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Specification for

Non-calibrated short link steel chain (grade 30) for general engineering purposes: class 1 and 2

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The preparation of this British Standard was entrusted by the Mechanical Engineering Standards Committee (MEE/-) to Technical Committee MEE/12 upon which the following bodies were represented:

- Associated Offices Technical Committee
- British Chain Manufacturers' Association
- British Ports Association and the National Association of Ports Employers
- British Railways Board
- Chain Testers' Association of Great Britain
- Corporation of Trinity House
- Department of Industry (National Physical Laboratory)
- Department of Trade (Marine Division)
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials Users' Association
- Federation of Civil Engineering Contractors
- Federation of Manufacturers of Construction Equipment and Cranes
- Federation of Wire Rope Manufacturers of Great Britain
- Health and Safety Executive
- Ministry of Defence
- National Association of Drop Forgers and Stampers
- National Coal Board
- Coopted members

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Foreword

This British Standard has been prepared under the direction of the Mechanical Engineering Standards Committee to meet the needs of industry for a standard to replace BS 590:1949, which is withdrawn.

This standard deals with non-calibrated short link steel chain of grade 30 for general engineering purposes and provides for two qualities, class 1 quality chain for arduous duties such as lashing or load binding and class 2 quality chain for general duties.

Notwithstanding the usage permitted by the withdrawn BS 590, chain produced to this standard is not considered suitable for lifting purposes. This recognizes the lack of suitable compatible connecting components, such as hooks, and the trend, in lifting operations, towards the use of higher tensile strength steels for chain and other components as reflected by international standards and British Standards. Calibrated chain has not been included in this standard because of the wide variation in the design of pocketed wheels for use with this grade of chain, which makes it impractical to standardize the proportions of the chain links.

For chain for lifting applications, reference should be made to BS 4942-1 to BS 4942-6.

In view of the purposes for which chain complying with the requirements of this standard may be used and the importance of reliability, the opportunity has been taken to update some requirements, including those for material and heat treatment in such a way that the chain maker may best benefit from technological advances in steel-making and chain production. For example, no precise steel specification is given but, in accordance with the philosophy on performance standards of the international committee ISO/TC 111, Round steel link chains, lifting hooks and accessories, responsibility for the choice of steel is vested in the chain maker, subject only to certain general requirements and the restriction of the use of rimming steels to the manufacture of class 2 chain only.

It should also be noted that, in defining the mechanical properties of the finished chain, the ratio of maximum service load to proof force to minimum breaking force of 1 : 2 : 4, used in international standards and British Standards for lifting chain of grade M (4) and higher, has been adopted for the heat-treated and tested class 1 chain. In the case of class 2 chain which may, at the discretion of the chain maker, be supplied in the non-heat-treated condition, the corresponding ratio 1 : 2 : 5 previously specified in BS 590 has been retained. Only class 1 chain is to be marked with the quality grade mark "30".

Attention is drawn to Appendix A which gives recommendations for the use, care and maintenance of chains.

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 12, 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 specifies requirements for non-calibrated electrically welded round steel short link chains, grade 30, for general engineering purposes in a range of sizes from 5.5 mm to 40 mm.

Two classes of chain are covered, i.e.

class 1: for arduous duties

class 2: for general duties

Chain produced to this standard is not considered suitable for lifting applications.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1

size (d_n)

nominal diameter of the steel wire or bar from which the chain is made

2.2

material diameter (d)

diameter of the material in the chain link, as measured

2.3

proof force (F_e)

force to which, after processing (see 2.7), the whole of the chain is subjected, as specified in 4.4

2.4

breaking force (F_m)

maximum force that the chain withstands during the course of a static tensile test to destruction (see 5.1)

2.5

maximum service load

maximum tensile load to which the chain is to be subjected in service

2.6

ultimate permanent elongation

extension at the point of fracture of the chain, expressed as a percentage of the gauge length (see 5.2)

2.7

processing

any treatment of the chain subsequent to welding, e.g. heat treatment, polishing or protective coating

2.8

lot

specified length of chain from which a test sample is selected (see D.2)

3 Dimensions

3.1 Size. The size of chain, d_n , shall be one of the sizes given in Table 1.

3.2 Material diameter. The material diameter, d , of any section of a finished link, which shall comply with the size given in Table 1 within stated tolerances, shall be the mean of two measurements of the section at right angles in the same plane. The measurements shall be made away from the weld.

