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INTERNATIONAL STANDARD



1537

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## Continuous mechanical handling equipment for loose bulk materials — Troughed belt conveyors (other than portable conveyors) — Idlers

*Engins de manutention continue pour produits en vrac — Transporteurs à courroie en auge (autres que mobiles) — Rouleaux de soutien*

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[ISO 1537:1975](https://standards.iteh.ai/catalog/standards/sist/4e152866-430c-40f9-bafb-e7faa082de13/iso-1537-1975)

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**Descriptors** : handling equipment, continuous handling, bulk products, conveyors, belt conveyors, idlers, dimensions.

Price based on 5 pages

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 101 has reviewed ISO Recommendation R 1537 and found it technically suitable for transformation. International Standard ISO 1537 therefore replaces ISO Recommendation R 1537-1970 to which it is technically identical.

ISO Recommendation R 1537 was approved by the Member Bodies of the following countries :

Belgium	Greece	Spain
Canada	India	Sweden
Colombia	Israel	Switzerland
Czechoslovakia	Italy	Thailand
Egypt, Arab Rep. of	Netherlands	Turkey
Finland	New Zealand	United Kingdom
France	Norway	U.S.A.
Germany	South Africa, Rep. of	U.S.S.R.

The Member Body of the following country expressed disapproval of the Recommendation on technical grounds :

Japan

No Member Body disapproved the transformation of ISO/R 1537 into an International Standard.

# Continuous mechanical handling equipment for loose bulk materials – Troughed belt conveyors (other than portable conveyors) – Idlers

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the dimensions of idlers and their arrangement and clearances for troughed belt conveyors (other than portable conveyors) with three carrying idlers.

### 4.1.2 Other materials

The subject of idlers made of other materials will be considered at a later date.

## 4.2 Dimensions

## 2 REFERENCE

ISO 64, *Steel tubes – Outside diameters.*

### 4.2.1 External diameters, $d_1$ , of carrying idlers and return idlers

## 3 CLASSIFICATION

Idlers for belts include

- a) carrying idlers in line, of equal length, supporting the carrying belt;
- b) return idlers of two types, supporting the return belt, namely :
  - 1) with one single return idler;
  - 2) with one set of two return idlers of equal length, the axes of which are equally inclined to the horizontal to form a V. The angle of inclination is  $10^\circ$ .

The latter arrangement is applicable to conveyors with belts at least 800 mm wide.

## 4 SPECIFICATIONS

### 4.1 Materials

#### 4.1.1 Steel

Where the idlers, carrying and return, are constructed from steel tubes, their diameters shall be extracted from ISO 64 (see table 1).

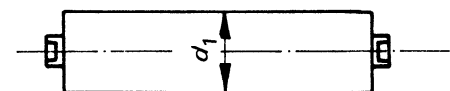


FIGURE 1 – Idler

TABLE 1 – External diameters,  $d_1$ , of carrying idlers and return idlers

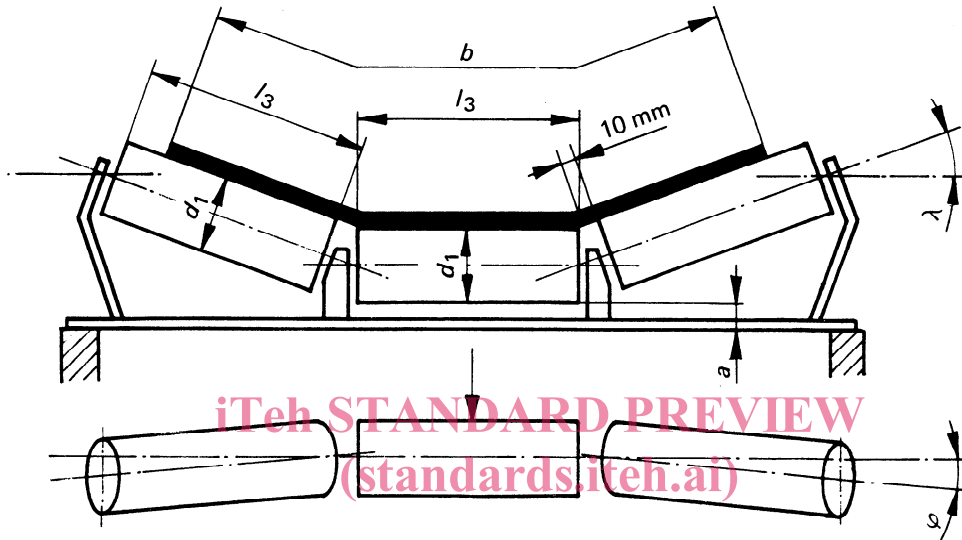
mm	in
63,5	2 1/2
76,1	3
88,9	3 1/2
101,6	4
108	4 1/4
127	5
133	5 1/4
152,4	6
159	6 1/4
168,3	6 5/8
193,7	7 5/8
219,1	8 5/8

4.2.2 Lengths

These lengths are applicable to fixed conveyors; other lengths may be necessary for field conveyors.

4.2.2.1 LENGTHS OF CARRYING IDLERS

Table 2 gives the lengths of carrying idlers suitable for troughed belt conveyors using a centre idler and two side idlers in line.



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 FIGURE 2 Carrying idlers

TABLE 2 - Lengths of carrying idlers

Belt widths <sup>1)</sup>		Carrying idlers	
<i>b</i>		<i>l<sub>3</sub></i>	
mm	in	mm	in
400	16	160	6 1/4
500	20	200	8
650	26	250	10
800	32	315	12 5/8
1 000	40	380	15 1/4
1 200	48	465	18 5/8
1 400	56	530	21 1/4
1 600	64	600	24
1 800	72	670	26 5/8
2 000	80	750	29 1/4

1) See ISO/R 251, Widths and lengths of conveyor belts.

4.2.2.2 LENGTHS OF RETURN IDLERS

Table 3 gives the lengths of the return idlers for the two following arrangements :

- a) one single return idler (see figure 3);
- b) one set of two return idlers in V form (see figure 4).

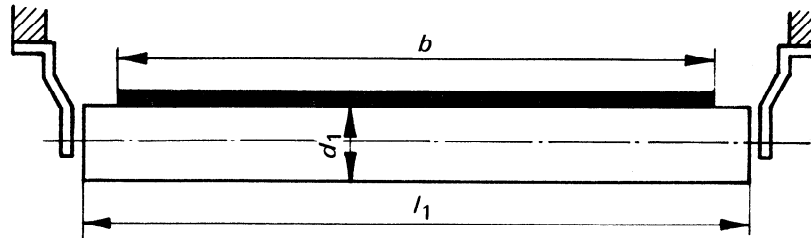


FIGURE 3 – One return idler

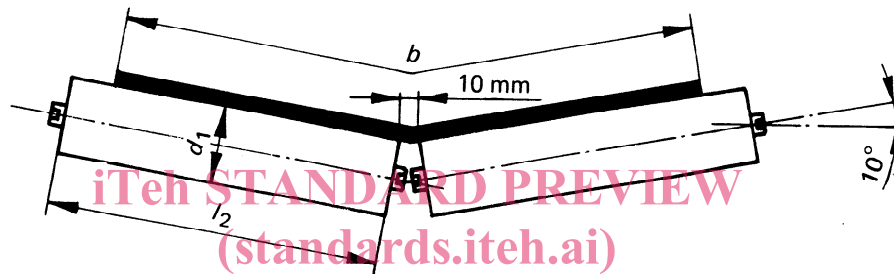


FIGURE 4 – Two return idlers in V form

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TABLE 3 – Lengths of return idlers

Belt widths <i>b</i>		Return idlers			
		one idler <i>l</i> <sub>1</sub>		two idlers <i>l</i> <sub>2</sub>	
mm	in	mm	in	mm	in
400	16	500	20		
500	20	600	24		
650	26	750	30		
800	32	950	38	465	18 5/8
1 000	40	1 150	46	600	24
1 200	48	1 400	56	700 (670) <sup>1)</sup>	28
1 400	56	1 600	64	800 (750) <sup>1)</sup>	32
1 600	64	1 800	72	900	36
1 800	72	2 000	80	1 000	40
2 000	80	2 200	88	1 100 (1 150) <sup>1)</sup>	44

1) These values are employed for conveyors used in and supplied to COMECON countries.

