BRITISH STANDARD

BS 7540-2:2005

Electric cables — Guide to use for cables with a rated voltage not exceeding 450/750 V —

Part 2: Harmonized cable types from HD 21 and HD 22

(Implementation of CENELEC HD 516 S2)

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Contents

Foreword

This part of BS 7540 has been prepared by Subcommittee GEL/20/17. Together with BS 7540-1 and BS 7540-3 it supersedes BS 7540:1994, which is withdrawn.

BS 7540 is published in three parts:

a) Part 1: *General guidance*;

b) Part 2: *Harmonized cable types from HD 21 and HD 22*;

c) Part 3: *National standard cables not included in HD 21 or HD 22*.

BS 7540-1 and BS 7540-2 together form the UK implementation of the European Committee for Electrotechnical Standardization (CENELEC) Harmonization Document HD 516 S2.

NOTE BS 7540 is applicable only to cable types that are specified in British Standards, so the parts of HD 516 that cover non-BS cables are not included in the main body of BS 7540. These non-BS cables are, however, listed in Annex A, with references to the relevant clauses in HD 21 and HD 22.

This part of BS 7540 should be read in conjunction with BS 7540-1, which gives general recommendations and guidance.

Attention is drawn to the Electrical Equipment (Safety) Regulations 1994 [1].

Additional information on installation practice is given in BS 7671.

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 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 iii, a blank page, pages 1 to 57 and a back cover.

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Introduction

This British Standard provides guidance for equipment manufacturers, installers and end-users on the properties of low voltage electric cables, and the limitations that are deemed to be necessary in order to safeguard life, buildings and goods.

The information is given in the form of limiting values and is illustrated by examples, which are not exhaustive but which indicate ways by which safety can be obtained.

1 Scope

This part of BS 7540 provides guidance for the safe use of electric cables with a rated voltage not exceeding 450/750 V. It is applicable to those cable types that are specified in Harmonized Documents HD 21 and HD 22 as implemented in BS 638-4, BS 6004, BS 6007, BS 6500, BS 7211 and BS 7919.

NOTE These British Standards also specify requirements for cable types that are specific to the United Kingdom and are not included in HD 21 or HD 22. Guidance on these cables is given in BS 7540-3. The classes of external influence (environmental conditions) used in this part of BS 7540 are as listed in BS 7540-1:2005, .

2 Normative references

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

BS 638-4:1996, *Arc welding power sources, equipment and accessories — Specification for welding cables*.

BS 4727-2:Group 08, *Glossary of Electrotechnical, power, telecommunication, electronics, lighting and colour terms — Part 2: Terms particular to power engineering — Group 08: Electric cable terminology*.

BS 6004:2000, *Electric cables — PVC insulated, non-armoured cables for voltages up to and including 450/750 V, for electric power, lighting and internal wiring*.

BS 6007:2000, *Electric cables — Single core unsheathed heat resisting cables for voltages up to and including 450/750 V, for internal wiring*.

BS 6500:2000, *Electric cables — Flexible cords rated up to 300/500 V, for use with appliances and equipment intended for domestic, office and similar environments*.

BS 7211:1998, *Specification for thermosetting insulated cables (non-armoured) for electric power and lighting with low emission of smoke and corrosive gases when affected by fire*.

BS 7540-1:2005, *Electric cables — Guide to use for cables with a rated voltage not exceeding 450/750 V — Part 1: General guidance*.

BS 7671, *Requirements for electrical installations — IEE Wiring Regulations — Sixteenth edition*.

BS 7919:2001, *Electric cables — Flexible cables rated up to 450/750 V, for use with appliances and equipment intended for industrial and similar environments*.

3 Terms and definitions

For the purposes of this part of BS 7540, the terms and definitions given in BS 7540-1, BS 7671 and BS 4727-2:Group 08 apply.

4 Specific cable types

Specific guidance for each cable type is organized in tabular format.

— HD 21 is covered by Tables 1 to 7.

— HD 22 is covered by Tables 8 to 19.

There are two tables for each part of each HD.

Table A for each part of the relevant HD shows:

— where to find the specific cable type in the relevant part of the HD, and in the British Standard that implements it;

— harmonized designations and, where applicable, national codes;

— constructional details for the cable;

— recommendations for installation (fixed cable types) or conditions and limits of operation (flexible cords and cables);

— recommended temperature limits.

Table B shows, for each generic cable type in the particular part of the HD:

— recommended use;

— comments about limitations and suitability.

NOTE Annex B shows how the table numbers in the cable product standards correspond to the table numbers in this part of BS 7540.

Table 1A — Cables conforming to HD 21.3 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature					
		HD 21.3:1995, Clause 2 BS 6004:2000, Table 4a H07V-U[a] 6491X[b]	HD 21.3:1995, Clause 2 BS 6004:2000, Table 4a H07V-R[a] 6491X[b]	HD 21.3:1995, Clause 3 BS 6004:2000, Table 4b H07V-K[a] 6701X[b]	HD 21.3:1995, Clause 4 BS 6004:2000, Table 5 H05V-U[a]	HD 21.3:1995, Clause 4 BS 6004:2000, Table 5 H05V-R[a]	HD 21.3:1995, Clause 5 BS 6004:2000, Table 5 H05V-K[a] 2491X[b]
Constructional details							
Nominal voltage rating	V	450/750	450/750	450/750	300/500	300/500	300/500
Conductor class[c]		1	2	5	1	2	5
Number of cores		1	1	1	1	1	1
Cross-sectional area size range	mm^2	1.5 to 10	1.5 to 400	1.5 to 240	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0
Method of installation[d]							
In conduit		+	+	+	—	—	—
In cable trunking		+	+	+	+[e]	+[e]	+[e]
In cable ducting		+	+	+	—	—	—
In cable wiring of electric appliances and equipment		+	+	+	+	+	+
Clipped direct		—	—	—	—	—	—
On cable tray		—	—	—	—	—	—
Embedded		—	—	—	—	—	—
Temperature							
Maximum continuous conductor operating[f]	°C	70	70	70	70	70	70
Maximum conductor short circuit[g]	°C	160	160[h]	160	160	160	160
Maximum cable surface	°C	70	70	70	70	70	40
Maximum storage[i]	°C	40	40	40	40	40	40
Minimum installation and handling	°C	5	5	5	5	5	5

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] CMA code designation.
[c] Conductor class designations:
1 = solid wire;
2 = stranded;
5 = flexible.
[d] The presence of water in contact with the cable is not acceptable.
[e] Signalling and control circuit only.
[f] The maximum conductor temperature at which the particular cable should operate depends upon the limiting temperature of the other cables and accessories with which it is in contact.
[g] Maximum allowable time 5 s.
[h] For conductor sizes above 300 mm^2 this temperature is reduced to 140 °C.
[i] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 1B — Cables conforming to HD 21.3 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 21.3:1995	BS 6004:2000		
Single core non-sheathed cables with rigid (solid or stranded) conductor, H07V-U or H07V-R	Clause **2**	Table 4a	The cables are **suitable** for: — installation in surface-mounted or embedded conduits, or similar closed systems.	For voltages up to 1 000 V a.c., or up to 750 V d.c. to earth, the cables are permitted for fixed protected installation in, or on, lighting or controlgear.
Single core non-sheathed cables with flexible conductor, H07V-K	Clause **3**	Table 4b		
Single core non-sheathed cables with solid conductor for internal wiring, H05V-U	Clause **4**	Table 5	The cables are **suitable** for: — fixed protected installation inside appliances and in, or on, lighting fittings.	In cable trunking systems, the cables are only permitted for signalling or control circuits.
Single core non-sheathed cables with flexible conductor for internal wiring, H05V-K	Clause **5**	Table 5		

Table 2A — Cables conforming to HD 21.5 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature				
		HD 21.5:1994, Clause 2 BS 6500:2000, Table 24 H03VH-Y[a]	HD 21.5:1994, Clause 4 BS 6500:2000, Table 26 H03VVH2-F[a] 2192Y[b]	HD 21.5:1994, Clause 4 BS 6500:2000, Table 26 H03VV-F[a] 218*Y[b]	HD 21.5:1994, Clause 5 BS 6500:2000, Table 27[c] H05VV-F[a] 318*Y[b]	HD 21.5:1994, Clause 5 BS 6500:2000, Table 27 H05VVH2-F[a] 3192Y[b]
Constructional details						
Nominal voltage rating	V	300/300	300/300	300/300	300/500	300/500
Conductor class[d]		Tinsel	5	5	5	5
Number of cores		2	2	2 to 4	2 to 5	2
Cross-sectional area size range	mm^2	0.1	0.5 to 0.75	0.5 to 0.75	0.75 to 4	0.75 to 1.0
Duty[a]						
Extra light		+	+	+	+	+
Light		—	+	+	+	+
Ordinary		—	—	—	+	+
Heavy		—	—	—	—	—
Presence of water						
Condition AD1		+	+	+	+	+
Condition AD2		—	—	—	+	+
Condition AD6		—	—	—	—	—
Condition AD7		—	—	—	—	—
Condition AD8		—	—	—	—	—
Corrosive or polluting substances condition AF3		—	—	—	+	+
Impact condition AG2		—	—	—	—	—
Vibrations condition AH3		—	—	—	—	—
Flora condition AK2		—	—	—	—	—
Fauna condition AL2		—	—	—	—	—
Solar radiation condition AN2		—	—	—	—	—
Outdoor use[f]						
Intermittent and temporary periods of short duration[g]		—	—	—	+	+
Permanent[g]		—	—	—	—	—

Table 2A — Cables conforming to HD 21.5 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature				
		HD 21.5:1994, Clause 2 BS 6500:2000, Table 24 H03VH-Y[a]	HD 21.5:1994, Clause 4 BS 6500:2000, Table 26 H03VVH2-F[a] 2192Y[b]	HD 21.5:1994, Clause 4 BS 6500:2000, Table 26 H03VV-F[a] 218*Y[b]	HD 21.5:1994, Clause 5 BS 6500:2000, Table 27[c] H05VV-F[a] 318*Y[b]	HD 21.5:1994, Clause 5 BS 6500:2000, Table 27 H05VVH2-F[a] 3192Y[b]
Flexing and torsion						
Frequent flexing		+	+	+	+	+
Frequent torsion		—	—	+	+	—
Temperature						
Maximum continuous conductor operating	°C	40	60[h]	60[h]	60	60
Maximum conductor short circuit[i]	°C	150	150	150	150	150
Maximum cable surface	°C	40	50	50	50	50
Maximum storage[j]	°C	40	40	40	40	40
Minimum installation and handling	°C	5	5	5	5	5

