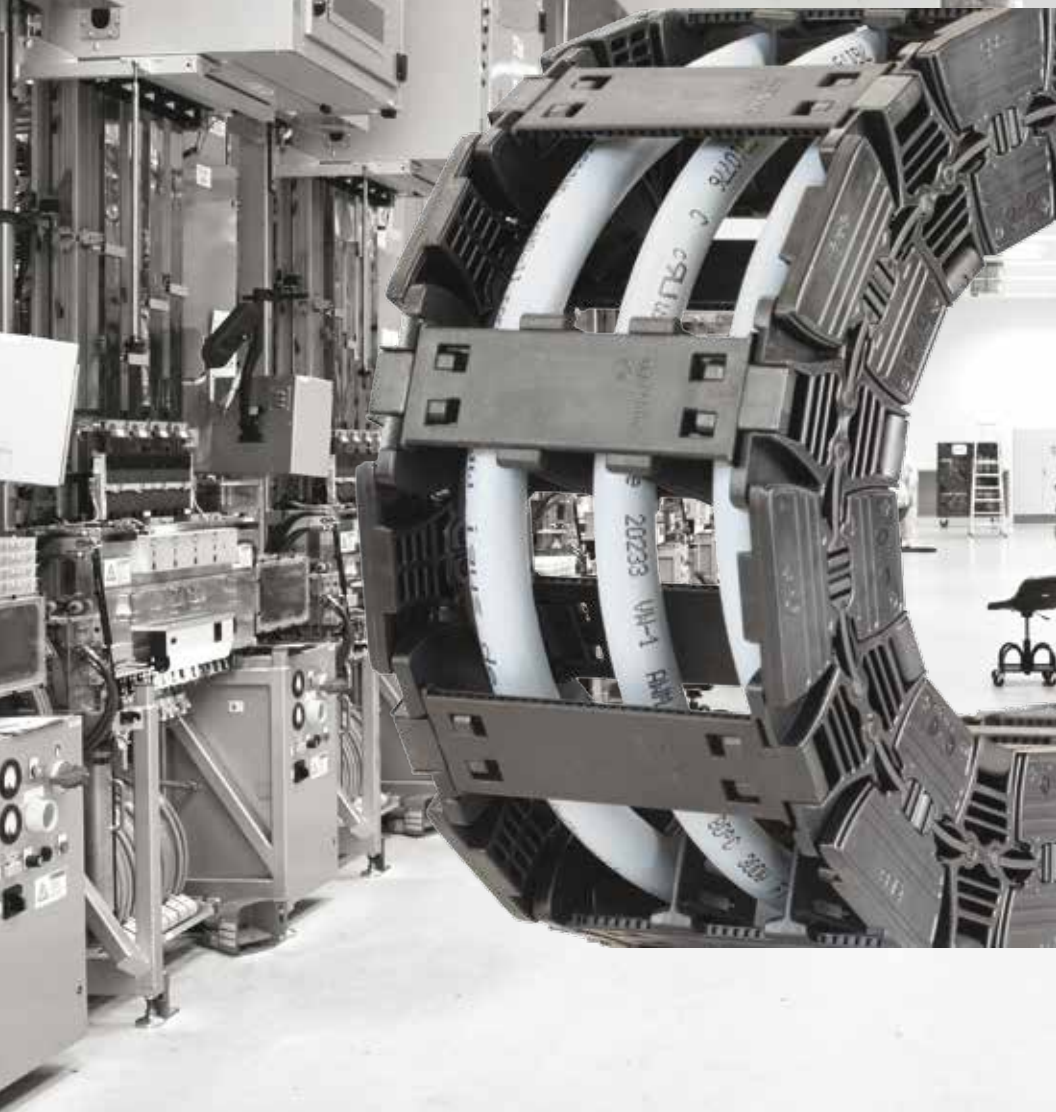


motion plastic solutions for ...


cleanrooms



plastics for longer life®... igus
www.igus.com/cleanroom

Clean solutions ...

Cleanroom-suitable, ESD-compliant, space-saving, vibration-dampening...



