Selection table for flat & ribbon cables
# FLAT & RIBBON CABLES

<table>
<thead>
<tr>
<th>Flat &amp; ribbon cables</th>
<th>Temperature (°C) - flexing</th>
<th>Temperature (°C) - fixed</th>
<th>Nominal voltage U/U</th>
<th>Bending radius - flexing x Ø</th>
<th>Bending radius - fixed x Ø</th>
<th>Halogen-free</th>
<th>UV-resistant</th>
<th>Outdoor use</th>
<th>Drag chain</th>
<th>Colored cores</th>
<th>VDE 0293</th>
<th>Screened/shielded</th>
<th>HAR/VDE REG no.</th>
<th>UL/CSA</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC-flat</td>
<td>-5 to +70</td>
<td>-40 to +80</td>
<td>300/500</td>
<td>10x</td>
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<td>NEO-flat</td>
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<td>10x</td>
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<td>15x</td>
<td>X</td>
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<td>-30 to +80</td>
<td>-40 to +80</td>
<td>300/500</td>
<td>15x</td>
<td>15x</td>
<td>X</td>
<td>X</td>
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<td>Ribbon</td>
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<td>TUBEFLEX-Y</td>
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<td>15x</td>
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</table>

The selection table is intended as an initial orientation. Please see the relevant page of the catalogue for detailed information on the product properties.
Technical data
- Special PVC-flat cable adapted to EN 50214 / DIN VDE 0283-2
- Temperature range: flexing: -5°C to +70°C, fixed installation: -40°C to +80°C
- Nominal voltage: up to 1 mm² U0/U 300/500 V for 1,5 mm² U0/U 450/750 V
- Test voltage: up to 1 mm² 2000 V from 1,5 mm² 2500 V
- Minimum bending radius: 10x cable thickness
- Radiation resistance: up to 80x106 cl/kg (up to 80 Mrad)

Cable structure
- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of PVC compound type TI2 to DIN VDE 0207-363-4-1/DIN EN 50363-4-1
- Sheath colour black (RAL 9005)

Properties
- Extensively oil resistant, oil-/ chemical Resistance - see table Technical Informations
- Extremely small bending radius
- High flexibility
- Minimum waste of space
- Packeting possibility
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers

Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

Application
- PVC type of flat cables are used mainly as trailing cable for crane installations, floor conveyor systems and shelf control units.

Installation notes
- Cables reels with flat cables must be transported in standing position on the flange. A bending flexibility can be achieved on a plane surface. For this purpose, the corresponding fitting instructions should be followed.
- Put the cable trolly on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trollys must be wider than the double thickness of a cable-packet.
- During the packeting performance, it must be started with the smaller cross-section which lays on the bedding surface and will be builded successively so that the biggest cross-section is laying on the top.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm², is very critical due to its low tensile stress. In such case, you should be careful of a symmetrical load distribution.
- In such case, you should further, be careful of a symmetrical load distribution.

Note
- Part no. 27012 (6x4).
- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm².

Cable structure

<table>
<thead>
<tr>
<th>Part no.</th>
<th>No. cores x cross-sec.</th>
<th>Outer dimension approx. mm</th>
<th>Cop. weight kg / km</th>
<th>Weight approx. kg / km</th>
<th>AWG-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>26980</td>
<td>4 G 0,75</td>
<td>4,3 x 12,6</td>
<td>28,8</td>
<td>80,0</td>
<td>19</td>
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<td>19</td>
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<td>26982</td>
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<td>26986</td>
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<td>26992</td>
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<td>133,0</td>
<td>16</td>
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<td>27002</td>
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<td>235,0</td>
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<td>4,5 x 33,5</td>
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<td>332,0</td>
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</tbody>
</table>

Dimensions and specifications may be changed without prior notice. (R01)
Flat and Ribbon Cables

**NEO-Flat (N)FGLGOU**

**Technical data**
- Special Neoprene-flat cable adapted to DIN VDE 0250 part 809
- **Temperature range**
  - flexing: -30°C to +80°C
  - fixed installation: -40°C to +80°C
- **Nominal voltage**
  - U0 / U: 300 / 500 V
- **Test voltage**: 3000 V
- **Minimum bending radius**: 10x cable thickness
- **Radiation resistance**: up to 50x10^6 J/kg (up to 50 Mrad)

