



e-skin® clean-room

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



Advantages of the e-skin® series:

- Reclosable corrugated tube
- Easy to maintain
- For small installation spaces
- Available in three versions
- e-skin® SK - for unsupported lengths up to 4m
- e-skin® soft SKS - made of elastic material, for lower clearance heights than SK
- e-skin® hybrid SKY combines the advantages of e-skin® SK and SKY
- Easy filling with "zipper" function
- Special design allows unsupported lengths
- 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 cleanrooms according to IPA cleanroom Class 1
- Available from stock, with a guarantee of up to 36 months



When to use another energy supply system:

- For longer unsupported lengths
 - ▶ E6.1 system, page 832
 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 corrugated tube energy supply systems for cleanrooms

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 reclosable 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® SK40 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
- Hanging and standing applications
- Display and semiconductor production
- Pick & place applications
- Printers
- Medical technology
- All machines that use corrugated tubes

Series	Inner height <i>hi</i> [mm]	Inner width <i>Bi</i> [mm]	Outer width <i>Ba</i> [mm]	Outer height <i>ha</i> [mm]	Bend radius <i>R min.*</i> [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	20	33	50	25	055	0.6	823
SKS28	28	68	95	40	055	0.7	823
SKS40	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	28	68	95	40	055	0.9	824
SKY40	38	85	118	57	100	1.4	824

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

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 145



IPA Qualification Certificate -
Report IG1907-1125:

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 145



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

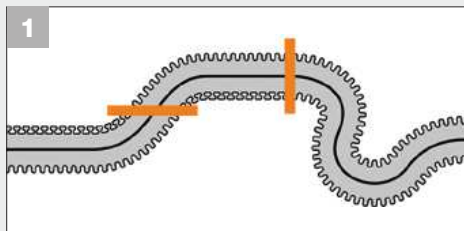
In the new igus® cleanroom laboratory according to IPA certification



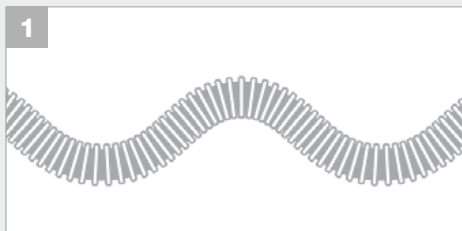
igus® cleanroom laboratory according to IPA certification ISO Class 1 in accordance with EN ISO 14644-1 in the igus® technical centre, Cologne. Cleanroom compatibility of chain applications can be tested quickly to your requirements.



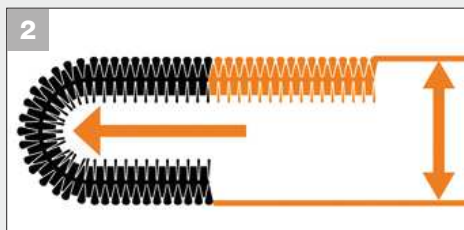
Service life test in the 3,800m² igus® laboratory in Cologne (Germany)



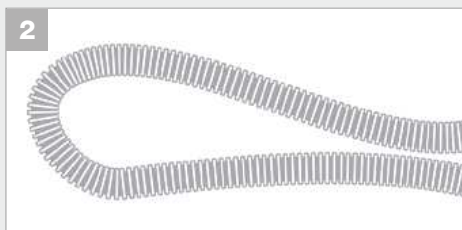
e-skin® consists of two shells (upper and lower). The shells can be configured in order to define specific movements



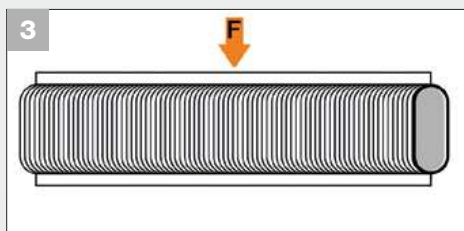
Conventional corrugated tubes have the same bend radius along their entire length



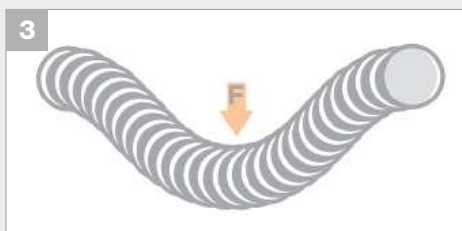
e-skin® is suitable for short unsupported lengths



