

**BUREAU OF INDIAN STANDARDS****DRAFT FOR COMMENTS ONLY**

*(Not to be reproduced without the permission of BIS or used as an Indian Standard)*

**भारतीय मानक मसौदा**

**सेमी-ऑटोमैटिक गन्ना बोने की मशीन— विशिष्टि**

*( आइ एस 11976 का पहला पुनरीक्षण )*

*Draft Indian Standard*

**SUGARCANE PLANTER, SEMI-AUTOMATIC — SPECIFICATION**

*(First Revision of IS 11976)*

**ICS 65.060.30**

Agricultural Machinery and Equipment Last Date for Comments : **11 December 2023**  
Sectional Committee, FAD 11

**FOREWORD**

*(Formal clause will be added later)*

While quality seeds are essential for high crop yields, the method of planting those seeds in the soil is equally crucial for the success of the crop. The uniform depth and proper alignment in rows contribute to the efficient growth and management of crops. This is particularly important for crops like sugarcane, where the correct planting technique can lead to higher yields and reduced labour requirements for thinning the crops later. Sugarcane planting is a multi-step process that involves opening furrows, placing sugarcane setts (sections of the sugarcane stalk with buds), and fertilizers, and then covering and compacting the furrows. Traditionally, this planting process has been carried out manually, which can be labour-intensive, time-consuming, and expensive. To address these challenges and improve the efficiency of sugarcane planting, sugarcane planters have been developed. Sugarcane planters are agricultural machines designed specifically to mechanize the process of planting sugarcane.

Sugarcane planters are of two types, namely, drop type, and cutter type. A drop type planter opens the furrow, places setts and fertilizer and covers with soil. In the cutter type planter, the whole sugarcane stem is fed and the planter cuts it to a predetermined length and carries it to the furrow.

In view of increase in manufacturing and use of drop type planter in the country, a need was felt to prepare the standard. The standard was first published in 1986 deriving assistance from Indian Institute of Sugarcane Research, Lucknow and Andhra Pradesh Agricultural University, Hyderabad. The first revision of the standard has been undertaken to incorporate necessary editorial changes and to bring it out in the latest style and format of Indian Standards. References to Indian Standards wherever applicable have also been updated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2: 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Draft Indian Standard*  
**SUGARCANE PLANTER, SEMI-AUTOMATIC — SPECIFICATION**  
(First Revision of IS 11976)

## 1 SCOPE

**1.1** This standard specifies material, constructional, performance and other requirements of semi-automatic tractor drawn, drop type sugarcane planters.

## 2 REFERENCES

The standards given below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

<i>IS No.</i>	<i>Title</i>
IS 210 : 2009	Grey iron castings — Specification ( <i>fifth revision</i> )
IS 277 : 2018	Galvanized steel strips and sheets (plain and corrugated) — Specification ( <i>seventh revision</i> )
IS 292 : 1983	Specification for leaded brass ingots and casting ( <i>second revision</i> )
IS 306 : 1983	Specification for tin bronze ingots and castings ( <i>third revision</i> )
IS 617 : 1994	Cast aluminum and its alloys — Ingots and castings for general engineering purposes — Specification ( <i>third revision</i> )
IS 1500 (Part 1) : 2019/ ISO 6506-1 : 2014	Metallic materials — Brinell hardness test: Part 1 Test method ( <i>fifth revision</i> )
IS 17231 : 2019/ ISO 730 : 2009	Agricultural Wheeled Tractors - Rear - Mounted Three - Point Linkage - Categories 1N, 1, 2N, 2, 3N, 3, 4N and 4
IS 1570 (Part 2) : 1979	Schedules for wrought steels: Part 2 Carbon steels (Unalloyed steels) ( <i>first revision</i> )
IS 2062 : 2011	Hot rolled medium and high tensile structural steel — Specification ( <i>seventh revision</i> )
IS 9856 : 1981	Test code for potato planters
IS 7201 (Part 1) : 1987	Methods of sampling for agricultural machinery and equipment: Part 1 Hand -tools and hand-operated/animal-drawn equipment ( <i>first revision</i> )

## 3 TERMINOLOGY

For the purpose of this standard the following definitions shall apply.

**3.1 Sugarcane Planter** — An implement which opens the furrow, places sugarcane setts and fertilizer and covers with soil covers.

**3.1.1 Drop Type Planter** — A machine in which sugarcane setts of desired length are fed and dropped at pre-determined spacing.

