

# High Performance Cable Solutions for the World of Semiconductors



**The Quality Connection**

**LEONI**

# Intelligent solutions for manufacturing

Sophisticated modern industrial machinery places high demands on the cables and systems it uses. In the future, quality, functionality and precision will not be the only decisive factors here. With an eye on the continued advance of digitalization, we also see ourselves as partners for systems and solutions business, who work with you to develop futureproof designs.

We tackle technological innovations early on and offer you tailor-made products whose functionality we then test under simulated real-world conditions. This reduces downtime and ensures the reliability of your machine pool. This is an area where machine construction is merging with information technology (smart factory). Bitte weiteren Absatz einfügen

## LEONiQ – intelligent solutions for the digital world

With LEONiQ, we have developed an intelligent cable technology that is capable of recording and analysing a wide range of parameters throughout any kind of cable system. LEONiQ provides feedback on the state of the entire system and its controls, and offers recommendations for future development cycles.

This new key technology will make energy and data streams more efficient, more secure and more available. For the first time, not only the networked devices become intelligent but the network itself. In this way, LEONiQ creates wide-ranging opportunities to generate value for customers.

**LEONI is a global provider of products, solutions and services for energy and data management in the automotive sector and other industries. The value chain encompasses wires, optical fibers, standardized cables, special cables and assembled systems as well as intelligent products and smart services. As an innovation partner and solutions provider, LEONI supports its customers with pronounced development and systems expertise. The market-listed group of companies employs more than 90,000 people in 31 countries and generated consolidated sales of EUR 4.9 billion in 2017. Further information: [www.leoni.com](http://www.leoni.com)**

