प्रारंभिक व्यावसायिक परीक्षण रिपोर्ट
INITIAL COMMERCIAL TEST REPORT

संख्या/No. CSIR/CMERI/FMTTC/2024/055
माह/Month: September, 2024

THIS TEST REPORT VALID UP TO : 31ST AUGUST, 2031

BALWAAN BS-20M
MANUALLY OPERATED KNAPSACK SPRAYER

सत्यमेव जयते
Goverment Of India

कृषि मशीनरी प्रशिक्षण और परीक्षण केंद्र
Farm Machinery Training and Testing Centre
सीएसआईआर- केन्द्रीय यांत्रिक अभियांत्रिकी अनुसंधान संस्थान
CSIR - Central Mechanical Engineering Research Institute
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CSIR/CMERI/FMTTC/2024/055	BALWAAN BS-20 M MANUALLY OPERATED KNAPSACK SPRAYER (INITIAL COMMERCIAL TEST)

Name & Address of Applicant : Modish Tractor Aurkisan Pvt. Ltd.
C-17, Purohit Ji Ka Bas, Road No – 1, MSME Office, 22 Godam Industrial Area,
Jaipur – 302006.

Name & Address of Manufacturer : Modish Tractor Aurkisan Pvt. Ltd.
17-C Sharma Colony, Extension. 22, Godam Industrial Area, Jaipur – 302006, Rajastha

Type : Knapsack Sprayer (Manually Operated)

Make : Balwaan Krishi

Model : BS-20M

Test Conducted at : Farm Machinery Training and Testing Centre
CSIR- Central Mechanical Engineering Research Institute, M G Avenue, Durgapur, Pin – 713209,
West Bengal.

THIS TEST REPORT IS VALID UP TO: 31st AUGUST, 2031

[vide DAC&FW OM No. 13-22/2020- M&T (I&P) dated 12.12.2023]

सत्यमेव जयते
Goverment Of India

CSIR - Central Mechanical Engineering Research Institute * Durgapur- 713209 *

CSIR-CMERI

FARM MACHINERY TRAINING AND TESTING CENTRE * CSIR-CMERI DURGAPUR

Report No.: CSIR/CMERI/FMTTC/2024/055 **Month: September** **Year: 2024**

CSIR - Central Mechanical Engineering Research Institute,
Durgapur - 713209
(W.B.), INDIA

Report prepared by

Report verified by
Subrata Kr Mandal

2. SPECIFICATIONS

1.1 General

Type	:	Manual Operated Knapsack Sprayer
Make	:	Balwaan Krishi
Model	:	BS-20M
Brand	:	Balwaan Krishi
Name of manufacturer	:	Modish Tractor Aurkisan Pvt. Ltd. 17-C Sharma Colony, Extension. 22, Godam Industrial Area, Jaipur – 302006, Rajasthan
Year of manufacture	:	2024
Capacity of sprayer, (l)	:	20
Working pressure, kg/cm^2 *	:	1 to 3.5

1.2 Chemical Tank

Material of construction	:	Plastic
Size (mm)	:	392 x 297 x 155
Capacity (l)	:	20

1.3 Agitating Device : N. A

1.4 Nozzle

Type of nozzle	:	Hollow Cone – Double Nozzle, Flat Fan, Flower nozzle 6 hole
Nozzle designation	:	**Not specified**
Number of nozzle	:	Three types

1.5 Accessories (for operator's safety against pesticides) : Mask, hand gloves and goggles provided.

1.6 Overall Dimensions, mm

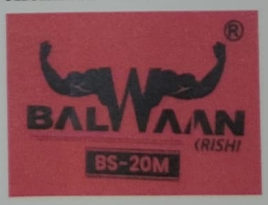
Height	:	510
Width	:	165
Length	:	425

*As per data provided by applicant

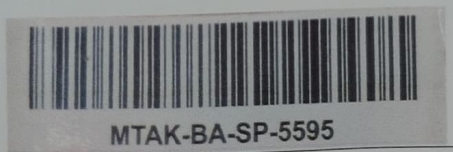
1.6.1 Mass with all accessories and chemical tank, kg : 2.55

1.6.2 Mass with accessories and chemical tank full, kg : 22.65

1.7 Identification/Labelling plate : The following is printed on the body of the chemical tank



One sticker also contains the following information:



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Report verified by

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4. RUNNING – IN

Though the applicant has not recommended running-in, with the consent of the applicant the running-in of the sprayer was conducted for one hour in order to overcome variation in initial performance. Lubrication and the adjustment of the components were done as per applicant's recommendation.

5. TEST FOR DISCHARGE RATE
(Vide Clause 6.1.3 of IS: 10134 - 1994)

1. Date of test : 13.09.2024
2. Atmospheric conditions: -
   a) Temperature : 32 °C
   b) Relative humidity : 71 %
   c) Pressure : 100.2 kPa

3. Data recorded :

No. of hand strokes per minute	Working pressure (kPa)	Test No.	Delivery from the discharge line (ml/min)	Overflow (ml/min)	Average delivery from the discharge line (ml/min)	Discharge rate of pump (ml/min)
16	300	1	520	NIL	527.50	527.50
16	300	2	520	NIL		
16	300	3	530	NIL		
16	300	4	540	NIL		

Average discharge rate = 527.50 ml/min at 300 kPa Pressure

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6. TEST FOR VOLUMETRIC EFFICIENCY

(Vide Clause 6.2 of IS: 10134 - 1994)

Date of test	:	13.09.2024
Discharge of water in 10 successive stroke	:	330
No. of cycle	:	10
Actual volume of water in one cycle	:	33.01 ml
Inner diameter of pump cylinder	:	48 mm
Stroke length at 300 kPa pressure	:	20 mm
Piston Displacement	:	36.2 cc
Theoretical volume of water in one cycle	:	36.2 ml
Volumetric efficiency, %	:	91.18 %
Remarks:- The volumetric efficiency of pump conforms to the requirement of IS: 10134 - 1994.		

