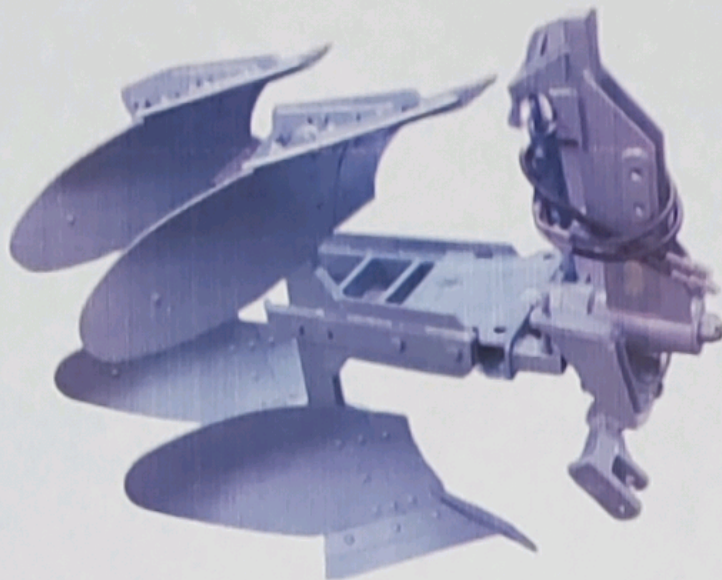


व्यावसायिक परीक्षण रिपोर्ट
COMMERCIAL TEST REPORT

संख्या / No.: 69/2021
माह / Month: November, 2022

THIS TEST REPORT ISSUED ON: 01 DEC 2022

THIS TEST REPORT VALID UPTO: 30 NOV 2029



**ANKITA IMPLEMENTS PVT.LTD. TRACTOR DRAWN
HYDRAULIC REVERSIBLE M.B. PLOUGH**



कृषि यांत्रिकीकरण प्रभाग
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69/2021	ANKITA IMPLEMENTS PVT.LTD. TRACTOR DRAWN HYDRAULIC REVERSIBLE M.B. PLOUGH	COMMERCIAL
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Manufacturer: M/s Ankita Implements Pvt.Ltd., K-37, Opp. CEAT Tyres, MIDC, Waluj, Pandharpur Aurangabad-431136

Applicant: M/s Ankita Implements Pvt.Ltd., K-37, Opp. CEAT Tyres, MIDC, Waluj, Pandharpur Aurangabad-431136

**ANKITA IMPLEMENTS PVT.LTD. TRACTOR DRAWN
HYDRAULIC REVERSIBLE M.B. PLOUGH**

Report No.: 69/2021

Month: November

Year: 2022



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Type of test	Commercial
Period of test	2022
Test Report No.	69/2021
This test report issued on	01 DEC 2022
This test report valid upto	30 NOV 2029

1. This test report should not be reproduced in part or full without prior permission of the Director, Central Institute of Agricultural Engineering, Nabi Bagh, 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 CONVERSIONS

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
	1kw	1.341 hp
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

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1. SCOPE OF TEST

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

1.1 LABORATORY TEST

- Checking of specifications
- Hardness of soil engaging parts
- Chemical analysis of critical components

1.2 FIELD TEST

- Rate of work
- Quality of work
- Labour requirement
- Ease of operation and adjustments
- Breakdowns and repairs

2. METHOD OF SELECTION

The sample is directly submitted by manufacture in Central Institute of Agricultural Engineering, Bhopal.

3. TEST PROCEDURE/TEST CODES

- i) IS 6288 : 1971 : Test code for Mould Board Ploughs
(Reaffirmed 1999)
- ii) IS 10691 : 1983 : Specification for share for Tractor-operated Mould Board
(Reaffirmed 2001) Ploughs
- iii) IS 4468 :1997 (Part-I) : Agricultural wheeled Tractors-Rear Mounted three point
(Reaffirmed 2012) linkage.

