COMMERCIAL TEST REPORT

REPORT NO.: IMP-2011/415
MONTH- JULY 2023

सत्यमेव जयते

POTATO PLANTER
(S KUMAR)

TESTED AT

STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, RAHMANKHERA, 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 10.07.2023 TO 09.07.2030

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP-2011/415	POTATO PLANTER (S KUMAR)	JULY	2023

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Type of test	:	COMMERCIAL
Name of machine	:	POTATO PLANTER (S KUMAR)
Test Code referred	:	IS: 11893-2002 (Reff.)- Specification for potato planter, semi-automatic IS: 9856-1981- Test code for potato planters. IS: 4468-2007- Agricultural wheeled tractors-rear mounted three point linkage. IS: 3342-1998 Test code for Chemical composition.
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 JULY 2023

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	**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

CONTENTS

1. SCOPE OF TEST

The scope of the test was to check and assess the followings.

i) Specification
ii) Hardness & chemical analysis of critical components.
iii) Field performance and suitability of machine for sowing potato seeds 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: 11893-2002 (Reff.)- Specification for potato planter, semi automatic.
ii) IS: 9856-1981- Test code for potato planters.
iii) IS: 4468-2007- Agricultural wheeled tractors-rear mounted three point linkage.
iv) IS: 3342-1998 Test code for Chemical composition.

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 22025 to 22030 were available and Sr. no. 22030 was selected for testing.

4. SPECIFICATION

4.1	**General**		
	Name and address of manufacturer/applicant	:	M/S- Gobind Industries Pvt. Ltd. Village- Dharsaniya, Lucknow Road, Barabanki- 225001
	Name of the machine	:	Potato Planter.
	Type	:	Tractor mounted.
	Make	:	S KUMAR
	Model	:	S Kumar Potato Planter.
	Year of manufacture	:	2022
	Serial No.	:	22030
4. 2	**Brief specification of prime mover used**		
	Type	:	Four wheel, general purpose two wheel drive agriculture tractor
	Make and model	:	Mahindra-475 (DI)
	Chassis No.	:	30.3
	Max. PTO Power Kw/ps	:	2018
4.3	**FURROW OPENER**		
	Number of furrow opener	:	Two
	Method of changing of furrow opener Spacing	:	provided
	Range of spacing(mm)	:	90
	Method of fixing	:	Two straight MS element fixed & bolted in triangular shape, which work as soil opener & seed dropped in center of shovels.

4.4	**RIDGERS**		
	Type	:	Two plain concave MS flat are arranged in concavity as like to bund former and make ridges.
	Number of ridges	:	Two
	Method of changing of ridge spacing	:	Not provided
	Range of spacing	:	Not provided
	Soil covering device	:	Provided on behind of ridge
	Method of adjustment of height of Soil covering device	:	Provided
	Method of adjustment of height of Soil covering device	:	Fixed, 250 mm
4.5	**METERING MECHANISM**		
4.5.1	**Seed metering mechanism**		
	Type	:	Elevator type
	Method of feeding seeds to metering device	:	The seeds are filled in to hopper and metered by elevator.
	No. of cups on elevator	:	10 × 2
	Method of arrangement & size of elevator	:	550×120×7.0
	Drive details	:	Metering device drive shaft is driven by ground wheel through chain and sprocket.
	No. of teeth on drive sprocket	:	18
	No. of teeth on driven sprocket	:	16
4.5.2	**Fertilizer metering mechanism**		
	Type	:	Roller cup type
	No. of notch	:	04
	Material	:	Fiber
	Drive details	:	Chain and sprocket
	No. of teeth on drive sprocket	:	13
	No. of teeth on driven sprocket	:	20
	Size of fertilizer tube		
	Length	:	625
	Inner diameter	:	35.51
	Outer diameter	:	41.93
	Thickness	:	3.54

4.6	**GROUND WHEEL DETAILS**		
	No. of wheels	:	One
	Type of wheels	:	M.S. with lugs type
	Diameter (mm)	:	550 Ø
4.7	**FRAME**		
	Type	:	M.S.square, welded fabrication
	Provision for changing of row spacing	:	Provided.
	Method of transmitting power to Feed shaft	:	Through chain and sprocket.

