



**“MULTISPEED” ROTAVATOR-7 FEET  
FIELD EMPEROR (FIELD KA ASLI KING)**

**TESTED AT**

**STATE LEVEL FARM MACHINERY TRAINING AND TESTING  
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(The Institute is approved Testing Centre by Department of Agriculture & Cooperation, Ministry of Agriculture, GOI vide letter no. 8-1/2004-My (I&P) dated September 14,2010 and subsequent letters)

**THIS TEST REPORT VALID FROM 05.05.2022 TO 04.05.2029**

Test Report No.	Name of the Machine/Implement, Model No.	Month	Year
IMP- 2011/358	“MULTISPEED” ROTAVATOR-7 FEET FIELD EMPEROR (FIELD KA ASLI KING)	MAY	2022



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Type of test	:	COMMERCIAL
Name of machine	:	“MULTISPEED” ROTAVATOR-7 FEET FIELD EMPEROR (FIELD KA ASLI KING)
Test Code referred	:	IS: 11531-1995 (Reaffirmed) Test code for Puddler. IS: 4468- 2007 (Pt.-I)-Agricultural wheeled tractors- Rear mounted three point linkage. IS: 4931-1996 (Reaffirmed)-Technical requirements for Power Take-Off shaft of Agricultural Tractors. IS: 6690-1996 (Reaffirmed)-Blades for Rotavator and Power Tillers.
Test requested by	:	M/S. AGRICO INDUSTRIED VILLAGE- SULTANPUR,SAHAPUR, GONDA ROAD - BARABANKI, U.P.-255001
Testing Authority	:	STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, RAHMANKHERA, HARDOI ROAD LUCKNOW, U.P. - 227107
Period of test	:	MARCH 2021 TO MAY 2022

1. This Test Report should not be reproduced in part or full without prior permission of the Incharge Testing Centre.
2. The data given in the Test Report pertain 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

S. No	Units	Conversion Factor
1	<b>Force</b>	
	1 kgf	9.80665 N
		2.20462 lbf
2	<b>Power</b>	
	1 hp	1.01387 metric hp (Ps)
		745.7 W
	1 Ps	735W
	1 kW	1.35962 Ps
3	<b>Pressure</b>	
	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

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### 1. SCOPE OF TEST

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

- i) Specification
- ii) Hardness & chemical analysis of material of rotavator blades
- iii) Field performance under dry and wet land condition with regard to
  - a) Rate of work
  - b) Quality of work.
  - c) Ease of operation, maintenance & adjustments.
  - d) Wear of soil engaging components.

### 2. TEST PROCEDURE / CODES

- i) IS: 11531-1995 ( Reaffirmed) Test code for Puddler
- ii) IS: 4468-March 2007 (pt.-I)-Agricultural wheeled tractors-Rear mounted three point linkages.
- iii) IS: 4931-1996 (Reaffirmed)-Technical requirements for power take-off shaft of Agricultural Tractors.
- iv) IS: 6690-1996 (Reaffirmed)-Blades(s) for rotavator and power tillers.

### 3. METHOD OF SELECTION

The test sample was directly submitted for test by the applicant at the Institute.

### 4.SPECIFICATION

<b>4.1</b>	<b>General</b>		
	Name of manufacturer/applicant	:	M/S. Agrico Industries Village- Sultanpur,Sahapur, Gonda Road - Barabanki, U.P.-255001
	Type	:	Tractor Mounted Multispeed Rotavator-7 Feet.
	Make	:	AGRICO INDUSTRIES
	Model	:	7 Feet Multispeed Rotavator Field emperor-FB0S 1075.
	Year of manufacture	:	2021
	Serial No.	:	1794
	Tractor horse power required	:	42 and above
	Type of blade	:	Hatched ( L- shape )
	Working width of implement, mm	:	1730
<b>4.2</b>	<b>PRIME MOVER USED</b>		
	Tractor	:	Four wheel, two wheel drive general purpose agricultural tractor
	Make & Model	:	Mahindra 605 DI
	Chassis no	:	N8M04311
	Max. PTO Power Kw	:	37.8
	Year of manufacture	:	2018