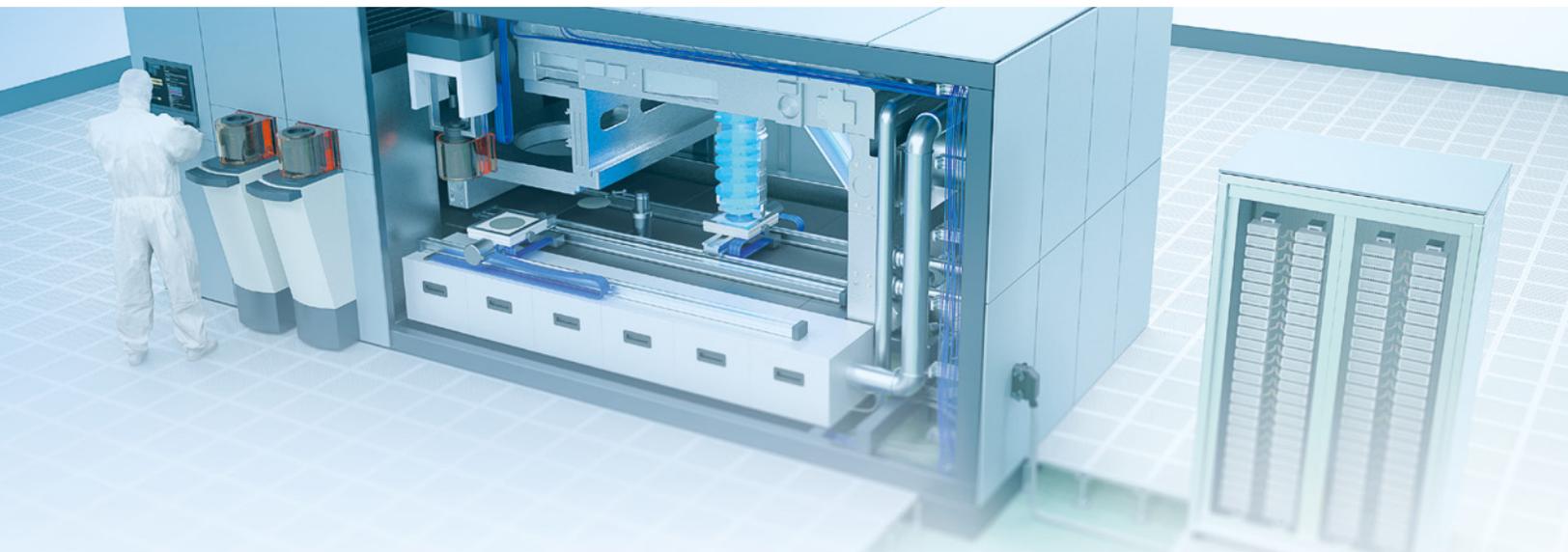


Alongside the superior electrical and mechanical properties offered by our cables and systems, we can also draw on a wide variety of materials that enables us to provide you with know-how and consulting services for machinery beyond our Tailor Made Product range. Whatever requirement you have – we know the answer on outgassing, particulation, temperature, radiation, chemical load and many more. The starting point here is the technological enhancement of our products in terms of miniaturization, sensors and artificial intelligence.

- Semiconductor industry
  - Data processing and control systems
  - Photolithography systems
  - Wafer handling equipment
  - Inspection equipment
  - Pick and place equipment
- Measurement technology
- High-frequency technology
- Cleanroom technology
- Food and packaging machinery
- Conveyor systems
- Assembly and handling systems

LEONI has a value chain that is unique in its sector. Our approach is based on a comprehensive understanding of application, combined with long experience and technical know-how.

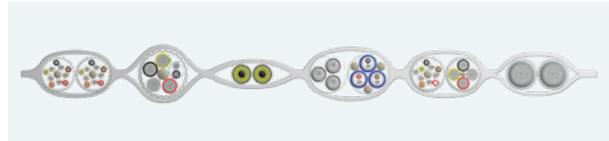
# Total Flexibility for the most technically advanced and cleanest applications



## High Performance Flat cable

### Applications:

- Wafer processing and inspection
- High-speed pick and place devices
- Test & measurement equipment
- Surface mount equipment
- Advanced lithography
- High performance packaging machines
- Laser cutting and laser edging machines
- LCD-Panel manufacturing
- Linear motion and drives
- ... any application with a fast and rapid movement, either automated or robotic driven



## Flexible Sleeve Technology cable

### Customer's benefits:

- Industry leading flex life performance of up to 150 million cycles at very tight bend radii
- Friction free and virtually no abrasion
- High-performance fluoropolymer materials
- Clean-room ready: rated Class 1
- Very low out-gassing characteristics, suitable for vacuum applications
- Intended for high accelerations and fast application speeds
- Light weight allows for extreme point to point accuracy
- Cables are designed to match your requirements
- Complete cable assembly solutions available

# LEONI now offers three product groups



LEONI has successfully engineered and produced many customized composite flat cable solutions that have accomplished more than 150 million flex cycles at a bend radius of only 7.5 times the cable's height.

Several factors influence the flex life of the cable; these include but are not limited to:

- bend radius of the cable in the application
- the cable design (type of stranding, copper, component layout, insulation materials, etc.)
- the acceleration and speed of the application
- length of travel and stroke length
- general application environment such as temperature, track chain or free travel, industrial vs. clean room, exposure to chemicals, etc.

## LEONI's High-Performance Flat (HPF) cables

LEONI HPF cables enable the end user to configure the cable for whatever the application demands including up to 150 million cycles. A wide range of individual conductors can be custom designed.

