BRITISH STANDARD

BS 6591:1985
ISO 5612:1984

Specification for

Scraper bars for chain conveyors for mining

[ISO title: Mining — Scraper bars for chain conveyors]

UDC 622.647.53:621.867.137.064

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Mining and Quarrying Requisites Standards Committee (MQE/-) to Technical Committee MQE/6, upon which the following bodies were represented:

Association of British Mining Equipment Companies
British Chain Manufacturers' Association
British Valve Manufacturers' Association Ltd.
Health and Safety Executive
Institution of Mining Engineers
National Coal Board

This British Standard, having been prepared under the direction of the Mining and Quarrying Requisites Standards Committee, was published under the authority of the Board of BSI and comes into effect on
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The following BSI references relate to the work on this standard:
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Amendments issued since publication

Amd. No.	Date of issue	Comments

Contents

National foreword

This British Standard has been prepared under the direction of the Mining and Quarrying Requisites Standards Committee and is identical with ISO 5612:1984 "*Mining — Scraper bars for chain conveyors*" published by the International Organization for Standardization (ISO). The United Kingdom has taken part in the preparation of the International Standard through Sub-committee 2 of Technical Committee 82 of the International Organization for Standardization (ISO).

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The comma has been used as a decimal marker. In British Standards it is current practice to use a full point on the baseline as the decimal marker.

Wherever the words "International Standard" appear, referring to this standard, they should be read as "British Standard".

Cross-references

International Standard	Corresponding British Standard
ISO/R 147:1960	BS 1610:1964 *Methods for the load verification of testing machines* (Technically equivalent)
ISO 610:1979	BS 2969:1980 *Specification for high tensile steel chains (round link) for chain conveyors and coal ploughs* (Identical)
ISO 1082:1984	BS 4831:1985 *Specification for shackle type connector units for chain conveyors for mining* (Identical)

It should be noted that where reference is made in the text to "l" bars, this should read "I" bars to indicate the shape of the section.

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 4, 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 and field of application

This International Standard specifies the requirements for a range of scraper bars for use in twin outboard chain assemblies made from chains complying with ISO 610 and associated shackle type connectors complying with ISO 1082. The range of scraper bars specified is intended for use with chains of diameter 14, 18, 22, 24 and 26 mm in a selected range of chain centres and is clamped tight within the shackle type connectors.

This International Standard is not intended to indicate a complete design, but gives sufficient detail to ensure dimensional compatibility with the associated chains and connectors. Dimensions of section ends of the scraper bars necessary for compatibility between scraper bars and connectors are specified. The centre sections of the scraper bars may be of any design and shape, within the range of dimensions given in Table 1 for the appropriate chain centres. Other dimensions may be subject to national standards or agreement between the purchaser and the manufacturer.

As a guide to the selection of scraper bars for specific applications, scraper bars are rated by determining the force at which a specified minimum deflection is attained, when the bar is subjected to a three-point bend test. The bars can be classified as "light", "medium" or "heavy", according to their strength ratings.

2 References

ISO/R 147, *Load calibration of testing machines for tensile testing of steel.*

ISO 610, *High-tensile steel chains (round link) for chain conveyors and coal ploughs.*

ISO 1082, *Mining — Shackle type connector units for chain conveyors.*

3 Definitions

For the purpose of this International Standard, the following definitions apply.

3.1
twin outboard chain assembly

pairs of chains to which scraper bars are coupled by means of shackle type connectors

3.2
nominal chain centres

the distance between the centres of the chains in the assembly

3.3
force-deflection test

a test to determine the ability of a scraper bar to sustain a minimum deflection and the strength rating

3.4
minimum deflection

the deflection that a scraper bar is required to sustain without fracture

3.5
strength rating

the force required to produce a central deflection in the scraper bar, equal to 10 % of the nominal chain centres of the assembly

3.6
inspector

the representative of the purchaser

4 Material

It shall be the responsibility of the manufacturer to select the steel so that the finished scraper bars, suitably heat-treated, where appropriate, meet the specified mechanical properties.

5 Heat treatment

Any heat treatment shall be the responsibility of the manufacturer.

6 Dimensions

Scraper bars shall comply with the dimensions specified in Table 1 and illustrated in Figure 1 and Figure 2. The centre sections of the scraper bars may be of any design and shape, within the range of dimensions given in Table 1 for the appropriate chain centres.

All other dimensions shall be chosen to ensure compatibility with other associated equipment, i.e. connector, sprocket, conveyor pans, drives etc.

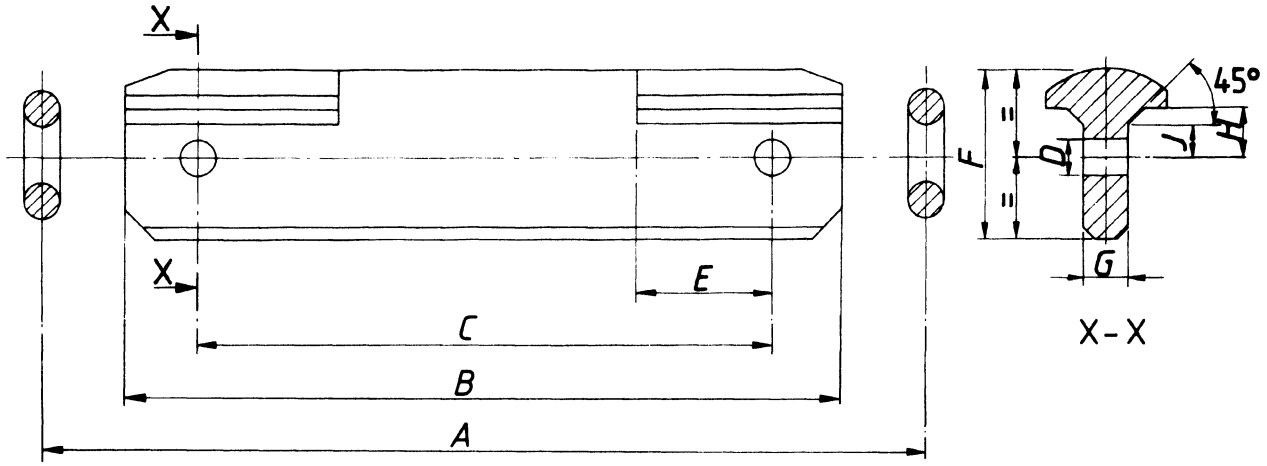
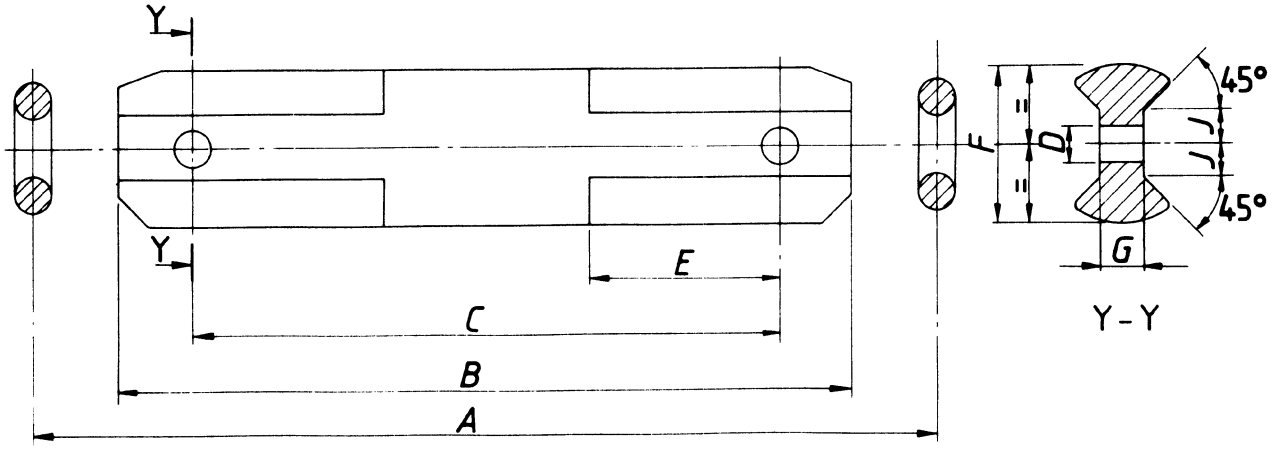


Figure 1 — Dimensions of "T" scraper bars



NOTE Ends of bars should be suitably relieved by chamfer or other means to avoid interference with sprockets.

Figure 2 — Dimensions of "I" scraper bars

7 Sampling and testing

7.1 General

All test data shall be recorded. The testing procedure shall be as follows.

7.2 Selection of samples

Unless otherwise specified by the purchaser, the following sampling arrangements shall apply, but this shall not preclude the inspector asking for such further samples as he may deem necessary:

a) test samples shall be selected at random; they shall be in the same condition as the bulk of the scraper bars, and free from any coating which might obscure defects;

b) for sampling purposes, the scraper bars shall be divided into lots, a lot comprising 500 scraper bars; any fraction shall be considered as a complete lot;

c) for dimensional tests, four samples shall be taken from each lot;

d) for the force-deflection test, one sample shall be taken from each lot.

7.3 Dimensional tests

The dimensions required by clause **6** shall be verified.