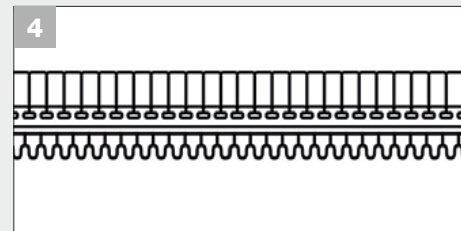
Conventional corrugated tubes cannot be used for unsupported applications



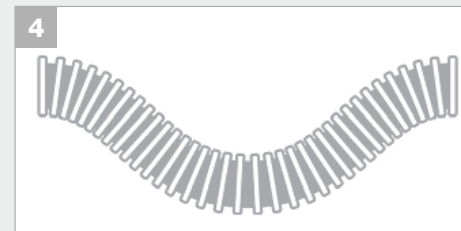
Lateral stability thanks to an oval geometry of the e-skin®



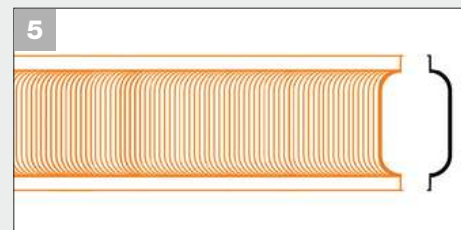
Very little if any stability in respect of forces acting on the sides



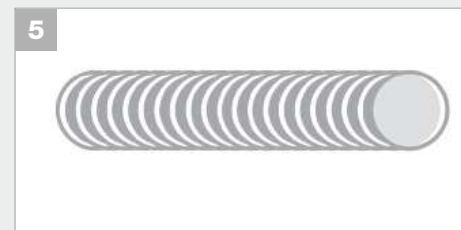
e-skin® supports itself



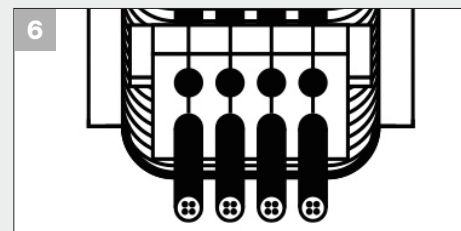
Conventional corrugated tubes have very little or any inherent rigidity. e-rib solves this ► www.igus.eu/e-rib



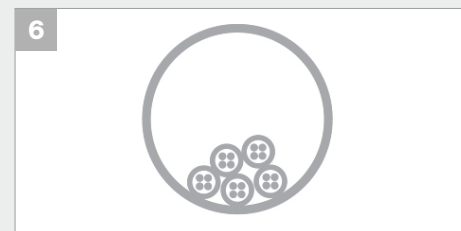
e-skin® is openable, easy to fill



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	$\leq 2.20m$	upon request	upon request	upon request
SK40	$\leq 4.00m$	upon request	upon request	upon request
SKS20	$\leq 1.20m$	upon request	upon request	upon request
SKS28	$\leq 1.40m$	upon request	upon request	upon request
SKS40	$\leq 2.60m$	upon request	upon request	upon request
SKY28	$\leq 1.80m$	upon request	upon request	upon request
SKY40	$\leq 2.80m$	upon request	upon request	upon request

Options with order keys | Examples based on series SK28


 Standard	<i>Reverse Bend Radius</i>
<p>Part No. Standard</p> 	<p>Part No. RBR</p>  <p><small>A version with Reverse Bend Radius (RBR) can be easily made by using the lower 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!</small></p>
 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