"+" = Acceptable

"—" = Not suitable

[a] Harmonized code designation.
[b] CMA code designation.
[c] 4 mm2 cables are covered in BS 7919:2001, Table 40.
[d] Conductor class designation 5 = flexible
[e] See BS 7540-1:2005, Annex D.
[f] Only for relevant classification given for duty.
[g] See BS 7540-1:2005, Annex C.
[h] Cords with cross-sectional area of 0.5 mm2 should be used in lengths not exceeding 2 m and their current should not exceed 3 A.
[i] Maximum allowable time 5 s.
[j] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 2B — Cables conforming to HD 21.5 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 21.5:1994	BS 6500:2000		
Flat tinsel cord, H03VH-Y	Clause **2**	Table 24	The cables are **suitable** for: — connecting small hand-held appliances (e.g. electric razors) when authorized by the relevant appliance specifications. The cables are **not suitable** for: — cooking or heating appliances.	The connection of this cord to appliances should be fixed, or suitable small connectors should be used. The length of the cord should not exceed 2 m with a non-detachable plug at the end. The current should not exceed 0.2 A.
Light PVC sheathed cord, H03VV-F (circular) and H03VVH2-F (flat)	Clause **4**	Table 26	The cables are **suitable** for: — use in domestic premises, kitchens and offices; — light duties; — light portable appliances (e.g. radio sets, table and standard lamps, office machines). The cables are **not suitable** for: — cooking and space heating appliances; — use in elevated temperature zones in luminaires; — outdoor use, in industrial[a] or agricultural buildings; — non-domestic portable tools.	For use in elevated temperature zones in luminaires, cables conforming to HD 21.12:1994, Clause **2** (H03V2V2-F or H03V2V2H2-F) are preferred. For light PVC sheathed cord with cross-section 0.75 mm^2, the same recommendations for use and comments as for ordinary PVC sheathed cord (HD 21.5:1994, Clause **5**) are applicable. Where extra flexibility is required and provided there is no particular danger of mechanical damage, these light cords may be used. If cords are subject to frequent flexing and/or torsion, circular cords are recommended instead of flat ones.
Ordinary PVC sheathed cord, H05VV-F (circular) and H05VVH2-F (flat)	Clause **5**	Table 27	The cables are **suitable** for: — use in domestic premises, kitchens, offices; — household appliances, including in damp premises; — medium duties (e.g. washing machines, spin dryers, and refrigerators); — hand-held inspection lamps (circular cables only). The cables are **not suitable** for: — outdoor use, in industrial[a] or agricultural buildings; — non-domestic portable tools.	Providing that there is no risk of contact with hot parts and the cables are not subjected to radiation, they may be used for cooking and heating appliances, but the use, in these cases, of cables conforming to HD 21.12:1994, Clause **3** is preferred (H05V2V2-F or H05V2V2H2-F).

[a] Admissible, however, in tailors' workshops and similar premises.

Table 3A — Cables conforming to HD 21.7 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature					
		HD 21.7:1996, Clause 2 BS 6004:2000, Table 12 H05V2-U[a] 6491X HR[b]	HD 21.7:1996, Clause 2 BS 6004:2000, Table 12 H05V2-R[a] 6491X HR[b]	HD 21.7:1996, Clause 2 BS 6004:2000, Table 12 H05V2-K[a] 2491X HR[b]	HD 21.7:1996, Clause 3 BS 6004:2000, Table 11a H07V2-U[a] 6491X HR[b]	HD 21.7:1996, Clause 3 BS 6004:2000, Table 11a H07V2-R[a] 6491X HR[b]	HD 21.7:1996, Clause 3 BS 6004:2000, Table 11b H07V2-K[a] 6701X HR[b]
Constructional details							
Nominal voltage rating	V	300/500	300/500	300/500	450/750	450/750	450/750
Conductor class[c]		1	2	5	1	2	5
Number of cores		1	1	1	1	1	1
Cross-sectional area size range	mm^2	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	1.5 to 2.5	1.5 to 35	1.5 to 35
Method of installation[d]							
In conduit		—	—	—	+	+	+
In cable trunking		+[e]	+[e]	+[e]	+	+	+
In cable ducting		—	—	—	+	+	+
In cable wiring of electric appliances and equipment		+	+	+	+	+	+
Clipped direct		—	—	—	—	—	—
On cable tray		—	—	—	—	—	—
Embedded		—	—	—	—	—	—
Temperature							
Maximum continuous conductor operating[f]	°C	90	90	90	90	90	90
Maximum conductor short circuit[g]	°C	160	160	160	160	160	160
Maximum cable surface	°C	90	90	90	90	90	90
Maximum storage[h]	°C	40	40	40	40	40	40
Minimum installation and handling	°C	5	5	5	5	5	5

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] CMA code designation.
[c] Conductor class designations:
1 = solid wire;
2 = stranded;
5 = flexible.
[d] The presence of water in contact with the cable is not acceptable.
[e] Signalling and control circuit only.
[f] The maximum conductor temperature at which the particular cable should operate depends upon the limiting temperature of the other cables and accessories with which it is in contact.
[g] Maximum allowable time 5 s.
[h] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 3B — Cables conforming to HD 21.7 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 21.7:1996	BS 6004:2000		
Single core non-sheathed cables for internal wiring, H05V2-U, H05V2-R or H05V2-K	Clause **2**	Table 12	The cables are **suitable** for: — internal wiring and fixed protected installation inside appliances and in lighting fittings. The cables are **not suitable** for: — fixed installations in distribution systems.	The maximum conductor temperature in normal use is 90 °C. These cables should not be used in contact with objects higher than 85 °C.
Single core non-sheathed cables for internal wiring, H07V2-U, H07V2-R or H07V2-K	Clause **3**	Table 11a (-U and -R types) Table 11b (-K types)	The cables are **suitable** for: — internal wiring and fixed protected installation inside appliances and in lighting fittings. The cables are **not suitable** for: — fixed installations in distribution systems, except where limited to a maximum conductor temperature of 70 °C.	The maximum conductor temperature in normal use is 90 °C. These cables should not be used in contact with objects higher than 85 °C. For voltages up to 1 000 V a.c., or up to 750 V d.c. to earth, the cables are permitted for fixed protected installation in, or on, lighting or controlgear. In cable trunking systems, the cables are only permitted for signalling or control circuits.

Table 4A — Cables conforming to HD 21.9 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature		
		HD 21.9:1995, Clause 2 BS 6004:2000, Table 10a H07V3-U[a]	HD 21.9:1995, Clause 2 BS 6004:2000, Table 10a H07V3-R[a]	HD 21.9:1995, Clause 3 BS 6004:2000, Table 10b H07V3-K[a]
Constructional details				
Nominal voltage rating	V	450/750	450/750	450/750
Conductor class[b]		1	2	5
Number of cores		1	1	1
Cross-sectional area size range	mm^2	1.5 to 10	1.5 to 630	1.5 to 240
Method of installation[c]				
In conduit[d]		+	+	+
In cable trunking[d]		+	+	+
In cable ducting[d]		+	+	+
In cable wiring of electric appliances and equipment		+	+	+
Clipped direct		—	—	—
On cable tray		—	—	—
Embedded		—	—	—
Temperature				
Maximum continuous conductor operating[e]	°C	70	70	70
Maximum conductor short circuit[f]	°C	160	160[g]	160
Maximum cable surface	°C	70	70	70
Maximum storage[h]	°C	40	40	40
Minimum installation and handling	°C	−25	−25	−25

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designations:
1 = solid wire;
2 = stranded;
5 = flexible.
[c] The presence of water in contact with the cable is not acceptable.
[d] For installation at low temperatures.
[e] The maximum conductor temperature at which the particular cable should operate depends upon the limiting temperature of the other cables and accessories with which it is in contact.
[f] Maximum allowable time 5 s.
[g] For conductor sizes above 300 mm^2 this temperature is reduced to 140 °C.
[h] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 4B — Cables conforming to HD 21.9 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 21.9:1995	BS 6004:2000		
Non-sheathed cable for installation at low temperature with rigid (solid or stranded) conductor, H07V3-U or H07V3-R	Clause **2**	Table 10a	The cables are **suitable** for: — installation in surface-mounted or embedded conduits, or similar closed systems when installation is carried out in conditions of low ambient temperature.	For voltages up to 1 000 V a.c., or up to 750 V d.c. to earth, the cables are permitted for fixed protected installation in, or on, lighting or controlgear.
Non-sheathed cable for installation at low temperature with flexible conductor, H07V3-K	Clause **3**	Table 10b		

Table 5A — Cables conforming to HD 21.10 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature			
		HD 21.10:2001, Clause 2 BS 6500:2000, Clause 8 H03VVH8-F[a]	HD 21.10:2001, Clause 2 BS 6500:2000, Clause 8 H03VVH2H8-F[a]	HD 21.10:2001, Clause 3 BS 6500:2000, Clause 8 H05VVH8-F[a]	HD 21.10:2001, Clause 3 BS 6500:2000, Clause 8 H05VVH2H8-F[a]
Constructional details					
Nominal voltage rating	V	300/300	300/300	300/500	300/500
Conductor class[b]		5	5	5	5
Number of cores		2 to 3	2	2 to 3	2
Cross-sectional area size range	mm^2	0.5 to 0.75	0.5 to 0.75	0.75 to 1.5	0.75
Duty[c]					
Extra light		+	+	+	+
Light		+	+	+	+
Ordinary		—	—	+	+
Heavy		—	—	—	—
Presence of water					
Condition AD1		+	+	+	+
Condition AD2		—	—	+	+
Condition AD6		—	—	—	—
Condition AD7		—	—	—	—
Condition AD8		—	—	—	—
Corrosive or polluting substances condition AF3		—	—	+	+
Impact condition AG2		—	—	—	—
Vibrations condition AH3		—	—	—	—
Flora condition AK2		—	—	—	—
Fauna condition AL2		—	—	—	—
Solar radiation condition AN2		—	—	—	—
Outdoor use[d]					
Intermittent and temporary periods of short duration[e]		—	—	+	+
Permanent[e]		—	—	—	—
Flexing and torsion					
Frequent flexing		+	+	+	+
Frequent torsion		—	—	—	—