**3.2 Sugarcane Sett** — Cut pieces of sugarcane of desired length.

**3.3 Uniformity of Sett Placement** Placement of the predetermined number of sugarcane setts of specified length over a predetermined furrow length in a specified manner.

**4 MATERIALS**

**4.1** The materials for the construction of different components of the sugarcane planter shall be selected from those given in *col 3* of Table 1. The material shall, as far as possible, conform to Indian Standard and grade as given in *col 4* and *5* of Table 1.

**Table 1 Material for Construction of Different Components of Planter***(Clause 3.1)*

<b>Sl. No.</b>	<b>Component</b>	<b>Material</b>	<b>Applicable Standard</b>	<b>Grade</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
i)	Frame	Mild steel	IS 2062	-
ii)	Wheel	Mild steel	IS 2062	-
		Cast iron	IS 210	FG 200
		Pneumatic tyre	-	-
iii)	Axle and shaft	Mild steel	IS 2062	-
iv)	Sugarcane sett and fertilizer boxes	Mild steel	IS 2062	-
		Galvanized steel sheet	IS 277	-
		Plastics	-	-
		Fibreglass	-	-
v)	Tines	Mild steel	IS 2062	-
		Carbon steel	IS 1570 (Part 2)	Cu 55 Mu 75
vi)	Furrow opener	High carbon steel	IS 1570 (Part 2)	C 75
vii)	Sett feeding drum	Galvanized steel Sheet	IS 277	-
		Mild steel	IS 2062	-
viii)	Sett carrying chute	Mild steel	IS 2062	-
		Plastics	-	-
ix)	Fertilizer metering mechanism	Cast iron	IS 210	FG 200
		Mild steel	IS 2062	-
		Aluminium	IS 617	A-4M
		Plastics	-	-
x)	Bushes	Brass	IS 292	3
		Gun metal	IS 306	-
		Nylon	-	-
xi)	Covering device	Mild steel	IS 2062	-
		Cast iron	IS 306	FG 200
xii)	Pulley, sproket and gear	Cast iron	IS 210	FG 200
		Mild steel	IS 2062	-
xiii)	Hitching mechanism	Mild steel	IS 2062	-

xiv)	Feed, adjusting mechanism	Mild steel Cast iron	IS 2062 IS 210	- FG 200
xv)	Depth adjusting mechanism	Mild steel Cast iron	IS 2062 IS 210	- -
xvi)	Compacting roller	Cast iron		
xvii)	Marker	Mild steel	IS 2062	FG 200
xviii)	Seat	Mild steel	IS 2062	-
xix)	Foot rest	Mild steel	IS 2062	-

## 5 HARDNESS

**4.1** The furrow openers shall be hardened to have Brinell hardness between 350 and 450 HB when tested in accordance with IS 1500 (Part 1).

## 6 CONSTRUCTIONAL REQUIREMENTS

**6.1 Frame** — Shall be rigid and strong.

**6.2 Wheels** — Wheels shall have either bushes or dust proof bearings with provisions for lubrication.

**6.3 Axles and Shafts** — Axles and shafts shall be so attached that they can be easily removed for cleaning when required.

**6.4 Sett Box** — Sett box shall have adequate capacity and may be trapezoidal or rectangular. The box shall be sufficiently strong and shall not buckle when fully filled with sugarcane setts.

**6.4.1** The thickness of mild steel and galvanized steel sheet for boxes shall be not less than 1.0 and 0.63 mm respectively.

**6.5 Tines** — Tines shall be properly attached with tool bar either by bolts or by clamps.

**6.6 Furrow Openers** — Furrow openers shall be provided with depth adjustment arrangement and may be of ridger type with adjustable wings. There may be different furrow openers for sett and fertilizer or common for sett and fertilizer with the provision of dropping them separately.

**6.7 Sett Feeding Drum** — The sett feeding drum shall have 12 or more sett compartments to distribute the sugarcane setts uniformly while operating at a forward speed of 1.5 km/h.

**6.8 Fertilizer Box** — The fertilizer box shall have adequate capacity and may be trapezoidal. The box shall be sufficiently strong and shall not buckle when fully filled with fertilizer.

**6.8.1** The thickness of mild steel and galvanized steel sheet for boxes shall be not less than 1.0 and 0.63 mm respectively.

**6.9 Fertilizer Metering Mechanism** — The fertilizer metering mechanism shall be of gravity -feed system -with agitator or positive metering type.