3.3 Tolerances

3.3.1 Tolerance on material diameter. For sizes up to 18 mm the diameter, d , of the material in the finished link shall nowhere differ from the nominal diameter by more than $^{+2}_{-6}$ %, except at the weld. For sizes 18 mm and over, the diameter, d , of the material in the finished link shall nowhere differ from the nominal diameter by more than ± 5 %, except at the weld.

3.3.2 Tolerances at the weld. The dimension of the steel at the weld, d_w and G , shall nowhere be less than the diameter d of the steel adjacent to the weld, or exceed it by more than the following tolerances in the directions given (see Figure 1 and Table 1):

- a) type 1: 10 % of the nominal diameter in any direction;
- b) type 2: 20 % of the nominal diameter in any direction;
- c) type 3: 20 % of the nominal diameter in the direction perpendicular to the plane of the link and 35 % in other planes.

NOTE Type 1 weld eliminates functional problems such as kinking or locking by severely limiting the weld oversize to 10 % of the nominal diameter. Both types 2 and 3 welds ensure freedom from these hazards by limiting the oversize beyond the 10 % allowed under type 1 to certain areas of the link only (see Figure 1) thus providing clearance where required.

3.3.3 Area affected dimensionally by welding. The area affected dimensionally by welding (designated e in Figure 1) shall not extend by more than $0.6d_n$ on either side of the centre of the link (see Figure 1) for types 1 and 3 welds, and by more than $0.3d_n$ for type 2 welds.

3.4 Length and width. The length and width of the links shall be as given in Table 1 and as designated in Figure 2.

Table 1 — Dimensions

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Nominal size, d_n	Diameter tolerance, $(d - d_n)$	Maximum tolerance at the weld			Outside link length, l , limits		Outside link width away from weld, w , max. $(3.5d_n)$	Inside link width away from weld, w_1 , min. $(1.25d_n)$
		Type 1 ($d_w - d$)	Types 2 and 3 ($d_w - d$)	Type 3 ($G - d$)	Max. ($5d_n$)	Min. ($4.75d_n$)		
5.5	+0.11 -0.33	0.55	1.1	1.95	28	26	19	6.9
6	+0.12 -0.36	0.6	1.2	2.1	30	28	21	7.5
6.5	+0.13 -0.39	0.65	1.3	2.3	33	31	23	8.2
7	+0.14 -0.42	0.7	1.4	2.45	35	33	25	8.8
7.5	+0.15 -0.45	0.75	1.5	2.65	38	36	26	9.4
8	+0.16 -0.48	0.8	1.6	2.8	40	38	28	10
8.5	+0.17 -0.51	0.85	1.7	3.0	43	40	30	10.7
9	+0.18 -0.54	0.9	1.8	3.15	45	43	32	11.3
9.5	+0.19 -0.57	0.95	1.9	3.35	48	45	33	11.9
10	+0.20 -0.60	1.0	2.0	3.5	50	47	35	12.5
10.5	+0.21 -0.63	1.05	2.1	3.7	53	50	37	13.2
11	+0.22 -0.66	1.1	2.2	3.85	55	52	39	13.8
11.5	+0.23 -0.69	1.15	2.3	4.05	58	55	40	14.4
12	+0.24 -0.72	1.2	2.4	4.2	60	57	42	15
12.5	+0.25 -0.75	1.25	2.5	4.4	63	59	44	15.7
13	+0.26 -0.78	1.3	2.6	4.55	65	62	46	16.3
14	+0.28 -0.84	1.4	2.8	4.9	70	66	49	18
15	+0.30 -0.90	1.5	3.0	5.25	75	71	53	19
16	+0.32 -0.96	1.6	3.2	5.6	80	76	56	20