4.8	**HOPPER**		
	Capacity		
	Seed (kg)	:	100
	Fertilizer (kg)	:	70
	Type	:	M.S. sheet fabricated
	Thickness of hopper sheet (mm)	:	1.83
4.9	**TYPE OF HITCH AND ITS DETAILS**		
	Type	:	Three point linkage
	Shape	:	Pyramid type
	Material of construction	:	M.S. flat

4.9.1	**Three point linkage (Cat. II) (Refer fig.1) IS-4468-2007**			
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	25.35	Conforms
(b)	Diameter of hitch pin hole (B)	25.70 to 25.91	26.28	**Does not conforms**
(c)	Width between outer faces of yoke (E)	86 (Max.)	77.26	Conforms
(d)	Width between inner faces of yoke (F).	52 (min)	57.20	Conforms
(e)	Linch pin hole distance(D)	93 (min)	101.21	Conforms
II	**Lower hitch points**			
(a)	Dia of hitch pin	27.79 to 28.0	27.90	Conforms
(b)	Linch pin hole distance (K)	49 (Min.)	72.08	Conforms
III	**Diameter of linch pin hole**			
(a)	Upper hitch pin (L)	12 (min)	12.06	Conforms
(b)	Lower hitch pin	12 (min)	10.67	**Does not conforms**
IV	**Mast height (M)**	510 (min.)	580	Conforms
V	**Lower hitch point span (N)**	823.5 to 826.5	650	**Does not conforms**

4.10	**Fertilizer Metering Control Lever & Furrow Opener Of Fertilizer Boot**		
	Material and Type	:	M.S. rod
	Total length (mm)	:	1100
	Dia. of rod (mm)	:	10
	Height from ground level (mm)	:	1130
4.11	**OVER ALL DIMENSIONS (mm)**		
	Length		1860
	Width		1630
	Height		1600
4.12	**Power requirements**		45 (apa)
4.13	**Number of greasing point**		7
4.14	**Number of oil points**		10

