

NO. FIM /MPKV/IMPL. NO. / 216/ 2019

MONTH: DECEMBER, 2019

COMMERCIAL TEST REPORT

This test report valid up to 10/ 12/2026



**Ankita 9 Tyne Seed-Cum-Fertilizer Drill
(Tractor Mounted) [Commercial]**



सत्यमेव जयते



**Farm Machinery Testing and Training Centre,
All India Coordinated Research Project on
Farm Implements and Machinery,
Dr. Annasaheb Shinde College of Agricultural
Engineering and Technology,
Mahatma Phule Krishi Vidyapeeth
Rahuri, Dist. Ahmednagar 413 722 (M.S.)**

COMMERCIAL TEST REPORT

| Test Report No. | Name of the Machine/Implement, Model No. | Month | Year |
|---------------------------------------|--|----------|------|
| FIM/ MPKV/ IMPL. NO/ 216 / 2019 | Ankita 9 Tyne Seed-Cum-FertilizerDrill (Tractor Mounted) [Commercial] | December | 2019 |

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Rahuri, Dist. Ahmednagar - 413 722 (M.S.)**

Telephone: (02426) 243 219

Fax No.: (02426) 243 326

Email: fimmpkv@gmail.com

(The Institute is approved Testing Centre by Department of Agriculture & Cooperation, Ministry of Agriculture, GOI Vide Letter No. 8-1/2004-M&T (I&P) dated June 17, 2013 and subsequent letters)

| | | |
|--------------------|---|---|
| Type of Test | : | COMMERCIAL |
| Name of machine | : | Ankita 9 Tyne Seed-Cum-FertilizerDrill (Tractor Mounted) [Commercial] |
| Test Code Referred | : | The implement was tested in accordance with the relevant test codes IS: 6316-2004 (Sowing equipment-Seed cum Fertilizer Drill – Test Code), IS: 6813-2006 (Sowing Equipment - Seed cum Fertilizer Drill – Specifications), and IS: 4468 – 1997 (Specification for Three Point Linkage), IS: 7565 (Part-I) (Reaffirmed Dec.-2004) (Tines for tractor operated cultivators: Part 1 Rigid tines) |
| Test requested by | : | M/S Ankita Agro Engineering , K- 37, MIDC Waluj, Phone No.0240-2552341/9422737939 Dist.:- Aurangabad, Pin- 431136 Maharashtra |
| Testing Authority | : | All India Coordinated Research Project on Farm Implements and Machinery , Dr. Annasaheb Shinde College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar 413 722 (M.S.) |
| Period of test | : | October 2019 to December 2019 |
| Validity period | : | This test report valid up to 10/12/2026 |

1. This Test Report should not be reproduced in part or full without prior permission of the Testing Authority.
2. The data given in the Test Report pertains 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

| Sr. 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 | 735.5 W |
| | 1 kW | 1.35962 Ps |
| 3 | Pressure | |
| | 1 psi | 6.895 kPa |
| | 1 Kg/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 purpose of test was to check and assess the following: -

1.1 **LABORATORY TEST: -**

- Checking of specifications
- Metering mechanism to meter seed at desired rate
- Variation in dropping of seed in different openers
- Variation of seed rate due to quantity of seed in the seed box.
- Evenness of seed distribution.
- Visible damage to seed caused by metering mechanism.
- Hardness and chemical composition of the soil engaging parts i.e. furrow openers.

1.2 **FIELD TEST: -**

- Rate of work.
- Quality of work
- Ease of operations and adjustments
- Labour requirement
- Breakdowns and repairs

2 METHOD OF SELECTION

The machine was selected by Random sampling method.

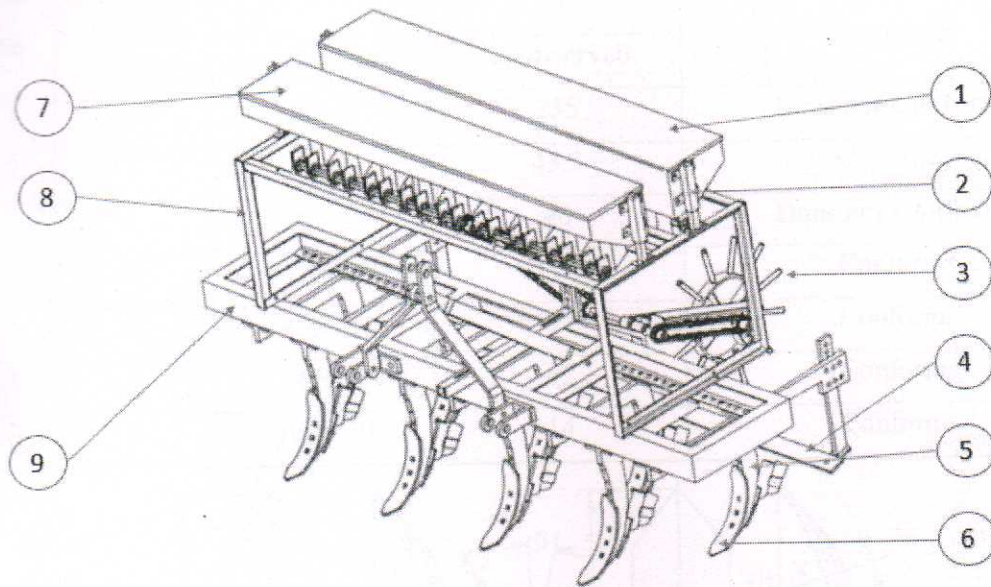
3 TEST PROCEDURE

The implement was tested in accordance with the relevant test codes IS: 6316-2004 (Sowing equipment-Seed cum Fertilizer Drill – Test Code), IS: 6813-2006 (Sowing Equipment - Seed cum Fertilizer Drill – Specifications), and IS: 4468 – 1997 (Specification for Three Point Linkage), IS: 7565 (Part-I) (Reaffirmed Dec.-2004) (Tines for tractor operated cultivators: Part 1 Rigid tines)

