

**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

पेडल संचालित धान थ्रेसर — विशिष्टि

(आइ एस 3327 का दूसरा पुनरीक्षण)

*Draft Indian Standard*

**PEDAL-OPERATED PADDY THRESHERS — SPECIFICATION**

*(Second Revision of IS 3327)*

**ICS 65.060.01**

---

Agricultural Machinery and  
Equipment Sectional Committee,  
FAD 11

Last date for Comments: **19 November 2023**

---

**FOREWORD**

*(Formal clause will be added later)*

Traditionally, the common method of threshing paddy involved trampling paddy with a team of bullocks on a specially prepared threshing floor or by manually beating the bundles of paddy sheaves. With advancement, pedal-operated paddy threshers were introduced to reduce the efforts of farmers. These are mechanical devices operated by human power using pedals which are used to separate grain from the paddy straw.

The pedal-operated paddy thresher consists mainly of a well-balanced cylinder with a series of threshing teeth fixed on slats and it is worked by a pedal and gear drive mechanism either in standing position (Fig. 1) or sitting position (Fig. 2). While the cylinder is kept in rotary motion at high speed, the paddy sheaves in bundles of suitable size are held in contact with the teeth. The grains are separated by the combing as well as by the beating action of the threshing teeth. The thresher with a smaller cylinder is operated by one person and the one with a larger cylinder is operated by two persons. In the unit operated by two persons, the driving mechanism is fitted at both the ends of the cylinder.

This standard was first published in the year 1965 and subsequently revised in 1982 to make it more implementable. The second revision of the standard has been brought out in latest style and format of Indian Standard incorporating figures for pedal operated paddy thresher in standing and sitting position.

In revision of this standard, assistance has been derived from the technical information provided by Agricultural Machinery Manufacturers Association (AMMA, India) with support from Indian Institute of Sugarcane Research (IISR) Lucknow.

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*

**PEDAL-OPERATED PADDY THRESHERS — SPECIFICATION**

(*Second Revision of IS 3327*)

**1 SCOPE**

**1.1** This standard prescribes the material, dimensional and other requirements for the pedal-operated paddy thresher.

**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 399 : 1963	Classification of commercial timbers and their zonal distribution ( <i>first revision</i> )
IS 617 : 1994	Cast aluminium and its alloys – Ingots and castings for general engineering purposes – Specification ( <i>third revision</i> )
IS 2062 : 2011	Hot rolled medium and high tensile structural steel — Specification ( <i>seventh revision</i> )
IS 280 : 2006	Mild steel wire for general engineering purposes ( <i>fourth revision</i> )
IS 4454 (Part 1) : 2001	Steel wire for mechanical springs — Specification: Part 1 Cold drawn unalloyed steel wire ( <i>third revision</i> )
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> )
IS 12239 (Part 1) : 2018/ISO 4254-1 : 2013	Guide for Safety and Comfort of Operator of Agricultural Tractors and Power Tillers: Part 1 General Requirements ( <i>second revision</i> )
IS 16814 : 2021/ISO 13857 : 2019	Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs

**3 TERMINOLOGY**

**3.0** For the purpose of this standard, the following definitions shall apply.

**3.1 Cylinder** — The rotary member of the thresher on which the slats with the threshing teeth are fitted.

**3.2 Pedal Operated** — Operated by the foot of the operator.

**3.3 Size** — The threshing length of the cylinder (*see A in Fig. 3*).

**3.4 Slats** — The members of the cylinder on which the threshing teeth are fitted.

**3.5 Threshing Teeth** — The hooks of the thresher which separate the grains from the harvested crops.

**4 SIZES**

4.1 Size of the thresher shall be up to 600 mm in case of one-person operated thresher and up to 800 mm in case of two-person operated thresher.

4.1.1 A tolerance of  $\pm 5$  mm shall be permitted on the declared size, subject to the size remaining within the specified limits (*see 4.1*).