Table 1 — Dimensions of scraper bars

Dimensions in millimetres

Nominal size and pitch of chain	Nominal chain centres	Overall length of bar		Hole centres		Hole diameter		Lateral clearance		Height of bar	Web thickness			Vertical clearance		Location of chamfer	
								"T" bar	"I" bar		"T" bar		"I" bar			"T" bar	"I" bar
	A	*B*		*C*		*D*		*E*		*F*	*G*			*H*		*J*	
		max.	min.	max.	min.	max.	min.	min.	min.	max.	max.	min.	max.	max.	min.	min.	max.
14 × 50	350 400 500	302 352 452	298 348 448	248,5 298,5 398,5	247,5 297,5 397,5	17,5	17	19	54	52	17,5	16	12,5	16,5	16	12	9
18 × 64	400 500 600 650 700	342 442 542 592 642	338 438 538 588 638	290,5 390,5 490,5 540,5 590,5	289,5 389,5 489,5 539,5 589,5	21,5	21	42	61	64	20,5	19	16	22	21,5	15,5	12,5
22 × 86	450 500 600 650 700 750	362 412 512 562 612 662	358 408 508 558 608 658	300,5 350,5 450,5 500,5 550,5 600,5	299,5 349,5 449,5 499,5 549,5 599,5	25,5	25	46	90	81	24,5	23	20,5	26,5	26	18	15
24 × 86	600	512	508	444,5	443,5	25,5	25	—	90	88	—	—	23	—	—	—	15
24 × 87,5	600	512	508	444,5	443,5	25,5	25	—	90	88	—	—	23	—	—	—	15
26 × 92	500 600 650 700 800	402 502 552 602 702	398 498 548 598 698	330,5 430,5 480,5 530,5 630,5	329,5 429,5 479,5 529,5 629,5	28,5	28	46	—	95	28	26,5	—	29,5	29	18,5	—

7.4 Force-deflection test

7.4.1 *Testing machine*

The testing machine and loading arrangements used shall be suitable for meeting the requirements of the test procedure. The type and accuracy of the testing machine shall be in accordance with class 1 of ISO/R 147 or an equivalent national standard. The testing machine shall be used only within the appropriate range as shown by the test certificate for the machine.

7.4.2 *Procedure*

Position the bar with the connector bolt holes lying in the vertical plane and simply supported at the appropriate bolt hole centres.

Apply a test force at the mid-point of the span, using appropriately shaped supports and loading pad, rounded on the contact surfaces to a radius of 25 mm.

Carry out the test in a single loading in which the force is gradually increased until the specified central deflection is reached (i.e. equal to 10 % of the chain centres). Read the force from the testing machine indicator and classify the bar as "light", "medium", or "heavy" in accordance with the strength ratings given in Table 2. Each bar tested shall reach the specified minimum deflection with no visible sign of fracture.

For classification into a given category, the force reached at the specified minimum deflection shall be at least equal to the appropriate value specified in Table 2, for each class.

8 Inspection procedure

8.1 Acceptance

A scraper bar lot shall be deemed to comply with this International Standard if each of the samples taken from a lot fulfils all the specified test requirements.

Should any of the samples fail to meet any one of the specified tests, two further samples shall be selected from the same lot. If both these additional samples meet the specified test requirements, the lot shall be deemed to comply with this International Standard. Should either of the two further samples fail any one of the specified tests, the lot shall be rejected.

8.2 Marking

8.2.1 *Identification marking*

All finished scraper bars shall be legibly marked to indicate the manufacturer and, by agreement between the purchaser and the manufacturer, any other relevant information.

8.2.2 *Inspection marking*

Provided all specified tests are satisfactory and a lot has been accepted, the inspector shall signify his acceptance. The precise extent and nature of the inspection marking to be used shall be subject to agreement between the purchaser and the manufacturer.

8.3 Test certificate

At the option of the purchaser, the manufacturer shall supply a representative certificate(s) of test and examination with every consignment of scraper bars supplied as conforming to this International Standard; when so agreed between the purchaser and the manufacturer, identification of the cast number of the steel shall be stated. This shall also apply in instances where scraper bars are supplied as part of a complete conveyor chain assembly.

The certificate shall be signed by the manufacturer and by the inspector if he witnessed the inspection tests.

8.4 General inspection

For the purpose of witnessing the tests and inspecting the testing machines and methods of examination, the inspector shall be given access to the relevant parts of the works of the manufacturer at all reasonable times.

Table 2 — Strength rating of scraper bars — Minimum force[a]

Nominal size and pitch of chain mm	**Strength rating**		
	Light	Medium	Heavy
	Minimum force, kN		
14 × 50	35	75	150
18 × 64	60	125	250
22 × 86	90	185	370
24 × 86	105	215	430
24 × 87,5	105	215	430
26 × 92	125	255	510

[a] These values approximate to 7,5 % (light), 15 % (medium) and 30 % (heavy) of the gross chain strength, i.e. twice the minimum breaking force for grade C chain as specified in ISO 610.

Publications referred to

See national foreword.

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389 Chiswick High Road
London
W4 4AL