4.2.3 Spindle ends

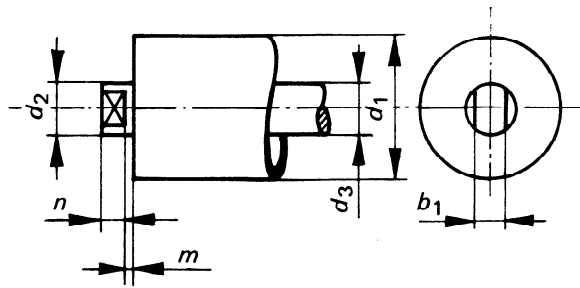


FIGURE 5 – Spindle end without added end cap

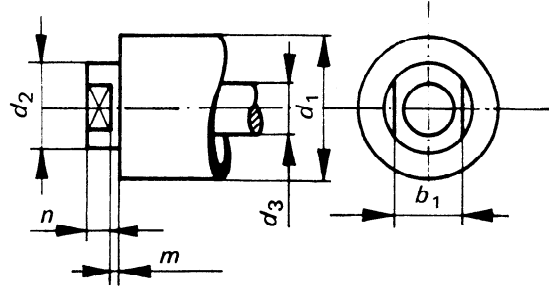


FIGURE 6 – Spindle end with added end cap

The standard dimensions for spindle ends are

- diameter  $d_2$ ;
- diameter  $d_3$ , corresponding to the inner diameter of the bearing;
- partial lengths  $m$  and  $n$ ;
- width on flats  $b_1$ .

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TABLE 4 – Spindle ends – Dimensions in millimetres

	$d_2$	$d_3$	$b_1$	$m$	$n$ <sup>1)</sup>
without added end cap (see figure 5)	20	20	14	4	9
	25	25	18	4	12
	30	30	22	4	12
	40	40	32	4	12
with added end cap (see figure 6)	35	20	30	4	10
	45	25 (30)	38	4	12

TABLE 5 – Spindle ends – Dimensions in inches

	$d_2$	$d_3$	$b_1$	$m$	$n$ <sup>2)</sup>
without added end cap (see figure 5)	25/32 or 51/64	25/32 or 51/64	35/64 or 9/16	5/32	11/32 or 23/64
	63/64	63/64	45/64 or 23/32	5/32	15/32 or 31/64
	1 3/16	1 3/16	55/64 or 7/8	5/32	15/32 or 31/64
	1 9/16 or 1 37/64	1 9/16 or 1 37/64	1 11/64	5/32	15/32 or 31/64
with added end cap (see figure 6)	1 3/8	25/32 or 51/64	1 3/16	5/32	25/64
	1 49/64 or 1 25/32	63/64 (1 3/16)	1 31/64 or 1 1/2	5/32	15/32 or 31/64

1) For return idlers, the dimension  $n + 10$  mm is allowed.

2) For return idlers, the dimension  $n + 25/64$  in is allowed.

**4.3 Arrangement of carrying idlers<sup>1)</sup>**

**4.3.1 Angle of inclination  $\lambda$  of side idlers**

**4.3.1.1 DEFINITION**

Angle of the axis of these idlers from the horizontal.

**4.3.1.2 VALUES**

Values of the angle of inclination  $\lambda$  for the normal parts of the installation are given in table 6.

TABLE 6 – Values of the angle of inclination  $\lambda$

For all standard widths of belts	20°	25°	30°	35°	45°	(55°)
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NOTES

1 In view of the developments in belt manufacturing techniques, when using angles greater than 30° the user shall satisfy himself that the belt will trough adequately on the idler set.

2 The 55° value shall not be used except for handling of special materials.

**4.3.2 Angle of tilt  $\varphi$  of side idlers**

**4.3.2.1 DEFINITION**

Angle formed by the projections of their axes and the axis of the centre idler on the belt plane (see figure 2).

**4.3.2.2 VALUES**

If an angle of tilt  $\varphi$  is required, it shall be chosen as a function of the angle of inclination  $\lambda$  and the belt speed, and shall be as small as practicable, and in any case not more than 3°.

**4.3.3 Gap between side idlers and centre idler**

The gap between side idlers and the centre idler is 10 mm (25/64 in) maximum.

In order to comply with this condition, it may be necessary, in certain cases, to adopt minor modifications in design, such as rounding or chamfering of spindle ends or to reduce dimension  $n$  as defined in 4.2.3.

In any case the distance  $n$  defined in 4.2.3 shall remain at 4 mm (5/32 in).

**4.4 Idlers clearance**

**4.4.1 Definition**

The gap between the periphery of idlers and the top of the idler transom or any other structural part (see figure 2).

**4.4.2 Values**

The minimum values for idlers clearances are given in table 7.

TABLE 7 – Minimum idlers clearances

Idler diameters		Minimum clearance $a$	
mm	in	mm	in
63,5 to 133	2 1/2 to 5 1/4	30	1 1/4
152,4 to 168,3	6 to 6 5/8	38	1 1/2
193,7	7 5/8	50	2
219,1	8 5/8	60	2 3/8

1) The case where the axis of side idlers and centre idler are not in the same plane (staggered idlers) will be the subject of further consideration.

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