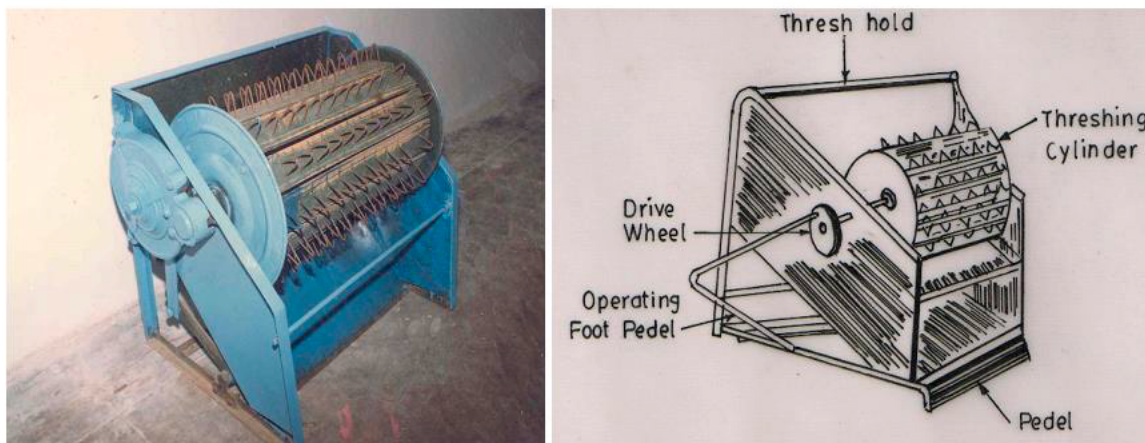


FIG. 1 PEDAL-OPERATED PADDY THRESHER IN STANDING POSITION



FIG. 2 PEDAL-OPERATED PADDY THRESHER IN SITTING POSITION

## 5 MATERIALS

5.1 The material used for various parts of the paddy thresher (*see Fig. 3*) shall be as given in *col 3* of Table 1. The material should conform to the relevant standards indicated in *col 4* of Table 1.

**Table 1 Materials for Various Components**

(Clause 5.1)

Sl. No.	Component	Material	Applicable Standard
(1)	(2)	(3)	(4)
i.	Base	Wood or Mild steel	IS 399 IS 2062
ii.	Front grain shield	Wood or Mild steel	IS 399 IS 2062

iii.	Side frames	Mild steel	IS 2062
iv.	Side boards	Mild steel	IS 2062
v.	Cylinder end discs	Mild steel	IS 2062
vi.	Crank	Mild steel	IS 2062
vii.	Axles	Mild steel	IS 2062
viii.	Pedal frame fulcrum	Mild steel	IS 2062
ix.	Pedal frame	Mild steel	IS 2062
x.	Rear grain shield	Mild steel	IS 2062
		or Canvas	
xi.	Threshing teeth	Spring steel wire or Mild steel wire or EN8D C45	IS 4454 (Part 1) IS 280
xii.	Gears	Cast iron or Forged Mild steel	IS 210
xiii.	Gear housing	Cast iron or Aluminium alloy or Mild steel	IS 210 IS 617 IS 2062
xiv.	Pedal board	Wood or Mild steel	IS 399 IS 2062
xv.	Slats	Wood or Mild steel	IS 399 IS 2062

NOTE — Wood used for various component should preferably be teak, sal or babul.

## 6 CONSTRUCTIONAL REQUIREMENTS

### 6.1 Body Frame

The body frame of the paddy thresher shall consist of the base, the side frames and the front grain shield. The rear grain shield may also be provided.

**6.1.1 Base** — The wooden base shall be at least 50 × 50 mm size. The wooden parts shall be joined to each other by mortise and tenon joints. The base shall be fixed to the side frames (*see 6.1.2*) with carriage bolts. The base may also be of mild steel angle section of nominal size of at least 30 × 30 × 3 mm and the parts in this case shall be welded to the side frames.

**6.1.2 Side Frames** — The side frames shall be of mild steel angle section of nominal size of at least 30 × 30 × 3 mm and the parts shall be welded or bolted. The side frames shall support side boards which shall be made of mild steel sheet of thickness 0.5 to 1.0 mm and these shall be bolted to the side frames. The side boards may be webbed.

**6.1.3 Front Grain Shield** — The front grain shield shall be at least 12 mm thick wooden plank or 0.5 to 1.0 mm thick mild steel sheet and it shall be fixed suitably to the side frames.

**6.1.4 Rear Grain Shield** — If provided, the rear grain shield shall be of either mild steel sheet having the same thickness as the side boards or canvas supported by at least three mild steel flat frames each of minimum 50 × 3 mm size. In case the rear grain shield is made of canvas supported by mild steel flats, the shield shall be so fabricated that it may be easily folded or entirely removed, when not in use.

### 6.2 Cylinder

The cylinder shall be constructed of a series of slats supported on each of its two sides by a cylinder end disc. The slats shall carry the threshing teeth. In case of the thresher operated by two persons, the cylinder shall be suitably reinforced at its centre. The diameter of the cylinder across the end discs (*see B in Fig. 3*) shall be in the range of 400 mm and 430 mm.

