



सत्यमेव जयते



**“TRACTOR MOUNTED UREA DEEP PLACEMENT APPLICATOR”  
DH SAMRIDDHI (DISTINCT HORIZON)**

**TESTED AT**

**STATE LEVEL FARM MACHINERY TRAINING AND TESTING  
INSTITUTE, REHMANKHERA, HARDOI ROAD  
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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 VALID FROM 16.03.2022 TO 15.03.2029**

TEST REPORT NO.	NAME OF THE MACHINE/IMPLEMENT, MODEL NO.	MONTH	YEAR
IMP-2011/356	“UREA DEEP PLACEMENT APPLICATOR” DH SAMRIDDHI (DISTINCT HORIZON)	MARCH	2022



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Type of test	:	COMMERCIAL
Name of machine	:	“UREA DEEP PLACEMENT APPLICATOR” DH SAMRIDDI (DISTINCT HORIZON)
Test Code referred	:	IS : 6316-1993 (Reaffirmed 2009); Sowing Equipment - Seed cum fertilizer Drills – Test Code IS : 6813-2000 (Reaffirmed 2006); Sowing equipment - Seed cum fertilizer Drill- Specification IS : 4468-1997 (Part-1) (Reaffirmed 2012); Agricultural wheeled tractors-Rear mounted three-point linkage: Part 1 Categories 1, 2, 3, & 4
Test requested by	:	M/S DISTINCT HORIZON PVT-LTD, G-1 PRAKASH SQUARE, TIKRA, KALLI POORAB RAIBARELI ROAD, LUCKNOW-226301
Testing Authority	:	STATE LEVEL FARM MACHINERY TRAINING AND TESTING INSTITUTE, REHMANKHERA, HARDOI ROAD, LUCKNOW, U.P. - 226101
Period of test	:	OCTOBER 2021 TO MARCH 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.
- 

### 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 test was to check and assess the following:-

- 1.1 Specification of the UREA DEEP PLACEMENT APPLICATOR;
- 1.2 Laboratory tests to find out;
  - Uniformity in Urea metering at the specified rate setting for Urea including maximum setting.
  - Variation in Urea rate due to different depths of fertilizer in fertilizer boxes
  - To assess the percentage of Urea damage in metering system
  - Variation in Urea rate due to change in speed
- 1.3 Field tests to evaluate the suitability of Urea Deep Placement Applicator for placing Urea with regard to:-
  - Quality of work
  - Rate of work
  - Labour requirement
  - Power requirement
  - Ease of operation and adjustment

## **2. TEST PROCEDURE**

The following test codes were followed to test the Urea Deep Placement Applicator.

- a) IS : 6316-1993 (Reaffirmed 2009); Sowing Equipment - Seed cum fertilizer Drills – Test Code
- b) IS : 6813-2000 (Reaffirmed 2006); Sowing equipment - Seed cum fertilizer Drill-Specification
- c) IS : 4468-1997 (Part-1) (Reaffirmed 2012); Agricultural wheeled tractors-Rear mounted three-point linkage: Part 1 Categories 1, 2, 3, & 4

## **3. METHOD OF SELECTION**

Machine was Randomly selected by representative of the testing authority out of 07 machines made available for selection from their periodical production line at manufacturer’s site. machines of Sr. No. DH/TSA/13 to Sr. No. DH/TSA/19 were available and Sr. No. DH/TSA/13 was selected for testing.

## **4. SPECIFICATIONS**

### **4.1 GENERAL**

- |                                              |                                                                                                               |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 1. Name & address of manufacture / applicant | M/S DISTINCT HORIZON PVT-LTD,<br>G-1 PRAKASH SQUARE, TIKRA, KALLI<br>POORAB RAIBARELI ROAD,<br>LUCKNOW-226301 |
| 2. Name of Implement                         | UREA DEEP PLACEMENT APPLICATOR.                                                                               |
| 3. Type                                      | Tractor Drawn, Mounted Type.                                                                                  |
| 4. Make                                      | DH SAMRIDDHI                                                                                                  |
| 5. Serial No.                                | DH/TSA/13                                                                                                     |