Table 5A — Cables conforming to HD 21.10 Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature			
		HD 21.10:2001, Clause 2 BS 6500:2000, Clause 8 H03VVH8-F[a]	HD 21.10:2001, Clause 2 BS 6500:2000, Clause 8 H03VVH2H8-F[a]	HD 21.10:2001, Clause 3 BS 6500:2000, Clause 8 H05VVH8-F[a]	HD 21.10:2001, Clause 3 BS 6500:2000, Clause 8 H05VVH2H8-F[a]
Temperature					
Maximum continuous conductor operating	°C	60[f]	60[f]	60	60
Maximum conductor short circuit[g]	°C	150	150	150	150
Maximum cable surface	°C	50	50	50	50
Maximum storage[h]	°C	40	40	40	40
Minimum installation and handling	°C	5	5	5	5

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designation 5 = flexible.
[c] See BS 7540-1:2005, Annex D.
[d] Only for relevant classification given for duty.
[e] See BS 7540-1:2005, Annex C.
[f] Cords with cross-sectional area of 0.5 mm^2 should be used in lengths not exceeding 2 m and their current should not exceed 3 A.
[g] Maximum allowable time 5 s.
[h] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 5B — Cables conforming to HD 21.10 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 21.10:2001	BS 6500:2000		
Extensible leads — light duty PVC sheathed types, H03VVH8-F (circular) and H03VVH2H8-F (flat)	Clause **2**	Clause **8**	The cables are **suitable** for: — use in domestic premises, kitchens and offices; — light duties; — light portable appliances (e.g. radio sets, table and standard lamps, office machines). The cables are **not suitable** for: — cooking and space heating appliances; — use in elevated temperature zones in luminaires; — outdoor use, in industrial[a] or agricultural buildings; — non-domestic portable tools.	For use in elevated temperature zones in luminaires, cables conforming to HD 21.12:1994, Clause **2** (H03V2V2-F or H03V2V2H2-F) are preferred. For light PVC sheathed cord with cross-section 0.75 mm^2, the same recommendations for use and comments as for ordinary PVC sheathed cord (HD 21.10:2001, Clause **3**) are applicable. Where extra flexibility is required and provided there is no particular danger of mechanical damage, these light cords may be used. If cords are subject to frequent flexing and/or torsion, circular cords are recommended instead of flat ones.
Extensible leads — ordinary duty PVC sheathed types, H05VVH8-F (circular) and H05VVH2H8-F (flat)	Clause **3**	Clause **8**	The cables are **suitable** for: — use in domestic premises, kitchens, offices; — household appliances, including in damp premises; — medium duties (e.g. washing machines, spin dryers, and refrigerators); — hand-held inspection lamps (circular cables only). The cables are **not suitable** for: — outdoor use, in industrial[a] or agricultural buildings; — non-domestic portable tools.	Providing that there is no risk of contact with hot parts and the cables re not subjected to radiation, they may be used for cooking and heating appliances, but the use, in these cases, of cables conforming to HD 21.12:1994, Clause **3** is preferred (H05V2V2-F or H05V2V2H2-F).

[a] Admissible, however, in tailors' workshops and similar premises.

Table 6A — Cables conforming to HD 21.12 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature			
		HD 21.12:1994, Clause 2 BS 6500:2000, Table 28 H03V2V2-F[a]	HD 21.12: 1994, Clause 2 BS 6500:2000, Table 28 H03V2V2H2-F[a]	HD 21.12: 1994, Clause 3 BS 6500:2000, Table 29 H05V2V2H2-F[a]	HD 21.12: 1994, Clause 3 BS 6500:2000[b], Table 29 H05V2V2-F[a]
Constructional details					
Nominal voltage rating	V	300/300	300/300	300/500	300/500
Conductor class[c]		5	5	5	5
Number of cores		2 to 4	2	2	2 to 5
Cross-sectional area size range	mm^2	0.5 to 0.75[d]	0.5 to 0.75[d]	0.50 to 1.0	0.75 to 4
Duty[e]					
Extra light		+	+	+	+
Light		+	+	+	+
Ordinary		—	—	+	+
Heavy		—	—	—	—
Presence of water					
Condition AD1		+	+	+	+
Condition AD2		—	—	+	+
Condition AD6		—	—	—	—
Condition AD7		—	—	—	—
Condition AD8		—	—	—	—
Corrosive or polluting substances condition AF3		—	—	+	+
Impact condition AG2		—	—	—	—
Vibrations condition AH3		—	—	—	—
Flora condition AK2		—	—	—	—
Fauna condition AL2		—	—	—	—
Solar radiation condition AN2		—	—	—	—
Outdoor use[f]					
Intermittent and temporary periods of short duration[g]		—	—	+	+
Permanent[g]		—	—	—	—

Table 6A — Cables conforming to HD 21.12 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature			
		HD 21.12:1994, Clause 2 **BS 6500:2000, Table 28** **H03V2V2-F**[a]	**HD 21.12: 1994, Clause 2** **BS 6500:2000, Table 28** **H03V2V2H2-F**[a]	**HD 21.12: 1994, Clause 3** **BS 6500:2000, Table 29** **H05V2V2H2-F**[a]	**HD 21.12: 1994, Clause 3** **BS 6500:2000**[b]**, Table 29** **H05V2V2-F**[a]
Flexing and torsion					
Frequent flexing		+	+	+	+
Frequent torsion		+	—	—	+
Temperature					
Maximum continuous conductor operating	°C	90	90	90	90
Maximum conductor short circuit[h]	°C	150	150	150	150
Maximum cable surface[i]	°C	80	80	80	80
Maximum storage[j]	°C	40	40	40	40
Minimum installation and handling	°C	5	5	5	5

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] 4 mm^2 cables are covered in BS 7919:2001, Table 41.
[c] Conductor class designation 5 = flexible.
[d] Cords with cross-sectional area of 0.5 mm^2 should be used in lengths not exceeding 2 m and their current should not exceed 3 A.
[e] See BS 7540-1:2005, Annex D.
[f] Only for relevant classification given for duty.
[g] See BS 7540-1:2005, Annex C.
[h] Maximum allowable time 5 s.
[i] See BS 7540-1:2005, **5.4.3**.
[j] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 6B — Cables conforming to HD 21.12 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 21.12:1994	BS 6500:2000		
Heat-resistant light polyvinyl chloride sheathed cord for maximum conductor temperature of 90 °C, H03V2V2-F and H03V2V2H2-F	Clause **2**	Table 28	The cables are **suitable** for: — use in domestic premises, kitchens and offices; — light duties; — light portable appliances; — cooking and space heating appliances; — internal use in equipment; — use in high ambient temperatures; — use in elevated temperature zones in luminaires where there is no risk of contact with hot parts and there is no risk of radiation. The cables are **not suitable** for: — outdoor use, in industrial[a] or agricultural buildings; — non-domestic portable tools.	The maximum conductor temperature in normal use is 90 °C. Skin contact should be avoided when operating at high temperatures. For heat-resistant light PVC sheathed cord with cross-section 0.75 mm^2, the same recommendations for use and comments as for ordinary heat-resistant PVC sheathed cord (HD 21.12:1994, Clause **3**) are applicable. Where extra flexibility is required and provided there is no particular danger of mechanical damage, these light cords may be used. If cords are subject to frequent flexing and/or torsion, circular cords are recommended instead of flat ones.
Ordinary heat-resistant polyvinyl chloride sheathed cord for maximum conductor temperature of 90 °C, H05V2V2-F and H05V2V2H2-F	Clause **3**	Table 29	The cables are **suitable** for: — use in domestic premises, kitchens and offices; — cooking and space heating appliances; — internal use in equipment; — use in high ambient temperatures for household appliances, including in damp premises for medium duties; — use in elevated temperature zones in luminaires where there is no risk of contact with hot parts and there is no risk of radiation. The cables are **not suitable** for: — outdoor use, in industrial[a] or agricultural buildings; — non-domestic portable tools.	The maximum conductor temperature in normal use is 90 °C. Skin contact should be avoided when operating at high temperature. If cords are subject to frequent flexing and/or torsion, circular cords are recommended instead of flat ones.

[a] Admissible, however, in tailors' workshops and similar premises.

Table 7A — Cables conforming to HD 21.13 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 21.13:1995, Clause 3 BS 7919:2001, Tables 42 and 43 H05VV5-F[a]	HD 21.13:1995, Clause 4 BS 6004:2000, Table 13 H05VVC4V5-F[a]
Constructional details			
Nominal voltage rating	V	300/500	300/500
Conductor class[b]		5	5
Number of cores		2 to 60	2 to 60
Cross-sectional area size range	mm^2	0.5 to 2.5[c]	0.5 to 2.5[c]
Duty[d]			
Extra light		+	+
Light		+	+
Ordinary		+	+
Heavy		—	—
Presence of water			
Condition AD1		+	+
Condition AD2		+	+
Condition AD6		—	—
Condition AD7		—	—
Condition AD8		—	—
Corrosive or polluting substances condition AF3		+	+
Impact condition AG2		—	—
Vibrations condition AH3		—	—
Flora condition AK2		—	—
Fauna condition AL2		—	—
Solar radiation condition AN2		—	—
Outdoor use[e]			
Intermittent and temporary periods of short duration[f]		+	+
Permanent[f]		—	—
Flexing and torsion			
Frequent flexing		+	—
Frequent torsion		+	—

Table 7A — Cables conforming to HD 21.13 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 21.13:1995, Clause 3 **BS 7919:2001, Tables 42 and 43** **H05VV5-F**[a]	**HD 21.13:1995, Clause 4** **BS 6004:2000, Table 13** **H05VVC4V5-F**[a]
Temperature			
Maximum continuous conductor operating	°C	60	60
Maximum conductor short circuit[g]	°C	150	150
Maximum cable surface	°C	50	50
Maximum storage[h]	°C	40	40
Minimum installation and handling	°C	5	5

