COMMERCIAL TEST REPORT

REPORT NO.: IMP-2011/413
MONTH- JUNE 2023

सत्यमेव जयते

"AGRIZONE MULTISPEED ROTAVATOR-7 FEET"
GRIZO J TYPE (200 MS)

TESTED AT

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

Telephone: 0522- 2841021 E-mail:fmtcsima@gmail.com

(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- 2011/413	"AGRIZONE MULTISPEED ROTAVATOR-7 FEET" GRIZO J TYPE (200 MS)	JUNE	2023

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Type of test	:	COMMERCIAL
Name of machine	:	"AGRIZONE MULTISPEED ROTAVATOR-7 FEET" GRIZO J TYPE (200 MS)
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

Selected Conversions

S. 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	735W
	1 kW	1.35962 Ps
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 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.4440 to 4445 were available and Sr. No. 4444 was selected for testing.

4. SPECIFICATION

4.1	**General**		
	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 J TPYE 200 MS
	Brand	:	AGRIZONE
	Year of manufacture	:	2022-23
	Serial No.	:	4444
	Tractor horse power required (apa.)	:	45 and above.
	Type of blade	:	J Type
	Working width of implement, mm	:	1980
4.2	**PRIME MOVER USED**		
	Tractor	:	Swaraj 735 (XT)
	Chassis No.	:	MBNAN49ACKTD03186
	Max. PTO Power Kw	:	26.1
	Year of manufacture	:	2019
	Rated Engine speed recommended for field test (RPM) apa	:	1700/1800
4.3	**CHASSIS**		
	Type	:	M.S. Square pipe.
	Size of pipe, mm	:	2095×60×60

	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.
4.3.1	**SIDE SUPPORT**		
	Type	:	M.S. flat.
	Thickness of plate, mm	:	8 & 10.0
	Method of fixing, mm	:	Fixed to the frame with nuts bolts size (34.50×11.67×1.5 mm) and welded with chassis frame.
4.3.2	**SHIELD (COVER)**		
	Type	:	M.S. Flat.
	Curved width, Length mm	:	540×2095
	Thickness of sheet, mm	:	4.0
	Method of mounting	:	Welded with supporting plate of chassis.
4.4	**TRAILING BOARD**		
	Type & material	:	M.S. sheet supported with M.S. flat.
	Size of board, mm	:	2322×520
	Thickness of sheet, mm	:	3.0
	Locking system	:	04 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.

4.5	**ROTOR SHAFT**		
	Material	:	M.S. pipe.
	Type of rotor axle	:	Tubular section with disc flanges for mounting the blades.
	Size of shaft, mm Length Dia.	 : :	 2080 73.0
	No. of flanges	:	13
	Type of flange	:	M.S. circular plate.
	Dia. of flange, mm	:	213
	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 two nuts bolts size (34.70×11.70Ø×1.5 mm).
	Distance of between two flanges, mm	:	150
	Total no. of blades	:	78
	Dia. of rotor with blades, mm	:	473

	Method of fixing	:	Rotor shaft is bolted with hubs on both ends. These hubs are centrally mounted with two ball bearings on each ends.
4.5.1	**ROTOR BLADE**		
	Number	:	78
	Type	:	J-shape hatched.
	Material	:	High Carbon steel.
	Overall thickness, mm	:	7.0
	Thickness at the beveled edge, mm	:	2.24
	Speed of rotor shaft (rpm)		218 (Corresponding to 540 rpm of PTO shaft.)
	Length of the beveled edge, mm	:	17.37

4.6	**DEPTH OF CONTROL MECHANISM**		
4.6.1	**Skid**		
	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 bolt & nut size (39.60×11.68Ø×1.5 mm).
4.6.2	**ADJUSTING RACK**		
	Type	:	M.S. casting having.
	Size, mm	:	137×45×10
	No. and size of locking bolt, mm	:	One and size of bolt (39.60×11.68Ø×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 (39.60×11.68Ø×1.5 mm)

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	**Upper hitch points**			
(a)	Diameter of hitch pin (A)	25.27 to 25.40	25.33	Conforms
(b)	Diameter of hitch pin hole (B)	25.70 to 25.91	25.85	Conforms
(c)	Width between outer faces of yoke (E)	86 (Max.)	72.0	Conforms
(d)	Width between inner faces of yoke (F).	52 (min)	55.75	Conforms
(e)	Linch pin hole distance (D)	93 (min)	106.65	Conforms
II	**Lower hitch points**			
(a)	Dia. of hitch pin	27.79 to 28.0	27.98	Conforms
(b)	Linch pin hole distance (K)	49 (Min.)	105.22	Conforms