### Examples include:

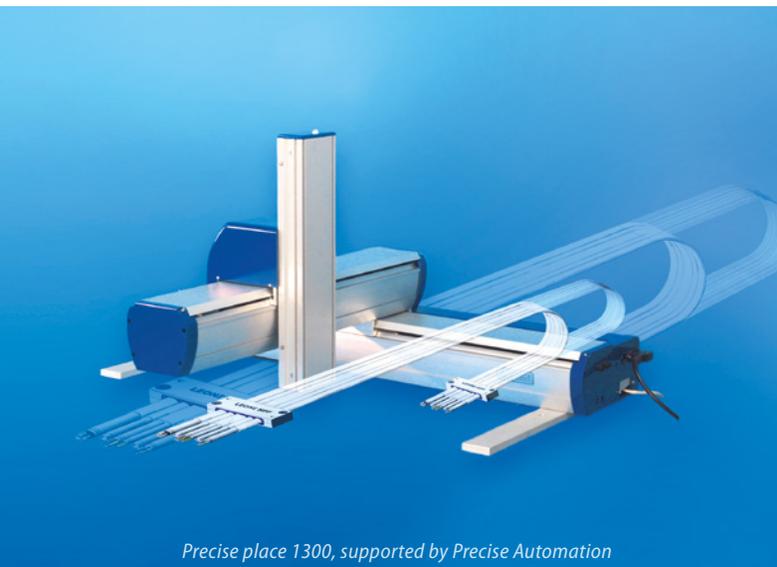
- Twisted copper pairs and multi-conductor hybrid cores
- Coaxial cables and components for flexing applications
- Ethernet, Cat5e, Cat6A, Cat7, and other protocol cores available
- Drive control
- Optical fibers and fiber bundles
- Tubing/lumens for air, water, ink etc.
- Any custom component you may require can be made available

## LEONI's Flexible Sleeve Technology (FST) allows for:

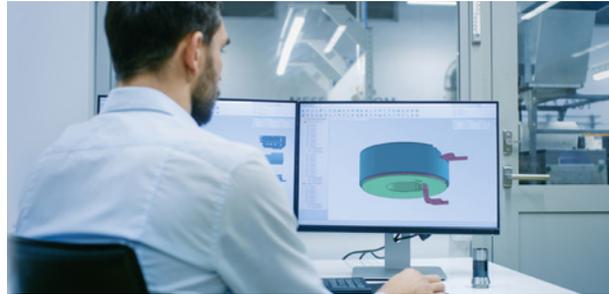
On-demand arrangement of approximately 20 industry standard components designed and selected for flex-life exceeding 10 million cycles.



# Custom engineered full service solutions



*Precise place 1300, supported by Precise Automation*



## **Tailor made complete intONE™ product offering: Your cable assembly partner**

- Complete cable assembly consultation
- 3D CAD models ready to be integrated into your equipment design
- 3D mapping of the cable assembly routing within your product
- Engineered design with bill of materials and specifications
- Component identification, selection and qualification
- Full project management services
- Rapid prototyping with < 4 weeks turnaround times\*
- Increased speed to market
- Intelligent cable technology and digitalization of your cable assembly
- 3D modelling of “molded” connectors, strain reliefs, grommets, etc.
- Unique logistical service to assist in production volume sourcing
- Industry leading bulk cable minimum order of 300 feet or 100 meters

The LEONI intONE™ team is dedicated to being your full service solution provider for your next project! What does this mean? You will benefit from LEONI's extensive knowledge and experience in cable and systems engineering as well as harmonized electronics design. We will work hand-in-hand with your engineering team and combine our knowledge into one turnkey solution tailor-made to you. This means: you and your engineers can focus on developing the core technology of your application and leave the rest to us. LEONI will be your partner throughout the entire lifecycle of your project to help you bring your concept to reality.

*\* based on available material and design complexity*

# Flexible Sleeve Technology: Industry standard components covering a wide range of applications

Our Flexible Sleeve Technology allows for on-demand design with the latest industry standard components. With this selection, a large array of applications can be covered; such as shielded or unshielded cores much like encoder cables, USB 3.0, CAT6 and CAT7, motor power, brake and control lines, pneumatic tubes, fiber optics and many others.

**Flexibility:** quick design tool prototyping, cores can be changed quickly and on demand

**Reliability:** proven design and performance of all components allows for easy termination and clamping

**Availability:** standard set of components allow for fast response times and functionality: complete assemblies with sleeves up to 10 feet\*

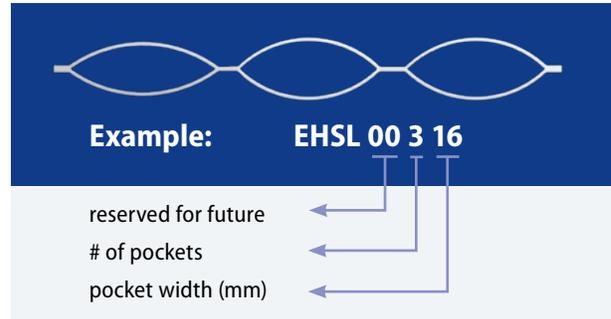
Visit our FST configurator on the LEONI Americas website:

[www.leoni.com/sleeve\\_configurator](http://www.leoni.com/sleeve_configurator)

## How does it work?

To order, follow these 4 easy steps!

