

Specification for

Higher tensile steel chain grade 40 —

(Short link and pitched or calibrated)
for lifting purposes

Co-operating organizations

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

- Admiralty*
- Air Ministry
- Associated Offices Technical Committee*
- Association of Consulting Engineers (Incorporated)
- British Chemical Plant Manufacturers' Association
- British Compressed Air Society
- British Electrical and Allied Manufacturers' Association*
- British Engineers' Association*
- British Internal Combustion Engine Manufacturers' Association
- British Iron and Steel Federation
- British Railways, The Railway Executive*
- Crown Agents for the Colonies*
- Department of Scientific and Industrial Research
- Engineering Equipment Users Association
- Institute of Marine Engineers*
- Institute of Petroleum
- Institution of Civil Engineers
- Institution of Gas Engineers
- Institution of Heating and Ventilating Engineers
- Institution of Mechanical Engineers*
- Institution of Mechanical Engineers (Automobile Division)
- Institution of Production Engineers
- Locomotive Manufacturers' Association
- Machine Tool Trades Association
- Ministry of Fuel and Power*
- Ministry of Labour and National Service (Factory Department)*
- Ministry of Supply*
- Ministry of Transport
- Ministry of Works*
- Office of the High Commissioner for India*
- War Office

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committees entrusted with the preparation of this standard:—

- British Constructional Steelwork Association
- Chain and Anchor Manufacturers' Association
- Chain Testers Association of Great Britain
- Dock and Harbour Authorities Association
- Federation of Civil Engineering Contractors
- Federation of Wire Rope Manufacturers of Great Britain
- Imperial Chemical Industries
- Institute of Welding
- Lloyds Register of Shipping
- Machine Made Chain Manufacturers' Association
- Makers of Electrically Welded Chain
- National Association of Drop Forgers and Stampers
- National Federation of Building Trades Employers
- National Physical Laboratory

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee, was published under the authority of the General Council on 15 December 1950

© BSI 10-1999

ISBN 0 580 35510 1

Amendments issued since publication

Amd. No.	Date of issue	Comments
2120	March 1955	
2886	August 1957	
3297	February 1959	
4561	May 1962	Indicated by a sideline in the margin

Contents

	Page
Co-operating organizations	Inside front cover
Foreword	ii
Section 1. Definitions	
1 Size	1
2 Proof load	1
3 Processing	1
4 Inspector	1
Section 2. Specification	
5 Types of chain	1
6 Quality of material	1
7 Heat treatment	1
8 Quality marking	1
9 Dimensions of links	1
10 Tolerances on pitched or calibrated chain	2
11 Workmanship	2
Section 3. Testing	
12 Testing machine	2
13 Proof testing	2
14 Inserted links	2
15 Correctness of the pitch of pitched chain	3
16 Selection of samples for mechanical tests	3
17 Breaking test	3
18 Ultimate breaking load	3
19 Energy absorption factor	3
20 Up-ending test	3
21 Inspection marking	3
22 Identification marking	3
23 Additional tests before rejection	4
24 Condition	4
25 Certificate of test and examination	4
26 Testing facilities	4
27 Inspection	4
Appendix A Certificate of test and examination	6
Appendix B Requirements for chain testing machines	7
Appendix C Safety recommendations for the use, care, and maintenance of chain	7
Appendix D Energy absorption factor	8
1) Test load	8
2) Extension	8
Appendix E Grading and quality marking	8
Appendix F Instruments for measuring the true mean diameter of chain links	8
Table 1	5

Foreword

This British Standard provides for electrically welded steel chain having a higher minimum tensile strength and a greater minimum energy absorption factor than that covered by BS 590, "*Mild steel chain, grade 30.*"

It is recognized that, by the use of alloy steel, chain of still higher minimum tensile strength can be made. When, however, such higher tensile strength is accompanied by reduced extension under breaking load, the energy absorption factor (which is the criterion of reliability) may be adversely affected and be lower than that prescribed in this standard.

By comparison with BS 590, the sizes in this standard (which range from $\frac{1}{4}$ in. to 2 in.) have been intentionally restricted. With one exception, there are $\frac{1}{32}$ in. sizes below $\frac{9}{16}$ in. and no $\frac{1}{16}$ in. sizes over 1 in. For sizes not tabulated, the appropriate breaking load, proof load, recommended safe working load and energy absorption factor can, when required, be calculated from the formulae given in Table 1 and in the notes to the table.

In view of the purposes for which chain is employed and the importance of reliability, it is recommended that supplies should be obtained only from manufacturers possessing adequate heat treatment and testing equipment and employing a competent staff for detailed examination.

Users are warned that the chain must not be taken as complying with this standard unless the specified tests have been made, and the test requirements obtained, in the presence of a person representing or approved by the purchaser. Where the quantity of chain ordered is insufficient to warrant the expense of special inspection it is recommended that the chain should be sent to an independent Test House for the specified tests and examination.

For normal conditions of use the maximum permissible load (safe working load) should not exceed one-half the proof load. When the conditions of working are exceptionally hazardous or severe the permissible working load should be substantially less than one-half the proof load.

The maximum safe working loads for normal conditions of use given in this standard (Column 5 of Table 1) are based on $8 d^3$ tons, where d is the nominal size of the chain in inches.

There are, however, some users whose equipment includes mild steel chain having a safe working load based on $6 d^2$ tons. These (or other users) may desire to take advantage of the greater strength of the higher tensile steel chain to obtain an increased factor of safety. Such users are recommended to rate the safe working load of higher tensile steel chain, covered by this standard, also at $6 d^2$ tons.

In addition to short link chain, the standard provides for pitched or calibrated load chain for use with pocketed sheaves. Although commonly termed "block chain," pitched chain is also used for purposes other than in connection with chain pulley blocks.

Owing to variation in the design of pocketed sheaves it is impracticable to standardize the proportions of pitched chain links and this standard provides only for pitched chain having a maximum overall length of link six times the nominal diameter of the steel from which the links are made. With a view to the ultimate standardization of the links for pitched or calibrated electrically welded higher tensile steel chain, it is recommended that purchasers should adopt and order such chain with links or the following outside dimensions:—

<i>Length</i>	4.90 times the nominal diameter of the steel used.
<i>Width</i>	3.25 times the nominal diameter of the steel used.

Users should take all possible steps to ensure ready differentiation between higher tensile steel chain and any other type of chain. The use of some positive system of identification is essential since periodical heat treatment of higher tensile steel chain is not only unnecessary but might, in fact, be dangerous. It is therefore recommended that, where a chain length is severed (for making into sling legs, or for any other purpose), the identification marking (see Clause 22) stamped on the ends of the length should be stamped upon an idle link or on a tag attached to the sling or other unit. In addition, the presence of the quality marking specified in Clause 8 will provide a definite means of establishing that the chain is of higher tensile steel quality.

It is usual trade practice to polish pitched chain, by “rumbling” in a revolving barrel, to ensure free working with pocketed sheaves. There is at present no evidence that polishing is detrimental to steel chain and this standard does not differentiate, in regard to testing, between polished and unpolished chain, whether short link or pitched.

British weights and measures are used throughout this Standard:
i.e. 1 ton = 2 240 lb. 1 cwt = 112 lb; linear dimensions are in feet and inches.
Corresponding metric weights and measures can be obtained from BS 350, “*Conversion factors and tables*”.

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 to iv, pages 1 to 9 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.