



## Testing and Training Center of Farm Machinery

(Approved by Govt. of India)

Department of Farm Machinery and Power Engineering

College of Agricultural Engineering and Technology

Junagadh Agricultural University

JUNAGADH – 362 001 (GUJARAT)



Phone : (0285) 2672080-90, Ext. 390 & 484; Fax : (0285) 2671018  
website: www.jau.in; Email:fmp@jau.in

JAU/CAET/FMP/ RKVY/ 162 /2019  
Junagadh. Date: 22/01/2019

To

**Shreeji Agro Industries**

Panchasar Road, Nr. Shreeji PVC Pipe, Opp. Shreeji Power Transformer,  
Wankaner-363 621, Dist. Morbi (Gujarat)

**Sub.: To release "Test Report"**

Ref.: Your application dated 20/04/2018

With reference to above cited subject and referred application for the testing of **TWO BOTTOM MECHANICALLY REVERSIBLE MOULD BOARD PLOUGH (TRACTOR MOUNTED) "SHREEJI-2FM46511"**, please find attached herewith the "Test Report" of the same.

**Testing Incharge  
and Professor & Head**

**Encl.: As above**

COMMERCIAL TEST REPORT

No.: TTCFMJ/A/231/690

Date of Report: 22/01/2019

This Test Report valid up to Date: 21/01/2026



**TWO BOTTOM MECHANICALLY REVERSIBLE MOULD BOARD PLOUGH  
(TRACTOR MOUNTED) "SHREEJI-2FM46511"**



**Testing and Training Center of Farm Machinery**  
(Approved by Govt. of India)  
**Department of Farm Machinery and Power Engineering**  
**College of Agricultural Engineering and Technology**  
**Junagadh Agricultural University**  
**JUNAGADH – 362 001 (GUJARAT)**



Phone : (0285) 2672080-90, Ext. 390 & 484; Fax : (0285) 2671018  
website: [www.jau.in](http://www.jau.in); Email: [fmp@jau.in](mailto:fmp@jau.in)

TTCFMJ/A/231/690	TWO BOTTOM MECHANICALLY REVERSIBLE MOULD BOARD PLOUGH (TRACTOR MOUNTED) "SHREEJI-2FM46511"	COMMERCIAL
------------------	--	------------



Name of machine : **Two Bottom Mechanically Reversible Mould Board Plough (Tractor Mounted) "Shreeji-2FM46511"**

Test requested by (Applicant) : **Shreeji Agro Industries**  
Panchasar Road, Nr. Shreeji PVC Pipe, Opp. Shreeji Power Transformer, Wankaner-363 621, Dist. Morbi (Gujarat)

Manufacturer : **Shreeji Agro Industries**  
Panchasar Road, Nr. Shreeji PVC Pipe, Opp. Shreeji Power Transformer, Wankaner-363 621, Dist. Morbi (Gujarat)

Testing Authority : Testing & Training Center of Farm Machinery  
Department of Farm Machinery & Power Engineering  
College of Agricultural Engineering & Technology  
Junagadh Agricultural University, Junagadh (Gujarat)

Type of test : COMMERCIAL

Test Code /Procedure : IS:6288-2005, IS:10691-1983, IS:9818-2004 (Part-I), IS:9818-2009 (Part-II) and IS:4468-2001 (Part-I)

Test Report No. : TTCFMJ/A/231/690

Date of Release : **22/01/2019**

This Test Report valid up to : **21/01/2026**

Date

1. The data given in the Test Report pertain to the particular machine submitted for test. The data collected during the test do not in any way attribute to the durability of the machine.
2. The results reported in this report are observed values and no corrections have been applied for atmospheric and site conditions.
3. The Test Report contains only performance data/ parameters obtained for a particular sample. However, this do not communicate/signify the approval/ recommendation of the Govt. of India or the Testing Authority for any Govt. programmes or otherwise.
4. This Test Report should not be reproduced in part or full without prior permission of the Testing Incharge, Testing & Training Center of Farm Machinery, College of Agricultural Engineering & Technology, Junagadh Agricultural University, Junagadh (Gujarat).

