

CFCLEAN

Cables for cleanroom applications



chainflex® cable	Bend radius e-skin® flat [factor x d]	Temperature e-skin® flat from/to [°C]	Approvals and standards	v max. [m/s] unsupported	a max.	Page
CFCLEAN elements for cleanroom applications						
Information about e-skin® flat with chainflex® CFCLEAN						446
Control elements						
CFCLEAN1	70	-10/+80		2	40	450 New
Coax elements						
CFCLEAN2	70	-10/+80		2	40	452
Data elements						
CFCLEAN3	70	-10/+80		2	40	454 New
Measuring system elements						
CFCLEAN4	70	-10/+80		2	40	456 New
Motor elements						
CFCLEAN7	70	-10/+80		2	40	458 New
Bus elements						
CFCLEAN8	70	-10/+80		2	40	460

chainflex® guarantee

These series are solutions for special applications, please contact igus® for information about the service life guarantee:

Phone +49-2203 9649-0, info@igus.de

Guarantee
igus chainflex

36

up to 36 months guarantee

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

- ... increases your overall effectiveness
- ... generates higher production yields
- ... modular and compact
- ... resource- and maintenance-friendly
- ... www.igus.eu/e-skin-flat

clean-room

The main advantages of the e-skin® flat are its modularity and ease of maintenance. Unlike common solutions that use defined flat ribbon cables, in which stranded elements are firmly fixed, the e-skin® flat cable guide system is designed with an openable chamber. Flexible chainflex® CFCLEAN cable elements (with or without connectors), e-skin® flat with support chains, hoses, etc. can now be replaced or added in a few minutes.

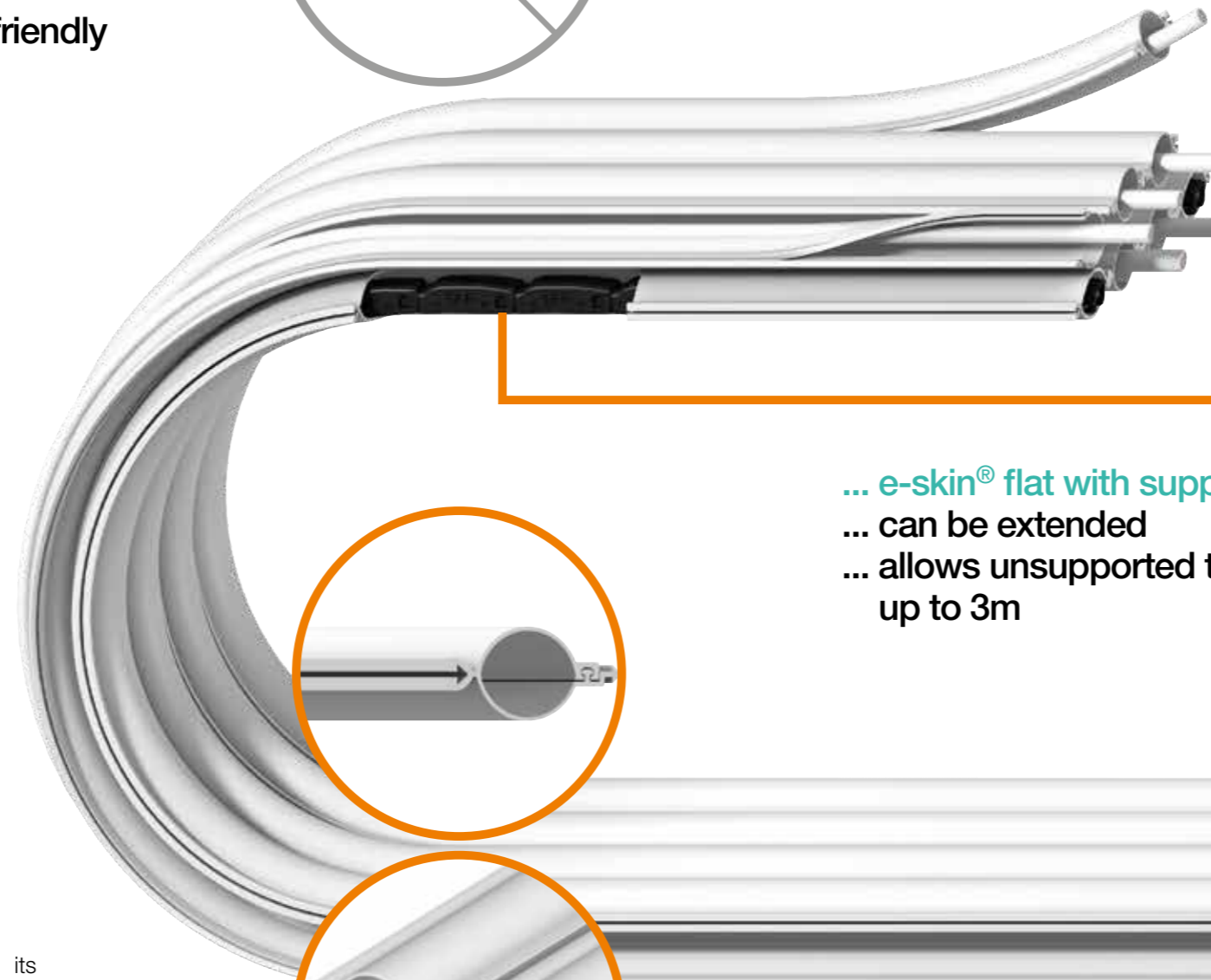
- Highly efficient in prototype phases
- Maximum availability due to easy replacement of individual elements
- Saving resources, as only individual elements are replaced in case of damage