**6.10 Sett Carrying Chute** — The sugarcane sett carrying chute shall be sufficiently wide at the lower end to ensure smooth drop of setts. The lower end of the chute shall be 10 cm above the ground level and the inclination of the chute shall be 10° to 15°.

**6.11 Covering and Compacting Device** — The setts shall be covered by covering tines with shovels followed by compacting rollers. The depth of covering shall be adjustable.

**6.12 Marker** — A marker shall be provided on the machine to guide the tractor driver in maintaining uniform row to row spacing.

**6.13 Transmission System** — This may be sprocket and chain or gear type with proper guards. Provisions for adjustment of chain shall be provided.

## 7 PERFORMANCE REQUIREMENTS

**7.1** The variation in dropping of setts and fertilizer in different feeding outlets separately shall be not more than 5 and 12.5 percent, respectively, from the average quantity obtained.

**7.2** The variation in number/quantity dropped per hectare and number/quantity specified to be dropped at a particular setting shall be not more than 7 and 12.5 percent for setts and fertilizer respectively.

**7.3** The variation in uniformity of sett dropping and placement at a forward speed of 1.5 km/h shall not exceed 10 percent.

**7.4** The bud damage shall not exceed 2 percent.

**7.5** The wheel slip at specified speed shall not exceed 10 percent.

**7.6** The variation in dropping of fertilizer due to box filling at  $\frac{1}{4}$ ,  $\frac{1}{2}$  and  $\frac{3}{4}$  of rated capacity shall not exceed by 10 percent.

**7.7** The planter shall be able to plant the setts up to a depth of 20 cm.

**7.8** The above requirements shall be tested in accordance with IS 9856 as detailed below:

<b>Performance Requirements (Ref to Cl No. in this Standard )</b>	<b>Method of Test (Ref to Cl No. of IS 9856)</b>	
	<b>Type Testing (2)</b>	<b>Routine Testing (3)</b>
<b>(1)</b>		
<b>7.1 and 7.2</b>	6.2.1 and 7.3.1	6.2.1
<b>7.3</b>	7.3.1	7.3.1
<b>7.4</b>	6.3	6.3
<b>7.5</b>	7.3.2.1 & 7.3.2.2	-
<b>7.6</b>	6.2.2	-
<b>7.7</b>	7.3.1	-

## 8 OTHER REQUIREMENTS

**8.1** The row spacing shall be adjustable between 60 to 90 cm.

**8.2** An etched metallic calibration plate indicating the metering position and quantity of fertilizer shall be attached under the top cover of fertilizer box.

**8.3** Arrangement for quick cut-off of the fertilizer when the planter is moving, shall be provided. This arrangement shall work without disturbing the setting of metering mechanism.

**8.4** Hitching arrangement shall conform to the three-point linkage specified in IS 17231.

**8.5** Proper lubrication arrangements shall be provided for all moving parts except the portions exposed to setts and fertilizer.

**8.6** Each planter shall be provided with instruction sheets containing full information on method of installation and operation of the planter. It shall also be provided with a manual on installation and operation containing maintenance instructions, calibration chart, etc.

**8.6.1** Each planter shall also be supplied with necessary tools,

**8.6.2** Each planter shall be provided with the following accessories.

- a) Pesticides tank;
- b) Foot rest;
- c) Compacting roller;
- d) Levelling device; and
- e) Area recorder.

## **9 TESTS**

**9.1** One planter of each model shall be tested for all the requirements mentioned in this standard.

**9.2** Each planter of a model shall be tested for requirements mentioned in **7.1 to 7.4, 8.1 to 8.5 and 10.1 to 10.3**.

**9.3** The testing of the sugarcane planter shall be done in accordance with IS 9856.

## **10 WORKMANSHIP AND FINISH**

**10.1** The welding shall be satisfactory in all respects and shall not be brittle or porous.

**10.2** The components shall be free from rust and shall have a protective coating to prevent surface deterioration in transit and storage.

**10.3** The components shall be free from pits, burrs and other defects that may be detrimental for their use.

## **11 MARKING**

**11.1 Marking** – Each planter shall be marked with the following particulars:

- a) Manufacturer's name or recognized trademark, if any;
- b) Model;
- c) Code number;
- d) Serial number; and
- e) Any other markings required under the *Standards of Legal Metrology (Packaged Commodities) Rules, 2011* and any other statutory requirement.

### **11.2 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

## **12 SAMPLING**

**12.1** Unless otherwise agreed to between the purchaser and the supplier, the sampling of the planter for lot acceptance shall be as per IS 7201 (Part 1).