1. Choose your cores from the list of components included in this brochure or visit [www.leoni-america.com](http://www.leoni-america.com) and click on the configurator.
2. Arrange the cores to fit your application and connector layout.
3. Choose a LEONI sleeve that matches your components. Keep in mind any width or height restrictions (e.g. of a cable track) and minimum bending radius.
4. Submit your request to LEONI through our website or by email at [infocables@leoni.com](mailto:infocables@leoni.com) or contact our engineering team toll free at +1-866-536-6422 any time for support or advice.



- For self-supporting applications, please choose a 16mm pocket
- Max 2 components in any pocket

LEONI part#	# of Pockets	Pocket width [mm]	Overall sleeve width [mm]
EHSL 00216	2	16	37
EHSL 00316	3	16	54
EHSL 00416	4	16	71
EHSL 00516	5	16	88
EHSL 00616	6	16	105
EHSL 00716	7	16	122
EHSL 00120	1	20	24
EHSL 00220	2	20	45
EHSL 00320	3	20	70
EHSL 00420	4	20	93
EHSL 00125	1	25	29
EHSL 00325	3	25	85
EHSL 00425	4	25	113
EHSL 00330	3	30	100
EHSL 00430	4	30	133
EHSL 00335	3	35	115
EHSL 00240	2	40	87
EHSL 00340	3	40	130
EHSL 00245	2	45	97
EHSL 00250	2	50	107
EHSL 00255	2	55	117
EHSL 00260	2	60	127
EHSL 00166	1	66	70

