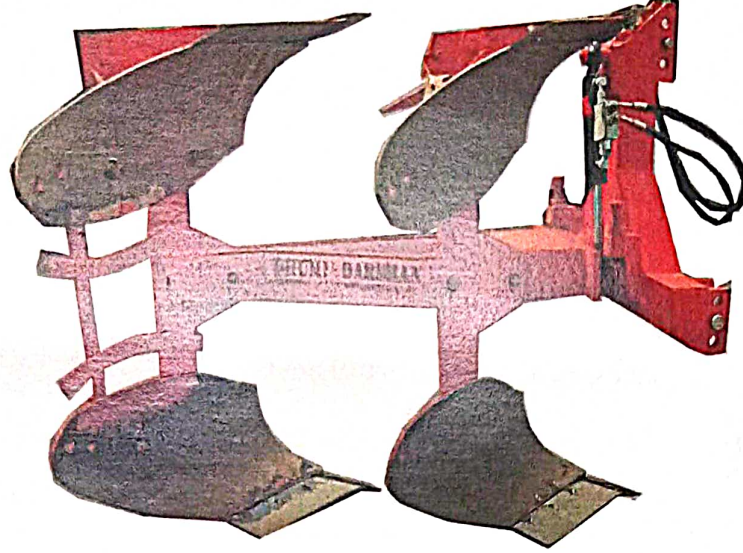


THIS TEST REPORT IS VALID UPTO 31.03.2029



**BHOOMI DARSHAN,
TWO BOTTOM HYDRAULIC REVERSIBLE M. B. PLOUGH
Model: 2021 (Tractor Mounted)**



सत्यमेव जयते

भारत सरकार
GOVT OF INDIA

कृषि एवं किसान कल्याण मंत्रालय

MINISTRY OF AGRICULTURE & FARMERS WELFARE

कृषि, सहकारिता एवं किसान कल्याण विभाग

DEPARTMENT OF AGRICULTURE, COOPERATION & FARMERS WELFARE

उत्तर पूर्वी क्षेत्र कृषि यंत्र प्रशिक्षण एवं परीक्षण संस्थान

NORTH EASTERN REGION FARM MACHINERY TRAINING & TESTING INSTITUTE

विश्वनाथ चारिआलि, जिला-विश्वनाथ (असम)

BISWANATH CHARIALI: BISWANATH: ASSAM, PIN - 784 176

[AN ISO 9001:2015 CERTIFIED INSTITUTION]

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1. SCOPE OF TEST

The scope of test was to check and assess the following:

1.1 Laboratory Test:

- a) Checking of specifications
- b) Hardness of soil engaging parts
- c) Chemical analysis of critical components
- d) Wear analysis of critical components

1.2 Field Test:

- a) Rate of work
- b) Quality of work
- c) Ease of operation and adjustments
- d) Labour requirement
- e) Power requirement
- f) Defects, Breakdowns & Repairs



2. METHOD OF SELECTION

As per Govt. of India, OM No. 13-1/2021-M&T (I&P), dated 03.02.2022, the random selection was exempted. Hence, the machine was directly submitted by the applicant at this Institute for test.

3. TEST PROCEDURE

The following codes were referred for testing of Two Bottom Hydraulic Reversible Mouldboard Plough

- i) IS: 6288:1971 (Reaffirmed Mar 2009) : Test code for Mould board ploughs.
- ii) IS: 10691:1983 (Reaffirmed Feb 2011) : Specification for Share for tractor-operated Mould board ploughs
- iii) IS: 4468 (Part I): 1997 (Reaffirmed Feb. 2012) : Agricultural wheeled tractors – Rear-mounted Three-Point Linkage: Part 1 Categories 1, 2, 3 & 4

4. SPECIFICATIONS

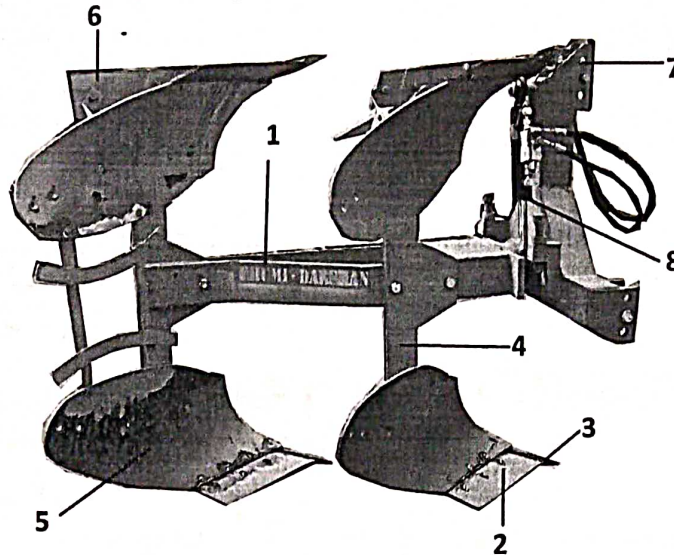
4.1 General:

