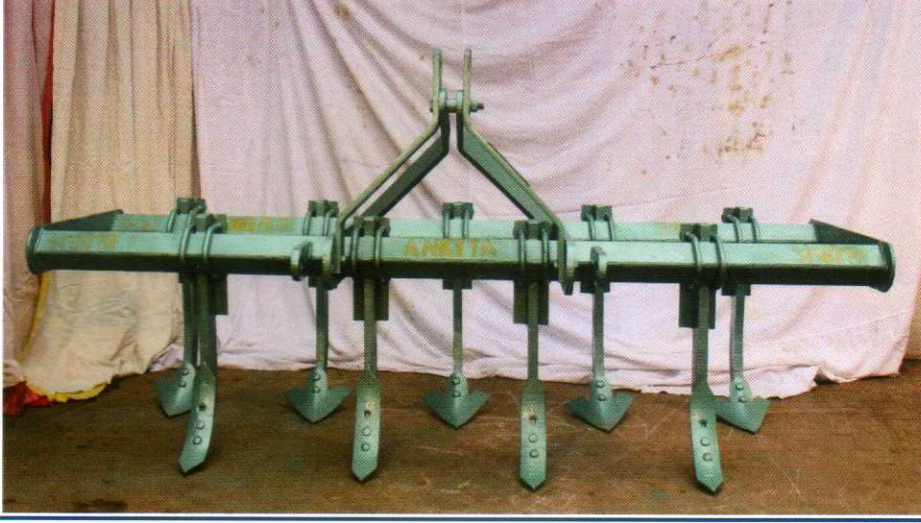


NO. FIM /MPKV/IMPL. NO. /217/ 2019

MONTH: DECEMBER, 2019

COMMERCIAL TEST REPORT

This test report valid up to 10/12 /2026



**Ankita 9 Tyne U-Clamp Cultivator
(Tractor Mounted) [Commercial]**



सत्यमेव जयते

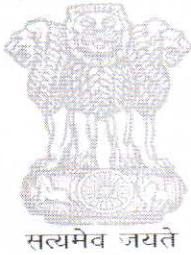


**Farm Machinery Testing and Training Centre,
All India Coordinated Research Project on
Farm Implements and Machinery,
Dr. Annasaheb Shinde College of Agricultural
Engineering and Technology,
Mahatma Phule Krishi Vidyapeeth
Rahuri, Dist. Ahmednagar 413 722 (M.S.)**

COMMERCIAL TEST REPORT

Test Report No.	Name of the Machine/Implement, Model No.	Month	Year
FIM/ MPKV/ IMPL. NO/ 217 / 2019	Ankita 9 Tyne u-clamp Cultivator (Tractor Mounted) [Commercial]	December	2019

This test report valid up to 10 / 12/ 2026



**Farm Machinery Testing and Training Centre,
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Dr. Annasaheb Shinde College of Agricultural
Engineering and Technology
Mahatma Phule Krishi Vidyapeeth
Rahuri, Dist. Ahmednagar - 413 722 (M.S.)**

Telephone: (02426) 243 219

Fax No.: (02426) 243 326

Email: fimmpkv@gmail.com

(The Institute is approved Testing Centre by Department of Agriculture & Cooperation, Ministry of Agriculture, GOI Vide Letter No. 8-1/2004-M&T (I&P) dated June 17, 2013 and subsequent letters)

Type of Test	: COMMERCIAL
Name of machine	: Ankita 9 Tyne u-clamp Cultivator (Tractor Mounted) [Commercial]
Test Code Referred	: IS: 7565 (Part-I) (Reaff. in Dec.-2004) : Tynes for tractor operated cultivators: Part 1 Rigid tines; IS: 4468 (Pt-I)-1997 (Reaffirmed in 2012) : Agricultural wheeled tractors-Rear mounted three point linkage. IS: 3342-1998 : Soil working equipment -cultivators, animal drawn -specification
Test requested by	: M/S Ankita Agro Engineering, K- 37, MIDC Waluj, Phone No.0240-2552341/9422737939 Dist.:- Aurangabad, Pin- 431136 Maharashtra
Testing Authority	: All India Coordinated Research Project on Farm Implements and Machinery, Dr. Annasaheb Shinde College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar 413 722 (M.S.)
Period of test	: October 2019 to December 2019
Validity period	: This test report valid up to 10/12/2026