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11 TEST FOR NOZZLE
(Vide Annex F of IS: 3652-1995)

Date of test : 12.09.2024
Types of Nozzle : Hollow Cone Type

11.1 TEST FOR DISCHARGE RATE OF NOZZLE

The discharge rate of nozzle at a pressure of 300 kPa:

Type of Nozzle	Declared Discharge rate (Lit/Min.)	Observed Discharge rate (Lit/Min.)
Hollow Cone	1.5 to 1.8	1.059
Flat Fan Nozzle	0.900	0.862

11.2 TEST FOR SPRAY ANGLE OF NOZZLE

The spray angle of nozzle at a pressure of 300 kPa:

Type of Nozzle	Declared Spray Angle (Degree)	Observed Spray Angle (Degree)
Hollow Cone	58	55
Flat Fan Nozzle	58	55

11.3 ENDURANCE TEST OF NOZZLE

i) Date : 09.09.2024 to 13.09.2024
ii) Total running time (h) : 48
iii) Quantity of liquid collected and spray angle observed during endurance test.

Sr. No.	No. of collection	Avg. discharge ml/min	Spray angle, degree
a)	First collection	780	54°
b)	Second collection	790	54°
c)	Third collection	800	52°
d)	Fourth collection	760	55°
e)	Fifth collection	790	52°
f)	Sixth collection	800	55°
g)	Seventh collection	785	53°
h)	Eighth collection	790	55°

Remarks:

i. Percentage variation in discharge rate from first to last collection, 1.28 %
ii. Percentage variation in spray angle from first to last collection, 1°

Report verified by Sutanta Kr Mandal

11.4 SPRAY DISTRIBUTION PATTERN OF NOZZLE

The liquid discharge from nozzle (Hollow cone) at 300 kPa pressure was collected in glass tubes of patternator. The spray pattern as per the quantity of liquid collected is represented in tabular form and in Fig. 1.

11.5 Nozzle designation : Not marked

Provision for strainer in nozzle : Not provided

11.6 MARKING OF NOZZLE

Manufacturer's name or recognized trade mark : Not marked
Batch or code number : Not marked

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Cl. 6.9.1	The handle shall be provided with a grip. The gap between connecting lever and handle near pivot and near knapsack body shall not be less than 25 mm to prevent crushing of the fingers of the operator.	The handle is provided with grip. The gap between connecting lever and handle near pivot and near knapsack body is 36.5 mm.	Conforms
Cl. 6.10 Discharge outlet	The discharge outlet shall be of nipple type or threaded type. The length of the nipple shall be not less than 20 mm. Pivot pins for delivery outlet fitting with connecting rod shall be riveted or with round headed nut and bolt.	The discharge outlet is of threaded type.	Conforms
Cl.6.11 Gasket	The gaskets of synthetic rubber, wherever provided shall withstand the test prescribed in 7.4 of IS: 10134:1994.	No distortion observed.	Conforms
Cl.6.12 Delivery Hose	A delivery hose of suitable diameter and preferably one metre in length shall be provided as agreed to between the purchaser and the supplier. The hose shall be connected with the discharge outlet and the cut-off device through hose connection. In case suction hose is provided, shall withstand pneumatic test as given in 7.1.1 of IS: 10134:1994.	A delivery hose of 7.17 mm inner dia. and 1310 mm length is provided with the sprayer hose connection.	Conforms
Cl.6.12.1 Hose Connections	The hose connection for threaded type and nipple type connection shall be nut- nipple & clamp type and clamp type respectively. The clamp shall be in the form of ferrule or clip.	Both ends are threaded type.	Conforms
Cl.6.12.2	The hose and hose connection shall with stand the test prescribed in 7.2 of IS:10134-1994.	Hose & hose connection withstand the test (Refer chapter-8 of this report).	Conforms
Cl.6.13 Cut-off device & Lance	The cut-off device and lance shall be provided and shall conform to the requirements given in Annex C & D of IS-3652:1995 respectively. Pivot pins for cut-off device shall be riveted or with round headed nut and bolt. The lever for cut-off device shall not have sharp edges.	Provided and for detail assessment (Refer Chapter No. 9, Cl. No. 9.1 to 9.4 of this report)	Conforms
Cl.6.14 Nozzles	Unless otherwise specified by the purchaser, the nozzle shall conform to the requirements as given in Annex F of IS 3652:1995	Provided and for detail assessment (Refer Chapter No. 10, Cl. No. 10.1 to 10.6 of this report)	**Does not conform in toto**

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Report verified by

Subrata Kr Mandal

17 TECHNICAL LITERATURE

The operator, maintenance & parts manual of sprayer was not provided during the test which found adequate, however, the manual should be updated as per IS: 8132:1999, with the inclusion of safety instructions regarding handling poisonous agrochemical and first aid.

TESTING AUTHORITY

Report Prepared by	Sr. Technical Officer, CSIR-CMERI Farm Machinery Testing Centre	24/09/2024
Report Verified & Approved by	In-Charge, CSIR-CMERI Farm Machinery Testing Centre	24.09.2024
Report Approved for release by	Head, Business Development Unit, CSIR-CMERI, Durgapur	24/09/24

18 APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's Comments
18	16.1 to 16.8	It's ok corrective action will be taken.

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FARM MACHINERY TRAINING AND TESTING CENTRE * CSIR-CMERI DURGAPUR