**Cable structure**
- Copper-conductor bare or tinned to DIN VDE 0293, BS 6630, IEC 60228
- Conductor construction: 35-120 mm² class 5: fine-wire
  - 1,5-25 mm² class 6 col.4: extra-fine-wire
- Special rubber core insulation
- Core identification to DIN VDE 0293
- GN-YE conductor
  - white numbering
  - up to 5 cores: black with continuous numbering
- Outer sheath of special rubber 5GM3, to DIN VDE 0207 part 21
- Sheath colour black
- **Properties**
  - Special rubber outer sheath, cold-resistant
  - Extensively oil resistant
  - oil-/chemical resistance
  - see table Technical Informations
  - Extremely small bending radius
  - High flexibility
  - Minimum waste of space
  - Packeting possibility
  - Outdoor application

**Tests**
- **Behaviour in fire**
  - to DIN VDE 0482-332-1-2
  - DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**
- G = with green-yellow conductor
- Part no. 28007 and 28013 (6x4).
- AWG sizes are approximate equivalent values. The actual cross-section is in mm².

**Application**
Neoprene type of flat cables are used mainly as trailing cable for crane installations, floor conveyer systems and shelf control units. These cables are also available for export with UL-approval on request.

**Installation notes**
- Cables reels with flat cables must be transported in standing position on the flange. A bending flexibility can be achieved on a plane surface. For this purpose, the corresponding fitting instructions should be followed.
- Put the cable trolly on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trollys must be wider than the double thickness of a cable-packet.
- During the packeting performance, it must be started with the smaller cross-section which lays on the bedding surface and will be builded successively so that the biggest cross-section is laying on the top.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm², is very critical due to its low tensile stress. In such case, you should add 10% reserve wire for calculation.

**Properties**
- Extremely small bending radius
- High flexibility
- Minimum waste of space
- Packeting possibility
- Outdoor application

**Tests**
- Behaviour in fire
- to DIN VDE 0482-332-1-2
- DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**
- G = with green-yellow conductor
- Part no. 28007 and 28013 (6x4).
- AWG sizes are approximate equivalent values. The actual cross-section is in mm².

**Technical data**
- Special Neoprene-flat cable adapted to DIN VDE 0250 part 809
- **Temperature range**
  - flexing: -30°C to +80°C
  - fixed installation: -40°C to +80°C
- **Nominal voltage**
  - U0 / U: 300 / 500 V
- **Test voltage**: 3000 V
- **Minimum bending radius**: 10x cable thickness
- **Radiation resistance**: up to 50x10^6 J/kg (up to 50 Mrad)

**Cable structure**
- Copper-conductor bare or tinned to DIN VDE 0293, BS 6630, IEC 60228
- Conductor construction: 35-120 mm² class 5: fine-wire
  - 1,5-25 mm² class 6 col.4: extra-fine-wire
- Special rubber core insulation
- Core identification to DIN VDE 0293
- GN-YE conductor
  - white numbering
  - up to 5 cores: black with continuous numbering
- Outer sheath of special rubber 5GM3, to DIN VDE 0207 part 21
- Sheath colour black

**Properties**
- Special rubber outer sheath, cold-resistant
- Extensively oil resistant
- oil-/chemical resistance
- see table Technical Informations
- Extremely small bending radius
- High flexibility
- Minimum waste of space
- Packeting possibility
- Outdoor application

**Tests**
- Behaviour in fire
- to DIN VDE 0482-332-1-2
- DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**
- G = with green-yellow conductor
- Part no. 28007 and 28013 (6x4).
- AWG sizes are approximate equivalent values. The actual cross-section is in mm².

<table>
<thead>
<tr>
<th>Part no.</th>
<th>No.cores x cross-sec. mm²</th>
<th>Outer dimension approx. mm</th>
<th>Cop. weight kg / km</th>
<th>Weight approx. kg / km</th>
<th>AWG-No.</th>
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<tr>
<td>28001</td>
<td>4 G 1,5</td>
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<td>58,0</td>
<td>254,0</td>
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</tr>
</tbody>
</table>

Dimensions and specifications may be changed without prior notice. (RI01)
PVC-flat-CY screened, EMC-preferred type

### Technical data
- Special PVC-flat cable, screened, adapted to DIN VDE 0283 part 2
- Temperature range
  - flexing: -5°C to +70°C
  - fixed installation: -40°C to +80°C
- Nominal voltage
  - Us/U: 300/500 V
- Test voltage: 3000 V
- Breakdown voltage: min. 6000 V
- Minimum bending radius: 15x cable thickness
- Radiation resistance
  - up to 80x10^6 cl/kg (up to 80 Mrad)

### Properties
- Bare copper-conductor, to DIN VDE 0295 cl.5, fine-wire, BS 6360 cl.5, IEC 60228 cl.5
- Core insulation of special PVC
- Core identification see table below
- Copper screened braiding, approx. 85% coverage
- Outer sheath of special PVC
- Sheath colour black (RAL 9005)
- Temperature range
  - flexing: -5°C to +70°C
  - fixed installation: -40°C to +80°C
- Nominal voltage
  - Us/U: 300/500 V
- AWG sizes are approximate equivalent values. The actual cross-section is in mm².