1. This Test Report should not be reproduced in part or full without prior permission of the Testing Authority.
2. The data given in the Test Report pertains to the 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

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 Kg/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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7	CONFIRMITY TO INDIAN STANDARD	12
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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
- Wear analysis of critical components
- Chemical analysis of critical components

1.2 FIELD TEST:

- Rate of work
- Quality of work
- Power requirement
- Ease of operations and adjustments
- Labour requirement
- Defects, Breakdowns and Repairs

2 METHOD OF SELECTION

The machine was selected by Random Sampling method.

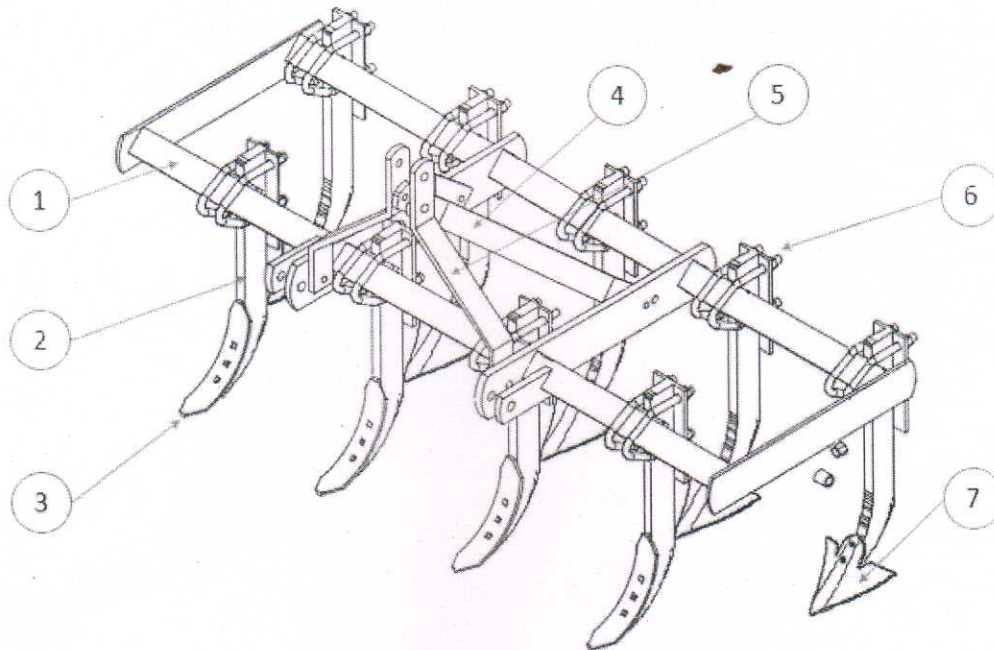
3 TEST PROCEDURE

The implement was tested in accordance with the relevant BIS test codes,

- | | | |
|--|---|---|
| IS: 7565 (Part-I)
(Reaffirmed in Dec.-2004) | : | Types for tractor operated cultivators: Part 1
Rigid tines. |
| IS: 4468 (Part-I) - 1997
(Reaffirmed in 2012) | : | Agricultural wheeled tractors-Rear mounted three
point linkages. |
| IS: 3342-1998 | : | Soil working equipment -cultivators, animal
drawn -specification |

4 SPECIFICATIONS

4.1	General:	
	Name of Implement	: Ankita 9 Tyne u-clamp Cultivator (Tractor Mounted)
	Name of Manufacturer	: M/s. Ankita Agro Engineering
	Name of Applicant & Address	: M/s Ankita Agro Engineering K- 37, MIDC Waluj, Dist. Aurangabad, (M.S.), India. Tel.: 0240 2552341 Mob.: 9130016507/9422737939
	Type	: Tractor Mounted
	Make	: ANKITA
	Model	: ANKITA
	Serial number	: DD372/2019
	Year of manufacture	: 2019
	Power source as recommended, hp	: 35 hp & Above
4.2	Prime mover used:	
	Tractor	: Mahindra 575 Di (Sarpanch)
	Engine No.	: C0552117RI
	Chassis No.	: NKJB03890
	Max. PTO Power, HP	: 39

