	6	Name and address of manufacturer	Shreeji Agro Industries,
	7	Contact no.	NA
	8	Email Id/Website	NA

5. CONFORMITY TO INDIAN STANDARDS

5.1	Material of Construction: Clause 4.1 of IS: 11313 - 2007				
	Sr. No.	Component	Specified Requirement	Observation	Remark
	1	Pump cylinder	Brass, stainless steel	Stainless steel	Conform
	2	Pressure chamber	Brass, stainless steel	Stainless steel	Conform
	3	Piston rod	Stainless steel	Stainless steel	Conform
	4	Piston or plunger	Stainless steel, gunmetal, plastics, rubber, vegetable tanned leather, chrome tanned leather	Stainless steel	Conform
	5	Spreader	Brass, stainless steel, plastics	Stainless steel	Conform



[Handwritten signature]
17/11/21

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

6	Valve assembly	Brass, stainless steel, plastics	Plastic	Conform
7	Roller pump shaft	Stainless steel	Stainless Steel	Conform
8	Pump rollers	Nylon filled with lead	Not Applicable	
9	Pressure regulators	Brass, stainless steel	Brass	Conform
10	Suction strainer	Brass, stainless steel, plastics	Stainless Steel	Conform
11	Strainer body	Brass, plastics	Plastic	Conform
12	Gasket	Rubber, PVC, Leather, Fiber	Rubber	Conform
13	Spray nozzles	Brass, stainless steel	Brass	Conform
14	Hose	Synthetic rubber, P.V.C.	Rubber	Conform
15	Tank	Galvanized iron, brass, Fiber glass reinforced plastics, plastics, HDPE	HDPE	Conform
16	Pipe for agitator	Galvanized iron, brass, P.V.C.	P.V.C.	Conform

17	Piston (buckle) screw	Brass, Stainless steel	Stainless steel	Conform
18	Pump Shaft	Aluminum alloy	Aluminum alloy	Conform
19	Roller pump body	Nickel resistant cast iron	Not Applicable	
20	Roller pump body plate	Nickel resistant cast iron	Not Applicable	
21	Roller pump rotor	Nickel resistant cast iron	Not Applicable	
22	Piston pump crank shaft	Carbon steel	Carbon steel	Conform
23	Pump inlet port end fitting	Brass	Brass	Conform
24	Piston rod guide	Aluminum alloy, Gun metal, nylon, brass	Aluminum alloy	Conform
25	Connecting rod	Carbon steel	Carbon steel	Conform

[Handwritten Signature]
17/11/21



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

5.2	Specified requirements as per Indian standard Clause 4.2 & 4.3 of IS: 11313 – 2007		
5.2.1	All metallic parts coming in contact with the pesticide should preferably be of the same material to minimize bimetallic.	The parts coming in the contact with pesticide are made of same material.	Conform
5.2.2	All material used for different components shall be declared by the manufacturer.	Provided	Conform
5.3	Constructional Requirement (Clause 5 of IS: 11313-2007)		
5.3.1	Tank		
	The tank, if provided, its capacity shall be not be less than 100 liters. The tank capacity shall be declared by the manufacturer.	1000 L	Conform
	The tank when filled up to its total capacity , the tank shall not show any sign of leakage and shall not buckle	No leakage or buckling of tank observed	Conform
	A filling hole of suitable diameter shall be provided on top of the tank.	Filling hole of suitable dia. 300 mm provided	Conform
	The hole shall be covered with a tightly fitted cap	Hole is covered with tight cap	Conform
	A suitable drain plug shall be provided at the bottom of the tank for cleaning	Drain plug provided	Conform
5.3.2	Lubrication		
	A suitable arrangement shall be provided for lubricating the moving parts and shall be indicated by the manufacturer in the manual	Provided	Conform
	The pump shaft of roller vane type displacement pump shall be supported by permanently lubricated bearings.	Pump shaft supported by bearings.	Conform
5.3.3	Spreader		
	If provided, shall be able to hold the piston in its position without distortion against the wall of the pump cylinder.	Provided and satisfactory	Conform
5.3.4	Driving shaft		
	A suitable driving shaft shall be provided so that either it can be coupled directly to the prime mover or through a pulley.	Propeller shaft provided	Conform



