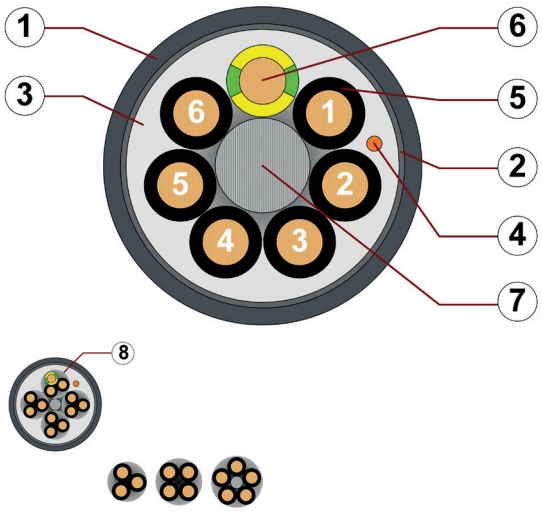
# Data sheet
# chainflex® CF10.UL

**Control cable (Class 6.6.4.1) ● For extremely heavy duty applications ● TPE outer jacket ● Shielded ● Oil and bio-oil resistant ● Flame retardant ● PVC-free ● Low-temperature-flexible ● Hydrolysis and microbe-resistant**

Example image




1. Outer jacket: Pressure extruded, flame-retardant TPE mixture
2. Overall shield: Extremely bending-resistant braiding made of tinned copper wires
3. Inner jacket: Pressure extruded, gusset-filling TPE mixture
4. CFRIP: Tear strip for faster cable stripping
5. Core insulation: Mechanically high-quality TPE mixture
6. Conductor: Stranded conductor in especially bend-resistant version consisting of bare copper wires
7. Strain relief: Tensile stress-resistant centre element
8. 12 cores or more: Bundles with optimised pitch length and pitch direction

**Example image**
For detailed overview please see design table

## Cable structure

| | |
|---|---|
| **Conductor** | Stranded conductor in especially bending-resistant version consisting of bare copper wires (following DIN EN 60228). |
| **Core insulation** | Mechanically high-quality TPE mixture. |
| **Core structure** | **Number of cores < 12:** Cores wound in a layer with short pitch length.<br>**Number of cores ≥ 12:** Cores wound in bundles which are then wound around a high tensile strength centre element, all with optimised short pitch lengths and directions. Especially low-torsion structure. |
| **Core identification** | **Cores < 0.75 mm²:** Colour code in accordance with DIN 47100.<br>**Cores ≥ 0.75 mm²:** Black cores with white numbers, one green-yellow core. |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Extremely bending-resistant braiding made of tinned copper wires.<br>Coverage approx. 70 % linear, approx. 90 % optical |
| **Outer jacket** | Low-adhesion, extremely abrasion-resistant and highly flexible TPE mixture, adapted to suit the requirements in e-chains®.<br>Colour: Slate grey (similar to RAL 7015)<br>Printing: white |
| **CFRIP®** | Strip cables faster: a tear strip is moulded into the inner jacket<br>Video ▶ www.igus.eu/CFRIP |

„00000 m“** igus chainflex CF10.UL.--.--① -----② 300/500V E310776

cЯUus AWM Style -----③ VW-1 AWM I/II A/B 90°C ---V④ FT-1 DNV-GL TAE00003X2

EAC/CTP CE RoHS-II conform www.igus.de +++ chainflex cable works +++

*** Length printing:** Not calibrated. Only intended as an orientation aid.
① / ② Cable identification according to Part No. (see technical table).
③ / ④ Printing of the UL Style / Voltage (see certifications for details).
Example: ... chainflex **CF10.UL.02.04 (4x0.25)C 300 V/500 V** ...

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP

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Example image

## Dynamic information

| | | | |
|---|---|---|---|
| **Bend radius** | **e-chain® linear** | minimum 5 x d |
| | **flexible** | minimum 4 x d |
| | **fixed** | minimum 3 x d |
| **Temperature** | **e-chain® linear** | -35 °C up to +100 °C |
| | **flexible** | -45 °C up to +100 °C (following DIN EN 60811-504) |
| | **fixed** | -50 °C up to +100 °C (following DIN EN 50305) |
| **v max.** | **unsupported** | 10 m/s |
| | **gliding** | 6 m/s |
| **a max.** | | 100 m/s² |
| **Travel distance** | | Unsupported travel distances and up to 400 m for gliding applications, Class 6 |

These values are based on specific applications or tests. They do not represent the limit of what is technically feasible.

