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/ 1200 /2019
Junagadh. Date: 25/7 /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 15/09/2018

With reference to above cited subject and referred application for the testing of **THREE BOTTOM HYDRAULICALLY REVERSIBLE MOULD BOARD PLOUGH (TRACTOR MOUNTED) "SHREEJI-SAIL-777",** please find attached herewith the "Test Report" of the same.

Testing Incharge
and Professor & Head

Encl.: As above

COMMERCIAL TEST REPORT

No.: TTCFMJ/A/257/744

Date of Report: 25/07/2019

This Test Report valid up to Date: 24/07/2026

THREE BOTTOM HYDRAULICALLY REVERSIBLE MOULD BOARD PLOUGH (TRACTOR MOUNTED) "SHREEJI-SAIL-777"

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Name of machine	:	**Three Bottom Hydraulically Reversible Mould Board Plough (Tractor Mounted) "Shreeji-SAIL-777"**
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/257/744
Date of Release	:	**25/07/2019**
This Test Report valid up to Date	:	**24/07/2026**

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^2	98.067 kPa = 735.56 mm of Hg
		1 bar	100 kPa = 10 N/cm^2
		1 mm of Hg	1.3332 m-bar

CONTENTS

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	: Three Bottom Hydraulically Reversible Mould Board Plough
b)	Type	: Two way with Optiquick adjustment setting, Over load security, Height adjustable drawbar, Infinite angle adjustment
c)	Make	: Shreeji
d)	Serial Number	: Not provided
e)	Model	: SAIL-777
f)	Year of manufacture	: 2019
g)	No. of plough bottom(s)	: Three on each side
h)	Size of plough (mm)	: 3x330 (adjustable)
i)	Recommended source of power as per applicant	: Tractor (55 hp and above), Brief specification of tractor used is given in **Annexure-I**.

4.2 Constructional Details (Refer Fig. 1):

4.2.1 Frame:

a) Constructional details : Fabricated from tubular square pipe of Steel (Boron as per applicant) in size (90x90 mm) 1980 mm with a knuckle joint type fixture (150x80, 540 mm length) at front with two adjustable hexagonal screw of size 490 x38 mm Ø and 400x38 mm Ø for providing Optiquick Adjustment Setting for adjustment of width of cut. Standards are bolted to the frame. The frame is provided with provision to attach fourth bottom at rear. Hitch pyramid is bolted/welded to main shaft.

b) Dimensions (mm):
i Length : 1980
ii Width (front/rear) : 90/90
iii Number & size of holes on frame for fixing standard (mm) : 4 holes for standard (16.0 (2 nos.) and 21.0 (2 nos.) mm Ø)
c) Balancing weight : Not provided

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

a) Numbers : 3
b) Material : Steel (Boron as per applicant)
c) Type : Separate for both bottoms
d) Dimensions (mm)
- Projected length : 610
- Curved length : 620
- Width : 80 (middle) & 80 (tip)
- Thickness : 25.0
e) No., size & spacing of holes for fixing frog (mm) : 2 holes of (21.0 and 16.0 mm Ø spaced at 120 mm from each other.
f) No. & size of holes for fixing to the frame : 4 holes at each front, middle & rear, 2 holes (16.0 mm Ø) and 2 holes of (21.0 mm Ø).
g) Method of fixing : One end of standard is bolted to the frame whereas another end is bolted to the frog to which plough bottom is fixed. An adjustable hexagonal screw of size 525x30 mm Ø is bolted between standard and plow bottom to adjust throw of cut soil sliced (inversion).

4.2.3 **Plough Bottoms:**

a) Numbers : 6 (3 on each side)
b) Type : Fixed
c) Size of plough (mm) : 3x330
d) Vertical suction (mm) : 12-15 (adjustable)
e) Horizontal suction (mm) : 3-5
f) Constructional details : The adjustable type plough bottom consists of mould board, shin, share, share-bar, wing and landside bolted to the frog. It is provided with adjustable bolts (which is bolted to the frog) for the provision to vary the vertical suction.

4.2.3.1 **Mould Board:**

a) Numbers : 6 (3 on each side)
b) Type : General purpose
c) Material : Steel (Boron as per applicant)
d) Dimensions (mm):
- Length : 785
- Width : 380
- Thickness : 8.0
e) No & size of hole on mould board (mm) : 5 holes of 10.0/19.0 mm Ø at front, middle and rear (3 for bolting frog, 1 for bolting brace and 1 for wing)
f) Angle of inclination of MB along the direction of travel (deg.) : 22
g) Method of fixing mould board : Directly bolted to the frog with 3 sunk headed L-Key bolts & nuts.