4. SPECIFICATIONS**4.1 General**

Manufacturer	M/s Ankita Implements Pvt. Ltd., K-37, Opp. CEAT Tyres, MIDC, Waluj, Pandharpur Aurangabad-431136
Name of machine	Tractor Drawn Hydraulic Reversible M.B. Plough (Two Bottom)
Type	Tractor Drawn
Make	ANKITA
Model	Pradhan Hydraulic
Year of manufacture	2022
Serial number	FK-4402
No. of plough bottom(s)	Two Bottom (Each Side)
Size of plough, mm	2020×1050×1340
Recommended source of power	Tractor 45 hp and above



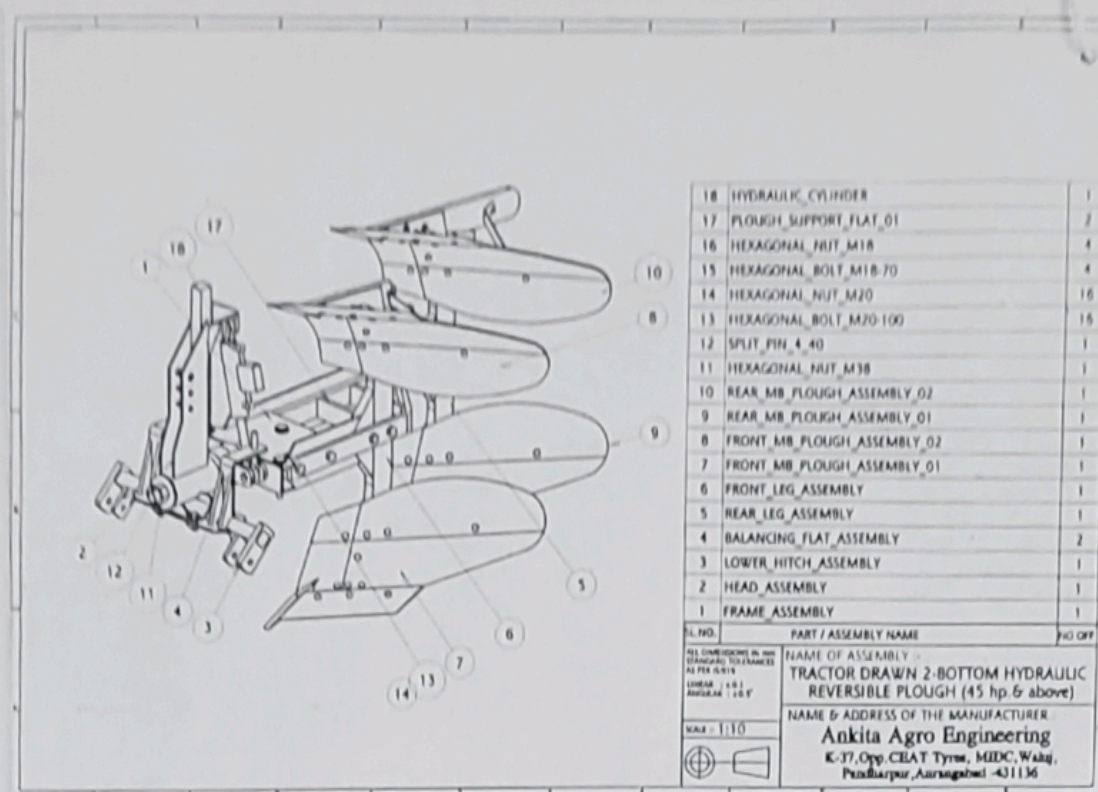


Fig. 1 Ankita Implements Pvt. Ltd Tractor Drawn Hydraulic Reversible M.B. Plough
(Two Bottom)

4.2 Prime mover used

Tractor	New Holland 3630
Chassis No./Engine No.	NHN36300ZFJ334016/169519DX
Max. PTO Power, kW (Ps)	41

4.3.1 Frame

1	Constructional details	A rectangular box fabricated by welded MS Plate.
2	Length, mm	307
3	Width, mm	285

4.3.2 Standard

1	Number	Two (One for each side)
2	Material	C-45
3	Dimensions, mm	
	Projected Length	1050
	Width	98
	Thickness	40
4	Method of fixing	Fixed with frame by nut & bolts.

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4.3.3 Plough bottoms

1	Constructional details	The plough bottoms consist of mould board, share, bar point and landside bolted and welded to the frog.
2	Numbers	Four (Two on each side)
3	Type	Reversible
4	Size of plough, mm	348×203×10
5	Vertical suction, mm	12
6	Horizontal suction, mm	10

4.3.4 Mould Board

1	Type	General purpose
2	Material	Mild steel
3	Dimensions, mm	
	Length	700
	Width	350
	Thickness	6.4
4	Angle of inclination of mould board along the line of travel, degrees	22 ⁰
5	Method of fixing	Mould board is bolted to the frog by countersunk bolt.

