

**TRACTR OPERATED POTATO DIGGER  
(S KUMAR)**

**TESTED AT**

**STATE LEVEL FARM MACHINERY TRAINING AND TESTING  
INSTITUTE, RAHMANKHERA, 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 12.06.2023 TO 11.06.2030**

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP- 2011/406	TRACTR OPERATED POTATO DIGGER (S KUMAR)	JUNE	2023



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Type of test	: COMMERCIAL
Name of machine	: TRACTR OPERATED POTATO DIGGER (S KUMAR)
Test Code referred	: IS: 13818- 1999 (Reaffirmed) -Test code for Tractor operated potato digger. 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- GOBIND INDUSTRIES PVT. LTD. VILLAGE- DHARSANIYA, LUCKNOW ROAD, BARABANKI- 225001
Testing Authority	: STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, RAHMANKHERA, HARDOI ROAD LUCKNOW, U.P. - 226101
Period of test	: DECEMBER 2022 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 disc and blades.
- iii) Field performance and suitability of machine for digging potato crops with regards 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: 13818-1999 (Reaffirmed)- Test code for tractor operated potato digger shakers.
- 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 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 2200 RF, 01,02,03,04 were available and Sr. No 22001 RF was selected for testing

## 4. BRIEF DESCRIPTION

Potato digger shakers is mounted type tractor PTO operated machine which digs out potatoes planted in two rows on the ridge. Blades at an inclination enter the potato zone digging out the potatoes while the tractor moves forward.

PTO shaft gives drive to a gear box. V- Belt pulley fixed at out – shaft of gear box drives the elevator Round bar conveyor on which potatoes are conveyed and dropped on the ground behind the machine.

## 5. SPECIFICATION

5.1.1 General	
Name and address of manufacturer/applicant	: M/S- Gobind Industries Pvt. Ltd. Village- Dharsaniya, Lucknow Road, Barabanki- 225001
Name of the machine	: Tractor operated Potato Digger
Type	: Tractor Mounted
Make	: S.KUMAR
Brand	: S.KUMAR
Required hr. power (apa)	: 35-75
Model	: S.KUMAR
Year of manufacture	: 2022-23
Serial No.	: 22001 RF

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<b>5.1.2</b>	<b>Brief specification of prime mover used</b>		
	Type	:	Four wheel, Drive agricultural purpose type.
	Make and model	:	Mahindra 475 DI
	Chassis No.	:	12135255
	Max. PTO Power Kw	:	30.30
	Engine speed for field operation recommended by applicant (r.p.m.)	:	1300
	Year of manufacture	:	2007
<b>5.2</b>	<b>BLADE</b>		
	Type	:	M.S. plate Plain
	Number	:	1
	Length (mm)	:	1145
	Width (mm)	:	100
	Inclination (°)	:	28° (Fixed)
	Clearance from ground (mm)		
	Minimum	:	30
	Maximum	:	41
	Clearance from transmission shaft casing, (mm)	:	575
	Thickness (mm)	:	8.0
	Distance from center to center of blades (mm)	:	573
<b>5.3</b>	<b>MAIN FRAME</b>		
	Type	:	M. S. Pipe box angle section and M.S. flat
	M.S. box Size (mm)	:	1325×50×50
	M.S. box (mm)	:	50×50
	Size of Angle section (mm)	:	1800×50×5
	Size of M.S Flat, (mm)	:	590×50×16
	Number and size of hole for mounting the blade	:	Five and (15.60 Ø)
	Size of bolt (mm)	:	34.75×13.8×1.5
	Hole spacing (mm)	:	265
	Method of fixing	:	M.S box, M.S angle section and M.S. flat are welded to each other.
<b>5.4</b>	<b>ELEVATOR CHAIN CONVEYOR</b>		
	Length (mm)	:	2940
	Width (mm)	:	1160
	Pitch (mm)	:	24.20
	Chain rod diameter (mm)	:	14.20
	Number of rods	:	74
	Flat belt width joining the rod (mm)	:	72
	Slope (°) fixed		
	Front side	:	39
	Rear side	:	15