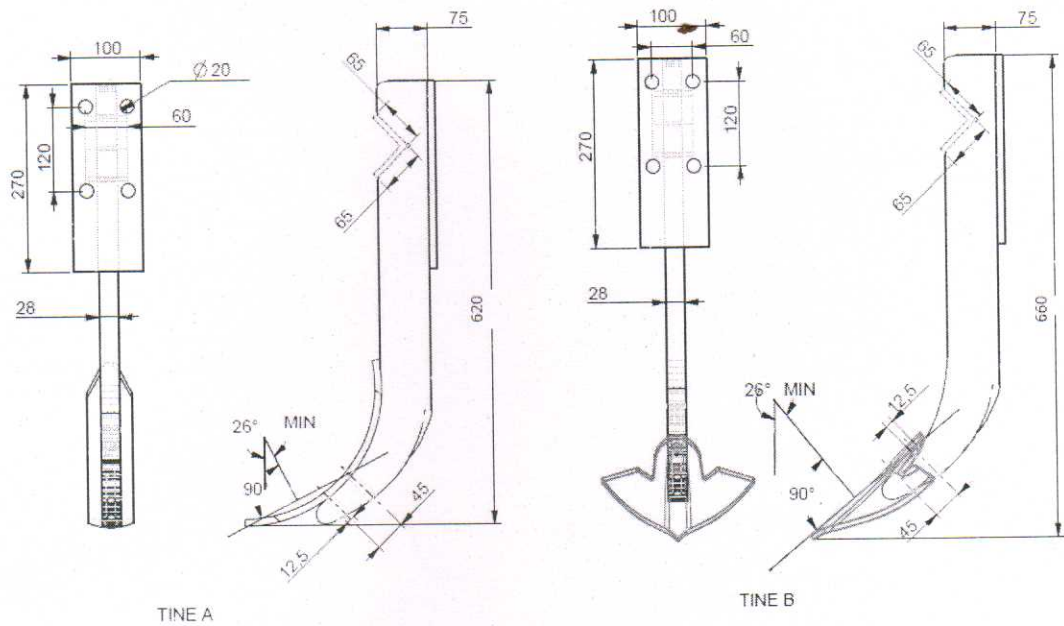


1. Main Frame	2.Tyne	3.Reversible Shovel	4,5 Three Point Linkage	6.U Clamp	7. Duck foot Shovel
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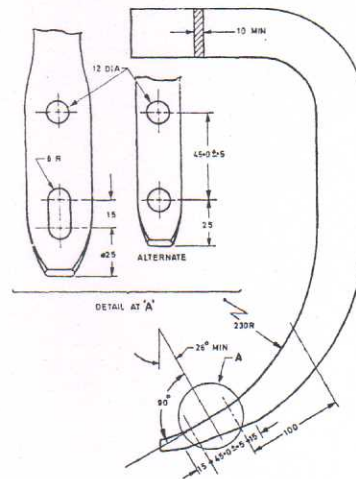
**Fig.1: Schematic View of Ankita 9 Tyne u-clamp Cultivator
(Tractor Mounted)**

4.3	Main Frame (Refer Fig 1):	
4.3.1	Constructional Details - Trapezoidal, two flats of size 700 x 125 x 10 are welded on two square Angle Boxes of size 1980 x 70 x 70 at both ends. Two Main Supports of size 800 x125 x20 are welded at middle for lower hitch points.. Same frame is used for all the attachments. Clamps are provided for attaching tines on the frame.	
4.3.2	Tyne (Refer Fig. 2):	
	Numbers	: 09
	Type	: Rigid Type
	Arrangement on main frame	: Front row- Four Tynes Rear row- Five Tynes

Material	:	Mild steel
Size, (mm)	:	Front Tyne - 620 x75x28 Rear Tyne - 660 x 75x 28
Center to center distance between two Tynes, (mm)	:	Front Tyne - 450 mm Rear Tyne- 450 mm
Number and size of hole for fixing shovel to tyne	:	Two on each Tyne, size- 12.5 mm
Method of fixing	:	Each tyne is fixed with U clamp on mainframe.
Provision for adjusting the spacing of tyne	:	Provided
Provision for height adjustments	:	Not Provided