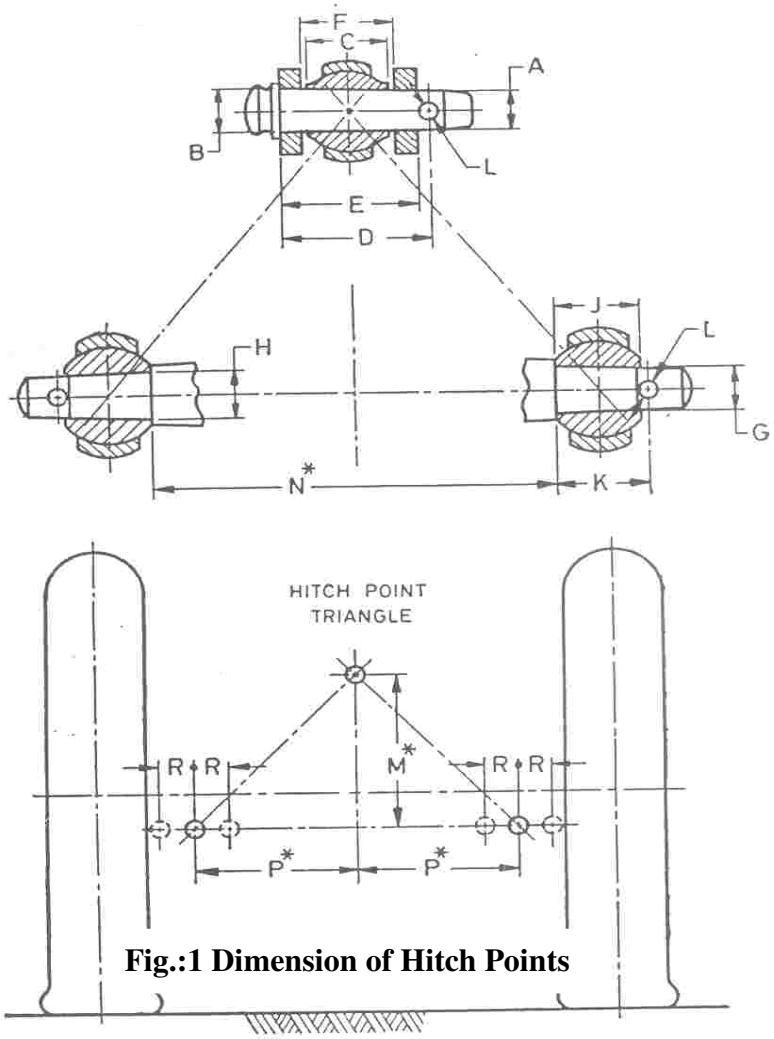

Fig.:1 Dimension of Hitch Points

FIG. 1. DIMENSIONS OF HITCH POINTS

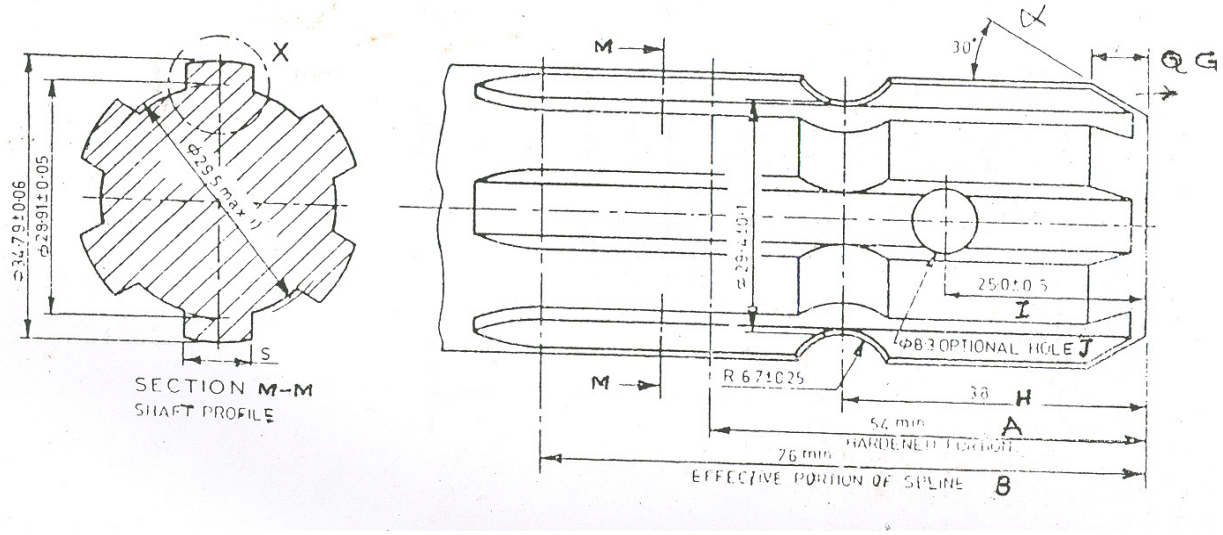

Fig. 2: Dimensions of Power Input Shaft, mm

4.15 VISUAL OBSERVATION AND PROVISION FOR ADJUSTMENTS		
Adequacy of protection of bearings against the ingress of dust	:	Bearing cover provided
Provision of lubrication of moving parts	:	Oil point and greasing point provided
Provision for belt or chain tightening	:	Slot and holes provided in the frame
Adequacy of anticorrosive coatings	:	Coated with light blue paint
Tightness of bolts, and nuts and other fasteners	:	Provided
Condition of welding of seams	:	Satisfactory
Other observation	:	Nil
Tuber distance adjustments	:	Four holes provided on the ground wheel for fixing the lugs. Tuber distance may be increased by fixing the lugs on outer holes.
Row spacing adjustments	:	Provided
Depth of planting adjustments	:	Provided
Tuber size adjustments	:	Not provided