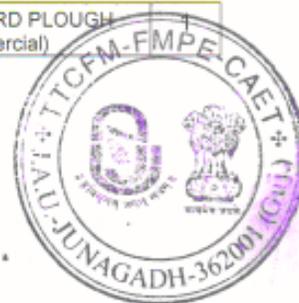
#### SELECTED CONVERSIONS

Sr. No		Units	Conversion Factor
1	Force	1 kgf	9.80665 N
			2.20462 lbf
2	Power	1 hp	1.01387 metric hp (Ps)
			745.7 W
		1 Ps	735.5 W
		1 kW	1.35962 Ps
3	Pressure	1 psi	6.895 kPa
		1 kgf/cm <sup>2</sup>	98.067 kPa = 735.56 mm of Hg
		1 bar	100 kPa = 10 N/cm <sup>2</sup>
		1 mm of Hg	1.3332 m-bar

Testing & Training Center of Farm Machinery, College of Agricultural Engineering & Technology, Junagadh Agricultural University, Junagadh (Gujarat)

C O N T E N T S

Sr. No.	Contents	Page No.
1	SCOPE OF TEST	1
2	METHOD OF SELECTION	1
3	TEST PROCEDURE	1
4	SPECIFICATIONS	1
5	FIELD PERFORMANCE TESTS	8
6	DEFECTS, BREAK DOWNS AND REPAIRS	10
7	CONFORMITY TO INDIAN STANDARDS	10
8	SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS	11
9	APPLICANT'S COMMENTS	12
10	ANNEXURES (I to III)	13



## 1. SCOPE OF TEST

### 1.1 LABORATORY TEST :

- ✓ Checking of specifications
- ✓ Hardness of the soil engaging components
- ✓ Chemical analysis of the soil engaging components
- ✓ Wear analysis of the soil engaging components

### 1.2 FIELD TEST:

- ✓ Rate of work
- ✓ Quality of work
- ✓ Draft requirement
- ✓ Labour requirement
- ✓ Ease of operation and adjustments
- ✓ Defects, breakdowns and repairs

## 2. METHOD OF SELECTION

The machine was directly submitted by the applicant for test at this Centre. Hence, method of selection is not known.

## 3. TEST PROCEDURE

The following test codes were referred:

- 1) IS:6288-2005, Test Code for Mould Board Plough
- 2) IS:10691-1983, Specification for Share for Tractor Operated Mould Board Ploughs
- 3) IS:9818-2004 (Part-I: General terms) and IS:9818-2009 (Part-II: Terms relating to Equipment), Glossary of terms relating to Tillage and Intercultivation Equipment
- 4) IS:4468-2001 (Part-I), Agricultural wheeled tractor - rear mounted three point linkage

## 4. SPECIFICATIONS

(Annex A, Clause 4.2 & 5.1, IS:6288-2005)

### 4.1 General:

- |   |    |  |
|---|----|--|
| a) Name   | :  | Two Bottom Mechanically Reversible Mould Board Plough  |
| b) Type   | :  | Two way  |
| c) Make   | :  | Shreeji  |
| d) Serial Number                                | :  | Not provided   |
| e) Model  | :  | 2FM46511   |
| f) Year of manufacture                          | :  | 2018   |
| g) No. of plough bottom(s)                      | :  | Two on each side   |
| h) Size of plough (mm)                          | :  | 2x300  |
| i) Recommended source of power as per applicant | of | Tractor (40 hp and above), Brief specification of tractor used is given in <b>Annexure-I</b> . |

### 4.2 Constructional details (Refer Fig. 1):

#### 4.2.1 Frame:

- |                           |   |   |
|---------------------------|---|---|
| a) Constructional details | : | Fabricated from two MS flats of 920x100x25 & 965x100x25 mm size are joined together with welded joint at front with lateral flat 380x125x20 and plate 405x380, 10 mm thick. Standards are bolted to the frame. Hitch pyramid is welded to main shaft. |
| b) Dimensions (mm):       |   |   |
| i) Length                 | : | 1060  |
| ii) Width (front/rear)    | : | 380/90  |

- iii Number & size of holes on frame for fixing standard (mm) : 6 holes for standard 20.0  $\varnothing$
- c) Balancing weight (mm) : Not provided

**4.2.2 Standard (Refer Fig. 2):**

- a) Numbers : 2
- b) Material : MS plate (curved)
- c) Type : Common for both bottom
- d) Dimensions (mm)
- i - Projected length : 1020
- Curved length : 1190
- ii - Width : 125 (middle) & 60 (tip)
- iii - Thickness : 38.5
- e) No., size & spacing of holes for fixing frog (mm) : 3 holes of 20.0 mm  $\varnothing$ , spaced at 130 and 70 mm from each other.
- f) No. & size of holes for fixing to the frame : 3 holes at each front & 3 holes at each rear of 20.0 mm  $\varnothing$ .
- g) Method of fixing : One end of standard is bolted to the frame whereas another end is bolted to the frog.

