

BS 8610:2017



BSI Standards Publication

Personal fall protection equipment –

Anchor systems – Specification

bsi.

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© The British Standards Institution 2017

Published by BSI Standards Limited 2017

ISBN 978 0 500 86596 1

ICS 3.34.60

The following BSI references relate to the work on this document:

Committee reference PH/5

Draft for comment 17/30360729 DC; 17/30360732 DC

Amendments/corrigenda issued since publication

Date	Text affected
------	---------------

Contents

	Page
Foreword	iii
0 Introduction	1
<i>Table 1 — Non-load-limiting codification and anchor system options</i>	1
<i>Table 2 — Load-limiting codification and anchor system options</i>	2
1 Scope	3
2 Normative references	4
3 Terms and definitions	5
<i>Figure 1 — Example of a BS 8610 anchor system</i>	5
<i>Figure 2 — Examples of type A non-load-limiting anchor systems</i>	6
<i>Figure 2 — Examples of type A non-load-limiting anchor systems (continued)</i>	7
<i>Figure 3 — Example of a type A load-limiting anchor system</i>	7
<i>Figure 4 — Example of a type C non-load-limiting anchor system</i>	8
<i>Figure 5 — Examples of type C load-limiting anchor systems</i>	8
<i>Figure 6 — Example of a type D non-load-limiting anchor system</i>	9
<i>Figure 7 — Example of an accompanied descent type rescue</i>	11
<i>Figure 8 — Example of rescue — remotely or self-operated — direct attachment systems</i>	12
<i>Figure 9 — Example of a remotely operated redirect attachment type rescue</i>	13
4 Anchor system requirements	14
<i>Figure 10 — Examples of principal safety-critical test direction</i>	15
<i>Figure 10 — Examples of principal safety-critical test directions</i>	15
<i>Figure 10 — Examples of principal safety-critical test directions</i>	16
<i>Table 3 — Schedule of tests</i>	18
<i>Figure 11 — Example of wire rope eyelet termination</i>	23
<i>Figure 12 — Examples of swaged terminations</i>	23
5 Anchor system test methods	34
<i>Table 4 — Anchor system requirements for verification</i>	35
<i>Figure 13 — Test lanyard for the dynamic performance test using a 100 kg test mass</i>	36
<i>Figure 14 — Example of the dynamic performance test apparatus</i>	37
<i>Figure 15 — Example of the static strength test apparatus</i>	38
<i>Figure 16 — Example of a Y hang arrangement for testing paired anchor devices</i>	39
<i>Figure 17 — Example of a type C single-span anchor system test arrangement</i>	45
<i>Figure 18 — Example of a type C multi-span anchor system test arrangement without a corner</i>	46
<i>Figure 19 — Example of a type C multi-span anchor system test arrangement with a corner</i>	46
<i>Figure 20 — Example of a type D anchor system test arrangement with a cantilever</i>	63
<i>Figure 21 — Example of a type D anchor system test arrangement with a corner</i>	63
6 Marking	69
<i>Figure 22 — Example of anchor system marking</i>	69
<i>Figure 23 — Example of additional anchor system marking</i>	70
7 Information to be supplied by the manufacturer	70
Annex A (normative) Criteria for test laboratories	76
Annex B (informative) Test rationale	78
Annex C (normative) Requirements for test apparatus and procedures	79
<i>Figure C.1 — Test mass</i>	80
<i>Figure C.2 — Examples of bond patterns of solid brickwork construction</i>	82
<i>Figure C.3 — Example of a Y hang arrangement for determining minimum spacing distances between anchor devices</i>	84
<i>Figure C.4 — Example of a support free zone for tensile tests in concrete — plan view of Figure C.8</i>	85

<i>Figure C.5 — Example of a support free zone for tensile tests in concrete — plan view of Figure C.9</i>	85
<i>Figure C.6 — Example of a support free zone for shear tests in concrete — plan view of Figure C.8</i>	86
<i>Figure C.7 — Example of a support free zone for shear tests in concrete — plan view of Figure C.9</i>	87
<i>Figure C.8 — Example of a test arrangement for single anchor tests in concrete</i>	87
<i>Figure C.9 — Example of a test arrangement for tests on posts in concrete</i>	88
<i>Figure C.10 — Examples of best and worst case direction of test load applied to the anchor point</i>	88
<i>Figure C.11 — Example of a test arrangement and support dimensions for single anchor tests in brickwork loaded in shear across a horizontal edge, e.g. under a window or a parapet wall</i>	89
<i>Figure C.12 — Example of a test arrangement and support dimensions for single anchor tests in brickwork loaded in shear across a vertical edge, e.g. adjacent to a window</i>	90
<i>Figure C.13 — Example of a test arrangement and support dimensions for single anchor tests in brickwork loaded in tension close to a vertical edge</i>	91
<i>Figure C.14 — Example of a test rig arrangement and support dimensions for tests of paired anchor devices in masonry loaded in tension (perpendicular to the surface of the base material test piece)</i>	92
<i>Figure C.15 — Example of a test arrangement for single anchor tests in a profiled roofing system</i>	93
Bibliography	94