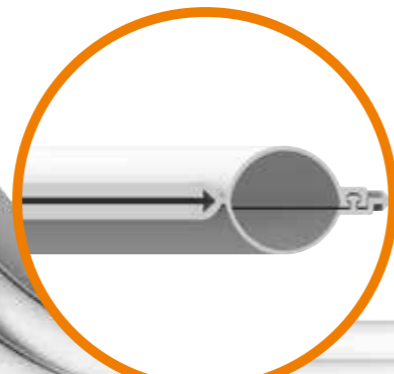
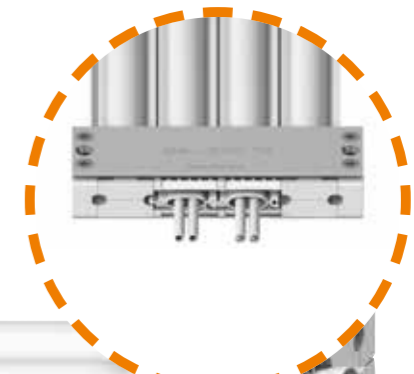
Commercially available ribbon cables with permanently integrated cable elements: the entire system must be replaced if damaged.



e-skin® flat system certified according to EN ISO Class 1 Report IG 2102-1212



- ... e-skin® flat with support chain SKF.S
- ... can be extended
- ... allows unsupported travel lengths of up to 3m

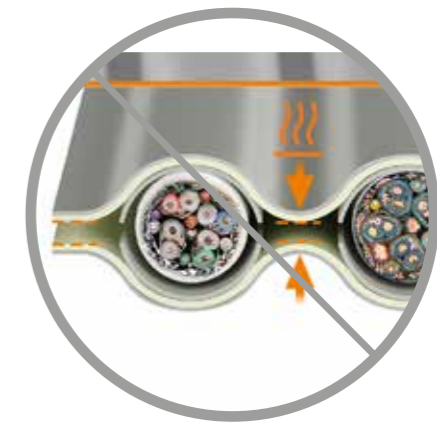


- ... combined with chainflex® CFCLEAN
- ... highest flexibility for machine development
- ... offers quick cable replacement
- ... replaces customer-specific flat ribbon cable
- ... cost-effective and sustainable
- ... available from stock
- ... minimum length 1m
- ... www.igus.eu/cfclean



- ... made for the e-skin® flat
- ... great flexural strength thanks to special very finely stranded conductors
- ... protected by highly abrasion-resistant heat-sealed film
- ... no outer jacket, so it is small and lightweight
- ... for energy, bus and data
- ... available from stock ...
- ... www.igus.eu/cfclean