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<b>5.5</b>	<b>DISC</b>		
	Diameter (mm)	:	508
	Thickness (mm)	:	5.0
	Number	:	02
	Spacing (mm)	:	1158
	Hub Diameter (mm), No & type of bearing	:	36.0 (02) bearing (6207) in each disc.
<b>5.6</b>	<b>TRANSMISSION</b>		
	Rear pulley diameter (mm)	:	240 (Ø)
	Front pulley diameter (mm)	:	178 (Ø)
	V-belt size, number	:	B-132, (four)
	Reduction ratio	:	1:0.74
	V-belt tightened, width (mm)	:	Slot provided in the frame & Tightened by Nuts & bolts.
	Diameter of casing of output shaft (mm)	:	39 (Ø)
	Diameter of rear drive shaft (mm)	:	38 (Ø)
	Diameter of idler shaft (mm)	:	38 (Ø)
	Diameter of agitator shaft (mm)	:	37 (Ø)
	Diameter of idler roller shaft (mm)	:	36 (Ø)
	Diameter of front idler shaft (mm)	:	37 (Ø)
	Driving sprocket teeth (nos.)	:	18
<b>5.7</b>	<b>SAFETY FEATURES</b>		
	P T O guard	:	Not Provided
	v- belt guard	:	Not Provided
<b>5.8</b>	<b>HITCH</b>		
	Type	:	Three Point linkage (Pyramid)
	Shape	:	Pyramid
	Material of construction	:	M.S. flat
	Size	:	680×65×10 (Front) & 1630×65×10 (Rear) side respectively.

<b>5.8.1</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	25.04	<b>Does not conform</b>
<b>(b)</b>	Diameter of hitch pin hole(B)	25.70 to 25.91	25.83	Conforms
<b>(c)</b>	Width between outer faces of yoke (E)	86 (Max.)	76.07	Conforms
<b>(d)</b>	Width between inner faces of yoke (F).	52 (min)	55.01	Conforms

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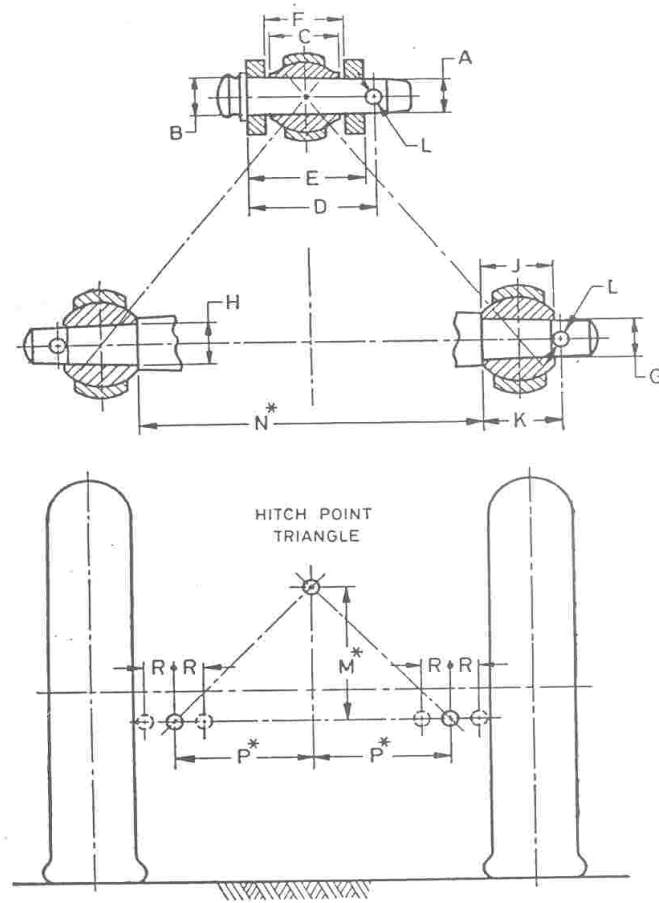
(e)	Linch pin hole distance(D)	93 (min)	108.21	Conforms
<b>II</b>	<b>Lower hitch points</b>			
(a)	Dia. of hitch pin	27.79 to 28.0	27.92	Conforms
(b)	Linch pin hole distance (K)	49 (Min.)	57.0	Conforms
<b>III</b>	<b>Diameter of linch pin hole</b>			
(a)	Upper hitch pin (L)	12 (min)	12.07	Conforms
(b)	Lower hitch pin	12 (min)	12.05	Conforms
<b>IV</b>	<b>Mast height (M)</b>	510 (min.)	510	Conforms
<b>V</b>	<b>Lower hitch point span (N)</b>	823.5 to 826.5	660 (fixed)	<b>Does not conform</b>