9,047 E-Chain® series for cleanroom applications with warranty¹⁾

197 DryLin® linear guide systems for cleanrooms with warranty²⁾

System E6-1:
Cleanroom solution -
smooth running, vibration-
free

1) Individual Series of various igus® E-Chains® from the E6, E6-1, T3, E3, E2/000, E4-1 and E-Z Chain® families were certified by the IPA Fraunhofer Institute in accordance with DIN EN ISO 14644-1 ISO Class 1 to ISO Class 5 (Report IG1303-640-1, IG0704-400 and IG308-295). This corresponds to 9,047 parts from the E-Chain® product range of the same design/principle.

... off the rod

solutions for electronics manufacturing – available from stock

CHAINFLEX® CFI30.02.12.

ESD-compliant: Avoid static charges in accordance with ESD and ATEX

Small, adjustable and precise: DryLin® T miniature guide system in new sizes



Cleanroom-suitable cables:
847 Chainflex® cables certified for cleanrooms to ISO class 1 or 2 by the IPA institute³⁾

2) Individual sizes from the drylin® "T", "N" and "W" product range were certified by the IPA Fraunhofer Institute in accordance with DIN EN ISO 14644-1 ISO Class 3 to ISO Class 6 (Report IG308-295). This corresponds to 197 parts from the DryLin® product range of the same design/principle.

3) Various igus® Chainflex® cable families were certified by the IPA Fraunhofer Institute in accordance with DIN EN ISO 14644-1 ISO Class 1 or Class 2 (Report IG1303-640-1 and IG0704-400). This corresponds to 847 of various Chainflex® catalog cables with tested exterior jacket materials.

igus® in cleanrooms

E-Chains® and Chainflex® motion cables in cleanrooms



For over 15 years, igus® has been one of the pioneers in energy supply systems for cleanrooms. igus® offers a wide range of IPA certified E-Chains®, which enables the machine-specific supply of energy to function in cleanrooms and allows for easier installation. As the quality requirements in the field of cleanroom technology are enhanced continuously by both the customers and the testing standards, igus® constantly strives to improve the products.

All test results

The Fraunhofer IPA has several igus® E-Chain® series and igus® Chainflex® motion cables tested according to DIN EN ISO 14644-1. Almost all E-Chains® from igus® can be used for applications in a cleanroom.

82% of all listed in the catalog Chainflex® cables are certified in class 1 or 2 according to DIN EN ISO 14644-1.

Product	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Total
Chainflex®	629	218	-	-	-	-	847
DryLin®	-	-	5	-	26	166	197
E-Chains®	1,170	4,062	993	-	2,822	-	9,047
Total	1,799	4,280	998	-	2,848	166	10,091

ISO Class 1

Results of measurement



Particle generation measurement:

For a total of 100 minutes, the air around the moving test object is analyzed for particles.

Result: NO particles larger $\geq 0.2 \mu\text{m}$ were measured.

Result according to DIN EN ISO 14644-1	E-Chain® Series	Report No.	Speed ft/s (m/s)
ISO Class 1	E3-15-040-075-0	IG0704-400	1.64 / 3.28 / 6.56 (0.5 / 1.0 / 2.0)
ISO Class 1	E6-29-060-150-CR	IG0704-400	1.64 / 3.28 / 6.56 (0.5 / 1.0 / 2.0)
ISO Class 1	E61-29-050-075-0	IG1303-640-1	1.64 / 3.28 / 6.56 (0.5 / 1.0 / 2.0)
ISO Class 2	E14-3-038-0	IG0308-295	3.28 (1.0)
ISO Class 2	1500-050-038-0	IG1303-640-1	1.64 / 3.28 / 6.56 (0.5 / 1.0 / 2.0)
ISO Class 2	E4-32-10-063-0-CR	IG1303-640-1	1.64 / 3.28 / 6.56 (0.5 / 1.0 / 2.0)
ISO Class 2	T3-29-050-038-0	IG1303-640-1	1.64 / 3.28 / 6.56 (0.5 / 1.0 / 2.0)
ISO Class 3	E6-29-060-150-0	IG0704-400	1.64 / 6.56 (0.5 / 2.0)
ISO Class 3	2500-05-055-0	IG0308-295	6.56 (2.0)
ISO Class 5	E4-32-10-063-0	IG1303-640-1	1.64 / 3.28 / 6.56 (0.5 / 1.0 / 2.0)