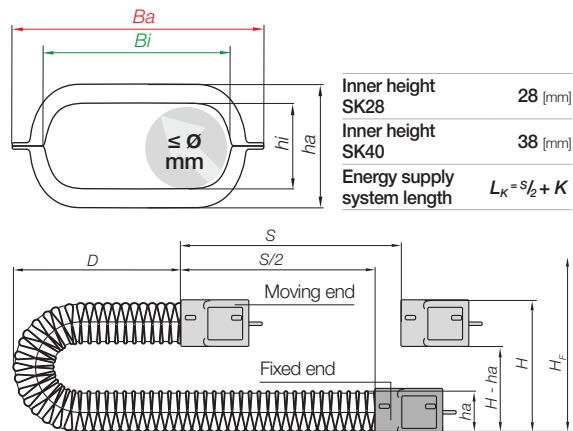
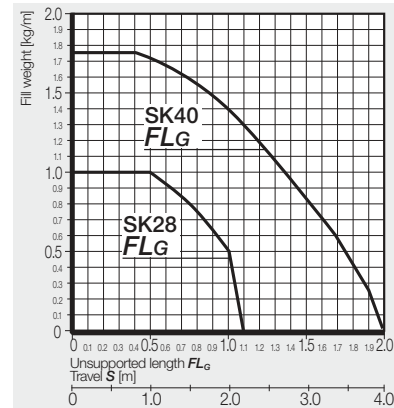
Series SK | Two-piece corrugated tube | With "zipper" opening principle

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.

33% less clearance height than e-skin® SK28¹⁾

20-38



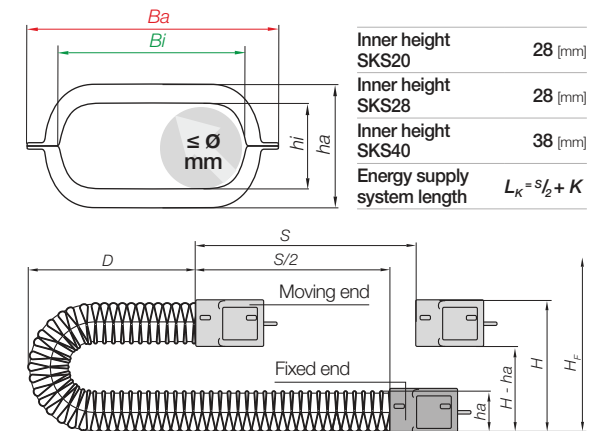
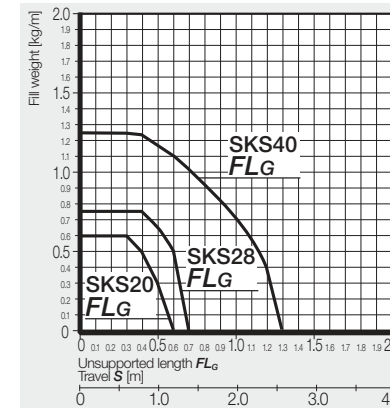
Series SKS | Two-piece corrugated tube | With "zipper" opening principle

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) 33% 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 at S < 200m / H_F: 200mm at 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

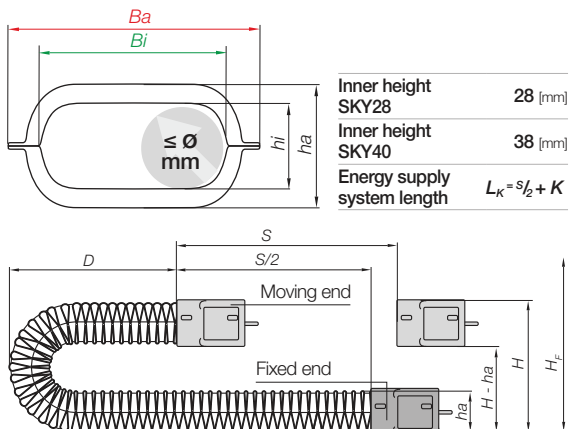
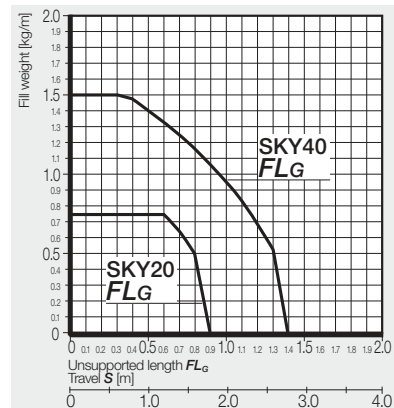
Part No.	Bi	Ba	hi	ha	R min.*	Cable Ø	H _F	Weight
	[mm]	[mm]	[mm]	[mm]	[mm]	≤ Ø [mm]	[mm]	[kg/m]
SKY28.068.02.1	68	95	28	40	055	20	230 ²⁾	≈ 0.54
SKY40.085.02.1	85	118	38	57	100	30	400 ²⁾	≈ 1.15

