



REINER!
2021

Ergebnis Reintechnik Preis

070.01 SKF.S.0800.070.01 SKF.S.0800.070.01

CHAINFLEX CF9

The igus[®] e-chains[®] for cleanroom

- IPA cleanroom Class 1
according to EN ISO 14644-1
- Abrasion-resistant
- Modular construction kit
- Easy to fill, openable
- Available from stock
- No minimum order quantity
- With up to 36-month guarantee



Profiles **Corrugated tube cleanroom energy supply systems**

Cleanroom energy supply - products

e-skin® flat SKF profiles SKF.C - fully enclosed	e-skin® flat SKF profiles SKF.O - with special locking mechanism	e-skin® SK - for longer unsupported lengths	e-skin® soft SKS - with more elastic material and lower clearance height	e-skin® hybrid SKY - combines the advantages of e-skin® SK and e-skin® soft SKS
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Advantages of the cleanroom energy supply system

<ul style="list-style-type: none"> ● Prevent particle ingress with closed cable chambers ● Support e-chain® for unsupported length and an optionally available, defined bend radius ● Space requirement: from 80mm ● Unsupported length: depending on the guided cables ● Modular expandable flat cable guidance system ● Fast, short applications ● Extremely quiet 29dB(A) 	<ul style="list-style-type: none"> ● Easy to fill due to a special locking mechanism ● Space requirement: from 80mm ● Unsupported length: depending on the guided cables ● Modular expandable flat cable guidance system ● Fast, short applications ● Extremely quiet 29dB(A) 	<ul style="list-style-type: none"> ● Two-piece corrugated tube, can be opened and closed like a zipper ● Space requirement: from 250mm ● Bend radii 55 - 100mm ● Unsupported length up to 2.0m ● IPA cleanroom Class 1 ● Openable corrugated tube with upper/lower shell ● Fast, short, unsupported applications ● Quiet 33dB(A) 	<ul style="list-style-type: none"> ● Flexible, two-piece corrugated tube, can be opened and closed like a zipper ● Space requirement: from 150mm ● Bend radii 55 - 100mm ● Unsupported length up to 1.3m ● IPA cleanroom Class 1 ● Openable corrugated tube with upper/lower shell ● Fast, short, unsupported applications ● Quiet 32dB(A) 	<ul style="list-style-type: none"> ● Two-piece corrugated tube, can be opened and closed like a zipper ● Space requirement: from 200mm ● Bend radii 55 - 100mm ● Unsupported length up to 1.4m ● IPA cleanroom Class 1 ● Openable corrugated tube with upper/lower shell ● Fast, short, unsupported applications ● Quiet 33dB(A)
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IPA cleanroom Class



Energy supply system material

igumer SKF	igumer SKF	igumer SK	igumer SKS	Combination of igumer SK (upper shell) and igumer SKS (lower shell)
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Product range

From page ► 798	From page ► 798	From page ► 812	From page ► 812	From page ► 812
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E6.1 e-chain® **E6 e-chain®** **R6 e-tube** **E3 e-chain®** **T3 e-chain®**

Cleanroom e-chain® - products

Crossbars removable along the inner and outer radius	Crossbars removable along the inner and outer radius	Fully enclosed, lids removable along the inner and outer radius	E3 system - three-piece band e-chain®, crossbars zip-open along the outer radius	T3 system - t-shaped band e-chains®, crossbars removable
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Advantages of the cleanroom e-chain®

<ul style="list-style-type: none"> ● Extremely quiet 32dB(A) ● Low vibration ● For very high speeds and accelerations ● Optimised crossbar geometry ● High push-pull forces ● Small bend radii ● IPA cleanroom Class 1, virtually no wear or abrasion 	<ul style="list-style-type: none"> ● For very high speeds and accelerations ● For small bend radii ● High strength ● Extremely quiet 37dB(A) ● Low vibration ● IPA cleanroom Class 1, virtually no wear or abrasion 	<ul style="list-style-type: none"> ● Available as closed e-tube for some sizes ● For very high speeds and accelerations ● For small bend radii ● High strength ● Extremely quiet 37dB(A) ● Low vibration ● IPA cleanroom Class 1, virtually no wear or abrasion 	<ul style="list-style-type: none"> ● For high speeds and accelerations ● For extremely fast opening and closing ● Quiet 38dB(A) ● extremely low noise and low vibration due small pitch ● IPA cleanroom Class 1, virtually no wear or abrasion 	<ul style="list-style-type: none"> ● Very low weight e-chain® ● For high speeds and accelerations ● Virtually no polygon effect ● Small bend radii and installation space ● Fast, easy filling and assembly ● Quiet 33dB(A) ● Extremely low noise and low vibration due small pitch ● IPA cleanroom Class 2, virtually no wear or abrasion
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IPA cleanroom Class



Energy supply system material

igumid G	igumid GE	igumid GE	igumid G	igumid TE
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Product range

From page ► 832	From page ► 870	From page ► 870	From page ► 916	From page ► 934
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e-skin[®] flat

SKF profiles -
cleanroom compatible
and compact **New**



Advantages of the e-skin[®] flat SKF series:

- Suitable for cleanroom according to IPA cleanroom Class 1
- Available in 2 versions: closed series SKF12C, SKF15C and openable series SKF12O with a special closure system
- Modular and compact design
- Replace cables quickly
- Optional support e-chain[®] for longer unsupported lengths
- Multi-layer version possible
- Stackable, width-variable mounting brackets available
- Fast, flexible changes to the filling
- Flexible standard modular system, no special production required
- chainflex[®] CFCLEAN cable offers high reliability due to balanced braided design



When to use another energy supply system:

- For longer unsupported lengths up to 2m
 - ▶ e-skin[®] SK, page 812
- For smaller installation spaces from 150 mm
 - ▶ e-skin[®] soft SKS, page 812
- For a combination of greater unsupported length and smaller installation space
 - ▶ e-skin[®] hybrid SKY, page 812
- For significantly higher fill weights and/or longer unsupported lengths
 - ▶ E6.1, page 832



New in this catalogue

SKF.O openable:
replace cables quickly with a
special locking mechanism

IPA cleanroom Class 1:
virtually no wear or abrasion

Modular structure:
extendable by connecting
additional profiles

Optional support e-chain®:
SKF12C series for unsupported
length and a defined bend radius

Mounting brackets:
stackable and variable width
with integrated strain relief

SKF.C fully enclosed:
prevent particle ingress with
closed cable chamber version

Flexible:
can be shortened or widened

Revolutionise efficiency of the
entire plant:
specially matched
chainflex® CFCLEAN
braided structure
More information ► Page 808

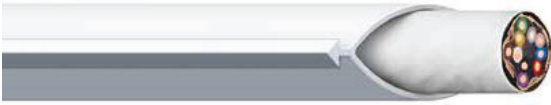
Connectable profiles - e-skin® flat SKF

The cable guides for automation systems and robots in the production of microelectronic components have to meet special particle-free requirements. In contrast to commercially available solutions using fixed flat ribbon cables where cables are firmly fixed, the e-skin® flat energy supply system offers an openable chamber design. Flexible braided cable elements (with or without connectors), e-skin® flat with support chains, hoses and so on, can now be changed or added in a few minutes.

- Available in 2 versions: closed and openable with a special closure system
- Modular and compact design
- Optional support e-chain® for longer unsupported lengths
- Multi-layer version possible
- Flexible standard modular system, no special production required
- chainflex® CFCLEAN cable offers high reliability due to balanced braided design
- Saving resources, as only individual elements are replaced in case of damage
- Replaces customer-specific flat ribbon cable

Typical industries and applications

- Cleanroom applications with compact installation spaces
- Short travels
- Display and semiconductor production
- LCD/LED panel production

SKF series Part No.	Inner height [mm]	Outer height [mm]	Quantity chambers	Cable ≤ Ø [mm]	Page
 <p>e-skin® flat SKF.C - fully enclosed prevent particle ingress with closed cable chambers</p>					
SKF12C* <small>New</small>	12	13	2 - 6	10	804
SKF15C <small>New</small>	15	16	2 - 6	13	804

*Support e-chain® for unsupported length and an optionally available, defined bend radius (please see below)

 <p>e-skin® flat SKF.O - openable easy to fill due to a special locking mechanism</p>					
SKF12O <small>New</small>	12	13	2 - 6	10	805

SKF.S e-chain® series Part No.	Outer width [mm]	Outer height [mm]	Bend radius R [mm]	Page
 <p>e-skin® flat SKF.S - support e-chain® can be combined with SKF12C series for unsupported length and a defined bend radius</p>				
SKF.S <small>New</small>	8	8	040 - 100	806

Support e-chain® visibly displayed for better explanation

i Cleanroom solutions of this type should be designed in conjunction with igus® engineering team. Please contact us at ► www.igus.eu/contact

🚚 Available from stock. Ready to ship in 3-5 business days.*
*Average time before the ordered goods are dispatched.

clean-room Further information about igus® cleanroom e-chains® and the new, unique igus® cleanroom laboratory for IPA cleanroom Class 1 components ► From page 144



IPA Qualification Certificate -
Report IG 2102-1212:
Tested was e-skin® flat system at
 $v_1 = 0.5\text{m/s}$, $v_2 = 1\text{m/s}$ und $v_3 = 2\text{m/s}$ or
 $a_1 = 1\text{m/s}^2$, $a_2 = 2\text{m/s}^2$, $a_3 = 4\text{m/s}^2$



Winner of the Purity Technology
Prize REINER! from the
IPA Fraunhofer Institute.