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

a)	Numbers	:	6 (3 on each side)
b)	Type	:	TYPE-4 (as per IS:10691-1983) (Refer Fig. 3a)
c)	Dimensions (mm)	:	Steel (Boron as per applicant) plates of size 365x150x12
d)	No & size of holes on share (mm)	:	2, 12.5/25.0 Ø
e)	Method of fixing share to the bottom	:	Share is bolted to the frog with 2 sunk headed L-Key bolts of size 38.0x12.2 mm Ø.

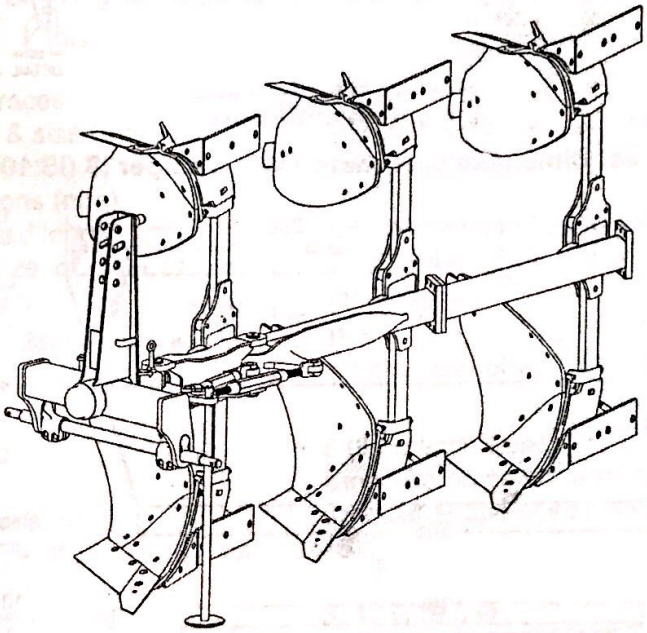


Fig. 1: Schematic View of Three Bottom Hydraulically Reversible Mould Board Plough

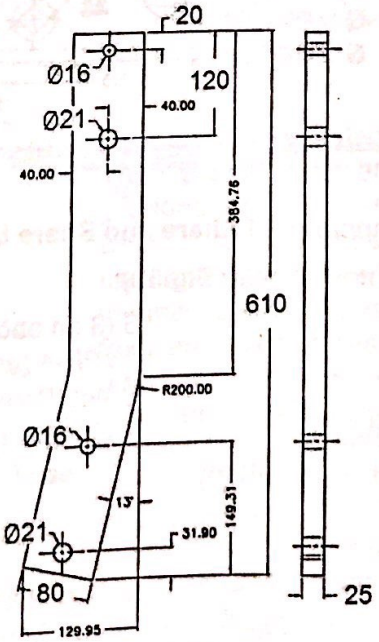
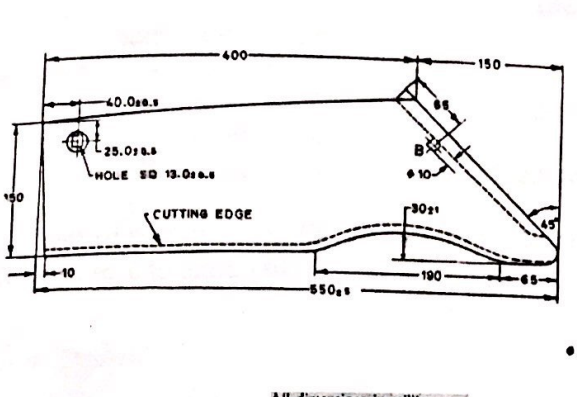


Fig. 2: Dimensions of Standard as observed



All dimensions in millimetres.