[Handwritten signature]
17/11/24

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	-------------------

5.3.5	Suction spout		
	There shall be suction spout having serrated nipple or threaded connection. In case of threaded connection external threaded size minimum of designation G 1/3 B "see IS 2643" shall be used.	G1/4B	Conform
5.3.6	Delivery spout		
	There shall be two delivery spouts having threaded connection. The external thread size shall be not less than the designations G 1/4B "see IS 2643". The engaged length of the thread shall be not less than 6mm.	External thread size G3/4 B, Engaged length of thread size is 7 mm	Conform
5.3.7	Overflow pipe		
	An overflow pipe of suitable diameter and length shall be provided.	L = 670 mm, Dia. = 26.7mm	Conform
5.3.8	Pump inlet/ outlet port		
	This may be integral or separately attached to pump body. The thread size of inlet/outlet port shall conform to thread size specified in IS2643.	The thread size of port is G 5/8.	Conform
	The engaged length of the thread shall be not more than 8mm.	7.6 mm	Conform
5.3.9	Regulator cum relief valve		
	A present regulator or valve to adjust the working pressure up to rated pressure shall be provided. It shall be able to release all or part of the liquid delivered by the pump to be returned to that set pressure. It shall not allow the increase of pressure by more than 25 % of pressure declared by the manufacturer.	Provided	Conform
5.3.10	Pressure Gauge		
	A suitable pressure gauge/pressure indicator having full scale reading not exceeding two and half times and not less than 1.5 times the rated pressure shall be provided.	100 bar	Conform
5.3.11	Pressure dampener		
	A pressure dampener may be provided at the option of the purchaser to facilitate easy reading of pressure.	Provided	Conform

[Handwritten Signature]
17/11/21



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	-------------------

5.3.12	Gaskets		
	The gasket, wherever provided shall withstand the test prescribed in 7.4 of IS 10134	Provided and fulfill the criteria	Conform
5.3.13	Delivery hose		
	If provided with couplings shall have suitable diameter and length as agreed to between the purchaser and the supplier.	Provided as requirement	Conform
	The hose connections for threaded type and nipple type connections shall be nut- nipple and clamp type respectively	Clamp type	Conform
	The metallic nut if provided shall have the internal thread size, minimum of designation G1/4B. The clamp shall consist of ferrule or clip. Other thread sizes if used shall be of standard pipe threads.	Internal thread size G 1/4 B and clamp consist of clip type	Conform
	The hose and hose connection shall with stand the test prescribed in 7.2 of IS 10134-1999. A minimum hydrostatic pressure of 1.5 MPa using water as a liquid, shall be developed in the Hose assembly and the pressure shall be retained for a period of 5 minutes.	The hose and hose connection fulfill the required criteria	Conform
5.3.14	Nozzle as per annexure F of IS: 3652 :1995 of Clause 6.8.4 F1		
	On the basis of spray distribution, the nozzle shall be following types a) Hollow Cone type b) Fan type c) Adjustable type -Double action type -Triple action type	Hollow Cone	Conform
	On the basis of method of attachment nozzle shall be following types a) Fixed type b) Swivel type	Swivel type	Conform
5.3.14.1	Description Clause F-2 of IS 3652:1995		
	Description of nozzle components as per Annexure F in Cl. No. F-2 of IS 3652:1995.	Nozzle consist of nozzle cap, disc, swirl core, nozzle tip & nozzle body.	Conform



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	-------------------

5.3.14.2	Performance requirements of Nozzle IS 3652:1995		
	The discharge rate of the nozzle declared by the manufacturer and tested as method of test prescribed in F-7 of IS 3652:1995.	Discharge rate declared by the manufacturer is 1.2 l/min at 15 kg/cm ² and tested as per standard (Refer Annexure – X)	Conform
	The spray angle of the nozzle declared by them manufacturer and tested as method of test prescribed in F-9& F-3.2 of IS 3652:1995.	60°	Conform
5.3.14.3	Other Requirements Clause 6.7.1.1 & F-5.1 of IS 3652:1995		
	The strainer is provided, the average size of any side or diameter of the apertures shall be not more 625 micro meter.	300 micro meter	Conform
	The cone nozzle shall be designated by the identification marks for the agricultural/public use.	Provided	Conform
5.3.14.4	Workmanship and finish Clause F-6 of IS 3652:1995		
	The components of the spray nozzle shall be free from burrs and other defects, inner faces etc.	Free from burrs and other defects and found satisfactory	Conform
	The matching faces of the cap, tip and nozzle body or boss, shall be finished flat so as to seal on the end face of the nozzle body or boss; gasket may be used, if necessary	Satisfactory	Conform
	The screw threads shall be well formed and creates of the threads shall be free from burrs or any other defects which may prevent free engagement.	Satisfactory	Conform
5.3.16	Construction Requirements Clause 5.7 & 5.8 of IS 11313:2007		
	The final and chemical discharge controls shall be in access of the operator. (Clause 5.7)	Satisfactory	Conform
5.4	Performance Requirement Clause 5.2.2, 6, 7.2, 7.3 of IS:15919-2012		
5.4.1	Measurement of the flow rate		
	When tested accordance with the 5.2.2, The measurements of the points on the rectangular pressure side outlets and air flow rate.	Avg. air velocity measured at 1 st gear at suction side 15.58m/s, outlet side 17.04m/s and avg. air flow rate at suction side 4.70m ³ /s and at outlet side 5.25m ³ /s (Refer Annexure IV)	
5.4.2	Measurement of air velocity distribution at distance and air flow angle (static test) (Clause 6)	Refer Annexure III	