Design principle of the two e-skin® flat profile versions | Openable and closable

The e-skin® flat profiles consist of individually connectable cable chambers. One or more cables can be fitted into these chambers. Here at least 2 chambers must be connected with each other. One chamber is closed or opened at a time and extended with further chambers until the required width is reached. For the closed profile SKF12C, a support chain SKF.12C is available, which offers the e-skin® flat with an unsupported length and the defined radius of 70mm. This support e-chain® must only be used in connection with this profile.




SKF.O, openable: easy to fill due to a special locking mechanism



SKF.C, fully enclosed: prevents particle ingress with closed cable chambers

Technical data

	Energy supply system, igumer SKF material - permitted temperature °C	+10°C up to +50°C
	Mounting bracket, aluminium - permitted temperature °C	+10°C up to +50°C
	Flammability class	UL-HB94

Find the right energy supply system for cleanroom and semiconductor applications in 30 seconds

- New online selection tools for igus® cleanroom energy supply systems
- Select the best igus® solution and enquire without obligation

More information ► www.igus.eu/info/e-skin-configurator



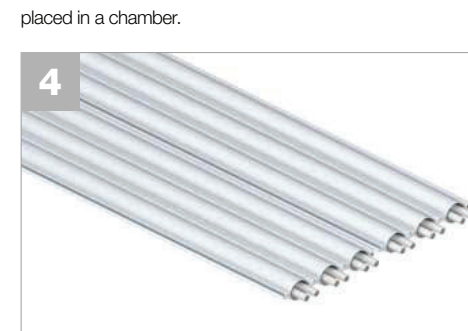
In the case of the openable e-skin® flat SKF.O version, the sections can be opened individually.



The cables can be fitted according to your requirements. Please note that only cables with the same diameter can be placed in a chamber.



After being filled, the e-skin® flat can easily be closed by hand or with the MT.SK.914.868 tool.



If several chambers are needed, additional sections can simply be added.



The e-skin® flat is clamped in place by the mounting preventing any strain on the cables.

Prevent particle ingress with closed cable chambers **New**

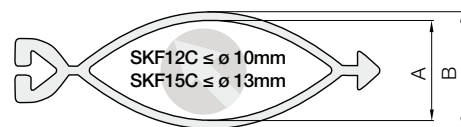
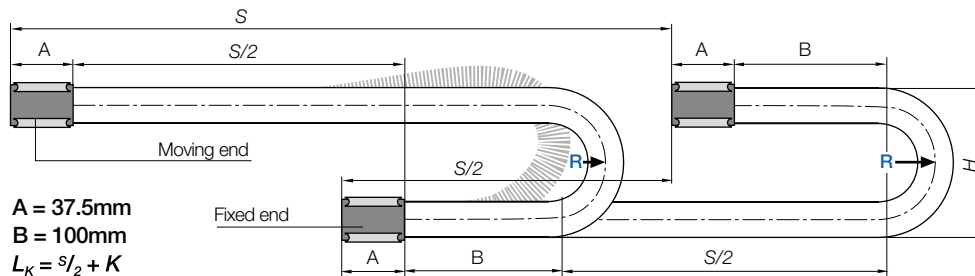
e-skin® flat profile SKF.C | Fully enclosed, can be combined with support e-chain®

Part No.	Inner height A [mm]	Outer height B [mm]	Quantity chambers	Cable \varnothing $\leq \varnothing$ [mm]	Weight [kg/m]
SKF					
SKF12C.1.1.10*	12	13	2 - 6	10	≈ 0.036
SKF15C.1.1.10	15	16	2 - 6	13	≈ 0.042

Optional support e-chain® for unsupported length and defined bend radius (only in combination with SKF12C)

This type of system should be designed in conjunction with our engineering team.

Installation dimensions | Features

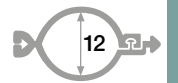


The support e-chain® SKFS can be easily added to the SKF12C, and enables unsupported travels.

More information ► Page 806

Note:The nominal clearance height = H and the allowance for the bend radius = K in the calculation of the energy supply length depend on the largest bend radius of the routed cables and their stiffness.**Generally speaking:**

$H = 2 \times R$ (largest bend radius of fitted cables) and or the used support chain
 $K = \pi \times R$ (largest bend radius of fitted cables)
 $+ 2 \times 100\text{mm} + 2 \times 37.5\text{mm}$

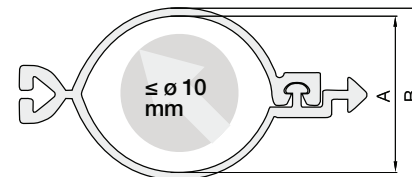
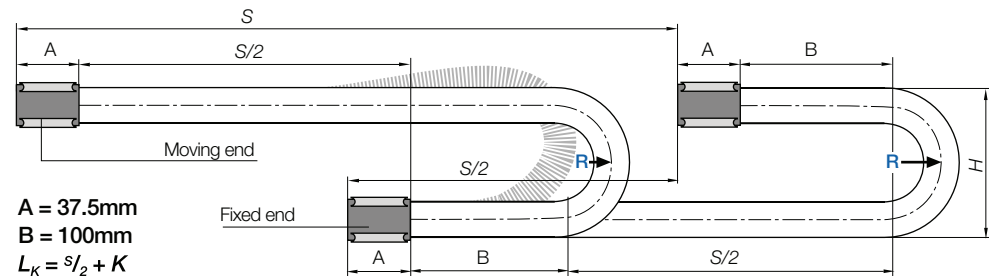
**All information on this page is for guidance only ...**Cleanroom solutions of this type should be designed in conjunction with igus® engineering team. Please contact us at ► www.igus.eu/contactEasy to fill due to the special locking mechanism **New**

e-skin® flat profile SKF.O | Openable with a special locking mechanism

Part No.	Inner height A [mm]	Outer height B [mm]	Quantity chambers	Cable \varnothing $\leq \varnothing$ [mm]	Weight [kg/m]
SKF					
SKF12O.1.1.10	12	13	2 - 6	10	≈ 0.046

This type of system should be designed in conjunction with our engineering team.

Installation dimensions | Features

**Note:**The nominal clearance height = H and the allowance for the bend radius = K in the calculation of the energy supply length depend on the largest bend radius of the routed cables and their stiffness.**Generally speaking:**

$H = 2 \times R$ (largest bend radius of fitted cables) and or the used support chain
 $K = \pi \times R$ (largest bend radius of fitted cables)
 $+ 2 \times 100\text{mm} + 2 \times 37.5\text{mm}$

Quickly close the openable version with the e-skin® flat tool part number **MT.SK.914.868**. More information ► upon request**All information on this page is for guidance only ...**Cleanroom solutions of this type should be designed in conjunction with igus® engineering team. Please contact us at ► www.igus.eu/contact



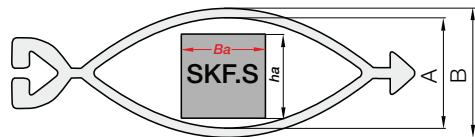
e-skin® flat with support e-chain® SKF.S | Only in combination with SKF12C

Part No.	Ba	ha	R	Inner height	Outer height	Pitch	Weight
SKF.S	[mm]	[mm]	[mm]	e-skin® A [mm]	e-skin® B [mm]	[mm]	[kg/m]
SKF.S.08.040.01.0*	8	8	040	12	13	18	≈ 0.073
SKF.S.08.070.01.0*	8	8	070	12	13	25	≈ 0.073
SKF.S.08.100.01.0*	8	8	100	12	13	25	≈ 0.073

*Optional support e-chain® for unsupported length and defined bend radius (only in combination with SKF12C)

This type of system should be designed in conjunction with our engineering team.

Installation dimensions | Features



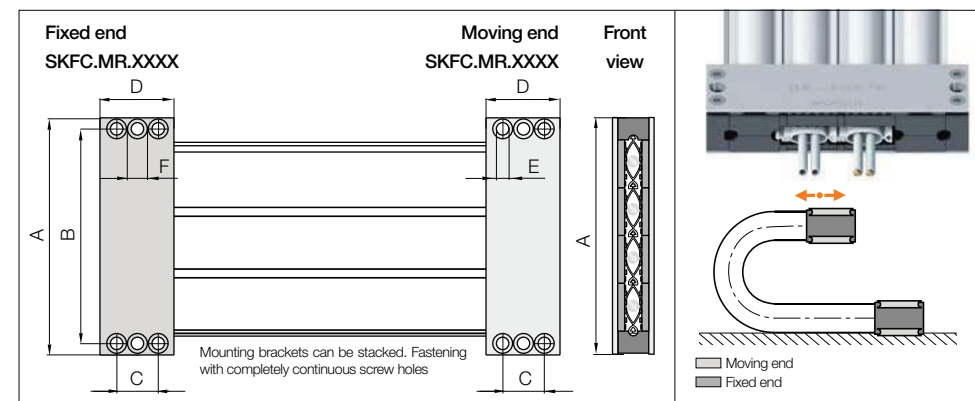
SKF with support chain as enclosed solution to prevent abrasion. Individual modules with 1 cable chamber each can be connected to form wider systems.