Commercially available ribbon cables
with permanently welded cable elements



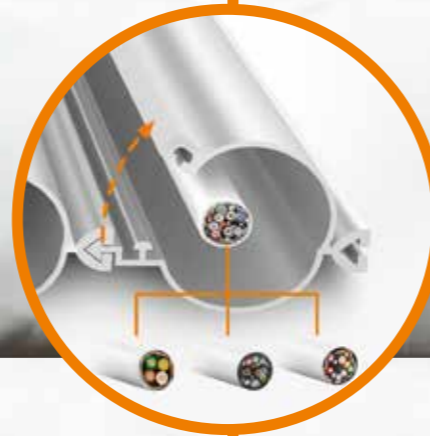
CFCLEAN3 DATA ELEMENTS



CFCLEAN8 BUS ELEMENTS



CFCLEAN1 CONTROL ELEMENTS



CFCLEAN7 MOTOR ELEMENTS



e-skin® flat cable guide systems combined with chainflex® CFCLEAN cables, constitute the further development of the conventional PTFE trackless cables for cables guides in the production environment of displays, semiconductors and OLEDs as well as in medical technology. The strengths of the PTFE ribbon cable have been enhanced and the intrinsic weaknesses eliminated. The new e-skin® flat cable guide system is the result of this refinement.

- Stiff cable jackets prevent system bending
- Low restoring forces:
 - ... due to highly flexible stranded structures
 - ... special conductors
 - ... no outer jacket required
- CFCLEAN chainflex® adapted to the application with up to 21% less weight than conventional cables
- About 16% smaller diameter than standard cables with jacket
- Minimum order length 1m
- All standard core/cross section combinations: data, bus, control, motor – available from stock, with a guarantee of up to 36 months



Control elements | chainflex® CFCLEAN1

36 20 million
Double strokes guaranteed






Min. 70mm
bend radius e-skin® flat

3m
travel distance e-skin® flat







- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Now with
UL approval
in combination
with e-skin® flat



Dynamic information

	Bend radius	e-skin® flat linear	min. 70mm (further radii in preparation, please see data sheet)
		fixed	minimum 3 x d
	Temperature	e-skin® linear	-10°C up to +80°C
		fixed	-25°C up to +90°C (following DIN EN 50305)
	v max.	unsupported	2m/s
	a max.		40m/s ²
	Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat









Cable structure

	Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
	Core insulation	Mechanically high-quality FEP mixture.
	Core structure	Cores wound in a layer with especially short pitch length.
	Core identification	Cores < 0.5mm²: Colour code in accordance with DIN 47100. Cores ≥ 0.5mm²: White cores with black numbers, one green-yellow core.
	Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
	Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

	Nominal voltage	300/300V 300V (following UL)
	Testing voltage	2,000V

Properties and approvals

	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
	UL verified	Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ► www.igus.eu/CFCLEAN1
	UL AWM	
	REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
	Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
	Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 Following 2014/35/EU
	CE	
	UKCA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom



chainflex® CFCLEAN are not cables in the sense of the standards for wires and cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted in e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm ²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN1.02.04	(4x0.25)C	3.5	21	27
CFCLEAN1.03.02	(2x0.34)C	3.5	17	22
CFCLEAN1.03.07	(7x0.34)C	5.0	40	50
CFCLEAN1.05.04	(4G0.5)C	5.0	36	49
CFCLEAN1.07.04	(4G0.75)C	5.0	50	63
CFCLEAN1.07.05	(5G0.75)C	5.5	58	74
CFCLEAN1.10.02	(2x1.0)C	5.0	37	49

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

Guarantee
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up to 36 months guarantee

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cycles per year

CFRIP

CE LISTED

UL

nec

NFPA

CUPA

DNV

EAC

REACH

RoHS

clean-room

UL

CE

UKCA

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chainflex cable
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




UL 451

Coax elements | chainflex® CFCLEAN2





- 36** 20 million Double strokes guaranteed
- Min. 70mm** bend radius e-skin® flat
- 3m** travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free



Dynamic information

	Bend radius	e-skin® flat linear	minimum 70mm (further radii in preparation, please see data sheet)
		fixed	minimum 3 x d
	Temperature	e-skin® linear	-10°C up to +80°C
		fixed	-25°C up to +90°C (following DIN EN 50305)
	v max.	unsupported	2m/s
	a max.		40m/s ²
	Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat






Cable structure

	Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
	Core insulation	Mechanically high-quality PTFE mixture.
	Core structure	Cores wound in a layer with especially short pitch length.
	Core identification	White core with black imprint ► Product range table
	Element shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
	Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

	Nominal voltage	300/300V
	Testing voltage	2,000V

Properties and approvals

	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
	UL verified	Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“
	REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
	Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
	Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242
	CE	Following 2014/35/EU
	UK CA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom



chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm ²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN2.KOAX1.03	3xHF75-0.3/1.6	6.5	23	57

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

Part No.	Characteristic wave impedance approx. [Ω]	Core identification
CFCLEAN2.KOAX1.03	75	Coax 75Ohm -1-, Coax 75Ohm -2-, Coax 75Ohm -3-

