

The Dangerous Machines (Regulation) Rules, 2007

UNION OF INDIA

India

The Dangerous Machines (Regulation) Rules, 2007

Rule THE-DANGEROUS-MACHINES-REGULATION-RULES-2007 of 2007

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7.

/421G.S.R. 506(E), dated 24.7.2007 - In exercise of the powers conferred by sub-section (1) of section 36 of the Dangerous Machines (Regulation) Act, 1983 (35 of 1983), and in supersession of the Dangerous Machines (Regulation) Rules, 1984, except as respects things done or omitted to be done before such supersession, the Central Government hereby makes the following rules, namely:-

1. Short title and commencement

(1) These rules may be called The Dangerous Machines (Regulation) Rules, 2007. (2) They shall come into force on such date as the Central Government may, by notification in the Official Gazette, specify, and different dates may be specified for different rules.

2. Definitions

- In these rules, unless the context otherwise requires,--(a) "Act" means the Dangerous Machines (Regulation) Act, 1983 (35 of 1983); (b) "Form" means a form appended to the First Schedule to the rules. (c) "Schedule" means a Schedule appended to these rules.

3. Form of license issued under section 9

(1) Every license issued to a person authorising him to manufacture, or to commence or to carry on business as the manufacturer of any dangerous machine shall be issued in Form I. (2) There shall be

issued for each category of dangerous machine, a separate license and every such license shall be issued in Form I.(3)Every license to commence or carry on business as a dealer of a dangerous machine shall be issued in Form II.(4)Every license referred to in sub-rule (2) shall be valid for dealing with the types or models of dangerous machines specified in the license.

4. Standards and specifications of power threshers, power operated chaff cutter and sugarcane crushers

- Every license issued under rule 3 shall ensure that the power thresher, power operated chaff cutter and sugarcane crushers manufactured by him/her complies with the standards and specifications laid down in the Second Schedule.

5. Modifications of existing dangerous machines how to be made

(1)Every person who has, immediately before the commencement of the Act, in his/her custody or control any power thresher, power operated chaff cutter and sugarcane crusher which does not comply, in all respects, with the provisions of the Act, and the rules and orders made thereunder, shall get it modified so as to ensure that the feeding system conforms to the specifications laid down in the Third Schedule.(2)The transmission system of every power thresher, power operated chaff cutter and sugarcane crusher shall be provided with suitable guards as specified in the Third Schedule.THE FIRST SCHEDULEFORM I[See Rule 3(1) and (3)]Form of Licence for Manufacture or Commencement of Carrying on Business as a Manufacturer of a Dangerous MachineLicence No.....Whereas M/sofhas/have.....(give full address) applied for a licence for commencement of/carrying on business as a manufacturer of..... (here specify which dangerous machine)And whereas the Controller is satisfied that the condition specified in Clause (a) of Sub-section (4) of Section 9 or, as the case may be, sub-section (4) of Section 9 has been complied with.Now, therefore, in exercise of the powers, conferred by Section 9 of the Act, licence is granted/renewed to M/s for a period of five years to commence/carry on business as a manufacturer of the :-

1.

2.

3.

(Give name of machine power thresher, power operated chaff cutter, power operated sugar cane crusher] and trade name with brief description and overall dimensions)This licence is issued subject to the following conditions, namely:-(1)The manufacturer shall ensure that the machine and every part thereof complies with the standards specified by Rule 4 of the Dangerous Machine (Regulation) (Amendment) Rules, 2007.(2)Without prejudice to the generality of condition under (1) above, the manufacturer shall ensure that the following parts are secured by safeguard of substantial construction:(a)the prime-mover and every part thereof;(b)the transmission machinery and every

