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Annex E (informative)

Table for cables suitable for underground workings

1570 The following table should be read as being an example for a list of cables which are suitable for different kind
1571 of applications in underground workings referring to 23.1.1 of this standard.

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Table E.1 — Suitable cables for power systems

| 1 | 2 | 3 | 4 | 5 |
|----|---|---|---|-------------------------|
| No | Cable type | Nominal voltage U_0/U | Scope | Methode of installation |
| 1 | Cable acc. to IEC 60502–2 with <ul style="list-style-type: none"> – Insulation of VPE (2X) with inner and outer semi-conductive layer – Conductive inner covering for multicore cables with concentric protective conductor – Protective conductor of plain copper as concentric conductor <ul style="list-style-type: none"> • over conductive inner covering (C) or • evenly distributed over the individual wires (CE) or – without inner covering of PVC (Y) or – without armouring of galvanized flat (F) or round (R) steel wires or – without a counter helix of galvanized steel tape – outer sheath of PVC (Y) | 6,6/10 kV | In coal mining <ul style="list-style-type: none"> – with armouring: in all mining workings, but not in mining operations and longwall – without armouring: only in electrical or in closed electrical operating areas Not in coalmining <ul style="list-style-type: none"> – in all mining workings, but not in mining operations and longwall | stationary |
| 2 | Cable with <ul style="list-style-type: none"> – Insulation of VPE (2X) with inner and outer semi-conductive layer – Copper screen over the outer semi-conductive layer (S) as protective conductor – Outer sheath of PVC (Y) | 6,6/10 kV and 12/20 kV | For mines not in coal mines with an inclination up to 50 gon, but not in mining operations and longwall Respectively three single-core cables as route cable. | stationary |
| 3 | Trailing cable with (inductive symmetric protective conductor for IT systems <ul style="list-style-type: none"> – Insulation of rubber compound, or – without a central cradle separator – Protective conductor of plain copper <ul style="list-style-type: none"> – applied as concentric conductor <ul style="list-style-type: none"> • between inner and outer sheath (KON) or | 600/1 000 V 1,8/3 kV and 3,6/6,6 kV | In all mining workings | |

| 1 | 2 | 3 | 4 | 5 |
|----|--|----------------------------|---|--|
| No | Cable type | Nominal voltage U_0/U | Scope | Methode of installation |
| 5 | Rubber sheathed cable acc. EN 50525–2-21 <ul style="list-style-type: none"> – Fine stranded conductors (-F) – Rubber insulation (R) – single protective copper conductor (G) – without inner rubber sheath – outer sheath consisting of cross-linked compound AG2 | 450/750 V | In mining workings not being endangered by firedamp Up to 1 000 V ac in all mining works, only in enclosures | stationary non stationary flexible |
| 6 | welding cable acc. to EN 50525–2-81 with <ul style="list-style-type: none"> – extra fine stranded conductor type: D or E: H01N2-D or E | 100/100 V | In mining workings not being endangered by firedamp | flexible |
| 7 | PVC- non sheathed cable for internal wiring acc. to EN 50525–2-31 Single core non-sheathed cables H05V- <ul style="list-style-type: none"> – solid (-U) or fine stranded (-K) conductor – PVC insulation (V) | 300/500 V | Only in enclosures | stationary |
| 8 | PVC- non sheathed cable for internal wiring acc. to EN 50525–2-31 Single core non-sheathed cables H07V- <ul style="list-style-type: none"> – solid (-U) or fine stranded (-K) conductor – PVC insulation (V) | 450/750 V | Only in enclosures up to 1 000 V ac | stationary |
| 9 | Single core cables with cross-linked elastomeric insulation acc. to EN 50264–3-1 table4 with <ul style="list-style-type: none"> – fine stranded conductor (F) – rubber compound (HX) insulation – outer sheath rubber compound | 3,6/6,6 kV | In separate electrical equipment rooms (switchgear rooms) | stationary |

| 1 | 2 | 3 | 4 | 5 |
|----|--|----------------------------|--|-------------------------------|
| No | Cable type | Nominal voltage U_0/U | Scope | Method of installation |
| 10 | <p>Screened and controlled mining cable</p> <ul style="list-style-type: none"> - EPR insulation acc. to IEC 60502-2 with inner and outer conductive layer; - protective copper conductor, evenly separated into concentric conductors over every conductor core insulation - pilot cores - concentric monitoring conductor over conductor insulation - inner sheath PVC acc. to EN 50363-1 - tinned steel braid armour - outer sheath PVC | 6,6/10 kV | In all mining workings, not in mining operations. and longwall | stationary and non-stationary |