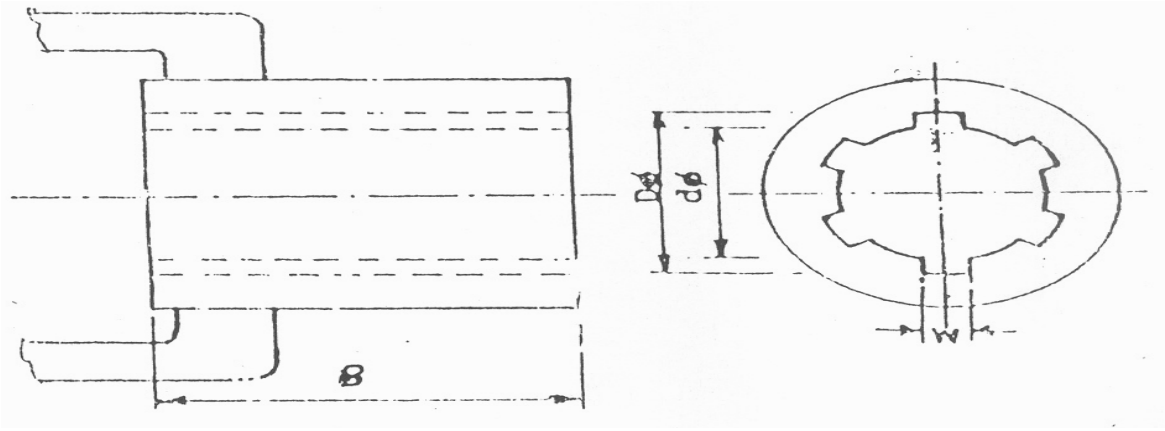

Fig. 3: Propeller Shaft Insert Dimensions, (mm)

5.0	CONFORMITY TO INDIAN STANDARD : (As per IS:11893-2002)- Specification for potato planter				
S. No	**Component**	**Material as per Indian Standards**	**Material as observed**	**Section or size (mm)**	**Remarks**
i	Frame	Mild steel	MS, box square	100×50 & 100×50	Conforms
ii	Wheel	Mild steel, cast iron, pneumatic	Mild steel	6.0 thickness	Conforms
iii	Axel and shaft	Mild steel	Mild steel	Ø- 25.46 (ferti.) Ø-32.23 (seed)	Conforms
iv	Seed box	Mild steel, Galvanized steel sheet, Plastic, Fiber glass	Mild steel	1.35 thickness	Conforms
v	Tines	Mild steel, plastic	Mild steel flat	520×45×11.5	Conforms
vi	Furrow opener	High carbon steel	High carbon steel	200×7	Conforms
vii	Seed carrying chute	Mild steel, plastic	plastic	Ø- 38.73	Conforms

viii	Seed metering mechanism	Cast iron, Mild steel, Aluminum, Brass, Gun metal, Plastics	Mild steel,	--	--
ix	Bushes	Brass, Gun metel, Nylon	Applicable	--	Conforms
x	Pully, Sprocket and gear	Cast iron, Mild steel	Mild steel,	--	Conforms
xi	Hitching mechanism	Mild steel	Mild steel,	Ø- 28.90	Conforms
xii	Feed adjusting mechanism	Mild steel, Cast iron	Applicable	Applicable	Conforms
xiii	Depth adjusting mechanism	Mild steel, Cast iron	Mild steel	Applicable	Conforms
xiv	Marker	Mild steel	Not applicable	Not applicable	**Does not conforms**
xv	Seat	Mild steel	Not applicable	Not applicable	**Does not conforms**
xvi	Foot rest	Mild steel	Not applicable	Applicable	Conforms
xvii	Bearing	--	Sealed ball bearing	205	Conforms
xviii	Share	--	Cast iron	205×75×10.28	Conforms

Clause no.	Description	Observation	Remark
Cl.4 HARDNESS	The share shall have a hardness of 350 to 450 HB when tested in accordance with IS:1500-1983	hardness of 360 to 390 HB	Conforms
Cl.5 CONSTRUCTIONAL REQUIRMENT			
5.1 Frame	It shall be rigid and strong	Rigid & strong	Conforms
5.2 Wheels	Wheels shall have bushed or dust proof bearing with provision for lubrication	Provided	Conforms
5.3 Axles and shafts	Axles and shafts shall be so attached that they can be easily removed for cleaning when required.	Seed metering drive shaft can be easily removed by removing the nut bolt of fixing bracket	Conforms
5.4 Seed box/ fertilizer box	The seed box and fertilizer box shall have adequate capacity and may have sloping bottom. The box shall be sufficiently strong and shall not buckle when fully filled with potato tubers	Capacity of seed box & fertilizer box is 90 kg & 70 kg box is strong enough and not buckling when fully fitted with potato tuber and fertilizer.	Conforms
5.4.1	The thickness of mild steel and galvanized steel sheet for box shall be not less than 1.0 mm and 0.63 mm respectively.	M.S. sheet 1.5 thickness	Conforms