Summary of pages

This document comprises a front cover, and inside front cover, pages i to iv, pages 1 to 94, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard is published by BSI Standards Limited, under licence from The British Standards Institution, and came into effect on 30 November 2017. It was prepared by Technical Committee PH/5, *Personal Fall Protection*. A list of organizations represented on this committee can be obtained on request to its secretary.

Product certification/inspection/testing

Users of this British Standard are advised to consider the desirability of third-party testing of product conformity with this British Standard. Appropriate conformity attestation arrangements are described in [Annex A](#). Users seeking assistance in identifying appropriate conformity assessment bodies or schemes may ask BSI to forward their enquiries to the relevant association.

Use of this document

Any user claiming compliance with this British Standard is expected to be able to justify any course of action that deviates from its recommendations.

Users of this British Standard are expected to be able to demonstrate compliance with all applicable requirements.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Currently in preview, click buy full version

0 Introduction

0.1 General

This British Standard covers two categories of anchor system:

- a) non-load-limiting, for single and multi-users; and
- b) load-limiting, for single and multi-users.

Each category consists of various types, i.e. type A, type C and type D, which cover different applications, including:

- restraint;
- fall arrest;
- rope access;
- work positioning;
- several types of rescue; and
- evacuation.

NOTE For anchor system options and codification, see Table 1 and Table 2.

Table 1 — Non-load-limiting codification and anchor system options

Type	Application Code	Application Use
A – e.g. eyebolt ^{A)} /post	1	Restraint
	2	Fall arrest
	3	Rope access and work positioning
	4	Rescue – accompanied descent
	5	Rescue – remotely or self-operated – direct attachment
	6	Rescue – remotely operated – redirect attachment
	7	Evacuation
C – e.g. flexible horizontal anchor line	1	Restraint
	2	Fall arrest
	5	Rescue – remotely or self-operated – direct attachment
D – e.g. rigid horizontal anchor line	1	Restraint
	2	Fall arrest
	3	Rope access and work positioning
	4	Rescue – accompanied descent
	5	Rescue – remotely or self-operated – direct attachment
	6	Rescue – remotely operated – redirect attachment
	7	Evacuation

^{A)} As an example of codification, an eyebolt for fall arrest – non-load-limiting would be A2.

NOTE 1 Type A, type C and type D anchor systems are based on the types described in BS EN 795. Type B and type E, as described in BS EN 795, are not covered in this British Standard as they are not installed in a base material and so, therefore, the sequence of types in this British Standard is type A, type C, and type D.

NOTE 2 For clarification, BS EN 795 (single user only) and PD/CEN TS 16415 (two or more users) cover only anchor devices and not the structural anchor or the base material.

Table 2 — Load-limiting codification and anchor system options

Type	Application Code	Application Use
A – eyebolt ^{A)} /post etc.	1L	Restraint
	2L	Fall arrest
	5L	Rescue – remotely or self-operated – direct attachment
C – flexible horizontal anchor line	1L	Restraint
	2L	Fall arrest
	5L	Rescue – remotely or self-operated – direct attachment
D – rigid horizontal anchor line	Not covered as load-limiting type D anchor systems do not currently exist	

^{A)} As an example of codification, an eyebolt for fall arrest – load-limiting would be A2L.

NOTE 1 Type A, type C and type D anchor systems are based on the types described in BS EN 795. Type B and type E as described in BS EN 795, are not covered in this British Standard as they are not installed in a base material and so therefore, the sequence of types in this British Standard is type A, type C, and type D.

NOTE 2 For clarification, BS EN 795 (single user only) and PD/CEN TS 16415 (two or more users) cover only anchor devices and not the structural anchor or the base material.

This British Standard is intended for the type testing of anchor systems and gives only minimum performance requirements. It is essential that anchor systems are designed and manufactured so that, in the foreseeable conditions of use for which they are intended, the user is able to perform the risk-related activity while being appropriately protected at the highest possible level.

This British Standard presumes that the manufacturer of the relevant parts of the anchor system, for the sake of consistency and traceability, operates a quality management system which complies with regulations in force at the time. Guidance on the form this quality management system could take can be found in BS EN ISO 9001.