Name and address of the manufacturer	: M/S Bharat Electric Welding Works, Piplia Mandi Raod, Vill. Budha, Dist. Mandsaur, Madhya Pradesh - 458556
Test requested by (Applicant)	: M/S Bharat Electric Welding Works, Piplia Mandi Raod, Vill. Budha, Dist. Mandsaur, Madhya Pradesh - 458556
Name of machine	: Two bottom Hydraulic Reversible M.B. Plough
Make	: Bhoomi Darshan
Model	: 2021
Serial Number of machine	: 101
Size of implement (mm)	: 2 x 330
Year of manufacture	: 2022
Country of origin	: India
Power Source as recommended, hp	: 45 and above

Prime Mover Used:

Tractor : John Deere 5310 4WD
 Chassis No./ Engine no. : 1PY5310ECLA049490/PY3029H143675
 Max. PTO Power, kW (Ps) : 36.4/49.5

4.2 Constructional Details (Refer Fig.1):



KEYWORDS			
1.	Main Frame	5.	Mould Board
2.	Share	6.	Landside
3.	Share Bar	7.	Hitch Pyramid
4.	Standard	8.	Hydraulic cylinder

Fig.1: SCHEMATIC VIEW OF TWO BOTTOM HYDRAULIC REVERSIBLE M.B PLOUGH

4.2.1 Main Frame:

Constructional Details: : Frame is made out of MS Flat and MS Sheet.
 Size of flat, mm : 1145 x 120 x 25.50 (01 no.)
 : 1190 (curved) x 120 x 24.50 (01 no.)
 : 435 x 125 x 22.65 (01 no.)
 : 240 x 120 x 22.65 (01 no.)
 No. & size of holes on frame for fixing standard, mm : 04 & 19.10 Φ
 No., size & spacing of bolts on frame for fixing standard, mm : 04 & 15.57 Φ / 18.47 Φ and 90.33/114.50

4.2.2 Standard :

Number : 04
 Material (apa) : Mild steel
Dimensions (mm)
 - Projected length : 1120
 - Width : 230 at middle & 68.13 at top (both side)
 - Thickness : 35.8
 Number of holes for fixing the frog : 03
 Size & spacing of holes for fixing frog, mm : 19.10 Φ & 108.97/112.16

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1	2	3	4
7.2	The counter sunk bolts of size 10 mm shall be used for fixing the share with the frog.	12.0 mm	Does not conform
7.3	The shares shall be supplied with bolts in holes.	Not Supplied	Does not Conform
8.	FINISH AND WORKMANSHIP		
8.1	The shares shall be free from flaws, scratches, cracks and other defects. All fins, burrs, flashes and sharp edges other than the cutting edge shall be removed.	As Per Requirement	Conforms
8.2	In case of steel shares, the welding of gunnel shall be satisfactory in all respects. The welding shall not be porous.	The welding at various joints were found satisfactory	Conforms
8.3	A coating of protective paint or grease on soil facing surface of the share shall be provided. The bottom surface not in direct contact with soil shall have an anti-rust paint coating.	Coated with anti-rust paint.	Conforms
9.	MARKING AND PACKING		
9.1	The shares shall be marked with the following particulars:		
	a) Manufacturer's name and recognized trade-mark, if any;	Not Provided	Does not Conform
	b) Size;	Not Provided	Does not Conform
	c) Type; and	Not Provided	Does not Conform
	d) Batch or code number.	Not Provided	Does not Conform

7. RUNNING-IN

Running-in was not recommended by the applicant. However, the implement was run-in for 1.0 hour before the actual test. All the fasteners were checked and tightened thereafter.

8. FIELD PERFORMANCE TEST

The implement was operated for 25.41 hr. for assessing its field performance. Total four trial were carried out and reported in **Annexure-I** and are summarized in ensuing **Table**. John Deere 5310 4WD tractor was used as prime -mover during field performance test.