5.5 Furrow openers	Furrow opener shall be ridger type with wings.	Three ridger with adjustable wings are provided	Conforms
5.6 Seed metering mechanism	Metering mechanism shall be of horizontally revolving ring type or of belt with cups	Horizontal belt with cup type seed metering mechanism is provided	Conforms
5.7 Seed carrying chute	The chute shall be of suitable length and shall be properly clamped with feed outlets of metering mechanism.	Length of belt is 2620 mm provided	Conforms
5.8 Transmission system	This may be sprocket and chain, belt and pulley or gear type with proper guards. Provision for tightening of belt and adjustment of chain shall be provided.	Sprocket and chain type transmission system is provided between ground wheel and metering device rotating shaft.	Conforms
6.0 PERFORMANCE REQUIRMENTS			
6.1	The variation in dropping of seed from each chute shall be not more than 5 percent from the average quantity obtained	The variation in dropping of seed from each chute is observed as 5 %	Conforms
6.2	The percent of germ damage shall not exceed 0.5 percent	--	N.A.
6.3	The variation in dropping due to box filling at ¼ , ½ and ¾ of rated capacity shall not exceed by 10 percent.	--	--
6.4	The variation in number of seed tubers per meter of row length shall not exceed by 10 percent.	Not applicable	Not applicable
6.5	The planter shall be able to plant tuber with 200 mm soil cover.	Planting depth was up to 100 mm but the planter has provision to plant up to 250 mm.	Conforms
6.6	The wheel slip at specified speed shall not exceed by 10 percent.	Wheel slippage is 4.66 to 6.33 %	Conforms
6.7	The percentage variation of elevating error in case of cup elevator planter shall not exceed by 10 percent.	Not applicable	Not applicable
7.0 OTHER REQUIRMENTS			
7.1	The row spacing shall be adjustable ranging from 450 to 600 mm preferably in steps of 50 mm.	The row spacing is 595 to 600 mm	Conforms
7.2	When the furrow openers are lowered to level surface, the openers shall not deviate by the more than 5 mm from the line of alignment vertically and horizontally.	No deviation is found in the furrow opener on level surface from the line of alignment.	Conforms

7.3	Proper lubrication arrangement shall be provided for all moving components except the portions exposed to seed tuber.	Greasing and oiling arrangements is provided in bearings, bushes and gears.	Conforms
7.4	Each planter shall have instruction manual containing full information of method of installation and operation of the planter. It shall also be provided with a manual containing maintenance and safety instructions, calibration chart etc.	Provided	Conforms
7.5	Each planter shall also be supplied with necessary standard tools.	Not provided	--
7.6	Each planter shall be provided with the following accessories: a. Foot rest b. Row marker; and c. Area recorder	Not applicable	--
8.0 WORKMANSHIP AND FINISH			
8.1	The welding shall be satisfactory in all respects and shall not be brittle or porous.	Welding is smooth and strong	Conforms
8.2	The components shall be free from rust and shall have a protective coating to prevent surface deterioration in transmit and storage.	All components are coated with enamel paints	Conforms
8.3	The components shall be free from pits, burns and other defects,That may be detrimental for their use.	Components are having good finish	Conforms
9.0 MARKING AND PACKING			
9.1 Marking	Each planter shall be marked with the following particulars:		
	a. Manufacturer's name and trade mark, if any	Provided	Conforms
	b. Model, code and serial number	Provided	Conforms

10 LABORATORY TEST	
10.1	Wear of soil engaging components the test implement was operated for 25.0 hours, wear of share of ridger are given in table- 2

TABLE-2

Component	S. No	Initial mass of component (g)	Final mass of component (g)	Loss in mass(g)	Wear (%)
Share	**1.**	1075	1035	40	3.72
	2.	1100	1040	60	5.45
	3.	1100	1045	55	5.0
Shovel	**1.**	3360	3160	200	5.95
	2.	3480	3180	300	8.62

10.2 CHEMICAL COMPOSTION

The chemical composition of Shovel & Tyne IS: 3342-1998 is tabulated in Table-3

TABLE-3

S. No.	Element	Shovel Composition (% of weight)		Remarks
		As per IS : 3342-1998	Observed	
1.	Carbon (C)	0.50 to 0.60	0.57	Conforms
2.	Sulphur (S)	0.05 (Max.)	0.003	Conforms
3.	Phosphorus (P)	0.05 (Max.)	0.019	Conforms
4.	Manganese (Mn)	0.50 to 1.0	0.87	Conforms
5.	Silicon (Si)	1.50 to 2.0	1.73	Conforms

S. No.	Element	Tyne Composition (% of weight)		Remarks
		As per IS : 3342-1998	Observed	
1.	Carbon (C)	0.50 to 0.60	0.58	Conforms
2.	Sulphur (S)	0.05 (Max.)	0.003	Conforms
3.	Phosphorus (P)	0.05 (Max.)	0.018	Conforms
4.	Manganese (Mn)	0.50 to 1.0	0.82	Conforms
5.	Silicon (Si)	1.50 to 2.0	1.65	Conforms

11. RUNNING IN

The tractor operated potato planter was run in for 1.0 hrs, Nuts bolts were tightened and lubrication done before actual test.