0.2 Advice on using this British Standard

It is recommended that this British Standard is read in the following order to ensure the correct category of anchor system is selected and tested.

a) [Clause 0](#), Table 1 and Table 2: depending on which category of anchor system has been chosen, select:

- 1) the category of anchor system, i.e. non-load-limiting or load-limiting;
- 2) the type of anchor system, i.e. type A, type C or type D; and
- 3) an application or applications that apply (application codes 1 to 7).

b) [Clause 1](#) Scope.

NOTE [Clause 3](#) clarifies terminology used in this British Standard.

c) [Clause 4](#), Anchor system requirements, should be read in the following order:

- 1) [4.1](#), General requirements;
- 2) [4.2](#), Pre-testing verification and recording requirements;
- 3) [4.3](#), Materials; and
- 4) [4.4](#), Design and ergonomics.

d) Depending on the category of anchor system selected [see a)], either select:

- 1) [4.5](#), Non-load-limiting anchor systems; or
- 2) [4.6](#), Load-limiting anchor systems.

- e) Using either [4.5](#) or [4.6](#), select the appropriate type and application, e.g. [4.5.1.1](#), Type A, Restraint – non-load-limiting.

NOTE Some of the subclauses cover more than one application.

- f) See Table 3 for the appropriate requirements and related test methods.

- g) [Clause 5](#), Test methods, should be read in the following order:

- 1) [5.1](#), Pre-test requirements;
- 2) [5.2](#), Dynamic performance test apparatus and preparation;
- 3) [5.3](#), Static strength test apparatus;
- 4) [5.4](#), General test requirements;
- 5) [5.5–5.7](#): Using Table 3 ([4.2.9](#)), select the test methods appropriate to the category, type and application chosen; and

NOTE Test methods generally comprise deformation, dynamic performance and static strength, in that order. For some applications, there are no dynamic performance tests.

- 6) [5.8](#), Corrosion resistance test method;
- h) [Clause 6](#), Marking.
- i) [Clause 7](#), Information to be supplied by the manufacturer.
- j) [Annex A](#) to [Annex C](#) provides further normative and informative information regarding:
- 1) criteria for test laboratories;
 - 2) test rationale; and
 - 3) requirements for test apparatus and procedures.

1 Scope

This British Standard provides requirements and test methods for type testing anchor systems that are installed and tested in the base materials specified by the manufacturer for:

- a) restraint systems;
- b) fall arrest systems;
- c) rope access systems;
- d) work positioning systems;
- e) rescue systems; and
- f) evacuation systems.

This British Standard covers anchor systems intended for one or more users simultaneously and specifies the maximum number of users for each type of anchor system.

NOTE 1 Where the manufacturer intends to rate their anchor systems for more than the specified maximum number of users, it is recommended that they liaise with an appropriate test house, taking into account the principles of this British Standard and develop a test specification accordingly.

This British Standard is not applicable to:

- 1) equipment conforming to BS EN 516 or BS EN 517;
- 2) type A load-limiting anchor systems (see [3.3.2](#)) for:
 - rope access and work positioning;

- rescue – accompanied descent;
- rescue – remotely operated – redirect attachment; and
- evacuation,

as they are considered not to be appropriate for such use.

3) type C non-load-limiting and load-limiting anchor systems (see [3.3.3](#)) for:

- rope access and work positioning;
- rescue – accompanied descent;
- rescue – remotely operated – redirect attachment; and
- evacuation,

as they are considered not to be appropriate for such use.

4) type B and type E, as described in BS EN 795, are not covered in this British Standard as they are not installed in a base material;

5) bespoke structurally designed anchors incorporated into structures

NOTE 2 The performance requirements in this British Standard are intended as minimum requirements for anchor devices, structural anchors and their base material(s). The performance requirements do not constitute structural verification of the structures for the imposed loads.

This British Standard is intended for use by manufacturers, installers and users of anchor systems and also other interested parties, e.g. architects and structural engineers, including those responsible for the design of safe access and egress on structures.

NOTE 3 Information on the use of anchor systems in personal fall protection systems, including rope access, can be found in BS 8437, BS 7985 and BS 7883.

NOTE 4 Anchor systems conforming to this British Standard for rope access should meet the requirements of the rope access industry for anchor systems, as detailed in BS 7985 and the Industrial Rope Access Trade Association (IRATA), International code of practice for industrial rope access (ICOP) [1].

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 7883, *Code of practice for the design, selection, installation, use and maintenance of anchor devices conforming to BS EN 795*

BS EN 1362, *Personal protective equipment against falls from a height — Connectors*

BS EN 1363, *Personal fall protection equipment — Personal fall protection systems*

BS EN 795:2012, *Personal fall protection equipment — Anchor devices*

BS EN 892, *Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods*

BS EN 12385-4, *Steel wire ropes — Safety — Part 4: Stranded ropes for general lifting applications*

BS EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods*