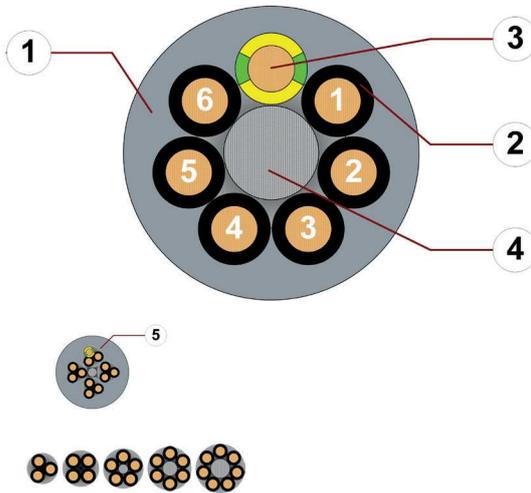


# Data sheet

## chainflex® CF77.UL.D



Control cable (Class 5.5.3.3) ● For heavy duty applications ● PUR outer jacket ● Oil resistant and coolant-resistant ● Flame retardant ● PVC and halogen-free ● Notch-resistant ● Hydrolysis and microbe-resistant



1. Outer jacket: Pressure extruded, gusset-filling PUR mixture
2. Core insulation: Mechanically high-quality TPE mixture
3. Conductor: Fine-wire strand consisting of bare copper wires
4. Strain relief: Tensile stress-resistant centre element
5. 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.  
**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 < 0.5 mm<sup>2</sup>:** Colour code in accordance with DIN 47100.  
**Cores ≥ 0.5 mm<sup>2</sup>:** Black cores with white numbers, one green-yellow core.  
**CF77.UL.02.03.INI:** brown, blue, black  
**CF77.UL.03.04.INI:** brown, blue, black, white  
**CF77.UL.03.05.INI:** brown, blue, black, white, green-yellow
- 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).  
Colour: Window-grey (similar to RAL 7040)  
Printing: black

„00000 m\*\*\*\* igus chainflex CF77.UL.-.D① --② -/V③ E310776

cRUus AWM Style -----④ VW-1 AWM I/II A/B 80°C ---V⑤ FT-1 DNV-GL TAE00003X1

EAC/CTP CE DESINA 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 ... CF77.UL.02.04.D ... 4x0.25 ... 300 V/500 V ...



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### Dynamic information

	<b>Bend radius</b>	<b>e-chain® linear</b> <b>flexible</b> <b>fixed</b>	minimum 6.8 x d minimum 5 x d minimum 4 x d
	<b>Temperature</b>	<b>e-chain® linear</b> <b>flexible</b> <b>fixed</b>	-25 °C up to +80 °C -40 °C up to +80 °C (following DIN EN 60811-504) -50 °C up to +80 °C (following DIN EN 50305)
	<b>v max.</b>	<b>unsupported</b> <b>gliding</b>	10 m/s 5 m/s
	<b>a max.</b>		80 m/s <sup>2</sup>
	<b>Travel distance</b>		Unsupported travels and up to 100 m for gliding applications, Class 5
	<b>Torsion</b>		± 180°, with 1 m cable length, Class 3 (except for 5-core types ≥ 4.0 mm <sup>2</sup> Product range table)

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

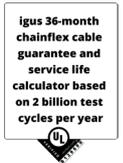
### Guaranteed service life according to guarantee conditions

Double strokes	5 million		7.5 million		10 million	
	< 10 m	≥ 10 m	< 10 m	≥ 10 m	< 10 m	≥ 10 m
Temperature, from/to [°C]	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

	<b>Nominal voltage</b>	300/500 V (following DIN VDE 0298-3) <b>Number of cores &lt; 12:</b> <b>Cores &lt; 0.5 mm<sup>2</sup>:</b> 300 V (following UL) <b>Cores ≥ 0.5 mm<sup>2</sup>:</b> 1000 V (following UL) <b>Number of cores ≥ 12:</b> 1000 V (following UL)
	<b>Testing voltage</b>	2000 V (following DIN EN 50395)



Example image



# Data sheet

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### Properties and approvals

	<b>UV resistance</b>	Medium
	<b>Oil resistance</b>	Oil-resistant (following DIN EN 50363-10-2), Class 3
	<b>Offshore</b>	MUD-resistant following NEK 606 - status 2009
	<b>Flame retardant</b>	According to IEC 60332-1-2, FT1, VW-1
	<b>Silicone-free</b>	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
	<b>Halogen-free</b>	Following DIN EN 60754
	<b>UL verified</b>	Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
	<b>UL/CSA AWM</b>	See data sheet for details ► <a href="http://www.igus.eu/CF77.UL.D">www.igus.eu/CF77.UL.D</a>
	<b>NFPA</b>	Following NFPA 79-2018, chapter 12.9
	<b>DNV-GL</b>	Type approval certificate No. TAE00003X1
	<b>EAC</b>	Certificate No. RU C-DE.ME77.B.00300/19 (TR ZU)
	<b>REACH</b>	In accordance with regulation (EC) No. 1907/2006 (REACH)
	<b>Lead-free</b>	Following 2011/65/EC (RoHS-II/RoHS-III)
	<b>Cleanroom</b>	According to ISO Class 1, material/cable tested by IPA according to DIN EN ISO standard 14644-1
	<b>DESINA</b>	According to VDW, DESINA standardisation
	<b>CE</b>	Following 2014/35/EU



igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year



Example image

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### Properties and approvals