part thereof; and(c)Every other dangerous part such as rollers, blowers, elevators, knife blades and the like.(3)The manufacturer shall clearly and legibly provide the machine with danger signals indicating the point beyond which no limb shall be inserted for the purpose of feeding the machine or for any other purpose while the machine is in operation.(4)The manufacturer shall ensure that the following particulars are legibly and conspicuously marked or inscribed on every dangerous machine by such method as would make it indelible, namely:(a)the direction of the rotation and the number of rotations per minute;(b)Its power requirements; and(c)the name and correct address of the manufacturer, the year of manufacture and the date, number and other particulars of the licence of the manufacturer.(5)Every manufacturer shall supply along with each dangerous machine a manual containing general instructions regarding the operation of such machine, in Hindi and regional languages.(6)Before, transferring the possession of the machine whether by sale, lease, hire or otherwise, the manufacturer shall deliver to the person acquiring the machine a declaration to the effect that the machine conforms to the standards laid down by or under this Act and also complies, in all respects, with the provisions of the Act and rules and orders made there under.(7)Failure to comply with the conditions specified above or of any provision of the Act or rule or order made there under will make this licence liable to suspension or cancellation as provided in Section 10.Note Bene. :- All references to the Act or any section thereof are references to the Dangerous Machines (Regulation) Act, 1983 (35 of 1983) or the relevant section thereof.Granted this day ofPlace:.....Date:

.....Designation.....SealFORM

II[See Rule 3(3)]Form of Licence for Commencement or Carrying on Business as a Dealer of a Dangerous MachineLicence NoWhereas M/s of (here give full address) has/have applied for a licence for commencement of/carrying on business as a dealer of..... (here specify which dangerous machine)And whereas the Controller is satisfied that the applicant proposes to commence/carry on business in(Specify which machine)which conform to the standards laid down by or under the Dangerous Machines (Regulation) Act, 1983 (35 of 1983).Now, therefore, in exercise of the power conferred by sub-section (4) of Section 9, licence is granted to M/s..... for a period of five years to commence/carry on business as a dealer of :-

Serial Number	Name of the Machine	Make/model and brief description	Horsepower/kilowatt requirement of the machine
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(1)

(2)

(3)

(Specify, types of threshers, power operated chaff cutter and power operated sugarcane crusher or other dangerous machine)This licence is issued subject to the following conditions, namely :-(1)The dealer shall deal only in machines of a manufacturer licenced under the Act.(2)Before transferring the possession of any machine whether by sale, lease, hire or otherwise, the dealer shall deliver to the person acquiring the possession of such machine, a declaration to the effect that the machine conforms to the standards laid down by or under this Act and also complies with, in all respects, the provisions of this Act and the rules and orders made there under.(3)Failure to comply with the conditions specified above or of any provision of the Act or rule or order made there under will make this licence liable to Suspension cancellation as provided in Section 10.Note Bene.- All references to

the Act or any section thereof are references to the Dangerous Machines (Regulation) Act, 1983 (35 of 1983) or the relevant section thereof. Granted thisday of

.....Place:.....Date:

.....Designation.....(Seal)THE

SECOND SCHEDULE[See Rule 4]

1. A power thresher shall comply with the following Indian Standards as may be relevant-

ISO 9020: 2002 (Power Threshers - Safety Requirements)

2. A power operated chaff cutter shall comply with the requirements of the following Indian Standards-

IS 15542: 2005 (Power Operated Chaff Cutter - Safety requirement) IS 11459: 1985 (specification for power operated chaff cutter)

3. A power operated sugarcane crusher shall comply with the requirements of the following Indian Standards:-

IS 15561 : 2005 (Sugarcane Crushers - Safety requirements) IS 1973 : 1999 (Sugarcane Crusher - Specifications (third revision)) THE THIRD SCHEDULE[See Rule 5]

1. Every power thresher, power operated chaff cutter and power operated sugarcane crusher referred to in Rule 5 shall be so modified as to ensure that the feeding system conforms to Section 7 as the case may be of IS 9020: 2002, Sections 7.2, 7.3 of IS 15542: 2005 and Sections 5.1, 5.1.1., 5.1.2, and 5.2 IS 15561 : 2005 of the Indian Standards respectively.

2. The transmission system shall be provided with suitable guards as specified in Section 6 of Indian Standards No. IS 9020 of 2002, Section 8 of Indian Standards No. IS 15542:2005 and Section 6 of IS 15561: 2005 respectively.

3. The recommended dimensions of the chute for Hammer-mill, Drummy and Syndicator type threshers are given in Table 1 below.

4. The recommended dimensions of chute for spike tooth cylinder type threshers are given in Table 2 below. The recommended dimensions of the chute for power operated chaff cutter and power operated sugarcane crusher

is given in Table 3 and Table 4 below respectively. The feeding hopper of the power thresher shall conform to Section A-2 of ANNEX A of IS 9020:2002. The positive feed rollers with conveyer or chute system used on chaff-cutter type power thresher shall conform to Section A-3 of ANNEX-A of IS 9020:2002. The conveyor feeding system used with spike tooth or rasp-bar type power thresher of power rating of 5.5 kW or higher shall conform to Section A-4 of ANNEX-A of IS 9020: 2002. The recommended dimension of conveyor system for power operated chaff cutter is given in Table-5.