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designation 5 = flexible.
[c] Cords with cross-sectional area of 0.5 mm^2 should be used in lengths not exceeding 2 m and their current should not exceed 3 A.
[d] See BS 7540-1:2005, Annex D.
[e] Only for relevant classification given for duty.
[f] See BS 7540-1:2005, Annex C.
[g] Maximum allowable time 5 s.
[h] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 7B — Cables conforming to HD 21.13 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 21.13:1995	British Standard		
Oil-resistant PVC sheathed cord, H05VV5-F (circular unscreened)	Clause **3**	BS 7919:2001, Table 43	The cables are **suitable** for: — the interconnection of parts of machines used for manufacturing purposes including machine tools; — use inside buildings; — applications requiring resistance to general purpose mineral oils. The cables are **not suitable** for: — continuous immersion in oil.	The cable may be allowed to move once installed, particularly for the re-positioning, maintenance, adjustment and inspection of machines, provided that the cable is not mechanically stressed during movement. Where the cables are not required to move in use, installation in conduit, trunking etc. is advised. Contamination by hydrocarbons, acids and alkalis should be avoided and the cables should be protected against mechanical damage. Where contact with special oils is likely, advice should be sought from the manufacturer.
Screened oil-resistant PVC sheathed cord, H05VVC4V5-K (circular screened)	Clause **4**	BS 6004:2000, Table 13	The cables are **suitable** for: — the interconnection of parts of machines used for manufacturing purposes including machine tools where some degree of protection against electromagnetic interference is required; — use inside buildings; — applications requiring resistance to general purpose mineral oils. The cables are **not suitable** for: — continuous immersion in oil; — applications requiring continual flexing.	The cable may be allowed to move once installed, particularly for the re-positioning, maintenance, adjustment and inspection of machines, provided that the cable is not mechanically stressed during movement. Where the cables are not required to move in use, installation in conduit, trunking etc. is advised. Contamination by hydrocarbons, acids and alkalis should be avoided and the cables should be protected against mechanical damage. Where contact with special oils is likely, advice should be sought from the manufacturer.

Table 8A — Cables conforming to HD 22.3 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature		
		HD 22.3:2004, Clause 2 BS 6007:2000, Table 8 H05SJ-K[a]	HD 22.3:2004, Clause 3 BS 6007:2000, Table 9 H05S-U[a]	HD 22.3:2004, Clause 3 BS 6007:2000, Table 10 H05S-K[a]
Constructional details				
Nominal voltage rating	V	300/500	300/500	300/500
Conductor class[b]		5	1	5
Number of cores		1	1	1
Cross-sectional area size range	mm^2	0.5 to 16	0.5 to 2.5	0.5 to 2.5
Method of installation[c]				
In conduit		+[d]	—	—
In cable trunking		+[d]	—	—
In cable ducting		+[d]	—	—
In cable wiring of electric appliances and equipment		+[e]	+[e]	+[e]
Clipped direct		—	—	—
On cable tray		—	—	—
Embedded		—	—	—
Temperature				
Maximum continuous conductor operating[f]	°C	180	180	180
Maximum conductor short circuit[g, h]	°C	350	350	350
Maximum cable surface	°C	180	180	180
Maximum storage[i]	°C	40	40	40
Minimum installation and handling	°C	−25	−25	−25

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designations:
1 = solid wire;
5 = flexible.
[c] The presence of water in contact with the cable is not acceptable.
[d] Only in sizes 1.5 mm^2 or greater.
[e] For use in higher temperature zones.
[f] The maximum conductor temperature at which the particular cable should operate depends upon the limiting temperature of the other cables and accessories with which it is in contact.
[g] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[h] Maximum allowable time 5 s.
[i] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 8B — Cables conforming to HD 22.3 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.3:2004	BS 6007:2000		
Heat-resistant silicone insulated cable, H05SJ-K	Clause **2**	Table 8	The cables are **suitable** for: — use at high temperatures; — fixed installation in and on lamps and in appliances; — internal wiring at high ambient temperatures and in protected locations.	The maximum conductor temperature in normal use is 180 °C. Cables having a conductor cross-section of 1.5 mm^2 or more are permitted for installation in visible or embedded conduits.
Unbraided heat-resistant silicone rubber insulated cable, H05S-U, H05S-K	Clause **3**	Table 9 (-U type) Table 10 (-K type)	The cables are **suitable** for: — internal wiring at high ambient temperatures and in protected locations.	The maximum conductor temperature in normal use is 180 °C. This cable can be damaged by contact with sharp edges and by abrasion, and care should be taken to avoid this in installation and in use.

Table 9A — Cables conforming to HD 22.4 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature			
		HD 22.4:2004, Clause 3 BS 6500:2000[a], Table 12 H05RR-F[b] 318-[c]	HD 22.4:2004, Clause 4 BS 6500:2000, Table 13 H05RN-F[b] 318-P[c]	HD 22.4:2004, Clause 5 BS 7919:2001, Table 14 H07RN-F[b] 638-P[c]	HD 22.4:2004, Clause 6 BS 7919:2001, Table 15 H07RN-F[b] 638-P[c]
Constructional details					
Nominal voltage rating	V	300/500	300/500	450/750	450/750
Conductor class[d]		5	5	5	5
Number of cores		2 to 5	2 to 3	1 to 5	6 to 36
Cross-sectional area size range	mm^2	0.75 to 6	0.75 to 1.0	1.0 to 630	1.5 to 4.0
Duty[e]					
Extra light		+	+	+	+
Light		+	+	+	+
Ordinary		+	+	+	+
Heavy		—	—	+	+
Presence of water					
Condition AD1		+	+	+	+
Condition AD2		+	+	+	+
Condition AD6		—	—	+	+
Condition AD7		—	—	—	—
Condition AD8		—	—	—	—
Corrosive or polluting substances condition AF3		—	+	+	+
Impact condition AG2		—	—	+	+
Vibrations condition AH3		—	—	+	+
Flora condition AK2		—	—	—	—
Fauna condition AL2		—	—	—	—
Solar radiation condition AN2		—	—	—	—
Outdoor use[f]					
Intermittent and temporary periods of short duration[g]		+	+	+	+
Permanent[g]		—[h]	+	+	+

Table 9A — Cables conforming to HD 22.4 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature			
		HD 22.4:2004, Clause 3 **BS 6500:2000[a], Table 12** **H05RR-F[b]** **318-[c]**	**HD 22.4:2004, Clause 4** **BS 6500:2000, Table 13** **H05RN-F[b]** **318-P[c]**	**HD 22.4:2004, Clause 5** **BS 7919:2001, Table 14** **H07RN-F[b]** **638-P[c]**	**HD 22.4:2004, Clause 6** **BS 7919:2001, Table 15** **H07RN-F[b]** **638-P[c]**
Flexing and torsion					
Frequent flexing		+	+	+	+
Frequent torsion		+	+	+	+
Temperature					
Maximum continuous conductor operating	°C	60	60	60	60
Maximum conductor short circuit[i, j]	°C	200	200	200	200
Maximum cable surface	°C	50	50	50	50
Maximum storage[k]	°C	40	40	40	40
Minimum installation and handling	°C	−25	−25	−25	−25

"+" = Acceptable
"—" = Not suitable

[a] 4 mm² and 6 mm² are in BS 7919:2001, Table 10.
[b] Harmonized code designation.
[c] CMA code designation.
[d] Conductor class designation 5 = flexible.
[e] See BS 7540-1:2005, Annex D.
[f] Only for relevant classification given for duty.
[g] See BS 7540-1:2005, Annex C.
[h] Permanent outdoor usage is permitted, but only for the relevant duty applications defined in BS 7540-1:2005, Annex D, where a black sheath is used and has been shown to conform to the requirements for carbon black specified in BS 6500, or where the manufacturer has demonstrated suitable alternative protection.
[i] Maximum allowable time 5 s.
[j] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[k] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 9B — Cables conforming to HD 22.4 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.4:2004	British Standard		
Tough ordinary EPR insulated and EPR sheathed cord, H05RR-F	Clause **3**	BS 6500:2000, Table 12 (4 mm^2 and 6 mm^2 are in BS 7919:2001, Table 10)	The cables are **suitable** for: — general use in domestic premises, kitchens, offices and for supplying appliances where the cables are subjected to low mechanical stresses (e.g. vacuum cleaners, cooking appliances, soldering irons, toasters); — hand-held inspection lamps. The cables are **not suitable** for: — permanent use outdoors; — use in agriculture; — use in industrial[a] or agricultural workshops; — supplying non-domestic tools.	For information about permanent outdoor usage, see Table 9A, footnote h.
Ordinary polychloroprene sheathed cord, H05RN-F	Clause **4**	BS 6500:2000, Table 13	As for HD 22.4:2004, Clause **3**	Permanent use outdoors is permitted, but only for ordinary duty applications.
Heavy polychloroprene or other equivalent synthetic elastomer sheathed flexible cable, H07RN-F	Clause **5**	BS 7919:2001, Table 14	The cables are **suitable** for: — use in dry, humid or moist rooms, in open air; — transportable motors or machines on building sites or in agricultural workings, etc.; — medium mechanical stresses, e.g. for industrial and agricultural workshop appliances, large boiling installations, heating plates, inspection lamps, electric tools such as drills, circular saws, domestic electric tools; — use in workshops having an explosive atmosphere[b]; — fixed installations, e.g. on rough-cast in temporary buildings and huts for accommodation purposes; — the wiring of constructional components in lifting appliances, machinery, etc. The cables are **not suitable** for: — situations involving permanent immersion in water.	Use up to 1 000 V a.c. is permitted for fixed, protected installation (in conduit or appliances) and also for motor connections of hoisting motors and the like. (For d.c. use see BS 7540-1:2005, **5.2**.) When a cable is to be used in the presence of explosive or flammable atmospheres, guidance should be sought in selecting suitable cables. Cables for permanent immersion in water are specified in HD 22.16.
Heavy polychloroprene or other equivalent synthetic elastomer sheathed flexible cable, H07RN-F (multicore)	Clause **6**	BS 7919:2001, Table 15	As for HD 22.4:2004, Clause **5**. In addition the cables are especially **suitable** for: — use as connections to machine tools.	

[a] Admissible, however, in tailors' workshops and similar premises.
[b] In some countries, usage in explosive atmospheres is precluded. Refer to BS EN 60079-14 when considering using this cable.

