BRITISH STANDARD

BS EN
1677-2:2000

Components for slings — Safety —

Part 2: Forged steel lifting hooks with latch, Grade 8

The European Standard EN 1677-2:2000 has the status of a British Standard

ICS 53.020.30; 77.140.85

National foreword

This British Standard is the official English language version of EN 1677-2:2000.

The UK participation in its preparation was entrusted to Technical Committee MHE/1, Chains and fittings, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 14, an inside back cover and a back cover.

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EUROPEAN STANDARD

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Components for slings - Safety - Part 2: Forged steel lifting hooks with latch, Grade 8

Accessoires pour élingues - Sécurité - Partie 2: Crochets de levage en acier forgé à linguet, Classe 8

Einzelteile für Anschlagmittel - Sicherheit - Teil 2: Geschmiedete Haken mit Sicherungsklappe, Güteklasse 8

This European Standard was approved by CEN on 21 May 2000.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 168 "Chains, ropes, webbing, slings and accessories – Safety", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2001, and conflicting national standards shall be withdrawn at the latest by February 2001.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

The other Parts of EN 1677 for components for slings are:

Part 1: Forged steel components - Grade 8
Part 3: Forged steel self-locking hooks - Grade 8
Part 4: Links - Grade 8
Part 5: Forged steel lifting hooks with latch - Grade 4
Part 6: Links - Grade 4

Annexes A and B of this European standard are informative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

0 Introduction

This European Standard has been prepared to be a harmonized standard providing one means of complying with the essential safety requirements of the Machinery Directive and associated EFTA regulations.

The hooks covered by this Part of EN 1677 are normally supplied to be part of a sling, but they may also be used for other applications. In such instances it is important that the hook design is checked to ensure its fitness for the intended use.

The extent to which hazards are covered is indicated in the scope. In addition, lifting equipment shall conform as appropriate to EN 292 for hazards that are not covered by this standard.

1 Scope

This Part of EN 1677 specifies requirements for forged steel lifting hooks with latch of grade 8 having eye or clevis and pin up to 63 t WLL, mainly for use in:

- chain slings according to EN 818-4
- steel wire rope slings according to prEN 13414-1:1999
- textile slings according to prEN 1492-1:2000, prEN 1492-2:2000

intended for lifting objects, materials or goods.

This Part of EN 1677 does not apply to hand forged hooks.

The hazards covered by this Part of EN 1677 are identified in clause 4.

Annex A is informative, and gives the bases for calculation of hook dimensions.

Annex B is informative, and gives an example of a designation system for hooks of grade 8.

Annex ZA gives the relationship with EU-Directives

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 292-1	Safety of machinery - Basic concepts - General principles for design Part 1: Basic terminology, methodology
EN 292-2: 1991/ A1: 1995	Safety of machinery - Basic concepts - General principles for design Part 2: Technical principles and specifications (Amendment 1: 1995)
EN 818-4	Short-link chain for lifting purposes - Safety Part 4: Chain slings Grade 8
EN 818-6:2000	Short link chain for lifting purposes - Safety Part 6: Chain slings - Specification for information for use and maintenance to be provided by the manufacturer
EN 1050: 1996	Safety of machinery - Principles of risk assessment
EN 1677-1:2000	Components for slings - Safety Part 1: Forged steel components - Grade 8
EN 1492-1:2000	Textile slings - Safety Part 1: Flat woven webbing slings made of man-made fibres
EN 1492-2:2000	Textile slings - Safety Part 2: Round slings made of man-made fibres
prEN 13414-1:1999	Steel wire rope slings – Safety Part 1: Wire rope slings

3 Terms and Definitions

For the purpose of this Part of EN 1677, the definitions given in EN 1677-1:2000 apply.

4 Hazards

Accidental release of a load, or release of a load due to failure of a hook, puts at risk, either directly or indirectly, the safety or health of those persons within the danger zone.

In order to provide the necessary strength and durability of hooks, this Part of EN 1677 gives requirements for the design, manufacture and testing to ensure the specified levels of performance are met.