## Guaranteed service life according to guarantee conditions

| Double strokes | 5 million | 7.5 million | 10 million |
|---|---|---|---|
| Temperature, from/to [°C] | R min. [x d] | R min. [x d] | R min. [x d] |
| -35/-25 | 6.8 | 7.5 | 8.5 |
| -25/+90 | 5 | 6 | 7 |
| +90/+100 | 6.8 | 7.5 | 8.5 |

Minimum guaranteed service life of the cable under the specified conditions.
The installation of the cable is recommended within the middle temperature range.

## Electrical information

| | |
|---|---|
| **Nominal voltage** | 300/500 V (following DIN VDE 0298-3)<br>**Cores < 0.5 mm²:** 300 V (following UL)<br>**Cores ≥ 0.5 mm²:** 1000 V (following UL) |
| **Testing voltage** | 2000 V (following DIN EN 50395) |

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Example image

## Properties and approvals

| | |
|---|---|
| **UV resistance** | High |
| **Oil resistance** | Oil-resistant (following DIN EN 60811-404), bio-oil-resistant (following VDMA 24568 with Plantocut 8 S-MB tested by DEA), Class 4 |
| **Flame retardant** | According to IEC 60332-1-2, Cable Flame, VW-1, FT1, FT2 / Horizontal Flame |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **PFAS-free** | Use of PFAS-free materials according to the content of the REACH directive and its rules for the production and processing of chemical substances |
| **UL verified** | Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ |
| **UL/CSA AWM** | See table UL/CSA for details |
| **NFPA** | Following NFPA 79-2018, chapter 12.9 |
| **DNV** | Type approval certificate No. TAE00003X2 |
| **REACH** | In accordance with regulation (EC) No. 1907/2006 (REACH) |
| **Lead-free** | Following 2011/65/EC (RoHS-II/RoHS-III) |
| **Cleanroom** | According to ISO Class 1. The outer jacket material of this series complies with CF34. UL.25.04.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |

## Properties and approvals

### UL/CSA AWM Details

| Conductor nominal cross section [mm²] | Number of cores | UL style core insulation | UL style outer jacket | UL Voltage Rating [V] | UL Temperature Rating [°C] |
|---|---|---|---|---|---|
| 0.25 | 4-25 | 10479 | 21529 | 300 | 90 |
| 0.5 | 4-25 | 10258 | 21387 | 1000 | 90 |
| 0.75 | 4-25 | 10258 | 21387 | 1000 | 90 |
| 1 | 2-25 | 10258 | 21387 | 1000 | 90 |
| 1.5 | 4-18 | 10258 | 21387 | 1000 | 90 |
| 2.5 | 4-12 | 10258 | 21387 | 1000 | 90 |
| 4 | 4 | 10258 | 21387 | 1000 | 90 |

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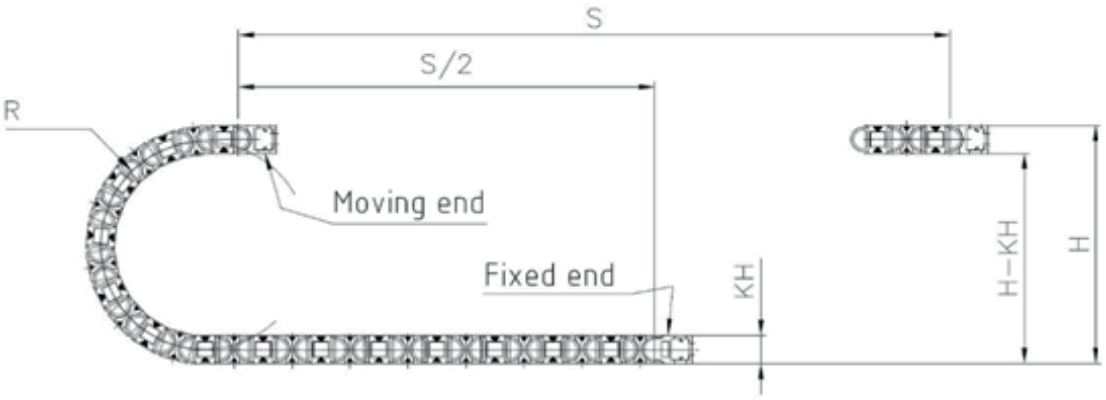
Example image