Table 10A — Cables conforming to HD 22.6 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.6:1995, Clause 2 BS 638-4:1996, Table 1 H01N2-D[a]	HD 22.6:1995, Clause 2 BS 638-4:1996, Table 2 H01N2-E[a]
Constructional details			
Nominal voltage rating	V	100/100	100/100
Conductor class[b]		Special D	Special E
Number of cores		1	1
Cross-sectional area size range	mm^2	10 to 185	10 to 185
Duty[c]			
Extra light		+	+
Light		+	+
Ordinary		+	+
Heavy		+	+
Presence of water			
Condition AD1		+	+
Condition AD2		+	+
Condition AD6		—	—
Condition AD7		—	—
Condition AD8		—	—
Corrosive or polluting substances condition AF3		+	+
Impact condition AG2		+	+
Vibrations condition AH3		+	+
Flora condition AK2		—	—
Fauna condition AL2		—	—
Solar radiation condition AN2		—	—
Outdoor use[d]			
Intermittent and temporary periods of short duration[e]		+	+
Permanent[e]		+	+
Flexing and torsion			
Frequent flexing		+	+
Frequent torsion		+	+

Table 10A — Cables conforming to HD 22.6 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.6:1995, Clause 2 BS 638-4:1996, Table 1 H01N2-D[a]	HD 22.6:1995, Clause 2 BS 638-4:1996, Table 2 H01N2-E[a]
Temperature			
Maximum continuous conductor operating	°C	85	85
Maximum conductor short circuit[f, g]	°C	250	250
Maximum cable surface[h]	°C	80	80
Maximum storage[i]	°C	40	40
Minimum installation and handling	°C	−20	−20

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designations:
D = normal flexible welding;
E = extra flexible welding.
[c] See BS 7540-1:2005, Annex D.
[d] Only for relevant classification given for duty.
[e] See BS 7540-1:2005, Annex C.
[f] Maximum allowable time 5 s.
[g] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[h] See BS 7540-1:2005, **5.4.3**.
[i] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 10B — Cables conforming to HD 22.6 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.6:1995	BS 638-4:1996		
Arc welding cables, H01N2-D H01N2-E	Clause **2**	Table 1 (for -D types) Table 2 (for -E types)	The cables are **suitable** for: — use with hand-held electrodes at 100 V.	Duty cycles, current ratings and voltage should conform to Annex B.

Table 11A — Cables conforming to HD 22.7 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature				
		HD 22.7:1995, Clause 2 BS 6007:2000, Table 3 H07G-U[a]	HD 22.7:1995, Clause 2 BS 6007:2000, Table 4 H07G-R[a]	HD 22.7:1995, Clause 2 BS 6007:2000, Table 5 H07G-K[a]	HD 22.7:1995, Clause 3 BS 6007:2000, Table 6 H05G-U[a]	HD 22.7:1995, Clause 3 BS 6007:2000, Table 7 H05G-K[a]
Constructional details						
Nominal voltage rating	V	450/750	450/750	450/750	300/500	300/500
Conductor class[b]		1	2	5	1	5
Number of cores		1	1	1	1	1
Cross-sectional area size range	mm^2	1.5 to 10	1.5 to 240	1.5 to 240	0.5 to 1.0	0.5 to 1.0
Method of installation[c]						
In conduit		+	+	+	—	—
In cable trunking		+	+	+	—	—
In cable ducting		+	+	+	—	—
In cable wiring of electric appliances and equipment		+	+	+	+	+
Clipped direct		—	—	—	—	—
On cable tray		—	—	—	—	—
Embedded		—	—	—	—	—
Temperature						
Maximum continuous conductor operating[d]	°C	110	110	110	110	110
Maximum conductor short circuit[e, f]	°C	260	260	260	260	260
Maximum cable surface	°C	110	110	110	110	110
Maximum storage[g]	°C	40	40	40	40	40
Minimum installation and handling	°C	−25	−25	−25	−25	−25

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designations:
1 = solid wire;
2 = stranded;
5 = flexible.
[c] The presence of water in contact with the cable is not acceptable.
[d] The maximum conductor temperature at which the particular cable should operate depends upon the limiting temperature of the other cables and accessories with which it is in contact.
[e] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[f] Maximum allowable time 5 s.
[g] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 11B — Cables conforming to HD 22.7 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.7:2995	BS 6007:2000		
Cables with increased heat resistance for internal wiring, H07G	Clause **2**	Tables 3, 4 and 5	The cables are **suitable** for: — use as internal wiring in dry locations only; — use in fixed installations elsewhere, e.g. visible or embedded conduits or tubes.	The maximum conductor temperature in normal use is 110 °.
Cables with increased heat resistance for internal wiring, H05G	Clause **3**	Tables 6 and 7		

Table 12A — Cables conforming to HD 22.9 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature				
		HD 22.9:1995, Clause 2 BS 7211:1998, Table 3a H07Z-U[a] 6491B[b]	HD 22.9:1995, Clause 2 BS 7211:1998, Table 3a H07Z-R[a] 6491B[b]	HD 22.9:1995, Clause 3 BS 7211:1998, Table 3b H07Z-K[a] 6701B[b]	HD 22.9:1995, Clause 4 BS 7211:1998, Table 4a H05Z-U[a]	HD 22.9:1995, Clause 5 BS 7211:1998, Table 4b H05Z-K[a] 2491B[b]
Constructional details						
Nominal voltage rating	V	450/750	450/750	450/750	300/500	300/500
Conductor class[c]		1	2	5	1	5
Number of cores		1	1	1	1	1
Cross-sectional area size range	mm^2	1.5 to 10	1.5 to 630	1.5 to 240	0.5 to 1.0	0.5 to 1.0
Method of installation[d]						
In conduit		+	+	+	—	—
In cable trunking		+	+	+	+[e]	+[e]
In cable ducting		+	+	+	—	—
In cable wiring of electric appliances and equipment		+	+	+	+	+
Clipped direct		—	—	—	—	—
On cable tray		—	—	—	—	—
Embedded		—	—	—	—	—
Temperature						
Maximum continuous conductor operating[f]	°C	90	90	90	90	90
Maximum conductor short circuit[g, h]	°C	250	250	250	250	250
Maximum cable surface	°C	90	90	90	90	90
Maximum storage[i]	°C	40	40	40	40	40
Minimum installation and handling	°C	5	5	5	5	5

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] CMA code designation.
[c] Conductor class designations:
1 = solid wire;
2 = stranded;
5 = flexible.
[d] The presence of water in contact with the cable is not acceptable.
[e] Signalling and control circuits only.
[f] The maximum conductor temperature at which the particular cable should operate depends upon the limiting temperature of the other cables and accessories with which it is in contact.
[g] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[h] Maximum allowable time 5 s.
[i] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 12B — Cables conforming to HD 22.9 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.9:1995	BS 7211:1998		
Single core non-sheathed cables for fixed wiring having low emission of smoke and corrosive gases, H07Z-U, H07Z-R and H07Z-K	Clause **2** (-U and -R types) Clause **3** (-K types)	Table 3a (-U and -R types) Table 3b (-K types)	The cables are **suitable** for: — installation in surface-mounted or embedded conduits, or similar closed systems, particularly for situations in which low emission of smoke and corrosive gases is required in the case of burning. The cables are **not suitable** for: — the provision of circuit integrity in case of fire.	The maximum conductor temperature in normal use is 90 °C. Skin contact should be avoided when operating at high temperature. For voltages up to 1 000 V a.c., or up to 750 V d.c. to earth, the cables are permitted for fixed protected installation in, or on, lighting or controlgear. The defined tests for smoke and corrosive gases relate only to the cables, and not to cable and conduit together. Meeting the requirements of BS EN 60332-1-2 does not imply a similar performance from bunched wires.
Single core non-sheathed cables for fixed wiring having low emission of smoke and corrosive gases, H05Z-U and H05Z-K	Clause **4** (-U types) Clause **5** (-K types)	Table 4a (-U types) Table 4b (-K types)	The cables are **suitable** for: — fixed protected installation inside appliances and in, or on, lighting fittings, particularly for situations in which low emission of smoke and corrosive gases is required in the case of burning. The cables are **not suitable** for: — the provision of circuit integrity in case of fire.	The maximum conductor temperature in normal use is 90 °C. Skin contact should be avoided when operating at high temperature. In cable trunking systems, the cables are only permitted for signalling or control circuits. The defined tests for smoke and corrosive gases relate only to the cables, and not to cable and conduit together. Meeting the requirements of BS EN 60332-1-2 does not imply a similar performance from bunched wires.

Table 13A — Cables conforming to HD 22.10 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.10:1994, Clause 3 BS 7919:2001, Table 23 H05BQ-F[a]	HD 22.10:1994, Clause 4 BS 7919:2001, Table 24 H07BQ-F[a]
Constructional details			
Nominal voltage rating	V	300/500	450/750
Conductor class[b]		5	5
Number of cores		2 to 5	2 to 5
Cross-sectional area size range	mm^2	0.75 to 1.0	1.0 to 16
Duty[c]			
Extra light		+	+
Light		+	+
Ordinary		+	+
Heavy		+	+
Presence of water			
Condition AD1		+	+
Condition AD2		+	+
Condition AD6		+	+
Condition AD7		+	+
Condition AD8		—	—
Corrosive or polluting substances condition AF3		+	+
Impact condition AG2		+	+
Vibrations condition AH3		+	+
Flora condition AK2		+	+
Fauna condition AL2		—	—
Solar radiation condition AN2		—	—
Outdoor use[d]			
Intermittent and temporary periods of short duration[e]		+	+
Permanent[e]		+[f]	+[f]
Flexing and torsion			
Frequent flexing		+	+
Frequent torsion		+	+

Table 13A — Cables conforming to HD 22.10 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.10:1994, Clause 3 BS 7919:2001, Table 23 H05BQ-F[a]	**HD 22.10:1994, Clause 4 BS 7919:2001, Table 24 H07BQ-F[a]**
Temperature			
Maximum continuous conductor operating	°C	90	90
Maximum conductor short circuit[g, h]	°C	250	250
Maximum cable surface[i]	°C	75	75
Maximum storage[j]	°C	40	40
Minimum installation and handling	°C	−40	−40

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designation 5 = flexible.
[c] See BS 7540-1:2005, Annex D.
[d] Only for relevant classification given for duty.
[e] See BS 7540-1:2005, Annex C.
[f] Permanent outdoor usage is permitted where a black sheath is used and has been shown to conform to the requirements for carbon black specified in BS 7919, or where the manufacturer has demonstrated suitable alternative protection.
[g] Maximum allowable time 5 s.
[h] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[i] See BS 7540-1:2005, **5.4.3**.
[j] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 13B — Cables conforming to HD 22.10 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.10:1994	BS 7919:2001		
EPR insulated and polyurethane sheathed flexible cable, H05BQ-F H07BQ-F	Clause **3** (H05 types) Clause **4** (H07 types)	Tables 23 and 24	The cables are **suitable** for: — use in dry, humid or moist situations, outdoors; — medium mechanical stresses, e.g. industrial and agricultural appliances, heating installations providing that there is no risk of contact with hot parts and cables are not subject to radiation, electric tools such as drills and circular saws; — transportable motors or machines on building sites, agricultural workings and shipyards; — use in cold-storage applications; — situations where the cable is subject to high abrasion and tear stresses.	The maximum conductor temperature in normal use is 90 °C, and the lowest handling temperature is −40 °C. Skin contact should be avoided when operating at high temperature. For information about permanent outdoor usage, see Table 13A, footnote f.

