



सत्यमेव जयते



**“AGRIZONE MULTISPEED ROTA VATOR-6.5 FEET”  
(GRIZO PUDDLING)**

**TESTED AT**

**STATE LEVEL FARM MACHINERY TRAINING AND TESTING  
INSTITUTE, REHMANKHERA, HARDOI ROAD  
LUCKNOW, U.P. - 226101**

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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 19.06.2023 TO 18.06.2030**

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP- 2011/412	“AGRIZONE MULTISPEED ROTAVATOR-6.5 FEET” (GRIZO PUDDLING)	JUNE	2023



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Type of test	:	COMMERCIAL
Name of machine	:	“AGRIZONE MULTISPEED ROTAVATOR-6.5 FEET” (GRIZO PUDDLING)
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- GSA INDUSTRIES VILL- DAULATPUR, RASULPUR,JAURAN ROAD DISTT-PATIALA, PUNJAB-147001
Testing Authority	:	STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, REHMANKHERA, HARDOI ROAD, LUCKNOW, U.P. - 226101
Period of test	:	JANUARY 2023 TO JUNE 2023

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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 linkages.
- 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 Randomly 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.4220 to 4224 were available and Sr. No. 4222 was selected for testing.

### 4. SPECIFICATION

<b>4.1</b>	<b>General</b>		
	Name of manufacturer/applicant	:	M/S- Gsa Industries Vill- Daulatpur, Rasulpur,Jauran Road Distt-Patiala, Punjab-147001
	Type	:	Tractor Mounted Type.
	Make	:	GSA Industries.
	Model	:	GRIZO PUDDLING
	Brand	:	AGRIZONE
	Year of manufacture	:	2022-23
	Serial No.	:	4222
	Tractor horse power required (apa.)	:	45 and above.
	Type of blade	:	J Type
	Working width of implement, mm	:	1800
<b>4.2</b>	<b>PRIME MOVER USED</b>		
	Tractor	:	INDO FARM-3055 (DI)
	Chassis No.	:	LNW3055002323
	Max. PTO Power Kw	:	39.0
	Year of manufacture	:	2020
	Rated Engine speed recommended for field test (RPM) apa	:	1700/1800
<b>4.3</b>	<b>CHASSIS</b>		
	Type	:	M.S. Square pipe.

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	Size of pipe, mm	:	1895×60×60
	Size of supporting flat, mm	:	563×115×8
	Type of mounting of pipe, mm	:	Fixed to side support with the help of nut and bolt.
<b>4.3.1</b>	<b>SIDE SUPPORT</b>		
	Type	:	M.S. flat.
	Thickness of plate, mm	:	8 & 10.0
	Method of fixing, mm	:	Fixed to the frame with nuts bolts size (34.50×11.68×1.5 mm) and welded with chassis frame.
<b>4.3.2</b>	<b>SHIELD ( COVER )</b>		
	Type	:	M.S. Flat.
	Curved width, Length mm	:	540×1895
	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. flat.
	Size of board, mm	:	2075×520
	Thickness of sheet, mm	:	3.0
	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	:	Spring Loaded Rod.
	No. of hinges	:	04
	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	:	1800
	Dia.	:	60 (Ø)
	No. of flanges	:	13
	Type of flange	:	M.S. circular plate.
	Dia. of pocket with rotar shaft (mm)	:	200
	Size of pocket (mm)	:	70×53×6
	No. of blades in each pocket	:	One in each Pocket.
	Method of mounting blades in pocket	:	Each blade is insert the pocket and fixed with bolt size (30×9.70Ø×1.5 mm).
	Distance of between two pocket, mm	:	80
	Total no. of blades	:	72

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	Dia. of rotor with blades, mm	:	550
	Method of fixing	:	Rotor shaft is bolted with hubs on both ends. These hubs are centrally mounted with two ball bearings on each ends.
<b>4.5.1</b>	<b>ROTOR BLADE</b>		
	Number	:	72
	Type	:	J-shape hatched.
	Material	:	High Carbon steel.
	Overall thickness, mm	:	8.0
	Thickness at the beveled edge, mm	:	2.80
	Speed of rotor shaft (rpm)	:	223 (Corresponding to 540 rpm of PTO shaft.)
	Length of the beveled edge, mm	:	15.08