4.3.5 Share

1	Type	Bar point share
2	Material	C-45
3	Size, mm	Front 715×40×25 Rear 715×40×25
4	Method of fixing	Bolts & Nuts.



4.3.6 Landside

1	Number	Four (Two for each bottom)	
2	Material	Mild Steel	
3	Dimensions, mm	Front	Rear
	Length	445	615
	Width	70	105
	Thickness	25	25
4	Method of fixing	Landside is welded to the frog	

4.3.7 Heal of landside

1	Number	---
2	Material	---
3	Size, mm	---
4	Method fixing	---

4.3.8 Braces

1	Number	FOUR
2	Material	MS
3	Size, mm	ISF 40×8×550
4	Method of fixing	Bolts & Nuts.

4.3.9 Frog

1	Numbers	Four (one for each bottom)
2	Material	Mild steel
3	Construction details	It is fabricated from MS plate of thickness 10mm (Body Plate & 12mm Vert. Plate) in irregular shape. All the components of plough bottom are bolted & welded on the frog.

4.3.10 Reversing Mechanism

1	Type	Hydraulic
2	Mode of operation	With the help of hydraulic jack and control valve

4.3.10.1 Main shaft

1	Constructional details	Cutting turning and threading & Heat Treatment
2	Method of fixing	Bush, pin and nut
3	Cross section, mm	φ75×690



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4.3.10.2 Hydraulic cylinder

1	Single/double acting	Double acting
2	Length of cylinder, mm	280
3	Diameter of piston rod, mm	28
4	Outer diameter of the cylinder	62.0
5	Capacity of cylinder, cm ³	412
6.	Working pressure, bar	330
7	Hose diameter, mm	19.0
8	Hose length, mm	1095

4.3.11 Hitch Pyramid

Constructional Details: Profile cutting, drilling and welding.

Specifications of Hitch pyramid

Dimension (See Fig.)	Description	As per IS: 4468(Part- I):1997 (Cat-I/Cat-II) mm	As measured (Cat-II) mm	Remarks
Upper hitch attachments				
d ₁	Diameter of hitch pin hole	19.3 to 19.5/ 25.7 to 25.9	26.0	Does not conform
b' ₁	Width between inner faces of yoke, Min.	44.5/52	54.1	Conforms
b' ₂	Width between outer faces of yoke, Max.	69/86	76.9	Conforms
Lower hitch points				
D ₂	Diameter of hitch pin	21.8 to 22.0/ 27.8 to 28.0	22	Conform
b' ₃	Linch pin hole distance, min	39/49	105	Conforms
l	Lower hitch point span	683±1.5/825±1.5	683	Conform
Other dimensions				
d	Diameter for linch pin - for upper hitch pin, min -for lower hitch pin, min	12/12 12/12	10 10	Does not conform Does not conform
h	Mast Height	460±1.5/ 610±1.5	565	Does not conform



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4.3.12 Overall dimensions

1	Length, mm	1810
2	Width, mm	1140
3	Height, mm	1330

4.4 Labelling plate

Name and address of manufacturer	:	Ankit Implements Pvt. Ltd.
Type	:	Two Bottom
Size	:	2020X1050X1340
Make	:	ANKITA
Model	:	Pradhan Hydraulic
Serial no.	:	FK-4402
Required size of prime mover, (hp)	:	
Year of manufacture	:	2022
Country of origin	:	
Weight, (kg)	:	450

4.5 Mass of implement, kg: 450

4.6 Colour of Implement: Olive Green

5. Running-in

The implement was initially operated in the test plot of ICAR-Central Institute of Agricultural Engineering, Bhopal for running in for about 1 hrs to check the initial working and any breakage etc, if any.