**4.2.3 Plough Bottoms:**

- a) Numbers : 4 (2 on each side)
- b) Type : Fixed
- c) Size of plough (mm) : 2x300
- d) Vertical suction (mm) : 6-10
- e) Horizontal suction (mm) : 3-4
- f) Constructional details : The fixed type plough bottom consists of mould board, shin, share, share-bar and landside bolted to the frog.

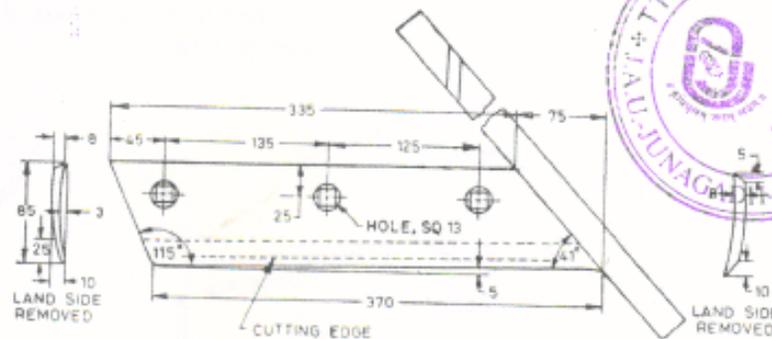
**4.2.3.1 Mould Board:**

- a) Numbers : 4 (2 on each side)
- b) Type : General purpose
- c) Material : Boron (as per applicant) plate
- d) Dimensions (mm):
- i - Length : 685
- ii - Width : 368
- iii - Thickness : 8
- e) No & size of hole on mould board (mm) : 8 holes of 14.0/23.0 mm  $\varnothing$  at front (4 for bolting frog, 1 for bolting brace and 1 for wing) and 8 holes of 14.0/23.0 mm  $\varnothing$  at rear (4 for bolting frog, 1 for bolting brace and 1 for wing).
- f) Angle of inclination of MB along the direction of travel (deg.) : 23
- g) Method of fixing mould board : Directly bolted to the frog with 6 sunk headed bolts & nuts.

**4.2.3.2 Share (Refer Fig. 3b):**

- a) Numbers : 4 (2 on each side)
- b) Type : TYPE-6 (as per IS:10691-1983) (Refer Fig.3a)
- c) Dimensions (mm) : Steel 30MnB5 (Boron as per applicant) plates of size 405x150x12
- d) No & size of holes on share (mm) : 2, 14.0/23.0  $\varnothing$





TYPE-6 (as per IS:10691-1983)

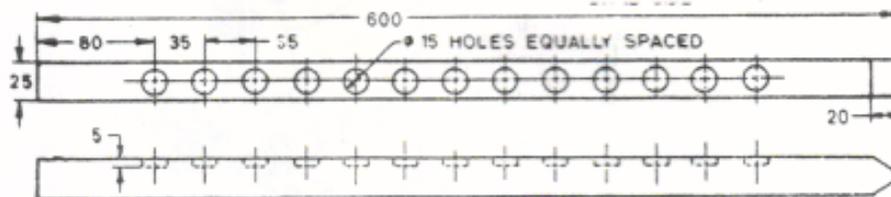
All dimensions in millimetres  
FIG. 5 TYPE 5 SHARE