<b>4.6</b>	<b>DEPTH OF CONTROL MECHANISM</b>		
<b>4.6.1</b>	<b>Skid</b>		
	Type & Material	:	Curved shape, M.S. doubles flat.
	Size, mm	:	595×50×10 & 598×50×10 Respectively.
	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 two bolt & nut size (34.39×11.8 Ø×1.5 mm) & (40×11.72 Ø×1.5 mm)
<b>4.6.2</b>	<b>ADJUSTING RACK</b>		
	Type	:	M.S. casting having.
	Size, mm	:	137×45×10
	No. and size of locking bolt, mm	:	One and size of locking bolt (39.60×11.68 Ø×1.5 mm)
	Range of depth adjustment, mm	:	0 to 55
	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 (40×11.72 Ø×1.5 mm)

<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>			
(a)	Diameter of hitch pin (A)	25.27 to 25.40	25.25	<b>Does not Conform</b>
(b)	Diameter of hitch pin hole (B)	25.70 to 25.91	25.77	Conforms
(c)	Width between outer faces of yoke (E)	86 (Max.)	72.50	Conforms
(d)	Width between inner faces of yoke (F).	52 (min)	55.60	Conforms
(e)	Linch pin hole distance (D)	93 (min)	106.31	Conforms

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<b>II</b>	<b>Lower hitch points</b>			
(a)	Dia. of hitch pin	27.79 to 28.0	27.97	Conforms
(b)	Linch pin hole distance (K)	49 (Min.)	103.68	Conforms
<b>III</b>	<b>Diameter of linch pin hole</b>			
(a)	Upper hitch pin (L)	12 (min)	12.02	Conforms
(b)	Lower hitch pin	12 (min)	12.07	Conforms
<b>IV</b>	<b>Mast height (M)</b>	510 (min.)	600	Conforms
<b>V</b>	<b>Lower hitch point span (N)</b>	823.5 to 826.5	885 (but adjustable)	Conforms

<b>4.7.1</b>	<b>Mast</b>		
	Type	:	M.S. flat fabrication.
	Size of flat, mm	:	Front- 630×170×8 & Rear- 650×295×8 Respectively.
	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	34.81	Conforms
<b>d <math>\phi</math></b>	28.91 $\pm$ 0.05	28.88	Conforms
<b>S</b>	8.69 (max.)	8.50	Conforms
<b>R</b>	6.7 $\pm$ 0.25	5.08	<b>Does not Conform</b>
<b><math>\alpha</math></b>	30°	30°	Conforms
<b>Q</b>	7.0	7.0	Conforms
<b>H</b>	38.0	38.0	Conforms
<b>A</b>	54.0 (min.)	60.82	Conforms
<b>B</b>	76.0 (min.)	77.30	Conforms

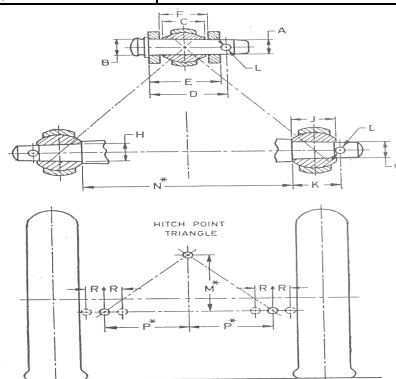
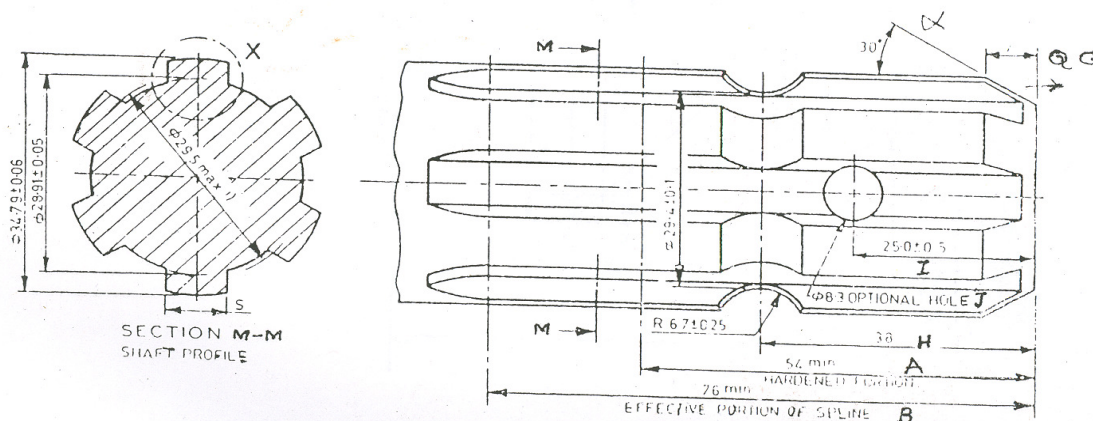