12. FIELD TEST

The field test of the implement was conducted for 25.0 hours in different soil moisture condition to assess the performance of the implement. The details of tractor used for field operation are given in annexure-I. The tractor engine speed was maintained at 1200 Engine rpm. The performance of implement is reported in Annexure III and summarized in Table-4

TABLE-4

S. No.	Parameters	Observation
1.	Tractor used	Mahindra-475 (DI)
2.	Type of soil	Sandy loam
3.	Type and variety of crop	Kufri Ganga
4.	Avg. forward speed of operation (kmph)	3.07 to 3.66
5.	Bottom width of ridge (cm)	52.49 to 58.31
6.	Avg. depth of planting (cm)	22.75 to 24.75
7.	Avg. row to row distance (cm)	65.2 to 68.7
8.	Avg. wheel slippage (%)	4.0 to 5.0
9.	Area covered (ha/h)	0.315 to 0.321
10.	Time required for one hectare (hr)	3.11 to 3.17
11.	Fuel consumption (l/hr) (l/ha)	4.500 to 4.800 12.43 to 15.238
12.	Field efficiency (%)	70.4 to 75.9
13.	Seed rate (kg/ha)	2360 to 2870
14.	Fertilizer rate (kg/ha)	129.00 to 200.00

12.1 Rate of Work

The rate of work was assessed by the area covered and output of the potato planter.
Area covered was recorded as 0.315 to 0.321 ha/h and the speed of operation as 3.07 to 3.66 kmph on L-2 gear of tractor. The time required to cover one hectare area was recorded as 3.11 to 3.17 hours.

12.2 Quality of Work:

The Depth of planting recorded as 22.75 to 24.75 cm. The field efficiency was recorded as 70.4 to 75.9 %.

12.3 Long Run Test:

The potato planter was operated for 25.0 hours with continuous run for 6.0 hours in one test. During the test no breakdown occurred nor any test conducted in the potato planter.

13. EASE OF OPERATION ADJUSTMENT & SAFETY

The potato planter is automatic feeding system.

14. DEFECTS, BREAKDOWNS & REPAIRS

No breakdown occurred during 25.0 hours of field operation.

15. COMMENTS & RECOMMENDATIONS

- The dimensions of three point linkage system Upper hitch point (b), Diameter of linch pin hole point (b) & Lower hitch point span (N) are not conforming to the requirement of As per IS: 4468-2007 (pt.- I) (mm).
- Specification of potato planter point v (xiv) & (xv) are not conforming to the requirement of As per IS: 11893-2002.
- 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.

16. LITERATURE

Literature is not provided with machine. A booklet containing figure of machine, brief specification, salient feature, servicing and maintenance schedule, precautions and calibration chart should be provided for the guidance of farmers and field personnel.

17. APPLICANT COMMENTS

- We will modify The dimensions of three point linkage system Upper hitch point (b), Diameter of linch pin hole point (b) & Lower hitch point span (N) are conforming to the requirement of As per IS: 4468-2007 (pt.- I) (mm) at our production level before the commercial used.
- We will modify the dimensions of Specification of potato planter point v (xiv) & (xv) are not conforming to the requirement of As per IS: 11893-2002, Before the commercial sale of machine.
- We will provide permanently display the quality and parameters on the machine. Before the commercial sale of machine

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

(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 10.07.2023 TO 09.07.2030

ANNEXURE-1

BRIEF SPECIFICATIONS OF THE TRACTOR USED DURING FIELD TEST

1	Make, model and type	Mahindra-475 (DI)
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	**Drawbar pull, kN :**	
	- Without ballast	27.10
	- With ballast	27.80
9	Type of wheel equipment	Pneumatic
10	**Number & size of tyre :**	
	Front	6.00-16.8 PR
	Rear	12.4- 28-12 PR
11	Standard track width, mm :	
	- Front	1230
	- Rear	1380
12	Wheel base, mm	1910
13	Ballast condition	Used as un-ballasted
14	**Total Operational Mass, kg :**	
	- Front	685
	- Rear	1165
	- Total	1850

