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**PRAKASH MULTISPEED ROTAVATOR 6 FEET  
(PRT6)**

**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 IS VALID FROM 22.11.2022 TO 21.11.2029**

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP- 2011/387	PRAKASH MULTISPEED ROTAVATOR 6 FEET (PRT6)	NOVEMBER	2022



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Type of test	:	COMMERCIAL
Name of machine	:	PRAKASH MULTISPEED ROTAVATOR 6 FEET (PRT6)
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: 6690-2007 (Reaffirmed)-Blades for Rotavator and Power Tillers.
Test requested by	:	M/S NAV BHARAT INDUSTRIES B-25 FOUNDRY NAGAR, AGRA-282006
Testing Authority	:	STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, RAHMANKHERA, HARDOI ROAD LUCKNOW, U.P. - 226101
Period of test	:	APRIL 2022 TO NOVEMBER 2022

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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.
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### Selected Conversions

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

- 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- 2007 (Pt.-I)-Agricultural wheeled tractors-Rear mounted three point linkage.
- iii) IS: 4931-1996 (Reaffirmed)-Technical requirements for power take-off shaft of Agricultural Tractors.
- iv) IS: 6690-2007 (Reaffirmed)-Blades for rotavator and power tillers.

## 3. METHOD OF SELECTION

The machine was selected by representative of the testing authority out of 05 machines made available for selection from their periodical production line at manufacturer's site. Machines of sr. no. 20220072 to 20220076 were available and Sr. no. 20220076 was selected for testing.

## 4. SPECIFICATION

<b>4.1</b>	<b>General</b>		
	Name of manufacturer/applicant	:	M/S Nav Bharat Industries B-25 Foundry Nagar, Agra-282006
	Type	:	Tractor Mounted Type
	Make	:	Prakash
	Model	:	PRT6
	Year of manufacture	:	2022
	Serial No.	:	20220076
	Tractor horse power required (apa)	:	42 & Above
	Type of blade	:	L Type
	Working width of implement, mm	:	1828
<b>4.2</b>	<b>PRIME MOVER USED</b>		
	Tractor	:	Mahindra-475
	Max. PTO Power Kw	:	30.3
	Year of manufacture	:	2018
<b>4.3</b>	<b>CHASSIS</b>		
	Type	:	M.S Square pipe.
	Size of pipe, mm	:	1935×60×60.
	Size of supporting flat, mm	:	612×124×10
	Type of mounting of pipe	:	Fixed to side support with the help of nut and bolt size (40.5×13.48×2.5)

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<b>4.3.1</b>	<b>SIDE SUPPORT</b>		
	Type	:	M.S. Plate.
	Thickness of plate, mm	:	10 & 8
	Method of fixing, mm	:	Fixed to the frame with nuts bolts and welded with chassis frame bolt size (40.5×13.78×1.5).
<b>4.3.2</b>	<b>SHIELD ( COVER )</b>		
	Type	:	M.S. sheet fabricated.
	Curved width, Length mm	:	1555×500×5.0
	Thickness of sheet, mm	:	5.0
	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. flat.
	Size of board, mm	:	1915×520
	Thickness of sheet, mm	:	2.5
	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	:	Bolted to flat of chassis frame.
	Type of hinge	:	M.S. bush.
	No. of hinges	:	02
	Method of fixing	:	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	:	Tubular section with disc flanges for mounting the blades.
	Size of shaft, mm		
		Length	: 1770
		Dia.	: 89.0
	No. of flanges	:	8
	Type of flange	:	M.S. circular plate.
	Dia. of flange, mm	:	249
	Thickness of flange, mm	:	12.0
	No. of blades on each flange	:	06 in each flange.
	Method of mounting blades on flanges, mm	:	Each blade is mounted with the help of two no. of bolts and nuts size (39.59×13.77×1.5).
	Distance of between two flanges, mm	:	250
	Total no. of blades	:	42
	Dia. of rotor with blades, mm	:	418