## Typical lab test setup for this cable series

| | |
|---|---|
| **Test bend radius R** | approx. 32 - 100 mm |
| **Test travel S** | approx. 1 - 15 m |
| **Test duration** | minimum 2 - 4 million double strokes |
| **Test speed** | approx. 0.5 - 2 m / s |
| **Test acceleration** | approx. 0.5 - 1.5 m / s² |




## Typical application areas

- For heaviest duty applications, Class 6
- Unsupported travel distances and up to 400 m and more for gliding applications, Class 6
- Almost unlimited resistance to oil, also with bio-oils, Class 4
- No torsion, Class 1
- Indoor and outdoor applications, UV-resistant
- Storage and retrieval units for high-bay warehouses, Machining units/machine tools, quick handling, Clean room, semiconductor insertion, Ship to shore, outdoor cranes, low temperature applications

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Example image

## Technical tables:

Mechanical information

| Part No. | Number of cores and conductor nominal cross section [mm²] | Outer diameter (d) max. [mm] | Copper index [kg/km] | Weight [kg/km] |
|---|---|---|---|---|
| CF10.UL.02.04 | (4x0.25)C | 6.5 | 24 | 60 |
| CF10.UL.02.08 | (8x0.25)C | 8.5 | 40 | 94 |
| CF10.UL.02.12 | (12x0.25)C | 9.5 | 64 | 137 |
| CF10.UL.02.25 | (25x0.25)C | 12.5 | 110 | 241 |
| CF10.UL.05.04 | (4x0.5)C | 7.5 | 37 | 83 |
| CF10.UL.05.05 | (5x0.5)C | 8.0 | 44 | 98 |
| CF10.UL.05.12 | (12x0.5)C | 11.5 | 103 | 211 |
| CF10.UL.05.25 | (25x0.5)C | 15.5 | 186 | 383 |
| CF10.UL.07.04 | (4G0.75)C | 8.0 | 49 | 101 |
| CF10.UL.07.05 | (5G0.75)C | 8.5 | 59 | 119 |
| CF10.UL.07.07 | (7G0.75)C | 10.0 | 89 | 171 |
| CF10.UL.07.12 | (12G0.75)C | 12.5 | 135 | 268 |
| CF10.UL.07.20 | (20G0.75)C | 15.5 | 210 | 395 |
| CF10.UL.07.25 | (25G0.75)C | 17.0 | 256 | 489 |
| CF10.UL.10.02 | (2x1.0)C | 7.5 | 38 | 88 |
| CF10.UL.10.03 | (3G1.0)C | 8.0 | 48 | 99 |
| CF10.UL.10.04 | (4G1.0)C | 8.5 | 61 | 117 |
| CF10.UL.10.05 | (5G1.0)C | 9.0 | 72 | 137 |
| CF10.UL.10.07 | (7G1.0)C | 11.0 | 110 | 204 |
| CF10.UL.10.25 | (25G1.0)C | 18.5 | 348 | 608 |
| CF10.UL.15.04 | (4G1.5)C | 9.0 | 83 | 144 |
| CF10.UL.15.05 | (5G1.5)C | 10.0 | 111 | 184 |
| CF10.UL.15.07 [17] | (7G1.5)C | 11.5 | 148 | 250 |
| CF10.UL.15.12 | (12G1.5)C | 15.0 | 240 | 420 |
| CF10.UL.15.18 | (18G1.5)C | 18.5 | 365 | 613 |
| CF10.UL.25.04 | (4G2.5)C | 11.0 | 140 | 232 |
| CF10.UL.25.07 [17] | (7G2.5)C | 14.0 | 226 | 369 |
| CF10.UL.25.12 | (12G2.5)C | 18.5 | 395 | 666 |
| CF10.UL.40.04 | (4G4.0)C | 12.5 | 205 | 315 |

[17] When using the cables with „7G1.5mm²“ and „G2.5mm²“ minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

**Note:** The given outer diameters are maximum values and may tend toward lower tolerance limits.
**G =** with green-yellow earth core **x =** without earth core

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Example image

### Electrical information

| Conductor nominal cross section [mm²] | Maximum conductor resistance at 20 °C (following DIN EN 50289-1-2) [Ω/km] | Max. current rating at 30 °C [A] |
|---|---|---|
| 0.25 | 79 | 5 |
| 0.5 | 39 | 10 |
| 0.75 | 26 | 14 |
| 1 | 19.5 | 17 |
| 1.5 | 13.3 | 21 |
| 2.5 | 8 | 30 |
| 4 | 4.95 | 41 |

The final maximum current rating depends among other things on the ambient conditions, the type of the installation and the number of loaded cores.