[Handwritten Signature]
17/11/21



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

5.4.3	Measurement of liquid distribution		
	The liquid distribution can be made in static (clause 7.2) or dynamic condition (Clause 7.3)	Refer Annexure I	
5.5	Performance Requirements Clause 6.0 of IS 11313:2007		
5.5.1	Discharge rate/suction capacity		
	When tested in accordance with the method given in 8.3, the pump shall be capable of discharging/sucking a minimum of 8000 ml water per minute at its rated speed and rated pressure.(Clause 6.1)	Refer Annexure II	Conform
	The discharge rate/suction capacity shall be declared by the manufacturer(Clause 6.1.1)	71l/min	Conform
5.5.2	Maximum Achievable Pressure		
	When tested in accordance with the method given in 8.7, maximum achievable pressure shall not be less than that of the value declared by the manufacturer. (Clause 6.4)	Max available pressure observed 20 bar against declared as 0 to 20 kg/cm ²	Conform
5.5.3	Endurance test Clause 6.5,8 of IS 11313:2007& Clause E-3.6 of IS 3652: 1995		
	Sprayer shall withstand the test endurance test specified in 8.8 and the variation in discharge rate between first and last observation shall not be more than $\pm 5\%$ (Clause 6.5, 8)	Endurance test of 50 hrs. Completed without any variation in pressure. Percentage variation in discharge is $0.73 \pm 0.16\%$ within specified limit (Annexure-VIII for more details)	Conform
	Endurance test in accordance with F-7 & F-9 of IS 3652:1995 for 48 hours duration with continuous stretches of 6 hour and should not be more than 10 per cent and ± 5 degree respectively. (Clause E-3.6)	50 hr	Conform
5.6	Other Requirements Clause 7 of IS:11313:2007		
5.6.1	Each sprayer shall be provide with parts catalogue and manual giving detailed information about sprayer, engine, its rated speed along with operational and maintenance instructions and safety precautions. (Clause 7.1)	Provided	Conform



[Handwritten Signature]
17/11/24

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER		COMMERCIAL
5.6.2	Each sprayer shall be provide with necessary tools, suction strainer having aperture size of 300 µm to 425 µm and a measuring jar for lubricating oil. (Clause 7.2)	300 µm	Conform
5.6.3	On the option of the purchaser, the following accessories shall be supplied		
	A set of spray nozzle (Conforming to Annex F of IS 3652) for differ discharge rate. (Clause 7.3)	Provided	Conform
5.7	Workmanship And Finish Clause:9 of IS:11313-2007		
	All the components of the sprayer shall be free from burrs, pits and other visual defects which may be detrimental for their use	Finishing and workmanship is good	Conform
	The expose metallic parts shall have a protective coat in to prevent surface deterioration	Expose metallic parts have the protective coat.	Conform
5.8	Marking And Packing(IS:11313:2007) Clause : 10of IS:11313:2007		
	Each sprayer shall be marked with following particulars		
	Manufacturers name and his registered trade mark	Shreeji Agro Industries	Conform
	SI. No. and batch or code no	077	Conform

6. COMMENTS AND RECOMMANDATIONS:-

1. It is the sole responsibility of manufacturer to supply the quality machine same as the test prototype provided including suggested modifications.
2. It is mandatory to use safety kit against chemical spraying in the field avoid chemical exposure for operator.
3. Points 4.2.1 not fulfill the criteria of BIS code 4931:1995.
4. The manual of machine should be provided in three languages English, Hindi and regional languages.