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<b>4.3</b>	<b>CHASSIS</b>		
	Type	:	M. S. Flat
	Size of pipe, mm	:	2125× 60 × 60
	Size of supporting flat, mm	:	615×105× 10
	Type of mounting of pipe	:	Fixed to side support with the help of nuts and bolts of size 34.50 × 12.8 × 1.5 mm
<b>4.3.1</b>	<b>SIDE SUPPORT</b>		
	Type	:	M.S. Plate
	Thickness of plate, mm	:	8.0
	Method of fixing	:	Fixed to the frame with nuts bolts of size 34.12 × 14.5 × 1.5 mm and welded with chassis frame
<b>4.3.2</b>	<b>SHIELD ( COVER )</b>		
	Type	:	M.S. sheet fabricated
	Curved width, mm	:	525
	Thickness of sheet, mm	:	4.0
	Method of mounting	:	Welded with supporting plate of chassis
<b>4.4</b>	<b>TRAILING BOARD</b>		
	Type & material	:	M.S. sheet supported with M.S. flate
	Size of board, mm	:	2310 × 510
	Thickness of sheet, mm	:	3.5
	Locking system	:	03 Clamps welded to chassis frame. The board is held in position by locking the fixing bracket through spring loaded rod.
	Method of mounting plate sector	:	Welded to flate of chassis frame
	Type of hinge	:	M.S. bush
	No. of hinges	:	2
	Method of fixing	:	One M.S. rod is passing through M.S. bush and fixed at both the end with main chassis frame.

<b>4.5</b>	<b>ROTOR SHAFT</b>		
	Material	:	M.S. pipe
	Type of rotor axle	:	Tabular section with disc flanges for mounting the blades
	Size of shaft, mm	:	Length : 1960 Dia : 89
		:	
	No. of flanges	:	9
	Type of flange	:	M.S. circular plate
	Dia of flange, mm	:	241
	Thickness of flange, mm	:	12.0
	No. of blades on each flange	:	7×6 and 2×3

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	Method of mounting blades on flanges	:	Each blade is mounted with the help of two nos. of bolts and nuts Size of bolt (35 × 13 × 1.5) mm
	Distance of between two flanges, mm	:	245
	Total no. of blades	:	48
	Dia of rotor with blades, mm	:	410
	Method of fixing	:	Rotor shaft is bolted with hubs on both ends. These hubs are centrally mounted with two ball on each end.
<b>4.5.1</b>	<b>Rotor Blade :</b>		
	Number	:	48
	Type	:	Hatched ( L-shape)
	Material	:	High Carbon steel
	Overall thickness, mm	:	7.15
	Thickness at the beveled edge, mm	:	2.70
	Length of the beveled edge, mm	:	10.70

<b>4.6</b>	<b>Depth of control mechanism</b>		
<b>4.6.1</b>	<b>Skid</b>		
	Type & Material	:	Curved shape, M.S. double flat
	Size, mm	:	630×50×10 &640×50×10
	No. of skid	:	02
	Method of fixing	:	Skid is bolted to side plate and adjusting rack at the front & rear side respectively with the help of bolt & nut. Size of bolt (34.60 × 13.40 × 1.5) mm
<b>4.6.2</b>	<b>Adjusting Rack</b>		
	Type	:	M.S. flat
	Size, mm	:	200 × 50 × 10
	No. and size of locking bolt, mm	:	02 in each and size 39× 63.40 × 2.5
	Range of depth adjustment, mm	:	76.0
	Method of fixing	:	M.S. flat is fixed to upper end of the skid and lower end to the side support on both sides. This is fit to side plate with nut and bolts Size is (39.45.× 15.57× 1.5)

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4.7 Three point linkage ( cat.-II) ( Refer fig.1)				
Sl. No.		As per IS:4468-2007 (pt.- I), mm	As measured, mm	Remarks
I	<b>Upper hitch points</b>			
(a)	Diameter of hitch pin (A)	25.27 to 25.40	25.38	Conforms
(b)	Diameter of hitch pin hole(B)	25.70 to 25.91	25.80	Conforms
(c)	Width between outer faces of yoke (E)	86 (max.)	74.50	Conforms
(d)	Width between inner faces of yoke (F).	52(min)	64.0	Conforms
(e)	Linch pin hole distance(D)	93 (min)	102	Conforms
II	<b>Lower hitch points</b>			
(a)	Dia of hitch pin	27.79 to 28.0	28.10	<b>Does not conform</b>
(b)	Linch pin hole distance (K)	49 (min.)	98.21	Conforms
III	<b>Diameter of linch pin hole for</b>			
(a)	Upper hitch pin (L)	12(min)	12.8	Conforms
(b)	Lower hitch pin	12(min)	12.25	Conforms
IV	<b>Mast height (M)</b>	510 (min.)	560	Conforms
V	<b>Lower hitch point span (N)</b>	823.5 to 826.5	810(but adjustable)	Conforms

4.7.1 Mast	
Type	: M.S. plate and flate fabrication
Size of flat (mm)	: 715 × 65 × 12 & 550×65×12
Shape	: Pyramid

4.8 Power transmission system:	
Method of transmission	: Propeller shaft receives drive from PTO and transmits power to rotary shaft through two gear reduction units, primary and secondary, consisting of gear reduction respectively.