UL/CSA AWM Details

Conductor nominal cross section [mm <sup>2</sup> ]	Number of cores	UL style core insulation	UL style outer jacket	UL Voltage Rating [V]	UL Temperature Rating [°C]
0.25	3-7	10493	20549	300	80
0.25	12-25	11323	21223	1000	80
0.34	4-5	10493	20549	300	80
0.5	4-7	11323	20940	1000	80
0.5	12-30	11323	21223	1000	80
0.75	3-7	11323	20940	1000	80
0.75	12-42	11323	21223	1000	80
1	2-7	11323	20940	1000	80
1	12-42	11323	21223	1000	80
1.5	3-36	11323	21223	1000	80
2.5	3-12	11323	21223	1000	80
4	4-5	11323	21223	1000	80
6	5	11323	21223	1000	80

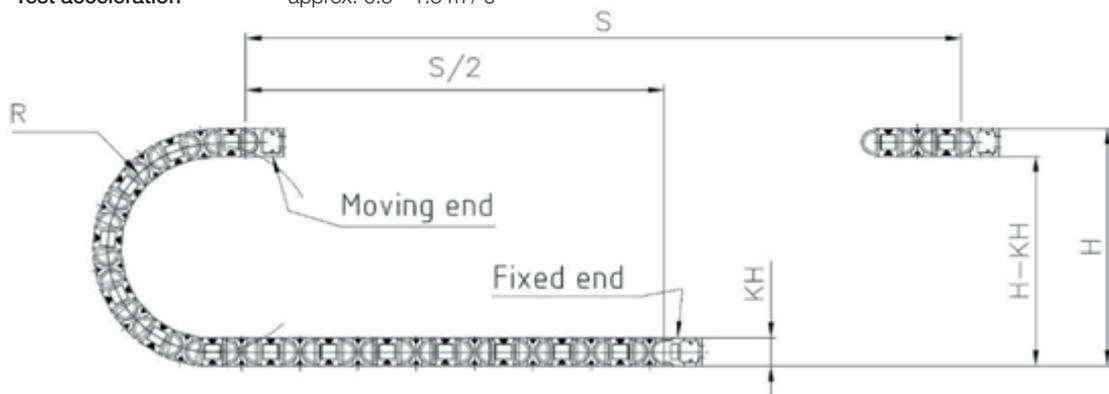


igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year



### 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<sup>2</sup>



### 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
- Torsion ± 180°, with 1 m cable length, Class 3
- 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

Example image

igus® chainflex® CF77.UL.D

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### Technical tables:

#### Mechanical information

Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.02.03.INI <sup>12)</sup>	3x0.25	5.0	9	29
CF77.UL.02.04.D	4x0.25	5.5	11	35
CF77.UL.02.12.D	12x0.25	9.0	32	78
CF77.UL.02.18.D	18x0.25	10.5	47	127
CF77.UL.03.04.INI <sup>12)</sup>	4x0.34	6.0	16	39
CF77.UL.03.05.INI <sup>12)</sup>	5x0.34	6.0	17	35
CF77.UL.03.04.INI.D	5x0.34	6.0	17	35
CF77.UL.05.04.D	4G0.5	6.0	21	46
CF77.UL.05.05.D	5G0.5	6.5	26	53
CF77.UL.05.07.D	7G0.5	7.5	39	78
CF77.UL.05.12.D	12G0.5	10.0	63	130
CF77.UL.05.18.D	18G0.5	12.0	94	184
CF77.UL.05.25.D	25G0.5	14.0	129	243
CF77.UL.05.30.D	30G0.5	15.0	155	315
CF77.UL.07.03.D	3G0.75	6.5	23	52
CF77.UL.07.04.D	4G0.75	7.0	31	59
CF77.UL.07.05.D	5G0.75	7.5	38	71
CF77.UL.07.07.D	7G0.75	8.5	54	100
CF77.UL.07.12.D	12G0.75	12.0	91	180
CF77.UL.07.18.D	18G0.75	13.5	134	239
CF77.UL.07.20.D	20G0.75	14.5	149	269
CF77.UL.07.25.D	25G0.75	16.0	186	336
CF77.UL.07.36.D	36G0.75	19.0	279	506
CF77.UL.07.42.D	42G0.75	21.0	341	580
CF77.UL.10.02.D	2x1.0	6.5	21	51
CF77.UL.10.03.D	3G1.0	6.5	31	58
CF77.UL.10.04.D	4G1.0	7.0	41	73
CF77.UL.10.05.D	5G1.0	8.0	50	90
CF77.UL.10.07.D	7G1.0	9.0	71	120
CF77.UL.10.12.D	12G1.0	12.5	120	220
CF77.UL.10.18.D	18G1.0	15.0	179	314
CF77.UL.10.25.D	25G1.0	17.5	248	431
CF77.UL.10.42.D	42G1.0	22.5	433	699