TABLE 1 Recommended Dimensions of Chute For Hammer-Mill, Drummy And Syndicator Type Threshers

Sl. No	Size of the prime mover for thresher	A	C [For syndicator type thresher the dimension should be 230 mm]	E	F
1	2	3	4	5	6
	kW(HP)	mm	mm	mm	mm
(i)	3.7 (5)	500	200	50	125
(ii)	5.5(7.5)	550	200	60	175
(iii)	7.5(10)	600	220	60	190
(iv)	11(15) and above	650	220	60	200

TABLE 2 Recommended Dimensions Of Chute For Spike Tooth Cylinder Type Threshers

Sl. No	Size of the prime mover for thresher	A	C	E	F
(1)	(2)	(3)	(4)	(5)	(6)
	kW(HP)	mm	mm	mm	mm
(i)	3.7(5)	440	350	60	190
(ii)	5.5(7.5)	480	400	60	190
(iii)	7.5(10)	540	480	60	190
(iv)	11(15) and above	590	530	60	210

Note:- A, C, E and F refer to the dimensions as shown in the figure. TABLE 3 Recommended Dimensions Of Chute For Power Operated Chaff Cutter

Sl. No.	Description	Dimension (mm)
(1)	(2)	(3)
(i)	Minimum length of chute	900
(ii)	Minimum thickness of sheet metal of chute	1.6
(iii)	Minimum length of chute cover	450
(iv)	Height of chute from ground level	750 to 1100

TABLE 4 Recommended Dimensions Of Feed Plate/chute For Sugarcane Crusher.

Sl. No.	Description	Dimension (mm)
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(1)	(2)	(3)
(i)	Minimum thickness of Sheet Metal of feed plate/chute	1.6
(ii)	Maximum opening for feeding the cane in feedplate/chute	60
(iii)	Minimum length of chute cover	450
(iv)	The feed plate or feed chute shall be covered on front for a minimum distance of	600

TABLE 5 Recommended Dimensions Of Conveyor System For Power Operated Chaff Cutter

Sl. No.	Description	Dimension (mm)
(1)	(2)	(3)
(i)	Minimum length of conveyor cover	1200
(ii)	Minimum length of covered conveyor cover	450
(iii)	Minimum thickness of sheet metal for cover	1.6
(iv)	Feed reversing mechanism	Shall conform to the requirements in Annex-A of IS 15542:2005
(v)	Minimum thickness of MS Sheet (IS:2062) for guard of blower, if provided	1.6

ANNEXURE (Clauses 4.2 and 7.1) Requirements for Feeding Systems of Power Threshers A-1

FEEDING CHUTE A-1.1 Material Mild steel sheet (see IS 2062) shall be used in the manufacture of the feeding chute. The thickness of sheet shall not be less than 1.6 mm. **A-1.2 Shape** The shape of the chute shall be as shown in Figure 1A-1.3 Dimensions **A-1.3.1** The total length of chute, length of covered portion (see B and D in Fig. 1) shall be 900 mm. min. and 450 mm. min. respectively. The angle of lift of covered portion (see B Fig. 1) shall be between 10° to 30°. However, the length of the covered portion of chute for chaff-cutter type thresher shall not be less than 550 mm. **A-1.3.2** Other dimensions, when read in conjunction with Fig.1 for feeding chute of hammer mill type, drummy type and chaff-cutter type threshers of various power ratings are given in Table 3 for guidance. **TABLE 3 Recommended Dimensions of Chute for Hammer Mill, Drummy And Chaff-Cutter Type Threshers.**

SI. No.	Size of the Prime-mover for the thresher, kW	A	C	E	F
		mm	mm	mm	mm
(1)	(2)	(3)	(4)	(5)	(6)
(i)	3.7	500	200	50	125
(ii)	5.5	550	200	60	175
(iii)	7.5	600	220	60	190
(iv)	I and above	650	220	60	200