4. SPECIFICATION



| | |
|---|--|
| 4.1 GENERAL: | |
| Name of the Implement | : Ankita 9 Tyne Seed-Cum-FertilizerDrill (Tractor Mounted) |
| Name of Applicant and Address | : M/S Ankita Agro Engineering, K- 37, MIDCWaluj, PhoneNo.02402552341./9422737 939 Dist.:- Aurangabad Pin- 431136 Maharashtra |
| Type | : Tractor Mounted |
| Make | : ANKITA |
| Model | : ANKITA |
| Serial | DD362/2019 |
| Year of manufacture | : 2019 |
| Recommended traveling speed of the drill | : Not Mentioned |
| Recommended power of tractor (if tractor operated) | : 35 Hp and above |
| 4.2 Prime mover used: | |
| Tractor | : Mahindra 575 Di (Sarpanch) |
| Engine No. | : DK013BJ |
| Chassis No. | : NALPF745 |
| Max. PTO Power, hp | : 39 |



| | | | |
|---------------------|--------------------|-----------|---------------------------|
| 1. Seed Hopper/ Box | 3. Ground Wheel | 5. Tyne | 7. Fertilizer Hopper/ Box |
| 2. Adjusting Stand | 4. Covering device | 6. Shovel | 8,9 Main Frame |

FIG. 1: SCHEMATIC DIAGRAM OF Ankita 9 Tyne Seed-Cum-FertilizerDrill (Tractor Mounted)

| | | |
|------------|---|--------------------------|
| 4.3 | FURROW OPENERS: | |
| | a) Type and tilt angle with respect to vertical | : Reversible Shovel, 48° |
| | b) No. of openers | : 9 |

Specification of furrow opener as per IS 6813: 2000 (Reaffirmed 2004) (Ref. Fig. 2)

| Sl. No. | Notation | Dimensions (mm) | | Conformity to Indian Standard |
|---------|----------|-----------------|-------------|-------------------------------|
| | | As per IS:6813 | As observed | |
| 1 | A | 180±2 | 235 | Does not Conforms |
| 2 | B | 45±2 | 43.5 | Conforms |
| 3 | C | 30±1 | 40 | Does not Conforms |
| 4 | D | 11.5±0.5 | 11.0 | Conforms |
| 5 | E | 45±0.5 | 45 | Conforms |
| 6 | α | 45±5 | 42 | Conforms |
| 7 | β | 10 to 20 | 14 | Conforms |

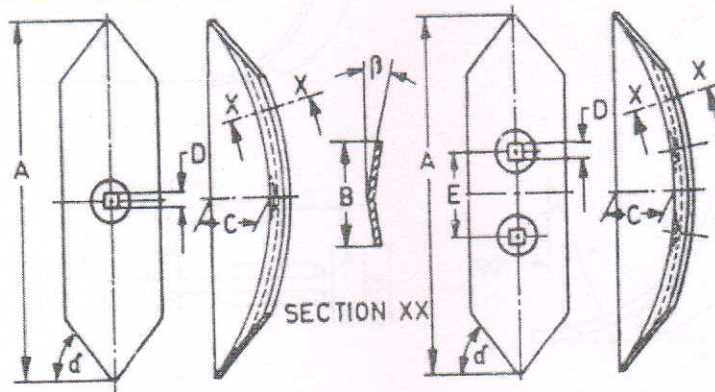
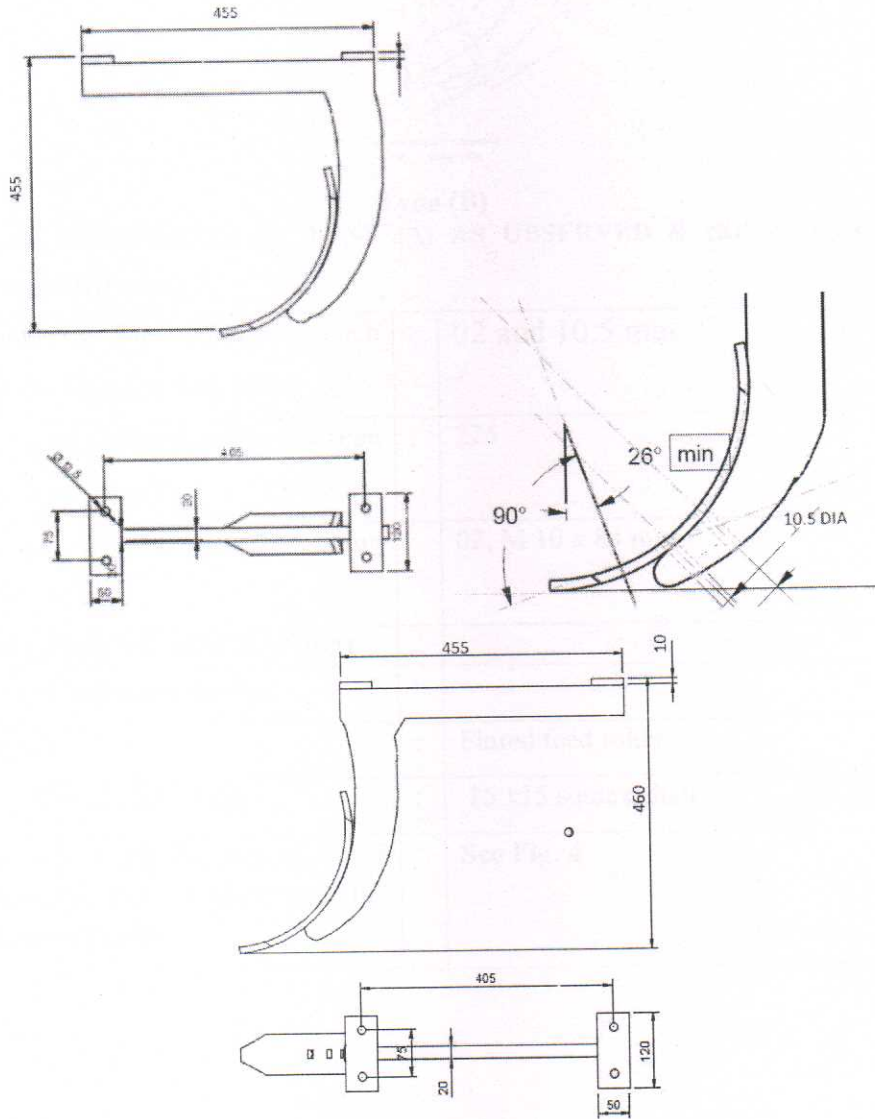