Result according to DIN EN ISO 14644-1	Chainflex® motion cables	Report No-	Speed (m/s) in dyamic application
ISO Class 1	CF77-UL-05-12-D	IG1303-640-1	in Series E61-29-50-075-0-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)
ISO Class 1	CF130-05-12-UL	IG1303-640-1	in Series E61-29-50-075-0-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)
ISO Class 1	CF130-15-07-UL	IG1303-640-1	in Series E61-29-50-075-0-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)
ISO Class 1	CF240-02-24	IG1303-640-1	in Series E61-29-50-075-0-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)
ISO Class 1	CF34UL-25-04-D	IG0704-400	in Series E6-29-060-150-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)
ISO Class 1	CF9-15-07	IG0704-400	in Series E6-29-060-150-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)
ISO Class 1	CF Clean Air	IG0704-400	in Series E6-29-060-150-CR, with v= 3.28 ft/s (1.0 m/s)
ISO Class 1	CF27-07-05-02-01-D	IG0704-400	in Series E6-29-060-150-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)
ISO Class 2	CF5-10-07	IG0704-400	in Series E6-29-060-150-CR, with v= 1.64 / 3.28 / 6.56 ft/s (0.5 / 1.0 / 2.0 m/s)



E-Chain Systems® E6.1, E3, E6.29.CR certified according to **DIN EN ISO 14644-1 Class 1**, by the Fraunhofer IPA Institute. 847 of all Chainflex® catalog cables are certified according to **ISO Class 1 or Class 2 IPA**. (Chainflex® motion cables with tested outer jacket material available from stock).

... put to the test

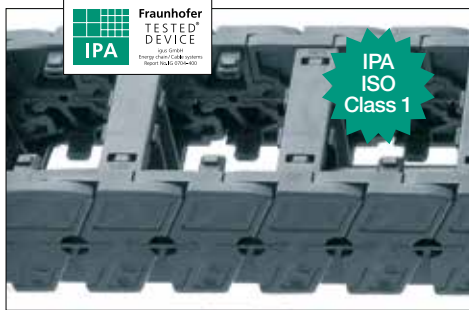
E-Chains® E6-1, E3, E6-29-CR certified according to DIN EN ISO Class 1



Lightweight, quiet, vibration-free – System E6-1

- ISO Class 1 for E61-29-050-075-0
- New generation of quiet running and cleanroom suitable E-Chains®

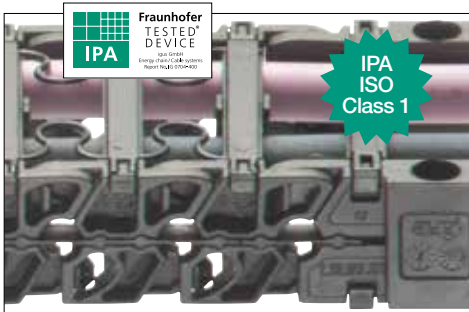
► www.igus.com/E6-1



Quiet and vibration-free – System E6

- ISO Class 1 for E6-29-060-150-0-CR
- Proven generation of quiet running and cleanroom suitable E-Chains®

► www.igus.com/E6



Highly dynamic – System E3

- ISO Class 1 for E3-15-040-075-0
- Small, low-noise, low-vibration

► www.igus.com/E3



Highly flexible – System T3

- ISO Class 2 for T3-29-050-038-0
- Smooth running, low sound level, easy installation

► www.igus.com/T3

... with top marks

further E-Chains® certified according to DIN EN ISO class 2



The standard – System E4-1

- ISO Class 2 for E4-32-10-063-0-CR
 - One E-Chain® series for almost all applications
- ▶ www.igus.com/E4-1



All rounder – E2/000 system

- ISO Class 2 for 1500-050-038-0
 - Snap open along the outer or inner radius
- ▶ www.igus.com/E2000



E-Z Chain

- ISO Class 2 for E14-3-038-0
 - Very easy to fill and cost-effective
- ▶ www.igus.com/e-zchain

the-chain from stock ...

