

Specification for

# Chains and chain wheels for slat conveyors

# Co-operating organizations

The Dairying Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Association of Public Analysts
- Chemical Society
- Commonwealth Bureau of Dairy Science and Technology
- Dairy Engineers' Association\*
- Department of Health and Social Security
- Hannah Dairy Research Institute
- Milk Distributive Council\*
- Milk Marketing Board
- Milk Marketing Board for Northern Ireland\*
- Milking Machine Manufacturers' Association
- Ministry of Agriculture, Fisheries and Food\*
- Ministry of Technology — Laboratory of the Government Chemist
- National Association of Creamery Proprietors and Wholesale Dairymen
- National Farmers' Union
- National Institute for Research in Dairying\*
- Office of the High Commissioner for Australia
- Office of the High Commissioner for New Zealand
- Royal Association of British Dairy Farmers
- Royal Institute of Public Health and Hygiene
- Royal Society for the Promotion of Health
- Scottish Milk Trade Federation
- Society of Chemical Industry
- Society of Dairy Technology\*
- United Kingdom Dairy Association
- University of Reading
- West of Scotland Agricultural College

The Government department and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- Brewery and Bottling Engineers' Association
- British Plastics Federation
- Food Machinery Association
- Metropolitan District Co-operative Council
- Individual experts

This British Standard, having been approved by the Dairying Industry Standards Committee, was published under the authority of the Executive Board on 29 October 1971

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## Foreword

This standard makes reference to the following British Standards:

BS 970, *Wrought steels in the form of blooms, billets, bars and forgings.*

BS 970-4, *Stainless, heat resisting and valve steels.*

BS 1449, *Steel plate, sheet and strip.*

BS 1449-4, *Stainless and heat resisting plate, sheet and strip.*

BS 4174, *Self-tapping screws and metallic drive screws.*

This British Standard was first issued in 1954 under the authority of the Dairying Industry Standards Committee and it is hoped that this revision will continue to prove an advantage to all industries which use this type of conveyor for transporting containers of about the same size as milk bottles.

Owing to the fact that the adoption of a standard form of integral slat conveyor would have necessitated some modification to designs existing at that time, the previous (1954) edition of this British Standard was confined to the roller chain and slat band chain types of conveyors. This revision extends the scope to include a greater variety of slat lengths in an attempt to cover a number of applications although it is appreciated that other sizes are used. These other sizes are excluded from the specification to avoid undesirable proliferation, and, for the same reason, some slat lengths are quoted as preferred sizes. The larger slats have a double-hinge design, and correspondingly greater permissible tension loads.

The requirements for slat roller chain are unchanged, no revision being considered necessary.

A section concerned with plastics materials of construction, which are coming into greater use, has been added and an appendix has been included, giving guidance on the choice of a conveyor system and on its use and maintenance.

**NOTE** The opportunity has been taken in this revision to convert the specification to metric units but, for convenience, imperial equivalents to the required precision have been retained as an interim measure. In particular the force unit used is the SI unit, the newton (N), which is defined as that force which, when applied to a body having a mass of 1 kg, gives it an acceleration of 1 m/s<sup>2</sup>.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**

### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 1 Scope

This British Standard covers chains and chain wheels for slat conveyors of the following types:

- 1) Metal slat band chain.
- 2) Slat roller chain.
- 3) Plastics slat band chain.

## 2 Metal slat band chain

**2.1 Dimensions.** The chain shall be in accordance with the dimensions and tolerances given in Table 1. The slats shall be in accordance with the dimensions and tolerances given in Table 2.