Tyne (A)



All dimensions in millimetres.
FIG. 1 RIGID TYNE

Tyne (B)

Fig. 2: Dimensions of Tyne (A) As Observed & Tyne (B) As Per IS (mm)

4.3.3 Shovel (Refer Fig. 3):

Numbers : 9

Type	:	Front- Reversible Shovel Rear - Sweep shovel
Material	:	MS
Size, mm	:	310X65X5.69
Thickness	:	5.69
No. & size of holes on each shovel point for fixing to tyne, (mm)	:	Provided
Method of fixing	:	Each shovel fitted on tyne with help of nut and bolts

Fig. 3. Specification of shovel as per IS:6023-1970 (Specification of reversible shovels)

Sr. No.	Notations	Dimensions (mm)		Conformity to IS
		As per IS	As measured	
1	A	270±2	310	Does Not Conform
2	B	75±2	65	Does Not Conform
3	C	35±1.6	34.70	Conform
4	D	15±0.5	15	Conform
5	E	45±0.25	45	Conform
6	a	45±5 degree	45	Conform
7	P	10 to 20 degree	17	Conform
8	Counter Sunk Bolt	12 mm	12	Conform
9	Beveled cutting edge	10 mm	10	Conform
10	Thickness	4/5/6 mm±5%	5.69	Conform

4.4	Hitch Pyramid:	
	Material	: Mild Steel
	Size (mm)	: 770 mm × 2 and 540 mm × 2

Specification of Hitch Pyramid As per IS: 4468 (Pt-I)-1997: (Reaffirmed in 2012)
(Refer Fig . 4)

S. No.	Notations	Specifications	Dimension (mm)		Remarks
			As per IS	As measured	
1.	Upper hitch points (Cat. II):				
	d ₁	Diameter of hitch pin hole	19.3+0.2	19.5	Conforms
	b' ₁	Width between inner surfaces of yoke, (Min)	44.5	45	Conforms
	b' ₂	Width between outer surfaces of yoke, (Max)	69.0	77	Does Not Conforms
2.	Lower hitch point (Cat. II):				
	D2	Diameter of hitch pin	22 ±0.2	22.5	Conforms
	b' ₃	Linch pin hole distance (Min)	39.0	85	Conforms
	L	Lower hitch point span	683± 1.5	684	Conforms
3.	Other dimensions:				
	d	Diameter for linch pin hole			
		For upper hitch pin, (Min)	12	12	Conforms
		For lower hitch pin, (Min)	12	12	Conforms
h	Mast height	460±1.5	460	Conforms	

IS 4468 (Part 1) : 1997

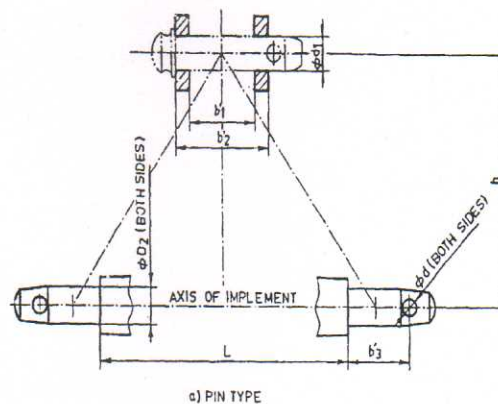


Fig. 4 Dimensions of Three Point Hitch Pyramid

4.5	Overall Dimensions, (mm): (Refer Fig . 5)	
	Length	: 1985 mm
	Width	: 1300 mm
	Height	: 1050 mm
	Mass, (kg)	: 238 kg
	Colour	: Green