[Handwritten Signature]
17/11/21



136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

7. CRITICAL TECHNICAL SPECIFICATION OF TRACTOR OPERATED AERO BLAST SPRAYER

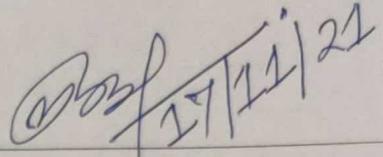
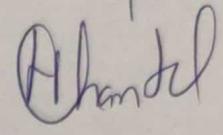
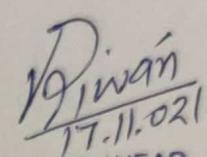
Sl. No.	Parameters	As per Recommendation	As Observed
1.	Tank capacity, L	100 (Min)	1000
2.	Pressure regulator	Must be provided	Provided
3.	Pressure dampener gauge with pressure	Liquid Filled Pressure gauge must be provided	Provided
4.	Discharge rate, ml/min	Min. 8000 at rated speed and rated pressure	64 ml/min at 15 bar
5.	Strainer at filling hole	Must be provided	Provided
6.	Nozzle designation and marking	Designation, manufacturers name or recognized trade mark & batch or code number should be marked	Provided
7.	Safety wear	Mask ,Apron, hand gloves, goggles and Gum boots must be provided ,	Provided
8.	Provision of drain plug in the tank	Must be provided	Provided
9.	P.T.O. drive shaft - Safety against to overload - Guard on shaft	Must be provided Must be provided	Provided
10.	Guard on belt pulley drive/Gear box	Must be provided	Provided
11.	Labeling plate of sprayer	Metallic labeling plate should be riveted with following information: Manufactures name, make, model serial number, month & year of manufacture, rated speed, rated pressure and recommended tractor horse power	Provided
12.	Literature	Operator manual, service manual & parts catalogue should be provided English, Hindi & regional languages.	Provided



[Handwritten signature]
17/11/21

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

8. TESTING AUTHORITY

Mool Chandra Gautam	Assistant Chief Technical Officer	 17/11/21
NS Chandel	Scientist and Testing Authority	
P.S. Tiwari	Head, Agricultural Mechanization Division, ICAR-Central Institute of Agricultural Engineering, Bhopal	 17.11.21 प्रभागध्यक्ष / HEAD कृषि यंत्रिकीकरण प्रभाग Agricultural Mechanization Division केन्द्रीय कृषि अभियांत्रिकी संस्थान Central Institute of Agricultural Engineering नबीबाग, भोपाल (म.प्र.)-462038 Nabi Bagh, Bhopal (M.P.)-462038

9. APPLICANT COMMENTS, IF ANY

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

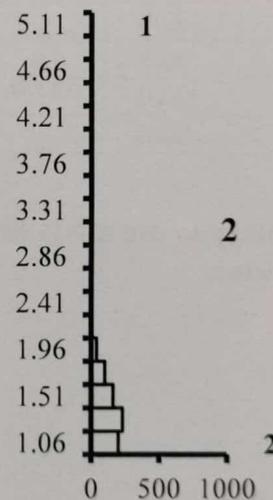
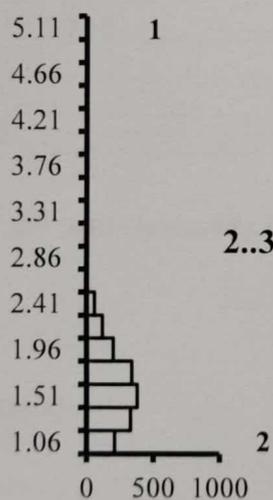
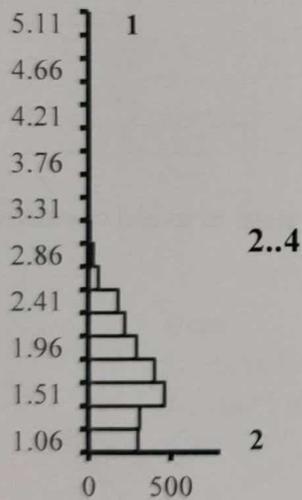
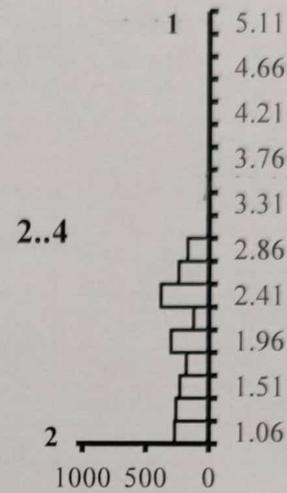
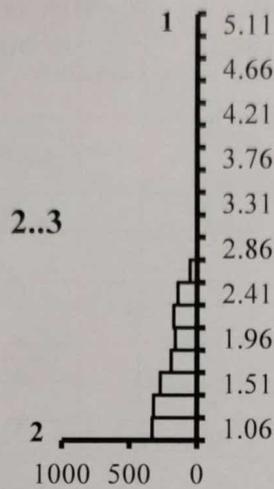
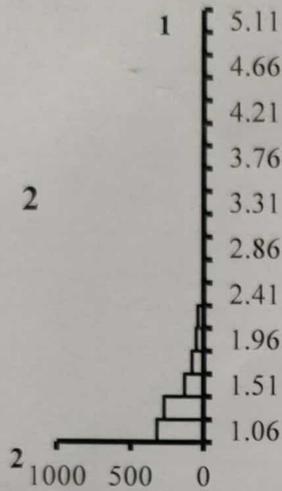
ANNEXURE-I