6. Laboratory test

6.1 Hardness of the different soil engaging components of M.B. Plough

Component	As per IS: 10691-1983	As observed	Conformity to IS
Share	350-450 HB	355 HB	Conforms
Share bar	350-450 HB	358 HB	Conforms
Mould board	350-450 HB	362 HB	Conforms



6.2 Chemical composition of the share material

Sl. No.	Element	Standard Requirement As per IS:10691-1983	As observed (%)	Conformity to IS
1.	Carbon	0.70-0.80	0.72	Conforms
2.	Silicon	0.10-0.35	0.19	Conforms
3.	Manganese	0.50-0.80	0.61	Conforms
4.	Sulphur	0.050 (max.)	0.013	Conforms
5.	Phosphorous	0.050 (max.)	0.023	Conforms

7. Field Performance Test

The plough was operated in the black cotton soil of Research Farm, ICAR-Central Institute of Agricultural Engineering, Bhopal. The soil consists of 12.6% sand, 32.7% silt and 54.7% clay. The average moisture content of the soil at the time of operation in the field was recorded as 13.5%. The average bulk density of the soil was 1560 kg/m³. Total three test trials were conducted. The results have been summarized in Table 1 and 2. Tractor (New Holland 3630) was used as a prime mover for field operations of M.B. plough.

Table 1: Field conditions during field testing of machine

Sl. No.	Parameters	Range
1.	Type of the soil	Black Cotton Soil (12.6% sand, 32.7% silt and 54.7% clay)
2.	Moisture content, % db	13.5 (10.9-14.8)
3.	Appearance of the field	Leveled with minor crop and weeds residue cover
4.	Size of the plot, ha	0.33
5.	Bulk density of the soil, kg/m ³	1560 (1490-1613)
6.	Power source	Tractor New Holland 3630
7.	Gear used	III rd low
8.	Engine speed, rpm	1450

Table 2: Field performance results of tractor operated two bottom hydraulic reversible M.B. Plough

Sl. No.	Parameters	Range
1.	Average speed of operation, (i) m/sec (ii) km/h	0.70 (0.60-0.80) 2.5 (2.2-2.9)
2.	Width of cut, mm	600 (580-640)



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3.	Average depth of cut, mm	230 (200-260)
4.	Effective field capacity, ha/h	0.13 (0.11-0.16)
5.	Field efficiency, %	83.0 (80.0-85.0)
6.	Time required for ploughing one hectare area, hours	7.7 (6.25-9.1)
7.	Breakage or maintenance noticed in the implement	Nil
8.	Average wheel slip, %	18 (15-20)
9.	Mean weight diameter of the inverted soil, mm	45.81(43.38-46.24)
10.	Fuel consumption	
	(i) l/h	4.2-4.5 (4.4)
	(ii) l/ha	33.8-40.1 (27.3)

Rate of work

- The rate of work was observed as 0.11 to 0.16 ha/h at the speed of operation varied from 2.2 to 2.9 km/h.
- The field efficiency of the implement was worked out to be 80.0 to 85.0%.

Quality of work

- The depth of operation and average working width of implement was measured as 200 to 260 mm and 600 mm, respectively.

Labour requirement

- One skilled operator is required to operate the equipment.

8. Ease of Operation and Adjustment

- 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.
- The plough can be easily reversed with the help of direction control valve lever.

9. Defects, Breakdowns and Repairs

- No breakdown was observed during approximately 25 hours of operation.

10. Summary of Observations, Comments and Recommendations.

- The average actual field capacity of the implement was found to be 0.13 ha/h.
- Labeling plate provided should be as per requirement of critical technical specification.



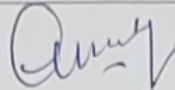
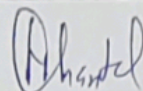
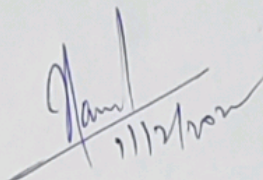
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- Some of the dimensions of the three point hitch does not conform fully to requirement of IS: 4468(Part-I):1997 (Reaffirmed in 2012). It is recommended that the same should be provided conforming to the relevant Indian Standards.

11. Adequacy of Literature

- Operator's manual, service manual and parts catalogue were not provided, it should be prepared and supplied with equipment.

12. Testing Authority

Dilip Jat	Scientist and Test Engineer	
N. S. Chandel	Sr. Scientist and Testing Authority	
Head, Agricultural Mechanization Division	Head, Agricultural Division, ICAR-Central Institute of Agricultural Engineering, Bhopal	 11/12/2021 HEAD कृषि यंत्रिकीकरण विभाग Agricultural Mechanization Division केंद्रीय कृषि अभियांत्रिकी संस्थान Central Institute of Agricultural Engineering नाबिबाग भोपाल (म.प्र.) 462038 Nabibagh Bhopal (M.P.) 462038

13. Applicants Comment, if any

- No specific comments have been received from the manufacturer.