All information on this page is for guidance only ...

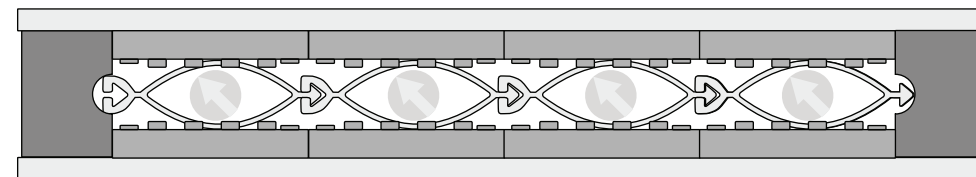
Cleanroom solutions of this type should be designed in conjunction with igus® engineering team. Please contact us at ► www.igus.eu/contact

Aluminium mounting brackets



SKFC.MR aluminium mounting brackets | Variable in width, stackable

Part No.	A	B	C	D	E	F
full set	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
SKFC.MR.0685 ►	68,5	59	18	37,5	4,5	6
SKFC.MR.0625 ►	62,5	53	18	37,5	4,5	6
SKFC.MR.0870 ►	87	77,5	18	37,5	4,5	6
SKFC.MR.1115 ►	111,5	102	18	37,5	4,5	6
SKFC.MR.1360 ►	136	126,5	18	37,5	4,5	6
SKFC.MR.1605 ►	160,5	151	18	37,5	4,5	6
SKFC.MR.0930 ►	93	83,5	18	37,5	4,5	6
SKFC.MR.1175 ►	117,5	108	18	37,5	4,5	6
SKFC.MR.1420 ►	142	132,5	18	37,5	4,5	6
SKFC.MR.1665 ►	166,5	157	18	37,5	4,5	6
SKFC.MR.0840 ►	84	74,5	18	37,5	4,5	6
SKFC.MR.1055 ►	105,5	96	18	37,5	4,5	6
SKFC.MR.1270 ►	127	117,5	18	37,5	4,5	6
SKFC.MR.1485 ►	148,5	139	18	37,5	4,5	6



Diameter-specific strain relief as a modular system



All information on this page is for guidance only ...

Cleanroom solutions of this type should be designed in conjunction with igus® engineering team. Please contact us at ► www.igus.eu/contact

THE alternative to ePTFE flat cable guides: braided structure CFCLEAN cables with e-skin® flat

Cable replacement in just a few minutes, modular, cost-effective, sustainable

The e-skin® flat cable guidance system, in combination with the CFCLEAN chainflex® cable solution, represents a logical further development of the commercially available ePTFE flat cable guide for cable guidance in flat panel display (FPD) and semiconductor production, and in the production of OLEDs as well as in medical technology. The strengths of the ePTFE flat cable guide have been enhanced and the weaknesses eliminated. The new e-skin® flat cable guide system is the result of this development.

Braided structure CFCLEAN cables with e-skin® flat vs. classic ePTFE flat cable guide



+ Advantages of igus® braided structure CFCLEAN cables with e-skin®

- Highly abrasion-resistant welded film to protect the stranded elements and minimise abrasion
- No outer jacket in order to reduce weight and outer diameter
- Extremely flexural resistant braiding of copper wires with 90% optical coverage for maximum electromagnetic compatibility
- Special TPE insulation for highly dynamic applications
- Special core structure for maximum service life
- Flexibility regarding application changes due to simple replacement of CFCLEAN or e-skin® flat profiles
- Length and width can be changed easily
- Resources-friendly and service-friendly due to easy interchangeability of each individual element

- Disadvantages of commercially available ePTFE flat cable guides

- Multi-layer jacket that holds individual cores together: thin PTFE outer film, PUR inner layer
- An enclosed, non-separable system
- Cores are inseparable from each other
- Individual elements not interchangeable, but entire systems
- High prototype costs
- No longer flexibly changeable after completion
- In case of service, the complete ePTFE flat cable guides must be replaced
- Ecologically and economically unsound due to waste of resources in case of damage

Energy supply systems for cleanrooms – revolutionise overall technical effectiveness of production equipment and generate higher yields

- Capable of increasing plant effectiveness
- Generating higher yields from production lines
- Using cleanroom energy supply systems in a more sustainable manner
- and much more ...

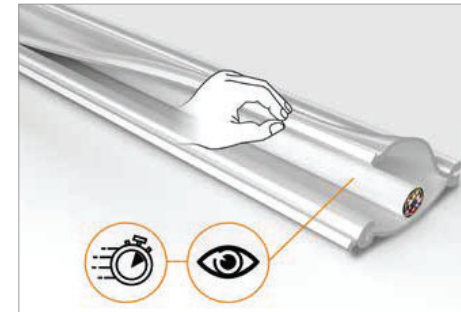
Download the white paper ► igus.eu/cleanroom



Cable replacement in minutes, no "welded" cables



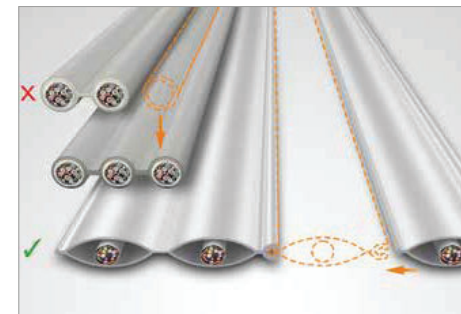
No minimum order quantity or surcharge for small quantities



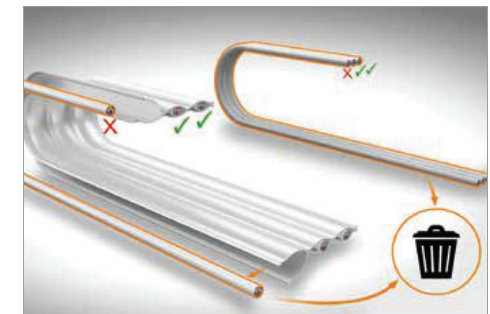
Quick and easy maintenance, simple handling



Easy visual inspection of the cables



Cables can be added without replacing the whole system



Less waste in case of replacement, as the entire system does not need to be replaced

e-skin® flat profiles in combination with chainflex® CFCLEAN cables

- All standard core/cross section combinations available: data, bus, control, motor
- Highly abrasion-resistant welded film to protect the stranded elements and minimise abrasion
- No outer jacket in order to reduce weight and outer diameter
- Extremely flexural resistant braiding of copper wires with 90% optical coverage for maximum electromagnetic compatibility
- Special TPE insulation for highly dynamic applications
- Special core structure for maximum service life
- Available from stock, with a guarantee of up to 36 months*
- Stiff cable jackets with chainflex® CFCLEAN prevent system bending
- chainflex® CFCLEAN cables adapted to the application with up to 21% weight reduction compared to conventional cables
- Approx. 16% smaller diameter compared to standard cables with jacket

**With up to 36-month guarantee* and UL verified**

We issue a guarantee of up to 36 months on our cables with confidence, as we are able to make reliable predictions about the service life of our cables due to over 30 years of experience and 700 experiments concurrently undertaken in our 3,800m² test laboratory. We are now the first German firm to have this promise validated for chainflex® cables (issue 02/2021). In a complex certification process, the US institute "Underwriters Laboratories" confirmed the accuracy of the statement "igus® 36-month chainflex® cable guarantee and service life calculator based on 2 billion test cycles per year". This makes our company the first in Europe to have an advertising statement confirmed by a testing institution. In future, every chainflex® cable that leaves the factory worldwide will be identified by the UL marketing label with its unique number B129699, referring to igus®.