Test for Measurement of the Liquid distribution (Static Test) Vertical Patternator Liquid Distribution Clause no 7 of IS: 15919: 2012

Date	21.09.2021					
Temperature		Rel. Humidity%			74	
Max., °C	31	Air Velocity, m/s			2.22	
Min., °C	29					
Tester	Satendra Singh	Satendra Singh	Satendra Singh	Satendra Singh	Satendra Singh	Satendra Singh
Pressure, bar	20	20	20	20	20	20
Rotation, I/min	540	540	540	540	540	540
Distance, m	2	2	2	2	2	2
Side	Left	Left	Left	Right	Right	Right
Nozzle Number						
5	160/ OFF	160/ OFF	160/ OFF	165/ OFF	165/ OFF	165/ OFF
4	158/ OFF	158/ OFF	158/ ON	160/ ON	160/ OFF	160/ OFF
3	156/ OFF	156/ ON	156/ ON	156/ ON	156/ ON	156/ OFF
2	154/ ON	154/ ON	154/ ON	154/ ON	154/ ON	154/ ON
1	150/ OFF	150/ OFF	150/ OFF	152/ OFF	152/ OFF	152/ OFF
Results						
Height, m	Inflow, ml/min					
5.11	0	0	0	0	0	0
4.885	0	0	0	0	0	0
4.66	0	0	0	0	0	0
4.435	0	0	0	0	0	0
4.21	0	0	0	0	0	0
3.985	0	0	0	0	0	0
3.76	0	0	0	0	0	0
3.535	0	0	0	0	0	0
3.31	0	0	0	0	0	0
3.085	0	0	10	10	0	0
2.86	0	0	170	30	0	0
2.635	0	50	240	60	0	0
2.41	0	140	380	180	60	0
2.185	40	170	120	220	120	0
1.96	50	160	300	290	200	40

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

1.735	80	190	180	400	340	100
1.51	130	270	230	460	380	160
1.285	270	320	260	310	330	230
1.06	320	330	270	300	210	200



Keys:

- 1 Height (m)
- 2 Inflow (ml/min)

Note: It is mandatory to use safety kit against chemical spraying in the field to avoid chemical exposure for operator.

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

ANNEXURE-II
Test for Discharge Rate
(Pump)

Sr. No	PTO RPM	Working Pressure (bar)	Discharge Rate (l/min)		Average Discharge (l/min)	Overflow (l/min)	Suction capacity Pump (l/min)
			LHS	RHS			
1	540	5	58.00.	59.00.	59.25	0	59.25
			60.00.	60.00.			
2	540	10	63.00.	63.00.	62.75	0	62.75
			63.00.	62.00.			
3	540	15	64.00.	64.00.	64.00	0	64.00
			65.00.	63.00			

Note: It is mandatory to use safety kit against chemical spraying in the field to avoid chemical exposure for operator.

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

ANNEXURE -III

Measurement of Air Velocity Distribution (Static Test)

Clause no 6 of IS: 15919: 2012

Air velocity (at 50 cm distance) at first gear				
Height, m	Left, m/s	Right, m/s	Mean, m/s	Deviation
1.06	1.6	10.4	6.00	6.22
1.285	1.1	3.3	2.20	1.56
1.51	1.2	7.3	4.25	4.31
1.735	4.2	9.3	6.75	3.61
1.96	1.2	7.3	4.25	4.31
2.185	0.8	2.8	1.80	1.41
2.41	0	0	0.00	0.00
2.635	0	0	0.00	0.00
2.86	0	0	0.00	0.00
3.085	0	0	0.00	0.00
3.31	0	0	0.00	0.00
3.535	0	0	0.00	0.00
3.76	0	0	0.00	0.00
3.985	0	0	0.00	0.00
4.21	0	0	0.00	0.00
4.435	0	0	0.00	0.00
4.66	0	0	0.00	0.00
4.885	0	0	0.00	0.00
5.11	0	0	0.00	0.00

Keys:

1. Height (m)
2. Air Velocity(m/s)

Note: It is mandatory to use safety kit against chemical spraying in the field to avoid chemical exposure for operator.