III	**Diameter of linch pin hole**			
(a)	Upper hitch pin (L)	12 (min)	12.6	Conforms
(b)	Lower hitch pin	12 (min)	12.10	Conforms
IV	**Mast height (M)**	510 (min.)	530	Conforms
V	**Lower hitch point span (N)**	823.5 to 826.5	850 (but adjustable)	Conforms

4.7.1	**Mast**		
	Type	:	M.S. flat fabrication.
	Size of flat, mm	:	Front- 630×170×8 & Rear- 650×295×8 Respectively.
	Shape	:	Pyramid.

4.8	**POWER TRANSMISSION SYSTEM:**		
	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.

4.8.1	**DIMENSIONS OF POWER INPUT SHAFT (Ref. Fig. 2)**		
Notation	**As per IS:4931-1996 (mm)**	**As observed (mm)**	**Remarks**
D ǿ	34.79 ± 0.06	34.86	Conforms
d ǿ	28.91 ± 0.05	28.88	Conforms
S	8.69 (max.)	8.50	Conforms
R	6.7 ± 0.25	5.49	**Does not Conform**
ά	30º	30º	Conforms
Q	7.0	7.0	Conforms
H	38.0	38.0	Conforms
A	54.0 (min.)	61.47	Conforms
B	76.0 (min.)	77.28	Conforms

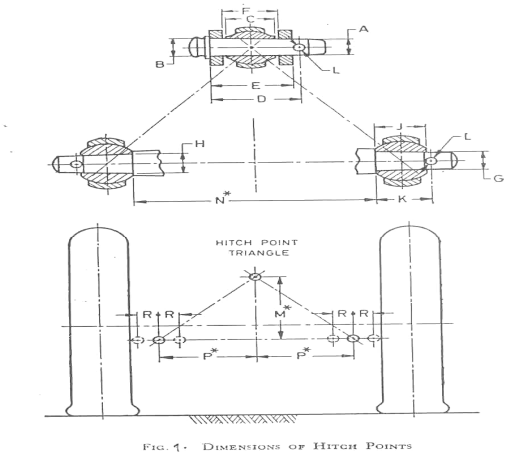

FIG. 1. DIMENSIONS OF HITCH POINTS

Fig.:1 Dimension of Hitch Points

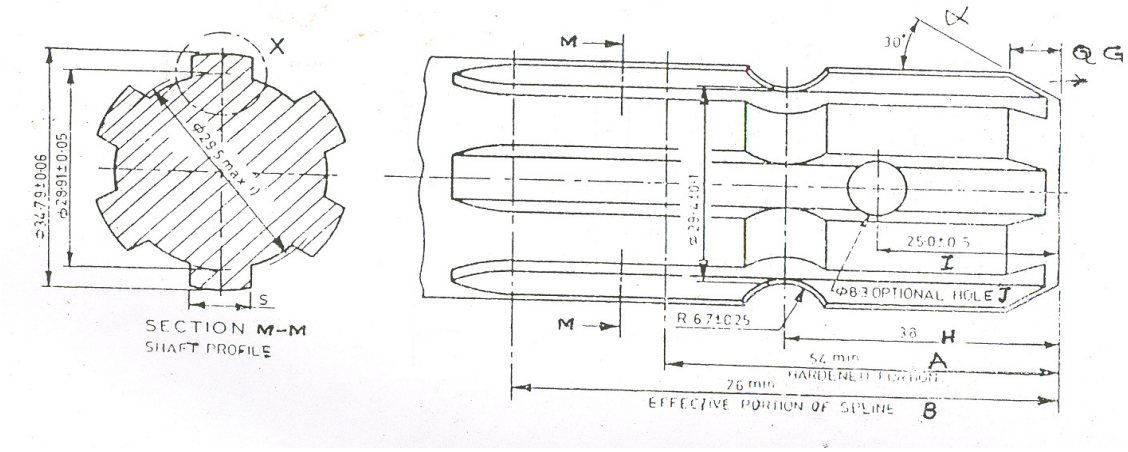

Fig. 2: Dimensions of Rotavator Power Input Shaft, mm

4.8.2	**Gear box Assembly (primary reduction) Multispeed gear box**		
	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)	:	975
	Dia. of shaft, mm	:	45.70
	No. of bearing	:	05-Tapper Roller bearing, (Two-30209), (One- 32209), (One- 32212), (One- 32214)
4.8.2.1	**Gear drive (secondary reduction)**		
	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.