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

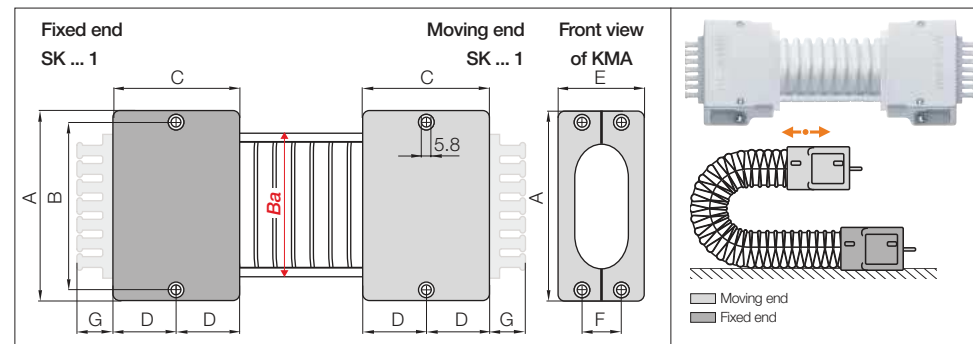


R min.*	SKY28 R 055	SKY40 R 100
H	200	325
D	160	300
K	322	693

*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.

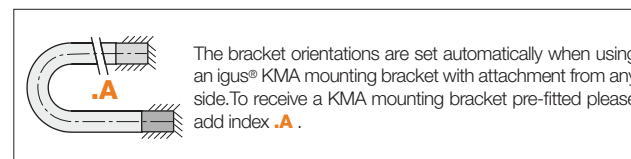
KMA mounting brackets | Attachment from any side



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

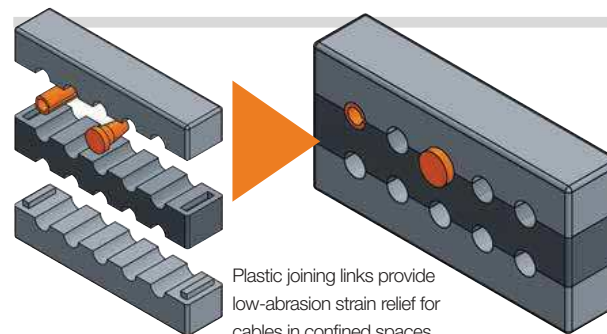
(KMA = polymer metal mounting bracket)



SK280.068.12ZB.1.A Order example



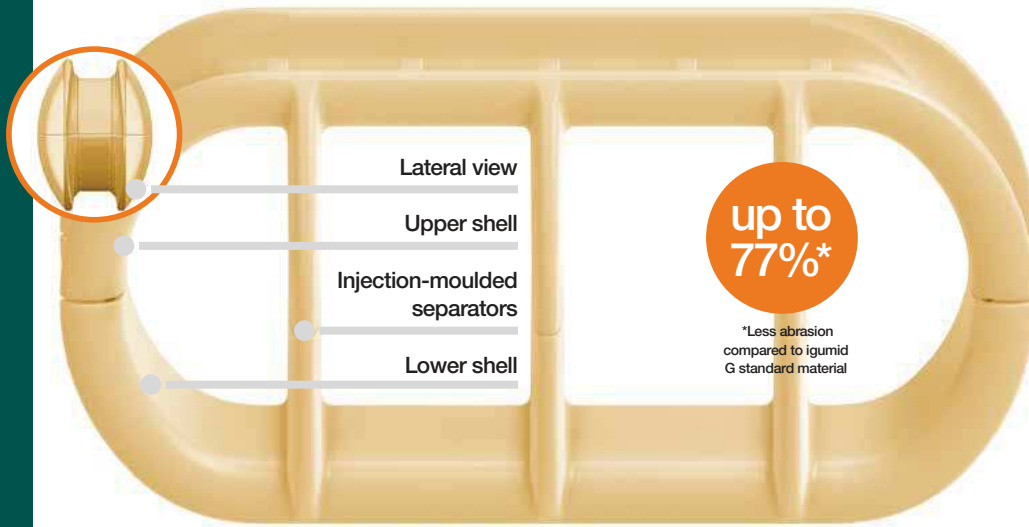
Strain relief e.g. clamps, tiewrap plates, nuggets and clips are available from stock. The complete chainfix range with ordering options ► From page 1392