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	Method of fixing	:	Rotor shaft is bolted with hubs on both ends. These hubs are centrally mounted with two ball bearings on each end.
<b>4.5.1</b>	<b>ROTOR BLADE</b>		
	Number	:	42
	Type	:	L-shape hatched.
	Material	:	High Carbon steel.
	Overall thickness, mm	:	7.06
	Thickness at the beveled edge, mm	:	1.40
	Length of the beveled edge, mm	:	18.90

<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	:	570×50×10 & 670×50×10
	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.
<b>4.6.2</b>	<b>Adjusting Rack</b>		
	Type	:	M.S. plate with adjusting 03hole.
	Size, mm	:	212×50×10
	No. and size of locking bolt, mm	:	2 in each –(40×15.5×1.5)
	Range of depth adjustment, mm	:	0-150
	Method of fixing, mm	:	M.S flat is fixed to upper end of the rack fixed to the side support on both sides and lower ends with the skids. This is fit to side plate with nut and bolts size (41×15.5×1.5)

<b>4.7</b>	<b>Three point linkage (Cat. II) ( Refer fig.1)</b>			
<b>Sl. No.</b>		<b>As per IS:4468-2007 (pt.- I) (mm)</b>	<b>As measured mm</b>	<b>Remarks</b>
<b>I</b>	<b>Upper hitch points</b>			
<b>(a)</b>	Diameter of hitch pin (A)	25.27 to 25.40	25.30	Conforms
<b>(b)</b>	Diameter of hitch pin hole(B)	25.70 to 25.91	25.50	<b>Does not conform</b>
<b>(c)</b>	Width between outer faces of yoke (E)	86 (Max.)	74.56	Conforms
<b>(d)</b>	Width between inner faces of yoke (F).	52 (min)	57.76	Conforms
<b>(e)</b>	Linch pin hole distance(D)	93(min)	103.0	Conforms
<b>II</b>	<b>Lower hitch points</b>			
<b>(a)</b>	Dia. of hitch pin	27.79 to 28.0	25.11	<b>Does not conform</b>
<b>(b)</b>	Linch pin hole distance (K)	49 (Min.)	108.0	Conforms

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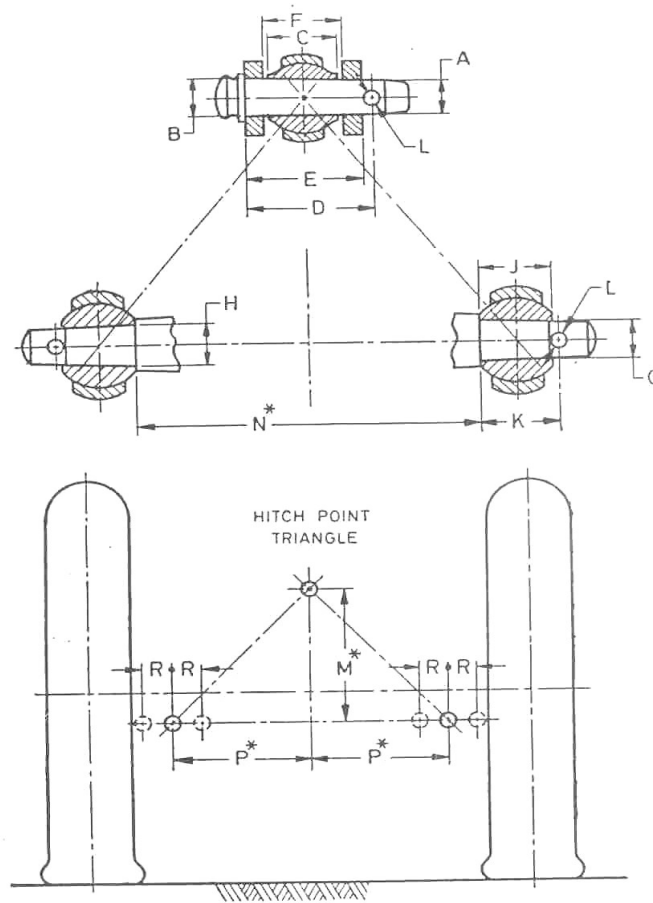
<b>III</b>	<b>Diameter of linch pin hole</b>			
<b>(a)</b>	Upper hitch pin (L)	12 (min)	12.35	Conforms
<b>(b)</b>	Lower hitch pin	12 (min)	12.35	Conforms
<b>IV</b>	<b>Mast height (M)</b>	510 (min.)	532	Conforms
<b>V</b>	<b>Lower hitch point span (N)</b>	823.5 to 826.5	826 (but adjustable)	Conforms

<b>4.7.1</b>	<b>Mast</b>			
	Type	:	M.S. plate and flat fabrication.	
	Size of flat, mm	:	697×279×8.0	
	Shape	:	Pyramid.	