	No. of bearing	:	04- (03) Tapper Roller 30210 (Two), 32210 (One) ball bearing 6311, (One)
4.8.3	**Propeller shaft**		
	Type	:	Telescopic (in two segments having 6 splines at both ends).
	Length of shaft (mm)		
	-- Minimum	:	800
	-- Maximum	:	965
	Mass of shaft, kg	:	14.290
	Provision for locking	:	Spring loaded locking pins on both sides are provided and shear bolt also provided.

8.3.1	**Propeller shaft hub dimensions (Ref. Fig.3)**		
Notation	**As per IS:4931-1996 (mm)**	**As observed (mm)**	**Remarks**
D ǿ	34.93± 0.03	34.90	Conforms
d ǿ	29.7± 0.1	29.75	Conforms
W	8.69 (min)	8.90	Conforms
B	54 (min)	54.32	Conforms

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

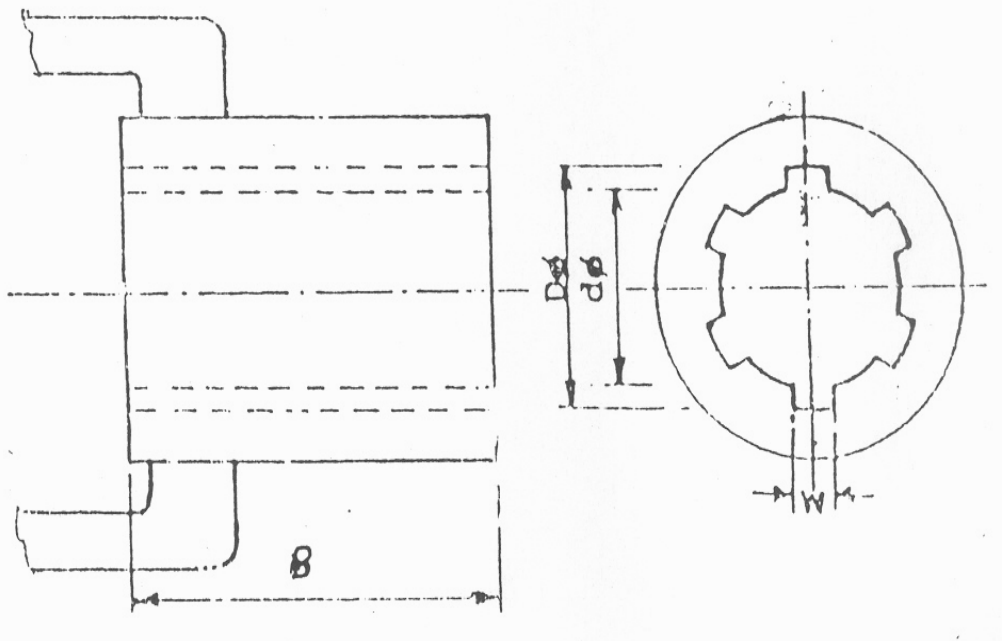

Fig. 3: Propeller Shaft Insert Dimensions, (mm)

4.11	**Overall Dimensions, mm (Ref. Fig.4)**		
	Length	:	1220
	Width	:	2350
	Height	:	1050
	Weight, Kg (apa)	:	490 (Approx)
4.12	Color	:	Red