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



Closed clamping block strain relief available upon request



Minimum particle emission, maximum service life; ring-shaped interior separation

Ring-shaped, wear-resistant interior separation system made of tribo-plastic for a long cable service life. Sprayed-on separators on two half-shells that are placed into the e-skin® cleanroom corrugated tube. iglidur® J, a material known from the iglidur® range of materials, is extremely wear-resistant and drastically minimises abrasion between cables.

- Reduces the abrasion of cables in the e-skin® energy supply system by up to 77%*
- Consists of upper and lower shells onto which separators have already been sprayed
- Can be combined with shelves
- Highly wear-resistant thanks to tribo-plastic material iglidur® J from the iglidur® range of materials
- For cleanroom-compatible corrugated tubes e-skin® SK, SKS, and SKY
- Maintenance-friendly and easy to retrofit for greater cleanroom suitability

*compared to the standard material igumid G

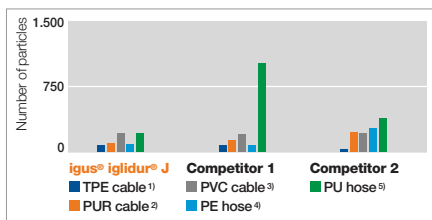
Proof: abrasion/cable tests in the igus® laboratory.

The iglidur® J material produces 90% less abrasion compared to igumid G standard material.

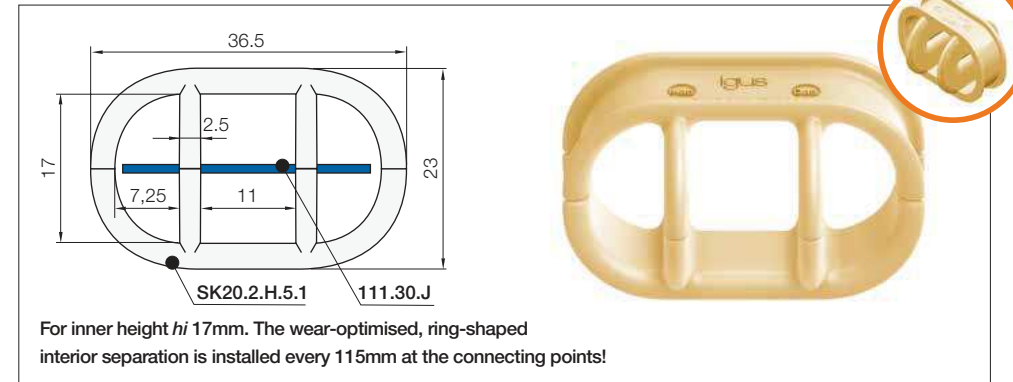


More information about iglidur® J material data

► www.igus.eu/igidur-j-material-data



*Measured and averaged on 5 different friction partners:
1) CF340.250.01 2) CF270.U.L.350.01.D 3) CF886.350.01
4) CAPE.A.10.0 5) CAPUA10.0



For inner height *hi* 17mm. The wear-optimised, ring-shaped interior separation is installed every 115mm at the connecting points!