Moving energy made easy: E-Chain Systems® from igus®

Designed to guide and protect

E-Chain Systems® act as the lifeline of modern-day machines. They not only extend the service life of cables and hoses, but also prevent machine downtime. The E-Chain® product range includes more than 80,000 innovative products from stock, from the smallest E2 Micro Chain, to E4-350, the world's largest plastic cable carrier. igus® is committed to listening to the wants and needs of its customers to produce high-performance cable management solutions.

Easy to equip



E-Z Chain

Easy to fill

- Fast installation of cables and hoses
- Cost-effective
- One-piece design



Zipper E-Chain®

Quick installation

- Fast assembly
- Extremely fast opening and closing
- Small and medium sizes available
- Open or fully enclosed design

Small and medium sizes



System E2 micro

For small installation spaces

- Smallest sizes, .20"- .59" (5-15 mm) inner heights
- Small pitch, quiet operation
- Lightweight
- Cable-friendly interior
- One-piece design



System E2 mini

- .71"- .83" (18-21 mm) inner heights
- Small pitch, quiet operation
- Optimized weight/stability ratio
- Versatile interior separation
- One- and two-piece design

Snap open or closed



System E2/000

Two-piece E-Chains®

- Medium sizes, .83"- 1.77" (21-45 mm) inner heights
- Snap-open along two sides
- Fast assembly – with E2 chain opener
- Modular interior separation available
- Two-piece design

Ultimate protection



RX Energy Tubes

Extremely chip-proof tubes

- Snap-open in the outer radius
- A smooth, curved outer contour prevents chips from sticking
- No holes, cracks, undercuts

Standard kit for nearly all applications



System E4-1

Universal E-Chain®

- Ideal for almost any application
- Inner heights .83"-4.41" (21-112 mm)
- Snap-open along two sides
- Open or fully enclosed design
- Fast assembly

Low noise, low-abrasion, vibration-free



System E6

Extremely low noise

- Extremely quiet operation, 46 dB(A)
- Low-vibration
- High velocities / accelerations
- Snap open along two sides

Robots, 3D and circular movements



Triflex® R

3D E-Chain® especially for robotic applications

- Four options: enclosed, E-Z, light, and snap-open



TwisterChain®

For circular or spiral movements

- For circular movements up to 540°
- Modular design – variable widths



TwisterBand

Rotary movements up to 7000°

- Compact, modular, cost-effective
- Ideal for small installation spaces
- Rotary speeds up to 360°/s
- Can be shortened easily
- Easy cable installation

ESD/ATEX E-Chain® ...

Conductivity of igus® products made from igumid G



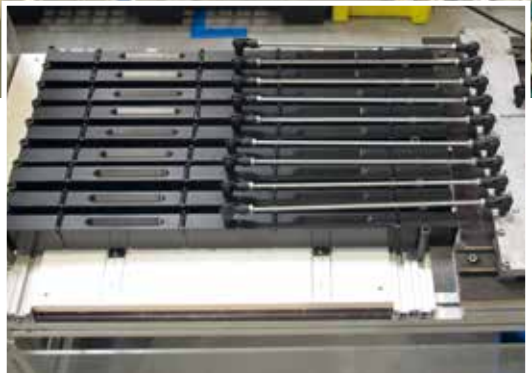
ESD/ATEX

- ESD material tested with over 10 million cycles for demanding applications
- Snap-open E-Chains® with mounting brackets and inner separation - ESD and ATEX versions available from stock
- Standardized product - igumid ESD with PTB certificate
- Suitable for explosion-protected areas for years

10 years ago igus® presented the conductive E-Chains® made from the newly developed igumid ESD material. Since then, these grey colored E-Chains® are among igus® most demanded special materials. To allow a quick completion of the engineers' application, the ESD program consisting of the zipper E-Chains®, E2/000, E4-1 and E4/light is now available from stock. 280 different ESD E-Chain® versions including inner separation and mounting brackets are shipped within 24 hours.