Fig. 3a: Dimensions of Share and Bar-point as per IS

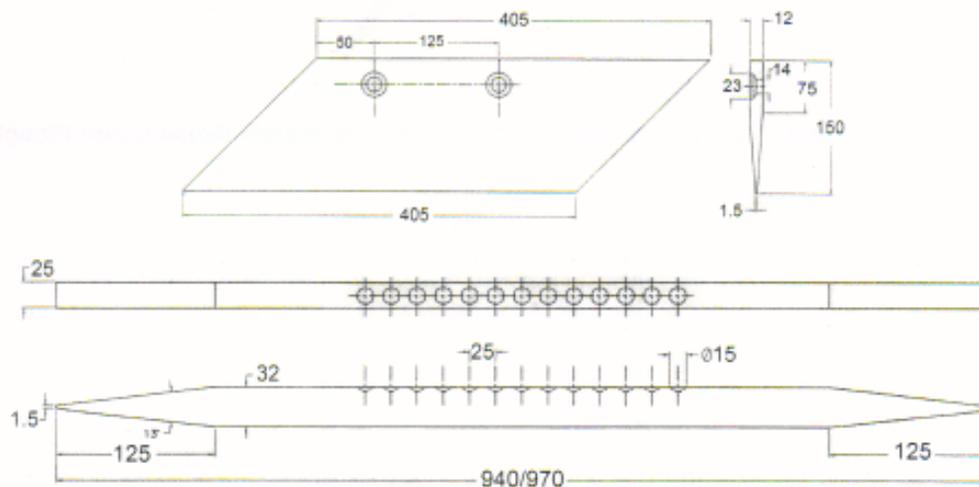


Fig. 3b: Dimensions of Share and Bar-point as observed

## 4.2.3.3 Share bar (Bar-point) (Refer Fig. 3b):

- |                    |   |
|--------------------|---|
| a) Numbers         | : 4 (2 on each side)                              |
| b) Type            | : TYPE-5 (as per IS:10691-1983) (Refer Fig.3a)    |
| c) Material        | : Steel 30MnB5 (Boron as per applicant) rect. bar |
| d) Dimensions (mm) | : 940x32x25 (front) & 970x32x25 (rear)            |

## 4.2.3.4 Shin of mould board:

- |   |                |
|---|----------------|
| a) Numbers                                      | : Not provided |
| b) Material & thickness (mm)                    | : -            |
| c) No & size of hole on shin for fixing on frog | : -            |

**4.2.3.5 Landside:**

- a) Numbers : 4 (2 on each side)
- b) Material : MS plate
- c) Dimensions (mm) :
  - Length & Thickness : 555x25 (front) & 665x25 (rear)
- d) No & size of hole on landside (mm) : Nil
- e) Method of fixing landside to frog : Welded to frog

**4.2.3.6 Braces:**

- a) Numbers : 4 (2 on each side)
- b) Material & size (mm) : MS flat, 385x40x10 (front) & 390x40x10 (rear)
- c) Dimensions (mm) :
  - Projected length : 375 (front), 385 (rear)
- d) No. & size of hole on each brace (mm) : 2, 14.0 Ø on mould board and 14.0 Ø on landside
- e) Method of fixing : Brace is bolted to the M. B. with one bolt and another end of which is bolted to the landside.

**4.2.3.7 Frog:**

- a) Numbers : 4 (2 on each side)
- b) Material : MS plate
- c) Dimensions (mm) : Irregular shape of size 405x255x10
- d) No. & size of holes on frog (mm) : 11
  - i -for mould board : 6, 14.0/23.0 Ø
  - ii -for share : 2, 14.0/23.0 Ø
  - iii -for standard : 3, 20.0 Ø
  - iv -for landside : --
  - v -for shin : --

**4.2.4 Reversing Mechanism:**

- a) Type : Mechanically, hand operated by a lever
- b) Mode of Operation : The reverse mechanism is operated by a lever provided in front of plough at RHS. The lever is connected to a cam enables the hitch pyramid to rotate 180° around the main shaft which is inserted in a hollow shaft at its front end fixed to the main frame at its rear end. When the implement is hitched to the three point linkage of tractor, hitch pyramid becomes fixed and the complete frame along with plough bottoms is free to rotate 180° along the axis of hollow shaft.

**4.2.4.1 Reversing lever:**

- a) Numbers : One
- b) Material : MS round bar
- c) Dimensions (mm) :
  - Projected/curved length : 860/885
  - Size (mm) : 20.0 Ø

- d) Method of fixing : It is hinged into reverse lever holder with the help of pin (75.0x12.5 Ø mm).
- 4.2.4.2 Adjusting grip:**
- a) Material and size (mm) : PVC, 55x37.0 Ø  
b) Method of fixing: : --
- 4.2.4.3 J-hook:** N.A.
- a) Material : --  
b) Size (mm) : --  
c) Dia. of hole for fixing j-hook (mm) : --  
d) Size of j-hook pin (mm) : --  
e) Method of fixing : --
- 4.2.4.4 Reverse lever lock pin pipe:**
- a) Constructional detail : It is round MS pipe welded RHS of main shaft housing. It has reverse lever lock pin and handle pin spring.  
b) Material : MS  
c) Size (mm) : 220x61.0 Ø
- 4.2.4.5 Reverse lever lock pin:** :
- a) Material : MS  
b) Size (mm) :  
-Size of round/sq. portion : 325x38.0 Ø  
-Size of extended portion : 50x38.0 Ø
- 4.2.4.6 Reverse lever pin spring:**
- a) Number of spring : 1  
b) Length of spring (mm) : 150.0  
c) Dia. (OD/ID) (mm) : 25.0/20.0  
d) No. of coils : 40  
e) Method of fixing : Reverse lock pin and spring are inserted into reverse lever lock pin pipe.
- 4.2.4.7 Reverse lever:**
- a) Number : One  
b) Material : MS Hexagonal rod  
c) Size (mm) : 355x28.0 Ø  
d) Dia. of reverse lever holder pin hole (mm) : 18 Ø  
e) Dia. of reverse lever holder hole (mm) : 20 Ø  
f) Method of fixing : It is fitted to reverse lever pin with main bracket (85x18 Ø mm).
- 4.2.5 Hitch Pyramid:**
- a) Constructional details : The hitch pyramid is fabricated from two MS flats to form upper hitch point and a cross bar of MS sq. bar to form lower hitch points. Both the upper and lower hitch points are welded on a hollow shaft of reversing mechanism.  
b) Size of upper hitch (mm) : Box type fabricated from 385x320x5 mm MS plate having box thickness 92 mm  
c) Size of cross bar (mm) : Box type fabricated from MS sq. bar (55x55) of length 750.