A-1.3.3 Other dimensions, when read in conjunction with Fig.1 for chute of spike tooth cylinder type thresher of various power ratings are given in Table 4 for guidance. **FIG. 1 AN IMPROVED FEEDING CHUTE COVERED PORTION**

TABLE 4 Recommended Dimensions for Chute for Spike Tooth Cylinder Type Threshers (Clause A-1.3.3)

SI. No.	Size of the Prime-mover for the thresher, kW	A	C	E	F
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		mm	mm	mm	mm
(1)	(2)	(3)	(4)	(5)	(6)
(i)	3.7	440	350	60	190
(ii)	5.5	480	400	60	190
(iii)	7.5	540	480	60	190
(iv)	11 and above	590	530	60	210

A 1.4 Other Requirements
A-1.4.1. To facilitate easy and smooth feeding of the crop during operation, the feeding chute shall be properly mounted on the thresher. In the-mounted position, angle α (see Fig.1) shall be kept as under:
 (a) For hammer-mill and drummy-type threshers - 10° to 15°
 (b) For chaff-cutter type threshers - 0° to 5°
 (c) For spike tooth type threshers - 10° to 15°
A-1.4.2 No sharp edges shall be provided on the feeding chute.
A. 1.4.3. The covered portion of the chute shall be rigidly attached and shall not be able to be detached without cutting.
A-1.4.4 The feeding chute shall be so fixed with the thresher that it is not possible to remove it easily.
A 2 Feeding Hopper
A-2.1 Material
A-2.1.1 Hopper - Mild steel sheet (see IS 2062) shall be used. The thickness of the sheet shall not be less than 1.6 mm.
A-2.1.2 Star Wheels - Cast iron (see IS 210) shall be used.
A-2.1.3 Star Wheel Shaft - Mild steel rod (see IS 2062) shall be used.
A-2.2 Shape The shape of the hopper unit shall be as shown in Fig.2
A-2.3 Dimensions
A-2.3.1 The dimension A in Fig.2 shall be 400 mm more than the length of the threshing cylinder and shall be declared by the manufacturer.
A-2.3.2 The thickness of sheet for the hopper shall be 1.6 mm.
A-2.3.3 The dimensions of the hopper and star wheels when read in conjunction with Fig.2 shall be as given in Table 5.
FIG. 2 DETAILS OF FEEDING HOPPER
 Star Wheel Shaft Feeding Hopper Star wheel Threshing Cylinder

A B
 C D
 E F
 G H
 K L
 M

TABLE 5 Dimensions of Hopper and Star Wheel (Clause A-2.3.3)

Sl. No.	Size of the Prime Mover for thresher kW	B	C	D	E	F	G	H	□
		Min	Min	Min	Min				± 5
		mm	MM	mm	mm	mm	mm	mm	deg
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(i)	7.5	900	180	340	75	280	45	20	50
(ii)	11	900	200	370	500	280	45	20	50
(iii)	15	925	220	400	535	280	45	20	50
(iv)	18.7 and above	950	240	430	565	280	15	20	50

Note:- Hopper feeding system is normally used with the threshers of 7.5 KW or more power ratings.
A-2.3.4 Mounting Dimensions
A-2.3.4.1 The feed hopper shall be built as an integral part of the thresher.
A-2.3.4.2 The location of the star wheels in relation to hopper sides (see J in Fig.2) shall be 75 mm. The centre to centre distance of two star wheels (see K in Fig.2) shall be 220

mm.A-2.3.4.3 The fixation of star wheel shaft in hopper (see L in Fig.2) and fixation of star wheel in relation to centre of threshing cylinder (see M in Fig.2) shall be 350 mm and 450 mm respectively).A-2.4 Other RequirementsA-2.4.1 The hopper shall be attached on the top of the threshing cylinder or on the side. If it is attached on the sides a feed regulating shaft shall be provided and it shall be operated at a speed of 25 to 55 rpm.A-2.4.2 No sharp edges shall be provided in hopper or on star wheels.A-2.4.3 The casting shall be smooth and shall not be porous.A-2.5. Other types of feeding mechanisms may also be used with feeding hoppers. A typical shape of the hopper unit with feed roller type feeding mechanism is shown in Fig. 3. The material and dimensional requirement of feed roller type feeding mechanism are given in A-2.5.1 and A-2.5.2A-2.5.1 MaterialThe material for the construction of hopper, feed rollers and feed roller shaft shall be of mild steel (see IS 2062).A-2.5.2 DimensionsA-2.5.2.1 The dimensions A in Fig.2-A shall be 400 mm more than the length of the threshing cylinder and shall be declared by the manufacturer.A-2.5.2.2. The thickness of sheet for hopper shall be 1.6 mm. Min.A-2.5.2.3 The dimensions of the hopper and feed rollers when read in conjunction with Fig.3 shall be as given in Table 6.FIG. 3 DETAILS OF FEEDING HOPPER WITH FEED ROLLER FEEDING HOPPER FEED ROLLER