<sup>12)</sup> Colour outer jacket: Colza yellow (similar to RAL 1021)

**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



Example image



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Part No.	Number of cores and conductor nominal cross section [mm <sup>2</sup> ]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CF77.UL.15.03.D	3G1.5	7.0	46	71
CF77.UL.15.04.D	4G1.5	7.5	61	88
CF77.UL.15.05.D	5G1.5	8.0	75	105
CF77.UL.15.07.D <sup>17)</sup>	7G1.5	9.5	105	152
CF77.UL.15.12.D	12G1.5	13.0	179	297
CF77.UL.15.18.D	18G1.5	17.0	268	405
CF77.UL.15.25.D	25G1.5	19.5	297	564
CF77.UL.15.36.D	36G1.5	23.5	551	848
CF77.UL.25.03.D	3G2.5	8.5	75	132
CF77.UL.25.04.D	4G2.5	9.5	95	167
CF77.UL.25.05.D	5G2.5	10.0	124	196
CF77.UL.25.07.D <sup>17)</sup>	7G2.5	12.0	174	270
CF77.UL.25.12.D	12G2.5	17.0	297	479
CF77.UL.40.04.D <sup>90)</sup>	4G4.0	11.5	165	245
CF77.UL.40.05.D <sup>90)</sup>	5G4.0	12.0	198	284
CF77.UL.60.05.D <sup>90)</sup>	5G6.0	13.5	297	412
CF77.UL.02.05.D	5x0.25	6.0	13	39
CF77.UL.02.07.D	7x0.25	6.5	18	51
CF77.UL.02.25.D	25x0.25	11.5	63	155

<sup>17)</sup> When using the cables with „7G1.5mm<sup>2</sup>“ and „G2.5mm<sup>2</sup>“ minimum bend radius must be 17.5xd with gliding travel distance ≥ 5m.

<sup>90)</sup> Torsion ±90°

**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

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Example image

### Electrical information

Conductor nominal cross section [mm <sup>2</sup> ]	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
0.34	57	7
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
6	3.3	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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### Design table

Part No.	Number of cores	Core design	Part No.	Number of cores	Core design
CF77.UL.XX.02.D	2		CF77.UL.XX.18.D	6x3	
CF77.UL.XX.03.D CF77.UL.XX.03.INI	3		CF77.UL.XX.20.D	5x4	
CF77.UL.XX.04.D CF77.UL.XX.04.INI	4		CF77.UL.XX.25.D	5x5	
CF77.UL.XX.05.D CF77.UL.XX.05.INI CF77.UL.XX.05.INI.D	5		CF77.UL.XX.30.D	6x5	
CF77.UL.XX.07.D	7		CF77.UL.XX.36.D	6x5	
CF77.UL.XX.12.D	4x3		CF77.UL.XX.42.D	7x6	



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Example image



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### Colour code in accordance with DIN 47100.

Conductor no.	Colours according to DIN ISO 47100	Conductor no.	Colours according to DIN ISO 47100	Conductor no.	Colours according to DIN ISO 47100
1	white	22	brown-blue	43	blue-black
2	brown	23	white-red	44	red-black
3	green	24	brown-red	45	white-brown-black
4	yellow	25	white-black	46	yellow-green-black
5	grey	26	brown-black	47	grey-pink-black
6	pink	27	grey-green	48	red-blue-black
7	blue	28	yellow-grey	49	white-green-black
8	red	29	pink-green	50	brown-green-black
9	black	30	yellow-pink	51	white-yellow-black
10	violet	31	green-blue	52	yellow-brown-black
11	grey-pink	32	yellow-blue	53	white-grey-black
12	red-blue	33	green-red	54	grey-brown-black
13	white-green	34	yellow-red	55	white-pink-black
14	brown-green	35	green-black	56	pink-brown-black
15	white-yellow	36	yellow-black	57	white-blue-black
16	brown-yellow	37	grey-blue	58	brown-blue-black
17	white-grey	38	pink-blue	59	white-red-black
18	brown-grey	39	grey-red	60	brown-red-black
19	white-pink	40	pink-red	61	black-white
20	white-brown	41	grey-black		
21	white-blue	42	pink-black		



igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year



Example image