<b>5.9</b>	<b>MAST</b>		
	Type	:	M.S. plate and flat fabrication
	Size of flat, mm	:	670×65×10 (front) & 1640×65×10 (Rear) Respectively.
	Shape	:	Pyramid

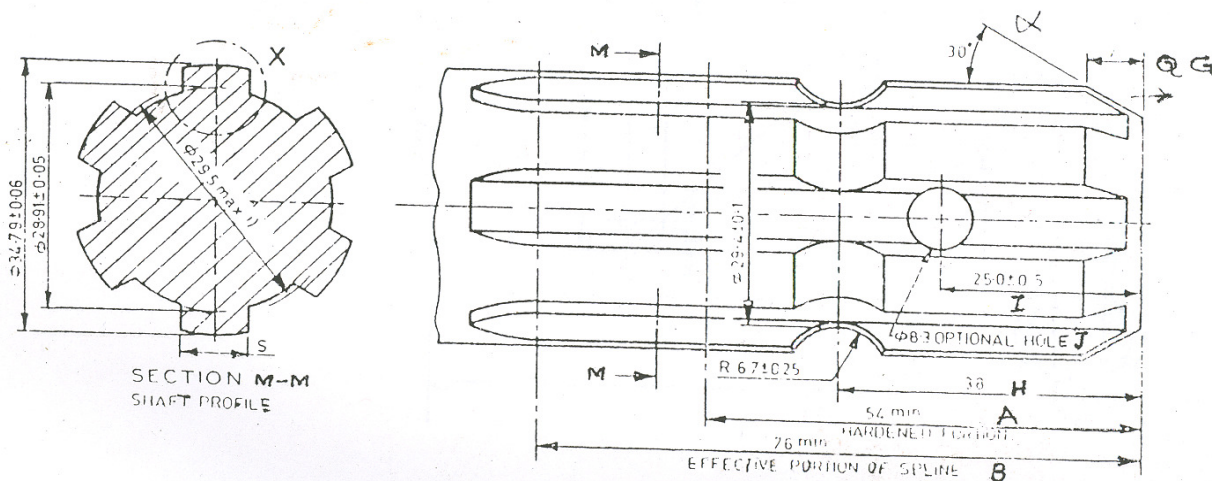
<b>5.10</b>	<b>POWER TRASMISSION SYSTEM</b>		
	Method of transmission	:	Differential pinion receives drive from PTO and transmits power to both side axels and one axel front round rods hub and other drives the back Round pipes.
<b>5.10.1</b>	<b>Dimensions of power input shaft (Ref. Fig. 2)</b>		
<b>Notation</b>	<b>As per IS:4931-1996 (mm)</b>	<b>As observed (mm)</b>	<b>Remarks</b>
D $\phi$	34.79 $\pm$ 0.06	31.31	<b>Does not conforms</b>
d $\phi$	28.91 $\pm$ 0.05	28.93	Conforms
S	8.69 (max.)	8.39	Conforms
R	6.7 $\pm$ 0.25	4.27	<b>Does not conforms</b>
$\alpha$	30°	30°	Conforms
Q	7.0	3.0	<b>Does not conforms</b>
H	38.0	38.0	Conforms
A	54.0 (min.)	61.68	Conforms
B	76.0 (min.)	73.72	<b>Does not conforms</b>