More information ► www.igus.eu/cfclean

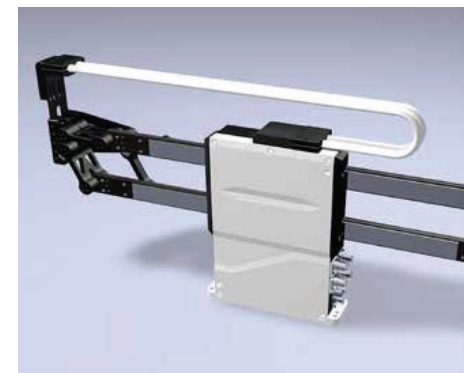
**igus 36-month
chainflex cable
guarantee and
service life
calculator based
on 2 billion test
cycles per year**



*The igus® chainflex® guarantee of up to 36 months is valid for the number of double strokes calculated according to the online service life calculator (www.igus.eu/ChainflexTools/ServiceLifeCalculator). The guarantee conditions available at [www.igus.eu/guarantee] apply.



e-skin® flat SKF installed in four layers one above the other or interlocked to save space



Pick and place module for battery production with e-skin® flat profiles completed almost 57 million double strokes (as of 02/2021)



Application example of an e-skin® flat SKF running together in two layers in a trade show machine

Find the right energy supply system for cleanroom and semiconductor applications in 30 seconds

- New online selection tools for igus® cleanroom energy supply systems
 - Select the best igus® solution and enquire without obligation
- More information ► www.igus.eu/info/e-skin-configurator





e-skin®

SK | SKS | SKY - cleanroom corrugated tube energy supply systems



Advantages of the e-skin® series:

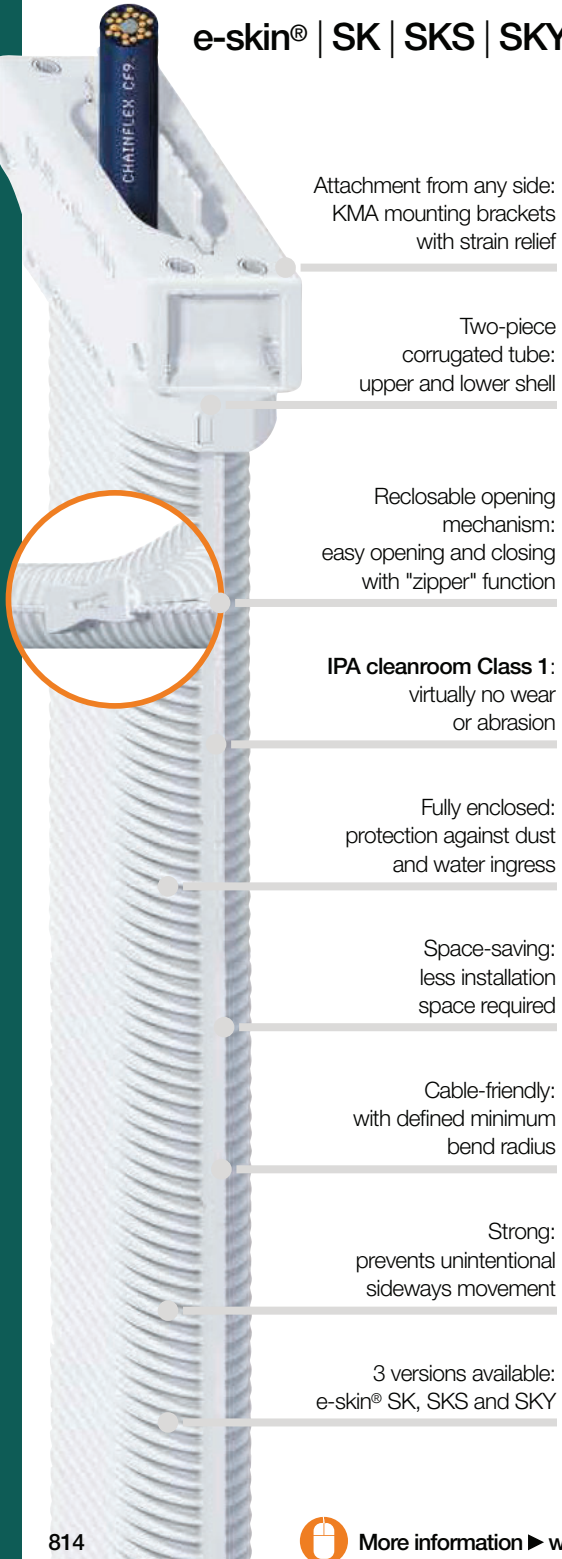
- Available in three versions
- e-skin® SK for longer unsupported lengths
- Compared to the SK series, e-skin® soft SKS has a more elastic material and smaller installation height <200mm
- e-skin® hybrid SKY combines the advantages of e-skin® SK and e-skin® soft SKF
- Corrugated tube consisting of an upper and lower shell that form a complete enclosure when connected together
- Easy filling with "zipper" function
- Special design allows unsupported lengths
- Less installation space required
- Cable-friendly with defined minimum bend radius
- Available with interior separation
- Prevents unintentional sideways movement
- Simple maintenance and inspection of the cables inside
- Protection against dust and water ingress
- Suitable for cleanroom according to IPA cleanroom Class 1



When to use another energy supply system:

- For longer unsupported lengths
 - ▶ E6.1 system, page 832
 - ▶ E6 system, page 870
- When installation space is limited
 - ▶ e-skin® flat SKF, page 798
- For high exposure to dirt
 - ▶ RX e-tubes, page 516





Attachment from any side:
KMA mounting brackets
with strain relief

Two-piece
corrugated tube:
upper and lower shell

Reclosable opening
mechanism:
easy opening and closing
with "zipper" function

IPA cleanroom Class 1:
virtually no wear
or abrasion

Fully enclosed:
protection against dust
and water ingress

Space-saving:
less installation
space required

Cable-friendly:
with defined minimum
bend radius

Strong:
prevents unintentional
sideways movement

3 versions available:
e-skin® SK, SKS and SKY

SK, SKS and SKY cleanroom corrugated tube energy supply systems

The e-skin® is a hose consisting of an upper and lower shell that form a sealed tube when connected to each other. It consists of polymer material igumid SK developed specifically for this. The simple and reclosable opening mechanism enables easy maintenance and inspection of the installed cables. Operating temperature +10°C / +50°C. e-skin® has many advantages over conventional corrugated tubes and it is available in 3 different versions:

- e-skin® SK for longer unsupported lengths
- e-skin® soft SKS with more elastic material and lower installation height
- e-skin® hybrid SKY combines the advantages of e-skin® SK and e-skin® soft SKF
- 15% higher fill weight (based on the latest test results for e-skin® SK40 series done in the igus® laboratory)
- 50% more unsupported length (based on the latest test results for the e-skin® SK 40 series done in the igus® laboratory)
- Bend radii from 55mm up to 100mm
- IPA cleanroom Class 1
- 5dB(A) quieter than usual "clean cable"
- Interior separation system consisting of "tribo-optimised" iglidur® material – to further minimise abrasion between the cables

Typical industries and applications

- Cleanroom ● Fast, short, unsupported applications
- Standing or hanging applications
- Display and semiconductor production
- Pick & place applications
- Printers
- Medical technology
- Any machine where corrugated tubes are used

Series Part No.	Inner height hi [mm]	Inner width Bi [mm]	Outer width Ba [mm]	Outer height ha [mm]	Bend radius R min.* [mm]	Unsupported length ≤ [m]	Page
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e-skin® SK - two-piece corrugated tube for longer unsupported lengths

SK28	28	68	95	40	055	1.1	822
SK40	38	85	118	57	100	2.0	822



e-skin® soft SKS - two-piece corrugated tube with more elastic material and lower clearance height

SKS20 <small>New*</small>	20	33	50	25	055	0.6	823
SKS28 <small>New*</small>	28	68	95	40	055	0.7	823
SKS40 <small>New*</small>	38	85	118	57	100	1.3	823



e-skin® hybrid SKY - two-piece corrugated tube combines the advantages of e-skin® SK and e-skin® soft SKS

SKY28 <small>New*</small>	28	68	95	40	055	0.9	824
SKY40 <small>New*</small>	38	85	118	57	100	1.4	824

*Note: the minimum bend radius is determined by the inner side corrugated tube!

*New in this catalogue

Available from stock. Ready to ship in 72hrs.*
*Average time before the ordered goods are dispatched.

Further information about igus® cleanroom e-chains® and the new, unique igus® cleanroom laboratory for IPA cleanroom Class 1 components ► From page 144



IPA Qualification Certificate - Report IG 1907-1125:

Tested was e-skin® 0.SK28.068.02.1 (prototype) at $v_1 = 0.5\text{m/s}$, $v_2 = 1\text{m/s}$ and $v_3 = 2\text{m/s}$ or $a_1 = 1\text{m/s}^2$, $a_2 = 2\text{m/s}^2$, $a_3 = 4\text{m/s}^2$



IPA Qualification Certificate - Report IG 1907-1125:

Tested was e-skin® SKS28.068.02.1 including cables at $v_1 = 0.5\text{m/s}$, $v_2 = 1\text{m/s}$ and $v_3 = 2\text{m/s}$ or $a_1 = 1\text{m/s}^2$, $a_2 = 2\text{m/s}^2$, $a_3 = 4\text{m/s}^2$










IPA Qualification Certificate - Report IG 1907-1125:

Tested was e-skin® SKY28.068.02.1 at $v_1 = 0.5\text{m/s}$, $v_2 = 1\text{m/s}$ and $v_3 = 2\text{m/s}$ or $a_1 = 1\text{m/s}^2$, $a_2 = 2\text{m/s}^2$, $a_3 = 4\text{m/s}^2$