## Specification of Hitch Pyramid as per IS: 4468-2001 (Part-I)

Sr.	Dimen. (Refer Fig. 4)	Description	Category-II	As observed	Remarks
<b>Upper Hitch attachments</b>					
1	-	Dia. of hitch pin	25.37-25.50	-	-
2	$d_1$	Dia. of hitch pin hole	25.70-25.90	25.27	Does not conform
3	$b_1$	Width between inner faces of yoke	52.0 (Min)	53.59	Conforms
4	$b_2$	Width between outer faces of yoke	86 (Max)	84.33	Conforms
<b>Lower hitch points</b>					
5	-	Dia. of hitch pin	27.80-28.00	-	-
6	$D_2$	Dia. of hitch pin hole	28.70-29.00	25.73	Conforms
7	$b_3$	Linch pin hole distance	49 (Min)	95.00	Conforms
8	$l$	Lower hitch point span	823.5- 826.5	595.00	Does not conform
<b>Other dimensions</b>					
9	$d$	Dia. of linch pin hole (upper hitch pin)	12 (Min)	12.00	Conforms
10	$d$	Dia. of linch pin hole (lower hitch pin)	12 (Min)	12.00	Conforms
11	$h$	Mast height	608.5- 611.5	625.00	Does not conform

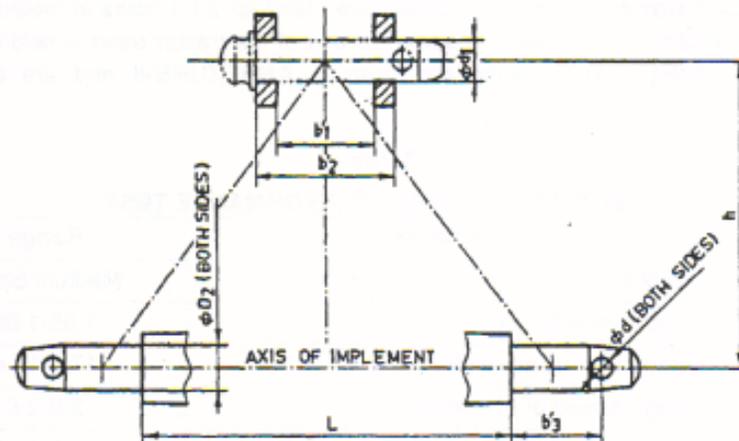


Fig. 4: Implement Hitch Attachment as per IS

## 4.2.5.1 Upper hitch point:

- |   |  |
|---|--|
| a) Material                                       | : MS Plate   |
| b) Size (mm)                                      | : 385x320x5  |
| c) No. of holes on upper hitch point              | : 01   |
| d) Size of hole for fixing upper hitch point (mm) | : 25.27 $\emptyset$  |
| e) Size of hole for fixing j-hook                 | : N.A.   |
| f) Size of hole for fixing lever                  | : 20.0 $\emptyset$   |
| g) Method of fixing                               | : Upper hitch point is connected to reversing mechanism bracket pin (125x19.0 $\emptyset$ mm). |

**4.2.5.2 Main shaft:**

- a) Constructional details : The main shaft is fabricated from a MS rod of size 750x46.0 Ø mm. The rear end is tightened to the main frame and front end is inserted in a hollow shaft of MS pipe (305x116/100 OD/ID mm) and supported by two taper roller bearings.
- b) Method of fixing : Hollow housing is fitted on the main shaft and tightened with MS flange, a spring washer and hexagonal nut. The shaft and nut is tightened with bolt.

**4.3 Overall dimensions (mm) :**

- a) Length : 1940  
b) Width : 1040  
c) Height : 1505

**4.4 Total mass (kg) :** 466.0

**4.5 Color of implement :** Light Blue

**5. FIELD PERFORMANCE TESTS**

- 5.1 The plough was operated in the uncultivated land for 23.0 hours in medium black soil of Cattle Breeding Farm. The brief specifications of the tractor used in field testing is given in **ANNEXURE-I**. The results are given in **ANNEXURE-II** and are summarized in **Table 1**.