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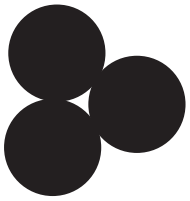
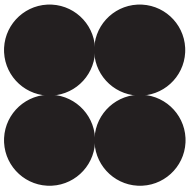
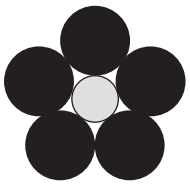
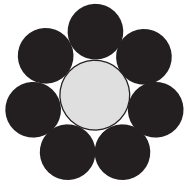
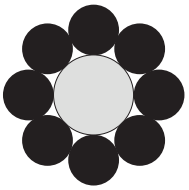
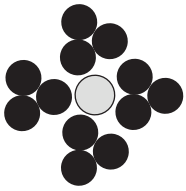
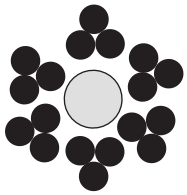
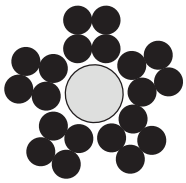
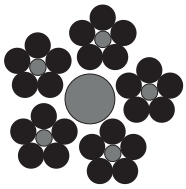
Example image

## Design table

| Part No. | Number of cores | Core design |
|---|---|---|
| CF10.UL.XX.02 | 2 |  |
| CF10.UL.XX.03 | 3 |  |
| CF10.UL.XX.04 | 4 |  |
| CF10.UL.XX.05 | 5 |  |
| CF10.UL.XX.07 | 7 |  |

| Part No. | Number of cores | Core design |
|---|---|---|
| CF10.UL.XX.08 | 8 |  |
| CF10.UL.XX.12 | 4x3 |  |
| CF10.UL.XX.18 | 6x3 |  |
| CF10.UL.XX.20 | 5x4 |  |
| CF10.UL.XX.25 | 5x5 |  |

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Example image

## Colour code in accordance with DIN 47100.

| Conductor no. | Colours according to DIN ISO 47100 |
|---|---|
| 1 | white |
| 2 | brown |
| 3 | green |
| 4 | yellow |
| 5 | grey |
| 6 | pink |
| 7 | blue |
| 8 | red |
| 9 | black |
| 10 | violet |
| 11 | grey-pink |
| 12 | red-blue |
| 13 | white-green |
| 14 | brown-green |
| 15 | white-yellow |
| 16 | brown-yellow |
| 17 | white-grey |
| 18 | brown-grey |
| 19 | white-pink |
| 20 | white-brown |
| 21 | white-blue |

| Conductor no. | Colours according to DIN ISO 47100 |
|---|---|
| 22 | brown-blue |
| 23 | white-red |
| 24 | brown-red |
| 25 | white-black |
| 26 | brown-black |
| 27 | grey-green |
| 28 | yellow-grey |
| 29 | pink-green |
| 30 | yellow-pink |
| 31 | green-blue |
| 32 | yellow-blue |
| 33 | green-red |
| 34 | yellow-red |
| 35 | green-black |
| 36 | yellow-black |
| 37 | grey-blue |
| 38 | pink-blue |
| 39 | grey-red |
| 40 | pink-red |
| 41 | grey-black |
| 42 | pink-black |

| Conductor no. | Colours according to DIN ISO 47100 |
|---|---|
| 43 | blue-black |
| 44 | red-black |
| 45 | white-brown-black |
| 46 | yellow-green-black |
| 47 | grey-pink-black |
| 48 | red-blue-black |
| 49 | white-green-black |
| 50 | brown-green-black |
| 51 | white-yellow-black |
| 52 | yellow-brown-black |
| 53 | white-grey-black |
| 54 | grey-brown-black |
| 55 | white-pink-black |
| 56 | pink-brown-black |
| 57 | white-blue-black |
| 58 | brown-blue-black |
| 59 | white-red-black |
| 60 | brown-red-black |
| 61 | black-white |

Guarantee igus chainflex 4 YEARS up to 4 years guarantee

igus 4-year chainflex cable guarantee and service life calculator based on 2 billion test cycles per year

CFRIP