The modularity of e-skin® enables flexible adjustment to your requirements

System comparison of cleanroom e-skin® energy supply systems from igus® with relative specifications of the distinguishing parameters

Parameters	e-skin® SK	e-skin® soft SKS	e-skin® hybrid SKY
Diagrams of e-skin® coloured here for demonstration purposes			
Required clearance height	100%	67%	87%
Fill weight	100%	70%	85%
Unsupported length	100%	60%	81%
Price	88%	100%	95%
Price compared to commercially available "Clean Cable"	65%	65%	65%
DIN EN ISO Class 1			
Openable version	Yes	Yes	Yes
Enclosed version	Yes	Yes	Yes
Operating noise	33dB(A)	32dB(A)	33dB(A)
Quieter than usual "clean cables"	5dB(A)	6dB(A)	5dB(A)
Page number	► Page 822	► Page 823	► Page 824

 Further information about igus® cleanroom e-chains® and the new, unique igus® cleanroom laboratory for IPA cleanroom Class 1 components ► From page 144



In the igus® laboratory, e-skin® withstood more than 10 million double strokes at 3m/s (issue 12/2020)



The standard bending tests show how flexible the e-skin® soft is. It only bends, even under loads that would break other energy chains

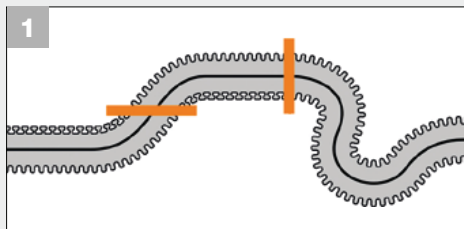
In the new igus® cleanroom laboratory according to IPA certification



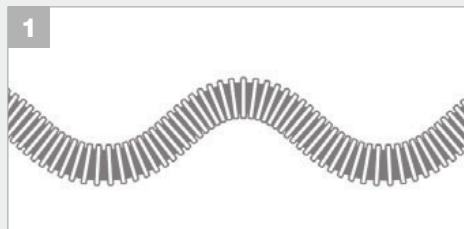
igus® cleanroom laboratory according to IPA certification ISO Class 1 in accordance with EN ISO 14644-1 in the igus® technical centre, Cologne. Cleanroom compatibility of chain applications can be tested quickly to your requirements.



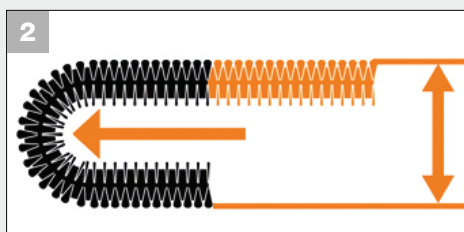
Service life test in the 3,800m² igus® laboratory in Cologne (Germany)



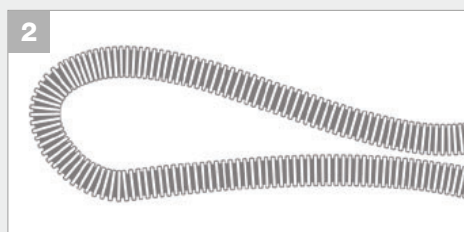
e-skin® consists of two shells (upper and lower). The shells can be configured in order to define specific movements



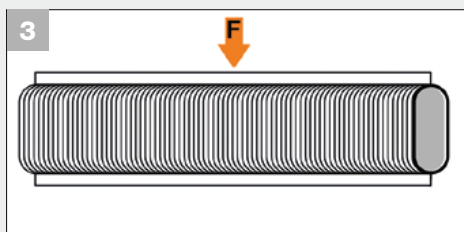
Conventional corrugated tubes have the same bend radius along their entire length



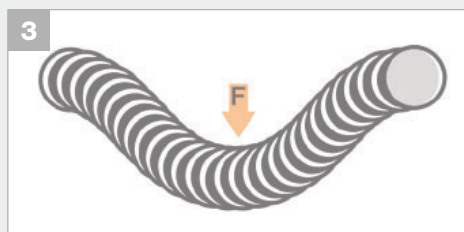
e-skin® is suitable for short unsupported lengths



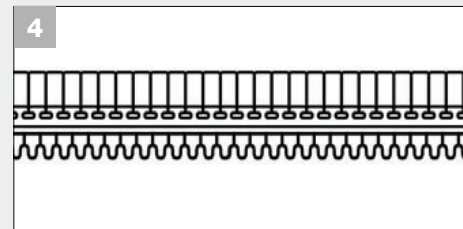
Conventional corrugated tubes cannot be used for unsupported applications



Lateral stability thanks to an oval geometry of the e-skin®



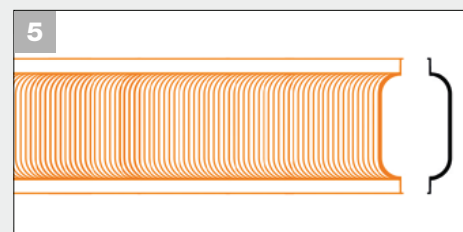
Very little any stability in respect of forces acting on the sides



e-skin® supports itself



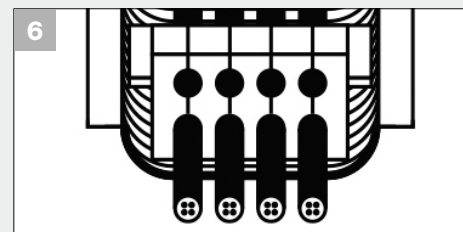
Conventional corrugated tubes have very little or any inherent rigidity. e-rib solves this ► www.igus.eu/e-rib



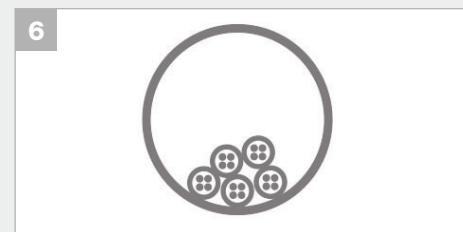
e-skin® is openable, easy to fill



Conventional corrugated tubes (for dynamic applications) cannot be opened






e-skin® can be fitted with interior separation and strain relief







No interior separation possible

Technical data

 Speed FL_G / acceleration FL_G	≤ 10 [m/s] / ≤ 75 [m/s ²]
 SK energy supply system, igumer S material - permitted temperature °C	+10°C up to +50°
SKS energy supply system, igumer SKS material - permitted temperature °C	+10°C up to +50°
SKY energy supply system, the material is a combination of igumer SK (upper shell) and igumer SKS (lower shell) - permitted temperature °C	+10°C up to +50°
Mounting bracket, igumid NB material - permitted temperature °C	+10°C up to +50°
 Flammability class	UL94-HB

■ FL_G = unsupported with straight upper run

Installation types, maximum travels






Series	 Unsupported	 Vertical hanging	 Vertical standing	 Side mounted unsupported
SK28	≤ 2.20 m	upon request	upon request	upon request
SK40	≤ 4.00 m	upon request	upon request	upon request
SKS20	≤ 1.20 m	upon request	upon request	upon request
SKS28	≤ 1.40 m	upon request	upon request	upon request
SKS40	≤ 2.60 m	upon request	upon request	upon request
SKY28	≤ 1.80 m	upon request	upon request	upon request
SKY40	≤ 2.80 m	upon request	upon request	upon request

Find the right energy supply system for cleanroom and semiconductor applications in 30 seconds

- New online selection tools for igus® cleanroom energy supply systems
 - Select the best igus® solution and enquire without obligation
- More information ► www.igus.eu/info/e-skin-configurator




Options with order keys | Examples based on series SK28

 Standard	Reverse Bend Radius
Part No. Standard	Part No. RBR
	 A version with Reverse Bend Radius (RBR) can be easily made by using the bottom shell for the complete e-skin®. Thus very defined movements can be implemented with the two parts. Note: the minimum bend radius is determined by the inner side corrugated tube!
 SK28.068.02.1	SK28.068.02.RBR.1
 Ready to ship in 72hrs.*	Ready to ship in 72hrs.*

*Average time before the ordered goods are dispatched.

