igus solutions for the medical industry.

Reduce cost...


Dipl.-Ing. (FH) Ulf Hottung Industry Manager Medical Technology Tel.: +49 2203 9649-7706 Email: uhottung@igus.eu evaluation, "to go" as it were.

## Maintenance and lubrication-free plastic products for medical technology.

In medical technology, everything is becoming compacter, lighter and more modular. Why? The mobile laboratory of today comes to the doctor in the surgery or directly to the patient. Results are available immediately after
igus ${ }^{\circledR}$ enables this change of the Point of Care due to:

- Lightweight, compact bearings that are extremely wear-resistant
- Lubrication- and maintenance-free linear technology
- Fail-safe energy chains and cables - even in very restricted spaces
- Speedy delivery of small series as well thanks to 3D printing

Analytical diagnostics is becoming faster, while follow-up costs and extra work due to maintenance or failure are avoided.

In the igus ${ }^{\circledR}$ systems with more than 100,000 products from stock, every customer will find the right solution. Injection moulding and mass production guarantee a cost-effective solution for all motion plastics ${ }^{\circledR}$ applications, from rugged energy supply systems and flexible cables to lubrication and maintenance free plain bearings.

Our online tools also enable you to reduce process costs. igus® delivers from stock in 24-48 hours! Also, see our industry website.

Ø www.igus.eu/medical

I look forward to speaking to you.


dry-tech ${ }^{\oplus}$ bearing technology:

- $N o$ additional lubricants =
no dirt accumulation or contamination
- Resistance against acidic, alkaline and alcoholic cleaning agents
- Easy to clean
- Highest quality stainless steels available for sliding pairs
- FDA- and/or EU-compatible materials possible
- Stability even at high temperatures
- Lightweight construction with the use of aluminium and carbon materials
- 3D printed components to your requirements
f www.igus.eu/dry-tech
the-chain:
e-chains ${ }^{\circledR}$ and chainflex ${ }^{\circledR}$ cables
- Reduce downtimes, increase service life of cables and hoses
- Various types of motions and installation orientations
- Cleanroom suitability
- Guide sensitive bus, data and fibre optic cables, as well as air, fluids etc.
- For different environments such as cold, heat, humidity, etc.
- Space-saving installation
- Eliminate downtimes thanks to predictive maintenance
$\int$ www.igus.eu/the-chain


## ... with motion plastics ${ }^{\circ}$ from igus ${ }^{\circ}$..

## Dispense with lubrication ．．．

## ．．．withstands high stress ．．．

Lubrication－free ．．．hygienic ．．．maintenance－free ．．．space－saving

## Medical assistance system



## Laboratory technology



Fittings


iglidur ${ }^{\ominus} \mathrm{X}$ plain bearing and drylin${ }^{\ominus} \mathrm{N}$ linear guide systems
－Lubrication－free，can be disinfected
－Low noise
－Smallest installation space
－No stick－slip
$\bumpeq$ www．igus．eu／x $\bumpeq$ www．igus．eu／drylinN

drylin® ${ }^{\oplus}$ square guide and flange bearing
－Maintenance－free dry running，low noise
－High number of cycles，high accelerations possible
－Overlapping movements possible
－Suitable for short strokes
§ www．igus．eu／drylinQ

iglidur X plain bearings
－No additional lubrication，for high loads
－Space－saving and compact
－Metric and imperial dimensions
－Very good media resistance
今 www．igus．eu／x

## FDA／EU－compliant ．．．easy to clean ．．．high temperatures

## Prostheses



Physiotherapy


## Medical practice and surgical furniture



iglidur ${ }^{\circledR} \mathrm{J}$ plain bearings
－For high loads
－Quiet，vibration dampening
－Best coefficients of friction during dry operation
－Suitable for outdoor use
作 www．igus．eu／j

iglidur ${ }^{\circledR}$ plain bearings and drylin ${ }^{\circledR}$ linear guide
－No risk of contamination
－Long service life，tough，vibration dampening
－Shock resistant，low adjustment forces
－Modular system
$\bumpeq$ www．igus．eu／drylin $\bumpeq$ www．igus．eu／iglidur

pre－tensioned iglidure JVFM plain bearings
－Spring pretension can be integrated
－Quiet operation
－Tolerates edge loads，high load capacity
－Maintenance－free，low cost
今 www．igus．eu／JVFM

## ... dispense with maintenance ...

... fail-safe ... compact ...
.. low noise ... universal use ... complete system ...