A B

C D

E F

G J

K L

TABLE 6Dimensions of Hopper and Feed Roller(Clause A 2.5.2.3)

Sl. No.	Size of the Prime Mover for thresher kW	B	C	D	E	F	G	H	□
		Min	Min	Min	Min				± 5
		mm	mm	mm	mm	mm	mm	mm	deg
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(i)	15	740	150	545	560	300	100	15	55
(ii)	26.3	900	200	560	570	300	100	15	55
(iii)	37.5	925	230	570	580	300	100	15	55

Note.- Hopper feeding system with feed roller type feeding mechanism is normally used with thresher of 15 kW or more power ratings.A-2.5.2.4 The feed hopper shall be built as an integral part of the thresher.A-2.5.2.5 The location of the feed rollers in relation to hopper sides (see J in Fig.3) shall be 90 mm. The centre to centre distance of two feed roller rods (see K in Fig.3) , shall be 355 mm.A-2.5.2.6 The fixation of feed roller in hopper (see L in Fig.3) and fixation of feed roller in relation to centre of threshing cylinder (see M in Fig.3) shall be 125 mm and 450 mm respectively.A-2.5.2.7 No sharp edges shall be provided in hopper or on feed rollers.A-3 POSITIVE FEED ROLLERS WITH CONVEYOR OR CHUTEA-3.0 The system is used on a chaff-cutter type thresher. It comprises a feed pressing roller, two corrugated feed rollers and a feeding chute or conveyor with power transmission system. For this type of threshers with power ratings of 15 kW or more, a feed reversing mechanism is recommended. It comprises a gear box, a clutch lever and two joining shafts with universal joints (see Fig.4). In some threshers fast and loose pulleys to cut off the drive to the upper and lower feed rollers are also used. In the feeding system with feed reversing

mechanism, if the hand of an operator gets entrapped, the clutch lever is pressed by his hand or shoulder and the drive to the feed roller is cut off in the neutral position or the direction of the upper and lower feed rollers is reversed.

A-3.1 Material

A-3.1.1 Chute - The chute shall be made of mild steel sheet (see IS 2062) having thickness of not less than 1.6 mm.

A-3.1.2 Conveyor - Canvass or rubber (see IS 1891 (Part I) or steel slats (see IS 2062).

A-3.1.3 Driving Roller - Cast iron (see IS 210).

A-3.1.4 Pressing Roller - Cast iron (see IS 210).

A-3.1.5 Feed Rollers - Cast iron (see IS 210).

A-3.1.6 Tension Spring - Spring steel (see IS 4454 (Part 1)).

A-3.1.7 Clutch Lever - Mild steel (see IS 2062).

A-3.1.8 Gears - Cast iron (see IS 210).

A-3.1.9 Gear Box - Cast iron (see IS 210) or mild steel (see IS 2062).

A-3.1.10 Gear Shaft - Mild steel (see IS 2062).

A-3.2 Shape The shape of feeding system with feed reversing mechanism used for chaff-cutter type threshers is shown in Fig.4.

A-3.3 Dimensions

A-3.3.1 If chute is used, the dimensions shall be as given in A-1.3.1 and A-1.3.2 and the arrangement should be as shown in Fig.5.

A-3.3.2 If conveyor is used, the length of centre to centre distance of conveyor rollers (see A in Fig.4) shall be minimum of 1200 mm. Minimum of 450 mm of length of conveyor at feed inlet side shall be covered.

