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Specification for

Alloy steel chain grade 80 —

Polished short link calibrated load
chain for pulley blocks

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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 Committee entrusted with the preparation of this standard:

Association of Crane Makers	Institute of Welding
Association of Hand Lifting Tackle Makers	Lloyd's Register of Shipping
British Constructional Steelwork Association	Machine Made Chain Manufacturers' Association
Chain and Anchor Manufacturers' Association	National Association of Drop Forgers and Stampers
Chain Testers Association of Great Britain	Individual Manufacturers
Dock and Harbour Authorities Association	
Federation of Civil Engineering Contractors	
Federation of Wire Rope Manufacturers of Great Britain	

This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 31 March 1959

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Foreword

This standard makes reference to the following British Standards:

BS 350, *Conversion factors and tables*.

BS 394, *Short link wrought iron chain*.

BS 590, *Mild steel chain, grade 30*.

BS 1610, *Verification of testing machines*.

BS 1663, *Higher tensile steel chain, grade 40*.

BS 1696, *Short link wrought iron chain of special quality*.

BS 3113, *Alloy steel chain, grade 60*.

BS 3243, *Hand operated chain pulley blocks*.

Chain to this British Standard has the very high tensile strength made possible by the application of advanced manufacturing techniques and the use of high quality alloy steel.

It is referred to as “Grade 80” chain in keeping with a way of grading based on the specified minimum breaking load in tons of a 1 inch chain, described in Appendix E.

Comparable references are:

Grade 30 for chain to BS 590¹⁾.

Grade 40 for chain to BS 1663²⁾.

Grade 60 for chain to BS 3113³⁾.

Grade 80 chain to this standard is designed for use as load chain in pulley blocks and for other applications demanding accurately calibrated chain of great strength and wear-resisting properties. It is not recommended for general lifting purposes such as slinging. For these purposes Grade 60 alloy steel chain is recommended where a chain stronger than Grade 40 is required.

This standard lays down test and other requirements to meet the specialized properties required in calibrated load chain. These properties include high tensile strength combined with a high yield point. They confer on the chain a high static factor of safety at safe working loads between $12d^2$ tons and $14d^2$ tons (where d is the size⁴⁾ of the chain in inches), and the ability to withstand proof loads of $32d^2$ tons without visible permanent deformation.

The energy absorption represented by the minimum energy absorption factor of $320d^2$ inch tons is higher than that of chain to BS 1663, and is ample to absorb the most severe single shock to which calibrated load chain is liable to be exposed in service. More energy can be stored elastically in Grade 80 chain than in chain of lower tensile strength; it acts as a spring, absorbing energy without permanent deformation. Greater plastic energy absorption and stretch at the expense of tensile strength would be unnecessary and undesirable; an accurately calibrated load chain will give due warning of even quite small stretch by interference between chain and pocketed wheel.

The need for an accurate fit between the chain and the pocketed wheel in modern high strength blocks⁵⁾ is covered by the dimensional tolerances specified. The calibration formula, first adopted in BS 1663²⁾, has been retained. To it, however, have been added more specific limits for the dimensions of the weld, and a drawing has been included showing the precise link shape demanded.

¹⁾ BS 590, *Mild steel chain, grade 30*.

²⁾ BS 1663, *Higher tensile steel chain, grade 40*.

³⁾ BS 3113, *Alloy steel chain, grade 60*.

⁴⁾ The nominal diameter of the steel from which the chain is made.

⁵⁾ BS 3243, “*Hand-operated chain pulley blocks*”.

The lifting appliances used with Grade 80 chain are smaller and lighter than conventional designs. With the co-operation of the blockmakers, it has been possible for the first time to standardize link dimensions in a complete range of chain sizes. This has led to the adoption also of a standard mould gauge for the inspection of these chains. (See Clause 11.).

This chain demands considerable technical and manufacturing resources. Servicing the chain demands similar resources. Users are therefore warned to regard each length of chain as a unit which should not be modified in any way. For this reason, individual links are not marked; the chain *as a unit* is identified by a tag or ring welded or brazed to one end. The chain, therefore, should be sent for repair or servicing as a unit, and it is recommended that spare units be kept available.

Grade 80 chain requires the periodic inspection usual with chains. It does not need periodic heat treatment. Indeed, heat treatment different from that given during manufacture can certainly cause serious damage.

The term “British Standard alloy steel chain Grade 80” should be used only with reference to chain of the dimensions (nominal diameter, etc.) laid down in the table and clauses of this standard.

This standard is not applicable to surface hardened chain.

Appendix A shows the information which should be supplied with the enquiry and order. Recommendations relating to contracts in which chain to this standard is included are offered in Appendix B. Recommendations for safe operation are given in Appendix G.

NOTE Where metric equivalents have been given, the figures in British units are to be regarded as the standard. The metric conversions are approximate. More accurate conversions should be based on the tables in 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 12 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.