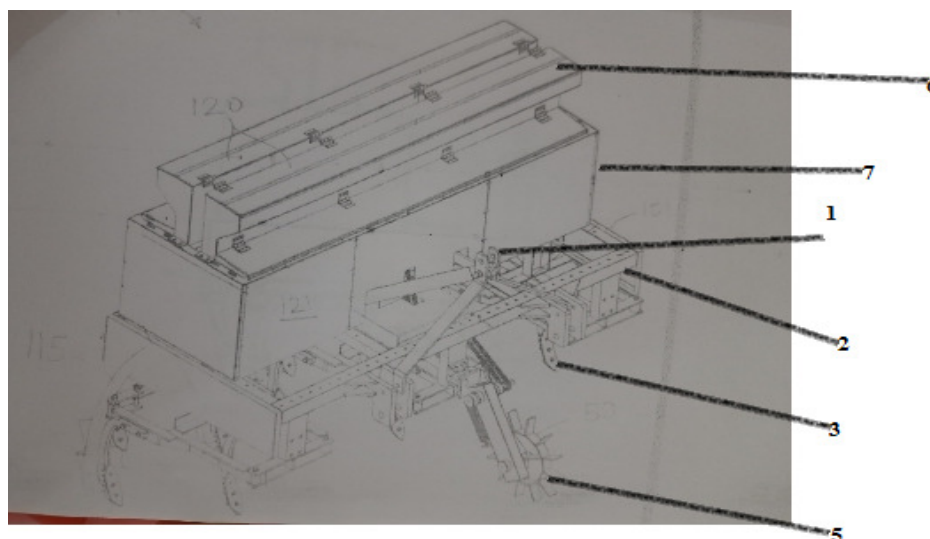
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- |                                                                      |                                                                     |
|----------------------------------------------------------------------|---------------------------------------------------------------------|
| 6. Model                                                             | 2021-22                                                             |
| 7. Brand                                                             | DISTINCT HORIZONE                                                   |
| 8. Nominal width, mm                                                 | 2060                                                                |
| 9. Year of manufacture                                               | 2021-2022                                                           |
| 10. Different fertilizer for which the machine is designed to place. | Urea Pellets (Only) & Institute Farm                                |
| 11. Source of power                                                  | Tractor                                                             |
| Recommended traveling speed of the machine, kmph :                   | Not specified. However, during test it was observed as 3.28 to 3.43 |
| :                                                                    | Not specified. However, during test                                 |
| 12. Recommended power of tractor                                     | Mahindra 605 (DI) Arjun (Novo)                                      |
| 13. Power required (apa) :                                           | 40 hp and above.                                                    |

## 4.2 CONSTRUCTIONAL DETAILS (Refer Fig.1)

### 4.2.1 Main Frame

- |                                                                       |                                                                                                                                     |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1. Main frame details :                                               | A rectangular mainframe is fabricated by welding construction, made of MS square bars and MS angles are provided on the main Frame. |
| 2. Size of square bar, mm :                                           | 1805×80×80                                                                                                                          |
| 3. Dimensions of frame, mm                                            |                                                                                                                                     |
| Length :                                                              | 900                                                                                                                                 |
| Width :                                                               | 1805                                                                                                                                |
| 5. Size of MS sheet, flat & angle for supporting fertilizer box, mm : | 1805×35×3.5 (2 nos.)<br>430×35×3.5 (2 nos.) both side                                                                               |



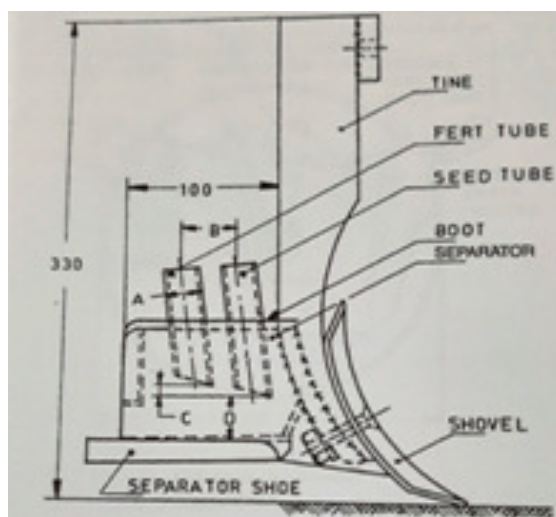
- |                               |                        |                   |
|-------------------------------|------------------------|-------------------|
| 1. Hitch point                | 2. Chassis             | 3. Furrow Openers |
| 4. Stand                      | 5. Transmission system | 6. Hopper         |
| 7. Picker boxes and its frame |                        |                   |

(Refer Fig-1) UREA DEEP PLACEMENT APPLICATOR

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#### 4.2.2 Tyne (Refer Fig-2)

- |                                            |           |                                                         |
|--------------------------------------------|-----------|---------------------------------------------------------|
| 1. No. of tynes                            | :         | 08+04 (optional)                                        |
| 2. Type                                    | :         | Reversible                                              |
| 3. Material                                | :         | M.S sheet                                               |
| 4. Arrangement of tyne on mainframe        | :         | 04 at front & 04 at rear. Respectively & 2,2 (optional) |
| 5. Spacing of tynes, mm                    | :         | 425                                                     |
| 6. Provision for adjustment of row spacing | :         | Threading screw provided.                               |
| 7. Dimensions of tynes, mm                 |           |                                                         |
|                                            | Length    | : 613                                                   |
|                                            | Width.    | : 45                                                    |
|                                            | Thickness | : 19                                                    |



(Refer Fig-2)

#### 4.2.3 Furrow Openers

- |                           |   |                        |
|---------------------------|---|------------------------|
| 1. Type                   | : | Reversible Shovel Type |
| 2. No. of furrow openers  | : | 8 (04 optional)        |
| 3. Arrangement of openers | : | Welded from the sheet. |