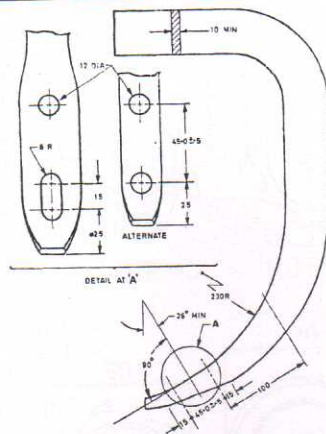
Fig. 2: REVERSIBLE SHOVEL AS PER INDIAN STANDARD

| | | |
|--|---|---|
| Arrangement of openers | : | Furrow openers are arranged on the toolbar in two rows (4 at front and 5 at rear) |
| Range if selection of openers | : | 9 |
| Method of changing row space and range | : | Provided |
| Nominal width (cm) | : | 4.35 |
| Lifting and lowering of openers | : | By hydraulic levers of tractor |
| Depth control | : | Through tractor hydraulics |
| 4.3.1 Tyne (Refer Fig. 2): | | |
| Numbers | : | 9 |
| Type | : | Rigid Type |

| | | |
|---------------------------|---|--|
| Arrangement on main frame | : | Four tynes in front row and Five tynes in rear row |
| Material | : | M.S. |
| Size, (mm) | : | Front- 440 x 420 x 25 Rear- 550X420X25 |



Tyne (A)



All dimensions in millimetres.
FIG. 1 RIGID TYNE

Tyne (B)

Fig. 3: DIMENSIONS OF TYNE (A) AS OBSERVED & (B) AS PER IS STANDARD (mm)

| | | | |
|------------|---|---|---------------------|
| | Number & size of holes on each tyne for fixing shovel, (mm) | : | 02 and 10.5 mm |
| | Center to center distance between two tynes, (mm) | : | 225 |
| | No and size of bolts for fixing shovel to tyne | | 02, M 10 x 84 mm |
| 4.4 | METERING MECHANISM | | |
| | a) Seed metering device: | : | |
| | Type | : | Fluted feed roller |
| | Size of feed shaft (mm) | : | 15 x15 square shaft |
| | Size (dia.) and number of fluted rollers (in case of plate type, the number of holes) | : | See Fig. 4 |

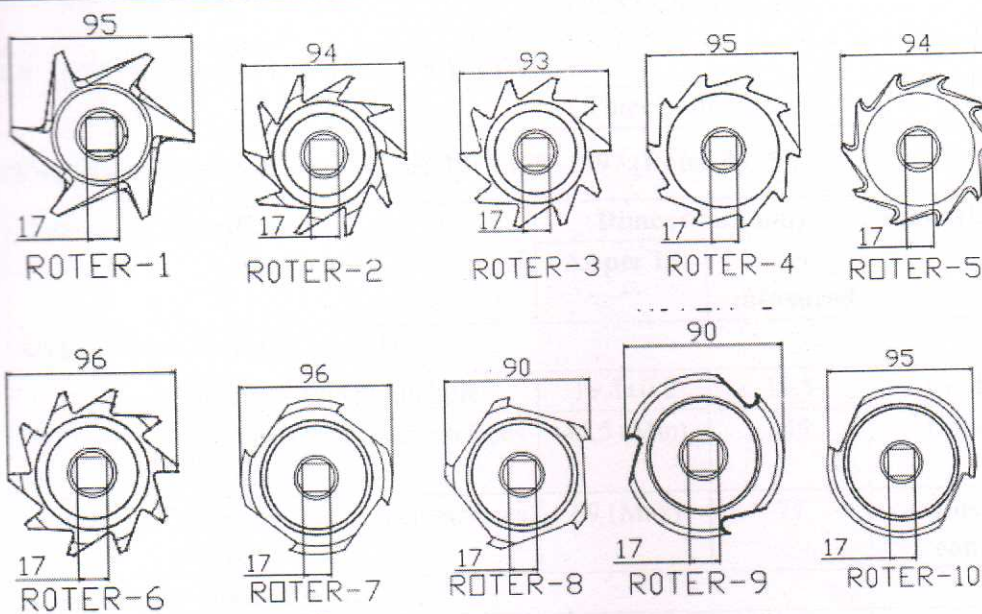
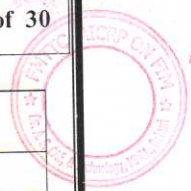


FIG.4: DIMENSIONS OF SEED METERING FLAT PLATES AS OBSERVED

| | | | |
|------------|--|---|--|
| | Source of power (ground wheel or other) | : | Ground Wheel |
| | Transmission ratio of shaft of seed metering device to land wheel axle | : | 1:1, 1:1.5, 1:2.2 |
| | Type of agitator | : | Not Provided |
| | Method of feed rate control for different sizes of seeds | : | Provided |
| | Provision for closing seed discharge. | : | Provided |
| 4.5 | HOPPER: | | |
| | Seed box (Kg) | : | 50 |
| | Fertilizer box | : | 50 |
| | Type of hoppers | : | Trapezoidal box type with lid and locking system |
| 4.6 | MARKER DETAILS | : | Not Provided |
| 4.7 | SEED COVERING ARRANGEMENT: | | |
| | Type | : | MS Flat |



| | | | |
|------------|---------------------------------------|---|---------------------|
| | Size (mm) | : | 1980 x 65 x 10 mm |
| 4.8 | TYPE OF HITCH AND ITS DETAILS: | | |
| | Type | : | Three point linkage |

Specification of Hitch Pyramid As per IS: 4468 -1997 (Refer fig. 5)

| S No. | Notation | Specifications | Dimension (mm) | | Remarks |
|----------|--|--------------------------------------|----------------|-------------|-------------------------|
| | | | As per IS | As measured | |
| 1 | Upper Hitch Points (Cat. I/II): - | | | | |
| | d_1 | Diameter of hitch pin hole | 19.3 ± 0.2 | 19.5 | Conforms |
| | b'_1 | Width between inner surfaces of yoke | 44.5 (Min) | 45 | Conforms |
| | b'_2 | Width between outer surfaces of yoke | 69 (Max) | 77 | Does not conform |
| 2 | Lower Hitch point (Cat. I): | | | | |
| | D_2 | Diameter of hitch pin | 22 ± 0.2 | 22.0 | Conforms |
| | b'_3 | Linch pin hole distance (Min) | 39.0 | 85 | Conforms |
| | l | Lower hitch point span | 683 ± 1.5 | 684 | Conforms |
| 3 | d | Diameter for linch pin hole | | | |
| | | For upper hitch pin, (Min) | 12 | 12 | Conforms |
| | | For lower hitch pin, (Min) | 12 | 12 | Conforms |
| | h | Mast height | 460 ± 1.5 | 460 | Conforms |