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ANNEXURE- II

STATIONARY CALIBRATION TEST (SEED)

Forward speed (kmph)	Level of seed in hopper	Rate setting	Mass of tuber from each furrow opener (kg)		Mass of tubers from all furrow opener (kg)	Average	Seed rate (kg/ha)	Variation from mean (%)
			1	2				
5.0	Full	Max.	14.00	14.20	28.20	14.10	2820	0.49 to 0.50
		Med.	11.10	13.50	24.60	12.30	2460	0.45 to 0.54
		Min.	10.30	11.90	22.20	11.10	2220	0.46 to 0.53
	¾	Max.	13.10	12.60	25.70	12.85	2570	0.50 to 0.49
		Med.	12.00	12.80	24.80	12.40	2480	0.48 to 0.51
		Min.	8.00	7.50	16.10	8.05	1610	0.46 to 0.49
	½	Max.	15.25	14.40	29.65	14.82	2965	0.49 to 0.53
		Med.	12.00	13.60	25.60	12.80	2560	0.46 to 0.53
		Min.	9.0	10.10	19.10	9.55	1910	0.47 to 0.52
	¼	Max.	14.20	16.10	30.30	15.15	3030	0.46 to 0.53
		Med.	14.10	12.70	26.80	13.40	2680	0.47 to 0.52
		Min.	11.70	12.10	23.80	11.90	2380	0.49 to 0.50

ANNEXURE-III

STATIONARY CALIBRATION TEST (FERTILIZER)

Forward Speed (km/h)	Level of seed in hooper	Rate setting	Weight offer from furrow opener (g)				Mass of ferti. From all furrow opener (kg)	Average (g)	Ferti. rate Kg/ha	Variation from mean (%)
			1	2	3	4				
5.0	Full	Max.	1410	1520	1600	1610	6.14	1535	614.00	0.93-1.06
		Med.	1050	1100	1210	1205	4.56	1141.25	456.00	0.92-1.06
		Min.	43	62	40	42	0.187	46.75	18.70	0.78-1.21
	¾	Max.	1300	1415	1400	1618	5.73	1433.25	573.00	0.89-1.10
		Med.	1200	1000	1120	1110	4.53	1132.5	453.00	0.90-1.09
		Min.	60	57	48	50	0.215	53.75	21.50	0.88-1.11
	½	Max.	1050	1200	1200	1320	4.77	1192.5	477.00	1.09-1.36
		Med.	1020	1110	1206	1250	4.58	1146.5	458.00	0.89-1.10
		Min.	50	50	51	55	0.206	51.5	20.60	0.95-1.04
	¼	Max.	1220	1315	1200	1270	5.00	1251.25	500.00	0.94-1.03
		Med.	1160	1200	1000	1100	4.46	1115	446.00	0.90-1.09
		Min.	39	50	65	50	0.204	51	20.40	0.75-1.25

IMP: 2011/415	POTATO PLANTER (S KUMAR)	COMMERCIAL	15

ANNEXURE-IV

FIELD DATA SHEET OF POTATO PLANTER

Tractor Used- Mahindra-475 (DI)
Gear Used- L-2
R.P.M- 1200/1300

S. No	Date of test	Potato variety	Avg. speed of operation (kmph)	Avg. wheel slip (%)	Bottom width of ridges (cm)	Avg. depth of planting (cm)	Avg. width of planting (cm)	Row to row spacing (cm)	Field efficiency (%)	Avg. no of seed tuber per meter row length	Seed rate (kg/ha)	Fertilizer rate (kg/ha)	Fuel consumption	
													L/hr	l/ha
1.	22.12.22	Kufri Ganga	3.66	4.33	52.49	22.75	1.21	68.7	72.8	8.2	2830	129.00	4.500	14.01
2.	23.12.22	Kufri Ganga	3.07	5.0	58.31	24.75	1.26	65.2	75.9	8.25	2360	150.00	4.600	14.603
3.	24.12.22	Kufri Ganga	3.54	4.0	56.27	24.3	1.25	66.2	70.4	8.75	2370	200.00	4.800	15.238
4.	25.12.22	Kufri Ganga	3.40	4.0	55.28	23.4	1.35	66.0	84.4	6.75	2870	150.00	4.800	12.403

ANNEXURE –V

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	Min
7	Maximum	Max	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