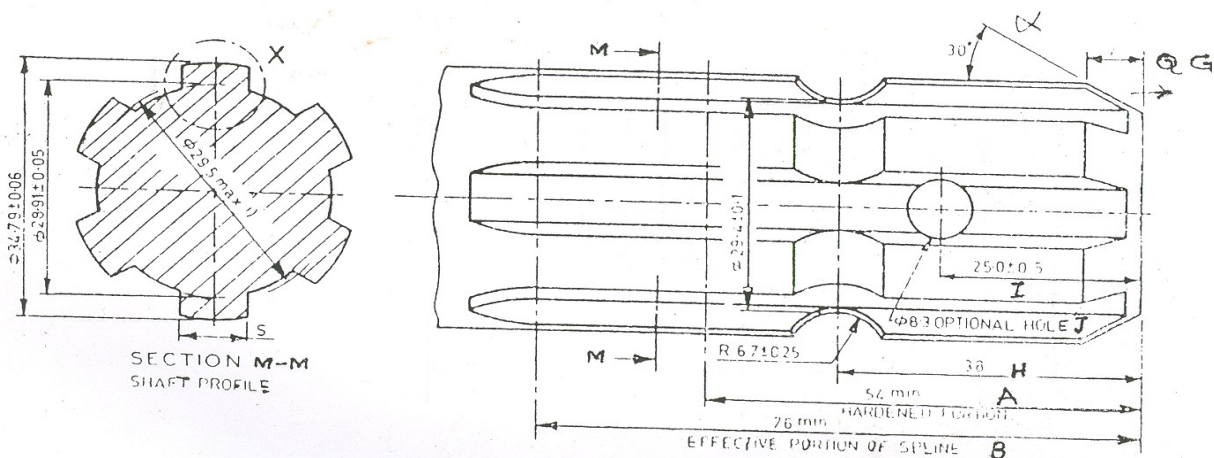
<b>4.8</b>	<b>Power transmission system:</b>			
	Method of transmission	:	Propeller shaft receives drive from PTO and transmits power to rotary shaft through two spur gear & one Pinion beveled gear reduction units, primary and secondary, consisting of gear reduction respectively.	

<b>4.8.1</b>	<b>Dimensions of power input shaft (Ref. Fig. 2)</b>			
<b>Notation</b>	<b>As per IS:4931-1996 (mm)</b>	<b>As observed (mm)</b>	<b>Remarks</b>	
<b>D <math>\phi</math></b>	34.79 $\pm$ 0.06	34.70	<b>Does not conform</b>	
<b>d <math>\phi</math></b>	28.91 $\pm$ 0.05	29.05	<b>Does not conform</b>	
<b>S</b>	8.69 (max.)	8.68	Conforms	
<b>R</b>	6.7 $\pm$ 0.25	5.21	<b>Does not conform</b>	
<b><math>\acute{\alpha}</math></b>	30°	30°	Conforms	
<b>Q</b>	7.0	4.42	<b>Does not conform</b>	
<b>H</b>	38.0	35.91	<b>Does not conform</b>	
<b>A</b>	54.0 (min.)	56.09	Conforms	
<b>B</b>	76.0 (min.)	63.25	<b>Does not conform</b>	