Table 14A — Cables conforming to HD 22.11 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.11:1995, Clause 3 BS 7919:2001, Table 13 H05GG-F[a]	HD 22.11:1995, Clause 3 BS 7919:2001, Table 13 H05GGH2-F[a]
Constructional details			
Nominal voltage rating	V	300/500	300/500
Conductor class[b]		5	5
Number of cores		2 to 5	2
Cross-sectional area size range	mm^2	0.75 to 6.0	0.75
Duty[c]			
Extra light		+	+
Light		+	+
Ordinary		+	+
Heavy		—	—
Presence of water			
Condition AD1		+	+
Condition AD2		+	+
Condition AD6		—	—
Condition AD7		—	—
Condition AD8		—	—
Corrosive or polluting substances condition AF3		+	+
Impact condition AG2		—	—
Vibrations condition AH3		—	—
Flora condition AK2		—	—
Fauna condition AL2		—	—
Solar radiation condition AN2		—	—
Outdoor use[d]			
Intermittent and temporary periods of short duration[e]		+	+
Permanent[e]		—	—
Flexing and torsion			
Frequent flexing		+	+
Frequent torsion		+	—

Table 14A — Cables conforming to HD 22.11 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.11:1995, Clause 3 BS 7919:2001, Table 13 H05GG-F[a]	**HD 22.11:1995, Clause 3 BS 7919:2001, Table 13 H05GGH2-F[a]**
Temperature			
Maximum continuous conductor operating	°C	110	110
Maximum conductor short circuit[f, g]	°C	250	250
Maximum cable surface[h]	°C	90	90
Maximum storage[i]	°C	40	40
Minimum installation and handling	°C	0	0

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designation 5 = flexible.
[c] See BS 7540-1:2005, Annex D.
[d] Only for relevant classification given for duty.
[e] See BS 7540-1:2005, Annex C.
[f] Maximum allowable time 5 s.
[g] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[h] See BS 7540-1:2005, **5.4.3**.
[i] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 14B — Cables conforming to HD 22.11 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.11:1995	BS 7919:2001		
EVA cords and flexible cables, H05GG-F, H05GGH2-F	Clause **3**	Table 13	The cables are **suitable** for: — use in domestic premises, kitchens, offices; — use in high ambient temperatures for household appliances that are subject to low mechanical stresses; — use internally in equipment, e.g. luminaires or central heating boilers. The cables are **not suitable** for: — outdoor use, in agricultural or industrial[a] workshops, or for non-domestic portable tools.	The maximum conductor temperature in normal use is 110 °C. Skin contact should be avoided when operating at high temperature.

[a] Admissible, however, in tailors' workshops and similar premises.

Table 15A — Cables conforming to HD 22.12 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature				
		HD 22.12:1996, Clause 3 BS 6500:2000[a], Table 15 H05BB-F[b]	HD 22.12:1996, Clause 4 BS 7919:2001, Table 12 H07BB-F[b]	HD 22.12:1996, Clause 5 BS 6500:2000, Table 16 H05BN4-F[b]	HD 22.12:1996, Clause 6 BS 7919:2001, Table 16 H07BN4-F[b]	HD 22.12:1996, Clause 7 BS 7919:2001, Table 17 H07BN4-F[b]
Constructional details						
Nominal voltage rating	V	300/500	450/750	300/500	450/750	450/750
Conductor class[c]		5	5	5	5	5
Number of cores		2 to 5	1 to 5	2 to 3	1 to 5	6 to 36
Cross-sectional area size range	mm^2	0.75 to 6.0	1.0 to 500	0.75 to 1.0	1.5 to 630	1.5 to 4.0
Duty[d]						
Extra light		+	+	+	+	+
Light		+	+	+	+	+
Ordinary		+	+	+	+	+
Heavy		—	+	—	+	+
Presence of water						
Condition AD1		+	+	+	+	+
Condition AD2		+	+	+	+	+
Condition AD6		—	+	—	+	+
Condition AD7		—	—	—	—	—
Condition AD8		—	—	—	—	—
Corrosive or polluting substances condition AF3		—	—	+	+	+
Impact condition AG2		—	+	—	+	+
Vibrations condition AH3		—	+	—	+	+
Flora condition AK2		—	—	—	—	—
Fauna condition AL2		—	—	—	—	—
Solar radiation condition AN2		—	—	—	—	—
Outdoor use[e]						
Intermittent and temporary periods of short duration[f]		+	+	+	+	+
Permanent[f]		—[g]	+[h]	+	+	+
Flexing and torsion						
Frequent flexing		+	+	+	+	+
Frequent torsion		+	+	+	+	+

Table 15A — Cables conforming to HD 22.12 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature				
		HD 22.12:1996, Clause 3 **BS 6500:2000[a], Table 15** **H05BB-F[b]**	**HD 22.12:1996, Clause 4** **BS 7919:2001, Table 12** **H07BB-F[b]**	**HD 22.12:1996, Clause 5** **BS 6500:2000, Table 16** **H05BN4-F[b]**	**HD 22.12:1996, Clause 6** **BS 7919:2001, Table 16** **H07BN4-F[b]**	**HD 22.12:1996, Clause 7** **BS 7919:2001, Table 17** **H07BN4-F[b]**
Temperature						
Maximum continuous conductor operating	°C	90	90	90	90	90
Maximum conductor short circuit[i, j]	°C	250	250	250	250	250
Maximum cable surface[l]	°C	75	75	75	75	75
Maximum storage[j]	°C	40	40	40	40	40
Minimum installation and handling	°C	−40	−40	−20	−20	−20

"+" = Acceptable
"—" = Not suitable

[a] 4 mm² and 6 mm² are in BS 7919:2001, Table 11.
[b] Harmonized code designation.
[c] Conductor class designation 5 = flexible.
[d] See BS 7540-1:2005, Annex D.
[e] Only for relevant classification given for duty.
[f] See BS 7540-1:2005, Annex C.
[g] Permanent outdoor usage is permitted, but only for the relevant duty applications defined in BS 7540-1:2005, Annex D, where a black sheath is used and has been shown to conform to the requirements for carbon black specified in BS 6500, or where the manufacturer has demonstrated suitable alternative protection.
[h] Permanent outdoor usage is permitted where a black sheath is used and has been shown to conform to the requirements for carbon black specified in BS 7919, or where the manufacturer has demonstrated suitable alternative protection.
[i] Maximum allowable time 5 s.
[j] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[k] See BS 7540-1:2005, **5.4.3**.
[l] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 15B — Cables conforming to HD 22.12 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.12:1996	British Standard		
EPR/EPR cords and flexible cables, H05BB-F	Clause **3**	BS 6500:2000, Table 15 (4 mm² and 6 mm² are in BS 7919:2001, Table 11)	The cables are **suitable** for: — general use in domestic premises, kitchens and offices; — supplying appliances where the cables are subjected to low mechanical stresses (e.g. cooking appliances, soldering irons, toasters, hand-held inspection lamps); — low temperature uses. The cables are **not suitable** for: — permanent use outdoors, in agriculture, in industrial[a] or agricultural workshops; — supplying non-domestic tools,	The maximum conductor temperature in normal use is 90 °C, and the lowest handling temperature is −40 °C. Skin contact should be avoided when operating at high temperature. For information about permanent outdoor usage, see Table 15A, footnote g.
EPR/EPR cords and flexible cables, H07BB-F	Clause **4**	BS 7919:2001, Table 12	The cables are **suitable** for: — use in dry, humid or moist rooms, in open air; — use in workshops having an explosive atmosphere[b]; — medium mechanical stresses, e.g. for industrial and agricultural workshop appliances, large boiling installations, heating plates, inspection lamps, electric tools such as drills, circular saws, domestic electric tools; — transportable motors or machines on building sites or in agricultural workings, etc.; — fixed installations, e.g. on rough-cast in temporary buildings and huts for accommodation purposes; — the wiring of constructional components in lifting appliances, machinery, etc.; — low temperature outdoor use with caravans, car heaters and at camping sites.	The maximum conductor temperature in normal use is 90 °C, and the lowest handling temperature is −40 °C. Skin contact should be avoided when operating at high temperature. Use up to 1 000 V a.c. is permitted for fixed, protected installation (in conduit or appliances) and also for motor connections of hoisting motors and the like. (For d.c. use, see BS 7540-1:2005, **5.2**.) When a cable is to be used in the presence of explosive or flammable atmospheres, guidance should be sought in selecting suitable cables. For information about permanent outdoor usage, see Table 15A, footnote h.
EPR/CSP cords and flexible cables, H05BN4-F[c]	Clause **5**	BS 6500:2000, Table 16	As for HD 22.12:1996, Clause **3**[c].	The maximum conductor temperature in normal use is 90 °C. Skin contact should be avoided when operating at high temperature.