\* depending on components and layout longer lengths possible

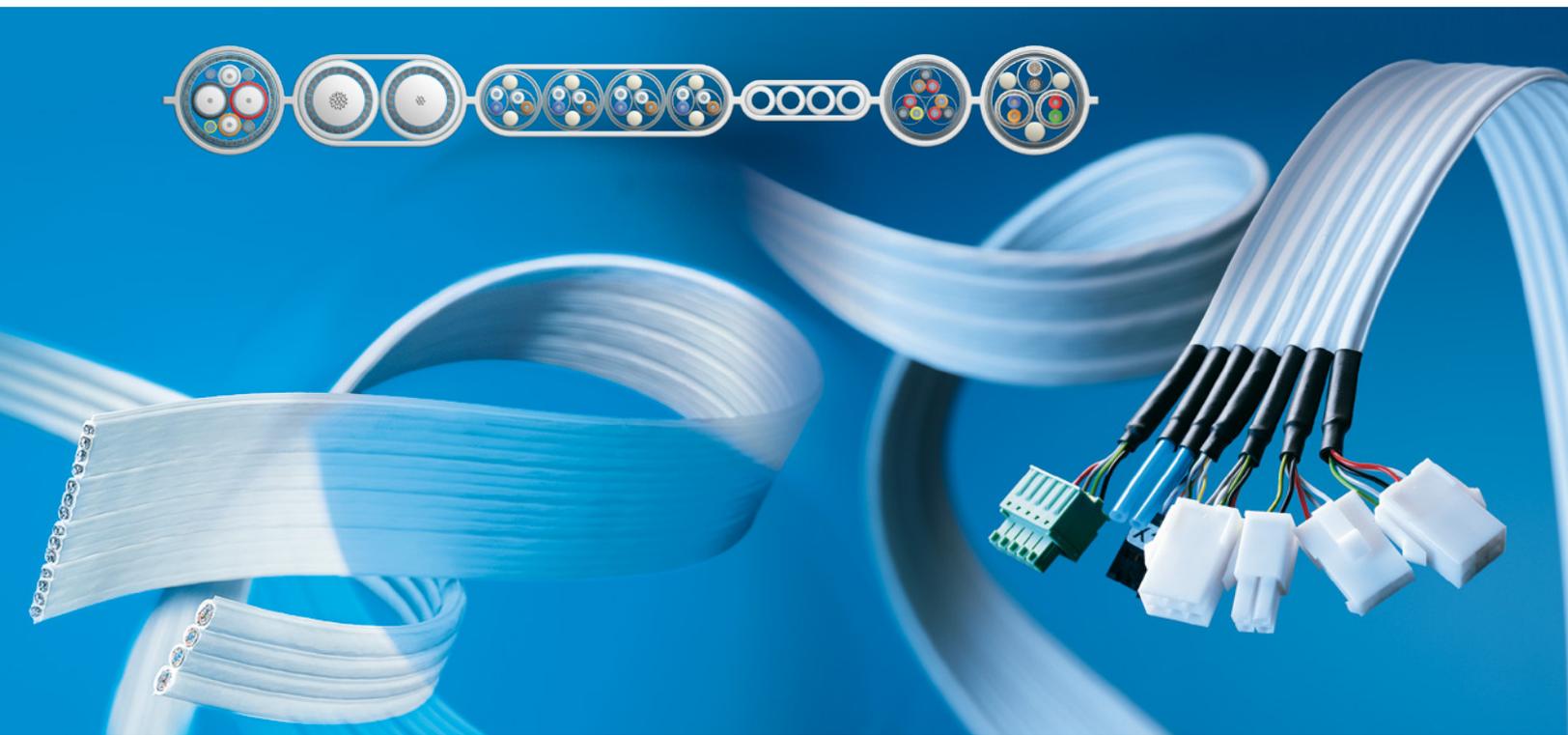
## Cross sections at a glance\*

Reference	LEONI part#	Description	Nom diameter [mm]	#Comp/ 16 mm pocket	
A	COMP 38839	4/C 16AWG; shielded; blk/wht/red/yel-grn	6.3	1	
B	COMP 38836	4/C 18AWG; shielded; blk/wht/red/yel-grn	5.1	2	
C	COMP 38835	4/C 20AWG; shielded; blk/wht/red/yel-grn	4.2	2	
D	COMP 38834	7PR 26AWG; blk/wht-blk, brn/wht-brn, red/wht-red, org/wht-org, yel/wht-yel, grn/wht-grn, blu/wht-blu	5.1	2	
E	COMP 38833	5PR 26AWG; shielded; blk/wht-blk, brn/wht-brn, red/wht-red, org/wht-org, yel/wht-yel	4.7	2	
F	COMP 38838	3 individually shielded PR; blk/wht-blk, brn/wht-brn, red/wht-red	6.0	2	
G	COMP 39264	3x coax 75 Ohm (RG179B equiv)	5.4	2	
H	COMP 39529	3x coax 50 Ohm (RG316 equiv)	5.2	2	
I	COMP 39059	Ethernet Cat5e equivalent	5.2	2	
J	COMP 39063	2/C 22AWG; shielded; blk/wht	3.1	2	

Reference	LEONI part#	Description	Nom diameter [mm]	#Comp/ 16 mm pocket	
K	COMP 39060	polyurethane tube; ID: 4.3mm (0.170") OD: 6.4mm (0.250")	6.7	1	
L	COMP 39061	polyurethane tube; ID: 2.5mm (0.098") OD: 4.0mm (0.157")	4.3	2	
M	COMP 39062	polyurethane tube; ID: 4.0mm (0.157") OD: 6.0mm (0.236")	6.3	1	
N	COMP 39262	62.5/125 MM glass fiber optic	2.6	2	
P	COMP 39267	1x 12AWG; shielded; grey	4.2	2	
Q	COMP 38843	4/C 16AWG; blk/wht/red/yel-grn + 1PR 22AWG; blk/wht; shielded	7.2	1	
R	COMP 38840	4PR 26AWG; brn/grn, yel/vio, gry/pnk, red/blk + 4/C 24AWG; wht, brn-grn, wht-grn, blu; shielded	5.7	2	
S	COMP 39117	(based on E) 5PR 24AWG; shielded; blk/wht-blk, brn/wht-brn, red/wht-red, org/wht-org, yel/wht-yel	5.1	2	
T	COMP 051628	4tw.pr 26 AWG Wht-blu/blu, wht-grn/grn, wht-or/org, wht-brn/brn	6.7	1	