**Table 1 — Dimensions of metal slat band chain** (See Figure 1)

| Detail                                       | Dimensions   |      |              |      |
|----------------------------------------------|--------------|------|--------------|------|
|                                              | Single-hinge |      | Double-hinge |      |
|                                              | mm           | (in) | mm           | (in) |
| Pitch, <i>A</i>                              | 38.1         | 1.50 | 38.1         | 1.50 |
| Maximum length of gearing barrel, <i>B</i>   | 42.4         | 1.67 | 80.3         | 3.16 |
| Maximum diameter of gearing barrel, <i>C</i> | 13.0         | 0.51 | 13.0         | 0.51 |
| Minimum gap between guides                   | 44.5         | 1.75 | 83.8         | 3.30 |
| Chain length tolerance <sup>a</sup>          | ± 0.15 %     |      | ± 0.15 %     |      |

<sup>a</sup> Measured under a tension of 10 % of the maximum tension load (see 2.7) on a 96-hinge length.

**Table 2 — Dimensions of metal slat band slats** (See Figure 1)

| Detail                                   | Dimensions               |              |
|------------------------------------------|--------------------------|--------------|
|                                          | Single- and double-hinge |              |
|                                          | mm                       | (in)         |
| Length tolerance (see 2.2)               | ± 1.0                    | + 0.04       |
|                                          | – 0.3                    | – 0.01       |
|                                          | 34.80                    | 1.370        |
| Minimum width, <i>F</i>                  | 3.18 ± 0.25              | 0.125 ± 0.01 |
| Thickness, <i>G</i>                      | 6.35 ± 0.25              | 0.25 ± 0.01  |
| Pin hole centre to top of slat, <i>H</i> | 1.5                      | 0.06         |
| Chamfer                                  | at 20° to top surface    |              |
| Slat form                                | Rectangular              |              |

**2.2 Slat lengths.** The slat length (dimension *E* in Figure 1) shall be selected from the following nominal values:

- 76.2 mm (3 in)**
- 82.6 mm (3 ¼ in)**
- 88.9 mm (3 ½ in)
- 101.6 mm (4 in)**
- 152.4 mm (6 in)
- 190.5 mm (7 ½ in)**

The nominal lengths in bold type are preferred sizes.

**2.3 Materials of construction.** For applications within the dairying industry, all parts shall be constructed of a suitable stainless steel of specified composition, e.g. Grade 410S21 to BS 1449-4<sup>1)</sup>.

NOTE For other applications mild steel or other metals may be acceptable, provided that they are protected from corrosion, e.g. rusting.

## 2.4 Workmanship

**2.4.1 Flatness.** On a length of 96 pitches under full working load:

- 1) no point on any slat surface, excluding the chamfer, shall be more than 1.5 mm (0.06 in) above any point on any other slat surface;
- 2) no slat top surface shall be more than the chamfer depth above the next slat, either
  - a) along the length of one strand, or
  - b) from one strand sideways on to another strand running parallel to it.

The individual slats shall present a substantially flat top surface. Any burrs shall be removed from the edges of the underside.

**2.4.2 Joints.** The joints between slats shall articulate freely.

**2.4.3 Straightness.** The chain shall be sufficiently straight and free from permanent side-bow to ensure satisfactory operation.

<sup>1)</sup> BS 1449, "Steel plate, sheet and strip", Part 4, "Stainless and heat resisting plate, sheet and strip".