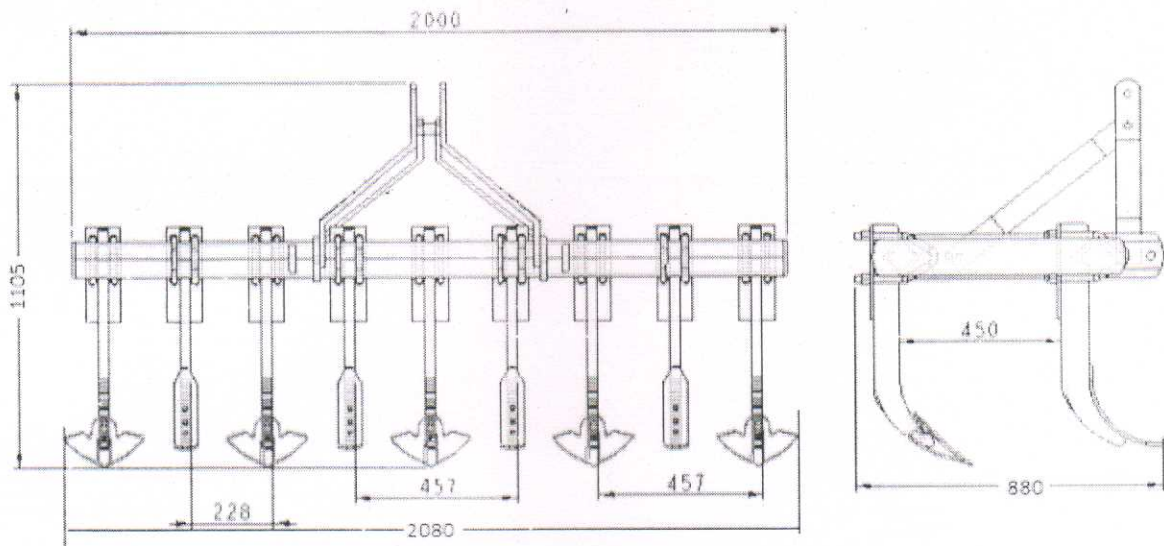


Fig. 5 Overall Dimensions of Nine Tyne Cultivator

1. CONFORMITY TO INDIAN STANDARD

Cl. No.	Requirement as per IS	Results as observed	Remarks
Cl.1.0	Material IS:6638-1990		
Cl.1.1	Frame (Mild Steel) IS:226-1969	Mild Steel	Conforms
	Tyne (Carbon Steel) IS:1570-1961	Mild Steel	Does not Conforms
	Hitch (Mild Steel) IS:226-1969	Mild Steel	Conforms
	Hitch Pin (Carbon Steel)	Carbon Steel	Conforms

	Steel)IS:1570-1961		
Cl.2	Size		
Cl.2.1	Working size: The working size of the cultivator shall be determined by multiplying the number of tynes and row spacing expressed in m.	9 x 2.025	Conforms
Cl.2.1.1	When the tynes are fitted at minimum spacing it will be designated as minimum working size. Recommended minimum working sizes for 7, 9, 11 and 13 tined cultivators shall be 1.05, 1.35, 1.65 and 1.95 m respectively.	NA 9 tyne, 0.225 m	--
Cl.2.1.2	Nominal Size — The nominal size of the cultivator shall be determined by multiplying the number of spaces between rows and row spacing and expressed in m.	9 x 0.225	Conforms
Cl.3	DIMENSIONAL REQUIREMENTS		
Cl.3.1	The row spacing between two tynes shall be adjustable from 150 to 250 mm preferably in steps of 25 mm.	Adjustable	Conforms
Cl.3.2	The contact angle of the shovel with tyne shall be declared. The deviation of this angle shall be	Not Declared	Does not Conforms

	not more than $\pm 3^\circ$ of the declared angle.		
Cl. 4	OTHER REQUIREMENTS		
Cl.4.1	The frame shall be rigid and strong	Rigid and Strong	Conforms
Cl.4.2	The number of tines shall be 7, 9, 11 or 13.	9	Conforms
Cl.4.3	The two tool bars of equal length and size shall be provided.	Equal	Conforms
Cl.4.4	While fixing the shovel to the tine, ensure that the shovel bolts are flush with the surface of the shovel.	Shovel bolts are flush with the surface of the shovel.	Conform
Cl. 5	FINISH AND WORKMANSHIP		
Cl.5.1	All components of the cultivator should be free from pits, burrs and other visual defects.	Satisfactory	Conforms
Cl.5.2	The welding of various parts shall be satisfactory in all respects (see 7.1 of IS : 822-1970§).	Satisfactory	Conforms
Cl.5.3	The exposed metallic parts shall be free from rust and shall have a protective coating which will prevent surface deterioration in transit and storage.	Oil Painted	Conforms
Cl.6	MARKING AND PACKING		
Cl.6.1	Marking		