FIG. 4 FEED REVERSING DEVICE FOR CHAFF-CUTTER TYPE THRESHERS

BEVEL PINON
BEVEL GEAR
REVERSE GEAR
FEED REVERSING DIVICE
CLUTCH GEAR
UNIVERSAL JOINT SHAFT
CLUTCH LEVER
CONSTANT MESH GEAR
FORWARD GEAR
TENSION SPRING
FEED REVERSING ROLLER
CANVASS FEED CONVEYOR
UPPER FEED ROLLER
LOWER FEED ROLLER
THRESHING CYLINDER
CHOPPING BLADES
DRIVING ROLLER

All dimensions in milimetres

FIG. 5 SAFE FEEDING CHUTE USED ON A CHAFF-CUTTER TYPE THRESHER

A-3.4 Feed Reversing Device

A-3.4.1 Functioning of Device (see Fig.6)

Pinion 'A' receives the drive from the main shaft of the thresher by means of chain and sprocket. Pinion 'A' meshes with bevel gear 'B' which is mounted on a counter shaft. On the same shaft a spur pinion 'G' is mounted which slices on splines with the help of a hand lever. When pinion 'G' meshes with the gear 'F' on the lower feed shaft, the lower feed roller revolves in clockwise direction and the upper feed roller in anti clockwise direction. This is the feed-in-position.

A-3.4.1.1 When pinion 'G' is meshed with gear 'C', the direction of rotation of the upper and lower rollers is reversed. In other words, the upper roller rotates in clockwise and the lower roller in anti-clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the threshing chamber.

A-3.4.1.2 The third position is when pinion 'G' does not mesh either with gear 'F' or 'C' This is the neutral position. The lever to slide pinion 'G' can be actuated by hand or foot or shoulder.

PATH OF TRAVEL OF THE POWER

RG ROTATION OF GEARS AND SHAFTS

FIG. 6 POWER TRANSMISSION THROUGH FEED REVERSING SYSTEM FOR CHAFF-CUTTER THRESHER

UPPER SHAFT A
COUNTER SHAFT B
DRIVE SHAFT C
LOWER SHAFT D
FORWARD SPEED E
REVERSE SPEED F
 G

PATH OF TRAVEL OF THE POWER

RG ROTATION OF GEARS AND SHAFTS

A-3.4.1.3. The details of gears in this system shall be as given in Table 7.

TABLE 7 Details of Gears in The Feed Reversing Mechanism

Sl. No	Type of Gear/pinion	Designation	Shaft on which mounted
(1)	(2)	(3)	(4)
	Bevel Gear	A	Splinedshaft on main shaft
	do	B	Counter shaft
	Spur pinion	C	Counter Shaft
	Spur gear	D	Upper feed roller Shaft
	do	E	do
	do	F	Lower feed roller shaft
	Bevel Gear	G	Splinedshaft on Main shaft

A-3.4.2 Functioning of Device (see Fig.7) If the roller handle is put in backward direction, bevel gear 'A' which is mounted on splined shaft receives the drive from main shaft. The main shaft moving in anti-clock wise direction will rotate bevel gear 'A' also in anti-clockwise direction. Bevel gear 'A' meshes with bevel gear 'B' which is mounted on a counter shaft, having at other end a pinion 'C'. This will rotate bevel gear 'B' counter shaft and pinion 'C' in clockwise direction. Gear 'D' meshes with pinion 'C' and rotates in anti-clockwise direction. Gears 'D' and 'E' are on the same shaft, hence the direction of rotation of 'E' would also be the same. Gears 'E' and 'F' mounted on upper and lower feed roller shafts respectively, mesh with each other, therefore the gear 'F' rotates in clockwise direction. The direction of rotation of upper and lower feed rollers would be the same as that of gears 'F' and 'F'. This is the feed-in-position.

A-3.4.2.1 If the roller handle is put in forward direction, bevel gear 'G', which is mounted on splined shaft, receives the drive from main shaft and moves in anti-clockwise direction. Bevel gear 'G' meshes with bevel gear 'B'. The bevel gear 'B', counter shaft and pinion 'C' will rotate in anti-clockwise direction. This will ultimately lead to the rotation of lower feed roller in anti-clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the threshing chamber.

A-3.4.2.2 In case the roller handle is kept in central position, feed-reversing mechanism will not operate. This is the neutral position.

A-3.5 Where conveyor feeding system is not provided in a chaff-cutter type thresher nor the chute is covered from top, a second set (secondary set) of feed rollers shall be placed at 200 to 300 mm axial distance to assist feeding of the crop to the primary set of feed rollers. The top roller (which is idle, that is, not driven positively) of the second set of the rollers shall have moderate axial grooves and a spring control to let the hand be withdrawn without injury before the hand gets to the second set of rollers.