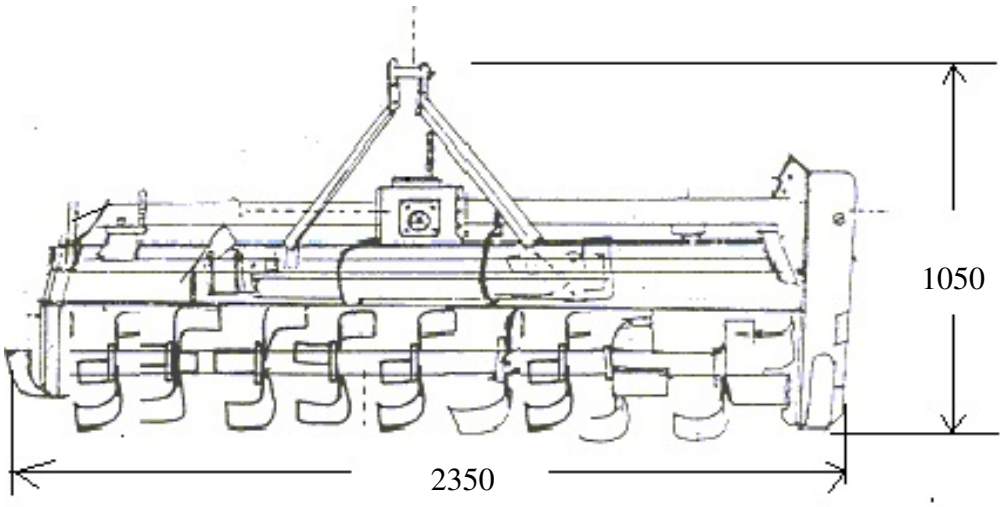

Fig. 4: Overall Dimensions of Rotavator, mm

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: 6690-2007	As observed	
1-	On Edge Portion	53±3	52.6,54.5,55.5	Conforms
2-	On Shank Portion	37-45	39.3,40.2,44.3	Conforms

5.2	**Chemical composition**			
A.	The chemical composition of blades is tabulated in Table-2			
				TABLE-2
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	0.58	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.)	0.027	Conforms

6 FIELD PERFORMANCE TEST

The field tests of the implement comprising of dry and wet land operation were conducted for 40.3 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±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	Dry land operation	Wet land operation
i	Tractor used	Swaraj 735 (XT)	
ii	Type of soil	Red	
iii	Av. Soil moisture, %	8.65 to 10.95	-----
iv	Av. Depth of standing water, cm	-----	6.12 to 7.5
v	Puddling Index, %	----	85.00 to 89.00
vi	Av. Speed of operation, kmph	2.41 to 2.61	2.43 to 2.47
vii	Field efficiency, %	81.99 to 92.33	----
viii	Av. Depth of cut/depth of puddle, cm	7.10 to 7.27	13.67 to 14.00
ix	Av. Working width, m	1.95 to 1.97	---
x	Area covered, ha/h	0.387 to 0.470	----
xi	Time required for one hectare, h	2.13 to 2.58	-----
xii	Fuel consumption		
	- l/h	5.000 to 5.380	5.600 to 5.800
	- l/ha	10.650 to 13.880	----

6.1 Rate of Work

6.1.1 Dry Land Operation

-The rate of work in Red soil was recorded as 0.387 to 0.470 ha/h and the forward speed as 2.41 to 2.61 kmph.

-The time required to cover one hectare area was recorded as 2.13 to 2.58 h.

6.1.2 Wet Land Operation

-Speed of operation varied from 2.43 to 2.47 kmph.

6.2 Quality of Work

6.2.1 Dry land operation

-The depth of operation was recorded as 7.10 to 7.27 cm.

-The field efficiency was recorded as 81.99 to 92.33 %.

6.2.2 Wet Land Operation

-Depth of puddle was recorded as 13.67 to 14.00 cm.

-Puddling index was recorded as 85.00 to 89.00 %

6.2.3 Fuel consumption

- l/h	5.000 to 5.380	5.600 to 5.800
- l/ha	10.650 to 13.880	----

6.3 WEAR OF BLADES

6.3.1 On Mass basis

Wear of hatchet blades on mass basis after 40.3 hrs. Of field operation are tabulated in Table-4.

Table-4

Sl. No.	Initial mass of blade (g)	Mass after 40.3 h of operation	Loss in mass		Wear / h
			g	%	
1.	525	506	19	3.34	0.08
2.	515	498	25	4.85	0.12
3.	535	512	23	4.29	0.10
4.	520	502	18	3.46	0.08
5.	525	500	25	4.70	0.11
6.	520	504	16	3.07	0.07
7.	525	504	21	4.0	0.09
8.	520	490	30	5.76	0.14
9.	520	506	14	2.69	0.06
10.	525	500	25	4.70	0.11
11.	520	500	20	3.48	0.09
12.	530	504	26	4.90	0.12
13.	520	488	32	6.15	0.15
Remark:- Rate of hourly wear (%) on mass basis was observed as 0.06 to 0.15					