Reliable cables ...

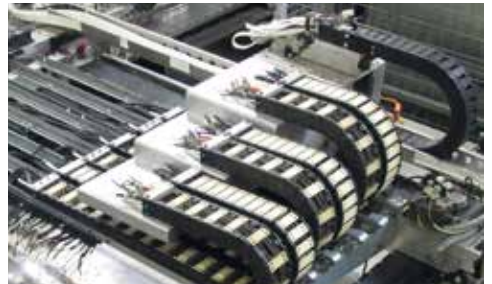
18,840 ft² lab... more than 700 cable tests... 2 billion test cycles...



Tests with seven outer jacket materials



CFLG-2LB-50/125 tested with
70.4 million strokes at 4.35 x d



Test of CF98-05-04 with
18 mm radius: 69.3 million cycles

Chainflex® classifications...

Reference types of the corresponding jacket materials following DIN EN ISO 14644-1, tested by IPA



Series	
Control Cables	
CF2	Cleanroom ISO class 1
CF5	Cleanroom ISO class 2
CF6	Cleanroom ISO class 2
CF9-UL	Cleanroom ISO class 1
CF9	Cleanroom ISO class 1
CF10-UL	Cleanroom ISO class 1
CF10	Cleanroom ISO class 1
CF77-UL-D	Cleanroom ISO class 1
CF78-UL-D	Cleanroom ISO class 1
CF98	Cleanroom ISO class 1
CF99	Cleanroom ISO class 1
CF130-UL	Cleanroom ISO class 1
CF140-UL	Cleanroom ISO class 1
CF170-D	Cleanroom ISO class 1
CF180	Cleanroom ISO class 1
Data Cables	
CF11	Cleanroom ISO class 1
CF12	Cleanroom ISO class 1
CF112	Cleanroom ISO class 1
CF240-PUR	Cleanroom ISO class 1
CF240	Cleanroom ISO class 1
CFKcoax	Cleanroom ISO class 1
Bus Cables	
CF11-LC-/D/CF14-CAT5	Cleanroom ISO class 1
CFBUS	Cleanroom ISO class 1
Fiber optic cables	
CFLG-LB	Cleanroom ISO class 1
CFLG	Cleanroom ISO class 1
Measuring System Cables	
CF11-D	Cleanroom ISO class 1
CF111-D	Cleanroom ISO class 1
CF113-D	Cleanroom ISO class 1
CF211	Cleanroom ISO class 2

Series	
Servo Cables	
CF21-UL	Cleanroom ISO class 2
CF27-D	Cleanroom ISO class 1
CF210-UL	Cleanroom ISO class 1
CF270-UL-D	Cleanroom ISO class 1
Power Cables	
CF30	Cleanroom ISO class 2
CF31	Cleanroom ISO class 2
CF34-UL-D	Cleanroom ISO class 1
CF35-UL-PE/2	Cleanroom ISO class 1
CF35-UL	Cleanroom ISO class 1
CF37-D	Cleanroom ISO class 1
CF38-PE/2	Cleanroom ISO class 1
CF38	Cleanroom ISO class 1
CF300-UL-D	Cleanroom ISO class 1
CF310-UL	Cleanroom ISO class 1
CF330-D	Cleanroom ISO class 1
CF340	Cleanroom ISO class 1
CFPE	Cleanroom ISO class 1
Robot Cables	
CFROBOT2	Cleanroom ISO class 1
CFROBOT3	Cleanroom ISO class 1
CFROBOT4	Cleanroom ISO class 1
CFROBOT5	Cleanroom ISO class 1
CFROBOT6	Cleanroom ISO class 1
CFROBOT7	Cleanroom ISO class 1
CFROBOT8	Cleanroom ISO class 1
CFROBOT9	Cleanroom ISO class 1
CFROBOT	Cleanroom ISO class 1
Special Cables	
CFBRAID	Cleanroom ISO class 1
CFFLAT	Cleanroom ISO class 1
CFSPECIAL-182	Cleanroom ISO class 1
CFTHERMO	Cleanroom ISO class 1

... 847 certified cables ...