4.8.1 Dimensions power input shaft (Ref. Fig. 2)			
Notation	As per IS:4931-1996, mm	As observed, mm	Remarks
D $\phi$	34.79 ± 0.06	34.76	Conforms
d $\phi$	28.91 ± 0.05	28.90	Conforms
S	8.69 (max.)	8.65	Conforms
R	6.7 ± 0.25	6.5	Conforms
á	30 °	30°	Conforms
Q	7.0	7.0	Conforms
H	38.0	34.86	<b>Does not conform</b>
A	54.0 (min)	51.85	<b>Does not conform</b>
B	76.0 (min.)	64.42	<b>Does not conform</b>



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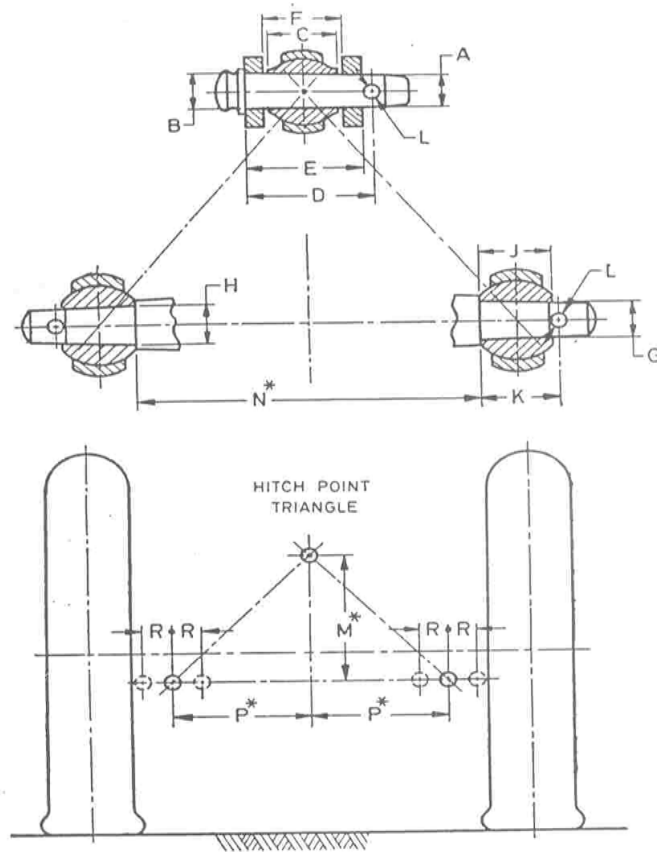