Table 15B — Cables conforming to HD 22.12 — Guide to use (*continued*)

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.12:1996	British Standard		
EPR/CSP cords and flexible cables, H07BN4-F[c]	Clause **6**	BS 7919:2001, Table 16	As for HD 22.12:1996, Clause **4**[c].	The maximum conductor temperature in normal use is 90 °C. Skin contact should be avoided when operating at high temperature. Use up to 1 000 V a.c. is permitted for fixed, protected installation (in conduit or appliances) and also for motor connections of hoisting motors and the like. (For d.c. use, see BS 7540-1:2005, **5.2**.)
EPR/CSP cords and flexible cables (multicore), H07BN4-F[c]	Clause **7**	BS 7919:2001, Table 17	As for HD 22.12:1996, Clause **6**[c].	The maximum conductor temperature in normal use is 90 °C. Skin contact should be avoided when operating at high temperature.

[a] Admissible, however, in tailors' workshops and similar premises.
[b] In some countries, usage in explosive atmospheres is precluded. Refer to BS EN 60079-14 when considering using this cable.
[c] Cable types H05BN4-F and H07BN4-F are not at present recommended for installation or handling below –20 °C (based on a test temperature of –30 °C). For outdoor usage in cold climates (e.g. for car heaters) preference should therefore be given to H05RN-F and H07RN-F cables (in HD 22.4) and, if oil resistance is not essential, to H05BB-F and H07BB-F cables.

Table 16A — Cables conforming to HD 22.13 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.13:1996, Clause 3 BS 7919:2001, Table 18 H07ZZ-F[a]	HD 22.13:1996, Clause 4 BS 7919:2001, Table 19 H07ZZ-F[a]
Constructional details			
Nominal voltage rating	V	450/750	450/750
Conductor class[b]		5	5
Number of cores		1 to 5	6 to 36
Cross-sectional area size range	mm^2	1.5 to 630	1.5 to 4.0
Duty[c]			
Extra light		+	+
Light		+	+
Ordinary		+	+
Heavy		—	—
Presence of water			
Condition AD1		+	+
Condition AD2		+	+
Condition AD6		—	—
Condition AD7		—	—
Condition AD8		—	—
Corrosive or polluting substances condition AF3		+	+
Impact condition AG2		+	+
Vibrations condition AH3		+	+
Flora condition AK2		+	+
Fauna condition AL2		—	—
Solar radiation condition AN2		—	—
Outdoor use[d]			
Intermittent and temporary periods of short duration[e]		+	+
Permanent[e]		—[f]	—[f]
Flexing and torsion			
Frequent flexing		+	+
Frequent torsion		+	—

Table 16A — Cables conforming to HD 22.13 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.13:1996, Clause 3 **BS 7919:2001, Table 18** **H07ZZ-F**[a]	**HD 22.13:1996, Clause 4** **BS 7919:2001, Table 19** **H07ZZ-F**[a]
Temperature			
Maximum continuous conductor operating	°C	70	70
Maximum conductor short circuit[g, h]	°C	250	250
Maximum cable surface	°C	50	50
Maximum storage[i]	°C	40	40
Minimum installation and handling	°C	−5	−5

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designation 5 = flexible.
[c] See BS 7540-1:2005, Annex D.
[d] Only for relevant classification given for duty.
[e] See BS 7540-1:2005, Annex C.
[f] Permanent outdoor usage is permitted, but only for the relevant duty applications defined in BS 7540-1:2005, Annex D, where a black sheath is used and has been shown to conform to the requirements for carbon black specified in BS 7919, or where the manufacturer has demonstrated suitable alternative protection.
[g] Maximum allowable time 5 s.
[h] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[i] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 16B — Cables conforming to HD 22.13 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.13:1996	BS 7919:2001		
Flexible cable, insulated and sheathed with cross-linked polymer and having low emission of smoke and corrosive gases, H07ZZ-F	Clause **3** (1 to 5 cores) Clause **4** (multicores)	Table 18 (1 to 5 cores) Table 19 (multicores)	The cables are **suitable** for: — indoor and temporary outdoor usage as for HD 22.4:2004, Clause **5** or Clause **6**, particularly for situations in which low emission of smoke and corrosive gases is required in the case of burning.	The maximum conductor temperature in normal use is 70 °C. Skin contact should be avoided when operating at high temperature. Permanent outdoor use is not permitted unless specially formulated and tested sheaths are used. The defined tests for smoke and corrosive gases relate only to the cables, and not to cable and conduit together.

Table 17A — Cables conforming to HD 22.15 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.15:1995, Clause 3 BS 7919:2001, Table 22 H05SS-F[a]	HD 22.15:1995, Clause 3 BS 7919:2001, Table 22 H05SST-F[a]
Constructional details			
Nominal voltage rating	V	300/500	300/500
Conductor class[b]		5	5
Number of cores		2 to 5	2 to 5
Cross-sectional area size range	mm^2	0.75 to 6.0	0.75 to 6.0
Duty[c]			
Extra light		+	+
Light		+	+
Ordinary		+	+
Heavy		—	—
Presence of water			
Condition AD1		+	+
Condition AD2		+	+
Condition AD6		—	—
Condition AD7		—	—
Condition AD8		—	—
Corrosive or polluting substances condition AF3		—	—
Impact condition AG2		—	—
Vibrations condition AH3		—	—
Flora condition AK2		—	—
Fauna condition AL2		—	—
Solar radiation condition AN2		—	—
Outdoor use[d]			
Intermittent and temporary periods of short duration[e]		+	+
Permanent[e]		—	—[f]
Flexing and torsion			
Frequent flexing		—	—
Frequent torsion		—	—

Table 17A — Cables conforming to HD 22.15 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.15:1995, Clause 3 BS 7919:2001, Table 22 H05SS-F[a]	**HD 22.15:1995, Clause 3 BS 7919:2001, Table 22 H05SST-F[a]**
Temperature			
Maximum continuous conductor operating	°C	180	180
Maximum conductor short circuit[g, h]	°C	350	350
Maximum cable surface[i]	°C	180	180
Maximum storage[j]	°C	40	40
Minimum installation and handling	°C	−25	−25

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designation 5 = flexible.
[c] See BS 7540-1:2005, Annex D.
[d] Only for relevant classification given for duty.
[e] See BS 7540-1:2005, Annex C.
[f] Permanent outdoor usage is permitted, but only for the relevant duty applications defined in BS 7540-1:2005, Annex D, where a black sheath is used and has been shown to conform to the requirements for carbon black specified in BS 7919, or where the manufacturer has demonstrated suitable alternative protection.
[g] Maximum allowable time 5 s.
[h] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[i] See BS 7540-1:2005, **5.4.3**.
[j] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 17B — Cables conforming to HD 22.15 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.15:1995	BS 7919:2001		
Heat-resistant silicone rubber sheathed multicore flexible cables without strain-bearing element, H05SS-F or H05SST-F	Clause **3**	Table 22	The cables are **suitable** for: — use at high temperature or in contact with hot surfaces; — fixed installation within and attached to lamps in industrial installations provided mechanical protection is assured; — use in equipment that requires some flexing in use and that is subject to low mechanical stresses.	The maximum conductor temperature in normal use is 180 °C. Skin contact should be avoided when operating at high temperature. This cable can be damaged by contact with sharp edges and by abrasion. Care should be taken to avoid this in installation and in use, particularly for unbraided cables. The flammability performance of braided cables should be confirmed with the manufacturer before installation. The maximum permissible load is 15 N/mm^2 of the total copper cross-sectional area (10 N approximately equals 1 kg). For information about permanent outdoor usage, see Table 17A, footnote f.

Table 18A — Cables conforming to HD 22.16 — Constructional details, method of installation and temperature

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.16:2000, Clause 3 BS 7919:2001, Table 20 H07RN8-F[a]	HD 22.16:2000, Clause 4 BS 7919:2001, Table 21 H07RN8-F[a]
Constructional details			
Nominal voltage rating	V	450/750	450/750
Conductor class[b]		5	5
Number of cores		1 to 5	6 to 36
Cross-sectional area size range	mm^2	1.5 to 630	1.5 to 4.0
Duty[c]			
Extra light		+	+
Light		+	+
Ordinary		+	+
Heavy		+	+
Presence of water			
Condition AD1		+	+
Condition AD2		+	+
Condition AD6		+	+
Condition AD7		+	+
Condition AD8		+ (up to 10 m depth)	+ (up to 10 m depth)
Corrosive or polluting substances condition AF3		+	+
Impact condition AG2		+	+
Vibrations condition AH3		+	+
Flora condition AK2		—	—
Fauna condition AL2		—	—
Solar radiation condition AN2		—	—
Outdoor use[d]			
Intermittent and temporary periods of short duration[e]		+	+
Permanent[e]		+	+
Flexing and torsion			
Frequent flexing		+	+
Frequent torsion		+	+

Table 18A — Cables conforming to HD 22.16 — Constructional details, method of installation and temperature (*continued*)

Parameter	Unit	Constructional details, method of installation and temperature	
		HD 22.16:2000, Clause 3 **BS 7919:2001, Table 20** **H07RN8-F**[a]	**HD 22.16:2000, Clause 4** **BS 7919:2001, Table 21** **H07RN8-F**[a]
Temperature			
Maximum continuous conductor operating	°C	60	60
Maximum conductor short circuit[f, g]	°C	200	200
Maximum cable surface	°C	50	50
Maximum storage[h]	°C	40	40
Minimum installation and handling	°C	−25	−25

"+" = Acceptable
"—" = Not suitable

[a] Harmonized code designation.
[b] Conductor class designation 5 = flexible.
[c] See BS 7540-1:2005, Annex D.
[d] Only for relevant classification given for duty.
[e] See BS 7540-1:2005, Annex C.
[f] Maximum allowable time 5 s.
[g] Values in excess of 160 °C are reduced under certain conditions (see BS 7540-1:2005, **5.3.4**).
[h] In direct sunlight the storage temperature of the cable may exceed the value given but subject to a maximum of 60 °C.

Table 18B — Cables conforming to HD 22.16 — Guide to use

Cable type	Standard reference		Recommendations for use	Comments
	HD 22.16:2000	BS 7919:2001		
Water-resistant polychloroprene or other equivalent synthetic elastomer sheathed flexible cable, H07RN8-F	Clause **3**	Table 20	As for HD 22.4:2004, Clause **5**. In addition the cables are **suitable** for: — applications in fresh water, up to 10 m depth and at a maximum water temperature up to 40 °C, such as the connection of submersible pumps or similar applications. The cables are **not suitable** for: — under-water power transmission or installation in a waterway.	As for HD 22.4:2004, Clause **5**. Cables should not be installed in water where it is possible that mechanical damage might occur and cause a hazard.
Water-resistant polychloroprene or other equivalent synthetic elastomer sheathed flexible cable, H07RN8-F (multicore)	Clause **4**	Table 21	As for HD 22.16:2000, Clause **3**. In addition the cables are **suitable** for: — use with machine tools.	As for HD 22.16:2000, Clause **3**.