Body scanner


X-ray machine


Medical simulator

e-chain ${ }^{\oplus}$ E4.1/E4.1L

- High loads, long travels
- For almost all applications
- ESD option, cleanroom tested
- Separable, light, quickly openable
$\Omega$ www.igus.eu/E4-1
... for all movement ... cost-effective ... quick delivery.


## Large medical equipment



## Medical trolleys and beds



twisterchain ${ }^{\ominus}$ with trough and readycable ${ }^{\ominus}$

- Linear, circular and multi-axis movements
- e-chain ${ }^{\oplus}$ option
- Choice of 10 colours
- System-solution: chain, cable, connector

A www.igus.eu/twisterchain

easychain ${ }^{\oplus}$ and chainflex ${ }^{\oplus}$ cables

- Save installation space, easy to fill
- Cables with $4 \times \mathrm{d}$ available
- High cycles in small installation space
- Cost-effective cables
$\int$ www.igus.eu/easychain

e-chains ${ }^{\ominus}$ and chainflex ${ }^{\oplus}$ cables
- Smallest installation space, small bend radii
- Non-magnetic
- Ready-to-connect complete systems with chain, cables and pre-assembled connectors f www.igus.eu/chainflex


## ... the right solution ...

## Maintenance-free plain and linear bearing solutions ..

... extremely low profile

drylin ${ }^{\circledR} \mathrm{N}$ low profile guides

- 100\% lubrication-free
- Low installation height between 6 and 12 mm
- Very low weight
- Numerous carriage options - also with pretension f www.igus.eu/drylinN
... for almost unlimited design freedom

drylin ${ }^{\circledR}$ W linear system
- Easy installation, maintenance-free
- Resistant to dirt due to dry operation
- Lightweight and quiet
- Square rail with floating bearing function for 90 degree installation
- Manually adjustable bearing clearance (optional)
- VA stainless steel version or full carbon
version: non-magnetic, light and strong
f www.igus.eu/drylinW
... Linear drive through rotational motion

drylin ${ }^{\oplus}$ lead screw technology
- Efficient and durable dryspin® technology
- Self-locking trapezoidal and metric threads
- Lead screw nuts made from 5 iglidur® materials
- High helix thread from $1 / 4$ inch to 20 mm diameter and $1 / 10$ inch to 90 mm pitch
苗 www.igus.eu/leadscrew-technology


## available from stock.

## For example ...

... the best shaft for your linear plain bearings

drylin ${ }^{\circledR}$ R shaft guides and shafts

- 100\% lubrication-free
- Dimensions identical to standard commercial ball bearings
- Shafts, shaft support blocks and accessories available from stock
- Replaceable liners
- 8 different shaft materials
- Lightweight, round or supported
f www.igus.eu/drylinR
... Drive: trapezoidal, high helix thread or toothed belt

drylin ${ }^{\circledast}$ linear axes
- 100\% lubrication-free, extensive accessories
- For format adjustments up to quick small parts handling
- NEW: The first lubrication-free linear carriages made of iglidure i3 material - printed well as injection moulded
$\uparrow$ www.igus.eu/drylin-drive
... complete systems


