

Flexible cables for use at mines and quarries

ICS 29.060.20

Confirmed
January 2011

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW



This is a preview. [Click here to purchase the full publication.](#)

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee MRE/3, Mining Electrical Equipment, to Subcommittee MRE/3/1, Cables and their connections, upon which the following bodies were represented:

Association of British Mining Equipment Companies
British Cable Makers' Confederation
Health and Safety Executive
Quarry Products Association

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on
15 April 1998

© BSI 1998

Amendments issued since publication

Amd. No.	Date	Text affected

The following BSI references relate to the work on this standard:
Committee reference MRE/3/1
Announced in *BSI Update*
96-08-01

ISBN 0 580 28651 7

Contents

	Page
Committees responsible	Inside front cover
Foreword	iv
1 Scope	1
2 Normative references	1
3 Definitions	1
4 Abbreviations	2
5 Voltage designation	2
6 Cables with individual metallic screens, rated voltage 640/1100 V, for use with coalcutters and for similar purposes (types 7, 7M, 7S, 11, 14 and 16) and flat cables for use on overhead catenary systems and for similar purposes (type FS4)	2
7 Cables with galvanized steel pliable wire armouring, rated voltages up to 1900/3300 V (types 20, 21, 62, 63, 64, 70, 71, 201, 211, 321 and 331)	13
8 Cables with galvanized steel pliable wire armouring having up to 24 individual screened cores, rated voltage 320/550 V (types 506, 512, 518 and 524)	26
9 Cables with galvanized steel pliable wire armouring having individual metallic screened or unscreened cores, rated voltage 3800/6600 V (types 621, 630 and 631)	29
10 Cable with individual metallic screens, rated voltage 600/1000 V, for use with drills (type 44)	34
11 Cable with individual non-metallic screens, rated voltage 600/1000 V, for use with drills (type 43)	36
12 Cable with individual metallic screened cores, non-armoured, rated voltage 3800/6600 V (type 730)	38
13 Cable with metallic screened cores, non-armoured, rated voltage 6350/11000 V (type 830)	39
14 Cables with individual metallic screens, rated voltage 1900/3300 V, for use with coalface cutters and for similar purposes (types 307, 307M and 307S)	44
Annexes	
A (informative) Approved codes of practice and conductivities	51
B (informative) Recommended current ratings	51
C (informative) Short circuit current carrying capability of flexible cable screens	52
D (normative) Measurement of insulation and sheath thickness	55
E (normative) Protective screens: form, method of application and material	56
F (normative) Voltage and insulation resistance tests	57
G (normative) Tests for galvanized steel wire taken from completed cables	58
H (normative) Electrical test for conducting elastomeric screen for type 43 cable	58
Tables	
1 Clause 6 cable types and construction	3
2 Sequence of colours	4
3 Constructional details of type 7 cable	6
4 Constructional details of type 7M cable	7
5 Constructional details of type 7S cable	8
6 Constructional details of type 11 cable	9
7 Constructional details of type 14 cable	10

	Page	
8	Constructional details of type 16 cable	11
9	Constructional details of type FS4 cable	12
10	Insulation resistance	13
11	Clause 7 cable types and construction	14
12	Core identification	16
13	Minimum wire diameters	17
14	Constructional details of type 20 cable	18
15	Constructional details of type 21 cable	19
16	Constructional details of cable types 62, 63, 64, 70 and 71	20
17	Constructional details of type 201 cable	21
18	Constructional details of type 211 cable	22
19	Constructional details of type 321 cable	23
20	Constructional details of type 331 cable	24
21	Test voltage on core	25
22	Insulation resistance	25
23	Test voltage on completed cable	25
24	Constructional details of cable types 506, 512, 518 and 524	27
25	Clause 9 cable types and construction	30
26	Constructional details of type 621 cable	31
27	Constructional details of type 630 cable	32
28	Constructional details of type 631 cable	33
29	Insulation resistance	34
30	Clause 10 cable type and construction	34
31	Constructional details for type 44 cable	35
32	Clause 11 cable type and construction	36
33	Constructional details for type 43 cable	38
34	Clause 12 cable type and construction	38
35	Constructional details of type 730 cable	40
36	Insulation resistance	41
37	Clause 13 cable type and construction	41
38	Constructional details of type 830 cable	43
39	Insulation resistance	43
40	Clause 14 cable types and construction	44
41	Constructional details of type 307 cable	47
42	Constructional details of type 307M cable	48
43	Constructional details of type 307S cable	49
44	Insulation resistance	50
A.1	Cables with conductivities of between 50 % and 99 %	51
B.1	Current ratings of cables of clauses 6, 7, 9, 10, 11, 12, 13 and 14	52
B.2	Current ratings for cables of clause 8	52
B.3	Current de-rating factors	52
B.4	Voltage drop and current rating	52
C.1	Short circuit current ratings	53
E.1	Protective screenbraid thickness and width	57