Since failure can be caused by the incorrect choice of grade and specification of hook, this Part of EN 1677 also gives requirements for marking and the manufacturer's certificate.

Errors in fitting can also lead to failure and this Part of EN 1677 contains dimensional requirements to allow correct fit.

Risk of injury due to sharp edges, sharp angles or rough surfaces when handling is also covered by this standard.

Those aspects of safe use associated with good practice are given in EN 818-6:2000.

Table 1 contains those hazards which require action to reduce risk identified by risk assessment as being specific and significant for forged steel lifting hooks with latch, Grade 8.

Table 1: Hazards and associated requirements

Hazards identified in annex A of EN 1050: 1996		Relevant clause of annex A of EN 292-2: 1991/ A1: 1995	Relevant clause/subclause of this Part of EN 1677
1	Mechanical Hazard due to Inadequacy of Strength	1.3.2 4.1.2.3 4.1.2.5 4.2.4 1.7.3 1.7.4	5 5 5 5 7 9
1.3	Cutting hazard	1.3.4	5.4
1.8	Friction or abrasion hazard	1.3.4	5.4
15	Errors of fitting Hazard	1.5.4	5.2 9
17	Falling objects	1.3.3	5.6

5 Safety requirements

5.1 Design

The articulation and relative movement shall be in accordance with 5.1 of EN1677-1:2000.

NOTE : The form of the hook is not specified in detail. For example, a minimum value of dimension F (see figure 1) as measured in any direction is specified so that the eye of the hook can accommodate a pin, but the eye of the hook need not be circular.

The form of the upper end shall be either of the eye type or the clevis type as designated in table 2 and figure 1.

Each hook shall have a spring loaded latch conforming to 5.6 to ensure that the load cannot become accidentally unhooked.

Table 2: Forms of hooks

Form	Description	Principal use
E	Eye type	Chain slings, wire rope slings and textile slings
C	Clevis type	Mechanically assembled chain slings

5.2 Dimensions

The principal dimensions of the hooks shall conform to table 3, in which the hook dimensions are related to the working load limit.

NOTE 1: With an eye type hook, connecting devices may be required between the hook and the rest of the sling.

