

# Steel for cold forged fasteners and similar components —

## Part 1: Specification for carbon and low alloy steel wire

UDC 669.14:621.88

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

**BSI**  
Documents

AVA

Document Sharing Hub

# Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Iron and Steel Standards Committee (ISM/-) to Technical Committee ISM/26, upon which the following bodies were represented:

- British Steel Industry
- British Steel Industry (Wire Section)
- British Wire Netting Association
- Fencing Contractors' Association
- Society of Chain Link Fencing Manufacturers
- Welding Manufacturers Association (BEAMA Ltd.)

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- BEAMA Ltd.
- British Industrial Fasteners Federation
- Society of Motor Manufacturers and Traders Limited
- Stainless Steel Wire Export Group

This British Standard, having been prepared under the direction of the Iron and Steel Standards Committee, was published under the authority of the Board of BSI and comes into effect on 30 April 1987

© BSI 01-1999

First published, as BS 3111, April 1959  
First revision, as Part 1, September 1977  
Second revision, April 1987

The following BSI references relate to the work on this standard:  
Committee reference ISM/26  
Draft for comment 86/35467 DC

ISBN 0 580 15848 9

## Amendments issued since publication

| Amd. No. | Date of issue  | Comments                              |
|----------|----------------|---------------------------------------|
| 5692     | September 1987 | Indicated by a sideline in the margin |
|          |                |                                       |
|          |                |                                       |
|          |                |                                       |

# Contents

|                                                                                                                                              | Page               |
|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Committees responsible                                                                                                                       | Inside front cover |
| Foreword                                                                                                                                     | ii                 |
| 1 Scope                                                                                                                                      | 1                  |
| 2 Designation                                                                                                                                | 1                  |
| 3 Information to be supplied by the purchaser                                                                                                | 1                  |
| 4 General                                                                                                                                    | 1                  |
| 5 Steelmaking process                                                                                                                        | 1                  |
| 6 Freedom from defects                                                                                                                       | 1                  |
| 7 Decarburization                                                                                                                            | 1                  |
| 8 Chemical composition                                                                                                                       | 2                  |
| 9 Mechanical tests                                                                                                                           | 5                  |
| 10 Hardenability                                                                                                                             | 6                  |
| 11 Grain size                                                                                                                                | 6                  |
| 12 Tolerances on diameter                                                                                                                    | 7                  |
| 13 Marking                                                                                                                                   | 7                  |
| 14 Test certificate                                                                                                                          | 7                  |
| Appendix A Options                                                                                                                           | 8                  |
| Appendix B Tests for surface defects                                                                                                         | 8                  |
| Appendix C Detection of surface carburization                                                                                                | 9                  |
| Appendix D Hardening test on steel wire for wire diameters not exceeding 25 mm                                                               | 9                  |
| Table 1 — Permitted depths of decarburization                                                                                                | 2                  |
| Table 2 — Chemical composition (ladle analysis)                                                                                              | 3                  |
| Table 3 — Permitted deviations in product analysis from specified range: carbon steels types 0 and 1 and boron-treated steels types 9 and 10 | 4                  |
| Table 4 — Permitted deviations in product analysis from specified range: alloy steels types 2, 3, 5 and 7                                    | 4                  |
| Table 5 — Mechanical properties of wire                                                                                                      | 5                  |
| Table 6 — Hardenability requirements                                                                                                         | 6                  |
| Table 7 — Steel type 1: Jominy hardenability requirements                                                                                    | 7                  |
| Table 8 — Tolerances on diameter                                                                                                             | 7                  |
| Table 9 — Number of turns in reverse torsion test                                                                                            | 9                  |
| Publications referred to                                                                                                                     | Inside back cover  |

## Foreword

This Part of BS 3111 has been prepared under the direction of the Iron and Steel Standards Committee and is a revision of BS 3111-1:1977 which is withdrawn.

In this revision the number of alloy steels has been reduced and provisions in respect of decarburization and mechanical properties have been updated.

Chemical composition and properties of boron steels have also been updated.

Part 2 of BS 3111 specifies stainless steel wire.

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 10, 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 Part of BS 3111 specifies requirements for steel wire up to and including 30 mm diameter for use in the manufacture of low, medium and high tensile, cold forged fasteners and similar components in the following eight types of steel.

- 0 low carbon steel
- 1 medium carbon steel
- 2 carbon-molybdenum steel
- 3 1 % chromium steel
- 5 1 % chromium-molybdenum steel
- 7 1/2 % nickel-chromium-molybdenum steel
- 9 low carbon-manganese-boron steel
- 10 medium carbon-manganese-boron steel

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

## 2 Designation

The designation shall consist of the following items in the order given:

- a) the number of this British Standard, i.e. BS 3111-1;
- b) the type number and grade number of steel required (see Table 2);
- c) the abbreviation COND and one of the following letters denoting the delivery conditions:
  - A denotes drawn to size and finally spheroidize annealed;
  - B denotes drawn, spheroidize annealed and finally light drawn;
  - C denotes spheroidize annealed and finally light drawn;
  - D denotes direct drawn.
- d) the abbreviation GR and the number denoting the grade of decarburization required (see Clause 7).

Examples of this designation are as follows:

- 1) BS 3111-1 9/2 COND A GR3
- 2) BS 3111-1 0/1 COND B

## 3 Information to be supplied by the purchaser

### 3.1 General

The following information shall be supplied by the purchaser at the time of enquiry and order.

- a) the complete designation as covered by clause 2;
- b) the nominal, maximum or minimum diameter required (see clause 12);
- c) the coil mass with inside and outside diameters.

NOTE If coatings are required the type of coating to be applied, its mass or thickness and method of measurement should be agreed at the time of the enquiry and order.

### 3.2 Options

A number of options are specified in appendix A. In the event that the purchaser does not indicate his wish to implement any of these options and specify his requirements at the time of the enquiry and order, the manufacturer shall supply in accordance with the basic specification.

## 4 General

The wire shall comply with the general requirements of this standard and the appropriate specific requirements for the steel type and grade. Where any of the options given in appendix A are called up at the time of the enquiry and order, the wire shall, in addition, comply with the requirements of any such options.

## 5 Steelmaking process

The steel making and casting process shall be any process except the Bessemer process.

See also option A.1.

## 6 Freedom from defects

The steel shall be free from pipe and from such segregation and surface defects as might preclude its use for the purpose for which it is intended.

See also option A.2.

## 7 Decarburization

7.1 The requirements of 7.2 and 7.3 shall not apply to steel type 0 except type 0/4.

7.2 Decarburization shall be determined by microscopic examination as described in BS 6617-1.

NOTE The definitions of decarburization are as given in BS 6617-1.

7.3 Decarburization shall be one of the four grades given in Table 1.

For grade 1, no complete decarburization shall be present. The depth of partial decarburization at any point on the periphery shall not exceed the value in Table 1.

For grades 2, 3 and 4, the average total decarburization shall not exceed the value in Table 1. The depth of decarburization obtained at the maximum decarburization position shall not exceed the average value in Table 1 by more than 50 %.

7.4 The steel shall not be surface carburized. Where it is suspected that there is surface carburization the method described in appendix C shall be used for detection.