**Fig.:1 Dimension of Hitch Points**



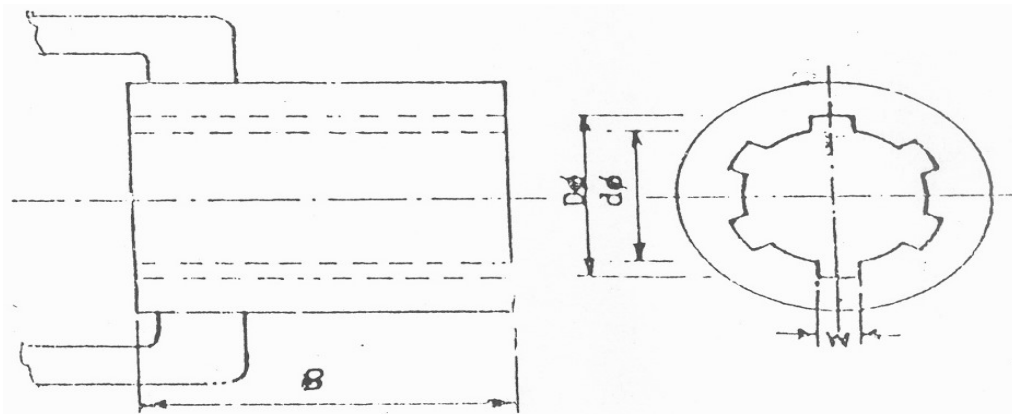
**Fig. 2: Dimensions of Rotavator Power Input Shaft, mm**

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<b>4.8.2</b>	<b>Gear box Assembly ( primary reduction ) Multispeed gear box</b>		
	Type	:	Bevel pinion gear.
	No. of teeth on pinion	:	13
	No. of teeth on bevel gear	:	23
	Reduction ratio at gear box	:	1:0.56
	Oil capacity, l	:	4.0
	Oil change period hours	:	250
	Recommended grade of oil	:	80 W90
	Length of power transmission shaft, mm (from gear box to secondary reduction unit)	:	810
	Dia. of shaft, mm	:	49
	No. of bearing	:	05, Tapper roller- 32210,32211,32213 & Two 32209.
<b>4.8.2.1</b>	<b>Gear drive ( secondary reduction )</b>		
	Type	:	Gear Drive
	No. of teeth drive gear	:	20
	No. of teeth driven idler spur gear	:	35
	No. of teeth driven spur gear	:	28
	Reduction ratio at gear box	:	1:0.71
	Oil capacity, l	:	4.0
	Recommended grade of oil, apa	:	80 W90
	Oil change period, h (apa)	:	250
	Provision for oil level checking	:	Provided
	Provision for dipstick/breather	:	Breather Provided
	Oil filling arrangement	:	Provided
	No. of bearing	:	Four tapper roller bearing Two-30209 & 30310 and ball bearing 6311 on rotor shaft.
<b>4.8.3</b>	<b>Propeller shaft</b>		
	Type	:	Telescopic (in two segments having 06 splines at both ends).
	<b>Length of shaft (mm)</b>		
	-- Minimum	:	805
	-- Maximum	:	1052
	Mass of shaft, kg	:	18.5
	Provision for locking	:	Spring loaded locking pins on both sides are provided.

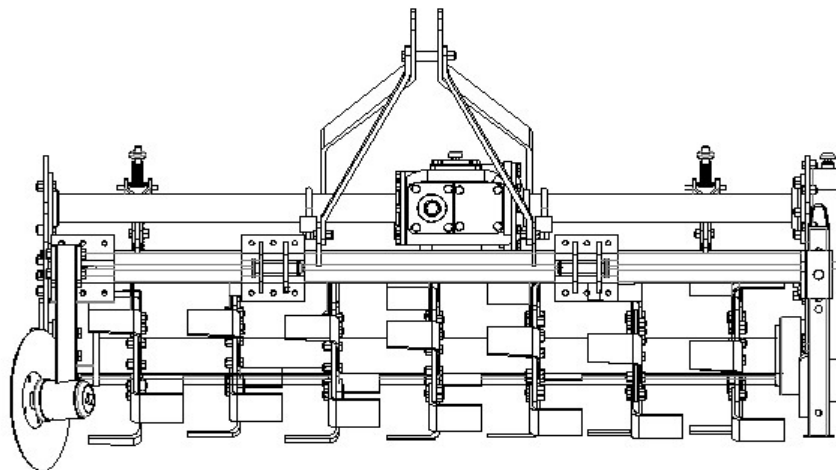
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<b>8.3.1</b>	<b>Propeller shaft hub dimensions ( Ref. Fig.3 )</b>		
<b>Notation</b>	<b>As per IS:4931-1996 (mm)</b>	<b>As observed (mm)</b>	<b>Remarks</b>
D $\phi$	34.93 $\pm$ 0.03	34.50	<b>Does not conform</b>
d $\phi$	29.7 $\pm$ 0.1	30.51	<b>Does not conform</b>
W	8.69 (min)	8.84	Conforms
B	54 (min)	64.15	Conforms
<b>4.8.4</b>	Safety clutch/device	:	Provided
<b>4.9</b>	Rotavator Stand	:	Provided
<b>4.10</b>	Furrow wheel	:	Provided