	<p>Each cultivator shall be marked with the following particulars:</p> <p>a) Manufacturer's name and trade-mark, if any;</p> <p>b) Maximum size and number of tines; and</p> <p>c) Batch or code number.</p>	Provided	Conforms
		Provided	Conforms
		Provided	Conforms
Cl.6.2	These particulars shall be stamped, engraved or embossed on metallic plate rigidly attached on a non-wearing part of the cultivator.	Metallic Plate Rigidly Attached	Conforms
Cl.6.3	The cultivator should be packed to ensure safety of the components in transportation as agreed to between the purchaser and the supplier.	Provided	Conforms

5. LABORATORY TEST

5.1 Hardness: The surface hardness of Single point headed Shovel was recorded as under: -

Sr. No	Hardness (HB)		Conformity to IS
	As per IS: 3342-1998	As observed	
1	The shovel and sweep shall have hardness in the range of 350 to 450 HB (see IS:1500) when tested upto a distance of 50mm from the cutting edge	Shovel=299.67 Sweep=117	Does not Conforms

5.2 Chemical composition: - A piece of shovel was analyzed for its chemical Composition.

The results of chemical analysis are given as under: -

Constituents	As per IS: 6023-1970 (% of weight)	Composition as observed (% of weight)	Remarks
Carbon (C)	0.70-0.80	0.6104	Conforms
Manganese (Mn)	0.50-0.80	0.7988	Does not Conforms
Sulphur (S)	0.050 Max	0.0130	Conforms
Phosphorous (P)	0.040 Max	0.0111	Conforms

* Material conformed to SAE9260

6. FIELD PERFORMANCE TEST**SUMMARY OF FIELD PERFORMANCE TEST.****Table 1: Summary of field performance for Dry land operation**

Sr. No.	Parameters	Dry land operation	
i)	Tractor used	Mahindra 575 Di (Sarpanch)	
ii)	Type of soil	Medium Black	
iii)	Gear used	L -3	
iv)	Av. Soil moisture (%)	14.0- 16.0	
v)	Bulk density of soil (g/cc)	1.28-1.35	
vi)	Field efficiency (%)	76.27-83.72	
vii)	Av. Speed of operation (kmph)	3.68 – 4.021	
viii)	Av. Depth of cut (mm)	12.76 – 14.38	
ix)	Av. Working width (cm)	195.4-197.4	
x)	Area covered (ha/h)	0.554 – 0.629	
xi)	Wheel Slippage (%)	3.50– 4.77	
xii)	Time required for one hectare (h)	1.589 – 1.80	
xiii)	Fuel consumption		
		l/h	3.60 – 3.90
		l/ha	5.78 – 7.03

6.1 Rate of Work

- The rate of work in medium soil was recorded as 0.554 – 0.629 ha/h at the forward speed of 3.68 – 4.021 kmph respectively.
- The time required to cover one hectare area was recorded as 1.589 – 1.80 hour.

6.2 Quality of work

- The depth of tilled was recorded as 12.76 – 14.38 cm.
- The field efficiency was recorded as 76.27-83.72 percent.

6.3 Power requirement: The draft requirement was recorded as 330-345 kgf and the power requirement was calculated as 4.57 – 5.09 Hp.

6.4 Wear Analysis:

6.4.1 On mass Basis-

Table 3: Wear of shovels on mass basis

Sr. No	Initial mass of shovels	Final mass of shovels after 29.5 hr	% wear loss of shovels after 29.5 hr	Hourly % wear loss of shovels
Reversible shovels				
1	1431	1403	1.95	0.066
2	1427	1396	2.17	0.073
3	1429	1392	2.58	0.087
4	1428	1395	2.31	0.078
Sweep shovels				
1	1482	1443	2.63	0.089
2	1481	1438	2.90	0.098
3	1479	1444	2.36	0.080
4	1474	1435	2.64	0.089
5	1474	1433	2.78	0.094

Remark: The hourly percentage wear of shovel on mass basis were recorded as 0.066 to 0.098 .

