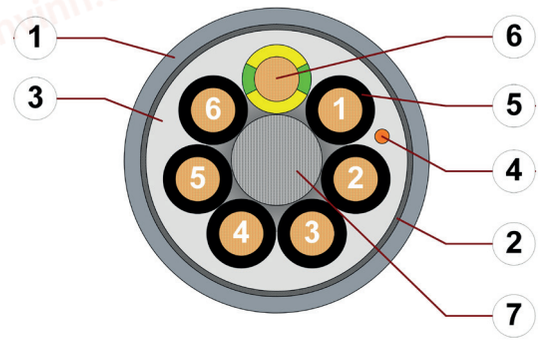
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# Data sheet
# chainflex® CF78.UL

**Control cable (Class 5.5.3.1) ● For heavy duty applications ● PUR outer jacket ● Shielded ● Oil resistant and coolant-resistant ● Flame retardant ● PVC and halogen-free ● Notch-resistant ● Hydrolysis and microbe-resistant**



Example image




1. Outer jacket: Pressure extruded PUR mixture
2. Overall shield: 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: Fine-wire strand 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** | Finely stranded conductor 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.<br>Especially low-torsion structure. |
| **Core identification** | Black cores with white numbers, one green-yellow core. |
| **Inner jacket** | TPE mixture adapted to suit the requirements in e-chains®. |
| **Overall shield** | Bending-resistant braiding made of tinned copper wires.<br>Coverage approx. 55 % linear, approx. 80 % optical |
| **Outer jacket** | Low-adhesion, halogen-free, highly abrasion resistant PUR mixture, adapted to suit the requirements in e-chains® (following DIN EN 50363-10-2).<br>Colour: Window-grey (similar to RAL 7040)<br>Printing: black |
| **CFRIP®** | Strip cables faster: a tear strip is moulded into the inner jacket<br>Video ▶ www.igus.eu/CFRIP |

**„00000 m“** igus chainflex CF78.UL-.-.① --② -/-V③ E310776**

**cЯUus AWM Style 21223 VW-1 AWM I/II A/B 80°C ---V⑤ FT-1 GL 61 935-14 HH**

**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 Printing of nominal voltage (see general electrical values).
④ / ⑤ Printing of the UL Style / Voltage (see certifications for details).
Example: ... chainflex ... **CF78.UL.05.04** ... **(4G0.5)C** ... **300 V/500 V** ...


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Example image

## Dynamic information

| | | | |
|---|---|---|---|
| Bend radius | e-chain® linear | minimum 6.8 x d |
| | flexible | minimum 5 x d |
| | fixed | minimum 4 x d |
| Temperature | e-chain® linear | -25 °C up to +80 °C |
| | flexible | -40 °C up to +80 °C (following DIN EN 60811-504) |
| | fixed | -50 °C up to +80 °C (following DIN EN 50305) |
| v max. | unsupported | 10 m/s |
| | gliding | 5 m/s |
| a max. | | 80 m/s² |
| Travel distance | | Unsupported travels and up to 100 m for gliding applications, Class 5 |

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] | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m | < 10 m | ≥ 10 m |
| | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] | R min. [factor x d] |
| -25/-15 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |
| -15/+70 | 6.8 | 7.5 | 7.5 | 8.5 | 8.5 | 9.5 |
| +70/+80 | 8.5 | 10 | 9.5 | 11 | 10.5 | 12 |

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) |
| Testing voltage | 2000 V (following DIN EN 50395) |


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Example image

## Properties and approvals

| | |
|---|---|
| **UV resistance** | Medium |
| **Oil resistance** | Oil-resistant (following DIN EN 50363-10-2), Class 3 |
| **Offshore** | MUD-resistant following NEK 606 - status 2009 |
| **Flame retardant** | According to IEC 60332-1-2, CEI 20-35, FT1, VW-1 |
| **Silicone-free** | Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992) |
| **Halogen-free** | Following DIN EN 60754 |
| **UL/CSA** | Style 11323 and 21223, 1000 V, 80 °C |
| **NFPA** | Following NFPA 79-2012, chapter 12.9 |
| **DNV-GL** | Type approval certificate No. 61 935-14 HH |
| **EAC** | Certificate No. RU C-DE.ME77.B.01254 (TR ZU) |
| **CTP** | Certificate No. C-DE.PB49.B.00416 (Fire protection) |
| **CEI** | Following CEI 20-35 |
| **Lead-free** | Following 2011/65/EC (RoHS-II) |
| **Clean room** | According to ISO Class 1. The outer jacket material of this series complies with CF77. UL.05.12.D - tested by IPA according to standard DIN EN ISO 14644-1 |
| **CE** | Following 2014/35/EU |