Table - 1

**SUMMARY OF FIELD PERFORMANCE TEST**

Sr.	Parameters	Range
1	Type of soil	Medium black
2	Soil bulk density (g/cc)	1.65-1.66
3	Average soil moisture (%)	17.1-17.4
4	Average speed of operation (km/h)	2.5-2.8
5	Average wheel slippage (%)	13.8-14.5
6	Average depth of cut (cm)	20.0-22.0
7	Average working width (cm)	60.0-63.0
8	Area covered (ha/h)	0.131-0.144
9	Time required to cover 1 hectare (h)	6.93-7.64
10	Field efficiency (%)	84.6-85.9
11	Soil inversion (%)	90.6-92.5
12	Fuel consumption (l/h)	4.25-4.36
13	Fuel consumption (l/ha)	29.52-32.48
14	Av. implement draft (kgf)	770-805
15	Power requirement (hp)	7.45-8.27

**5.1.1 Rate of work:**

- The rate of work in medium black soil was observed as 0.131-0.144 ha/h when the speed of operation varied between 2.5-2.8 km/h.
- The time required for ploughing one hectare area was recorded as 6.93-7.64 hr.
- The field efficiency of the implement was worked out as 84.6-85.9%.

**5.1.2 Quality of work:**

- The depth of operation and working width of implement were measured as 20.0-22.0 and 60.0-63.0 cm respectively.
- The percentage of soil inversion by weed count method was measured as 90.6-92.5 %.

**5.1.3 Draft requirement**

The implement draft was measured as 770-805 kgf.

**5.1.4 Labour requirement:**

One skilled operator is needed to operate the tractor and the implement simultaneously.

**5.1.5 Wear analysis (Mass basis):****5.1.5.1 Share:**

Share	Mass of share (g)		Percentage of wear	
	Before operation	After 23.0 hours of operation	After 23.0 hours of operation	Per hour
Front-1	5472	5451	0.38	0.017
Front-2	5385	5362	0.43	0.019
Rear-1	5381	5360	0.39	0.017
Rear-2	5478	5462	0.29	0.013

Remark: The percentage hourly wear on mass basis was observed as 0.013-0.019 %.

**5.1.5.2 Bar-point:**

Bar- point	Mass of bar point (g)		Percentage of wear	
	Before operation	After 23.0 hours of operation	After 23.0 hours of operation	Per hour
Front-1	5050	5032	0.36	0.015
Front-2	5117	5101	0.31	0.014
Rear-1	4819	4808	0.23	0.010
Rear-2	4984	4965	0.38	0.017

Remark: The percentage hourly wear on mass basis was observed as 0.010-0.017 %.

**5.1.6 Ease of operation and adjustments:**

- The implement can be leveled by adjusting the top link easily from the operator's seat.
- The operator can easily adjust and control the implement from operator's seat in the field as the adjustments are within the easy reach of operator.
- All the components like share, mould board, bar-point etc. are bolted to each other and can be easily detachable and replaceable.

**6. DEFECTS, BREAK DOWNS AND REPAIRS**

No breakdown was occurred during 23.0 hour of operation of plough.

**7. CONFORMITY TO INDIAN STANDARDS**

Specifications for Share for Tractor-Operated Mould Board Plough (IS: 10801-1983)

Cl. No.	Requirements as per IS	Observation	Conformity to IS
1	2	3	4
3	<b>TYPES</b>		
3.1	On the basis of the dimensions, the share shall be of following 7 types: a) Type 1, b) Type 2, c) Type 3, d) Type 4, e) Type 5, f) Type 6, and g) Type 7	Type 6	Conforms
4	<b>MATERIAL</b>		
4.1	The share shall be manufactured from chilled cast iron or steel conforming to Grade 75C6 of IS: 1570 (Part 2)-1979. Steel equivalent or better than this grade may also be used.	Steel 30MnB5	Conforms
	The composition of Grade 75C6 is given below for guidance: Carbon 0.70 to 0.80 percent Manganese 0.50 to 0.80 percent <b>Note:</b> The sulphur and phosphorus content shall not be more than 0.05 percent each.	C: 0.275 %	-
		Mn: 1.350 %	-
4.2	The material of bar-point shall be 40C8 or 55C8 of IS: 5517-1978. Carbon 0.70 to 0.80 percent Manganese 0.50 to 0.80 percent	C: 0.278 %	-
		Mn: 1.384 %	-
	The material of share and bar-point was got analyzed from Alpha Laboratory Services, Shapar (Veraval), Rajkot vide Test Report No. AS-47657/18-19 and AS-47660/18-19, Dt. 24/12/2018 respectively.		
5	<b>HARDNESS</b>		
5.1	The chilled cast iron shares shall have a Brinell hardness of 360 to 400 HB when tested in accordance with IS:1789-1961 and depth of chilling shall be not less than 1.5 mm.	N.A.	--
5.2	The cutting edge of the steel share shall be hardened and tempered to give a Brinell hardness of 350 to 450 HB when tested in accordance with IS:1500-1968.	327-336 BHN (Share)	Does not conform
		481-496 BHN (Bar-point)	Does not conform
	The hardness of share and bar-point was determined from Alpha Laboratory Services, Rajkot vide Test report No. AH-6302/18-19 and AH-6305/18-19, Dt. 24/12/2018 respectively.		