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

ANNEXURE-IV

Measurement of Air Velocity Distribution at the Outlet and Suction Side of a
Fan (Static Test at First Gear) Clause no 5.2.3 of IS: 15919: 2012

Main (ring) Fan Cross Section=3017.54cm², Measuring Points = 25

Measuring points	LHS		RHS	
	Suction side, Air velocity (m/s)	Outlet side, Air velocity (m/s)	Suction side, Air velocity (m/s)	Outlet side, Air velocity (m/s)
1	10.9	11.8	13.8	13.6
2	13.4	13	15.3	14
3	15.2	19.1	19.1	15
4	15.5	19.5	16.8	13.5
5	14.9	10.5	10	19.8
6	17.9	23.1	13.6	19.1
7	17.8	21.1	19.1	16.9
8	18.1	22.8	19.3	12.4
9	17.8	20.6	17.6	22
10	15	22.3	15.7	20.3
11	14.7	22.9	14.8	14.2
12	15.6	18.1	19.9	10.3
13	13.8	22.9	20.1	14.2
14	12.8	12.2	15.5	14
15	15.9	16.3	7.6	14.6
16	18.1	18.4	7.3	21.9
17	17.4	14.5	11.6	16.4
18	17.1	11.8	18.8	18.6
19	14.7	21	19.6	17.2
20	14.3	18	19.7	18.5
21	16.2	17.3	11.2	18.1
22	18	21.3	11.1	16.4
23	17.3	23.4	14	15.5
24	15.5	19.9	18.5	15.8
25	13.4	20.8	17.7	15.4
	Average velocity at suction side, m/s	15.58	Average velocity at outlet, m/s	17.40
	Average air flow rate at suction side, m ³ /s	4.70	Average air flow rate at outlet side, m ³ /s	5.25

Note: It is mandatory to use safety kit against chemical spraying in the field to avoid chemical exposure for operator.

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

ANNEXURE-V

Data for Pressure Adjustment Test

(Clause 8.7 of IS: 11313-2007)

S. No	Working pressure, bar	Fluctuation range, bar	Pressure drop, bar	Ratio
1	10	Nil	Nil	Nil
2	15	Nil	Nil	Nil
3	20	Nil	Nil	Nil

ANNEXURE-VI

Droplet Size Distribution Pattern of Hollow Cone Nozzles

The droplet size distribution of the spray nozzle was measured using droplet size analyzer. The droplet size distribution obtained at different working pressure is given below.