6.3.2 Wear On Dimensions basis Fig. 5: (J-Type hatched Blade)

Sl. No.	Initial Width at, mm		Width after 40.3. 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.	43.65	44.55	41.80	43..40	1.85	1.15	4.23	2.58
2.	42.54	44.93	40.94	43.73	1.60	1.20	3.76	2.67
3.	44.46	46.22	42.36	4427	2.10	1.95	4.72	4.21
4.	44.20	46.13	42.15	44.53	2.05	1.60	4.63	2.46
5.	43.50	47.08	41.55	45.78	1.95	1.30	4.48	2.76
6.	44.18	45.00	42.08	43.20	2.10	1.80	3.55	4.00
7.	44.95	47.03	43.35	45.93	1.60	1.10	3.55	2.33
8.	43.46	45.63	40.96	43.63	2.50	2.00	5.75	4.38
9.	43.68	46.62	41.58	44.77	2.10	1.85	4.80	3.96
10.	44.30	47.05	42.25	45.45	2.05	1.60	4.62	3.40
11.	43.84	46.19	41.19	44.89	1.85	1.30	4.21	2.81
12.	43.13	46.78	41.23	45.38	1.90	1.40	4.40	2.99
13.	44.17	46.08	42.02	44.28	2.15	1.80	4.86	3.90
Remark: The wear percentage of blade on dimension basis in wet & dry land opreated was recorded as 3.55 to 5.75 & 2.33 to 4.38 (%) at 65mm from edge respectively.								

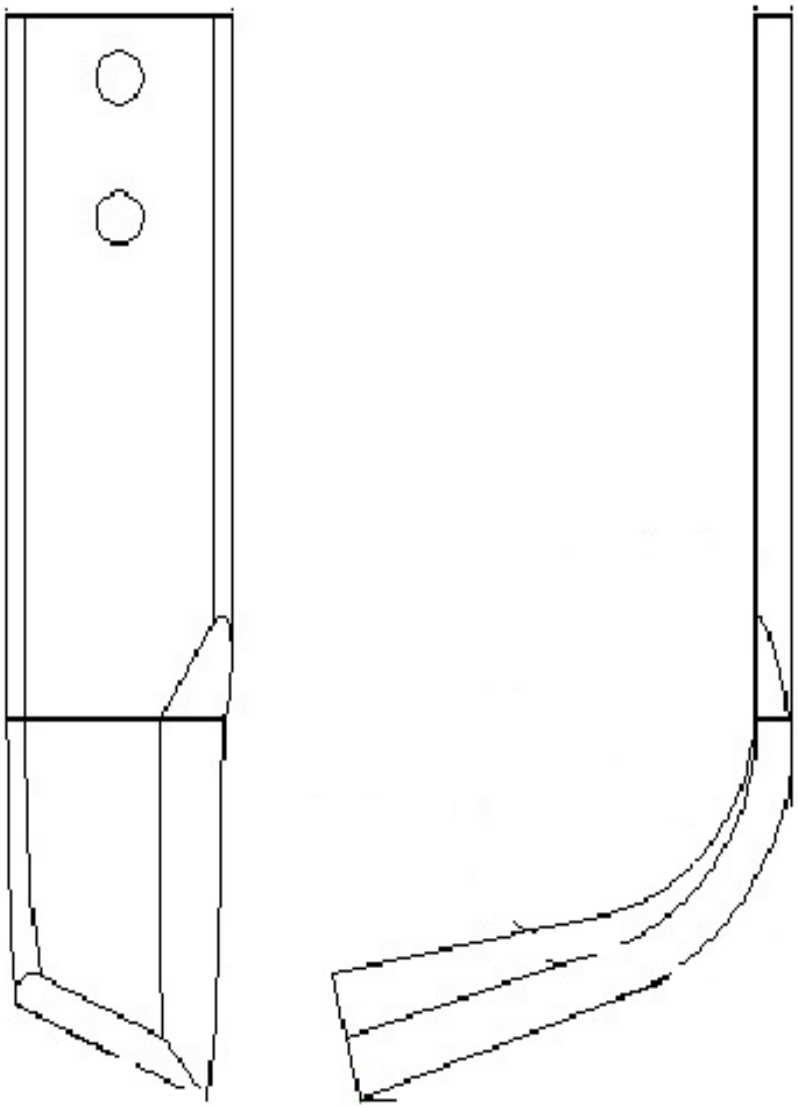

Fig. 5: Dimensions for Wear Analysis (J-Type hatched Blade)

7. EFFECTIVENESS OF SEALINGS

After completion of field test in wet land operation for 20.7 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.