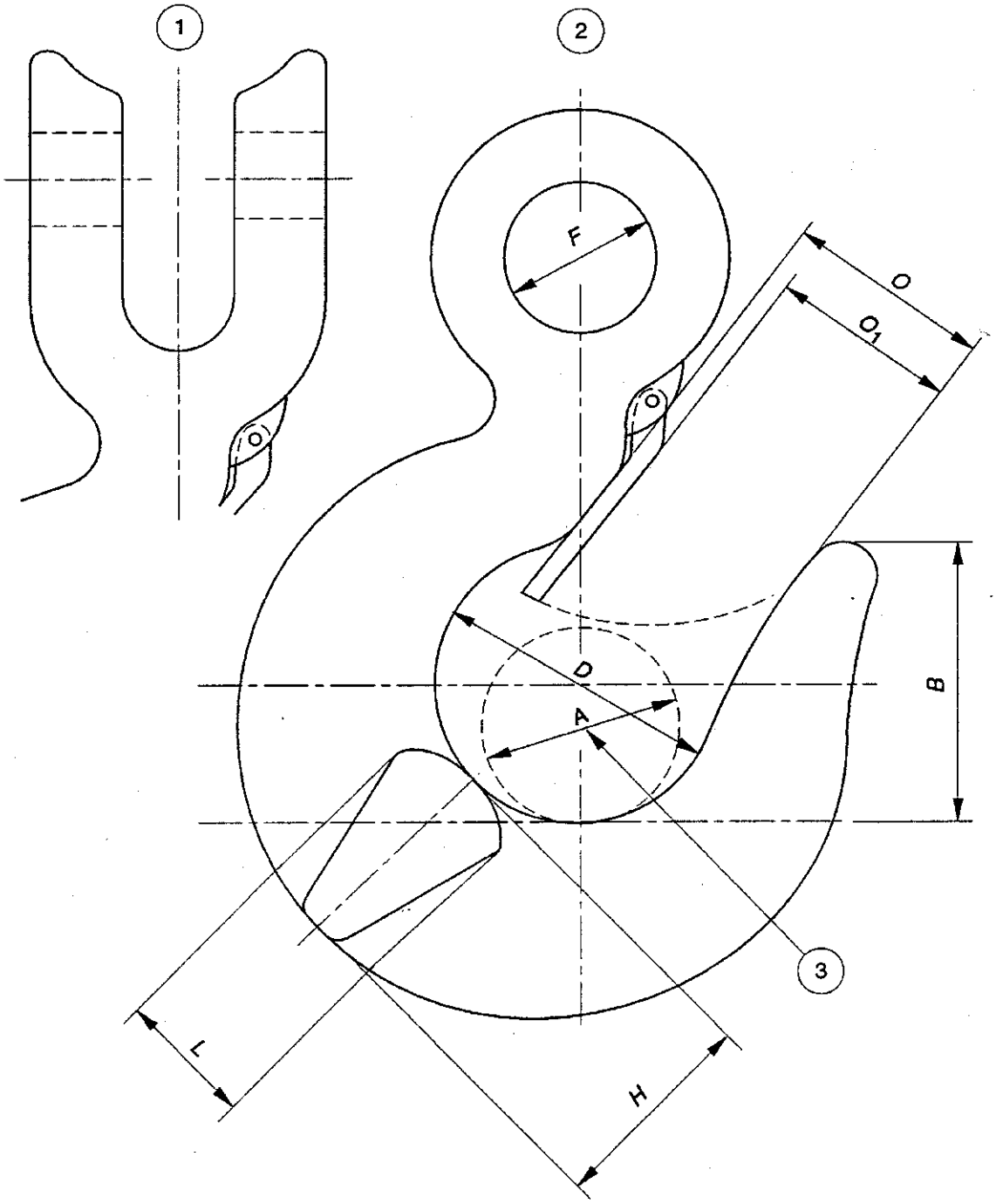
NOTE 2: For direct use in wire ropeslings and textile slings, dimension F should be larger than the minimum value given in table 3.

In addition, the following requirements shall be met:

a) the actual point height B shall be equal to or greater than the full throat opening O (see figure 1);

b) the full throat opening O shall not exceed 95 % of the actual seat diameter D;

c) the hook latch shall be capable of closing over the maximum diameter of bar A, as indicated in figure 1, that can be admitted through the actual throat opening O_1.



1. Clevis type
2. Eye type
3. Maximum diameter of bar

Figure 1: Dimensions of hooks

Table 3: Dimensions of hooks (see figure 1)

Code Number	Working load limit (WLL) t	D min. mm	O min. mm	O_1 min. mm	F min. mm	H max. mm	L max. mm
3	0,25	11	8	8	6	12	8
4	0,5	15	11	11	8	17	11
5	0,8	19	14	14	10	21	14
6	1,12	22	17	16	12	25	17
7	1,5	26	20	18	14	29	20
8	2	30	23	21	16	34	23
9	2,5	34	26	24	18	38	26
10	3,15	38	29	27	20	43	29
11	4	42	32	30	23	48	32
13	5,3	49	37	35	26	55	37
14	6	52	40	37	28	59	40
16	8	60	46	43	32	68	46
18	10	67	51	48	36	76	51
19	11,2	71	54	51	38	80	54
20	12,5	75	57	53	40	85	57
22	15	82	63	58	44	93	63
23	16	85	65	60	46	96	65
25	20	95	72	68	51	107	72
26	21,2	98	75	70	52	111	75
28	25	106	81	76	57	120	81
32	31,5	119	91	85	64	135	91
36	40	134	102	96	72	152	102
40	50	150	115	107	81	170	115
45	63	168	129	120	90	190	129

5.3 Materials and heat treatment

Materials and heat treatment shall be in accordance with 5.2 of EN 1677-1:2000.