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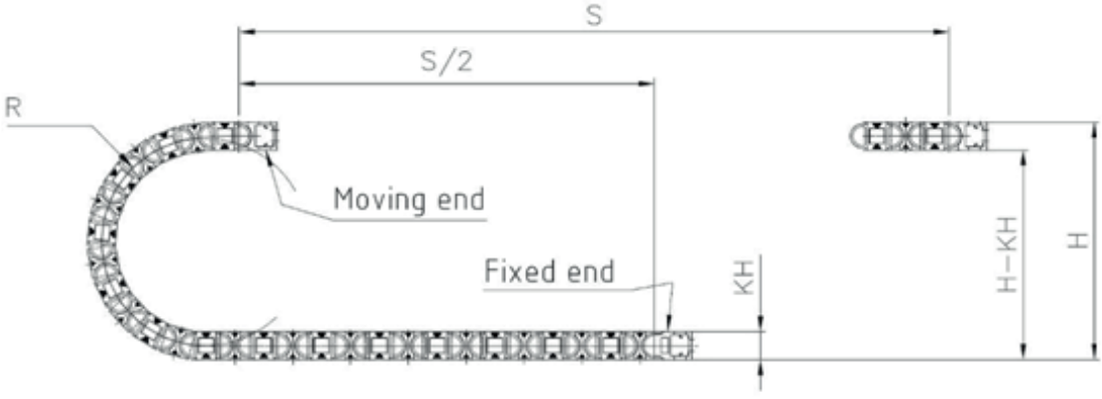
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Example image

## Typical lab test setup for this cable series

| | |
|---|---|
| **Test bend radius R** | approx. 48 - 200 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 / $s^2$ |




## Typical application areas

- For heavy duty applications, Class 5
- Unsupported travel distances and up to 100 m for gliding applications, Class 5
- Almost unlimited resistance to oil, Class 3
- No torsion, Class 1
- Indoor and outdoor applications with average sun radiation
- Machining units/machine tools, Storage and retrieval units for high-bay warehouses, Packaging industry, quick handling, refrigerating sector


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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] |
|---|---|---|---|---|
| CF78.UL.05.04 | (4G0.5)C | 8.0 | 38 | 77 |
| CF78.UL.05.05 | (5G0.5)C | 8.0 | 45 | 91 |
| CF78.UL.05.07 | (7G0.5)C | 9.5 | 58 | 119 |
| CF78.UL.05.09 | (9G0.5)C | 11.0 | 77 | 143 |
| CF78.UL.05.12 | (12G0.5)C | 12.5 | 92 | 202 |
| CF78.UL.05.18 | (18G0.5)C | 14.5 | 146 | 247 |
| CF78.UL.05.25 | (25G0.5)C | 16.0 | 168 | 354 |
| CF78.UL.07.03 | (3G0.75)C | 8.0 | 42 | 77 |
| CF78.UL.07.04 | (4G0.75)C | 8.5 | 49 | 96 |
| CF78.UL.07.05 | (5G0.75)C | 9.5 | 61 | 105 |
| CF78.UL.07.07 | (7G0.75)C | 10.5 | 82 | 142 |
| CF78.UL.07.12 | (12G0.75)C | 13.5 | 136 | 242 |
| CF78.UL.07.18 | (18G0.75)C | 15.5 | 193 | 354 |
| CF78.UL.07.36 | (36G0.75)C | 22.0 | 390 | 702 |
| CF78.UL.07.42 [11)] | (42G0.75)C | 24.5 | 458 | 769 |
| CF78.UL.10.03 | (3G1.0)C | 8.5 | 50 | 87 |
| CF78.UL.10.04 | (4G1.0)C | 9.0 | 62 | 104 |
| CF78.UL.10.05 | (5G1.0)C | 9.5 | 74 | 119 |
| CF78.UL.10.07 | (7G1.0)C | 11.0 | 104 | 164 |
| CF78.UL.10.12 | (12G1.0)C | 14.5 | 166 | 295 |
| CF78.UL.10.18 | (18G1.0)C | 17.0 | 240 | 407 |
| CF78.UL.10.25 | (25G1.0)C | 20.0 | 325 | 545 |
| CF78.UL.15.03 | (3G1.5)C | 9.5 | 68 | 129 |
| CF78.UL.15.04 | (4G1.5)C | 10.0 | 85 | 134 |
| CF78.UL.15.05 | (5G1.5)C | 10.5 | 109 | 160 |
| CF78.UL.15.07 [17)] | (7G1.5)C | 12.5 | 144 | 217 |
| CF78.UL.15.12 | (12G1.5)C | 16.0 | 233 | 387 |
| CF78.UL.15.18 | (18G1.5)C | 19.0 | 345 | 541 |
| CF78.UL.15.25 | (25G1.5)C | 22.5 | 463 | 724 |
| CF78.UL.15.36 | (36G1.5)C | 26.5 | 663 | 1095 |
| CF78.UL.15.42 | (42G1.5)C | 29.5 | 820 | 1296 |