Order example | Order key and colour examples | Examples based on series SK28

 Order example for complete energy supply system (1m), colour white, with mounting brackets and interior separation:

Energy supply system (1,000mm)	Please order the required length in mm	SKS28.068.02.1
+ Mounting brackets	KMA 1 set (with tiwrap plates)	SK280.068.12ZB.1
Interior separation	Fitted every 112mm	SKS28.1.1.01
Order text:	1,000mm SKS28.068.02.1 + SK280.068.12ZB.1 + 16 x SKS28.1.1.01	

 Order key

Oval design	SK28.068.02.1	Order index
Series / Type		Colour
Inner height		<input type="checkbox"/> White Standard
Width index		Order index
Version		.1
Colour index (standard white)		

White e-skin® ready to ship in 72hrs.*

15% higher fill weight and 50% longer unsupported length¹⁾

28-38



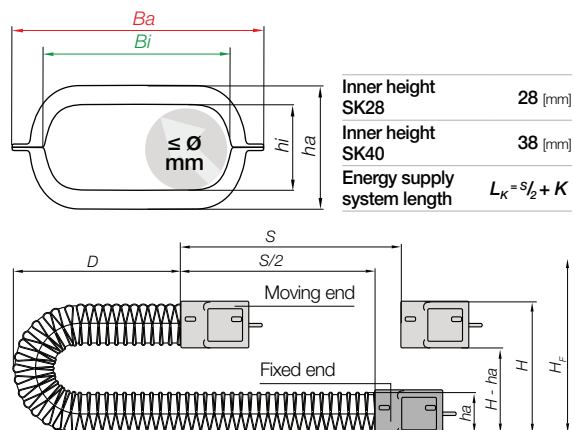
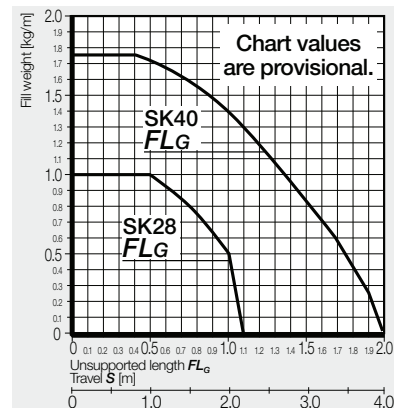
Series SK | Two-piece corrugated tube | With "zipper" opening principle

Part No.	Bi	Ba	hi	ha	R min.*	Cable \varnothing	H _F	Weight
SK	[mm]	[mm]	[mm]	[mm]	[mm]	≤ \varnothing [mm]	[mm]	[kg/m]
SK28.068.02.1	68	95	28	40	055	20	265 ²⁾	≈ 0.54
SK40.085.02.1	85	118	38	57	100	30	450 ²⁾	≈ 1.15

1) Based on the latest test results for e-skin® SK40 series done in the igus® laboratory

2) Required clearance height H_F with 0.75kg/m fill weight**Note:** the minimum bend radius is determined by the inner side corrugated tube!

Installation dimensions



R min.*	SK28 R 055	SK40 R 100
H	250	350
D	160	300
K	399	693

Note: the minimum bend radius is determined by the inner side corrugated tube!

No bend radius is specified in the part number, since it depends on travel and fill weight. The smallest specified radius below is the minimum to guarantee the service life of the cables. In most applications, however, the radius remains larger because the shape of the tube defines this.

32% less clearance height than e-skin® SK28¹⁾

20-38



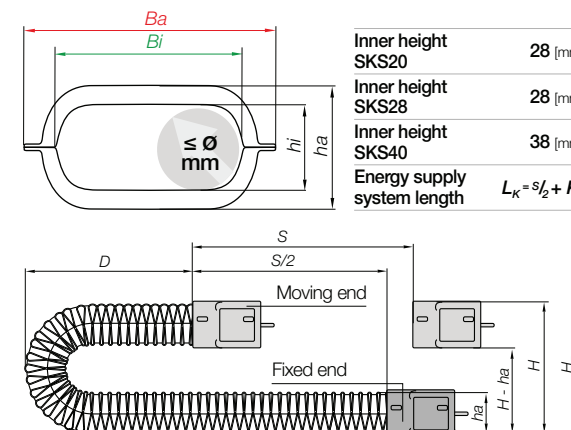
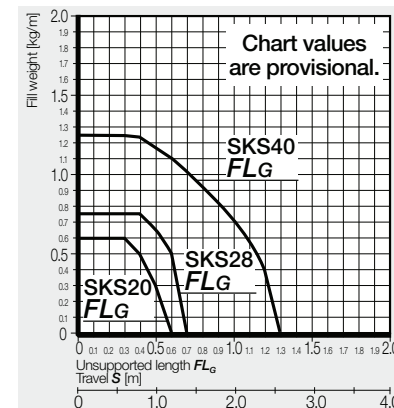
Series SKS | Two-piece corrugated tube | With "zipper" opening principle

Part No.	Bi	Ba	hi	ha	R min.*	Cable \varnothing	H _F	Weight
SKS	[mm]	[mm]	[mm]	[mm]	[mm]	≤ \varnothing [mm]	[mm]	[kg/m]
SKS20.033.02.1	33	50	20	25	055	13	160 ^{2*)} / 200 ^{2*)}	≈ 0.20
SKS28.068.02.1	68	95	28	40	055	20	200 ⁴⁾	≈ 0.54
SKS40.085.02.1	85	118	38	57	100	30	350 ⁴⁾	≈ 1.15

1) 32% lower clearance height than e-skin® SK28 (based on the latest test results done in the igus® laboratory)

4) Required clearance height H_F with 0.75kg/m fill weight / 2) Required clearance height H_F with 0.50kg/m fill weight**H_F: 160mm with S < 200m / H_F: 200mm with S > 200m**Note:** the minimum bend radius is determined by the inner side corrugated tube!

Installation dimensions



R min.*	SKS20 R 055	SKS28 R 055	SKS40 R 100
H	150	150	300
D	125	130	300
K	300	266	693

Note: the minimum bend radius is determined by the inner side corrugated tube!

No bend radius is specified in the part number, since it depends on travel and fill weight. The smallest specified radius below is the minimum to guarantee the service life of the cables. In most applications, however, the radius remains larger because the shape of the tube defines this.

13% lower clearance height and 28% longer unsupported length¹⁾



Series SKY | Two-piece corrugated tube | With "zipper" opening principle

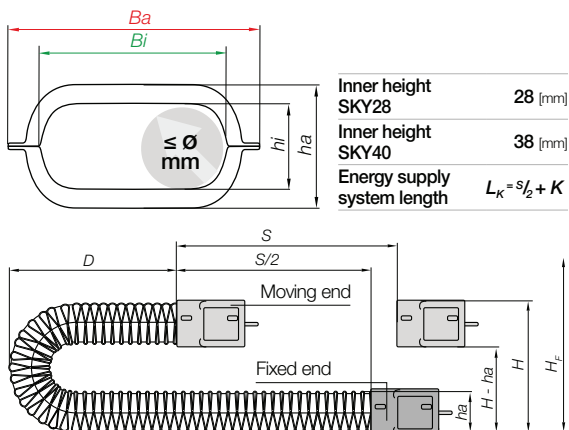
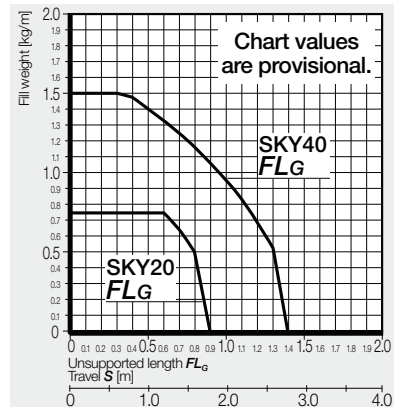
Part No.	Bi	Ba	hi	ha	R min.*	Cable Ø	H _F	Weight
SKY	[mm]	[mm]	[mm]	[mm]	[mm]	≤ Ø [mm]	[mm]	[kg/m]
SKY28.068.02.1	68	95	28	40	055	20	230 ²⁾	≈ 0.54
SKY40.085.02.1	85	118	38	57	100	30	400 ²⁾	≈ 1.15

1) 13% lower clearance height than e-skin® SK28 und 28% longer unsupported length than SKS28 (based on the latest test results one in the igus® laboratory)

2) Required clearance height H_F with 0.75kg/m fill weight

*Note: the minimum bend radius is determined by the inner side corrugated tube!

Installation dimensions

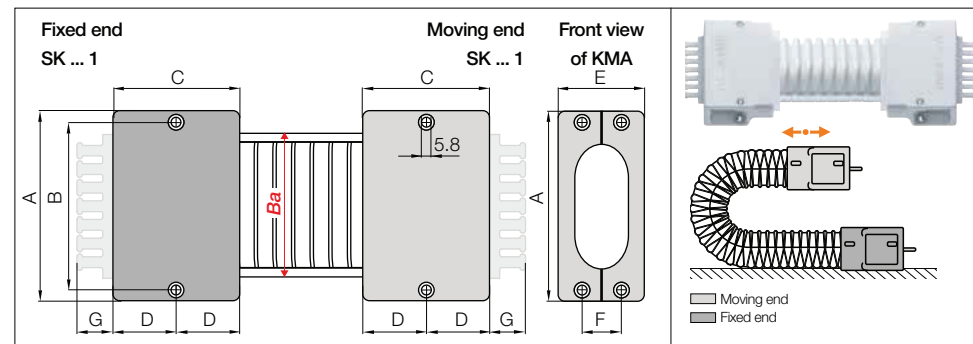


R min.*	SKY28 R 055	SKY40 R 100
H	200	325
D	160	300
K	322	693

*Note: the minimum bend radius is determined by the inner side corrugated tube!

No bend radius is specified in the part number, since it depends on travel and fill weight. The smallest specified radius below is the minimum to guarantee the service life of the cables. In most applications, however, the radius remains larger because the shape of the tube defines this.