A-3.6 Other Requirements

A-3.6.1 All the sharp edges shall be avoided.

A-3.6.2 Castings shall be smooth and shall not be porous.

A-3.6.3 The shifting of gear shall be easy and smooth.

ROLLER SHAFT	MAIN SHAFT
HANDLE	COUNTER SHAFT
ROLLER SHAFT	ROLLER HANDLE
LEVER	UPPER FEED ROLLER
SPLINED SHAFT	UPPER ROLLER SHAFT
REVERSE MOTION	LOWER ROLLER SHAFT
FORWARD MOTION	LOWER FEED ROLLER
DIRECTION OF MAIN SHAFT	

FIG. 7 WORKING OF FEED REVERSING MECHANISM FOR CHAFF-CUTTER TYPE

THRESHERA-4 Conveyor Feeding System
A-4.0 Conveyor system is generally used with spike tooth or rasp bar type threshers of power ratings of 5.5. kW or higher.
A-4.1 Material
A-4.1.1 Conveyor - Rubber (see IS 1891 (Part I))
A-4.1.2 Fenders - Mild steel (see IS 2062)
A-4.1.3 Conveyor Roller - Cast iron (see IS 210)
A-4.1.4 Cover - Mild steel sheet (see IS 2062) having thickness of 1.6 mm, Min.
A-4.2 Shape The shape of a conveyor system is given in Fig.8.
A-4.3 Dimensions
A-4.3.1 The centre to centre distance of conveyor roller (see A in Fig.8), shall be minimum of 1000 mm.
A-4.3.2 The length of covered portion of conveyor shall be minimum of 600 mm.
A-4.4. Other Requirements
A-4.4.1 All the sharp edges shall be avoided.
A-4.4.2 Castings shall be smooth and shall not be porous.

Fender	Cover
Conveyor Roller	Rasp Bar
Conveyor	Cylinder

FIG. 8 ARRANGEMENT FOR FEEDING CONVEYOR FOR RASP-BAR TYPE THRESHER ANNEX A

[Clause 7.3(b)] Requirement of Conveyor
A-1 CONSTRUCTION It comprises a feed pressing roller, two corrugated feed rollers and conveyor with power transmission system. For this type of chaff cutters with power ratings of 15kW or more, a feed reversing mechanism is recommended. It comprises of a gear box, a clutch lever and two joining shafts with universal joints (see Fig.9). In some chaff cutters fast and loose pulleys to cut-off the drive to the upper and lower feed rollers are also used. In the feeding system with feed reversing mechanism, if the hand of an operator gets entrapped, the clutch lever is pressed by his hand or shoulder and the drive to feed roller is cut off in the neutral position or the direction of the upper and lower feed rollers is reversed.
A-2

MATERIALA-2. Conveyor - Canvass or rubber (see IS 1891) (Part 1) or steel slats (see IS 2062).
A-2.2 Driving Roller - Cast iron (see IS 210).
A-2.3 Pressing Roller - Cast iron (see IS 210).
A-2.4 Feed Rollers - Cast iron (see IS 210).
A-2.5 Tension Spring - Spring steel (see IS 4454 (Pan I))
A-2.6 Clutch Lever - Mild steel (see IS 2062)
A-2.7 Gears - Cast iron (see IS 210).
A-2.8 Gear Box - Cast iron (see IS 210) or mild steel (see IS 2062)
A-2.9 Gear shaft - Mild steel (see IS 2062)
A-2.10 Stand - Mild steel (see IS 2062)
A-3 DIMENSION The length of center-to-center distance of conveyor rollers (see A in Fig.9) shall be minimum of 1200 mm. Minimum of 450 mm of length of conveyor at feed inlet side shall be covered.
A-4 FEED REVERSING DEVICE

A-4.1 Functioning of Device (see Fig.10) Pinion 'A' receives the drive from the main shaft of the chaff cutter by means of chain and sprocket. Pinion 'A' meshes with bevel gear 'B' which is mounted on a counter shaft. On the same shaft a spur pinion 'G' is mounted which slides on splines with the help of a hand lever. When pinion 'G' meshes with the gear 'F' on the lower feed shaft, the lower feed roller revolves in clockwise direction and the upper feed roller in anti-clockwise direction. This is the feed-in-position.