IS 4468 (Part 1): 1997

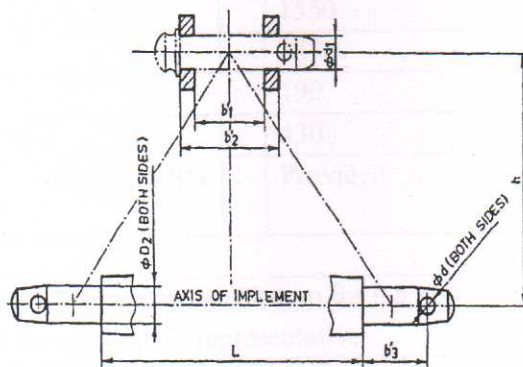


FIG. 5 DIMENSIONS OF THREE POINT HITCH PYRAMID

| | | | |
|------------|---|---|-----------------------------|
| 4.9 | GROUND DRIVE DETAILS: | | |
| | No. of wheels | : | One |
| | Type of wheel | : | Pegged MS construction |
| | Size (mm) | : | 560 |
| | Method of transmitting power to feed shafts | : | Through chain and sprockets |

4.10 DETAILS OF ADJUSTMENTS:

| Sl. No. | Adjustments | Method |
|---------|------------------------------------|---|
| 1 | Feed rate | Through Fluted feed roller |
| 2 | Spacing of furrow openers | Provided |
| 3 | Depth of sowing | Through ground wheels & position control lever |
| 4 | Height of covering device | Through holes provided on the mounting flats |
| 5 | Drive wheel height | Through holes provided on the mounting flat |
| 6 | Reduction ratio of drive mechanism | By interchanging drive and driven sprockets of drive wheel. |

| | | | |
|-------------|---|---|---|
| 4.11 | DETAILS OF SAFETY ARRANGEMENT FOR ROTATING PARTS | : | The guard is provided for the drive chain of ground wheel.. |
|-------------|---|---|---|

4.12 OVERALL DIMENSIONS (mm) (Refer Fig. 6)

| | | | |
|-------------|----------------------------------|---|----------|
| | Length | : | 2285 |
| | Width | : | 1550 |
| | Height | : | 1370 |
| | Weight (kg) | : | 190 |
| | Ground clearance (mm) | : | 430 |
| 4.13 | NUMBER OF GREASING POINTS | : | Provided |

5 RUNNING -IN

The machine was run-in at company workshop for 0.5 hour as per the instructions and recommendations of the applicant's representative.

6 LABORATORY TEST**6.1 Metering:****6.1.1 Calibration:**

The calibration of seed drill in the laboratory was carried out for Sorghum, Wheat seeds at full, three-fourth, one-half and one-fourth capacity of the hopper and at maximum, optimum and minimum feed rates after best possible adjustments made by

the manufacturer's representative. The details of the tests are summarized in following tables.

| Sr. no. | Parameters | Sorghum | Wheat | |
|---------|--|---------|--------|--------|
| i) | Working width of seed drill/Planter (cm) | 202.5 | 202.5 | |
| ii) | Circumference of drive wheel (mm) | 1758.4 | 1758.4 | |
| iii) | Area sown in one revolution of wheel (m ²) | 3.64 | 3.64 | |
| iv) | No. of revolutions required to sow one ha | 2857 | 2747 | |
| v) | Seed rate to be sown per ha (kg) | Minimum | 6.29 | 83.42 |
| | | Medium | 13.60 | 100.57 |
| | | Maximum | 16.23 | 118.17 |
| vi) | Seed quantity required for one revolution (gm) | Minimum | 2.2 | 29.2 |
| | | Medium | 3.72 | 35.2 |
| | | Maximum | 5.68 | 41.36 |
| vii) | Seed quantity required for 25 revolutions (gm) | Minimum | 6.11 | 81.11 |
| | | Medium | 13.22 | 97.78 |
| | | Maximum | 15.78 | 114.89 |

| Level of seed in hopper | Level of opening Marked as | Weight of total seed from all furrow openers (gm) for 25 revolutions of ground wheel | | Seed rate (kg/ha) | |
|-------------------------|----------------------------|--|--------|-------------------|--------|
| | | Sorghum | Wheat | Sorghum | Wheat |
| Full | Minimum | 10.33 | 100.89 | 10.63 | 103.77 |
| | Medium | 12.89 | 109.00 | 13.26 | 112.11 |
| | Maximum | 15.78 | 114.89 | 16.23 | 118.17 |
| ¾ | Minimum | 8.56 | 86.67 | 8.80 | 89.14 |
| | Medium | 10.67 | 94.00 | 10.97 | 96.68 |
| | Maximum | 13.22 | 97.78 | 13.60 | 100.57 |
| ½ | Minimum | 6.89 | 84.22 | 7.09 | 86.62 |
| | Medium | 7.22 | 86.78 | 7.43 | 89.25 |
| | Maximum | 10.33 | 94.56 | 10.63 | 97.25 |
| ¼ | Minimum | 6.11 | 81.11 | 6.29 | 83.42 |
| | Medium | 6.78 | 86.33 | 6.97 | 88.80 |
| | Maximum | 8.78 | 90.56 | 9.03 | 93.14 |

**7 CONFORMITY TO INDIAN STANDARD**

| Clause | Performance requirement as per IS: 6813-2006 | | | | As observed | Remarks |
|--------|---|------------------|--------------------------------------|---------|------------------------|----------|
| 1 | 2 | | | | 3 | 4 |
| 1 | TYPE: - For the purpose of this standard, the seed-cum-fertilizer drills shall be of the following types depending upon the source of power: a) Animal-drawn b) Tractor-operated: 1) Trailed, and 2) Mounted. NOTE: Animal-drawn shall be of trailed type only | | | | Tractor Mounted | Conforms |
| 2 | SIZE: The size of the drill shall be expressed by the number of seed furrow openers and the maximum spacing in millimeters between two adjacent furrow openers. | | | | 9 x 225 mm | Conforms |
| 3 | MATERIALS: | | | | | |
| Sr. No | Component | Material | Applicable Standard | Grade | As observed | Remarks |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| i) | Frame and tool bar | Mild Steel | IS 226:1975 | --- | MS | Conforms |
| ii) | Wheel | Mild steel | IS 226:1975 | --- | MS | Conforms |
| | | Cast iron | IS 210:1978 | FG 200 | | |
| | | Pneumatic tyre | --- | --- | | |
| iii) | Axle and Shaft | Mild Steel | IS 226:1975 | --- | MS | Conforms |
| iv) | Seed boxes | Mild Steel | IS 226:1975 | --- | MS (Powder Coating) | Conforms |
| | | Galvanized sheet | IS 277:1985 | --- | | |
| | | Seasoned wood | IS 399:1963 | --- | | |
| | | Plastic | --- | --- | | |
| | | Fibre glass | --- | --- | | |
| v) | Tines | Mild steel | IS 226:1975 | --- | MS | Conforms |
| | | Carbon steel | IS 1570 (Part2/Sec2): 1988 | C55Mn75 | | |