		Smooth, round interior separation unassembled SK20.2.H.5 assembled SK20.2.H.5.1
		Full-width shelf, continuous unassembled 110.30.J assembled 111.30.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 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**
 - 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**
- More information ► upon request

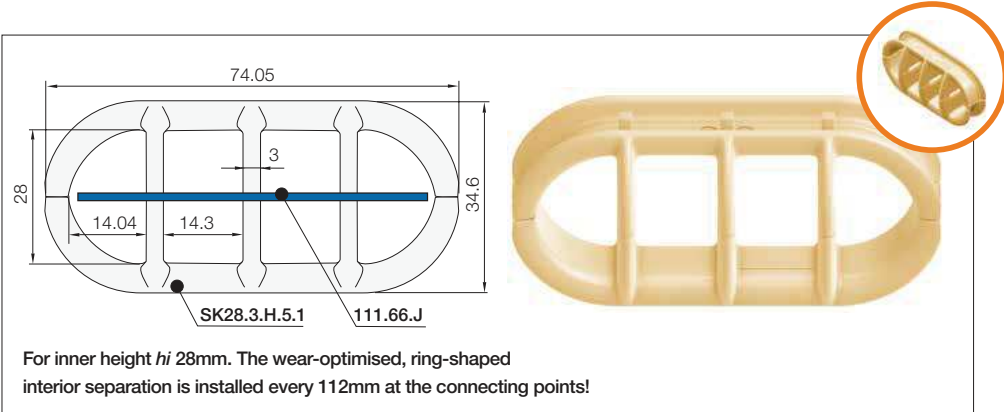


Tool part number MT.SK.914.868 shown here

e-skin® corrugated tubes - designed in seconds

- Create filling options and configure them completely with interior separation, mounting brackets and chainflex® cables
 - Automatic creation of a parts list and drawing with dimensioning
 - Easy inquiry and order of the complete corrugated tube
- More information ► www.igus.eu/eskin-quickfill





For inner height h_i 28mm. The wear-optimised, ring-shaped interior separation is installed every 112mm 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.

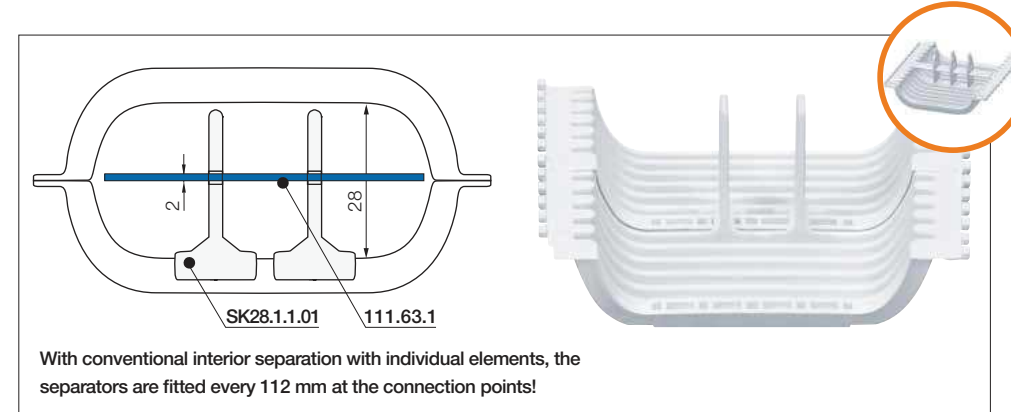
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- More information ► upon request

Tool part number
MT.SK.914.868
shown here

e-skin® corrugated tubes - designed in seconds

- Create filling options and configure them completely with interior separation, mounting brackets and chainflex® cables
 - Automatic creation of a parts list and drawing with dimensioning
 - Easy enquiry and order of the complete corrugated tube
- More information ► www.igus.eu/eskin-quickfill