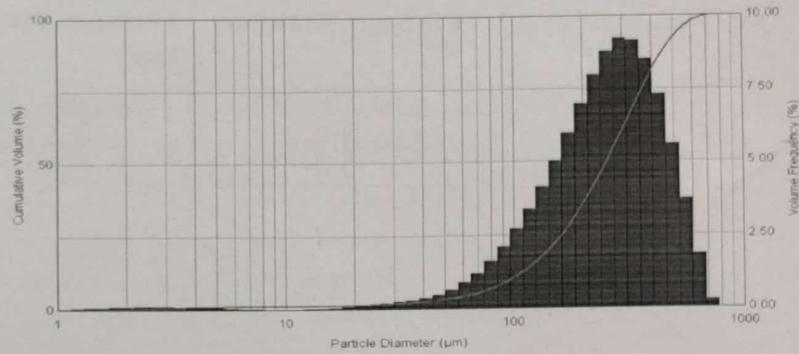


Fig. 1 Droplet size distribution pattern at rated pressure 5 bar

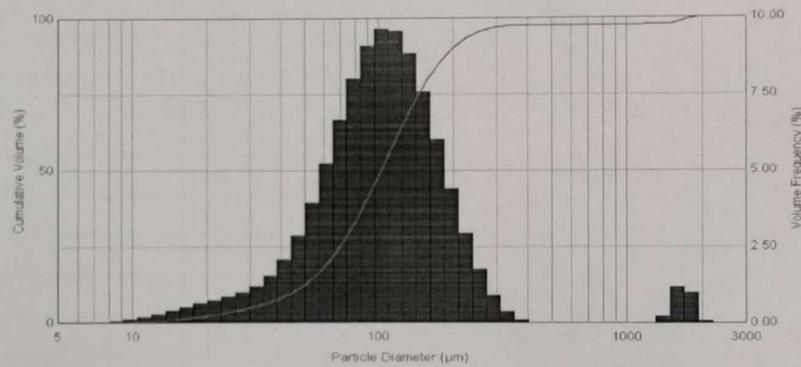


Fig. 2 Fig. 1 Droplet size distribution pattern at rated pressure 10 bar

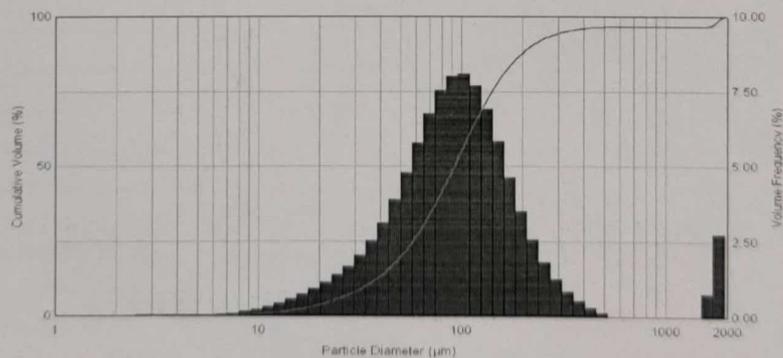


Fig. 3 Fig. 1 Droplet size distribution pattern at rated pressure 15bar

Note:

VMD = Volume Median Diameter

ANNEXURE-VII

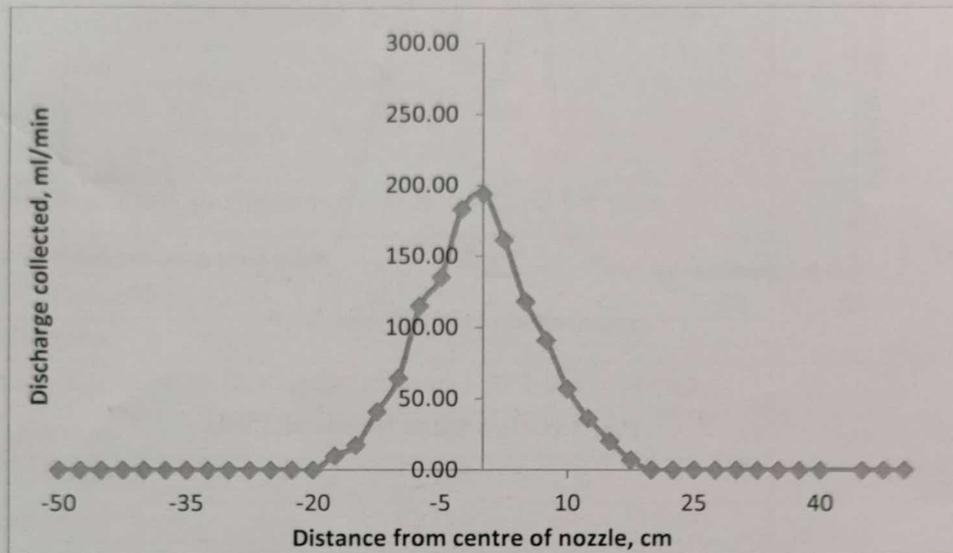
Spray Distribution Pattern of the Hollow Cone Nozzle at
Different Operating Pressure