FIG. 4 TYPE 4 SHARE

Fig. 3a: Dimensions of Share TYPE-4 as per IS (IS:10691-1983)

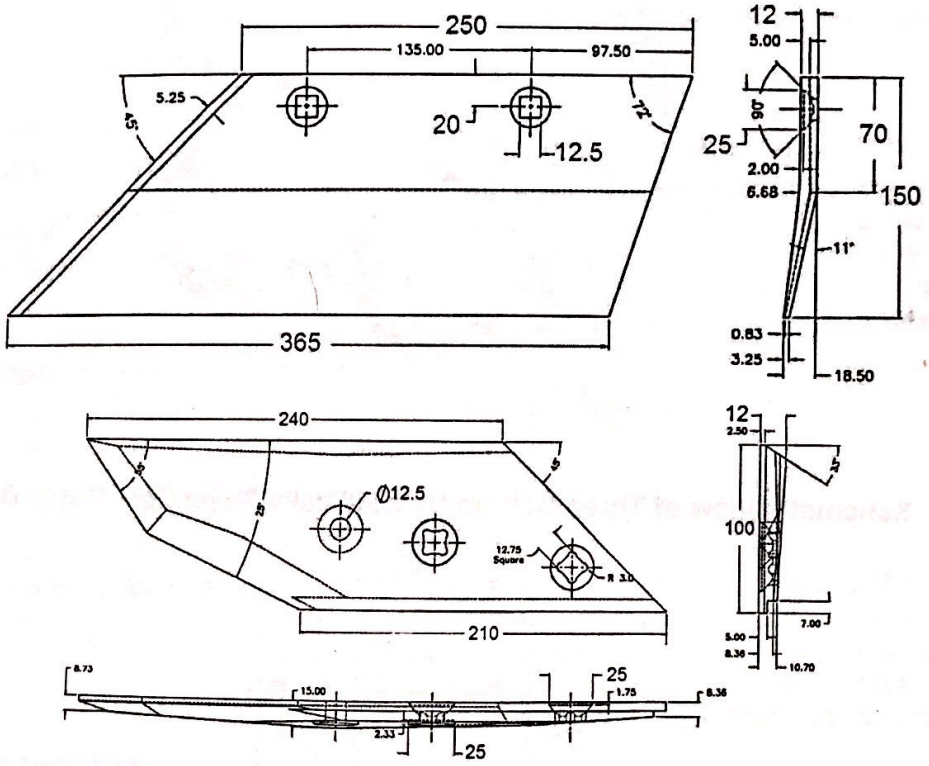


Fig. 3b: Dimensions of Share and Share bar (Share nose) as observed

4.2.3.3 **Share bar / Share nose (Refer Fig.3b):**

a)	Numbers	:	6 (3 on each side)
b)	Type	:	TYPE-4 (as per IS:10691-1983) **(Refer Fig. 3a)**
c)	Material	:	Steel (Boron as per applicant)
d)	Dimensions (mm)	:	240x100x12 (front/middle/rear)
e)	No & size of hole on Share bar for fixing on frog	:	3 holes of 12.5/25.0 mm Ø

4.2.3.4 **Shin of mould board:**

a)	Numbers	:	6 (3 on each side)
b)	Material & thickness (mm)	:	Steel (Boron as per applicant), 8 mm
c)	No & size of hole on shin for fixing on frog	:	3 holes of 10.0/19.0 mm Ø

4.2.3.5 **Landside:**

a) Numbers	:	6 (3 on each side)
b) Material	:	Steel (Boron as per applicant)
c) Dimensions (mm)	:	
- Length & Thickness	:	570x120x12 in 2-piece (front) & 680x120x12 in 2-piece (middle/rear)
d) No & size of hole on landside (mm)	:	5 holes (10.0/19.0 (2 nos.), 12.5/25.0 (3 nos.)) at front and 6 holes (10.0/19.0 (2 nos.), 12.5/25.0 mm Ø (4 nos.)) at middle/rear
e) Method of fixing landside to frog	:	Bolted to frog

4.2.3.6 **Braces:**

a) No. of braces	:	6 (3 on each side)
b) Material & size (mm)	:	Steel (EN-15 as per applicant), 550x30 Ø at front and rear
c) Dimensions (mm)		
- Projected length	:	525 (Front) and 525 (middle/rear)
d) No. & size of hole on each brace (mm)	:	2, 10.0 mm Ø on mould board, 12.5 mm 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 frog.