Lift/swivel unit

- Very light and dynamic due to plastic and aluminium
- Lubrication- and maintenance-free
- Compact structure and modular design
- 4-square profile with hollow chamber suitable for supply cables and media
- Delivered ready to install with NEMA stepper motors
f www.igus.eu/HSQ
... linear axis with motor and control unit, ready to connect

drylin ${ }^{\oplus}$ E drive technology
- Complete systems delivered in 3-4 days
- NEMA stepper motors / DC motors
- Can also be configured online
- With dryve control unit (optional)

民 www.igus.eu/drylinE $\bumpeq$ www.igus.eu/dryve

## More igus ${ }^{\circ}$ products ...

## ... and solutions

## Lubrication-free bearing made easy ...

... moves neatly without lubricants

iglidur plain bearings

- Wear-resistant polymers
- FDA-compliant and antibacterial materials
- Customised special solutions - from a quantity of 1
- High wear resistance
- High load capacity and good coefficients of friction
- Service life can be calculated online

伦www.igus.eu/iglidur
.. Ball bearings with absolute dry running

xiros® polymer ball bearings

- Lubrication- and maintenance-free
- High corrosion resistance for
temperatures up to $+150^{\circ} \mathrm{C}$
- Non-magnetic
- Lightweight
... lubrication-free, compact slewing ring bearing

iglidur® PRT slewing ring bearing
- Cost-effective, low maintenance, lubrication-free
- Easy to install and replaceable sliding pads
- High wear resistance
- For very high loads and high stiffness
- Extensive accessories (e.g. toothing, locking, ... )
$\Omega$ www.igus.eu/PRT
... insensitive to dirt

igubal ${ }^{\bullet}$ spherical bearings
- Self-aligning bearing elements, made of plastic
- Different types of designs, e.g. spherical, double, joint, flanged and pillow block bearings
- Different spherical ball materials
- Extremely cost-effective
- Service life can be calculated online

今 www.igus.eu/igubal

## ... as you need it.

... material from prototypes to series

iglidur® tribo-filament for 3D printing

- Can be processed by commercially available 3D printers
- Choice of 5 materials: iglidur® 1150 excellent wear resistance. iglidur® $1170-\mathrm{PF}$ sophisticated processing. iglidurº $1180-\mathrm{PF}$ good wear resistance. iglidur ${ }^{\otimes} 1210$ chemical resistance. iglidur® J260PF extremely wearresistant primarily in conjunction with plastic shafts $\mathcal{\sim}$ www.igus.eu/tribofilament
... for free design



## iglidur® bar stock

- iglidur® materials as round bars, tubes and plates
- Currently 26 iglidur® materials to choose from
- Cut to required size without offcut removal
- Mechanical processing from a batch size of 1
- Maintenance-free and calculable
f www.igus.eu/barstock
... special geometries


Special parts made of tribo-plastics

- Special solutions
- Self-lubricating and maintenance-free plain bearing solutions completely according to your wishes
- Specifically tailored to your application
- Mechanically produced or moulded
$\int$ www.igus.eu/speedimold
... cut and glue


Tribo-tape

- Suitable for a lining surfaces and shapes where wear is an issue
- Easy to cut and glue
- Less space required
- Optional self-adhesive back
$\uparrow$ www.igus.eu/tribotape


## iglidur Tribo -3D printing ...

## 3D printing for wear-resistant parts ...



Wear-resistant plastic parts from the 3D printer
iglidur® Tribo-Filaments are the only 3D printing materials specially developed for moving applications. The printed parts can be used directly in the moving application and convince their users due to the typical Tribo characteristics - they are lubrication-free and extremely wear-resistant. The degree of wear is up to 50 times lower than that of other 3D printing materials.


Injection moulding tools, quick and inexpensive from the 3D printer

Due to 3 D printing, igus ${ }$ is able to make customised injection moulds in a short time with up to $80 \%$ lower costs. Maintenance-free plastic bearings in the desired shape can thus be made quickly and, above all, costeffectively.