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



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

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<b>5.12</b>	<b>PROPELLER SHAFT</b>		
	Type	:	Telescopic with two segments have 06 sapling.
	<b>Length of shaft (mm)</b>		
	-- Minimum	:	570
	-- Maximum	:	665
	Mass of shaft, kg	:	13.00
	Provision for locking	:	Locking pipe provided

<b>5.12.1</b>	<b>Propeller shaft hub dimensions</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	29.75	Conforms
W	8.69 (min)	8.75	Conforms
B	54 (min)	55.05	Conforms
<b>5.13</b>	<b>VISUAL OBSERVATION AND PROVISION FOR ADJUSTMENTS</b> (Clause 6.1.1(c)), 6.2 (a) and 8.3 of IS: 13818-1999		
	Adequacy of protection of bearings against the ingress of dust	:	Sealed bearings provided.
	Adequacy of safety arrangements, especially at moving points	:	Provided.
	Provision for lubrication of moving parts	:	Provided
	Provision for belt tightening	:	Slot provided with nut & bolt.
	Provision for transportation	:	Two rear side transport wheel provided.
	Provision for easy changing of components requiring frequent replacement	:	Satisfactory
	Provision for anti-corrosive coatings	:	Powder paint coated
	Tightness of bolts and nuts and other fasteners	:	Properly tightened
	Depth of cut	:	By raising and lowering the disc.
	Blade inclination	:	Fixed
	Blade clearance from ground	:	By raising and lowering the disc.
	Distance from center to center of blades	:	Fixed
	Conveyor belt	:	By shifting the bearing block in to the slots.

<b>5.14</b>	<b>MATERIAL OF CONSTRUCTION</b>		
<b>S.N.</b>	<b>COMPONENT</b>	<b>:</b>	<b>MATERIAL</b>
<b>1.</b>	Frame	:	M.S Steel
<b>2.</b>	Elevator chain	:	M.S. Rod
<b>3.</b>	Blades	:	Carbon Steel
<b>4.</b>	Disc	:	Carbon Steel
<b>5.</b>	Main shaft	:	Mild Steel
<b>6.</b>	Idler shaft	:	Mild Steel
<b>7.</b>	Agitator shaft	:	Mild Steel

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8.	Sprocket	:	Alloy Steel
9.	Pulley	:	Cast Iron

<b>5.15</b>	<b>OVERALL DIMENSIONS</b>		
	Length, (mm)	:	2200
	Width, (mm)	:	1720
	Height, (mm)	:	990
	Mass, (kg)	:	720 (apa)
	Color	:	Blue



**Fig. 3: Dimensions of Overall Dimensions, mm**

## 6.0 RUNNING IN

The tractor operated potato digger was run-in for 1.0 hrs. Nut and bolt were tightened and lubrication done before actual test.

## 7.0 TEST AT NO- LOAD

The potato digger was operated for one hour at 1300 engine rpm without load. Operation of potato digger was found satisfactory and no abnormality noticed during no load running test. Fuel consumption of Mahindra 475 DI tractor was observed 3.100 to 3.500 l/h

## 8.0. LABORATORY TEST

### 8.1 a) Wear of soil engaging components

The test implement was operated for 25.0 hours, wear of soil engaging components (cutting disc & blades) are given in **table- I**

**TABLE-I**

Cutting Disc	Initial mass of cutting disc before test (g)	Final mass of cutting disc after test (g)	Loss in mass (g)	Wear (%) by mass
1.	7760	7690	70	0.90
2.	7780	7680	100	1.28
<b>Blade</b>				
1.	6990	6780	210	3.00

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8.2 The hardness of cutting disc & blades was determined. The results of hardness test are tabulated in Table-II.