**Fig. 3: Propeller Shaft Insert Dimensions, (mm)**

<b>4.11</b>	<b>Overall Dimensions, mm (Ref. Fig.4)</b>		
	Length	:	1150
	Width	:	2040
	Height	:	1040
	Weight, Kg (apa)	:	495



**Fig. 4: Overall Dimensions of Rotavator, mm**

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## 5. LABORATORY TEST

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

**TABLE-1**

S.no	Portion of blade	Hardness (HRC)		Remark
		As observed	As per IS:6690-2007	
1-	One Blade Portion	52.5	53±3	Conforms

Sl. No.	Material	Requirement as per IS:6690-2007 ( Reaffirmed ) ( % by weight )	As observed (% by weight)	Remark
1.	Carbon (C)	0.50 to 0.60	0.27	Does not Conform
2.	Silicon (Si)	1.50 to 2.0	0.31	Does not Conform
3.	Manganese (Mn)	0.50 to 1.0	1.18	Does not Conform
4.	Sulphur (S)	0.05 (max.)	0.019	Conforms
5.	Phosphorous (P)	0.05 (max.)	0.029	Conforms

## 6 FIELD PERFORMANCE TEST

The field tests of the implement comprising of dry and wet land operation were conducted for 20 and 15 hours each in different soil moisture conditions to assess the performance of the implement. The details of tractor used for field operations are given in annexure I.

The tractor PTO speed was maintained at 540 rpm. The performance of implement is reported in Annexure-II and summarized in Table-3.

**TABLE-3**

### Summary of field performance

Sl. No.	Parameters	Dry land operation	Wet land operation
i	Tractor used	Mahindra-475	
ii	Type of soil	Heavy Sandy Loam	
iii	Av. Soil moisture, %	10.5 to 12.9	-----
iv	Av. Depth of standing water, cm	-----	10.17 to 10.5
v	Puddling Index, %		76.00 to 80.00

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vi	Av. Speed of operation, kmph	2.84 to 2.89	2.66 to 2.68
vii	Field efficiency, %	80.51 to 88.91	----
viii	Av. Depth of cut/depth of puddle, cm	10.5 to 12.83	14.4 to 14.8
ix	Av. Working width, m	1.76 to 1.78	---
x	Area covered, ha/h	0.405 to 0.457	----
xi	Time required for one hectare, h	2.18 to 2.46	-----
xii	Fuel consumption		
	- l/h	4.050 to 4.350	4.400 to 4.670
	- l/ha	8.829 to 10.701	----

## 6.1 Rate of Work

### 6.1.1 Dry Land Operation

-The rate of work in sandy loam soil was recorded as 0.405 to 0.457 ha/h and the forward speed as 2.84 to 2.89 kmph.

-The time required to cover one hectare area was recorded as 2.18 to 2.46 h.

### 6.1.2 Wet Land Operation

-Speed of operation varied from 2.68 to 2.73 kmph.

## 6.2 Quality of Work

### 6.2.1 Dry land operation

-The depth of operation was recorded as 10.5 to 12.83 cm.

-The field efficiency was recorded as 80.51 to 88.91 %.

### 6.2.2 Wet Land Operation

-Depth of puddle was recorded as 14.4 to 14.8 cm.