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CFRIP

LISTED

UL

nec

NFPA

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EAC

REACH

RoHS

clean-room

UL

CE

UK CA

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UL

Data elements | chainflex® CFCLEAN3

36 20 million

Double strokes guaranteed

**Min. 70mm**

bend radius e-skin® flat

**3m**

travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Now with
UL approval
in combination
with e-skin® flat

Dynamic information

	Bend radius	e-skin® flat linear	minimum 70mm (further radii in preparation, please see data sheet)
		fixed	minimum 3 x d
	Temperature	e-skin® linear	-10°C up to +80°C
		fixed	-25°C up to +90°C (following DIN EN 50305)
	v max.	unsupported	2m/s
	a max.		40m/s ²
	Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat

Cable structure

	Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
	Core insulation	Mechanically high-quality FEP mixture.
	Core structure	Cores twisted in pairs with a short pitch length, core pairs then wound with short pitch lengths.
	Core identification	► Product range table
	Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
	Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

	Nominal voltage	300/300V 300V (following UL)
	Testing voltage	2,000V

Properties and approvals

	Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
	UL verified	Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ► www.igus.eu/CFCLEAN3
	UL AWM	
	REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
	Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
	Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 Following 2014/35/EU
	CE	
	UKCA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom



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Part No.	Number of cores and conductor nominal cross section [mm ²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN3.01.05.02	(5x(2x0.14))C	5.0	33	43
CFCLEAN3.01.06.02	(6x(2x0.14))C	5.5	36	50
CFCLEAN3.01.08.02	(8x(2x0.14))C	6.0	47	61
CFCLEAN3.02.03.02	(3x(2x0.25))C	5.0	34	44
CFCLEAN3.02.04.02	(4x(2x0.25))C	5.5	42	58
CFCLEAN3.02.05.02	(5x(2x0.25))C	5.5	50	63
CFCLEAN3.02.06.02	(6x(2x0.25))C	6.0	52	70

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

Part No.	Core identification
CFCLEAN3.01.05.02	brown/white, green/white, yellow/white, grey/white, pink/white
CFCLEAN3.01.06.02	brown/white, green/white, yellow/white, grey/white, pink/white, blue/white
CFCLEAN3.01.08.02	brown/white, green/white, yellow/white, grey/white, pink/white, blue/white, red/white, black/white
CFCLEAN3.02.03.02	brown/white, green/white, yellow/white
CFCLEAN3.02.04.02	brown/white, green/white, yellow/white, grey/white
CFCLEAN3.02.05.02	brown/white, green/white, yellow/white, grey/white, pink/white
CFCLEAN3.02.06.02	brown/white, green/white, yellow/white, grey/white, pink/white, blue/white

Guarantee
igus chainflex
36
months

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CFRIP

CE LISTED

UKCA

NEC

NFPA

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DNV

EAC

REACH

RoHS

clean-room

UL

CE

UKCA



Example image

Measuring system elements | chainflex® CFCLEAN4

36 20 million
Double strokes guaranteed






Min. 70mm
bend radius e-skin® flat

3m
travel distance e-skin® flat







- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free

Now with
UL approval
in combination
with e-skin® flat



Dynamic information

 Bend radius	e-skin® flat linear	minimum 70mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
 Temperature	e-skin® linear	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
 v max.	unsupported	2m/s
 a max.		40m/s ²
 Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat









Cable structure

 Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
 Core insulation	Mechanically high-quality FEP mixture.
 Core structure	According to measuring system specification.
 Core identification	According to measuring system specification.
 Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
 Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

 Nominal voltage	300/300V 300V (following UL)
 Testing voltage	2,000V

Properties and approvals

 Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
 UL verified	Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ► www.igus.eu/CFCLEAN4
 UL AWM	
 REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
 Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
 Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 Following 2014/35/EU
 CE	
 UKCA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom

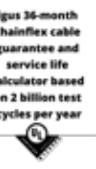


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Part No.	Number of cores and conductor nominal cross section [mm ²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN4.015	(4x(2x0.14)+4x0.5)C	6.5	60	77

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

Part No.	Core group	Colour code
CFCLEAN4.015	4x(2x0.14) 4x0.5	brown/green, yellow/violet, grey/pink, red/black blue, white, brown-green, white-green



Motor elements | chainflex® CFCLEAN7

36 20 million
Double strokes guaranteed






Min. 70mm
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travel distance e-skin® flat