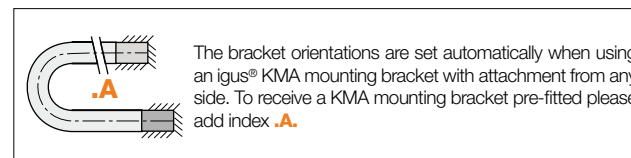
KMA mounting brackets | Attachment from any side



KMA | Recommended for unsupported, vertical hanging, standing applications

Width index	Part No. full set without tiewrap plates	Part No. full set with tiewrap plates	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]	G [mm]	Number of teeth
033.	► SK200.033.12.1	SK200.033.12ZB.1	53	44	32	7	28	-	5	3
068.	► SK280.068.12.1	SK280.068.12ZB.1	104	92	68	35	46	21	18	7
085.	► SK400.085.12.1	SK400.085.12ZB.1	125	113	68	35	66	41	18	10

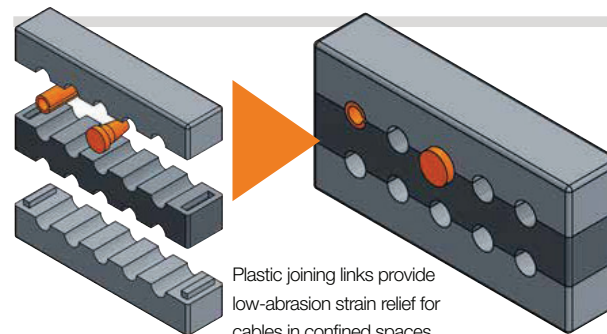
(KMA = polymer metal mounting bracket)



SK280.068.12ZB.1.A Order example

- Pre-assembled
- Colour index
- With integrated strain relief tiewrap plates
- Full set
- Width index
- Series

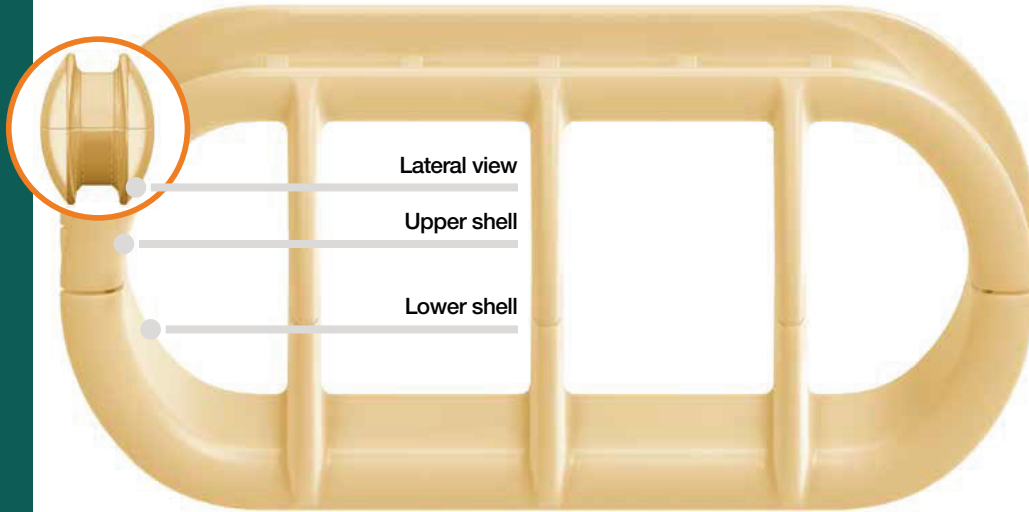
Strain relief e.g. clamps, tiewrap plates, nuggets and clips are available from stock. The complete chainfix range with ordering options ► From page 1392



Plastic joining links provide low-abrasion strain relief for cables in confined spaces



Closed clamping block strain relief available upon request



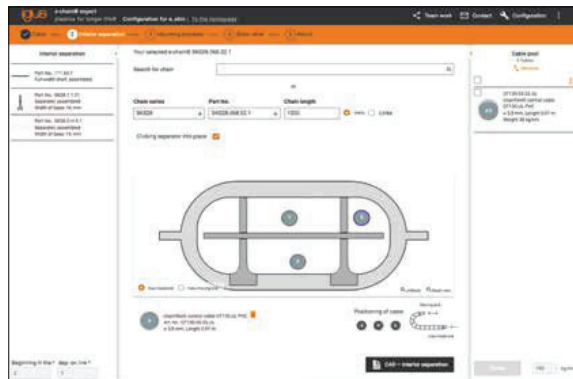
The new ring-shaped interior separation for minimum abrasion in the e-skin® energy supply system - easy to install, wear-optimised, iglidur J material

The wear-optimised interior separation of the igus® e-skin® consists of two upper and lower shells on which separators are already injection-moulded and which can be combined with shelves. In order to keep the abrasion between cables and e-skin® to a minimum, we rely on our tried-and-tested iglidur® J tribo-polymer.



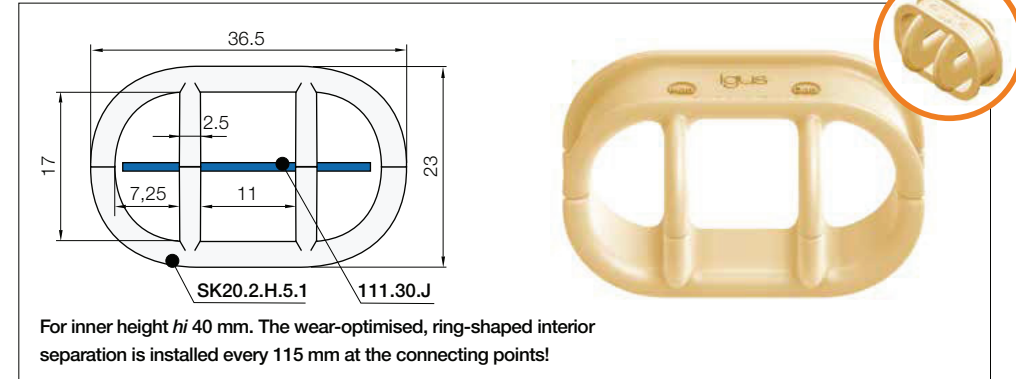
More information about iglidur® J material data

► www.igus.eu/info/igidur-j-material-data



e-skin® energy supply system ...
designed in minutes

► www.igus.eu/eskin-quickfill



For inner height *hi* 40 mm. The wear-optimised, ring-shaped interior separation is installed every 115 mm at the connecting points!

		<p>Smooth, round interior separation</p> <p>unassembled SK20.2.H.5</p> <p>assembled SK20.2.H.5.1</p>
		<p>Full-width shelf, continuous</p> <p>unassembled 110.30.J</p> <p>assembled 111.30.J</p>

Ring-shaped, wear-optimised

Upper and lower shells on which separators are already injection moulded can be combined with full-width shelves.

Full-width shelves

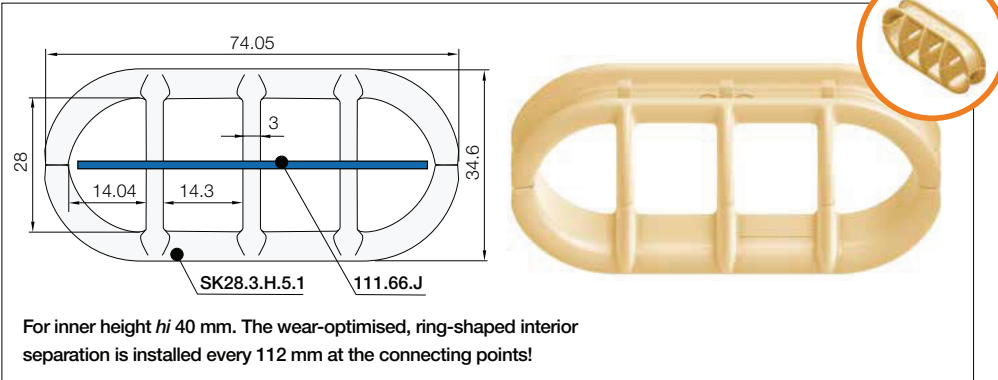
This option is for applications with many small cables with similar diameters. The full-width shelves are simply clamped between them.

Fast opening and closing of the e-skin®

- The tool for closing the e-skin® energy supply system part number MT.SK.914.868 - further information ► upon request
- Cost-effective, handy and fits in every pocket: the proven tool for opening and closing the e-skin® energy supply system part number MT.SK.02.1 - further information ► upon request



Tool part number
MT.SK.914.868
shown here



For inner height h_i 40 mm. The wear-optimised, ring-shaped interior separation is installed every 112 mm at the connecting points!

		<p>Smooth, round interior separation</p> <p>unassembled SK28.3.H.5</p> <p>assembled SK28.3.H.5.1</p>
		<p>Full-width shelf, continuous</p> <p>unassembled 110.66.J</p> <p>assembled 111.66.J</p>

Ring-shaped, wear-optimised

Upper and lower shells on which separators are already injection moulded can be combined with full-width shelves.