| | | | | | | |
|--------|---|-------------------|------------------------|--------|--------------|------------------|
| vi) | Boot | Mild steel | IS 226:1975 | --- | MS | Conforms |
| | | Cast Iron | IS 210:1978 | FG 200 | | |
| vii) | Furrow opener | High carbon steel | IS 1570 (Part 3): 1979 | C75 | EN 5 | Does not Conform |
| viii) | Seed agitator | Mild steel | IS 226:1975 | --- | Canvass | Conform |
| | | Cast Iron | IS 210:1978 | --- | | |
| | | Aluminum (PVC) | IS 617:1975 | --- | | |
| | | Rubber | --- | --- | | |
| | | Canvas | --- | --- | | |
| x) | Seed tubes | Steel ribbon | --- | --- | Rubber | Conforms |
| | | Plastics | --- | --- | | |
| | | Rubber | --- | --- | | |
| xi) | Seed metering mechanism (Flat plate type) seed feed canvas roller | Rubber | -- | -- | MS | Conform |
| | | Cast iron | IS 210 | FG200 | | |
| | | Mild steel | IS 2062 | --- | | |
| xiii) | Bushes | Brass | IS 292:1983 | 3 | Brass | Conforms |
| | | Gun metal | IS 306:1983 | --- | | |
| | | Nylon | --- | --- | | |
| xiv) | Covering device | Mild steel | IS 226:1975 | --- | MS | Conforms |
| | | Cast iron | IS 210:1978 | FG200 | | |
| | | Seasoned wood | IS 39:1963 | --- | | |
| xv) | Pulley, sprocket | Cast iron | IS 210:1978 | FG200 | Cast Iron | Conforms |
| | | Mild steel | IS 226:1975 | --- | | |
| xvi) | Hitching mechanism | Mild steel | Is 226:1975 | --- | MS | Conforms |
| xvii) | Feed adjusting mechanism | Mild steel | Is 226:1975 | --- | MS | Conforms |
| | | Cast iron | IS 210:1978 | FG200 | | |
| xviii) | Depth adjusting mechanism | Mild steel | IS 226:1975 | --- | Not Provided | Does not Conform |
| | | Cast iron | IS 210:1978 | FG200 | | |
| xix) | Row marker | Mild steel | IS 226:1975 | --- | Not Provided | Does not Conform |
| | | Cast iron | IS 210 | FG200 | | |
| 4 | HARDNESS:- The furrow openers of shall be | | | | 271 | Does not Conform |

| | | | |
|--------------|--|---------------------------|----------|
| | hardened between 350 and 450 HB when tested in accordance with IS 1500 : 2005 (RA 2003) | | |
| 5 | CONSTRUCTIONAL REQUIREMENTS: | | |
| 5.1 | Frame and toolbar: - These should be rigid and strong. The toolbar should have 12.5 mm diameter holes after every 50 mm throughout its length. | Provided | Conforms |
| 5.2 | Wheels: - Wheels should have either bushes or dust proof bearings. They should strong and shall be provided with lugs or pegs. Wheels should be so attached that they can be easily lowered or raised. | Provided | Conforms |
| 5.3 | Axle and Shafts: - Axles and shafts should be so attached that they can be removed for cleaning when desired | Provided | Conforms |
| 5.4 | Seed boxes: - | | |
| | These should be either separate or one continuous box with a partition. The boxes should have adequate capacity and may be of trapezoidal or cylindrical with or without tapered bottom. The boxes should be adequately covered to avoid entrance of water. The boxes should be sufficiently strong and should not buckle when fully filled with seed. The boxes should be provided with self-locking mechanism on being opened. | Provided | Conforms |
| 5.4.1 | The thickness of mild steel and galvanized steel sheet for boxes shall be not less than 1.0 mm and 0.63 mm respectively. | Provided | Conforms |
| 5.5 | Tines: - Tines should be properly attached with tool bar either by bolts or clamps | Provided | Conforms |
| 5.6 | Furrow openers: - Furrow openers should be provided with depth; adjustment arrangements. There may be different furrow openers for seed with the provision of dropping them separately. | Provided | Conforms |
| 5.6.1 | Furrow openers of shovel, shoe or disc type shall conform to the requirement. | Reversible Shovel type | Conforms |
| 5.7 | Seed Tubes: - The tubes shall be suitable length and shall be properly clamped with feed outlets of metering mechanism. There should not be any sharp bend in tubes. Tubes should be made of | Provided | Conforms |

| | | | |
|-------|--|----------------------------|--|
| | transparent plastic. | | |
| 5.7.1 | The thickness of plastic tubes shall be 2.5mm, minimum | Provided | Conforms |
| 5.8 | Metering Mechanisms | | |
| 5.8.1 | The seed metering mechanism components of Canvass feed roller and Flat plate with metering hole shall be in conformity to the relevant IS standard. Other types of seed metering mechanisms may also be used. | Fluted feed Roller | Conforms |
| 5.9 | Transmission System | | |
| | This may be sprocket and chain, belt and pulley, or gear type. Provisions for tightening of belt and adjustment of chains shall be provided. Suitable clutches maybe provided to stop the movement of metering mechanisms when the wheels are turned in reverse direction. The transmission system should be provided with a guard for safety. | Provided -- Provided | Conforms Not Applicable Conforms |
| 6 | PERFORMANCE REQUIREMENTS | | |
| 6.1 | The variation in dropping of seed in different feeding outlets separately shall be not more than 7 and 12.5 percent respectively from the average quantity obtained. | Provided | Conforms |
| 6.2 | 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 seed respectively. | Not specified | Does not Conform |
| 6.3 | The seed rate shall be easily adjustable up to 125 kg and 1000 kg per hectare respectively. | More than 125 kg | Conform |
| 6.4 | The percentage of visible damage to seed in the drill shall not exceed 0.5 percent. | Provided | Conforms |
| 6.5 | 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 | Provided | Conforms |
| 6.6 | The variation in quantity of seed per meter of row length shall not exceed by 10 percent. | Provided | Conforms |
| 6.7 | The drill shall be able to sow seed up to 100 mm deep | Provided | Conforms |
| 6.8 | The wheel slip at specified speed shall not exceed by 15 percent. | Provided | Conforms |
| 6.9 | The drill shall be able to sow onion | Provided | Conforms |