FIG. 1. DIMENSIONS OF HITCH POINTS

Fig.:1 Dimension of Hitch Points

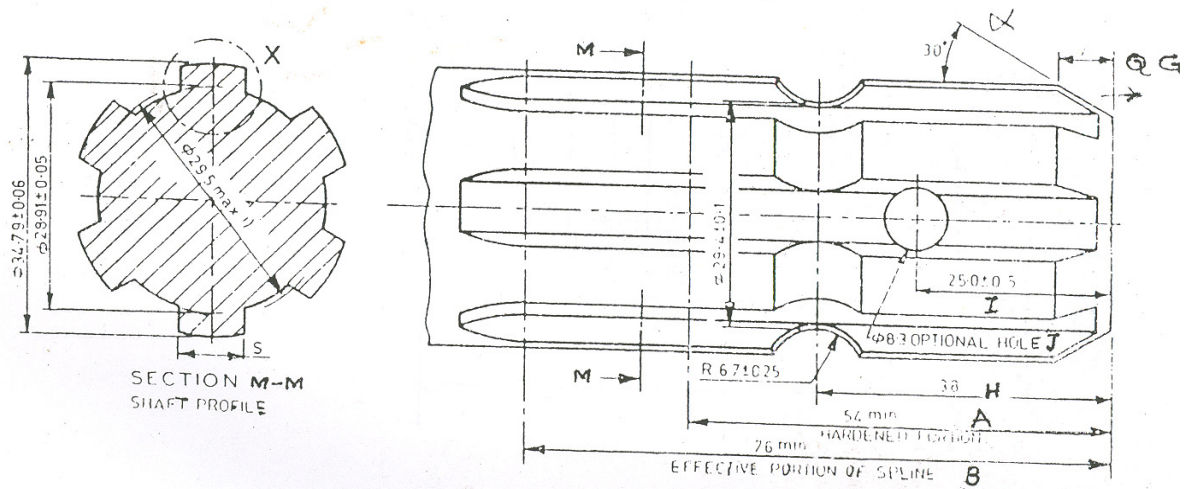


Fig. 2: Dimensions of Rotavator Power Input Shaft, mm

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<b>4.8.2</b>	<b>Gear box Assembly ( primary reduction )</b>		
	Type	:	Bevel pinion gear
	No. of teeth on pinion	:	11
	No. of teeth on bevel gear	:	22
	Reduction ratio at gear box	:	1:0.25
	Oil capacity, l	:	4
	Oil change period	:	After every 200 hours
	Recommended grade of oil	:	EP- 140
	Length of power transmission shaft, mm (from gear box to secondary reduction unit)	:	880
	Dia. of shaft, mm	:	48
	No. of bearing	:	05- Tapper roller bearings (Two-30207 & 30210,30219,32207) .
<b>4.8.2.1</b>	<b>Gear drive ( secondary reduction )</b>		
	Type	:	Gear drive
	No. of teeth drive gear	:	21
	No. of teeth driven idler spur gear	:	36
	No. of teeth driven spur gear	:	28
	Reduction ratio at gear box	:	1:0.27
	Oil capacity, l	:	3.0
	Recommended grade of oil, apa	:	EP-140
	Oil change period, h (apa)	:	200
	Provision for oil level checking	:	Provided
	Provision for dipstick/breather	:	Breather Provided
	No. of bearing	:	04- Tapper roller Two 30207, & One 30208 and One ball bearings 6309 on rotor shaft.
<b>4.8.3</b>	<b>Propeller shaft</b>		
	Type	:	Telescopic (in two segments having 6 spline at both ends
	Length of shaft, mm	:	
	-- Minimum	:	730
	-- Maximum	:	1010
	Mass of shaft, kg	:	17.960
	Provision for locking	:	Spring loaded locking pins on both side are provided.

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4.8.3.1 Propeller shaft insert dimensions ( Ref. Fig.3 )			
Notation	As per IS:4931-1996 (mm)	As observed (mm)	Remarks
D $\phi$	34.93 $\pm$ 0.03	34.90	Conforms
d $\phi$	29.7 $\pm$ 0.1	22.76	<b>Does not conform</b>
W	8.69 (min)	8.70	Conforms
B	54.0 (min)	55	Conforms

4.8.4	Safety clutch/device	:	Provided
4.9	Rotavator Stand	:	Provided
4.10	Furrow wheel	:	Provided

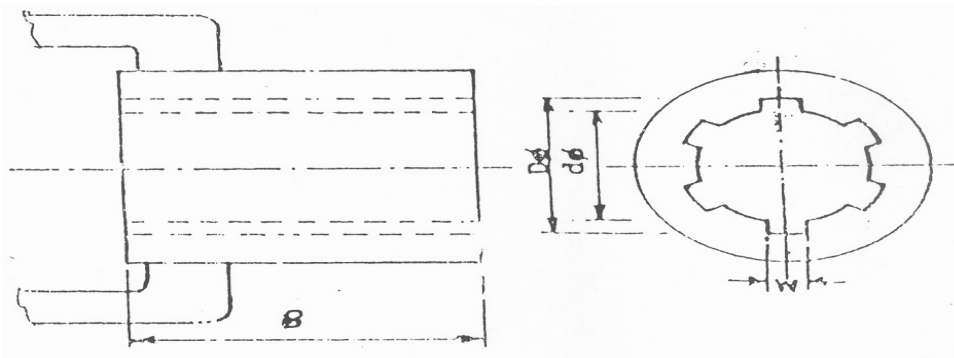


Fig. 3: Propeller Shaft Insert Dimensions, mm

Overall Dimensions (Ref. Fig.4)		
Length, mm	:	1100
Width, mm	:	2600
Height, mm	:	1040
Mass, kg	:	540 (apa)