5.4 Manufacturing methods and workmanship

Manufacturing methods and workmanship shall be in accordance with 5.3 of EN 1677-1:2000.

5.5 Mechanical properties

The mechanical properties shall conform to 5.4 of EN 1677-1:2000

5.6 Hook latches

The latch shall engage in the point of the hook to form a complete closure of mating surfaces. With the hook in any orientation the spring shall ensure that the latch is held positively in the closed position. Latches operated solely by gravity shall not be used.

NOTE: The force required to fully open the latch should not exceed that which can be applied manually.Table 4 contains guidance on the minimum initial torque and maximum torque during latch opening necessary to fulfil these requirements.

Table 4: Torque values for latches - guidance

Code number		Minimum initial torque	Maximum torque during opening
from	up to and including	Nm	Nm
3	5	0,05	0,1
6	7	0,1	0,2
8	10	0,2	0,4
11	14	0,3	0,6
16	18	0,75	1,5
19	23	1	2
25	28	2	4
32	45	3,5	7

The spring shall be constructed from corrosion protected material and shall be able to withstand at least 10 000 complete openings of the latch without fracture.

The latch shall be able to withstand force f_1, applied across the width of the latch, equidistant between the point of the hook and the centre of rotation of the latch, and force f_2 which shall be applied across the thickness of the latch laterally to f_1 (see figure 2). Both f_1 and f_2 shall be equivalent to 300 kg or 10 % of the working load limit of the hook, whichever is the greater, but f_2 shall not exceed 20 kN.

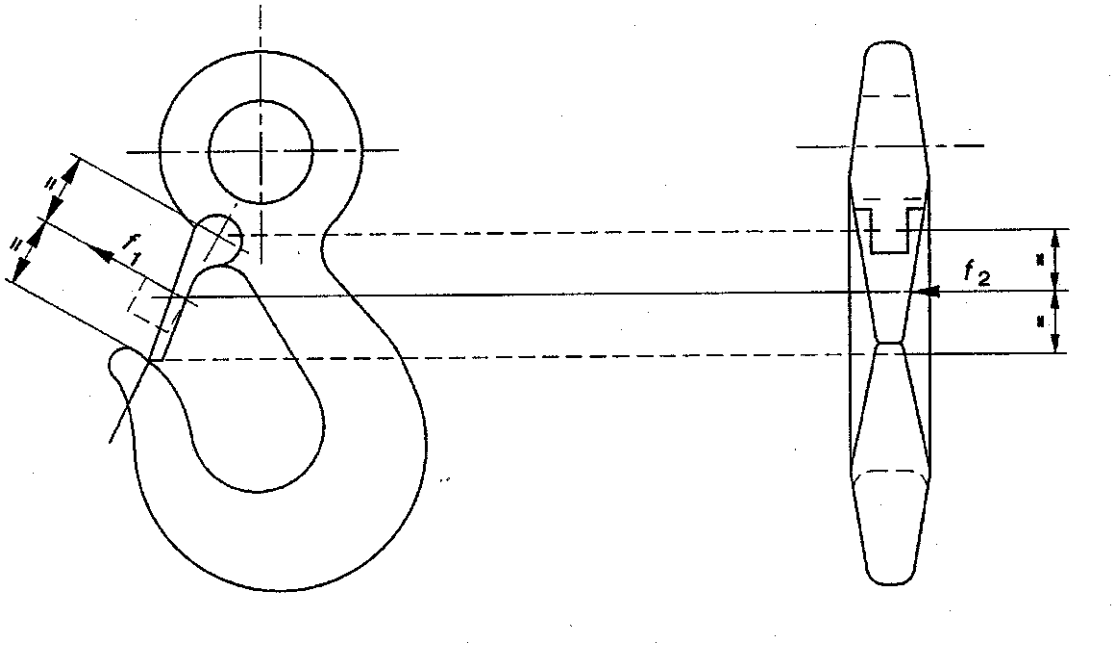


Figure 2: Application of forces for type testing of the latch

6 Verification of safety requirements

6.1 Qualification of personnel

All testing and examination shall be carried out by a competent person.