6.5 Ease of Operation & Adjustments:

- The tractor can adjust and control the implement easily.
- No specific problem was observed in maneuvering the tractor and implement combine.

7. DEFECTS, BREAKDOWNS AND REPAIRS

No breakdowns were observed during the course of operation.

8. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS

8.1 The dimension of shovel not fully conforms to IS: 3342-1998. It should be looked into at regular production level.

8.2 The hardness of shovel and sweep were recorded as 299.17 HB and 117 HB respectively against the requirement of 350 – 450 HB this should be looked in to.

- 8.3 Some dimensions of three point linkage does not conforms to the dimensions as given IS: 4468 (Part I): 1997 for cat. 1 /cat. 2. These may be fabricated as per relevant IS standard at regular production level.
- 8.4 The field performance of the implement was satisfactory.
- 8.5 The rate of work was recorded as 0.554 – 0.629 ha/h at the forward speed of 3.68 – 4.021 kmph.
- 8.6 The depth of operation was recorded as 12.76 – 14.38 cm and width of operation was recorded as 195.4-197.4 cm which is considered normal for such operations.
- 8.7 The hourly percentage wear of shovels on mass were 0.066 to 0.098 percent. The hourly rate of wear of shovels is considered normal.
- 8.8 Overall performance of the implement was found satisfactory.
- 8.9 Adequacy of literature: Operator's Manual in Marathi was supplied with test sample. The literature was found adequate. The literature may also be brought out in other vernacular languages for the guidance of users.
- 8.10 This test report valid up to 10/12/2026**
As per office memorandum no 13-24/2018-M&T(I&P) From Additional Commissioner (Machinery), Department of Agriculture, Cooperation and Farmers Welfares, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi.



9. TESTING AUTHORITY

1.	<p>V.D. Deshmukh Assistant Professor, AICRP on Farm Implements and Machinery, Dr. A. S. College of Agricultural Engineering & Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri</p>	
2.	<p>T. B. Bastewad Professor and Principal Investigator, AICRP on Farm Implements and Machinery, Dr. A. S. College of Agricultural Engineering & Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri</p>	
3.	<p>S. M. Nalawade Head, Department of Farm Machinery and Power, Dr. A. S. College of Agricultural Engineering & Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri</p>	

Test report compiled by **Er. R.R. Gurav**, Technical Assistant, FMTTC, AICRP on FIM, Dr. ASCAET, MPKV, Rahuri.



10. APPLICANT'S COMMENTS:

A) Hitch pyramid.

Width between outer faces of yoke will be maintained as per BIS recommendation in future.

B) Hardness and chemical composition of shovel and sweep will be improved as per BIS recommendation in future.

C) We will provide the literature in vernacular languages for the guidance of users in future.

Annexure - I
FIELD PERFORMANCE RESULTS

Place of Test: At khandewadi, chitegaon, patoda, dist. Aurangabad

Sr. No	Parameters	Test trials			
		I	II	III	IV
1	Date of test	05.10.2019	06.10.2019	07.10.2019	09.10.2019
2	Duration of test (h)	7.50	7.50	7.00	7.50
3	Gear used	L-3			
4	Furrow length (m)	248	240.7	212	238
5	Type of soil	Medium Black			
6	Bulk density (g/cc)	1.30	1.35	1.28	1.35
7	Soil moisture (%)	15.60	15.7	16.0	14.0
8	Previous treatment	Ploughed Land			
10	Forward speed (km/h)	3.90	3.83	3.68	4.02
11	Wheel slip (%)	4.13	3.50	4.77	3.96
12	Engine speed, rpm	No load		2000	2000
		On load		1740	1700
13	Av. depth of cut (cm)	13.68	13.28	12.76	14.38
14	Av. width of cut (cm)	196.6	196.4	197.4	195.4
15	Area covered (ha/hr)	0.608	0.629	0.554	0.621
16	Time required for one ha (hr)	1.64	1.589	1.80	1.60
17	Field efficiency (%)	79.06	83.72	76.27	79.31
18	Fuel consumption (l/h)	3.70	3.8	3.9	3.60
19	Fuel consumption (l/ha)	6.08	6.041	7.03	5.78
20	Power Requirement, hp	4.77	4.89	4.57	5.09