### Cable structure
- Special PVC-flat cable, screened, adapted to DIN VDE 0283 part 2
- Extensively oil resistant
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Cores screened individually or in bunches
- Test voltage: 3000 V
- Copper screened braiding, approx. 85% coverage
- Breakdown voltage: min. 6000 V
- Outer sheath of special PVC
- Minimum bending radius: 15x cable thickness
- Sheath colour black (RAL 9005)

### Application
- PVC screened flat cables are used mainly as trailing cable for crane installations, floor conveyor systems and shelf control units.

### Installation notes
- Put the cable trolley on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trolleys must be wider than the double thickness of a cable-packet.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm², is very critical due to its low tensile stress. In such case, you should add 10% reserve wire for calculation.

### EMC
- Electromagnetic compatibility
  - To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

### Suitable accessories
  - Cable Gland - STK-F
  - Cable Gland - STS-F

### Table

<table>
<thead>
<tr>
<th>Part no.</th>
<th>No.cores x cross-sec. mm²</th>
<th>Core marking</th>
<th>Core marking</th>
<th>Outer dimension approx. mm</th>
<th>Cop. weight kg / km</th>
<th>Weight approx. kg / km</th>
<th>AWG-No.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>5 G 0,5</td>
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<td>21,0 x 3,4</td>
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<tr>
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<td>48,4 x 14,4</td>
<td>1170,0</td>
<td>1800,0</td>
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</tbody>
</table>

Dimensions and specifications may be changed without prior notice. (RU01)
**Technical data**
- Special-Neoprene-flat cable, screened, adapted to DIN VDE 0250 part 809
- **Temperature range**
  - Flexing: -30°C bis +80°C
  - Fixed installation: -40°C to +80°C
- **Nominal voltage**
  - U0/U 300/500 V
- **Test voltage**
  - 3000 V
- **Minimum bending radius**
  - 15x cable thickness
- **Radiation resistance**
  - up to 50x10⁶ cl./kg (up to 50 Mrad)

**Cable structure**
- Copper-conductor bare or tinned to DIN VDE 0295 cl.6, extra fine-wire, BS 6360 cl.6, IEC 60228 cl.6
- Core insulation of special rubber
- Core identification to DIN VDE 0293
  - up to 5 cores coloured
  - from 7 cores, black with continuous white numbering
- GN-YE conductor
- Cores screened individually
- Cores laying parallel
- Copper screened braiding, approx. 85% coverage
- Outer sheath of special Neoprene
- Outer sheath colour black (RAL 9005)

**Properties**
- Outer sheath cold resistant
- Extensively oil resistant
- Extremely small bending radius
- High flexibility
- Minimum waste of space
- Packing possibility
- The high degree of screening density assures disturbance-free transmission of all signal and impulses
- Outdoor application

**Tests**
- **Behaviour in fire**
  - to DIN VDE 0482-332-1-2
  - DIN EN 60332-2-1, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

**Note**
- G = with green-yellow conductor
- AWG sizes are approximate equivalent values. The actual cross-section is in mm².

**Application**
Neoprene screened flat cables are used mainly as trailing cable for crane installations, floor conveyer systems and shelf control units. These cables are also available for export with UL-approval on request.

**Installation notes**
Cables reels with flat cables must be transported in standing position on the flange. A bending flexibility can be achieved on a plane surface. For this purpose, the corresponding fitting instructions should be followed.

- Put the cable trolley on the guiding rail or upon carrier beam and push them together at the starting point. The distance between the bedding surface of two cable trolleys must be wider than the double thickness of a cable-packet.
- During the packeting performance, it must be started with the smaller cross-section which lays on the bedding surface and will be builded successively so that the biggest cross-section is laying on the top.
- Further, be careful of a symmetrical load distribution.
- In case of multicore flat cables with small cross-section, smaller than 2,5 mm², is very critical due to its low tensile stress. In such case, you should add 10% reserve wire for calculation.