TTCFMJ/A/231/690	TWO BOTTOM MECHANICALLY REVERSIBLE MOULD BOARD PLOUGH (TRACTOR MOUNTED) "SHREEJI-2FM46511" (Commercial)	11
------------------	--	----

6	<b>DIMENSIONS AND TOLERANCES</b>		
6.1	The dimensions of types 1 to 7 plough shares shall be as given in Fig.3a. The tolerances on dimensions unless indicated otherwise, shall be $\pm 10$ percent.	Refer Fig. 3b	
6.2	The dimensions of bar for plough share shall be in accordance with Fig.3a.	Refer Fig.*3b	
7	<b>OTHER REQUIREMENTS</b>		
7.1	The cutting edge of the share shall be bevelled to a distance not more than 10 mm.	8-10 mm	Conforms
	The thickness of cutting edge shall be between 0.5 to 2 mm and should be uniform, as far as possible.	1.0 - 2.0 mm	Conforms
7.2	The counter sunk bolts of 10 mm size shall be used for fixing the share with frog. As far as possible, the bolt of M10 size should be used.	12.3 mm	Conforms
7.3	The shares shall be supplied with bolts in holes.	Supplied	Conforms
8	<b>WORKMANSHIP AND FINISH</b>		
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.	Satisfactory	Conforms
8.2	In case of steel shares, the welding of gunnel shall be satisfactory in all respect. The welding shall not be porous.	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	Provided	Conforms
9	<b>MARKING AND PACKING</b>		
9.1	The plough shall be marked with the following particulars:		
	a) Manufacturer's name and recognized trade-mark, if any	Marked (Shreeji)	Conforms
	b) Size	Not marked	Does not conform
	c) Type	Not marked	
	d) Batch/ Code Number	Not marked	
9.1.1	Each share may also be marked with the ISI Certification Mark	--	--
9.2	The shares of same type may be packed together for safe handling in transit and storage.	N.A.	--

#### 8. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS

- The marking/ labeling plate should be provided as per IS.
- Operator's-cum Service Manual and Parts catalogue is provided in English language. However, it should be also supplied in vernacular language for the guidance of users.

Testing & Training Center of Farm Machinery, College of Agricultural Engineering & Technology, Junagadh Agricultural University, Junagadh (Gujarat)

TTCFMJ/A/231/690	TWO BOTTOM MECHANICALLY REVERSIBLE MOULD BOARD PLOUGH (TRACTOR MOUNTED) "SHREEJI-2FM46511" (Commercial)	12
------------------	--	----

3. The specification of implement hitch does not fully conform to the IS: 4468 (Pt-I)-2001. This should be looked into. However looking to the present hitching system provided in the tractor, it is found suitable to attach the plough.
4. The hardness of the share and bar-point does not conform to IS. This should be looked in to. But, considering the percentage hourly wear on mass basis as 0.013-0.019 % (share) and 0.010-0.017 % (bar-point), the material is suitable for field operation.
5. The rate of work was recorded as 0.131-0.144 ha/h at corresponding forward speed of 2.5-2.8 km/h which is considered normal for two bottom mould board plough.
6. The depth of operation was recorded as 20.0-22.0 cm in the soil having 17.1-17.4 % average moisture, which is considered normal.
7. The average soil inversion by weed count method was recorded as 90.6-92.5 % which is considered normal for mould board plough.
9. The implement cut, throw and pulverize the furrow slice completely and leaves clear furrow without disturbing the natural topography of the land. The overall field performance of ploughing was found satisfactory.

Note: Test conducted by Er. H. R. Shekhda, Lab. Tech.