FIG. 1. DIMENSIONS OF HITCH POINTS

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



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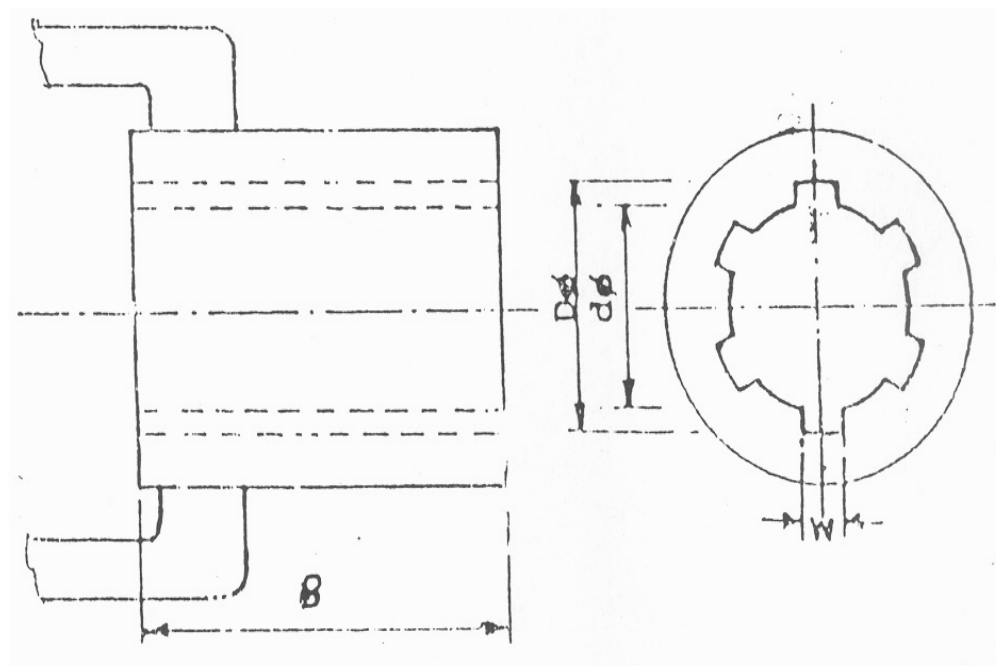


**Fig. 2: Dimensions of Rotavator Power Input Shaft, mm**

<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	: After every 200 hrs.
	Recommended grade of oil	: EP-140
	Length of power transmission shaft, mm (from gear box to secondary reduction unit)	: 850
	Dia. of shaft, mm	: 45.70
	No. of bearing	: 05-Tapper Roller bearing, (Two-30209), (One- 32209), (One- 32212), (One- 32214)
<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	: EP-140
	Oil change period, h (apa)	: After every 200 hrs.
	Provision for oil level checking	: Dipstick Provided.
	Provision for dipstick/breather	: Provided.
	Oil filling arrangement	: Nut and bolt Provided.

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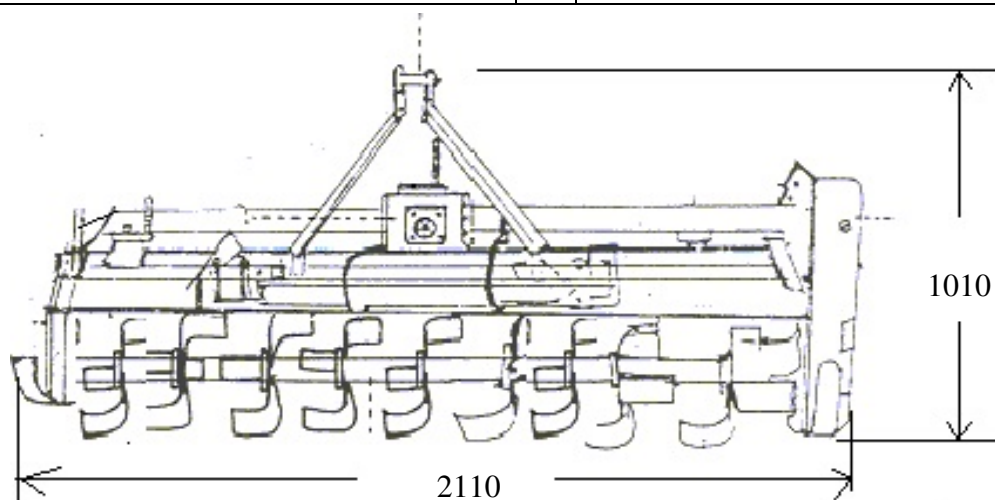
	No. of bearing	:	04- (02) Tapper Roller 30209 (One) ball bearing 6311, (One) 30210.
<b>4.8.3</b>	<b>Propeller shaft</b>		
	Type	:	Telescopic (in two segments having 6 splines at both ends).
	<b>Length of shaft (mm)</b>		
	-- Minimum	:	790
	-- Maximum	:	1020
	Mass of shaft, kg	:	14.380
	Provision for locking	:	Spring loaded locking pins on both sides are provided and shear bolt also provided.
<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	34.92	Conforms
d $\phi$	29.7 $\pm$ 0.1	29.81	Conforms
W	8.69 (min)	8.72	Conforms
B	54 (min)	52.60	<b>Does not Conform</b>
<b>4.8.4</b>	Safety clutch/device	:	Provided
<b>4.9</b>	Rotavator Stand	:	N.A
<b>4.10</b>	Furrow wheel	:	Provided



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

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<b>4.11</b>	<b>Overall Dimensions, mm (Ref. Fig.4)</b>		
	Length	:	1220
	Width	:	2110
	Height	:	1110
	Weight, Kg (apa)	:	430 (Approx)
<b>4.12</b>	Color	:	Red



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

## 5. LABORATORY TEST

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

**TABLE-1**

S. No	Portion of blade	Hardness (HRC)		Remark
		As per IS: 6690-1996	As observed	
1-	On Edge Portion	53±3	50.5,52.3,54.7	Conforms
2-	On Shank Portion	37-45	41.8,43.4,44.8	Conforms

<b>5.2</b>	<b>Chemical composition</b>			
A.	The chemical composition of blades is tabulated in Table-2			
				<b>TABLE-2</b>
Sl. No.	Material	Requirement as per IS:6690-1996 ( Reaffirmed ) ( % by weight )	As observed ( % by weight )	Remark
1.	Carbon (C)	0.50 to 0.60	0.59	Conforms
2.	Silicon (Si)	1.50 to 2.0	1.59	Conforms
3.	Manganese (Mn)	0.50 to 1.0	0.77	Conforms
4.	Sulphur (S)	0.05 (max.)	0.007	Conforms
5.	Phosphorous (P)	0.05 (max.)	0.026	Conforms

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## 6 FIELD PERFORMANCE TEST

The field tests of the implement of wet land operation were conducted for 36.5 hours each in different depth of water 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±10 rpm. The performance of implement is reported in Annexure-II and summarized in Table-3.