**EMC** = Electromagnetic compatibility

To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**Suitable accessories can be found in Chapter X.**
- Cable Gland - STK-F
- Cable Gland - STS-F

---

**Part no.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Cores x</th>
<th>Outer dimension approx. mm²</th>
<th>Weight approx. kg / km</th>
<th>AWG-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>28100</td>
<td>8 G 1,5</td>
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<tr>
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<td>12 G 1,5</td>
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<tr>
<td>28102</td>
<td>4 G 2,5</td>
<td>8,5 x 25,5</td>
<td>164,0</td>
<td>4 G 28</td>
</tr>
</tbody>
</table>

Dimensions and specifications may be changed without prior notice. (R101)
Flat and Ribbon Cables

Type L, Type L AWG 28, Type D

Technical data
Type L (stranded wire)
- Nominal voltage
  0,14 mm² = 350 V
  0,25 to 0,75 mm² = 600 V
- Test voltage
  0,14 mm² = 1200 V
  0,25 to 0,75 mm² = 2000 V
Type L AWG 28 (stranded wire)
- Pitch 1,27 mm
- Heat-resistance up to 105°C
- Nominal voltage 300 V
- Test voltage 2000 V
Type D (solid)
- Pitch 2,5 mm
- Nominal voltage 500 V
- Test voltage 1500 V

Cable structure
Type L (stranded wire)
- Tinned copper, fine wire stranded to DIN VDE 0295 cl. 5, BS 6360 cl.5
- Core insulation of PVC, flame retardant
- Cores coloured coded
Type L AWG 28 (stranded wire)
- Tinned copper 7x0,127
- Core insulation of PVC, flame retardant
- Cores single coloured, edge marking on one side
- Cores moulded, can be separated easily
Type D (solid)
- Cu-solid, tinned 0,5 mm Ø
- Core insulation of PVC
- Cores moulded, can be separated easily
- Cores coloured coded

Application
Ribbon cables are used as connecting and control cables wherever there is a need to install quickly and with a minimum waste of space. These cables offer an excellent degree of flexibility.

| Cores single coloured, edge marking on one side |
|---|---|---|---|
| Part no. | No.cores x cross-sec. mm² | Outer Ø approx. mm | Weight approx. kg/km |
| 44041 | 10 x 0,08 | 12,7 x 0,9 | 13,4 | 30,0 | 28 |
| 44042 | 14 x 0,08 | 17,8 x 0,9 | 18,0 | 50,0 | 28 |
| 44043 | 16 x 0,08 | 20,3 x 0,9 | 20,0 | 53,0 | 28 |
| 44044 | 20 x 0,08 | 25,6 x 0,9 | 25,0 | 65,0 | 28 |
| 44045 | 26 x 0,08 | 33,0 x 0,9 | 32,0 | 75,0 | 28 |
| 44046 | 34 x 0,08 | 42,3 x 0,9 | 43,0 | 90,0 | 28 |
| 44047 | 40 x 0,08 | 50,8 x 0,9 | 48,0 | 125,0 | 28 |
| 44048 | 48 x 0,08 | 61,0 x 0,9 | 59,0 | 145,0 | 28 |

Properties
Type L AWG 28 (stranded wire)
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)

Note
- Pitch (Distance between centre point)

| Standard-colour-code (not to DIN 47100) |
|---|---|---|
| 1 white | 12 white-green | 23 brown-blue |
| 2 brown | 13 white-yellow | 24 brown-red |
| 3 green | 14 white-grey | 25 brown-black |
| 4 yellow | 15 white-pink | 26 green-grey |
| 5 grey | 16 white-blue | 27 green-pink |
| 6 pink | 17 white-red | 28 green-blue |
| 7 blue | 18 white-black | 29 green-red |
| 8 red | 19 brown-green | 30 black |
| 9 black | 20 brown-yellow | 31 yellow-grey |
| 10 violet | 21 brown-grey | 32 yellow-pink |
| 11 white-brown | 22 brown-pink | 33 yellow-blue |

Dimensions and specifications may be changed without prior notice. (R/01)
TUBEFLEX-Y roundshaped flat ribbon cable for IDC-technique, pitch 1,27 mm

Properties
- Stranded tinned copper conductor, size AWG 28
- Core insulation of special PVC
- Cores colour grey, edge marking on one side
- Cores laying parallel and adjacent, alternately spliced or separated and periodically slotted
- Roundshaped flat ribbon cable, folded
- Taping
- Outer sheath of special PVC
- Outer sheath Colour grey

Tests
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Roundshaped flat ribbon cable, folded
- Test voltage core/core 2000 V
- Taping

Application
TUBEFLEX-Y Flat ribbon cable, due to its roundshape offers considerable advantages compared with other flat ribbon cables during the installation and assembly. This roundshaped cable bids enormous profits by using the quick and economical possibilities under continuance with the efficient connection in IDC-technique. All conductors can be contacted at one working procedure without stripping the insulation. The accurate to size pitch-image of the ribbon cable is obtained due to an adapted backshaping before the plug installation.