**TABLE-II**

Sl. No.	Material	Hardness as observed (HRC) IS: 6690 -2007 ( Reaffirmed)	As observed (% by weight)	Remark
1.	Cutting Disc	37-45	37.0-43.5	Conforms
2.	On Edge portion	37-45	38.0-44.0	Conforms

<b>8.3</b>	<b>Chemical composition</b>
	The chemical composition of blades and cutting disc is tabulated in Table-III

**TABLE-III**

Blade				
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	0.59	Conforms
2.	Silicon (Si)	1.50 to 2.0	1.74	Conforms
3.	Manganese (Mn)	0.50 to 1.0	0.88	Conforms
4.	Sulphur (S)	0.05 (max.)	0.003	Conforms
5.	Phosphorous (P)	0.05 (max.)	0.020	Conforms
Cutting Disc				
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	0.57	Conforms
2.	Silicon (Si)	1.50 to 2.0	1.74	Conforms
3.	Manganese (Mn)	0.50 to 1.0	0.87	Conforms
4.	Sulphur (S)	0.05 (max.)	0.003	Conforms
5.	Phosphorous (P)	0.05 (max.)	0.020	Conforms

## 9 FIELD PERFORMANCE TEST

The field test of the implement was conducted for 25.0 hrs. 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 to VII and summarized in Table-IV.

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**TABLE-IV**

**Summary of field performance**

Sl. No.	Parameters	Observation
1.	Tractor used	Mahindra 475 DI
2.	Type of soil	Sandy loam
3.	variety of crop	KUFARI GANGA
4.	Av. Soil moisture, %	10.5-12.5
5.	Soil potato ratio	
	Before digging	5.80-7.26
	After digging	14.55-20.33
6.	Separation index	1.16-2.50
7.	Conveyor loss	Nil
8.	Av. Speed of operation, kmph	1.48-1.67
9.	Av. Wheel slippage (%)	3.30-4.33
10.	Area covered (ha/h)	0.177-0.213
11.	Time required for one hectare (h)	4.69-5.65
12.	Fuel consumption (l/h)	3.100-3.500
13.	Potato digging (kg/h)	5980-6810
14.	Damage analysis of skinned (%)	1.08-1.52
15.	Damage analysis of badly damaged (%)	0.53-0.81
16.	Depth of cut (cm)	18.17-18.83

**9.1 Rate of work:**

The rate of work was assessed by the area covered and output of the potato digger 0.177 to 0.213 ha/h was covered by the potato digger with an output of 5980 to 6810 kg/h potatoes.

**9.2 Quality of work:**

Quality of work is assessed by the percentage of damage analysis of skinned and badly damaged ranged between 1.08 to 1.52 and 0.53 to 0.81 %.

**9.3 Long run test:**

Potato digger was operated for 25.0 Hrs. with continuous run for 25.0 Hrs. during the test no break down neither occurred nor any repair conducted in the potato digger.

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**10. EASE OF OPERATION, ADJUSTMENTS & SAFETY**

- 10.1 The propeller shaft has telescopic sections with universals joints, to adjust the length of drive shaft which is adequate.
- 10.2 The drive shaft (universal coupling shaft) is provided with shear bolt for safety.
- 10.3 Operator has to get down from tractor for making adjustment in potato digger.

**11. DEFECTS, BREAKDOWNS AND REPAIRS**

No breakdown occurred during 25.0 hrs. Operation in the field.

**12. COMMENTS & RECOMMENDATIONS**

- i) The dimensions of three point linkage system upper hitch only point (a) and Lower hitch point span (V) are not conforming to the requirement of As per IS:4468-2007 (pt.- I) (mm)
- ii) Dimensions of power input shaft notation (D $\phi$ , R, Q, B) have not been provided requirement of As per 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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13. LITERATURE :






The manufacturer has provided the literature of machine in a single leaflet where in off season storage technique are not there . Therefore, the manufacturer should develop a manual in Hindi or English & other regional languages as per IS: 8132-1983 for guidance of users & technical personnel.