| 7 | OTHER REQUIREMENTS | | |
|-------|--|---------------------------|----------|
| 7.1 | The animal-drawn drill shall not have more than five furrow openers and tractor-operated drill shall have 5 to 15 furrow openers. | Provided | Conforms |
| 7.2 | The row spacing shall be adjustable, ranging from 150 to 225 mm, preferably in steps of 25 mm. | provided | Conforms |
| 7.3 | When the furrow openers are lowered to plain surface, the openers shall not deviate by more than 5 mm from the line of alignment vertically and horizontally. | Provided | Conforms |
| 7.4 | The weight of tractor-mounted drill including the weight of seed filled at rated capacity of box shall not exceed 300 N/kW drawbar power of the tractor recommended for the drill. | Provided | Conforms |
| 7.5 | A permanent type metallic calibration plate indicating the metering position and quantity of seed shall be attached under the top cover of seed box. | Calibrated lines provided | Conforms |
| 7.6 | In case of all the trailed drills and mounted drills having plate type metering mechanism, arrangement for quick cut-off of the seed and fertilizer when the seed drill is moving, should be provided. This arrangement should be without disturbing the setting of metering mechanism. | Provided | Conforms |
| 7.7 | Proper lubrication arrangements should be provided for all moving components except the portions exposed to seed and fertilizer. | Provided | Conforms |
| 7.8 | In animal-drawn drill the system of hitching should be adjustable to suit the varying height of animals. For tractor-operated drills the system of hitching should be designed to suit the three-point linkage and drawbar of agricultural tractors (see IS 4468:1986 and IS 4931:1984). | N.A. | N.A. |
| 7.9 | Each drill shall be provided with instruction sheets containing full information on method of operation and installation of the drill. | Provided | Conforms |
| 7.9.1 | Each drill shall also be supplied with necessary tools. | Provided | Conforms |
| 7.9.2 | Provision should be made for easy removal of seed and fertilizer from the hoppers after the day's work. | Provided | Conforms |

| | | | |
|--------|--|---|---|
| 7.9.3 | Each drill shall be provided with manual containing maintenance and storage instructions, calibration chart, etc. | Provided | Conforms |
| 8 | ACCESSORIES | | |
| | The following accessories may be provided with each drill: | | |
| | a) Foot broad, | Not provided | Does not conform |
| | b) Covering device, | Provided | Conforms |
| | c) Row marker, | Not provided | Does not conform |
| | d) Press wheel, and | Not provided | Does not conform |
| | e) Area recorder. | Not provided | Does not conform |
| 9 | WORKMAN SHIP AND FINISH: - | | |
| 9.1 | The welding shall be satisfactory in all respects and should not be brittle or porous. | Provided | Conforms |
| 9.2 | The components shall be free from rust and shall have a protective coating to prevent surface deterioration in transit and storage. | Provided | Conforms |
| 9.3 | The components should be free from pits, burrs and other defects that may be detrimental for their use. | Provided | Conforms |
| 10 | MARKING AND PACKING: - | | |
| 10.1 | Marking: - Each drill shall be marked with the following particulars: a) Indication of the source of manufacture b) Model, code and serial number, c) Type and size. d) Type of seed (suitability) e) Mass | Provided Provided Not Provided Provided Provided | Conforms Conforms Does not conform Conforms Conforms |
| 10.1.1 | The product may also be marked with the BIS Standard Mark. | Not provided | Does not conform |
| 10.2 | Packing: - Packing of the drill and its components should be done as agreed to between the purchaser and the supplier to avoid damage in transit. | Provided | Conforms |

8. FIELD PERFORMANCE TEST**Field calibration:**

The field calibration of seed drill was conducted for Sorghum, Wheat following the same procedure as that of laboratory calibration, except the drill was operated in the well-prepared seedbed by mounting with the tractor.

Field operation:

The seed drill was operated for 29.0 hours at the At Khandewadi, Chitegaon, Tal. Paithan and Patoda, Tal. Gangapur, Dist. Aurangabad for under varying soil and moisture conditions in well-prepared seedbed. The details of test results are given as follow:

SUMMARY OF FIELD PERFORMANCE TEST

Place of Test: At Post:Khandewadi,Chitegaon, Patoda, Dist. Aurangabad

| Sr. No. | Parameters | Sorghum | Wheat |
|---------|----------------------------------|---------------|-------|
| 1. | Soil moisture (%) | 15.7-17.5 | 14.6 |
| 2. | Bulk Density (g/cc) | 1.27-1.35 | 1.31 |
| 3. | Av. Speed of travel (km/h) | 3.60-4.08 | 3.65 |
| 4. | Av. wheel slippage (%) | 4.64-5.30 | 3.89 |
| 5. | Av. Depth (mm) | | |
| | Seed | 64-67.8 | 62 |
| | Fertilizer | 50-53.4 | 47.6 |
| 6. | Av. Working Width of sowing (cm) | 196-198.4 | 196.4 |
| 7. | Area covered (ha/h) | 0.499-0.616 | 0.507 |
| 8. | Time required for one ha (h) | 1.62-2.0 | 1.97 |
| 9. | Seed rate (kg/ha) | 13-14 | 118 |
| 10. | Fertilizer rate (kg/ha) | 123 to 126.50 | 128 |
| 11.. | Field efficiency (%) | 70.38-76.22 | 70.80 |
| 12. | Avg. implement draft (kgf) | 342-360 | 350 |
| 13. | Power requirement (hp) | 4.74-5.26 | 4.74 |
| 14. | Fuel consumption | | |
| | -l/h | 3.8-4.0 | 3.60 |
| | -l/ha | 6.16-7.60 | 7.09 |

8.1 Rate of work:-

- The time required to cover one hectare for Sorghum, Wheat was recorded as 1.62-2.0 and 1.97 respectively.
- The field efficiency for Sorghum, Wheat was recorded as 70.38-76.22 and 70.80% respectively.

8.2 Quality of work: -

- The average depth of sowing for Sorghum, Wheat was recorded as 64-67.8, 62 mm respectively
- The average sowing width for Sorghum, Wheat was recorded as 196-198.4, 196.40cm respectively.
- Seed rate was recorded as 13-14 kg/ha for Sorghum, 118 kg/ha for Wheat .
- Fertilizer rate was recorded as 123 to 126.50 kg/ ha for sorghum and 128 kg/ha for wheat.

9 Wear analysis (Shovel) (Mass basis):**9.1 On Mass Basis:**

| S. No. | Initial Mass (gm) | Final Mass (gm) | Percentage of Wear | |
|--------|-------------------|-----------------|--------------------|----------|
| | | | After 29.0 h | Per hour |
| 1. | 541 | 514 | 4.91 | 0.16 |
| 2. | 541 | 518 | 4.25 | 0.14 |
| 3. | 536 | 512 | 4.47 | 0.15 |
| 4. | 538 | 515 | 4.27 | 0.14 |
| 5. | 539 | 519 | 3.71 | 0.12 |
| 6. | 537 | 519 | 3.37 | 0.12 |
| 7. | 544 | 520 | 4.41 | 0.15 |
| 8. | 532 | 508 | 4.51 | 0.15 |
| 9. | 540 | 523 | 3.14 | 0.10 |

Remark: The hourly percentage wear on mass basis of shovel was recorded as **0.10 to 0.16**.