Dimensions and specifications may be changed without prior notice. (RJ01)

<table>
<thead>
<tr>
<th>Part no.</th>
<th>No.cores x AWG No.</th>
<th>Flat ribbon dimension Width mm</th>
<th>Outer sheath nominal wall-thickness mm</th>
<th>Outer Ø approx. mm</th>
<th>Cop. weight kg / km</th>
<th>Weight approx. kg / km</th>
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<tbody>
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<td>7,4</td>
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<table>
<thead>
<tr>
<th>Part no.</th>
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<th>Flat ribbon dimension Width mm</th>
<th>Outer sheath nominal wall-thickness mm</th>
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Suitable accessories can be found in Chapter X.
- Cable Gland - STK-F
- Cable Gland - STS-F

CW&A Edition 27 (published 01.04.2015)
TUBEFLEX-(St)-CY roundshaped flat ribbon cable, screened, for IDC-technique, pitch 1.27mm, EMC-preferred type

**Technical data**
- Roundshaped special Flat Ribbon Cable, screened
- Conductor resistance at 20°C max. 230 Ohm/km
- Temperature range -20°C up to +80°C
- Voltage rating max. 300 V
- Test voltage core/core 2000 V core/screen 2000 V
- Dielectric strength, Spark-test 3000 V
- Insulation resistance min. 20 MΩm x km
- Capacitance (side cores) ca. 75 pF/m
- Impedance 115 Ohm
- Minimum bending radius 15x cable Ø
- Radiation resistance up to 80x10⁶ cJ/kg (up to 80 Mrad)

**Cable structure**
- Stranded tinned copper conductor, size AWG 28
- 7x0.127 mm = 0.09 mm²
- Roundshaped special Flat Ribbon Cable, screened
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Conductor resistance max. 230 Ohm/km
- Core insulation of special PVC
- Very interesting for cable pre-assemblers!
- Temperature range -20°C up to +80°C
- Cores colour grey, edge marking on one side
- Cores laying parallel and adjacent, alternately spliced or separated and periodically slotted
- Voltage rating max. 300 V
- Dual shielding: (St) - plastic coated Alu-foil and C - tinned copper wire braiding with optimal surface coverage
- Outer sheath of special PVC
- Outer sheath Colour grey

**Properties**
- The materials used in manufacture are cadmium-free and contain no silicone and free from substances harmful to the wetting properties of lacquers
- Very interesting for cable pre-assemblers!
- The dual shielding with plastic coated aluminium foil (St) and the additional tinned copper wire braiding (C) protects against high frequency interference and ensures disturbance-free signal and impulse transfer.

**Tests**
- PVC self-extinguishing and flame retardant acc. to DIN VDE 0482-332-1-2, DIN EN 60332-1-2, IEC 60332-1 (equivalent DIN VDE 0472 part 804 test method B)
- Dielectric strength, Spark-test 3000 V
- Outer sheath Colour grey
- Capacitance (side cores) ca. 75 pF/m
- Impedance 115 Ohm
- Minimum bending radius 15x cable Ø
- Radiation resistance up to 80x10⁶ cJ/kg (up to 80 Mrad)

**Application**
TUBEFLEX-(St)-CY flat ribbon cable, due to its roundshape offers considerable advantages compared with other flat ribbon cables during the installation and assembly. This roundshaped cable bids enormous profits by using the quick and economical possibilities under continuance with the efficient connection in IDC-technique. All conductors can be contacted at one working procedure without stripping the insulation. The accurate to size pitch-image of the ribbon cable is obtained due to an adapted backshaping before the plug installation.

**EMC** = Electromagnetic compatibility
To optimize the EMC features we recommend a large round contact of the copper braiding on both ends.

**C E** = The product is conformed with the EC Low-Voltage Directive 2006/95/EC.

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**Dimensions and specifications may be changed without prior notice. (R/01)**

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**Suitable accessories can be found in Chapter X.**
- Cable Gland - STK-F
- Cable Gland - STS-F