Fig. 1 Hollow Cone Nozzle at 5bar

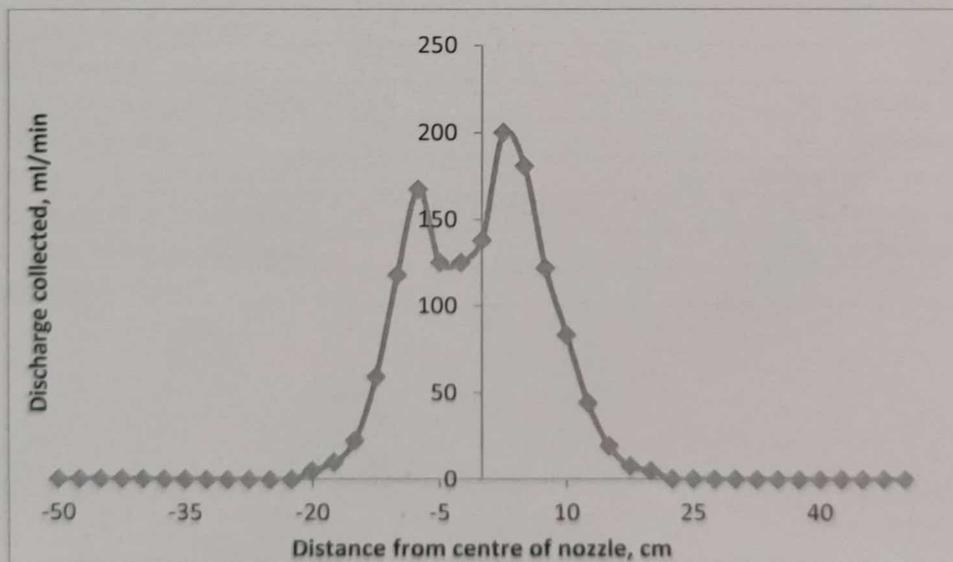


Fig. 2 Hollow Cone Nozzle at 10bar

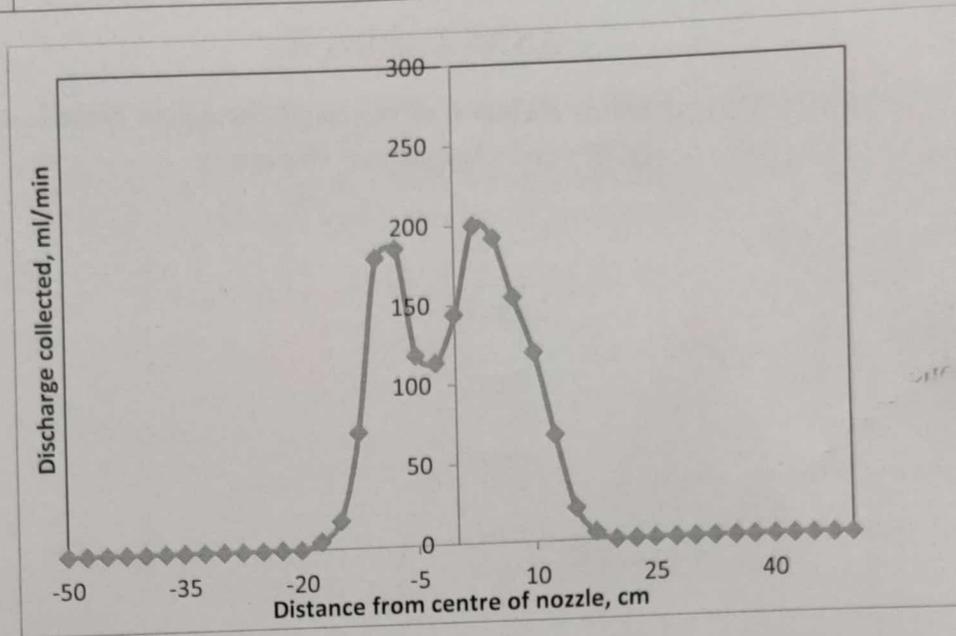


Fig. 3 Hollow Cone Nozzle at 15bar

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

ANNEXURE-VIII

Long Run Test

Clause no 7.3 of IS: 8548: 1977

1.	Total Running Time	50 hrs	
2.	Percentage Variation in Discharge (ml/min.) at 15 bar pressure	0.58%	
	First Collection		1710
	Second Collection		1710
	Last Collection		1720
3.	Percentage Variation in Discharge (ml/min.) at 10 bar pressure	0.70%	
	First Collection		1420
	Second Collection		1430
	Last Collection		1430
	Percentage Variation in Discharge(ml/min.) at 5 bar pressure	0.91%	
	First Collection		1100
	Second Collection		1100
	Last Collection		1110
4.	Average percentage variation in discharge rate between first and last observation (not more than $\pm 5\%$)	$0.73 \pm 0.16\%$	
5.	Visual Observations		
a.	Ease of transporting	Satisfactory	
b.	Proper tightness of fasteners	Satisfactory	
c.	Ease of Operating	Satisfactory	
d.	Any undue knocking or rattling sound	No unusual sound observed	
e.	Any marked vibration	No vibration observed	
f.	Any leakage of liquid or oil	No leakage observed	
g.	Any deformation or breakdown	No deformation observed	
h.	Marked wear of any component	No excessive wear observed	
i.	Any other observations	NA	

136/20	SHREEJI AGRO INDUSTRIES TRACTOR OPERATED AIR ASSISTED SPRAYER	COMMERCIAL
--------	--	------------

ANNEXURE-IX

Data for Agitation

Clause no 6.3 of IS: 8548: 1977

a)	PTO rpm	540
b)	Pressure	20 bar (As per manufacturer recommendation)
c)	Initial concentration, g/l	250
d)	Mixing time and effectiveness	2 hr
e)	Tracing material used for test	Sulphur Powder
Sample no.	Concentration (g/l)	Time (s)
1.	212	30
2.	225	30
3.	215	30
4.	220	30
5.	222	30
6.	228	30
7.	224	30
8.	230	30
9.	218	30
10.	220	30
f)	Quantity of tracing material remains in tank after operation (%)	16.5

ANNEXURE-X

Test for Discharge Rate

(Nozzle)

Type of nozzle used	Pressure, bar	Discharge, l/min
Hollow Cone	5	1.10
	10	1.43
	15	1.71