A-4.1.1 When pinion "G" is meshed with gear "C" the direction of rotation of the upper and lower rollers is reversed. In other words, the upper roller rotates in clockwise and the lower roller in anti clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the cutting zone chamber.
A-4.1.2 The third position is when pinion 'G' does not mesh either with gear 'F' or 'C'. This is the neutral position. The lever to slide pinion 'O' can be actuated by hand or foot or shoulder.
A-4.1.3 The details of gears in this system shall be as given in Table 2.

TABLE 2 Details Of Gears In The Feed Reversing Mechanism

Sl. No.	Type of Gear/Pinion	Designation	Shaft on which mounted
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(i)	Bevel gear	A	Splinedshaft on main shaft
(ii)	Bevel gear	B	Counter shaft
(iii)	Spur pinion	C	Countershaft
(iv)	Spur gear	D	Upper feed roller shaft
(v)	Spur gear	E	Upper feed roller shaft
(vi)	Spur gear	F	Lower feed roller shaft
(vii)	Bevel gear	G	Splinedshaft on main shaft

A 4.2 Functioning of Device (see Fig.11)A 4.2.1 If the roller handle is put in backward direction, bevel gear 'A' which is mounted on splined shaft receives the drive from main shaft. The main shaft moving in anticlockwise direction will rotate bevel gear "A' also in anti clockwise direc tion. Bevel gear 'A' meshes with bevel gear 'B' which is mounted on a counter shaft, having at other end a pinion 'C. This will rotate bevel gear 'B' counter shaft and pinion 'C in clockwise direction. Gear 'D' meshes with pinion 'C and rotates in anti-clockwise direction. Gears 'D' and 'E' are on the same shaft, hence the direction or rotation of 'E' would also be the same. Gears 'E' and 'F' mounted on upper and lower feed roller shafts, respectively, mesh with each other; therefore, the gear 'F' rotates in clockwise direction. The direction of rotation of upper and lower feed rollers would be the same at that of gears 'E' and 'F'. This is the feed-in position.A-4.2.2 If the roller handle is put in forward direction, bevel gear 'G', which is mounted on splined shaft, receives the drive from main shaft and moves in anti-clockwise direction. Bevel gear 'G' meshes with bevel gear 'B'. The bevel gear 'B' counter shaft and pinion 'C* will rotate in anti clockwise direction. This will ultimately lead to the rotation of lower feed roller in anti clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the threshing chamber.A-4.2.3 In case the roller handle is kept in central position, feed-reversing mechanism will not operate. This is the neutral position.FIG. 9 FEED REVERSING MECHANISM FOR CONVEYOR-FEED

CHAFF-CUTTER

BEVEL PINION	TENSION SPRING
BEVEL GEAR	FEED REVERSING ROLLER
REVERCE GEAR	CANVASS FEED CONVEYOR
FEED REVERSING DEVICE	UPPER FEED ROLLER
CLUTCH GEAR	LOWER FEED ROLLER
UNIVARSAL JOINT SHAFT	THRESHING CYLNDER
CLUTCH GEAR	CHOPPING BLADES
CONSTANT MESH GEAR	DRIVING ROLLER

FIG. 10 POWER TRANSMISSION THROUGH FEED-REVERSING SYSTEM FOR CONVEYOR-FEED CHAFF-CUTTER

UPPER SHAFT	A
COUNTER SHAFT	B
DRIVE SHAFT	C
LOWER SHAFT	D
FORWARD SPEED	E

REVERSE SPEED

F

G

□PATH OF TRAVEL OF THE POWER

□ROTATION OF GEARS AND SHAFTS

ROLLER SHAFT

MAIN SHAFT

HANDLE

COUNTER SHAFT

ROLLER SHAFT

ROLLER HANDLE

LEVER

UPPER FEED ROLLER

SPLINED SHAFT

UPPER ROLLER SHAFT

REVERSE MOTION

LOWER ROLLER SHAFT

FORWARD MOTION

LOWER FEED ROLLER

DIRECTION OF MAIN SHAFT

FIG. 11 FUNCTIONING OF FEED REVERSING MECHANISM FOR CONVEYOR-FEED
CHAFT-CUTTER