**6.2.1 Slat** — Each slat shall be at least 12 mm thick and 60 mm wide if made of wood and 0.5 to 1.0 mm thick and 45 mm wide if made of mild steel. The diameter of the cylinder across the slats (*see C in Fig. 3*) shall be in the range of 300 mm and 330 mm. The distance between the two slats (*see D in Fig. 3*) shall be in the range of 12 mm and 20 mm.

**6.2.2 Cylinder End Discs** — The cylinder end discs to support the slats may be webbed in order to reinforce them. The thickness of the sheet used in case of single disc shall be at least 1.5 mm. In case of double disc, the thickness of each disc shall be minimum 0.6 mm and the total thickness of two discs shall be minimum 1.5 mm. Mild steel bar of 6 mm diameter shall be rolled or welded along the edges of the discs.

**6.2.3 Threshing Teeth** — The threshing teeth shall be of at least 3 mm diameter. The wire shall be curved and fixed to the slats in such a way that the distance between the bottom ends of each teeth (*see E in Fig. 3*) shall be in the range of 25 mm and 32 mm. The threshing teeth shall project out 50 mm above the surface of the slats (*see F in Fig. 3*). The methods of fixing of the threshing teeth on the slat shall be such that when assembled, the threshing teeth on the two adjacent slats come staggered to each other. The distance between the tip of the two adjacent teeth (*see G in Fig. 3*) shall be between 50 to 75 mm.

### 6.3 Drive

The drive shall be of eccentric type. The drive shall consist of a crank, one end of which shall be connected to the spur gear and the other end shall be connected suitably to the pedal frame fulcrum which shall be welded to the pedal frame. The pedal frame shall carry the pedal board.

NOTE — The thresher is normally operated with a speed of 400 rev/min.

**6.3.1 Gear Housing** — The gear housing shall consist of the spur gear which shall engage the pinion. The gear ratio shall be not less than 3.5: 1.

**6.3.2 Crank** — The crank shall be made of bar of not less than 9 mm in diameter. This shall preferably be U-shaped.

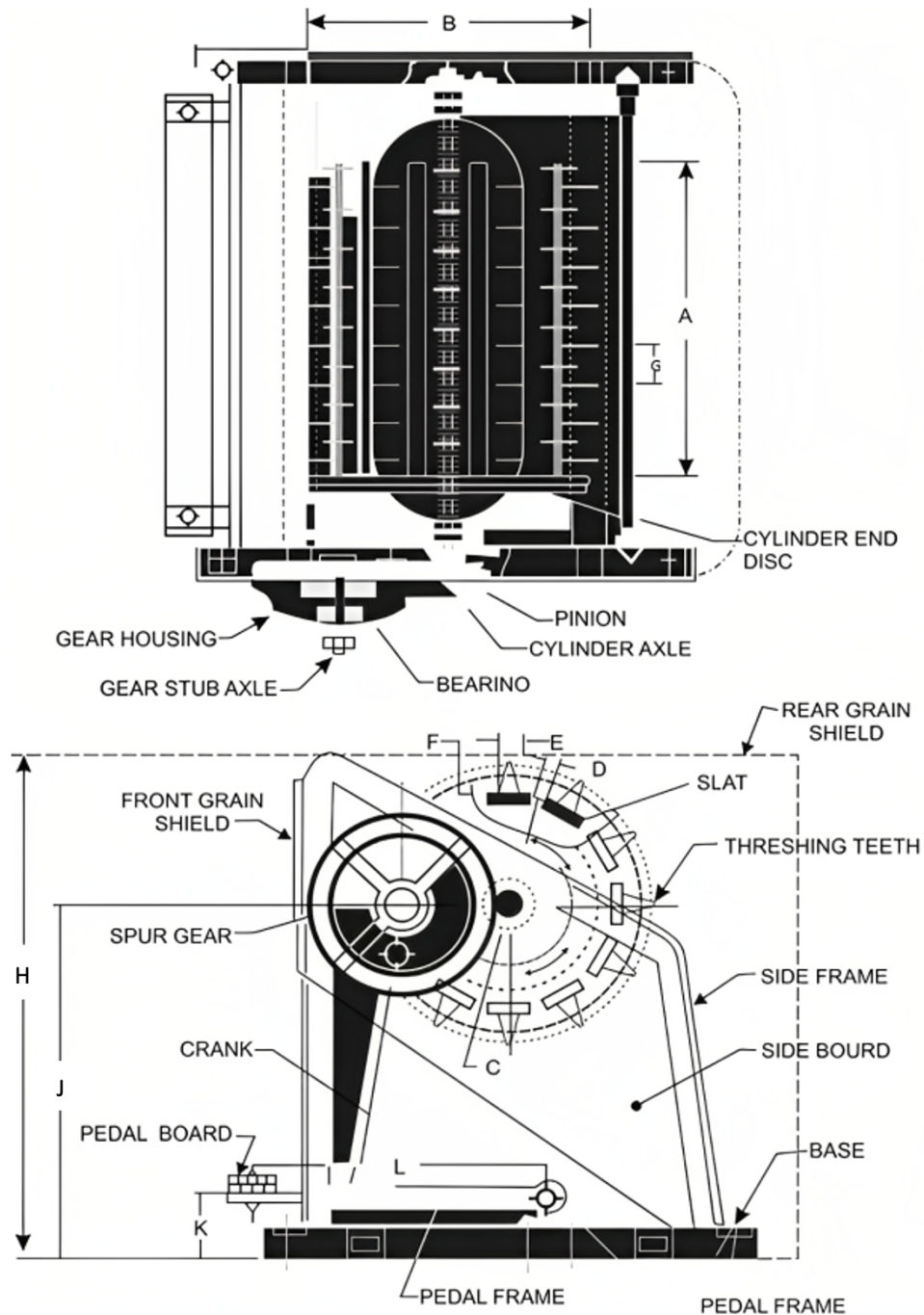
**6.3.3 Pedal Frame Fulcrum** — The fulcrum shall be made of mild steel tube or bar. In case mild steel tube is used, the inside diameter and thickness shall be at least 20 mm and 2.5 mm respectively, while in case of the bar, it shall be either round or square with 30 mm diameter or sides respectively.