-Puddling index was recorded as 76.00 to 80.00

## 6.3 WEAR OF BLADES

### 6.3.1 On Mass basis

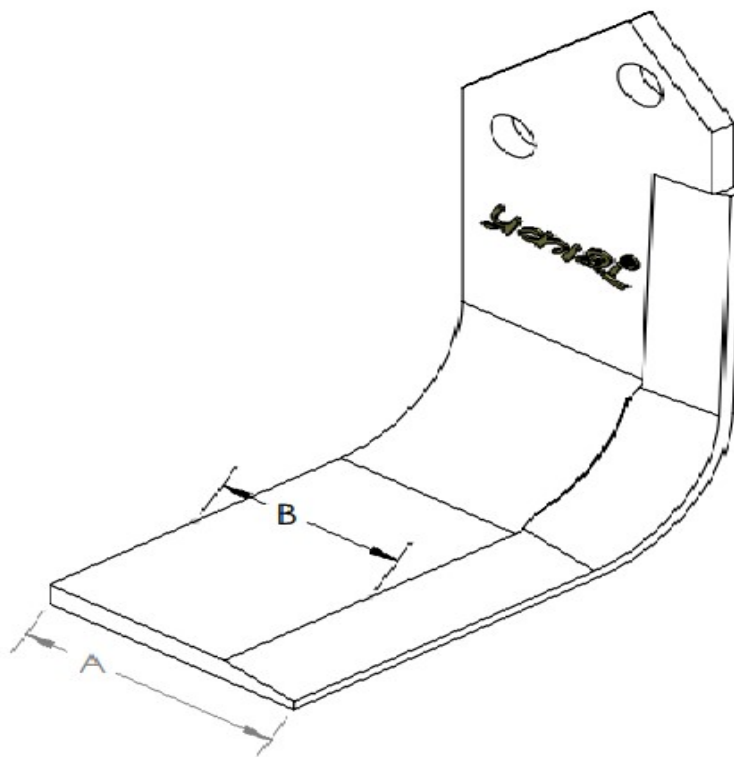
Wear of hatchet blades on mass basis after 35.0 hrs. of field operation are tabulated in Table-4.

**TABLE-4**

Sl.No	Initial mass of blade (g)	Mass after 35.0 h of operation	Loss in mass		Wear / h
			g	%	
1.	975	950	25	2.56	0.07
2.	1000	980	20	2.0	0.05
3.	1000	970	30	3.0	0.08
4.	965	950	15	1.55	0.04
5.	1000	980	20	2.0	0.05
6.	1005	970	35	3.48	0.09
7.	1020	1000	20	1.96	0.05

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6.3.2 Fig. 5: Dimensions for Wear Analysis (L-Type hatched Blade)								
Sl.No.	Initial Width at, mm		Width after 35.0 hrs. at, mm		Wear, (mm)		Wear, %	
	A (at tip)	B (65 mm from edge)	A (at tip)	B (65 mm from edge)	A (at tip)	B (65 mm from edge)	A (at tip)	B (65 mm from edge)
1.	82.74	85.29	81.14	84.64	1.60	0.65	1.93	0.76
2.	81.64	84.91	72.49	83.31	2.15	1.60	2.63	1.88
3.	81.12	86.71	79.37	85.91	1.75	0.80	2.15	0.96
4.	81.96	86.42	80.01	85.32	1.95	1.10	2.37	1.27
5.	83.28	85.66	80.93	83.81	2.35	1.25	2.82	1.46
6.	82.61	86.87	80.56	85.52	2.05	1.35	2.48	1.55
7.	81.26	87.12	79.46	86.17	1.80	0.95	2.21	1.90



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

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## 7. EFFECTIVENESS OF SEALINGS

After completion of field test in wet land operation for 35.0 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.