14. APPLICANT'S COMMENTS:

- ❖ We will modify the dimensions of three point linkage system to comply as per requirement of As per IS: 4468-2007 (pt.-I) (mm) at our production level before the commercial sale of machine.
- ❖ We will modify of dimensions of power input shaft notation as per requirement of As per IS: 4931-1996 (mm) at our production level before the commercial sale of machine.
- ❖ We will ensure arrangement on machine as per requirement at our production level before commercial sale.

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-	

**THIS TEST REPORT IS VALID FROM 12.06.2023 TO 11.06.2030**

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**ANNEXURE-1**

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

1	Make, model and type	Mahindra 475 DI, Four wheel Agriculture purpose tractor
2	Number of cylinders	04
3	Maximum PTO power, Kw	30.3
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	27.2
5	Rated engine speed, rpm	2300
6	No load engine speed during field test, rpm	1800
7	Drawbar power, Kw	27.1
8	<b>Drawbar pull, kN :</b>	
	- Without ballast	27.1
	- With ballast	27.8
9	Type of wheel equipment	2 Wheel drive
10	<b>Number &amp; size of tyre :</b>	
	Front	Two, 6.00-16.8-PR
	Rear	Two, 12.4-28-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**

Place of test : Barabanki

**FIELD DATA FOR WEEDS**

<b>S. No.</b>	<b>Type of weeds</b>	<b>Wet mass/ unit area (g/m<sup>2</sup>)</b>	<b>Dry mass/ unit area (g/m<sup>2</sup>)</b>
<b>1.</b>	Green weeds	1.000	NIL
<b>2.</b>	Green weeds	NIL	NIL
<b>3.</b>	Green weeds	2.250	NIL
<b>4.</b>	Green weeds	1.500	NIL

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**ANNEXURE-III**

**FIELD DATA OF POTATO DIGGER**

Place of test : Barabanki  
 Tractor used : Mahindra-475 DI  
 Gear used : L-1  
 Name of variety : KUFARI GANGA

<b>Test no</b>	<b>Topography</b>	<b>Soil type</b>	<b>A.V Row to row spacing (cm)</b>	<b>A.V Width of top (cm)</b>	<b>A.V with of Ridge bottom (cm)</b>	<b>A.V Height of ridge (cm)</b>	<b>A.V Soil moisture (%)</b>	<b>Length of run (m)</b>	<b>Gear used</b>	<b>Throttle setting</b>	<b>A.V Wheel slippage (%)</b>	<b>A.V Depth of potato zone (cm)</b>
<b>1</b>	Level	Sandy loam	64.00	30.67	46.667	20.50	10.5	100.00	L-1	1200/1300	3.30	16.50
<b>2</b>	Level	Sandy loam	64.33	31.00	51.67	21.83	12.5	140.00	L-1	1200/1300	4.33	17.67
<b>3</b>	Level	Sandy loam	63.17	30.83	60.33	21.50	10.5	71.00	L-1	1200/1300	4.20	16.90
<b>4</b>	Level	Sandy loam	63.33	30.17	48.50	23.67	11.5	71.00	L-1	1200/1300	3.93	17.00

<b>IMP-2011/406</b>	<b>TRACTOR OPERATED POTATO DIGGER (S KUMAR)</b>	<b>COMMERCIAL</b>	<b>15</b>
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**ANNEXURE-IV**

Place of test : Barabanki  
Tractor used : Mahindra-475 DI  
Gear used : L-1  
Name of variety : Kufari Ganga