#### 4.2.4 Fertilizer box (Hopper)

- |                           |   |                                                                                    |
|---------------------------|---|------------------------------------------------------------------------------------|
| 1. Type                   | : | Trapezoidal                                                                        |
| 2. Constructional details | : | Fertilizer box is fabricated using 1.5 mm M.S. sheet in trapezoidal cross section. |

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3. Dimension of hopper , mm
  - Length : 1810
  - Width at top : 200.89
  - Width at bottom : 76.13
  - Depth : 400.10
4. Capacity with fertilizer, kg : 40
5. Height from ground level, mm : 1560
6. Height from mainframe, mm : 805

#### 4.2.5 Lid of hopper

1. Constructional details : M.S. sheet
2. Size of lid, mm : 1815×200×1.5
3. Method of fixing : With the help of nuts & bolts.
4. Provision for locking : Provided.

#### 4.2.6 METERING MECHANISM (Fig.3)

##### Fertilizer distributor

- 1 Type : Cup feed plate
- 2 Size of feed shaft, mm
  - Length : 1850
  - Diameter : 14.5
- 3 Size and number of roller
  - Diameter, mm : 182.0
  - Number : 6
- 4 Source of power : Lugged Wheel
- 5 Transmission ratio of shaft of seed metering device to land wheel axle : 1:0.5
- 6 Type of agitator : Not provided
- 7 Provision for closing fertilizer discharge : Not provided



**Fig.3 view of fertilizer metering cup feed plate**

#### 4.2.7 Fertilizer tube

1. Type : Plastic steel ribbon type.
2. Number of tube : 08
3. Length of tube, mm : 1560
4. Size of tube, mm : 1560×46.78×2.0
5. Method of fixing : One end of the tube is open in the feed cup, and the other end in the Boot.



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#### 4.2.8 Drive Mechanism

1 Type : Chain and sprocket

#### 4.2.9 Ground drive wheel

1. Type & No. of lugs : M.S Lugged Fabrication. (12)
2. Number : One
3. Dia. of wheel with lug, mm : 487 (With Lugged) & 267 (RIM)
4. Provision for lubrication : Sealed bearings are provided

#### 4.2.10 Method of transmitting power to feed shaft

Power is transmitted from ground wheel axle to the intermediate axle, then to the fertilizer feed shaft through chain & sprocket arrangement.

**4.2.11 Marker details** : Marker is not provided

**4.2.12 Seed covering arrangement** : Not Applicable.

#### 4.2.13 Type of hitch and its details

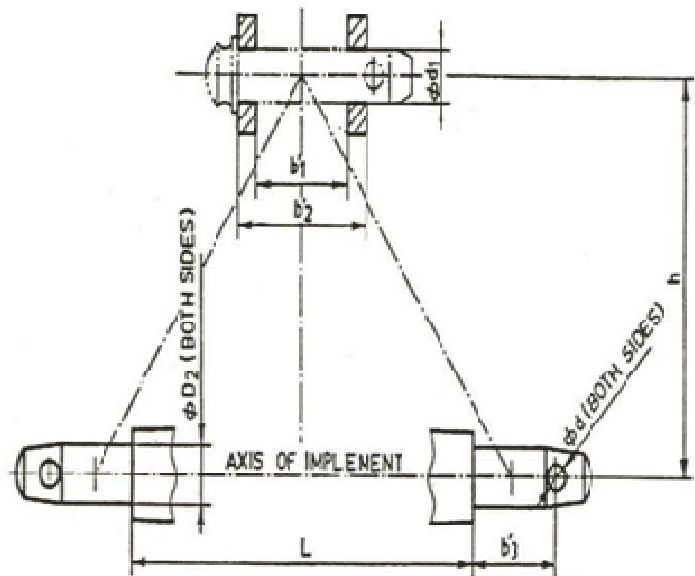
- Type : M.S. flat fabricated.
- Shape : Pyramid
- Material of construction : M.S. flat
- Size of flat, mm : 640×65×12 (front) & 770×65×12 (Rear)
- Length of lower link hitch pins, mm : 125.75
- Height of lower link hitch pins from ground level, mm : 640

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Dimensions of three point linkage (Refer figure.4):-

	Component	Specifications		Remarks
		As per IS:4468-1997, (Part-1) (Cat-II), mm,	As measured, mm	
<b>1. Upper hitch attachments</b>				
d <sub>1</sub>	Diameter of hitch pin hole	25.7 + 0.2	25.89	Conforms
b' <sub>1</sub>	Width between inner faces of yoke, Min	52.0	57.75	Conforms
b' <sub>2</sub>	Width between outer faces of yoke, Max	86.0	81.50	Conforms
<b>2. Lower hitch points</b>				
d <sub>2</sub>	Diameter of hitch pin	28.0 - 0.2	24.98	<b>Does not conform</b>
b' <sub>3</sub>	Linch pin hole distance Min,	49.0	105.20	Conforms
l	Lower hitch point span	825 ± 1.5 or lesser up to 683 mm	712 But adjustable	Conforms
<b>3. Other dimensions</b>				
d	Diameter of linch pin -for upper hitch pin, Min -for lower hitch pin, Min	12.0 12.0	12.01 12.68	Conforms Conforms
h	Mast height	610 ± 1.5 or more in the range of 810 ± 1.5	605	<b>Does not conform</b>

\* 02 out of 9 (22.2 %) dimensions are not conforming to BIS requirement.