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Now with
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Dynamic information

 Bend radius	e-skin® flat linear	minimum 70mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
 Temperature	e-skin® linear	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
 v max.	unsupported	2m/s
 a max.		40m/s ²
 Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat









Cable structure

 Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
 Core insulation	Mechanically high-quality FEP mixture.
 Core structure	Cores wound in a layer with especially short pitch length.
 Core identification	Power cores: White cores with black numbers 1-3, one green-yellow core. 1 Control pair: white, black
 Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
 Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

 Nominal voltage	600/1,000V 600V (following UL)
 Testing voltage	3,000V

Properties and approvals

 Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
 UL verified	Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ► www.igus.eu/CFCLEAN7
 UL AWM	
 REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
 Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
 Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 Following 2014/35/EU
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Part No.	Number of cores and conductor nominal cross section [mm ²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
CFCLEAN7.15.03.02.01	(4G1.5+(2x0.34)C)C	9.5	126	176
CFCLEAN7.15.04	(4G1.5)C	8.0	94	131
CFCLEAN7.PE.25.01	(1G2.5)C	4.5	41	73

Note: The given outer diameters are maximum values and may tend toward lower tolerance limits.
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CFRIP

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up to 36 months guarantee

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






UL

Bus elements | chainflex® CFCLEAN8







- 36** 20 million Double strokes guaranteed
- Min. 70mm** bend radius e-skin® flat
- 3m** travel distance e-skin® flat

- For heaviest duty applications in e-skin® flat
- PTFE foil wrap
- Shielded
- Highly abrasion-resistant
- PVC-free



Dynamic information

 Bend radius	e-skin® flat linear	minimum 70mm (further radii in preparation, please see data sheet)
	fixed	minimum 3 x d
 Temperature	e-skin® linear	-10°C up to +80°C
	fixed	-25°C up to +90°C (following DIN EN 50305)
 v max.	unsupported	2m/s
 a max.		40m/s ²
 Travel distance		Short, very fast applications with small radii and restricted installation space in an e-skin® flat









Cable structure

 Conductor	Very finely stranded special conductors with especially soft and bending resistant design, made of bare copper wires.
 Core insulation	Mechanically high-quality FEP mixture.
 Core structure	According to bus specification.
 Core identification	According to bus specification. ► Product range table
 Overall shield	Extremely bending-resistant braiding made of tinned copper wires. Coverage linear approx. 70%, optical approx. 90%
 Outer film	Low-adhesion, extremely abrasion-resistant and highly flexible PTFE wrap, adapted to suit the requirements in e-skin® flat. Colour: White

Electrical information

 Nominal voltage	300/300V
 Testing voltage	2,000V

Properties and approvals

 Silicone-free	Free from silicone which can affect paint adhesion (following PV 3.10.7 – status 1992)
 UL verified	Certificate No. B129699: „igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year“ See data sheet for details ► www.igus.eu/CFCLEAN8
 UL AWM	
 REACH	In accordance with regulation (EC) No. 1907/2006 (REACH)
 Lead-free	Following 2011/65/EC (RoHS-II/RoHS-III)
 Cleanroom	Air Purity Class 1, material/stranded structure tested by IPA according to ISO 14644-14, test report IG 2107-1242 Following 2014/35/EU
 CE	
 UKCA	In accordance with the valid regulations of the United Kingdom (as at 08/2021)

Typical application areas

- For heaviest duty applications and especially small radii in cleanroom with e-skin® flat
- Especially for short, very fast applications with small radii and restricted installation space
- Indoor applications with e-skin® flat
- Semi-conductor/OLED manufacturing, medical cleanroom



chainflex® CFCLEAN are not cables in the sense of the normal standards for cables. Due to the absence of the outer jacket in CFCLEAN, which provides mechanical protection for cables, the use of chainflex® CFCLEAN is only permitted inside e-skin® flat.

Part No.	Number of cores and conductor nominal cross section [mm ²]	Outer diameter (d) max. [mm]	Copper index [kg/km]	Weight [kg/km]
Ethernet/CAT5e				
CFCLEAN8.045	(4x(2x0.14))C	5.5	34	47

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

Part No.	Characteristic wave impedance approx. [Ω]	Core group	Colour code
Ethernet/CAT5e			
CFCLEAN8.045	100	4x(2x0.14)	white/blue, white/orange, white/green, white/brown

igus® chainflex® CFCLEAN8

Example image