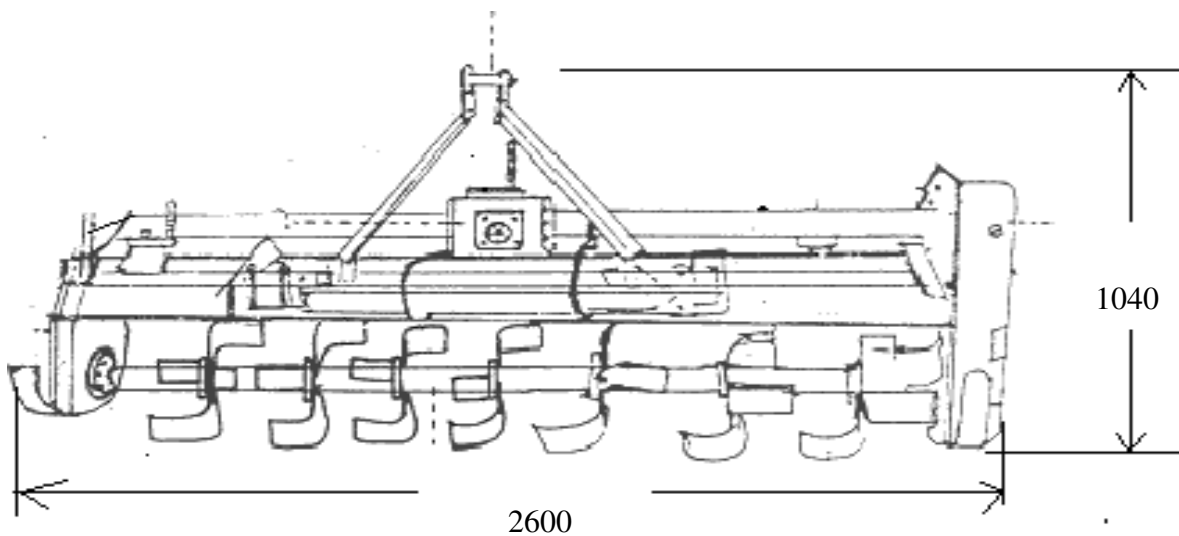


Fig. 4: Overall Dimensions of Rotavator, mm

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## 5. LABORATORY TEST

5.1 The hardness of blades was determined at edge portion. The results of hardness test are tabulated in Table-I.

**TABLE-1**

Hardness as observed (HRC)	As per IS:6690-1996 (Reaffirmed) (HRC)	As observed	Remark
Blade Edge portion	53±3	52.5,53.2,54.5	Conforms

## 5.2 Chemical composition

The chemical composition of blades is tabulated in Table-2

**TABLE- 2**

Sl. No.	Material	Requirement as per IS:6690-1996 (% by weight )	As observed (% by weight)	Remark
1.	Carbon (C)	0.50 to 0.60	0.28	<b>Does not Conform</b>
2.	Silicon (Si)	1.50 to 2.0	0.26	<b>Does not Conform</b>
3.	Manganese (Mn)	0.50 to 1.0	1.30	<b>Does not Conform</b>
4.	Sulphur (S)	0.05 (max.)	0.038	Conforms
5.	Phosphorous (P)	0.05 (max.)	0.034	Conforms

## 6. FIELD PERFORMANCE TEST

The field tests of the implement comprising of dry and wet land operation were conducted for 20 and 15 hour each in different land conditions to assess the performance of the implement. The details of tractor used for field operations are given in annexure I. The performance of implement is reported in Annexure-II and summarized in Table-3.

### Summary of field performance

**TABLE-3**

Sl.No.	Parameters	Dry land operation	Wet land operation
i	Tractor used	Mahindra 605 DI	
ii	Type of soil	Sandy loam	
iii	Av. Soil moisture, %	19.5 to 21.5	--
iv	Av. Depth of standing water, cm	--	10.66 to 11.00
v	Puddling Index, %	--	80 to 85
vi	Av. Speed of operation, kmph	3.48 to 3.75	3.86 to 4.09
vii	Av. Depth of cut/depth of puddle, cm	64.28 to 72.05	3.86 to 4.09
viii	Av. Working width, cm	1.88 to 1.97	--
ix	Area covered, ha/h	0.45 to 0.49	--
x	Time required for one hectare, h	2.04 to 2.22	--