	Page
Figures	
1	Core identification: type 506 cable 27
2	Core identification: type 512 cable 28
3	Core identification: type 518 cable 28
4	Core identification: type 524 cable 28
D.1	Positions for first measurement of insulation thickness 55
D.2	Position of point of intersection of the cross-wires of the measuring microscope 55
D.3	Position for measurement of sheath thickness 55
D.4	Position for measurement of sheath thickness for type FS4 cable 56
D.5	Position of point of intersection of the cross-wires of the measuring microscope 56
<hr/>	
List of references	Inside back cover

Foreword

This British Standard has been prepared by Technical Committee MRE/3/1. It supersedes BS 6708 : 1991 which is withdrawn. It updates insulation specifications and short circuit current ratings, and now includes a section covering cable types 307, 307M and 307S for rated voltages of 1900/3300 V and having individual metallic screens.

All matters relating to the use of electric cables in mines and quarries are now included in the Electricity at Work Regulations 1989 [1] and the associated Health and Safety Executive (HSE) Approved Codes of Practice, i.e. *The use of electricity in mines* (COP 34) [2] and *The use of electricity at quarries* (COP 35) [3]. Guidance is given in annex A.

Attention is drawn to the Health and Safety at Work etc. Act 1974 [4], the Mines and Quarries Act 1954 [5], the regulations made under these, and also any other appropriate statutory requirements or by-laws. These place responsibility for complying with certain specific safety requirements on the manufacturer and the user.

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 58, an inside back cover and a back cover.

1 Scope

This British Standard specifies requirements and dimensions for flexible cables used in mining and quarrying.

Specific types of cable covered in this standard are as follows:

- a) non-armoured cables having individually metallic screened cores and a rated voltage of 640/1100 V, for use:
 - 1) with coalface cutters and other similar machines: types 7, 7M, 7S, 11, 14 and 16;
 - 2) in overhead catenary systems and similar applications: types FS4 (flat form cable);
- b) cables with galvanized steel pliable wire armouring, with:
 - 1) unscreened cores and a rated voltage 640/1100 V: types 20 and 21; or
 - 2) individually metallic screened or unscreened cores and a rated voltage 640/1100 V used primarily for remote control circuits and coalface lighting: types 62, 63, 64, 70 and 71; or
 - 3) individually metallic screened cores and a rated voltage 640/1100 V: types 201 and 211; or
 - 4) a rated voltage 1900/3300 V used as trailing cables in quarries or for mine roadway cable extension purpose: types 321 and 331;
- c) auxiliary cables with galvanized steel pliable wire armouring having up to 24 individually metallic screened cores and a rated voltage 320/550 V, primarily for use on large mining machines where interconnection between machine sections or a machine section and auxiliary equipment is required: types 506, 512, 518 and 524;
- d) cables with galvanized steel pliable wire armouring having individually metallic screened or unscreened cores and a rated voltage 3800/6600 V, used as trailing cables in quarries and rated for roadway extension purposes: types 621, 630 and 631;
- e) non-armoured cable having individually metallic screened cores and a rated voltage 600/1000 V, primarily for use with hand-held drilling machines in mines: type 44;
- f) non-armoured cable having individually non-metallic screened cores and a rated voltage 600/1000 V, primarily for use with hand-held drilling machines in mines: type 43;
- g) non-armoured cable having individually metallic screened cores and a rated voltage 3800/6600 V, primarily for use as trailing cables for large machines at quarries: type 730;
- h) non-armoured cable having individually metallic screened cores and a rated voltage 6350/11000 V, primarily for use as trailing cables for large machines at quarries: type 830;

i) non-armoured cables having individually metallic screened cores and rated voltage 1900/3300 V, for use with coalface cutters and other similar machines: types 307, 307M and 307S.

NOTE 1. Information on approved codes of practice and conductivities related to the cables in this standard is given in annex A.

NOTE 2. Recommended current ratings are given in annex B.

NOTE 3. Short circuit current carrying capability of flexible cable screens is given in annex C.

2 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of a cited publication apply to this British Standard only when incorporated in the text by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

3 Definitions

For the purposes of this British Standard, the definitions given in BS 4727 apply, together with the following.

NOTE. Unless otherwise specified, voltages and currents are expressed by their r.m.s. values.

3.1 rated voltage U_0

The power–frequency voltage to earth for which the cable is designed.

NOTE. It is assumed that cables may be operated continuously at a power–frequency voltage 10 % above the rated voltage.

3.2 rated voltage U

The power–frequency voltage between conductors for which the cable is designed.

NOTE. It is assumed that cables may be operated continuously at a power–frequency voltage 10 % above the rated voltage.

3.3 flexible cable

Cable designed to be moved while energized.

3.4 trailing cable

Cable used to supply apparatus that changes position while energized.

3.5 fixed cable

Cable that does not change position while energized.

3.6 stranded conductor

Conductor made up of a number of wires twisted together.

NOTE. When the conductor consists of more than one layer, alternate layers are twisted in opposite directions.