**TABLE-3**

### Summary of field performance

Sl. No.	Parameters	Wet land operation
i	Tractor used	INDO FARM-3055 (DI)
ii	Type of soil	Red
iii	Av. Depth of standing water, cm	6.77 to 10.13
iv	Puddling Index, %	78.0 to 92.3
v	Av. Speed of operation, kmph	2.51 to 2.63
vi	Field efficiency, %	71.22 to 81.54
vii	Av. depth of puddle, cm	10.7 to 13.13
viii	Av. Working width, m	1.82 to 1.85
ix	Area covered, ha/h	0.344 to 0.380
x	Time required for one hectare, h	2.63 to 2.91
xi	Fuel consumption	
	- l/h	6.100 to 6.400
	- l/ha	16.569 to 17.751

### 6.1 Rate of Work

#### 6.1.1 Wet Land Operation

-The rate of work in Red soil was recorded as 0.344 to 0.380 ha/h and the forward speed as 2.51 to 2.63 kmph.

-The time required to cover one hectare area was recorded as 2.63 to 2.91 h.

#### 6.1.2 Quality of Work

#### 6.2 Wet Land Operation

-The depth of puddle was recorded as 10.7 to 13.13 cm.

-The field efficiency was recorded 71.22 to 81.54 %.

-Puddling index was recorded as 78.0 to 92.3 %

#### 6.2.1 Fuel consumption

- l/h	6.100 to 6.400
- l/ha	16.569 to 17.751

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### 6.3 WEAR OF BLADES

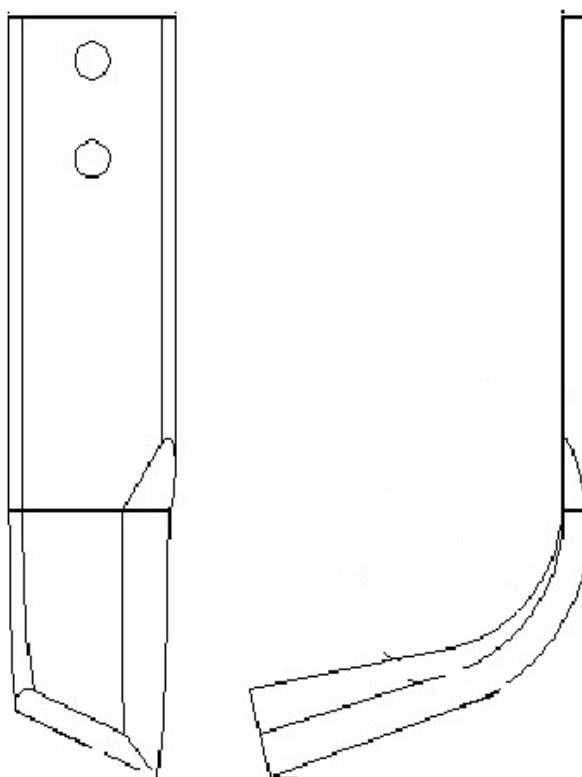
#### 6.3.1 On Mass basis

Wear of hatchet blades on mass basis after 36.5 hrs. Of field operation are tabulated in Table-4.

**Table-4**

Sl. No.	Initial mass of blade (g)	Mass after 36.5 h of operation	Loss in mass		Wear / h
			g	%	
1.	530	510	20	3.77	0.10
2.	450	430	20	4.44	0.12
3.	565	550	15	2.65	0.07
4.	560	540	20	3.57	0.10
5.	540	530	10	1.85	0.05
6.	485	460	25	5.15	0.14
7.	605	585	20	3.30	0.09
8.	572	550	22	3.85	0.10
9.	565	555	10	1.77	0.05
10.	540	525	15	2.78	0.08

**Remark:- Rate of hourly wear (%) on mass basis was observed as 0.05 to 0.14**



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

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## **7. EFFECTIVENESS OF SEALINGS**

After completion of field test in wet land operation for 36.5 hrs. 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>
<b>1.</b>	Primary reduction gear box.	No
<b>2.</b>	Secondary reduction gear; drive	No
<b>3.</b>	Hub of rotor assembly	No

## **8. EASE OF OPERATION, ADJUSTMENTS & SAFETY**

- 8.1 The propeller shaft has telescopic sections with universals joints, to adjust the length of drive shaft which is adequate.
- 8.2 Depth adjustment can be made by raising or lowering the skids.
- 8.3 The drive shaft (universal coupling shaft) is provided with shear bolt for safety.
- 8.4 Operator has to get down from tractor for making adjustment in rotavator.