4.2.3.7 **Frog:**

a) Numbers	:	6 (3 on each side)
b) Material	:	Steel (Boron as per applicant)
c) Dimensions (mm)	:	Irregular shape of size 480x425x12
d) No. & size of holes on each frog (mm)	:	16
i -for mould board	:	3, 10.0/19.0 Ø
ii -for share	:	2, 12.5/25.0 Ø
iii -for standard	:	2, 16.0 Ø, 21.0 Ø
iv -for landside	:	4, 12.5/25.0 Ø
v -for shin	:	3, 10.0/19.0 Ø
vi -for share bar	:	2, 12.5/25.0 Ø

4.2.4 **Reversing Mechanism:**

a) Type	:	Hydraulically Operated
b) Mode of operation	:	The reverse mechanism is operated by a lever provided on the distributor. The hydraulic cylinder which is connected between the upper hitch point and cam enables the hitch pyramid to rotate 180° around the main shaft which is inserted in a hollow shaft, as its front end fixed to the hitch pyramid and rear end of main shaft is fixed to the main frame. When the implement is hitched to 3-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 **Main Shaft:**

a) Constructional details	:	The main shaft is fabricated from a Steel (EN-15 as per applicant) rod of size 360x55 Ø mm. The rear end is tightened to the main frame and front end is inserted in a hollow shaft of MS pipe (200x120/100 OD/ID mm) and supported by two taper roller bearings.

4.2.4.2 **Cam:**

a)	Material	:	MS flat
b)	Dimensions (mm)		
i	-Total Length	:	185
ii	-Effective length	:	150
iii	-Width	:	115
iv	-Thickness	:	25
v	-Size of cam pin (mm)	:	28 Ø, 65 length
vi	-Size of linch pin hole on cam pin	:	Ring lock provided

4.2.4.3 **Hydraulic Cylinder:**

a)	Type	:	Double acting
b)	Size of cylinder (mm)	:	265x60.0 Ø (OD)
c)	Size of piston (mm)	:	245x28 Ø
d)	Size of connecting arm (mm)	:	30/68 Ø (ID/OD)
e)	Stoke length (mm)	:	145

4.2.4.4 **Distributor:** :

a)	Type	:	Double acting (inbuilt with hydraulic cylinder)
b)	Overall Size (mm)	:	65x65x65
c)	No. and size of hose pipes between tractor and distributor (mm)		02, 1250x19 Ø (OD)

4.2.4.5 **Reversing Mechanism Lock** : Provided

4.2.5 **Hitch Pyramid:**

a)	Constructional details	:	The hitch pyramid is fabricated from two Steel flats (as per applicant) to form upper hitch point and a cross bar of Steel rod (40 mm Ø) to form lower hitch points which is bolted to sq. hollow pipe (100x100 mm, 650 mm length).
b)	Size of upper hitch (mm)	:	Box type fabricated from Steel flat 560x170x8 mm having box thickness 75 mm
c)	Size of Cross bar (mm)	:	Round (rod) type fabricated from Hardened Steel shaft (970x40 Ø) and holder of Steel (EN-8 as per applicant)

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

Sr.	Dimen. (Refer Fig. 4)	Description	Category-II	As observed	Remarks
Upper Hitch attachments					
1	-	Dia. of hitch pin	25.37-25.50	-	-
2	d_1	Dia. of hitch pin hole	25.70-25.90	25.40	Does not conform
3	b'_1	Width between inner faces of yoke	52.0 (Min)	55.68	Conforms
4	b'_2	Width between outer faces of yoke	86 (Max)	73.03	Conforms
Lower hitch points					
5	-	Dia. of hitch pin	27.80-28.00	28.12	Does not conform
6	D_2	Dia. of hitch pin hole	28.70-29.00	-	-
7	b'_3	Linch pin hole distance	49 (Min)	55.00	Conforms
8	l	Lower hitch point span	823.5- 826.5	825.00	Conforms
Other dimensions					
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