Annex A (informative)
Harmonized cable types from HD 21 and HD 22 not implemented in a British Standard

Under the rules pertaining to implementation of CENELEC Harmonization Documents at a national level, it is not always necessary to make a full publication. This allowance recognizes that there might be, for instance, no market relevance for a particular product. It is necessary nevertheless to announce such Harmonization Documents and to ensure no that conflicting national standards exist.

All cables in HD 21 and HD 22 are covered by HD 516 S2 and its amendment No 1. Some of these cables are not included in British Standards and are therefore not covered in the body of BS 7540-2. These cables are listed in Table A.1 for HD 21 and Table A.2 for HD 22.

The general guidance given in BS 7540-1 is applicable to these cable types. Specific guidance is given only in HD 516 S2 and its amendment No 1.

Table A.1 — Harmonized cable types from HD 21 not implemented in a British Standard

Cable type	CENELEC harmonized code	CENELEC Harmonization Document	Clause in HD
Single core insulated cables for indoor decorative lighting chains	H03VH7-H	21.8 S2:1999	3
Divisible, two-layer insulated cables for Class II luminaires	H03VH7H-F	21.11 S1:1995	3
Heat-resisting PVC cords with strain-bearing member	H05V2V2D3-F	21.12 S1:1994	4
Flexible cables (cords), insulated and sheathed with halogen-free thermoplastic compound — 300/300 V	H03Z1Z1-F (circular) H03Z1Z1H2-F (flat)	21.14 S1:2003	3
Flexible cables (cords), insulated and sheathed with halogen-free thermoplastic compound — 300/500 V	H05Z1Z1-F (circular) H05Z1Z1H2-F (flat)	21.14 S1:2003	4

Table A.2 — Harmonized cable types from HD 22 not implemented in a British Standard

Cable type	CENELEC harmonized code	CENELEC Harmonization Document	Clause in HD
Sheathed single core silicone rubber cables	H05SS-K	22.3 S4:2004	4
Elastomer sheathed cables for decorative chains — 300/500V	H05RN-F (circular) H05RN-H2-F (flat)	22.8 S2:1994	2
Elastomer sheathed cables for decorative chains — 300/300V	H03RN-F	22.8 S2:1994	3
Cords for applications requiring high flexibility — EPR type	H03RR-H	22.14 S2:2002	3
Cords for applications requiring high flexibility — XLPVC type	H03V4V4-H	22.14 S2:2002	5
Cords for applications requiring high flexibility — Braided type	H03RT-H	22.14 S2:2002	6
Silicone rubber multicore cables with strain-bearing member	H05SSD3-K (unbraided) H05SSD3T-K (braided)	22.15 S1:1999	4

Annex B (informative)
Relationship between cable product standards and this part of BS 7540

Table B.1 identifies, for each cable product standard covered by BS 7540, the location of specific guidance for harmonized cables.

NOTE The location of specific guidance for national standard cables is identified in BS 7540-3:2005, Table A.1. A generic table giving the locations for all cables, including examples of how to use the table, is given in BS 7540-1:2005, Annex A.

Table B.1 — Cross-reference table

Cable standard	Table no. in cable standard	Table no. in BS 7540-2:2005
BS 638-4:1996	1, 2	10
	3, 6, 7	—
BS 6004:2000	4a, 4b, 5	1
	7, 8, 9	—
	10a, 10b	4
	11a, 11b, 12	3
	13	7
BS 6007:2000	3, 4, 5, 6, 7	11
	8, 9, 10	8
BS 6500:2000	11	—
	12, 13	9
	14	—
	15, 16	15
	24, 26, 27	2
	28, 29	6
BS 7211:1998	3a, 3b, 4a, 4b	12
	5, 6, 7	—
BS 7919:2001	10	9
	11, 12	15
	13	14
	14, 15	9
	16, 17	15
	18, 19	16
	20, 21	18
	22	17
	23, 24	13
	40	2
	41	6
	42, 43	7
	44	—

Annex C (normative)
Duty cycles, current ratings and voltage drop for arc welding cables (copper conductors)

C.1 Current ratings

The current ratings given in this annex for arc welding cables (copper conductors), according to BS 638-4, are calculated for sustained currents, 100 % duty cycles, using the methods given in BS 7769-1, for cables in free air at an ambient temperature of 25 °C unless otherwise specified, and a conductor temperature of 85 °C. Where the ambient temperature differs from 25 °C, the rating should be corrected by multiplying it by the appropriate factor shown in Table C.1.

Table C.1 — Ambient temperature correction factors

Ambient temperature °C	Factor
30	0.96
35	0.91
40	0.87
45	0.82

The current ratings are given in three forms as follows:

a) Table C.2 gives current ratings for single cycle operation over a maximum period of 5 min;

b) Table C.3 gives current ratings for repeat cycle operation based on a 5 min repeat period;

c) Table C.4 gives current ratings for repeat cycle operation based on a 10 min repeat period.

The method of operation, together with the current rating, is a determining factor in the choice of conductor size. The three methods used in Table C.2, Table C.3 and Table C.4 are defined as follows.

1) Single cycle operation as used in Table C.2 is a single on-load period not exceeding 5 min. The on-load time period is expressed as a percentage of 5 min, and is called the percentage duty cycle. For percentage duty cycles not stated in Table C.2, the next higher percentage duty cycle rating should be used or the cable manufacturer consulted.

2) Repeat cycle operation as used in Table C.3 and Table C.4 is a periodically switched constant load with an on-load period followed by an off-load period, which is repeated. The repeat periods are 5 min for Table C.3 and 10 min for Table C.4. The on-load time period is expressed as a percentage of the repeat period, and is called the percentage duty cycle. For percentage duty cycles not stated in the tables, the next higher percentage duty cycle rating should be used or the cable manufacturer consulted.

Where long cable runs are involved, it can be necessary to choose the cable size on the basis of voltage drop. The values given in Table C.2, Table C.3 and Table C.4 are for 10 m of cable carrying 100 A. For longer cable lengths and higher currents the values should be increased pro rata. The values in the table apply to direct current circuits only. In alternating current circuits the values are higher; the amount depends on the spacing between the two cables forming the welding circuit. To minimize the effects of alternating current on voltage drop, the two cables forming the welding circuit should be kept as close together as possible. When in use, welding cables should not be coiled.

Table C.2 — Current rating for single cycle operation over a maximum period of 5 min

Nominal cross-sectional area (mm^2)	Current rating (A)			
	100 % duty cycle	85 % duty cycle	60 % duty cycle	35 % duty cycle
10	100	103	108	122
16	135	145	175	230
25	180	195	230	300
35	225	245	290	375
50	285	305	365	480
70	355	385	460	600
95	430	470	560	730
120	500	540	650	850
150	580	630	750	980
185	665	720	860	1 120

Table C.3 — Current rating for repeat cycle operation based on a 5 min repeat period

Nominal cross-sectional area (mm^2)	Current rating (A)						
	100 % duty cycle	85 % duty cycle	80 % duty cycle	60 % duty cycle	35 % duty cycle	20 % duty cycle	8 % duty cycle
10	100	101	102	106	119	143	206
16	135	138	140	148	173	212	314
25	180	186	189	204	244	305	460
35	225	235	239	260	317	400	608
50	285	299	305	336	415	529	811
70	355	375	383	426	531	682	1 053
95	430	456	467	523	658	850	1 319
120	500	532	545	613	776	1 006	1 565
150	580	619	634	716	911	1 184	1 845
185	665	711	729	826	1 054	1 374	2 145

Table C.4 — Current rating for repeat cycle operation based on a 10 min repeat period

Nominal cross-sectional area (mm^2)	Current rating (A)						
	100 % duty cycle	85 % duty cycle	80 % duty cycle	60 % duty cycle	35 % duty cycle	20 % duty cycle	8 % duty cycle
10	100	100	100	101	106	118	158
16	135	136	136	139	150	174	243
25	180	182	183	190	213	254	366
35	225	229	231	243	279	338	497
50	285	293	296	316	371	457	681
70	355	367	373	403	482	602	908
95	430	448	456	498	606	765	1 164
120	500	524	534	587	721	917	1 404
150	580	610	622	689	853	1 090	1 676
185	665	702	717	797	995	1 277	1 971

C.2 Voltage drop

The voltage drops associated with the current ratings given in Table C.2, Table C.3 and Table C.4 are given in Table C.5. The values given in Table C.5 are for 10 m of cable carrying 100 A.

Table C.5 — Voltage drop at normal and elevated temperatures

Nominal cross-sectional area (mm^2)	**D.C. voltage drop** (V)		
	At 20 °C	**At 60 °C**	**At 85 °C**
10	1.95	2.26	2.450
16	1.24	1.430	1.560
25	0.795	0.920	0.998
35	0.565	0.654	0.709
50	0.393	0.455	0.493
70	0.277	0.321	0.348
95	0.210	0.243	0.264
120	0.164	0.190	0.206
150	0.132	0.153	0.166
185	0.108	0.125	0.136

Bibliography

Standards publications

BS 7540-3:2005, *Electric cables — Guide to use for cables with a rated voltage not exceeding 450/750 V — National standard cables not included in HD 21 and HD 22.*

BS 7769-1 (all sections), IEC 60287-1 (all sections), *Electric cables — Calculation of the current rating — current rating equations (100% load factor) and calculation of losses.*

BS EN 60079-14:2003, *Electrical apparatus for explosive atmospheres — Electrical installations in hazardous areas (other than mines).*

BS EN 60332-1-2:2004, *Tests on electric and optical fibre cables under fire conditions — Part 1-2: Test for vertical flame propagation for a single insulated wire or cable — Procedure for 1 kW pre-mixed flame.*

HD 21 (all parts), *Cables of rated voltages up to and including 450/750 V and having thermoplastic insulation.*

HD 22 (all parts), *Cables of rated voltages up to and including 450/750 V and having cross-linked insulation.*

Other publications

[1] GREAT BRITAIN. Electrical Equipment (Safety) Regulations 1994. London: HMSO.

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