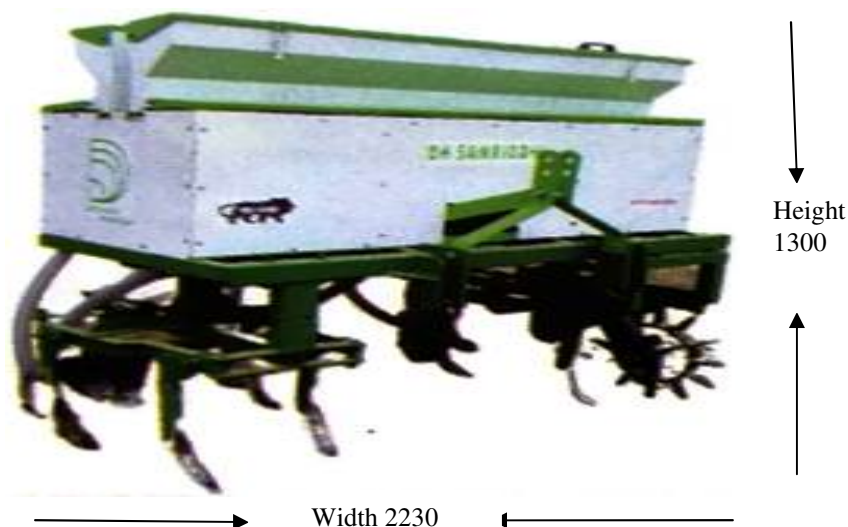


**Three point linkage (Refer figure.4):-**

- 4.2.14 **Details of depth adjustments** : Not provided.
- 4.2.15 **Safety arrangement for rotating parts** : Rotating parts are inside the machine for Chain drive, Chain cover provided.
- 4.2.16 **Metering unit controls** : Chain drive, Chain cover provided.
- 4.2.16.1 **Fertilizer metering control lever** : Not provided.

**4.3 Overall Dimensions, mm (Refer figure.5)**

- Length : 1305
- Width : 2230
- Height : 1300
- Mass (kg)
- With fertilizer, (apa) : 450
- Without fertilizer, (apa) : 350



**Fig.5: Overall Dimensions,(mm) of “DISTINCT HORIZONE” Tractor Mounted**

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4.4 No. of greasing/oiling points : Greasing- 13 , Oiling- 18

**4.6 Color**

Seed and fertilizer box : White  
Seed and fertilizer support angular : White & Green  
Main frame tyne : Green  
Wheel : Black

4.7 Labeling plate : Provided

**5. CONFORMITY WITH BIS REQUIREMENTS**

**CL.6.0 IS 6813-2000 Material of construction of different components**

SI. No.	Component	Material specified in IS	Observations	Remarks
1.	2.	3.	4.	5.
1.	Frame & tool bar	Mild steel	Mild steel	Conforms
2.	Axle & Shaft	Mild steel	Mild steel	Conforms
3.	Fertilizer Box	Mild steel , Galvanized iron sheet, Seasoned wood, plastic, fiber reinforced plastic	Mild steel	Conforms
4.	Tines	Mild steel, Carbon steel	Mild steel	Conforms
5.	Boot	Mild steel, Cast iron	Mild steel	Conforms
6.	Wheel	Mild steel, Cast iron, Pneumatic tyre	Mild steel	Conforms
7.	Furrow opener	High carbon steel	Mild steel	Conforms
8.	Fertilizer agitator	Mild steel, Cast iron, Aluminum, Canvas	N.A	--
9.	Fertilizer Tube	Steel ribbon, Plastic, Rubber	Steel ribbon	Conforms
10.	Fertilizer metering mechanism (agitator feed roller type)			
a.	Fertilizer feed roller, fertilizer feed cut off and fertilizer plate	Cast iron, Mild steel, nylon	Nylon	Conforms
b.	Fertilizer feed cup	Aluminum	Nylon	Conforms
c.	Retaining ring and cover	Brass, Gun metal, Bakelite	Not Provided	--
13.	Bushes	Brass, Gun metal, Nylon	Brass	Conforms
14.	Covering device	Mild steel, cast iron, seasoned wood	Not Provided	--
15.	Pulley, Sprocket	Cast iron, mild steel	Mild steel	Conforms
16.	Hitching Mechanism	Mild steel	Mild steel	Conforms
17.	Feed adjusting	Mild steel, cast iron	Mild steel	Conforms
18.	Depth adjusting Mechanism	Mild steel, cast iron	Not Provided	--
19.	Row marker	Mild steel	N.A	--