- A wide array of material types: iglidur ${ }^{\circledR} \mathrm{J}$ extremely wear-resistant,
- iglidur W300 - withstands high stress,
- iglidur® A180 - FDA-compliant,
- iglidur® UW - for underwater applications and much more
- Cost-efficient and delivered quickly, from batch size 1
- For simple geometries


## as good as injection-moulded

## ... made of high performance plastics

... makes printing even easier

iglidur ${ }^{\circledR}$ I150

- Very good resistance to wear with a pv value of up to $0.2 \mathrm{Nm} / \mathrm{s}$
- Can be processed even without a heated printing plate
- Recommended printing surface: igus ${ }^{\circledR}$ adhesive film or "BuildTak"
Highly abrasion resistant, lubrication-free

- Wan res processed

lue
ower-resist
- Wear-resistant
- Chemical-resistant
- Diameters: 1.75 mm and 3 mm
- Can be processed by commercially available 3D printers
... specifically developed for laser sintering

iglidur ${ }^{\circledR}$ C210

- At least 3 times more wear-resistant
- Detail accuracy with exact surfaces
- Processing similar to commercially available SLS materials
- Now also in black


## Just shop for

individual 3D parts.
Wearing parts from the 3D printing service: extremely fast and online.
We print your individual component made of lubrica-tion-free and abrasion-resistant iglidur ${ }^{\circledR}$ plastics; easy to order and quickly installed: everything from the prototype to the complex special part.


Explore the printing service at www.igus.eu/3dprintservice

## ... for medical technology

## Moving energy made easy ...

... small, strong, flexible



E2.1 micro and chainflex ${ }^{\circledR}$ cables

- For confined spaces
- Double stop dogs for high fill weights
- For large unsupported lengths (relative to the size)
- 10 and 15 mm inner height
- Cost-effective cable range
§ www.igus.eu/E2micro
... Guide capillary hoses



## e-cord

- Secure guiding of the smallest hoses $<\varnothing 1 \mathrm{~mm}$
- Modular assembly allowing customised movement
- Predefined radii prevents bending damage to the hoses

〔 www.igus.eu/e-cord
... multi-axis guidance

triflex ${ }^{\circledR}$ R and chainflex ${ }^{\circledR}$ torsion cables

- Multi-axis "3D e-chain®",

Torsion $\pm 10^{\circ}$ per chain link

- Enclosed version, fully enclosed
and openable
- Can be lengthened and shortened as needed - Range of e-chains ${ }^{\oplus}$ suitable torsion cables
$\uparrow$ www.igus.eu/triflexR
... the corrugated hose that can do more

e-skin ${ }^{\circledR}$ and chainflex ${ }^{\circledR}$ cables, e.g. CAT7
- Defined direction of motion
- Openable, quick assembly
- Built-in rigidity for unsupported lengths
- Various materials and colours available, even for small quantities
- IPA cleanroom class 1
§ www.igus.eu/e-skin


## Cleanroom and hygienic

... FDA-compliant, cleanroom compatible and ESD-suitable

First Hygienic Design e-chain ${ }^{\circledR}$
The world's first plastic e-chain ${ }^{\otimes}$ designed according to "Hygienic Design" guidelines. Due to the open design, the chain is very easy to clean and, thanks to rounded corners and the absence of threaded connections, dead spaces and the resulting germ formation are avoided. The material is FDA-compliant and is also highly resistant to aggressive cleaning agents and chemicals.