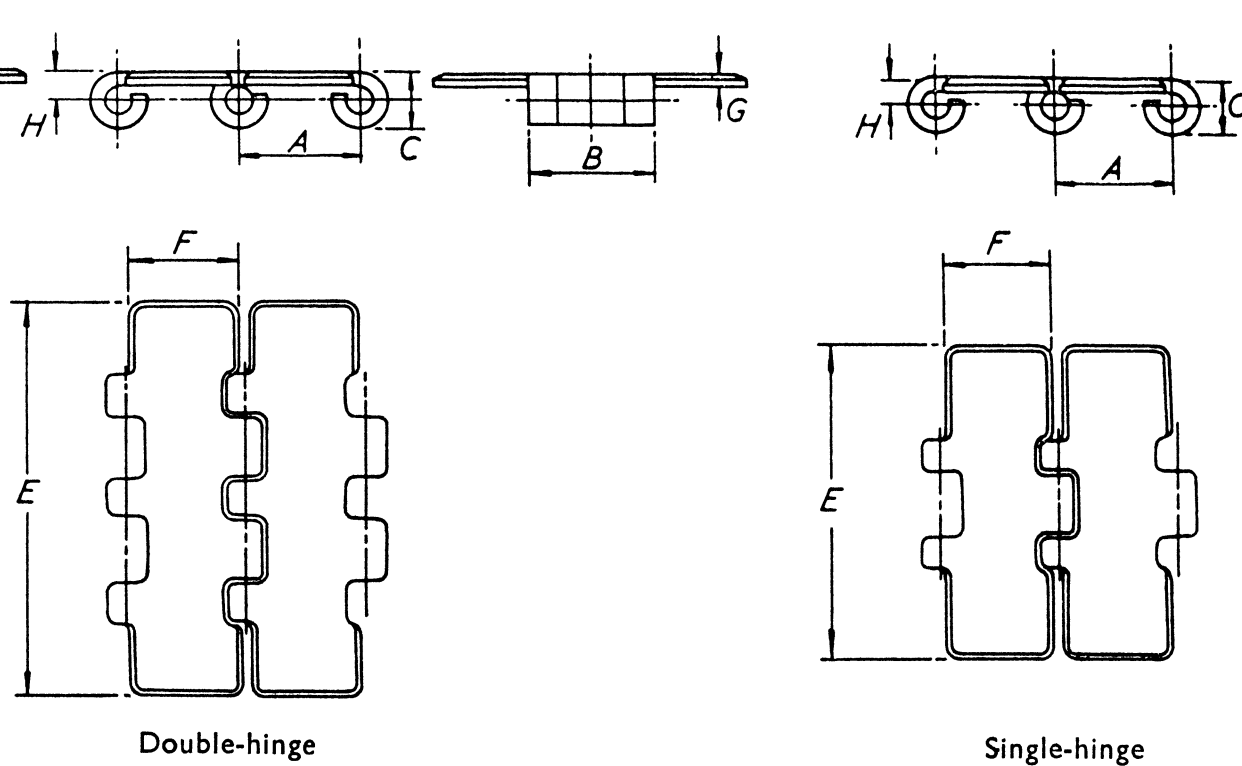


Figure 1 — Metal slat band chain

**2.5 Back-bend radius.** It shall be possible to bend the chain backwards through an arc having a radius of 100 mm (4 in).

**2.6 Bearing pin.** The bearing pin shall be secured by an interference fit in the outer barrels and, in addition, may be lightly riveted.

**2.7 Tension load.** The chain shall be suitable for maximum tension loads of:

- 1) 2.4 kN (550 lbf) for single-hinge chain;
- 2) 4.4 kN (1 000 lbf) for double-hinge chain.

The extension under full working load minus the extension under a measuring load of 10 % of the maximum tension load shall not exceed 1.0 % of the actual measured length under the measuring load.

## 2.8 Chain wheels

**2.8.1 Dimensions.** The chain wheels shall be in accordance with the dimensions and tolerances given in Table 3 and Figure 2.

The distance through the boss shall be equal to the width of the sprocket wheel (dimension *B* in Figure 2).

**2.8.2 Materials.** The chain wheels shall be of cast iron or steel or other material as agreed between the purchaser and the vendor.

**2.8.3 Teeth.** The teeth shall be machine-cut.

**2.8.4 Design.** The design of the chain wheels shall be such that the bore can be increased to up to 38 mm (1.5 in).

**2.8.5 Bushing and fixing details.** When so specified by the purchaser, the chain wheels shall be bushed or fitted with set-screws or keyways in accordance with the relevant British Standard.

**2.8.6 Guide flanges.** When required by the purchaser, the dimensions of guide flanges and the number and positions of the fixing holes shall be in accordance with Table 4 and Figure 3.