Test no	Duration of test	Duration of test (hrs)	Speed of operation (kmph)	A.V Depth of cut (cm)	Rate of work (out put)			Fuel consumption (l/h)	Damage analysis (%)			Losses (%)
					Kg/h	Ha/h	Time required for one (ha) (h)		Skinned (%)	Damaged	Badly damaged (%)	
<b>1</b>	27-12-22	6.0	1.67	18.33	5980	0.200	5.00	3.370	1.52	Nil	0.81	Nil
<b>2</b>	28-12-22	6.0	1.55	18.17	6700	0.182	5.49	3.100	1.32	Nil	0.69	Nil
<b>3</b>	29-12-22	6.0	1.48	18.27	5800	0.213	4.69	3.500	1.08	Nil	0.53	Nil
<b>4</b>	30-12-22	7.0	1.54	18.53	6810	0.177	5.65	3.430	1.29	Nil	0.66	Nil

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**ANNEXURE- V**

**FIELD PERFORMANCE DATA**

Test no	Ridge length (m)	Before digging (in 5.0 m <sup>2</sup> )			After digging & collected at the rear of canvas (in 5.0 m <sup>2</sup> )			Soil potato ratio		Separation index (1-Ra/Rb)	Mass of potatoes under canvas (kg)	Conveyor loss (%)
		Mass of soil potato mix collected at the canvas	Mass of Soil	Mass of Soil Potato	Mass of soil potato mix collected at the canvas	Mass of Soil	Mass of Soil Potato	Before Digging (Rb)	After digging (Ra)			
1.	100.00	180.00	150.00	23.00	24.00	22.600	1.220	6.52	18.52	1.84	Nil	Nil
2.	140.00	158.20	138.00	19.00	21.500	21.200	1.350	7.26	15.70	1.16	Nil	Nil
3.	71.00	165.00	146.00	22.500	29.500	27.500	1.890	6.49	14.55	1.24	Nil	Nil
4.	71.00	196.00	156.67	27.00	32.500	30.500	1.500	5.80	20.33	2.50	Nil	Nil

<b>IMP-2011/406</b>	<b>TRACTOR OPERATED POTATO DIGGER (S KUMAR)</b>	<b>COMMERCIAL</b>	<b>17</b>
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**ANNEXURE-VI**

**SIZE OF POTATO (POTATO INDEX)**

<b>S. NO.</b>	<b>Length (L)</b>	<b>Width (W)</b>	<b>Thickness (T)</b>	<b>Index (I)</b>	<b>S. NO.</b>	<b>Length (L)</b>	<b>Width (W)</b>	<b>Thickness (T)</b>	<b>Index (I)</b>
<b>1</b>	76.10	56.66	39.00	262.08	<b>12</b>	48.70	35.80	28.20	234.92
<b>2</b>	67.60	61.78	45.40	162.92	<b>13</b>	65.30	60.00	42.80	166.07
<b>3</b>	86.45	59.85	42.50	293.82	<b>14</b>	60.30	45.60	40.20	198.35
<b>4</b>	38.62	54.40	43.56	62.94	<b>15</b>	40.45	38.30	30.20	141.46
<b>5</b>	62.50	38.20	37.38	273.56	<b>16</b>	50.20	42.00	38.00	157.90
<b>6</b>	69.13	61.50	46.20	168.20	<b>17</b>	47.80	38.30	32.60	182.99
<b>7</b>	64.50	58.00	39.00	183.92	<b>18</b>	58.30	42.00	36.30	222.94
<b>8</b>	59.00	45.30	35.00	219.55	<b>19</b>	62.10	50.30	40.20	190.72
<b>9</b>	46.90	30.40	28.12	257.31	<b>20</b>	36.00	28.20	24.18	190.06
<b>10</b>	45.70	32.50	25.60	251.02	<b>21</b>	70.20	60.20	41.52	197.16
<b>11</b>	70.70	58.50	34.00	251.31	<b>22</b>	63.00	40.30	36.20	277.27

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**ANNEXURE –VII**

**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
		Ton	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	Maximum	Min	
7	Minimum	Max	

**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