Full-width shelves

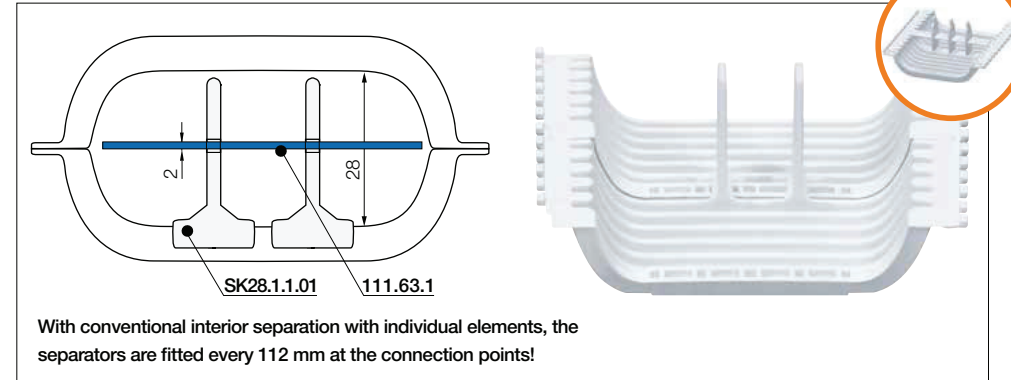
This option is for applications with many small cables with similar diameters. The full-width shelves are simply clamped between them.



Tool part number
MT.SK.914.868
shown here

Fast opening and closing of the e-skin®

- The tool for closing the e-skin® energy supply system part number MT.SK.914.868 - further information ► upon request
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With conventional interior separation with individual elements, the separators are fitted every 112 mm at the connection points!

		<p>Slotted separator</p> <p>unassembled SK28.1.01</p> <p>assembled SK28.1.1.01</p>
		<p>Full-width shelf, continuous</p> <p>unassembled 110.63.1</p> <p>assembled 111.63.1</p>

Vertical separation - slotted separators

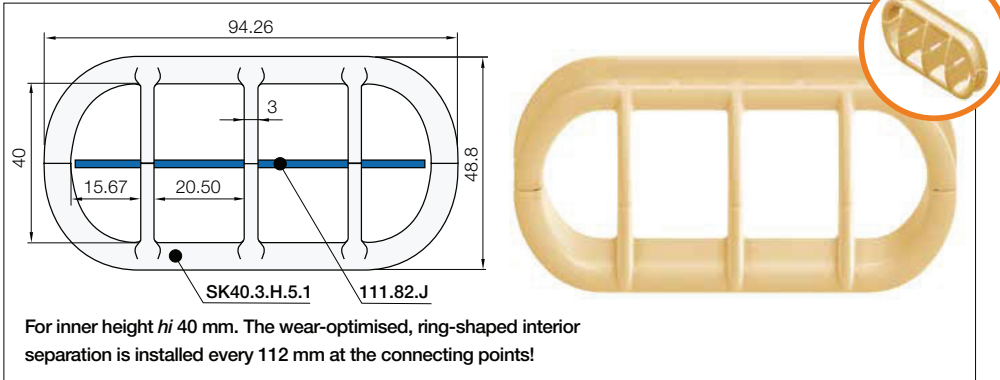
The interior separation* system for the igus® e-skin® consists of individual separators and full-width shelves, which can be fitted in a variety of ways.

Full-width shelves

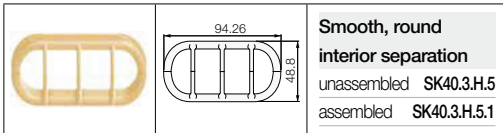
This option is for applications with many small cables with similar diameters. For full-width separation.



Absolutely dust-free environment for printed-circuit-board production using the abrasion-resistant e-skin® from igus®



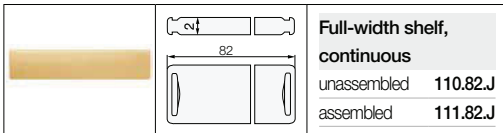
For inner height h_i 40 mm. The wear-optimised, ring-shaped interior separation is installed every 112 mm at the connecting points!



Smooth, round interior separation
unassembled SK40.3.H.5
assembled 111.82.J

Ring-shaped, wear-optimised

Upper and lower shells on which separators are already injection moulded can be combined with full-width shelves.



Full-width shelf, continuous
unassembled 110.82.J
assembled 111.82.J

Full-width shelves

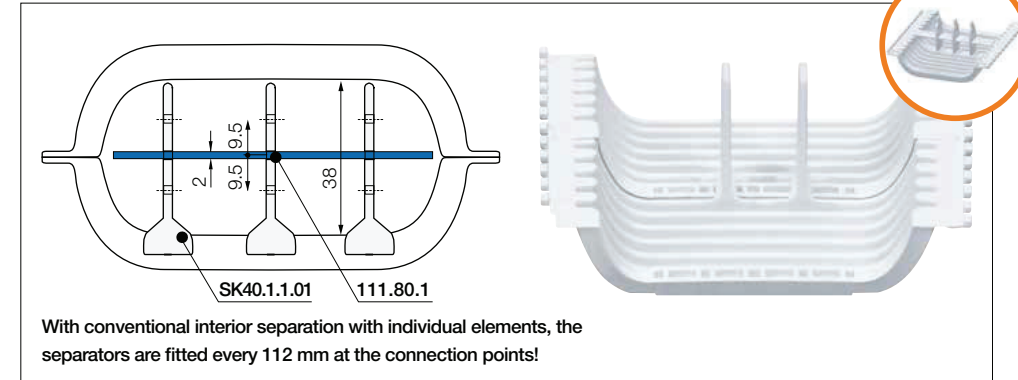
This option is for applications with many small cables with similar diameters. The full-width shelves are simply clamped between them.



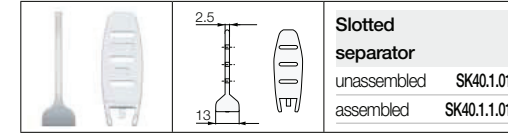
Tool part number
MT.SK.914.868
shown here

Fast opening and closing of the e-skin®

- The tool for closing the e-skin® energy supply system part number MT.SK.914.868 - further information ► upon request
- Cost-effective, handy and fits in every pocket: the proven tool for opening and closing the e-skin® energy supply system part number MT.SK.02.1 - further information ► upon request



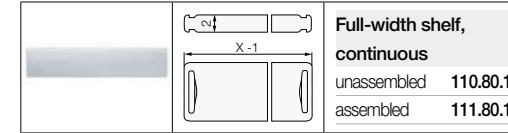
With conventional interior separation with individual elements, the separators are fitted every 112 mm at the connection points!



Slotted separator
unassembled SK40.1.1.01
assembled 111.80.1

Vertical separation - slotted separators

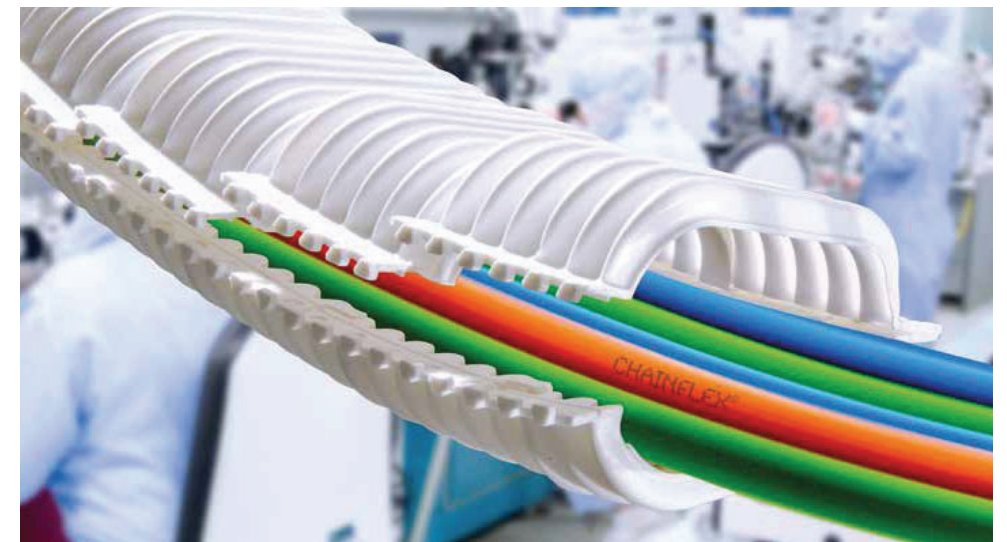
The interior separation* system for the igus® e-skin® consists of individual separators and full-width shelves, which can be fitted in a variety of ways.



Full-width shelf, continuous
unassembled 110.80.1
assembled 111.80.1

Full-width shelves

This option is for applications with many small cables with similar diameters. For full-width separation.



The igus® e-skin® energy supply system can be used for short unsupported lengths in cleanrooms