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

## 8. EASE OF OPERATION, ADJUSTMENTS & SAFETY

### 9. DEFECTS, BREAKDOWNS AND REPAIRS

9.1 No breakdown occurred during 35.0 hr. operation in the field.

### 10. COMMENTS & RECOMMENDATIONS

- 10.1 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.
- 10.2 Maneuverability of tractor with rotavator was found to be satisfactory. The quality of work was observed to be satisfactory.
- 10.3 The percentage wear of hatchet blades on mass basis during field operation (35.0 hr) ranged from 0.04 to 0.09 %, which is normal.
- 10.4 The percentage wear of hatchet blades on dimensional basis during field operation (35.0 hr) ranged from 1.93 to 2.82 % and 0.76 to 1.88 % respectively at Tip and at 65 mm from edge.
- 10.5 Dimensions of power input & corresponding propeller shaft hub have not been provided as per requirements of As per IS:4931-1996 (mm) form the standardization point of view and interchangeability of component 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.
- 10.6 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 :**

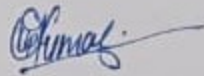

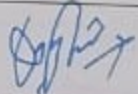

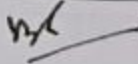

The specification of the implement operating manual, maintenance, safety instruction and spare parts catalogue provided in English. The literature developed is found to be adequate for the guidance of user and service personal. However, it need to developed (as per IS: 8132: 1999) in other regional languages.

**12. APPLICANTS'S COMMENTS:**

- 1- We will improve our dimensions of three point linkage system of Rotavator as per the requirement of IS:4468-2007 (pt,-I) (mm).
- 2- We will improve the dimensions of power unit and corresponding propeller shaft hub of Rotavator as per the requirement of IS: 4931-1996 (mm)
- 3- And also we will improve the chemical composition of blades, carbon, silicon ,Manganese as per the requirement of IS: 6690-1996.

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-	
(DIGVIJAY SINGH) -TEST ENGINEER-	
(VIJAY KUMAR SINGH) -ASSOCIATE PROFESSOR – ENGG.	
(DR. PRAMOD KUMAR GUPTA) -ADDITIONAL DIRECTOR-	
(DR. PANKAJ TRIPATHI) - DIRECTOR-	

**THIS TEST REPORT IS VALID FROM 22.11.2022 TO 21.11.2029**



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**ANNEXUR- 1**

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

1	Make, model and type	Mahindra-475
2	Number of cylinders	4
3	Maximum PTO power, Kw	30.3
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	27.20
5	Rated engine speed, rpm	2300
6	No load engine speed during field test, rpm	1800
7	Drawbar power, Kw	27.10
8	<b>Drawbar pull, kN :</b>	
	- Without ballast	27.10
	- With ballast	27.80
9	Type of wheel equipment	Pneumatic
10	<b>Number &amp; size of tyre :</b>	
	Front	6.00-16.8 PR
	Rear	12.4- 28-12 PR
11	<b>Standard track width, mm :</b>	
	- Front	1230
	- Rear	1380
12	Wheel base, mm	1910
13	Ballast condition	Used as un-ballasted
14	<b>Total Operational Mass, kg :</b>	
	- Front	685
	- Rear	1165
	- Total	1850

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**ANNEXURE- II**

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

Type of soil : Sandy loam  
Place of test : Institute Farm, Rehmankhera  
Tractor used : Mahindra-475  
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 (ha./h)	Field efficiency (%)	Time required for one hectare, (h)	Fuel consumption	
												(l/h)	(l/ha)
1	2	3	4.	5	6	7	8	9	10	11	12	13	14
1.	27.09.2022	7	72	11.20	2.87	-4.96	10.5	1.77	0.432	85.20	2.31	4.150	9.586
2.	28.09.2022	8	87	11.25	2.85	-4.97	11.17	1.76	0.426	85.02	2.34	1.100	9.594
3.	29.09.2022	8	78	12.9	2.84	-5.07	12.1	1.77	0.405	80.51	2.46	4.350	10.701

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**ANNEXURE-III**

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

Type of soil : Sandy loam  
Place of test : Institute Farm, Rehmankhera  
Tractor used : Mahindra-475  
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
1	2	3	4	5	6	7	8	9	10	11
1.	30.09.2022	6	10.23	78.5	14.8	2.70	-6.73	4.450	1800	1900
2.	03.10.2022	6	10.17	76.00	14.4	2.68	-6.87	4.670	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

**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