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xi	Field Efficiency,%	64.28 to 72.05	--		
xii	Fuel consumption, - l/h - l/ha	4.500 to 4.800	4.000 to 4.100		
		9.540 to 10.212	--		
<b>6.1</b>	<b>Rate of Work</b>				
<b>6.1.1</b>	<b>Dry land operation</b>				
	-The rate of work in sandy loam soil was recorded as 0.45 to 0.49 ha/hand the forward speed as 3.48 to 3.75 kmph.				
	-The time required to cover one hectare area was recorded as 2.04 to 2.22h.				
<b>6.1.2</b>	<b>Wet land operation</b>				
	-Speed of operation varied from 3.86 to 4.09 kmph.				
<b>6.2</b>	<b>Quality of work</b>				
<b>6.2.1</b>	<b>Dry land operation</b>				
	-The depth of operation was recorded as 10.4. to 10.8 cm.				
	-The field efficiency was recorded as 80. to 85 %.				
<b>6.2.2</b>	<b>Wet land operation</b>				
	-Depth of puddle was recorded as 10.5.to 10.6 cm.				
	-Puddling index was recorded as 80 to 85%.				
<b>6.3</b>	<b>WEAR OF BLADES</b>				
<b>6.3.1</b>	<b>On Mass basis</b>				
	Wear of hatchet blades on mass basis after 35.0 h of field operation is tabulated in Table-4.				
<b>TABLE-4</b>					
Sl.No.	Initial mass of blade, g	Mass after 35.0 h of operation	Loss in mass		Wear / h (%)
			g	%	
1.	1020	990	30	2.94	0.08
2.	980	940	40	4.08	0.11
3.	960	915	45	4.68	0.13
4.	1000	975	25	2.50	0.07
5.	980	952	28	2.85	0.08
6.	995	957	38	3.81	0.10
7.	1000	960	40	4.00	0.11
8.	985	960	25	2.53	0.07
9.	990	955	35	3.37	0.70

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6.3.2 On Dimensional basis								
S.No.	Initial width at,mm		Width after 35 h.of operation		Wear ,mm		Wear in %	
	1.	77.23	81.95	69.42	76.25	7.81	5.70	10.00
2.	78.15	81.25	74.12	78.12	4.03	3.13	5.15	3.85
3.	77.62	79.82	74.10	75.10	3.02	4.72	3.92	5.91
4.	76.30	80.47	73.15	74.12	3.05	6.35	4.00	7.98
5.	78.20	81.17	74.65	76.69	3.55	5.00	4.53	6.25
6.	76.07	79.80	68.17	73.16	7.90	6.64	10.38	8.32
7.	77.60	81.76	69.90	77.12	7.70	4.62	9.92	5.65
8.	77.20	79.02	74.00	75.10	3.02	4.72	3.42	3.91
9.	7820	81.17	74.15	76.63	3.53	5.09	4.45	6.25