**6.3.4 Pedal Frame** — The pedal frame shall be of mild steel flat of at least 30 × 5 mm size.

**6.3.5 Pedal Board** — The pedal board shall be wooden plank having minimum size of 25 mm × 65 mm or of mild steel of minimum 0.5 mm × 45 mm and its length shall depend on the size of the cylinder.

### 6.4 Axles

The cylinder axle and the gear stub axle shall be of mild steel round bar having a diameter between 16 mm and 20 mm. The axle shall be supported by ball or bush bearing or by bearings with loose balls in cup and cones, and these shall be guarded suitably



All dimensions in millimetres

FIG. 3 DETAILS OF PEDAL-OPERATED PADDY THRESHER

## 7 DIMENSIONS

7.1 The overall height of the thresher (*see H in Fig. 3*) shall be not more than 750 mm.

7.2 The height between the ground level and the centre of cylinder (*see J in Fig. 3*) shall be not more than 525 mm.

7.3 The height of the pedal board from the ground level (*see K in Fig. 3*) shall be 75 mm to 80 mm.

7.4 The distance between the centre of pedal board and the centre of pedal fulcrum (*see L in Fig. 3*) shall be  $360 \pm 10$  mm.

## 8 REQUIREMENTS

**8.1 Clearances** – The clearance between the frame and the tips of the threshing teeth shall be at least 50 mm. There shall be a clearance of at least 200 mm between the rear grain shield and tips of the threshing teeth.

**8.2 Lubrication** – The gear housing shall be provided with protected oil holes to facilitate lubrication of gears and provision shall also be made for easy opening of bearing cones for greasing of bearing balls.

**8.3 Safety Arrangement** – The metallic and wooden edges of the paddy thresher shall be rounded in order to protect the operator from possible injuries. The necessary safety aid shall be built in to prevent the possible detachment of certain parts and thin injuries to flying over, leading to the operator, while the thresher attains high rotary speed due to the centrifugal force. [*refer* IS 12239 (Part 1) or IS 16814].

## 9 TESTS

**9.1** The setting strength of the threshing teeth shall be such that when pulled by a force of 500 N, the teeth shall not come out of the slats.

**9.2** When placed on a level surface and operated at the maximum working speed, following shall not occur:

- a) Oscillation of the thresher;
- b) Undue vibration and unbalancing of the cylinder; and
- c) Feet of the operator shall not touch the rear grain shield.

## 10 WORKMANSHIP AND FINISH

**10.1** All the metallic parts of the thresher shall be given an anticorrosive rust preventive paint. The wooden parts shall be painted before assembly. The gear and bearings shall be well lubricated.

## 11 MARKING

**11.1** The paddy thresher shall be marked with the following particulars:

- a) Manufacturer's name or recognized trademark, if any;
- b) Batch or code number;
- c) Rotational speed;
- d) Size of drum;
- e) Type and size; and
- f) Any other markings required under the *Standards of Legal Metrology (Packaged Commodities) Rules, 2011* and any other statutory requirement.

**11.1.1** The particulars mentioned under **11.1** shall be punched or stencilled on the base of the thresher.

### 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 AND CRITERIA FOR CONFORMITY

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