#### TESTING AUTHORITY

Prof. A. L. Vadher Test Engineer & Assistant Professor	
Dr. T. D. Mehta Test Engineer & Associate Professor	
Dr. V. K. Tiwari Testing Incharge and Professor & Head	

#### 9. APPLICANT'S COMMENTS

1. The marking plate will be provided as per IS.
2. Operator's-cum Service Manual and Parts catalogue will be supplied in vernacular language for the guidance of users.

TTCFMJ/A/231/690

TWO BOTTOM MECHANICALLY REVERSIBLE MOULD BOARD PLOUGH  
(TRACTOR MOUNTED) "SHREEJI-2FM46511" (Commercial)

## Annexure-I

## Brief specifications of the tractor used during field test

1.	Make, model and type	L&T John Deere 5104 GJ-11M-6250
2.	Number of cylinders	3
3.	Maximum PTO power, kW	28.09
4.	Power at standard power take-off speed (540 & 1000 rpm) kW	-
5.	Engine speed corresponding to standard power take-off speed (rpm)	-
6.	Rated engine speed, rpm	2200
7.	No load engine speed during field test (rpm)	-
8.	Drawbar power, kW	23.57
9.	Drawbar pull (kN) :	
	Without ballast	-
	With ballast	-
10.	Type of wheel equipment	Pneumatic
11.	Number & size of tyre :	
	Front	6.0x16, 8 PR
	Rear	13.6x28, 12PR
12.	Inflation pressure of tyres (kg/cm <sup>2</sup> )	
	For Field	Front-1.6, Rear-0.8
	For Transport	Front-2.8, Rear-1.4
13.	Standard track width (mm) :	
	Front	1370
	Rear	1415
14.	Wheel base, mm	1950
15.	Total Operation Mass (kg) :	
	Front	730
	Rear	1380
	Total	2110

Testing & Training Center of Farm Machinery, College of Agricultural Engineering & Technology, Junagadh Agricultural University, Junagadh (Gujarat)

**Annexure-II**  
**Field Performance Results**

Place of Test: **Cattle Breeding Farm**

Sr.	Parameters	TEST TRIALS			
		I	II	III	IV
1	Date of Test	28/12/2018	01/01/2019	02/01/2019	03/01/2019
2	Duration of Test (h)	5.5	6.0	6.0	5.5
3	Gear used	A3			
4	Furrow length (m)	200	210	210	200
5	Type of soil	Medium black			
6	Bulk density of soil (g/cc)	1.66	1.66	1.65	1.65
7	Soil moisture (% , d.b.)	17.4	17.4	17.1	17.3
8	Av. forward speed (km/h)	2.8	2.7	2.5	2.6
9	Av. wheel slippage (%)	14.5	13.8	14.3	14.5
10	Av. depth of cut (cm)	20.0	22.0	21.0	20.5
11	Av. width cut (cm)	60.0	63.0	61.5	62.0
12	Area covered (ha/h)	0.144	0.144	0.131	0.137
13	Time required for 1 ha(h)	6.93	6.95	7.64	7.31
14	Field efficiency (%)	85.9	84.6	85.1	84.9
15	Soil inversion (%)	91.3	90.6	92.5	92.3
16	Fuel consumption (l/h)	4.26	4.36	4.25	4.30
17	Fuel consumption (l/ha)	29.52	30.30	32.48	31.42
18	Av. implement draft (kgf)	797	770	805	780
19	Power requirement (hp)	8.27	7.70	7.45	7.51

**Annexure-III**  
**Symbols and Abbreviations**



**A. Symbols assigned to basic SI units**

Sr.	Physical Quantity	Name of SI Unit	Symbol
1	Length	Meter	m
		Centimeter	cm
		Milimeter	mm
2	Mass	Kilogram	kg
		Gram	g
		Tonne	t
3	Time	Hour	h
		Minute	min
		second	S

**B. Symbols assigned to some derived units**

Sr.	Physical Quantity	Name of SI Unit	Symbol
1	Area	Square centimeter	cm <sup>2</sup>
		Square meter	m <sup>2</sup>
		Hectare	ha
2	Speed/Velocity	Meter Per second	m/s
		Kilometer per hour	km/h
3	Pressure	Newton per square milimeter	n/mm <sup>2</sup>
4	Time	Minute	min
		Hour	h
5	Volume	Cubic centimeter	cm <sup>3</sup>
		Mililitre	ml
		Litre	l

**C. Abbreviations**

Cl	:	Clause	Fig.	:	Figure
deg	:	Degree	kW	:	Kilowatt
IS	:	Indian Standard	N.A.	:	Not applicable
No.	:	Number	%	:	Percent
N.R.	:	Not Recorded	rpm	:	Revolution per minute
Ref.	:	reference	km/h	:	Kilometer per hour