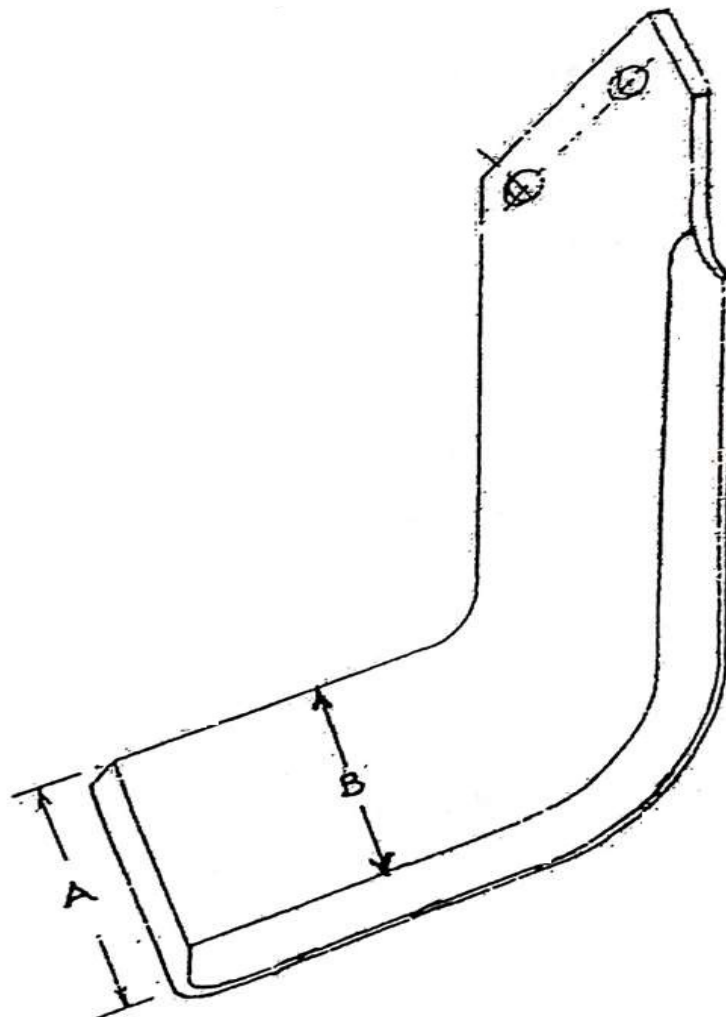


Fig. 5: Dimensions for Wear Analysis (L-Type hatched Blade)

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## **7.0 EFFECTIVENESS OF SEALINGS**

After completion of field test in wet land operation for 15.0 hr. The implement was dismantled for checking effectiveness of sealing provided against ingress of dust and water/mud in various sub-assemblies and also to check the conditions of components of the Rotavator.

<b>Sl. No.</b>	<b>Location</b>	<b>Whether ingress of mud and/or water was observed</b>
1.	Primary reduction gear box.	No
2.	Secondary reduction gear; drive	No
3.	Hub of rotor assembly	No

## **8.0 EASE OF OPERATION, ADJUSTMENTS & SAFETY**

- 8.1 Neither the implement nor the drive the shaft (universal coupling shaft) is provided with any safety clutch/device.
- 8.2 The propeller shaft has telescopic sections with universals joints, to adjust the length of drive shaft which is adequate.
- 8.3 Depth adjustment can be made by raising or lowering the skids.
- 8.4 Implement have provision to vary rotor shaft speed by gear the different soil and moisture conditions.

## **9. DEFECTS, BREAKDOWNS AND REPAIRS**

- 9.1 No breakdown occurred during 35 hr. operation in the field.

## **10. COMMENTS & RECOMMENDATIONS**

- i) The dimensions of three point linkage system are not conforming to the requirement of As per IS:4468-2007 (pt.- I) (mm) the standard three point linkage system conforming to BIS should be used at regular production level.
- ii) Maneuverability of tractor with rotavator was found to be satisfactory. The quality of work was observed to be satisfactory.
- iii) The percentage wear of hatchet blades on dimensional basis during field operation (35.0 hr) ranged from 2.50 to 4.68 which is normal. The percentage wear of hatched blade on dimensional basis during field operation (35.0 hr ) ranged from 3.42 to 10.38 % and 3.85 to 8.32 % respectively at Tip and at 65 mm from edge.
- iv) Dimensions of power input & corresponding propeller shaft hub have not been provided as per reuirements of As per IS:4931-1996 (mm) form the standardization point of view and interchangeability of comonents provision of input and propeller shaft as per the standard specification is necessary. It may be corrected at the production level before the commencing sale of the rotavators.
- v) Arrangement should be made to permanently display the quality and parameters obtained in the test in all commercially manufactured (agriculture machines by putting engraved seals or plates) on the machines, so that the farmers can get proper information about the quality of the equipment.

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**11. LITERATURE :**



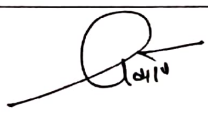

The specification of the implement operating manual, maintenance, safety instruction and spare parts catalogue provided in English. The literature developed is found to be adequate for the guidance of user and service personal. However, it need to developed (as per IS: 8132: 1999) in other regional languages.

**12. APPLICANT COMMENTS:**

No Comments Received;

This report is being issued with the condition that the tested implement will be rectified as per recommendation and comments given by the Institute and applicant respectively and after rectification the implement should be manufactured on commercial basis.