- Easy to clean
- Open design
- Rounded edges means that there are no
dead spaces
- No "material on material"
- No threaded connections
- Highly resistant to cleaning agents and chemicals
- FDA-compliant material
$\int$ www.igus.eu/hygienic
e-chains ${ }^{\circledR}$ and chainflex ${ }^{\circledR}$ cables in the cleanroom
For over 20 years igus ${ }^{\circledR}$ has been one of the forerunners in energy supply systems in cleanrooms. igus ${ }^{\circledR}$ offers a broad range of IPA-tested e-chains ${ }^{\circledR}$ that allows the machine-specific supply of energy in cleanrooms. Since the quality requirements for cleanroom technology applications are constantly growing, igus ${ }^{\circledR}$ is continuously working on improving its products.
- All 1,125 chainflex ${ }^{\circledR}$ catalogue cables certified according to ISO class 1 or class 2 IPA. (chainflex ${ }^{\circledR}$ cables with tested outer jacket material available from stock)
- 9,047 e-chains ${ }^{\circledR}$ series for cleanroom applications certified according to ISO class 1 to class 5 IPA
- 197 drylin ${ }^{\circledR}$ linear guides for cleanroom applications certified according to ISO class 3 to class 6 IPA
- e-chainsystems ${ }^{\circledR}$ E6.1, E3 and E6.29.CR certified according to ISO class 1 IPA
§ www.igus.eu/cleanroom



## chainflex ${ }^{\ominus}$ works ... with guarantee ... antimicrobial

More than 1,354 chainflex ${ }^{\circledR}$ cable types from stock


More than 25 years of chainflex ${ }^{\circledR}$ - cables with the special structure for a very long service life in energy chains ${ }^{\circledR}$ and the unique 36-month guarantee*.

Flexible cables in energy chains need special features to last through many cycles, high speeds and accelerations, as well as demanding environmental conditions. Electromagnetic compatibility and compliance with standards and guidelines such as DIN EN 45545, NFPA 79, UL, CSA, VDE, Inter- and Profibus are also taken for granted today. The igus ${ }^{\circledR}$ chainflex ${ }^{\oplus}$ product line ranges from control cables, servo cables, motor cables and robot cables to bus cables, data cables, encoder cables and fibre optic cables; all have been specially developed for e-chains ${ }^{\oplus}$.

- Temperatures $-40^{\circ} \mathrm{C}$ to $+90^{\circ} \mathrm{C}$
- For highly dynamic applications in energy chains ${ }^{\circledR}$
- Special design prevents cable failure and "corkscrewing"
- Highly abrasion-resistant jacket materials (PUR, PVC, TPE)

36 month guarantee for chainfle ${ }^{\oplus}$ cables

- Effectiveness in line with ISO 22196 and JIS Z 2801 and achieved an $R$ value $\geq 2$ in the test** - Cleanroom compatible, ISO Class 1 or 2



## Special solutions for your industry, for example:


e.g. chainflex ${ }^{\oplus}$ CF9 / CF10 - shielded TPE control cables for extreme demands in outdoor applications, for small bend radii, hydrolysis and microbe-resistant
$\mathcal{A}$ www.igus.eu/CF10

e.g. chainflex ${ }^{\oplus}$ CF98 / CF99 - for heavy duty use and especially for small radii. TPE- outer jacket, PVC- and halogen free, cold-flexible, resistant to hydrolysis and microbes.
€ www.igus.eu/CF99

e.g. chainflex ${ }^{\circledR}$ CFBUS. 052 - largest selection of e-chain ${ }^{\circledR}$ bus cables for extremely small radii, e.g. CAT7, CAN bus, USB 3.0, DVI cable etc.

A www.igus.eu/CFBUS

## CFLG88

e.g. chainflex ${ }^{\circledR}$ CFLG88 - preferably indoor applications, PVC outer jacket, maximum EMC protection,
flame-retardant
f www.igus.eu/CFLG88

e.g. chainflex ${ }^{\circledR}$ CFSPECIAL. 544 - antimicrobial, for use in moving applications with greater hygiene requirements, effectiveness in line with ISO 22196 and JIS Z 2801 and achieved an $R$ value $\geq 2$ in the test

色 www.igus.eu/CFSPECIAL544
i Save money with reliability and innovation ... 3 year igus ${ }^{\circledR}$ guarantee for every chainflex ${ }^{\circledR}$ cable.