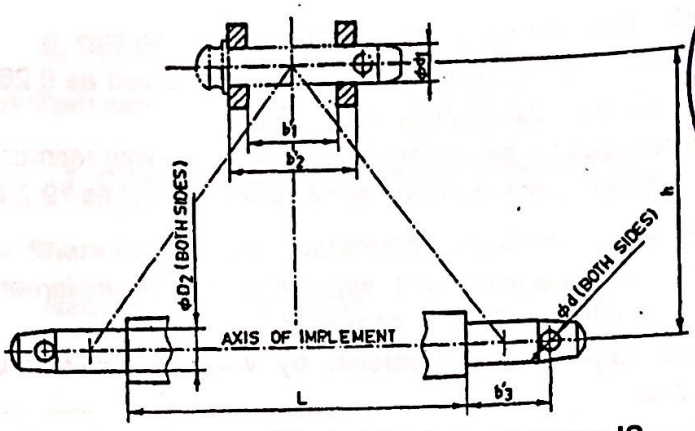


Fig. 4: Implement Hitch Attachment as per IS

4.3 Overall dimensions (mm) :

a)	Length	:	3060
b)	Width	:	1455
c)	Height	:	1485

4.4 Total mass (kg) : 550.0

4.5 Color of implement : Light Blue

5. FIELD PERFORMANCE TESTS

5.1 The plough was operated in the uncultivated land for 26.0 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)	1.61-1.64
3	Average soil moisture (%)	14.5-15.9
4	Average speed of operation (km/h)	3.2-3.6
5	Average wheel slippage (%)	13.0-14.8
6	Average depth of cut (cm)	26.0-30.0
7	Average working width (cm)	95.1-100.0
8	Area covered (ha/h)	0.264-0.282
9	Time required to cover 1 hectare (h)	3.55-3.79
10	Field efficiency (%)	79.2-84.6
11	Soil inversion (%)	92.6-94.7
12	Fuel consumption (l/h)	9.70-11.18
13	Fuel consumption (l/ha)	36.74-39.65
14	Av. implement draft (kgf)	1160-1220
15	Power requirement (hp)	14.63-15.77

5.1.1 **Rate of work:**

a) The rate of work in medium black soil was observed as 0.264-0.282 ha/h when the speed of operation varied between 3.2-3.6 km/h.

b) The time required for ploughing one hectare area was recorded as 3.55-3.79 h.

c) The field efficiency of the implement was worked out as 79.2-84.6 %.

5.1.2 **Quality of work:**

a) The depth of operation and working width of implement were measured as 26.0-30.0 and 95.1-100.0 cm respectively.

b) The percentage of soil inversion by weed count method was measured as 92.6-94.7 %.

5.1.3 **Draft requirement**

The implement draft was measured as 1160-1220 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 26.0 hours of operation	After 26.0 hours of operation	Per hour
Front-1	3402	3382	0.59	0.023
Front-2	3347	3338	0.27	0.010
Middle-1	3146	3128	0.57	0.022
Middle-2	3299	3281	0.55	0.021
Rear-1	3335	3320	0.45	0.017
Rear-2	3245	3231	0.43	0.017

Remark: The percentage hourly wear on mass basis was observed as 0.010-0.023 %.

5.1.5.2 **Share bar / Share nose:**

Share bar	Mass of Share bar (g)		Percentage of wear	
	Before operation	After 26.0 hours of operation	After 26.0 hours of operation	Per hour
Front-1	1910	1902	0.42	0.016
Front-2	1884	1876	0.42	0.016
Middle-1	2240	2227	0.58	0.022
Middle-2	1786	1775	0.62	0.024
Rear-1	1891	1880	0.58	0.022
Rear-2	2207	2196	0.50	0.019

Remark: The percentage hourly wear on mass basis was observed as 0.016-0.024 %.

5.1.6 **Ease of operation and adjustments:**

a) The implement can be leveled by adjusting the top link easily from the operator's seat.

b) 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.

c) 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 26.0 hour of operation of plough.

7. CONFORMITY TO INDIAN STANDARDS

Specifications for Share for Tractor-Operated Mould Board Plough (IS: 10681-1983):

Cl. No.	Requirements as per IS	Observation	Conformity to IS
1	2	3	4
3	**TYPES**		
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 4	Conforms
4	**MATERIAL**		
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 **Note:** The sulphur and phosphorus content shall not be more than 0.05 percent each.	C: 0.272 % Mn: 1.207 %	- -
4.2	The material of Share-bar (bar-point)/ Share nose shall be 40C8 or 55C8 of IS: 5517-1978. Carbon 0.70 to 0.80 percent Manganese 0.50 to 0.80 percent	C: 0.321% Mn: 1.432 %	- -
	The material of share and bar-point was got analyzed from Alpha Laboratory Services, Shapar (Veraval), Rajkot vide Test Report No. AS-52532/19 and AS-52526/19, Dt. 01/06/2019 respectively.		
5	**HARDNESS**		
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.	286-294 BHN (Share) 455-468 BHN (Share-bar)	Does not conform Does not conform
	The hardness of share and bar-point was determined from Alpha Laboratory Services, Rajkot vide Test report No. AH-7157/19 and AH-7151/19, Dt. 01/06/2019 respectively.		