Chainflex® cables for cleanroom applications - class 1 or class 2

Our cables are exclusively designed for movement, and are continuously optimized through a series of tests. Our goal is lasting durability and this is monitored and improved constantly in our laboratory with real application conditions. In particular, our cables are optimized for frequent flexing and fitted with highly abrasion-resistant jacket materials.

We will give a clear statement about the durability and guarantee the service life.

igus® cable product range for all motions



Control Cables

- Bending radii up to 4 x d
- Shielded/unshielded
- Jacket materials: PVC, PUR, TPE



Data Cables

- For travels up to 1,312 ft. (400 m)
- Optimized shields with high cover
- Jacket materials: PVC, PUR, TPE



Bus Cables

- Profibus, Profinet, CAN-Bus, Ethernet, CAT6_A, USB
- Jacket materials: PVC, PUR, TPE
- UL- and NFPA79 approval



Power Cables

- Shielded/unshielded
- For extreme applications
- Jacket materials: PVC, TPE



Servo Cables

- Abrasion-optimized
- With inner jacket for high dynamics
- Jacket materials: PVC, PUR



Measuring System Cables

- For high dynamics
- For 20 drive manufacturers
- Jacket materials: PVC, PUR, TPE

igus® dry-tech® from stock ...

DryLin® linear and drive technology

DryLin® is a range of maintenance-free and self-lubricating linear bearings in four different type series. Besides the freedom from maintenance and external lubricants, the main features include ruggedness and the insensitivity to dirt, water, chemicals, heat or impacts.

In addition the range is complemented by complete linear units with spindle drive or toothed belt, leadscrews nuts and threads, and new: drive technology - complete systems with linear axis and motor.



DryLin® linear technology comprises of 5 separate sizes.

- DryLin® T rail guide systems as alternative to standard commercial ball guide systems
- DryLin® N low profile guide systems for small space
- DryLin® W is a universal linear system with different profiles and carriage options
- DryLin® Q torque resistant square linear guides
- DryLin® R round shaft guide systems as an alternative to ball linings

► www.igus.com/drylin-linear



DryLin® drive technology

- Complete linear units with lead screw drive (trapezoidal or high helix thread) or belt drive
- For manual adjustments or electrical with motor

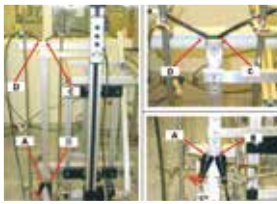
► www.igus.com/drylin-drive

... don't lubricate

DryLin® cleanroom compatibility, ESD compatibility and RoHS

The tested DryLin® guides reveal a distinct applicability for cleanrooms. In this connection, the individual cleanroom classes have to be considered in relation to the required speed and load. The combination of iglide® J with anodized and hard-anodized aluminum has "Level 1" in the ESD compatibility according to SEMI E78-0998 (best evaluation).

All DryLin® linear guides are designed for dry operation and have been tested under this condition. No oil or grease was used as additional lubricants.



Linear guide DryLin® NK-02-40-02

- Suitability for cleanrooms of the ISO Class 6 according to DIN EN ISO 14644-1
- ESD compatibility according to SEMI E78-0998 as suitable for the "Level 1"

► www.igus.com/drylinN



Lightweight and quiet run

- Suitability for cleanrooms of the ISO Class 5 according to DIN EN ISO 14644-1
- ESD compatibility according to SEMI E78-0998 as suitable for the "Level 1"

► www.igus.com/drylinT

igus.com/24

Shop online 24/7!

More catalogs and brochures online – www.igus.com/downloads
Ordering and deliveries weekdays from 8:00 am to 8:00 pm. No
minimum order quantities, no surcharges. 100,000 products
available from stock. Quick delivery. www.igus.com

9001:2008

igus® is certified in accordance with ISO 9001:2008 and ISO/
TS 16949:2009 in the field of energy supply systems, cables and
harnessing, as well as plastic bearings.

igus.com

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cleanroom