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Table E.2 — Suitable cables for communication systems

| 1 | 2 | 3 | 4 | 5 |
|-----|---|---------------------------|--|------------------------|
| No. | Cable type | Rated voltage up to ... V | Scope | Method of installation |
| 1 | <p>Mining cables with</p> <ul style="list-style-type: none"> - insulated conductors or - pairs or - cores and paired - PE insulation acc. to EN 50290-2-23 - or without single protective conductor - PVC inner sheath acc. to EN 50290-2-21 - PVC jacket acc. to EN 50290-2-22 - ribbon of steel spiral binder - outer sheath PVC acc. to EN 50290-2-22, blue or grey | 375 225 375/225 | In all mining workings but not in mining operations and longwall | stationary |
| 2 | <p>mining cables with</p> <ul style="list-style-type: none"> - insulated conductors or - pairs or - insulated conductors and pairs - PE insulation acc. EN 50290-2-23 - or without single protective conductor - PVC inner sheath acc. EN 50290-2-22 - tensile strength braid consisting of flat formed tinned steel wires | 375 225 375/225 | In all mining workings but not in mining operations and longwall | stationary |

| 1 | 2 | 3 | 4 | 5 |
|-----|--|---------------------------|---|--|
| No. | Cable type | Rated voltage up to ... V | Scope | Method of installation |
| | <ul style="list-style-type: none"> – PVC jacket acc. EN 50290–2-22, blue or grey | | | |
| 3 | Data signal and control cables with <ul style="list-style-type: none"> – insulated conductors – PE insulation acc. to EN 50290–2-23 – or without single protective conductor – PVC inner sheath acc. to EN 50290–2-22 – inner sheath – corrosion –protected ribbon of steel armouring – outer sheath acc. to EN 50290–2-22, blue, grey or black | 600 | In non-coal mining in all mining workings but not in mining operations and longwall | stationary |
| 4 | tensile strength optimized cables with stranded conductors for increased mechanical stress <ul style="list-style-type: none"> – pairs – PVC insulation acc. to EN 50290–2-21 – or without single protective conductor – PVC inner sheath acc. to EN 50290–2-22 – glass yarn strain relief in PVC jacket acc. to EN 50290–2-22, blue or grey | 375 | in all mining workings | stationary non stationary flexible |
| 5 | tensile strength optimized cables with stranded conductors for increased mechanical stress <ul style="list-style-type: none"> – pairs – PE insulation acc. to EN 50290–2-23 – or without protective conductor – copper braid screen over pair or copper braid screen over inner sheath – PVC inner sheath acc. to EN 50290–2-22 – glass yarn strain relief in PVC jacket acc. to EN 50290–2-22, blue or grey | 375 | in all mining workings | stationary non stationary flexible |
| 6 | armoured flexible cables with stranded conductors for higher mechanical performance <ul style="list-style-type: none"> – pairs – PE insulation acc. to EN 50290–2-23 – or without single protective conductor – PVC inner sheath acc. to EN 50290– | 375 | In all mining works but not suspended in shafts and boreholes and not for self-supporting cable suspensions | stationary non stationary flexible |

| 1 | 2 | 3 | 4 | 5 |
|-----|--|---------------------------|---|---------------------------------------|
| No. | Cable type | Rated voltage up to ... V | Scope | Method of installation |
| | 2-22 – flat formed tinned steel wire braid as mechanical protection – PVC jacket acc. to EN 50290–2-22, blue or grey | | | |
| 7 | other Multi-element cables used in analogue and digital communication control acc. to EN 50288–1 | | For intrinsically-safe installations | stationary, if applicable flexible |
| 8 | Fibre optic cables based on EN 60794–1-1 | | in all mining workings | |
| 9 | tensile strength optimized cables with stranded conductors with inner sheath and PVC jacket (L-YTY or YYTII) | 375 | unlimited | stationary, flexible |
| 10 | flexible control- and communication cables with EPR insulation and jacket and rubber sheathed steel support element. | 600 | in all mining workings, in shafts unsupported up to 200 m | flexible |