\* visit [leoni-americas.com](http://leoni-americas.com) for the complete list of components

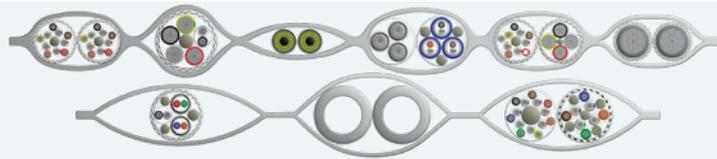
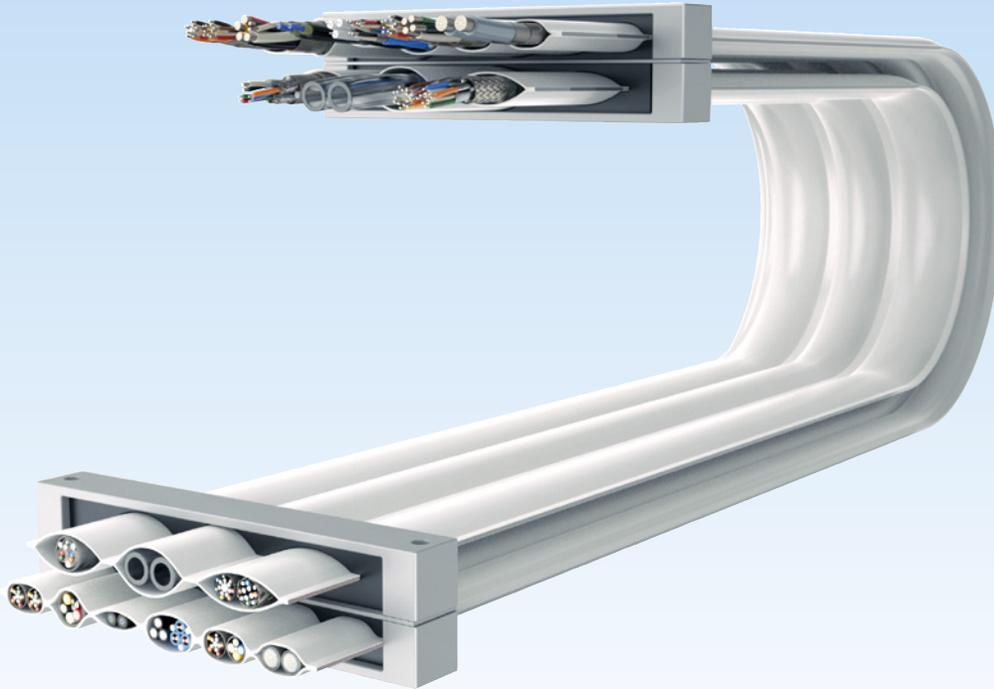
# High Performance Flex cables and cable solutions: Maximum reliability and flexible use up to 150 million cycles