**TESTING AUTHORITY**

(UPENDRA KUMAR) -SENIOR TECHNICAL ASSISTANT-	
(ANAND CHAUDHARI) -TEST ENGINEER-	
(JIWAN PRAKASH) -ASSOCIATE PROFESSOR – ENGG.	
(DR. PRAMOD KUMAR GUPTA) -ADDITIONAL DIRECTOR-	
(DR. PANKAJ TRIPATHI) - DIRECTOR-	



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**ANNEXUR- 1**

**BRIEF SPECIFICATIONS OF THE TRACTOR USED DURING FIELD TEST**

1	Make, model and type	Mahindra 605 DI
2	Number of cylinders	4
3	Maximum PTO power, Kw	33.8
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	37.5
5	Rated engine speed, rpm	2100
6	No load engine speed during field test, rpm	1900
7	Drawbar power, Kw	37.8
8	<b>Drawbar pull, kN :</b>	
	- Without ballast	34.5
	- With ballast	27.9
9	Type of wheel equipment	Pneumatic
10	<b>Number &amp; size of tyre :</b>	
	Front	7.50-16-(8PR) Two
	Rear	16.9-28. (12PR) Two
11	<b>Standard track width, mm :</b>	
	- Front	1290
	- Rear	1545
12	Wheel base, mm	2140
13	Ballast condition	un -ballast
14	<b>Total Operational Mass, kg :</b>	
	- Front	950
	- Rear	1415
	- Total	2320

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**ANNEXURE- II**

**OBSERVATION SHEET OF FIELD TESTING (DRY LAND OPERATION)**

Type of soil : Sandy loam  
Place of test : Institute Farm  
Tractor used : Mahindra 605 DI  
Gear used : L-2

Test No.	Date of test	Duration of test, h	Length of furrow, m	Av. Soil moisture %	Av. Speed of operation , kmph	Wheel slip, %	Av. Depth of cut, cm	Av. Working width, m	Area covered, d./h	Field efficiency, %	Time required for one hectare, h	Fuel consumption	
												(l/h)	(l/ha)
<b>1</b>	<b>2</b>	<b>3</b>	<b>4.</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
1.	14/06/21	7.0	145	20.5	3.48	-6.0	10.4	1.97	0.49	72.05	2.04	4.800	9.792
2.	15/06/21	7.0	150	21.0	3.75	-6.1	10.8	1.88	0.45	64.28	2.22	4.600	10.212
3.	16/06/21	6.0	148	19.5	3.55	-6.1	10.8	1.91	0.47	70.14	2.12	4.500	9.540

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**ANNEXURE-III**

**OBSERVATION SHEET OF FIELD TESTING (PUDDLING OPERATION)**

Type of soil : Sandy loam  
Place of test : Institute Farm  
Tractor used : Mahindra 605 DI  
Gear used : L-2

Test No.	Date of test	Duration of test, h	Av. Depth of standing water, cm	Puddling Index, %	Av. Depth of puddle, cm	Av. Speed of operation, kmph	Wheel slip, %	Fuel consumption	Engine speed, rpm	
								(l/h)	On load	No load
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>
1.	17/6/21	7.0	11.00	80	10.5	3.85	-6.16	4.100	1800	1900
2.	18/6/21	8.0	10.66	85	10.6	4.09	-6.63	4.000	1800	1900

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**ANNEXURE -IV**

**SYMBOL AND ABBREVIATIONS**

**SYMBOLS:**

<b>I- SYMBOLS ASSIGNED TO BASIC SI UNITS</b>			
<b>S.N.</b>	<b>PHYSICAL QUANTITY</b>	<b>NAME OF SI UNIT</b>	<b>SYMBOL</b>
1	Length	Meter	m
		Millimeter	mm
2	Mass	Kilogram	kg
		Gram	g
		Tone	t
3	Time	Second	s

<b>II- SYMBOLS ASSIGNED TO SOME DERIVED UNITS</b>			
<b>S.N.</b>	<b>PHYSICAL QUANTITY</b>	<b>NAME OF SI UNIT</b>	<b>SYMBOL</b>
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	kmph
3	Pressure	Newton per square millimeter	N/mm <sup>2</sup>
4	Time	Minute	min
		Hour	h
5	Volume	Cubic centimeter	cm <sup>3</sup>
		Milliliter	ml
		Liter	l
6	Minimum	Min	mm
7	Maximum	Max	mm

**ABBREVIATIONS:**

As per applicant	:	apa	Clause	:	Cl
Degree	:	deg	Figure	:	Fig
Indian Standard	:	IS	Kilowatt	:	kW
Number	:	No.	Not available	:	N.A.
Not Recorded	:	N.R.	Percent	:	%
Reference	:	Ref.	Revolution	:	rpm