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

- 9.1 No breakdown occurred during 36.5 h operation in the field.

## **10. COMMENTS & RECOMMENDATIONS**

- i) The dimensions of three point linkage system Upper hitch point (a) is not conforming to the requirement of As per IS:4468-2007 (pt.- I) (mm)
- ii) Dimensions of power input shaft notation (R) & corresponding propeller shaft hub notation (B) have not been provided as per requirement IS:4931-1996 (mm)
- iii) 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:

- We will Provide Diameter of upper hitch pin (A) as per IS: (4468-2007)
- We will modify the Dimensions of power input shaft (R) to comply with IS : 4931-1996.
- We will provide propeller shaft hub dimension as per IS 4931-1996 to comply with Indian standard
- We will make all Arrangement permanently display the quality and parameters obtained in the test in all commercial production level.

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-	
(VIJAY KUMAR SINGH) -ASSOCIATE PROFESSOR – ENGG.	
(DR. PRAMOD KUMAR GUPTA) -ADDITIONAL DIRECTOR-	
(DR. PANKAJ TRIPATHI) - DIRECTOR-	 25/6/23

**THIS TEST REPORT IS VALID FROM 19.06.2023 TO 18.06.2030**

STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, LUCKNOW

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**ANNEXUR- 1**

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

1	Make, model and type	INDO FARM-3055 (DI) Four wheel Agriculture purpose tractor
2	Number of cylinders	3
3	Maximum PTO power, Kw	39.0
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	35.3
5	Rated engine speed, rpm	2400
6	No load engine speed during field test, rpm	1900
7	Drawbar power, Kw	37.3
8	<b>Drawbar pull, kN :</b>	
	- Without ballast	22.93
	- With ballast	17.70
9	Type of wheel equipment	Pneumatic
10	<b>Number &amp; size of tyre :</b>	
	Front	02; 7.50-16.00-(8PR)
	Rear	02; 16.9-28.00-(12PR)
11	<b>Standard track width, mm :</b>	
	- Front	1315
	- Rear	1420
12	Wheel base, mm	2050
13	Ballast condition	un -ballast
14	<b>Total Operational Mass, kg :</b>	
	- Front	680
	- Rear	1150
	- Total	1830



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**ANNEXURE-II**

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

Type of soil : Red Soil  
Place of test : Vill- Daulatpur, Patiala (Punjab)  
Tractor used : INDO FARM-3055 (DI)  
Gear used : L-2 Gear used

Test No.	Av. Working width, m	Area covered, ha/h	Time required for one hectare, h	Field efficiency, %	Fuel consumption	
					(l/h)	(l/ha)
1.	1.84	0.344	2.91	71.22	6.100	17.751
2.	1.83	0.360	2.78	77.09	6.280	17.458
3.	1.85	0.380	2.63	81.54	6.300	16.569
4.	1.82	0.365	2.74	79.87	6.400	17.536
5.	1.85	0.369	2.71	78.51	6.250	16.937
6.	1.85	0.367	2.72	77.42	6.300	17.136

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**ANNEXURE-III**

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

Type of soil : Red Soil  
Place of test : Vill- Daulatpur, Patiala (Punjab)  
Tractor used : INDO FARM-3055 (DI)  
Gear used : L-2 Gear used

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>12</b>	<b>13</b>	<b>14</b>
1.	29.04.23	4.0	6.77	89.0	11.57	2.63	-3.73	6.100	1700	1800
2.	30.04.23	7.3	6.93	92.3	13.13	2.55	-4.67	6.280	1700	1800
3.	01.05.23	6.6	8.03	86.0	12.73	2.52	-4.8	6.300	1700	1800
4.	02.05.23	8.6	10.13	78.0	12.77	2.51	-4.87	6.400	1700	1800
5.	03.05.23	4.8	7.83	81.5	12.10	2.54	-4.6	6.250	1700	1800
6.	04.05.23	5.0	8.01	83.2	10.7	2.56	-4.36	6.300	1700	1800

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**ANNEXURE -III**

**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	mi
7	Maximum	Max	ma

**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