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Clause No.	Description	Observations	Remarks
1	2	3	4
<b>CL. 8. CONSTRUCTIONAL REQUIREMENTS</b>			
CL. 8.1 Frame And tool bar	These should be rigid and strong. The tool bar should have 12.5 mm diameter holes after every 50mm throughout its length, if it has to be attached through nuts and bolts.	MS box frame of 80×80 mm Is rigid and strong enough. Tines are fitted to tool bar With nut & bolt.	Conforms
CL.8.2 Wheels	Wheels should have either bushes or dust proof bearings. They should be strong and shall be provided with lugs/pegs. Wheels should be so attached that they can be easily lowered or raised	Wheels have ball bearing (6302) & provided with lugs & lowering arrangement not Provided.	Partially Conforms
CL. 8.3 Axles and Shafts	Axles and shafts should be so attached that they can be removed for cleaning when desired	No provision for removing axle & shaft for cleaning has made.	<b>Dose not Conform</b>
CL. 8.4 Seed and fertilizer boxes	a) These should be either separate or one continuous box with a partition.	Two separate box are Provided.	Conforms
	b) The boxes should have adequate capacity and may be trapezoidal or cylindrical with or without tapered bottom.	The capacity of fertilizer box is 40 & 50 kg. which is adequate The shape of fertilizer box are trapezoidal with tapered bottom.	Conforms
	c) The boxes should be adequately covered to avoid entrance of water	Box is provided with cover	Conforms
	d) The boxes should be sufficiently strong and should not buckle when fully filled with seed and fertilizer	No buckling of the boxes was noticed when filled with grains to its full capacity.	Conforms
	e) The boxes should be provided with self locking mechanism on being opened	Self locking mechanism Not provided.	<b>Dose not Conform</b>
CL. 8.4.1	The thickness of mild steel and galvanized steel sheet for boxes shall be not less than 1.0 mm and 0.63 mm respectively.	M.S. sheet of 1.5 mm thickness is provided.	
CL. 8.5 Tines	Tines should be properly attached with tool bar either by bolts and nuts or with clamps	Tines are properly attached with tool bar by bolts & nuts.	Conforms
CL. 8.6 Furrow Openers	Furrow openers of shovel shoe or disc type shall conform to the requirements as given in <u>IS: 6813-2000</u> separately.	Furrow openers of reversible Shovel type are provided but Dimension are not as per (IS)	<b>Dose not Conform</b>
CL 8.7.1 Seed & Fertilizer tubes	Tubes should be made of transparent plastics Thickness of plastic tubes shall be of 2.5 mm (min.)	Thickness of transparent Plastics tube is 2.5	Conforms
<b>CI 8.9 TRANSMISSION SYSTEM</b>			
a)	Transmission system of fertilizer drill shall be sprocket and chain, or gear type	Sprocket and chain type.	Conforms
b)	Provisions for tightening of belt and adjustment of chain shall be provided.	Provided	Conforms

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c)	Suitable clutches may be provided to stop the movement of metering mechanism when the wheels are turned in reverse direction.	Not provided	--
d)	The transmission system shall be provided with guard for safety.	Provided	Conforms
<b>CL.9 Performance Requirements</b>			
CL. 9.1	The variation in dropping of fertilizer in different feeding outlets separately shall be not more than 12.5 percent from the average quantity obtained	The variation in dropping of fertilizer in different feeding outlets separately was observed From 1.67 to 2.50 and 1.89 to 2.11.	Conforms
CL. 9.2	The variation in quantity dropped per hectare and quantity specified to be dropped at a particular setting shall be not more than 7 and 12.5 percent for fertilizer.	1.91 to 2.10 only for Fertilizer (UREA)	Partially Conforms
CL 9.3	The percentage of visible damage to seed in the machine shall not exceed 0.5 percent.	0.04 to 0.07 and 0.06 to 0.09	Conforms
CL 9.4	The variation in dropping due to box filling at $\frac{1}{4}$ , $\frac{1}{2}$ and $\frac{3}{4}$ of rated capacity shall not exceed 10 percent in 3kmph speed.	The variation in dropping due to box filling at $\frac{1}{4}$ , $\frac{1}{2}$ , $\frac{3}{4}$ , of rated capacity of fertilizer observed from 1.97 to 2.03, 1.93 to 2.08, 1.92 to 2.00%.	Conforms
CL.9.5	The fertilizer rate shall be easily adjustable up to 125 kg and 1000 Kg per hectare Respectively.	Required adjustment is not Provided.	<b>Dose not Conform</b>
CL. 9.6	a) The drill shall be able to sow fertilizer up to 100 mm deep	Drill is able to sow seed up to 100 mm depth.	Conforms
CL. 9.7	The wheel slip at specified speed shall not exceed by 15 percent	3.00 to 3.47 percent	Conforms
CL. 9.8	The Machine shall also be able to sow all types of granular fertilizers	Tested with UREA	--
<b>CL. 10 Other requirements</b>			
10.2	Row spacing shall be adjustable ranging from 150 to 225 mm preferably in steps of 25 mm	Required provision is provided	Conforms
10.3	When the furrow openers are lowered to plain surface openers shall not deviate by more than 5 mm from the line of alignment vertically and horizontally	Deflection was observed with in specified limit	Conforms
10.4	The weight of tractor mounted drill including the weight of seed and fertilizer filled at rated capacity of box shall not exceed 300 N/kW drawbar power of the tractor recommended for the drill.	230 N/kW	Conforms
10.5	A permanent type metallic calibration plate indicating the position and quantity of seed	Not provided	--

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	& fertilizer should be attached under the top Cover of seed box.		
10.6	In case of all the trailed drills and mounted drills having plate type mechanism arrangement for quick cut- off of the seed & fertilizer when the drill is moving should be Provided. This arrangement should be without disturbing the setting of metering Mechanism.	Not Applicable	--
10.7	Lubrication arrangement should be provided for all moving components except the portions exposed to fertilizer.	Required lubrication Arrangement is provided.	Conforms
10.8	For tractor operated drills the system of hitching should be designed to suit the three point linkage and drawbar of agricultural Tractors.	Three point linkage hitching system is provided.	Conforms
10.9	Each machine should be provided with instruction sheets containing full information on method of operation and of-drill	Instruction sheet is provided but does not have full information on method of Operation and of drill.	<b>Dose not Conform</b>
10.9.1	Each machine shall also be supplied with Necessary tools.	Tools are supplied with seed drill.	Conforms
10.9.2	Provision should be made for easy removal of fertilizer from the hopper after the days work.	Provided	Conforms
10.9.3	Each machine should be provided with a manual containing maintenance and storage instruction, calibration chart etc.	Provided	Conforms

**CL. 12 Workmanship and Finish**

CL.12.1	The welding shall be satisfactory in all respect and should not be brittle or porous	The welding is satisfactory in all respect.	Conforms
CL. 12.2	The components shall be free from rust and shall have protective coating to prevent surface deterioration in transit and storage	The components are free from rust and have protective coating of paint.	Conforms
CL. 12.3	The components should be free from pits, burrs and other defects that may be detrimental for their use	Components are free from pits, burrs and other defects.	Conforms

CI. 14.1	Each machine shall be marked with the following particulars:- a) Indication of the source of Manufacturer b) Model, Code and serial number c) Type and size	Provided	Conforms
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## 6. RUNNING -IN

The UREA deep placement applicator was run-in for one hour. Bolts and nuts were tightened and lubrication were done before actual test.

### 6.1 Wear Analysis of Shovel:

Wear of shovel on mass basis after 25.2 h of field operation is given as below.

S. No.	Initial mass of shovel, g	Mass of shovel after 25.2 h of operation, g	Wear in ,g	(%) wear on mass basis
1.	770	735	35	4.54
2.	1040	1000	40	3.84
3.	735	710	25	3.40
4.	1025	1005	20	1.99

Remark: The wear (%) of reversible shovel on mass basis is ( 0.07 to 0.18 %)

### 6.2 LABORATORY TEST

6.3 The surface hardness of Shovel & Ridger wear recorded as under Table-I.

**TABLE-1**

Sr. No.	Portion of blade	Hardness (HRC)		Remark
		As observed	As per IS:6690-1996	
1-	Shovel	53	56±3	Conforms
2-	Ridger	38	37-45	Conforms

6.4 **Chemical Composition:** A piece of shovel was analyzed for chemical composition the result of chemical analysis are given as under-

Constituents	Chemical composition (%) as per IS: 3342-1998	Chemical composition as observed (%)	Conformity to IS
Carbon (C)	0.50 - 0.60	0.70	Does not conforms
Silicon (Si)	1.50 – 2.0	0.34	Does not conforms
Manganese (Mn)	0.50 – 1.0	1.07	Does not conforms
Sulpher (S)	0.05 (max)	0.017	Conforms
Phosphorous (P)	0.05 (max)	0.019	Conforms

6.5 **Chemical Analysis of Ridger:**

Constituents	Chemical composition (%) as per IS: 3342-1998	Chemical composition as observed (%)	Conformity to IS
Carbon (C)	0.50 - 0.60	0.06	Does not conforms
Silicon (Si)	1.50 – 2.0	0.17	Does not conforms
Manganese (Mn)	0.50 – 1.0	0.89	Does not conforms
Sulpher (S)	0.05 (max)	0.001	Conforms
Phosphorous (P)	0.05 (max)	0.018	Conforms

### Fertilizer specifications:

Type	Urea Briquettes
Urea Briquettes weight (g)	2.5 to 3.0
No of Urea Briquettes in 1 (kg)	380 to 415



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## 7. FIELD TEST

Field test of Urea Deep Placement Applicator was conducted at Institute farm Rehmankhera, Lucknow for 25.2 hours consisting of 04 trials. The implement was used for placing Urea. The detailed test results are given in Annexure-IV and are summarized as under-:

### Summary of field test results:

Sl. No.	Parameters	Range of measurement
1.	Av. depth of fertilizer placement, cm	13.33 to 13.73
2.	Av. width of fertilizer placement, m	1.53 to 1.57
3.	Av. forward speed, kmph	3.28 to 3.43
4.	Field capacity, ha/h	0.414 to 0.475
5.	Field efficiency, %	82.47 to 92.02
6.	Fertilizer rate, kg/ha	203.5 to 213.00
7.	Fuel consumption, l/h	3.800 to 4.100 (8.123 to 9.158)
8.	Time required for 1 hac Area covered (hr)	2.10 to 2.41

### 8.1 Quality of work

The average depth of fertilizer placement was observed as 13.33 to 13.73 cm. Fertilizer rate was found to be 203.5 to 213.00 kg/ha.

### 8.2 Rate of work and fuel consumption

The average width of placement was observed as 1.53 to 1.57 m. The area covered was 0.414 to 0.475 ha and fuel consumption varied from 3.800 to 4.100 l/h and l/ha 8.123 to 9.158.

### 8.3 Field efficiency and labour requirement

Field efficiency of machine was observed as 82.47 to 92.02 %. Two laboures are required to operate the Urea Deep Placement Applicator. Out of two, one skilled labour is required for adjustments and calibrate the deep placement urea applicator and to operate the tractor and other unskilled to load the fertilizer box, cleaning of furrow openers etc.

### 9.0 EASY OF OPREATION ADJUSTMENT:

Operation and adjustment of Urea Deep Placement Applicator was observed to be satisfactory. However, the driver has to get down from the tractor to do the adjustments on urea deep placement applicator.

### 10.0 DEFECTS, BREAKDOWNS AND REPAIRS:

No breakdown was observed during 25.2 hrs. of operation of urea deep placement applicator.

### 11.0 COMMENTS AND RECOMMENDATIONS:

- i. The fertilizer metering mechanism of Urea Deep Placement Applicator is not as per the requirement of IS: 6813-2000. The metering mechanism conforming the requirements of IS code under reference should be used at regular production level.
- ii. Dimension of three point linkage do not conform fully to the requirements of IS: 4468-1997. Therefore, three point linkage system complying with IS requirements should be incorporated at regular production level.
- iii. The variation of dropping fertilizer at individual outlets conform to IS: 6813-2000
- iv. The fertilizer rate was not adjustable up to 1000 kg/ha which should be looked into at production level.
- v. The urea deep placement applicator should be provided with necessary tools & accessories as per CL. 10.9.1 & CL. 11 of IS 6813-2000
- vi. 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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12. LITERATURE:



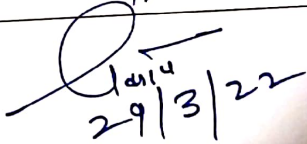

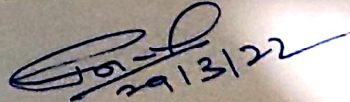
The manufacturer has developed a manual in Hindi or English and other regional languages, as per IS: 8132-1983 for the guidance of users & technical personnel.

13. APPLICANT'S COMMENTS:-

We shall strive to incorporate all recommendations as summarised in the report under section 11.0 (pg 13) at mass production level in the foreseeable future and conform to all suitable IS. As for the color of our product, it may be subject to change.

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-	
(DIGVIJAY SINGH) -TEST ENGINEER-	
(JIWAN PRAKASH) -ASSOCIATE PROFESSOR – ENGG.	 29/3/22
(DR. PRAMOD KUMAR GUPTA) -ADDITIONAL DIRECTOR-	
(DR. PANKAJ TRIPATHI) - DIRECTOR-	 29/3/22

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ANNEXURE-I

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

1	Make, model and type	Arjun Mahindra-605 DI (Novo)
2	Number of cylinders	4
3	Maximum PTO power, Kw	37.5
4	Power at standard Power Take-Off speed, 540± 10 rpm, Kw	43.0
5	Rated engine speed, rpm	2100
6	No load engine speed during field test, rpm	1800
7	Drawbar power, Kw	37.8
8	<b>Drawbar pull, kN :</b>	
	- Without ballast	34.5
	- With ballast	27.9
9	Type of wheel equipment	Pneumatic
10	<b>Number &amp; size of tyre :</b>	
	Front	Two, 7.50-16,8PR
	Rear	Two,16.9-28,12PR
11	Standard track width, mm :	
	- Front	1290
	- Rear	1545
12	Wheel base, mm	2140
13	Ballast condition	Used as un ballasted
14	<b>Total Operational Mass, kg :</b>	
	- Front	905
	- Rear	1415
	- Total	2320

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**ANNEXURE-II**

**SUMMARY OF STATIONARY CALIBRATION (FERTILIZER-UREA PELLETS)**

Forward speed (kmph)	Level of Urea Briquettes in hopper	Rate setting	Weight of Fertilizer (Urea Briquettes) from furrow openers (g)				Avg.	fertilizer Urea Briquettes rate (Kg/ha)	Variation from average (%)
			1	2	3	4			
3.0	Full	Max.	940	1110	1115	1160	108.25	432.50	1.81 to 2.23
		Med.	540	520	530	510	525.00	210.00	1.94 to 2.06
		Min.	-	-	-	-	-	-	-
	¾	Max.	935	1150	1125	1070	1070.00	428.00	1.81 to 2.23
		Med.	540	525	540	520	531.25	212.50	1.92 to 2.00
		Min.	-	-	-	-	-	-	-
	½	Max.	935	1110	1120	1125	1072.5	429.00	1.81 to 2.20
		Med.	530	540	550	510	532.5	213.00	1.93 to 2.08
		Min.	-	-	-	-	-	-	-
	¼	Max.	940	950	1000	1110	1000.00	405.00	1.85 to 2.18
		Med.	510	515	500	510	508.75	203.50	1.97 to 2.03
		Min.	-	-	-	-	-	-	-
5.0	Full	Max.	1070	1065	1435	1185	1188.75	475.50	1.74 to 2.35
		Med.	770	725	825	815	783.72	313.50	1.88 to 2.14
		Min.	-	-	-	-	-	-	-
	¾	Max.	1055	1010	1025	1075	1041.25	416.50	1.94 to 2.06
		Med.	860	720	925	860	841.25	336.50	1.78 to 2.28
		Min.	-	-	-	-	-	-	-
	½	Max.	1070	1180	1150	1070	117.50	447.00	1.91 to 2.10
		Med.	1000	725	825	830	845.00	338.00	1.72 to 2.38
		Min.	-	-	-	-	-	-	-
	¼	Max.	1060	1075	1080	1185	1100.00	440.00	1.89 to 2.12
		Med.	760	740	750	730	745.00	298.00	1.96 to 2.04
		Min.	-	-	-	-	-	-	-

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**ANNEXURE-III**

**FIELD PERFORMANCE TESTS RESULTS**

**Place of test:** Institute Farm, Rehmankhera, Lucknow

**Tractor used:** Mahindra 605 (DI) Arjun Novo

**Gear used** L-4 Gear used

S. No.	Test Number	1	2	3	4
1.	Date of test	26-10-21	27-10-21	28-10-21	29-10-21
2.	Duration of test, h	6.4	7.2	7.6	4.0
3.	Type of soil	Sandy loam			
4.	Name of fertilizer	UREA (PELLETS)			
5.	Av. Speed of operation, kmph	3.28	3.24	3.43	3.29
6.	Av. wheel slip, %	3.4	3.1	3.00	3.47
7.	Av. Fertilizer Depth/placement, cm	13.33	13.43	13.50	13.73
8.	Av. pellet spacing, cm	29.0	30	29.0	29.0
9.	Av. Number of pellets per meter of row length	4	4	5	3
10.	Av. Working width, m	1.53	1.54	1.53	1.57
11.	Area covered, ha/h	0.414	0.473	0.475	0.464
12.	Time required per ha., hr.	2.41	2.11	2.10	2.15
13.	Fertilizer rate, kg/ha	203.5 to 213.00			
14.	Field efficiency, %	82.47	92.02	90.48	89.92
15.	Fuel consumption, l/h / L/ha	3.800 (9.158)	3.850 (8.123)	4.000 (8.400)	4.100 (8.815)

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**ANNEXURE-IV**

**SUMMARY OF UNIFORMITY TEST (DATA SHEET)**

Rate setting	Parameter	Furrow openers				Average	Variation from mean (%)
		1	2	3	4		
Recommended for UREA Briquettes Placment	No. of UREA Briquettes dropped per meter of row length	3	4	6	5		
		4	3	5	4		
		5	3	4	6		
	<b>Av.</b>	4	3.33	5	5	4.33	1.67-2.50
--do--	Av. Distance between two UREA Briquettes (cm)	29	30	25	29		
		30	28	28	27		
		28	30	27	30		
	<b>Av.</b>	29	29.66	26.66	28.66	28.49	1.89-2.11

**ANNEXURE-V**

**SUMMARY OF MECHANICAL DAMAGE TEST (UREA BRIQUETTES) ON DIFFERENT RECOMMENDED SPEED**

Recommended Forward speed (kmph)	Mechanical damage from tyne type furrow openers (%)			
	1	2	3	4
3.0	0.07	0.05	0.06	0.09
	0.04	0.06	0.05	0.08
	0.05	0.04	0.02	0.04
<b>Average</b>	0.05	0.05	0.04	0.07
5.0	0.09	0.08	0.10	0.08
	0.06	0.08	0.09	0.08
	0.05	0.07	0.08	0.10
<b>Average</b>	0.06	0.07	0.09	0.08

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### SYMBOL AND ABBREVIATIONS

#### SYMBOLS:

#### ANNEXURE -VI

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.	PHYSICAL QUANTITY	NAME OF SI UNIT	SYMBOL
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	m
7	Maximum	Max	m

#### ABBREVIATIONS:

As per applicant	:	Apa	Clause	:	Cl
Degree	:	°	Figure	:	Fig
Indian Standard	:	IS	Kilowatt	:	kW
Number	:	No.	Not available	:	N.A.
Not Recorded	:	N.R.	Percent	:	%
Reference	:	Ref.	Revolution	:	rpm