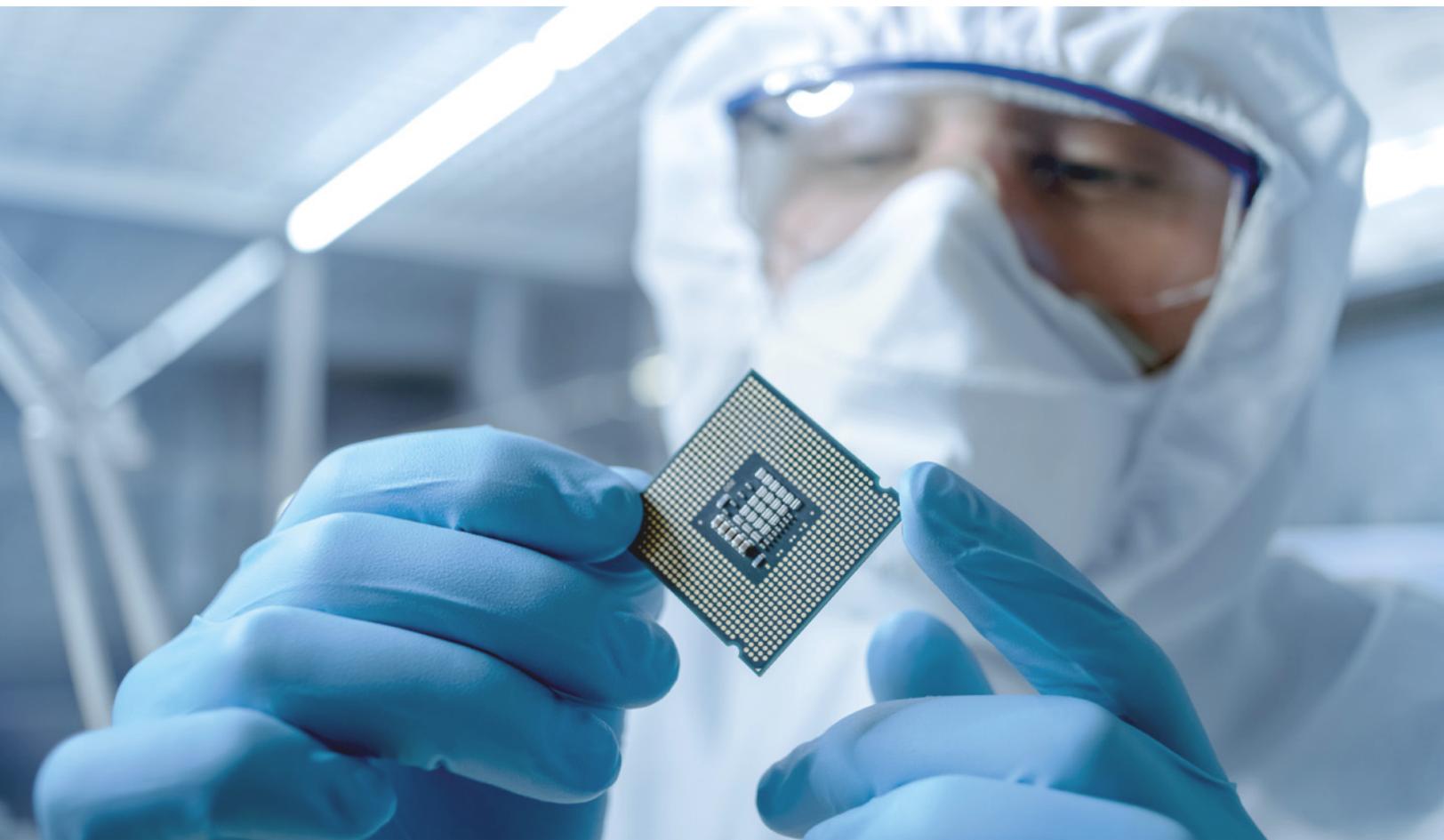
## High Performance Flex technology

Superior flexibility	Up to 150 million cycles at tight bending radii (7.5 times the cable height)
Unlimited options	LEONI can design any component that you require
Superior performance	Optimized system performance with custom HPF cable assemblies
Laminated designs	Custom made for high end systems requiring higher accelerations and application speeds
Custom components	Special conductor materials, optimized layout and unique insulation materials
Hybrid Designs	Include custom coaxial signal wires, power and control wires, optical fibers, tubes and other components
Low weight	Permits high positioning speeds and accuracy
Complete cable assemblies	Including mechanical and electrical components
Prototype orders	300 ft or 100 m for new custom designs
Web spacing	Can be defined in order to optimize overall cable width; zero web up to 2,5 mm webs possible
Typical copper used	Bare, silver plated copper in high strand counts as well as high strength copper alloys
Acceleration	Up to 45 m/s <sup>2</sup>
Speed of travel	> 3 m/s
Cable width	15–150 mm
Typical # of cables stacked	Up to 5 cables in one clamp; depending on design more cables can be stacked
Clean room class	IPA Class 1 (highest class possible)
Temperature range for optimal flex life	20 °C – 80 °C, 68 °F – 176 °F
Certifications	UL & CE
Self supporting design option	Up to 75 cm / 30 inches (depending on cable design)