6.2 Type tests

Type tests and acceptance criteria shall be in accordance with 6.2 of EN 1677-1:2000.

In the tests specified in 6.2.3 to 6.2.5 of EN 1677-1:2000 the force shall be applied to the hook axially, without shock, using a test fixture of diameter not greater than 60 % of the seat diameter, D, of the hook.

6.3 Manufacturing test regime and acceptance criteria

The manufacturing test regime and acceptance criteria shall be in accordance with 6.5 of EN 1677-1:2000.

6.4 Hook latches

A type test (see 6.2 of EN 1677-1:2000) to verify conformity to 5.6 shall be carried out on 3 sample latches for each size of hook. The test shall be carried out with the latches in situ or in a test fixture that accurately simulates the location of the latch and hook point. Forces f_1 and f_2 shall be separately applied as indicated in figure 2. The latch shall show no permanent deformation following removal of the forces.

If any of the three samples fails the test, the latch of the size submitted for type testing shall be deemed not to conform to this Part of EN 1677:2000.

7 Marking

Marking shall be in accordance with clause 7 of EN 1677-1:2000.

8 Manufacturer’s certificate

The manufacturer's certificate shall conform to clause 8 of EN 1677-1:2000.

9 Instructions for use

Instructions for use shall accompany the hooks and shall conform to the relevant clauses of EN 818-6:2000. Advice shall be given on how to assemble and disassemble forged steel clevis hooks and how to ensure the correct fit of the pin.

Annex A (informative)

Bases for the calculation of hook dimensions

The dimensions given in table 3 are derived from the following formulae:

$D = 21{,}2\sqrt{WLL}$

$O = 16{,}2\sqrt{WLL}$

$O_1 = 15{,}1\sqrt{WLL}$

$F = 11{,}4\sqrt{WLL}$

$H = 24\sqrt{WLL}$

$L = 16{,}2\sqrt{WLL}$

The dimensions (in millimetres) have been calculated using the WLL given in table 3 and rounded to the nearest whole number.

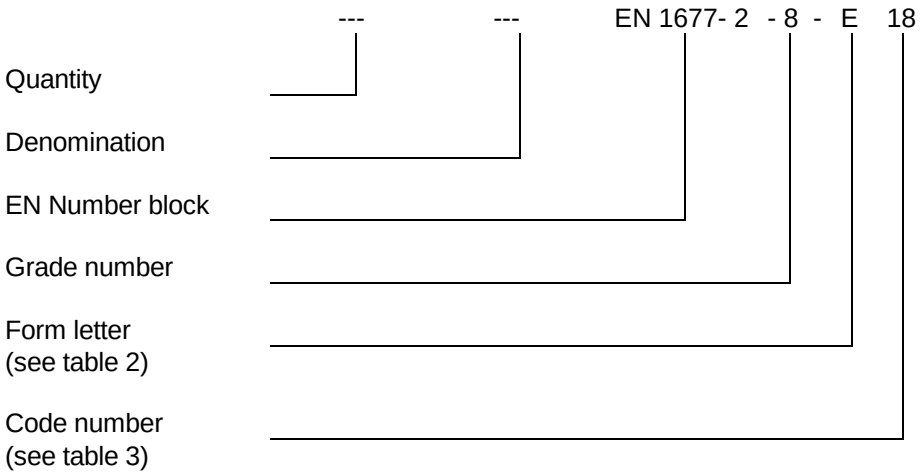
Annex B (informative)

Designation system for hooks - Grade 8

B.1 Designation

Designation of hooks should be in accordance with the general format given in B.2. The denomination of a hook should be determined by the manufacturer.

B.2 General format



Annex ZA (informative)

Relationship of this European Standard with EU Directives

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the essential requirements of EU Directive :

Machinery Directive 98/37/EC

WARNING: Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

The clauses of this European Standard, which are likely to support the requirements of the above-mentioned Directive, are mentioned in Table 1.

Compliance with this standard provides one means of conforming with the specific essential requirements of the Directive concerned.

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