Summary of Field Performance Test

Sl.No.	Parameters/Operations	Observations
1	2	3
1.	Gear used	A-2
2.	Type of soil	Light
3.	Av. soil moisture (%)	6.0 to 8.5
4.	Av. bulk density of soil (g/cc)	1.74 to 1.91
5.	Previous treatment	Nil
6.	Engine speed (rpm) :	
	- No load	2556 to 2561
	- On load	2482 to 2503
7.	Speed of operation (kmph)	2.92 to 3.03

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1	2	3
8.	Av. wheel slip (%)	4.49 to 8.00
9.	Av. depth of cut (cm)	16.2 to 24.06
10.	Av. working width (m)	0.74 to 0.77
11.	Area covered (ha/h)	0.1826 to 0.1989
12.	Time required for one ha (h)	5.02 to 5.47
13.	Field efficiency (%)	80.86 to 88.71
14.	Fuel consumption	
	-l/h	5.67 to 6.0
	-l/ha	28.63 to 31.92
15.	Av. Implement draft (kgf)	643 to 784
16.	Drawbar Power requirement (kW)	5.29 to 6.32

8.1.1 Rate of work :

- The area covered was recorded as 0.1826 to 0.1989 ha/h at the average speed of operation from 2.92 to 3.03 kmph.
- The time required to cover one hectare area was recorded as 5.02 to 5.47 h.

8.1.2 Quality of work:

- The depth of cut was recorded as 16.2 to 24.06 cm.
- Average working width was observed as 0.74 to 0.77 m.
- Field efficiency was observed as 80.86 to 88.71 %.

8.1.3 Power requirement:

The average draft of implement was recorded from 643 to 784kgf and Drawbar power requirement was calculated as 5.29 to 6.32kW.

8.2 Labour requirement:

One skilled operator was needed to operate the tractor with the implement.

8.3 Wear analysis:

8.3.1 On mass basis:

8.3.1.1 Share with Bar :

S. No.	Initial mass of share (g)	Final mass of share (g)	Difference (g)	Wear (%)	
				After 26.41 h	Per hour
1	8763.3	8438.2	325.1	3.71	0.14
2	8860.2	8428.4	431.8	4.87	0.18
3	8778.4	8428.3	350.1	3.99	0.15
4	8764.0	8510.6	253.4	2.89	0.11

Remarks: The hourly percentage of wear on mass basis was observed as 0.11 to 0.18.

8.3.2 On dimensional basis :

8.3.2.1 Share of front bottom :

S. No.	Notation	Dimension (mm)		Wear (%)	
		Initial	Final	After 26.41 h	Per hour
1.	Width at hole-1	135.0	120.0	11.11	0.42
2.	Width at hole-2	140.0	115.0	17.86	0.68

8.3.2.2 Share of rear bottom :

S. No.	Notation	Dimension (mm)		Wear (%)	
		Initial	Final	After 26.41 h	Per hour
1.	Width at hole-1	130.0	123.0	5.38	0.20
2.	Width at hole-2	140.0	121.0	13.57	0.51

Remarks: The hourly percentage of wear on dimension basis was observed as 0.20 to 0.68.

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9. EASE OF OPERATION AND ADJUSTMENTS

No noticeable difficulty was observed during the operation and adjustment of Two Bottom hydraulic Reversible M.B plough.

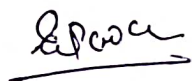
10. DEFECTS, BREAKDOWNS AND REPAIRS

No noticeable defect or breakdown was observed during test

11. COMMENTS AND RECOMMENDATIONS

- 11.1 The dimensions of the share and bar of plough does not conforms to IS: 10691-1983. This should be looked into for corrective action for standardisation.
- 11.2 The dimension of three point linkage, hitch pyramid does not conform to IS: 4468-1997. Therefore, this should be looked into for corrective action.
- 11.3 The chemical composition in share was not within its range as per IS: 10691-1983. This is recommended to looked into for corrective action of standardisation.
- 11.4 The thickness of the cutting edge was not as per IS: 10691-1983. This is recommended to looked, for corrective measures.
- 11.5 No adjustment for depth setting was observed during field test due to share and share bar are welded to each other. This should be looked into for corrective action.
- 11.6 The labelling plate should be provided as per the requirements of Indian Standard. This should be looked into for corrective action.
- 11.7 **Technical literature :**
Operator manual, service manual, parts manual covered in English was submitted along with the implements. However, it is recommended to bring out the same covered in Hindi and other vernacular languages as per IS: 8132-1999

TESTING AUTHORITY



(S.G. PAWAR)
AGRICULTURAL ENGINEER



(J.P. MANDAL)
SENIOR AGRICULTURAL ENGINEER



(K.K. NAGLE)
DIRECTOR

Draft Test Report Compiled By -

Sri Khagendra Bora, Sr. Technical Assistant

12. APPLICANT'S COMMENTS

Para No	Our Reference	Applicants Comments
12.1	11.3	We used material of Boron steel.