10. Labour requirement: -

Two labours are required to operate the drill. One skilled operator is needed to operate the tractor and the other person is needed for filling the seed box, to check furrow openers and seed tubes against choking.

11. Ease of operation and adjustments: -

- No arrangement is provided to check the seed while the machine is in operation.
- Overall operation and adjustment of onion seed planter was observed satisfactory.

12. Service and Maintenance: -

Daily oiling of drive unit and feed shaft bush is required. Cleaning of seed tubes and tightening of all nuts & bolts was required regularly. Daily cleaning of furrow openers against deposition of soil and mud is required.

13. DEFECTS, BREAK DOWNS AND REPAIRS

No breakdown was occurred during 29.0 h of operation of seed drill.

14. SUMMARY OF OBSERVATIONS, COMMENTS AND RECOMMENDATIONS

| | |
|------|---|
| 14.1 | The dimensions of the furrow openers do not conform fully to the requirement of IS 6813:2000 (Reaffirmed Dec. 2004). This should be modified accordingly. |
| 14.2 | The dimensions of the seed metering mechanisms conform to the requirement of IS 6813:2000 (Reaffirmed Dec. 2004). |
| 14.3 | The specification of three-point linkage does not fully conform to IS: 4468-1997. This should be looked into. |
| 14.4 | Furrow openers should be provided with depth adjusting arrangement to meet the requirements of IS 6813:2000. |
| 14.5 | Accessories like foot board, row marker, press wheel and area recorder may also be provided. |
| 14.6 | The hardness of the furrow openers was recorded as 271 HB against 350-450 HB, which confirms to the relevant Indian standard. |
| 14.7 | Suitable clutches are not provided to stop the movement of metering mechanisms when the wheels are turned in reverse direction. This should be looked into. |
| 14.8 | Overall performance of the implement was found satisfactory |

14.9

Adequacy of Literature: -




No literature was supplied with test sample. However a leaflet containing information on main specification size of parts and versatility of the implement was made available. Therefore, it is recommended that the following material should be brought out in vernacular language for the guidance of users:

4.10

This test report valid up to 10/12/2026

As per office memorandum no 13-24/2018-M&T(I&P)From Additional Commissioner (Machinery), Department of Agriculture, cooperation and farmers welfares, ministry of agriculture and farmers welfare, Government of India, New Delhi.

15. TESTING AUTHORITY

| | | |
|----|--|---|
| 1. | V.D. Deshmukh Assistant Professor, AICRP on Farm Implements and Machinery, Dr. A. S. College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri |  |
| 2. | T. B. Bastewad Professor and Principal Investigator, AICRP on Farm Implements and Machinery, Dr. A. S. College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri |  |
| 3. | S. M. Nalawade Head, Department of Farm Machinery and Power, Dr. A. S. College of Agricultural Engineering and Technology, Mahatma Phule Krishi Vidyapeeth, Rahuri |  |

Test report prepared and compiled by **Er. R.R.Gurav**, Technical Assistant, FMTTC, AICRP on FIM, MPKV, Rahuri.

16. APPLICANT'S COMMENTS:

A) Hitch pyramid.

Width between outer faces of yoke will be maintained as per BIS recommendation in future.

B) Laboratory Test.

Hardness and chemical composition of shovel will be improved as per BIS recommendation in future.

C) We will provide the literature in vernacular languages for the guidance of users in future.

ANNEXURE-I
STATIONARY CALIBRATION FOR SORGHUM

| Level of seed in hopper | Level of opening Marked as | Average weight of seed in gm from furrow openers at 25 revolutions | | | | | | | | | Weight of seed from all furrow openers in kg/ha | |
|-------------------------|----------------------------|--|------|------|------|------|------|------|------|------|---|---------|
| | | No.1 | No.2 | No.3 | No.4 | No.5 | No.6 | No.7 | No.8 | No.9 | | Average |
| Full | Minimum | 11 | 10 | 9 | 10 | 8 | 12 | 10 | 12 | 11 | 10.33 | 10.63 |
| | Medium | 12 | 11 | 13 | 14 | 12 | 13 | 15 | 14 | 12 | 12.89 | 13.26 |
| | Maximum | 14 | 15 | 16 | 17 | 15 | 16 | 14 | 17 | 18 | 15.78 | 16.23 |
| 3/4 | Minimum | 8 | 7 | 9 | 9 | 7 | 8 | 10 | 10 | 9 | 8.56 | 8.80 |
| | Medium | 11 | 10 | 9 | 12 | 10 | 9 | 11 | 12 | 12 | 10.67 | 10.97 |
| | Maximum | 13 | 15 | 13 | 14 | 12 | 13 | 14 | 12 | 13 | 13.22 | 13.60 |
| 1/2 | Minimum | 6 | 6 | 8 | 7 | 6 | 7 | 9 | 5 | 8 | 6.89 | 7.09 |
| | Medium | 8 | 7 | 7 | 6 | 8 | 7 | 6 | 9 | 7 | 7.22 | 7.43 |
| | Maximum | 10 | 9 | 10 | 11 | 12 | 10 | 8 | 11 | 12 | 10.33 | 10.63 |
| 1/4 | Minimum | 5 | 5 | 4 | 6 | 7 | 8 | 6 | 7 | 7 | 6.11 | 6.29 |
| | Medium | 7 | 6 | 6 | 5 | 7 | 7 | 9 | 8 | 6 | 6.78 | 6.97 |
| | Maximum | 8 | 9 | 10 | 10 | 8 | 9 | 7 | 10 | 8 | 8.78 | 9.03 |