6	**DIMENSIONS AND TOLERANCES**		
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 ± 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	**OTHER REQUIREMENTS**		
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.	1.0-1.5 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.	12.2 mm	Conforms
7.3	The shares shall be supplied with bolts in holes.	Supplied	Conforms
8	**WORKMANSHIP AND FINISH**		
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	**MARKING AND PACKING**		
9.1	The share shall be 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

1. The marking/ labeling plate should be provided as per IS.
2. 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.

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 share bar does not conform to IS and the chemical composition of the share and share bar does not conform to IS. This should be looked into. But, considering the percentage hourly wear on mass basis as 0.010-0.023 % (share) and 0.016-0.024 % (share-bar), the material is suitable for field operation.
5. The rate of work was recorded as 0.264-0.282 ha/h at corresponding forward speed of 3.2-3.6 km/h which is considered normal for three bottom mould board plough.
6. The depth of operation was recorded as 26.0-30.0 cm in the soil having 14.5-15.9 % average moisture, which is considered normal.
7. The average soil inversion by weed count method was recorded as 92.6-94.7 % which is considered normal for mould board plough.
8. 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 plough 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/ labeling 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.

Annexure-I

Brief specifications of the tractor used during field test

1.	Make, model and type	L&T John Deere 5310 Version – 2 (As per CFMTTI, Badni (MP) Test report No. T-511/993, Nov-2004) GJ-11M-6710
2.	Number of cylinders	3
3.	Maximum PTO power, kW	38.1
4.	Power at standard power take-off speed (540 & 1000 rpm) kW	37.9
5.	Engine speed corresponding to standard power take-off speed (rpm)	2422
6.	Rated engine speed, rpm	2400
7.	No load engine speed during field test (rpm)	800
8.	Drawbar power, kW	32.3
9.	Drawbar pull (kN) : Without ballast	18.2
	With ballast	23.1
10.	Type of wheel equipment	Pneumatic
11.	Number & size of tyre :	
	Front	6.50x20, 8 PR
	Rear	16.9x28, 12 PR
12.	Inflation pressure of tyres (kg/cm$^{2)}$	
	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	2050
15.	Total Operation Mass (kg) :	
	Front	730
	Rear	1380
	Total	2110

Annexure-II

Field Performance Results

Place of Test: **Cattle Breeding Farm**

Sr.	Parameters	TEST TRIALS			
		I	II	III	IV
1	Date of Test	12/06/2019	19/06/2019	20/06/2019	24/06/2019
2	Duration of Test (h)	6.50	6.00	6.50	7.00
3	Gear used	B1			
4	Furrow length (m)	200	200	200	200
5	Type of soil	Medium black			
6	Bulk density of soil (g/cc)	1.63	1.62	1.63	1.61
7	Soil moisture (%, d.b.)	15.8	14.6	15.9	14.5
8	Av. forward speed (km/h)	3.5	3.6	3.4	3.2
9	Av. wheel slippage (%)	14.8	14.1	13.0	14.2
10	Av. depth of cut (cm)	26.0	27.5	30.0	26.8
11	Av. width cut (cm)	98.3	95.1	100.0	96.3
12	Area covered (ha/h)	0.274	0.282	0.278	0.264
13	Time required for 1 ha(h)	3.65	3.55	3.60	3.79
14	Field efficiency (%)	79.2	81.7	80.8	84.6
15	Soil inversion (%)	94.6	92.6	93.8	94.7
16	Fuel consumption (l/h)	10.43	11.18	10.49	9.70
17	Fuel consumption (l/ha)	38.07	39.65	37.73	36.74
18	Av. implement draft (kgf)	1163	1173	1160	1220
19	Power requirement (hp)	15.14	15.77	14.76	14.63

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^2
		Square meter	m^2
		Hectare	ha
2	Speed/Velocity	Meter Per second	m/s
		Kilometer per hour	km/h
3	Pressure	Newton per square milimeter	n/mm^2
4	Time	Minute	min
		Hour	h
5	Volume	Cubic centimeter	cm^3
		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