Sl. No.	Location	Whether ingress of mud and/or water was observed
1.	Primary reduction gear box.	Not Notice
2.	Secondary reduction gear; drive	Not Notice
3.	Hub of rotor assembly	Not Notice

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 40.3 h operation in the field.

10. COMMENTS & RECOMMENDATIONS

i) Dimensions of power input shaft hub **Notation R** have not been provided as per requirements IS:4931-1996 (mm).

ii) 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.

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 modify the Dimensions of power input shaft (R) to comply with IS :4931-1996 (mm)
- 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-	23/6/23

THIS TEST REPORT IS VALID FROM 19.06.2023 TO 18.06.2030

ANNEXUR- 1

BRIEF SPECIFICATIONS OF THE TRACTOR USED DURING FIELD TEST

1	Make, model and type	Swaraj 735 XT (four wheel Agriculture purpose tractor)
2	Number of cylinders	3
3	Maximum PTO power, Kw	26.1
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	27.0
5	Rated engine speed, rpm	2000
6	No load engine speed during field test, rpm	1800
7	Drawbar power, Kw	23.4
8	**Drawbar pull, kN :**	
	- Without ballast	15.4
	- With ballast	22.3
9	Type of wheel equipment	Pneumatic
10	**Number & size of tyre :**	
	Front	Two, 6.00 – 16.00 (8 PR)
	Rear	Two, 13.6- 28.00 (12 PR)
11	Standard track width, mm :	
	- Front	1380
	- Rear	1420
12	Wheel base, mm	1810
13	Ballast condition	Used as un-ballasted
14	**Total Operational Mass, kg :**	
	- Front	740
	- Rear	1200
	- Total	1940

IMP-2011/413	**"AGRIZONE MULTISPEED ROTAVATOR-7 FEET" GRIZO J TYPE (200 MS)**	**COMMERCIAL**	**14**

ANNEXURE- II

OBSERVATION SHEET OF FIELD TESTING (DRY LAND OPERATION)

Type of soil : Red Soil
Place of test : Vill- Daulatpur, Patiala (Punjab)
Tractor used : Swaraj 735 (XT)
Gear used : L-1 Gear used

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.	29.04.2023	3.0	63.00	10.15	2.41	2.67	7.23	1.96	0.387	81.99	2.58	5.380	13.880
2.	30.04.2023	7.0	90.00	8.65	2.60	2.47	7.27	1.97	0.450	87.89	2.22	5.150	11.433
3.	01.05.2023	9.6	100.00	10.95	2.61	2.50	7.10	1.95	0.470	92.33	2.13	5.000	10.650

IMP-2011/413	"AGRIZONE MULTISPEED ROTAVATOR-7 FEET" GRIZO J TYPE (200 MS)	COMMERCIAL	15

ANNEXURE-III

OBSERVATION SHEET OF FIELD TESTING (PUDDLING OPERATION)

Type of soil : Red Soil
Place of test : Vill- Daulatpur, Patiala (Punjab)
Tractor used : Swaraj 735 (XT)
Gear used : L-1 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
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1.	02.05.2023	8.5	6.1	89.0	13.67	2.43	4.67	5.600	1700	1800
2.	03.05.2023	8.2	7.5	85.00	13.80	2.47	4.36	5.700	1700	1800
3.	04.05.2023	4.0	7.0	87.40	14.00	2.43	4.53	5.800	1700	1800

ANNEXURE –IV

SYMBOL AND ABBREVIATIONS

SYMBOLS:

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

II-	**SYMBOLS ASSIGNED TO SOME DERIVED UNITS**		
S.N.	**PHYSICALQUANTITY**	**NAME OF SI UNIT**	**SYMBOL**
1.	Area	Square centimeter	cm^2
		Square meter	m^2
		Hectare	ha
2	Speed/Velocity	Meter per second	m/s
		Kilometer per hour	kmph
3	Pressure	Newton per square millimeter	N/mm^2
4	Time	Minute	min
		Hour	h
5	Volume	Cubic centimeter	cm^3
		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