[17)] When using the cables with “7 G 1.5 mm²” and “7 G 2.5 mm²” minimum bend radius must be 17.5 x d with gliding travel distance ≥ 5 m.
[11)] Phase-out model

**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

| Part No. | Number of cores and conductor nominal cross section [mm²] | Outer diameter (d) max. [mm] | Copper index [kg/km] | Weight [kg/km] |
|---|---|---|---|---|
| **CF78.UL.25.03** | (3G2.5)C | 10.0 | 106 | 181 |
| **CF78.UL.25.04** | (4G2.5)C | 11.5 | 139 | 203 |
| **CF78.UL.25.05** | (5G2.5)C | 12.5 | 166 | 235 |
| **CF78.UL.25.07** [17] | (7G2.5)C | 14.5 | 229 | 334 |
| **CF78.UL.25.12** | (12G2.5)C | 19.0 | 382 | 585 |
| **CF78.UL.40.04** | (4G4.0)C | 14.0 | 203 | 328 |

[17] When using the cables with “7 G 1.5 mm²” and “7 G 2.5 mm²” minimum bend radius must be 17.5 x d with gliding travel distance ≥ 5 m.

**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] | Maximum current rating at 30 °C (following DIN VDE 0298-4) [A] |
|---|---|---|
| 0.5 | 39.0 | 10 |
| 0.75 | 26.0 | 14 |
| 1 | 19.5 | 17 |
| 1.5 | 13.3 | 21 |
| 2.5 | 8.0 | 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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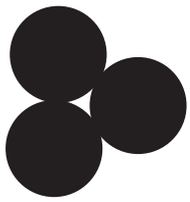
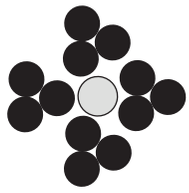
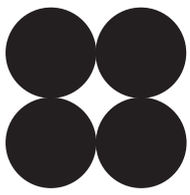
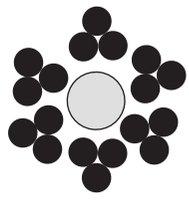
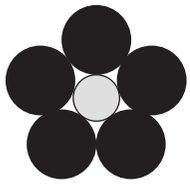
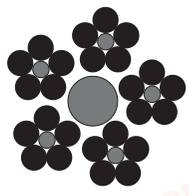
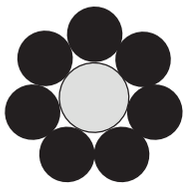
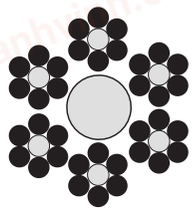
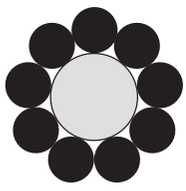
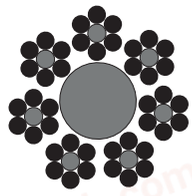
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Example image

## Design table

| Part No. | Number of cores | Core design | Part No. | Number of cores | Core design |
|---|---|---|---|---|---|
| CF78.UL.XX.03 | 3 |  | CF78.UL.XX.12 | 4x3 |  |
| CF78.UL.XX.04 | 4 |  | CF78.UL.XX.18 | 6x3 |  |
| CF78.UL.XX.05 | 5 |  | CF78.UL.XX.25 | 5x5 |  |
| CF78.UL.XX.07 | 7 |  | CF78.UL.XX.36 | 6x6 |  |
| CF78.UL.XX.09 | 9 |  | CF78.UL.XX.42 | 7x6 |  |

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