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

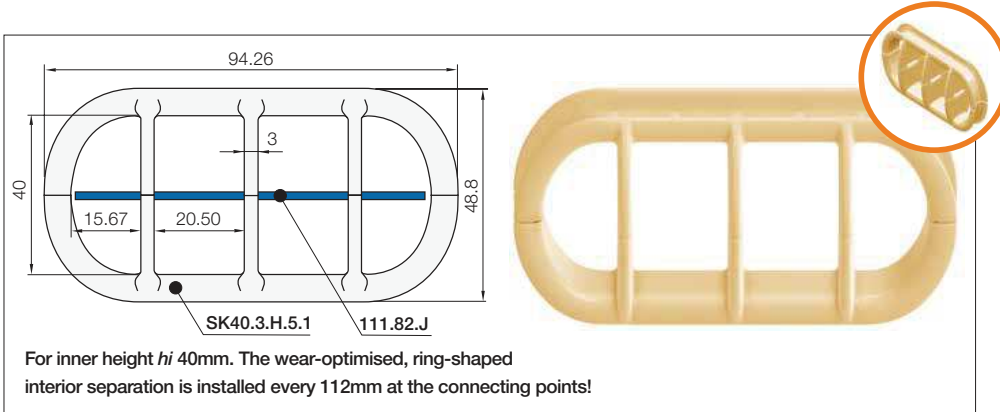
		<p>Slotted separator</p> <p>unassembled SK28.1.01</p> <p>assembled SK28.1.1.01</p>
		<p>Full-width shelf, continuous</p> <p>unassembled 110.63.1</p> <p>assembled 111.63.1</p>

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.

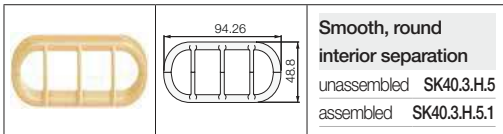
Full-width shelves
This option is for applications with many small cables with similar diameters. For full-width separation.



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



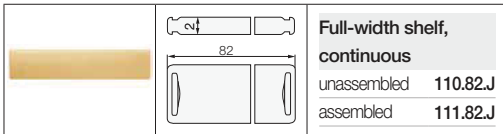
For inner height h_i 40mm. The wear-optimised, ring-shaped interior separation is installed every 112mm at the connecting points!



Smooth, round interior separation
unassembled SK40.3.H.5
assembled SK40.3.H.5.1

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.

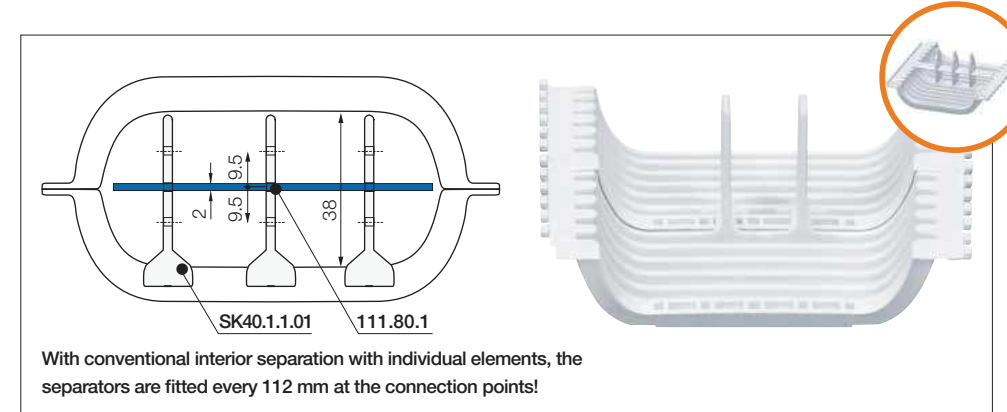
Fast opening and closing of the e-skin®

- The tool for closing the e-skin® energy supply system **part number MT.SK.914.868**
 - 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**
- More information ► upon request

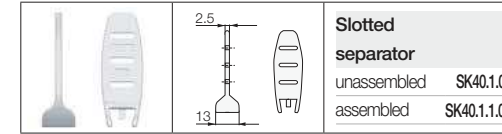
Tool part number
MT.SK.914.868
shown here

e-skin® corrugated tubes - designed in seconds

- Create filling options and configure them completely with interior separation, mounting brackets and chainflex® cables
 - Automatic creation of a parts list and drawing with dimensioning
 - Easy inquiry and order of the complete corrugated tube
- More information ► www.igus.eu/eskin-quickfill



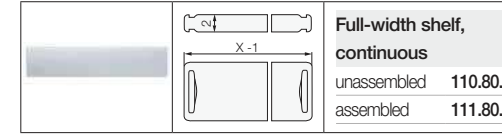
With conventional interior separation with individual elements, the separators are fitted every 112 mm at the connection points!



Slotted separator
unassembled SK40.1.1.01
assembled SK40.1.1.01

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