Continued ANNEXURE-II
STATIONARY CALIBRATION FOR WHEAT

| Level of seed in hopper | Level of opening Marked as | Average weight of seed in gm from furrow openers at 25 revolutions | | | | | | | | | Weight of seed from all furrow openers in kg/ha | |
|-------------------------|----------------------------|--|------|------|------|------|------|------|------|------|---|---------|
| | | No.1 | No.2 | No.3 | No.4 | No.5 | No.6 | No.7 | No.8 | No.9 | | Average |
| Full | Minimum | 100 | 102 | 98 | 102 | 100 | 103 | 103 | 98 | 102 | 100.89 | 103.77 |
| | Medium | 108 | 107 | 108 | 109 | 107 | 109 | 110 | 113 | 110 | 109.00 | 112.11 |
| | Maximum | 115 | 115 | 114 | 117 | 116 | 115 | 113 | 112 | 117 | 114.89 | 118.17 |
| 3/4 | Minimum | 89 | 87 | 86 | 87 | 89 | 84 | 85 | 86 | 87 | 86.67 | 89.14 |
| | Medium | 92 | 94 | 94 | 95 | 96 | 94 | 93 | 93 | 95 | 94.00 | 96.68 |
| | Maximum | 98 | 99 | 97 | 95 | 94 | 98 | 99 | 100 | 100 | 97.78 | 100.57 |
| 1/2 | Minimum | 83 | 84 | 86 | 87 | 85 | 84 | 84 | 83 | 82 | 84.22 | 86.62 |
| | Medium | 89 | 88 | 89 | 87 | 86 | 85 | 87 | 84 | 86 | 86.78 | 89.25 |
| | Maximum | 92 | 93 | 95 | 96 | 95 | 94 | 93 | 96 | 97 | 94.56 | 97.25 |
| 1/4 | Minimum | 83 | 84 | 82 | 79 | 83 | 84 | 78 | 77 | 80 | 81.11 | 83.42 |
| | Medium | 86 | 87 | 86 | 88 | 87 | 89 | 86 | 84 | 84 | 86.33 | 88.80 |
| | Maximum | 89 | 93 | 90 | 92 | 92 | 91 | 90 | 89 | 89 | 90.56 | 93.14 |

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Continued ANNEXURE-III
STATIONARY CALIBRATION FOR FERTILIZER

| Level of seed in hopper | Level of opening Marked as | Average weight of fertilizer in gm from furrow openers at 25 revolutions | | | | | | | | | Weight of seed from all furrow openers in kg/ha | |
|-------------------------|----------------------------|--|------|------|------|------|------|------|------|------|---|---------|
| | | No.1 | No.2 | No.3 | No.4 | No.5 | No.6 | No.7 | No.8 | No.9 | | Average |
| Full | Minimum | 127 | 124 | 125 | 128 | 122 | 125 | 127 | 128 | 122 | 125.33 | 128.91 |
| | Medium | 134 | 135 | 132 | 128 | 129 | 131 | 132 | 131 | 126 | 130.89 | 134.62 |
| | Maximum | 135 | 136 | 136 | 138 | 137 | 139 | 135 | 125 | 128 | 134.33 | 138.16 |
| 3/4 | Minimum | 120 | 119 | 120 | 126 | 124 | 121 | 122 | 118 | 126 | 121.78 | 125.25 |
| | Medium | 125 | 127 | 128 | 126 | 124 | 126 | 124 | 128 | 116 | 124.89 | 128.45 |
| | Maximum | 129 | 130 | 131 | 130 | 129 | 131 | 128 | 124 | 118 | 127.78 | 131.42 |
| 1/2 | Minimum | 117 | 125 | 119 | 122 | 117 | 119 | 123 | 121 | 122 | 120.56 | 123.99 |
| | Medium | 123 | 124 | 122 | 120 | 121 | 123 | 119 | 124 | 118 | 121.56 | 125.02 |
| | Maximum | 125 | 125 | 124 | 123 | 127 | 126 | 124 | 123 | 119 | 124.00 | 127.54 |
| 1/4 | Minimum | 117 | 114 | 116 | 115 | 119 | 117 | 120 | 119 | 115 | 116.89 | 120.22 |
| | Medium | 119 | 120 | 118 | 119 | 121 | 122 | 117 | 118 | 116 | 118.89 | 122.28 |
| | Maximum | 120 | 122 | 121 | 123 | 124 | 120 | 121 | 123 | 119 | 121.44 | 124.91 |

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ANNEXURE-IV
FIELD PERFORMANCE RESULTS

Place: At Post: Khandewadi, Chitegaon, Patoda, Dist. Aurangabad

| Sr. No. | Parameters | TEST TRIALS | | | | |
|---------|----------------------------------|--------------|------------|------------|------------|------------|
| | | I | II | III | IV | V |
| 1. | Date of Test | 04.10.2019 | 05.10.2019 | 06.10.2019 | 07.10.2019 | 09.10.2019 |
| 2. | Name of Crop | Sorghum | Sorghum | Sorghum | Sorghum | wheat |
| 3. | Furrow length (m) | 177.40 | 205.80 | 214 | 218.8 | 187 |
| 4. | Net duration of test (h) | 4.0 | 6.5 | 7.50 | 6.0 | 5.0 |
| 5. | Soil Type | Medium Black | | | | |
| 6. | Soil moisture (%) | 16.5 | 17.0 | 17.5 | 15.7 | 14.6 |
| 7. | Bulk Density (g/cc) | 1.34 | 1.30 | 1.27 | 1.35 | 1.31 |
| 8. | Av. Speed of travel (km/h) | 3.60 | 4.06 | 3.73 | 4.08 | 3.65 |
| 9. | Av. wheel slippage (%) | 5.30 | 4.96 | 4.64 | 4.85 | 3.89 |
| 10. | Av. Depth (mm) | | | | | |
| | Seed | 67.80 | 65.80 | 64 | 64.4 | 62 |
| | Fertilizer | 51 | 50 | 53.40 | 51 | 47.60 |
| 11. | Av. Working Width of sowing (cm) | 197 | 198.4 | 196 | 198.4 | 196.4 |
| 12. | Area covered (ha/h) | 0.499 | 0.579 | 0.521 | 0.616 | 0.507 |
| 13. | Time required for one ha (h) | 2.0 | 1.72 | 1.91 | 1.62 | 1.97 |
| 14. | Seed rate (kg/ha) | 14 | 13.5 | 13 | 14 | 118 |
| 15. | Fertilizer rate (kg/ha) | 125 | 124.7 | 126.5 | 123 | 128 |
| 16. | Field efficiency (%) | 70.38 | 72.01 | 71.25 | 76.22 | 70.80 |
| 17. | Avg. implement draft (kgf) | 356 | 342 | 360 | 348 | 350 |
| 18. | Power requirement (hp) | 4.74 | 5.14 | 4.98 | 5.26 | 4.74 |
| 19. | Fuel consumption | | | | | |
| | -l/h | 3.80 | 3.70 | 4.0 | 3.80 | 3.60 |
| | -l/ha | 7.60 | 6.3 | 7.66 | 6.16 | 7.09 |

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