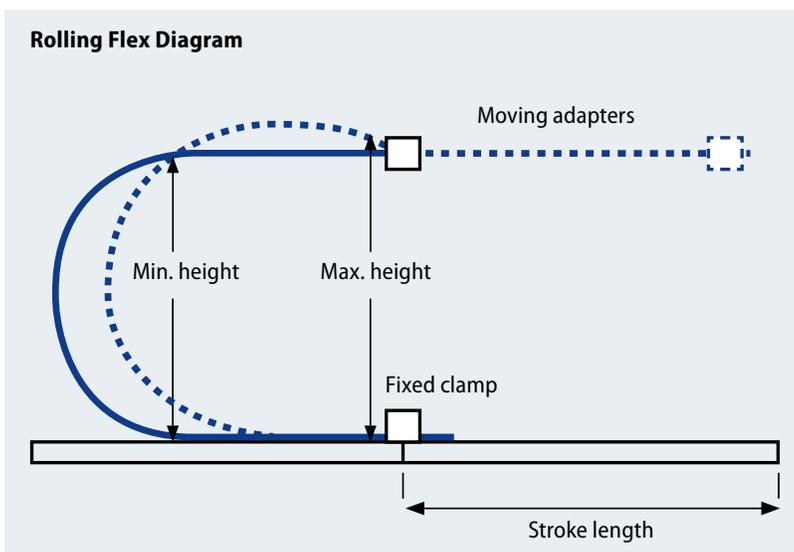
# Product specification of Flexible Sleeve Technology and cable solutions: Reliability and flexible use up to 10 million cycles



<b>Flexible Sleeve Technology</b>	
Superior flexibility	10 million cycles and beyond
Typical bending radius	Typical bending radius approximately 75 mm if only standard components are used
Unlimited options	Set of readily available standard components
Web spacing	Standard web spacing of 1 mm – 2 mm
Typical copper used	Bare and silver plated copper, Class 5 stranding or better
Acceleration	Up to 30 m/s <sup>2</sup>
Speed of travel	Up to 3 m/s
Cable width	22–127 mm
Typical # of cables stacked	Ranging from 2–10
Clean room class	IPA Class 1 (highest class possible), ISO 14644-1
Temperature range for optimal flex life	20 °C – 80 °C / 68 °F – 176 °F
Certifications	UL & CE
Self-supporting design option	Strength members that allow for 150 cm / 59 inches of supported free travel



The flex diagram on the right side provides a schematic of a typical motion set-up that LEONI HPF cables are often facing within the application.



## Custom cables made by LEONI



LEONI is your long-term, reliable partner supplying cables and complete cable assemblies. For decades we have manufactured high flex cables with outstanding success. We are proud to announce that virtually all our High-Performance-Flex (HPF) cables supplied are still successfully flexing in the field. In many cases this track record far exceeds the flex life expectations of our valued customers.

For many international industry-leading companies in North America, Europe and Asia, LEONI is the first choice for their cable and cable assembly needs. We supply our HPF cables into a variety of industries, such as, automated test equipment, linear motion, medical applications, solar and LCD-panel manufacturing.

Utilizing the experience of our HPF cables, LEONI now also offers a new line of customizable flat cables called Flexible Sleeve Technology (FST) – see page 4 for more details.

With LEONI's extensive cable expertise and flexible manufacturing processes, we are able to incorporate any component into a flat design. This allows us to accommodate any of your requirements, regardless of how demanding the application. LEONI's HPF and FST cables successfully stand up to the task.

Our sales and technical network enables us not only to respond quickly and effectively, but also makes LEONI an attractive partner for our customers.

Common systems and processes as well as clear objectives and shared values ensure the highest standards are maintained without compromise at LEONI.

Find more information about us:

**[www.leoni-america.com](http://www.leoni-america.com)**

# Your contact

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