Guarantee statements reduce risk plant engineering. With our unique igus ${ }^{\circledR}$ guarantee for ALL chainflex ${ }^{\circledR}$ cables, we are providing predictable security for 36 months, or up to 10 million double strokes ( 5 million double strokes for very costeffective chainflex ${ }^{\oplus} \mathrm{M}$ cables).


[^0]
## Harnessed systems ...

## ... delivered ready to install

readycable ${ }^{{ }^{\bullet}}$ : harnessed drive cables ... in 24-48 hrs

## readycable $^{\circledR}$ - in 24-48 hrs or today

igus ${ }^{\oplus}$ provides more than 4,200 harnessed cables for drives according to 24 different manufacturer standards. Professionally produced, $100 \%$ tested.

- Servo, motor and signal/encoder cables
- No cutting costs, no surcharges for small quantities and packaging

- Eliminate storage costs for cables, e-chains ${ }^{\circledR}$ and connectors
- Cut turnaround times by half
- Flexibility when orders vary
- Reduce the number of suppliers and orders
by $75 \%$
- Minimise your machine downtime
- System guarantee - depending on the application
f www.readychain.eu
readychain ${ }^{\circledR}$ assembly rack
80\% savings during prototyping. Assembly transport rack for ready-to-install energy supply systems. with cables and e-chains ${ }^{\circledR}$

readychain ${ }^{\circledR}$ - fully harnessed systems in 3-10 days
1,600 systems produced per week in 12 readychain ${ }^{\circledR}$ factories around the world - assembly time optimised to increase your cash-flow. The largest factory for harnessed readychain ${ }^{\circledR}$ systems with $4,700 \mathrm{~m}^{2}$ and 160 employees in Cologne.

- Cable length accurate to the centimetre as per customer specifications
- Smallest bend radii from $7.5 \times d$
- Reduce storage costs and increase cash flow
f www.readycable.eu


tercontec SpeedTec
Service packs (starting at 1 piece) or harnessed directly to customer specifications. Also available as overmoulded version.


## igus ${ }^{\circ}$ smart plastics ...

## eliminate downtime

## predictive maintenance ...


smart plastics eliminate downtimes.
Intelligent products announce maintenance date ahead of time and can be integrated in your processes of predictive maintenance.

The isense family of igus ${ }^{\circledR}$ products consists of various intelligent sensors and monitoring modules. They measure wear during the operation and alert the user early enough to plan a repair or an exchange. The igus ${ }^{\ominus}$ Communication Module (icom) makes the seamless integration into your IT infrastructure possible. This allows scenarios like the continuous monitoring or automatic triggering of in-house maintenance jobs. An optional connection with the igus ${ }^{\circledR}$ data centre widens the options: individual lifetime optimizations and faster operational processes like automatic ordering of external maintenance crews or ordering of spare parts. These include maintenance commissioning or spare parts ordering. Thanks to smart plastics your equipment runs continuously and your maintenance costs go down. Improved safety is an additional benefit.

## ... with intelligent igus ${ }^{\circledR}$ products




## igus ${ }^{\circ}$ services ...

## ... quick and reliable



Visit our industry web pages for more information, products, application examples and useful online-tools.
§ www.igus.eu/medical



Quickly find and configure products and calculate service life - all online.
Using our online product finders, you can find the right igus ${ }^{\circledR}$ product and get a service life prediction.
$\mathcal{f}$ www.igus.eu/online


The igus ${ }^{\circledR}$ delivery service
Over $97 \%$ availability of all catalogue parts -
no need for you to stock

- Over 100,000 products from stock
- No minimum order
- No surcharges for small quantities
- No costs for cutting cables
- No packaging costs

追 www.igus.eu/24

## Modern injection moulding technology

The igus ${ }^{\circledR} \mathrm{GmbH}$ quality policy is based on the objective of identifying and meeting customer needs, and of always being a professional partner and reliable supplier. igus ${ }^{\circledR}$ has always been committed to producing products of the best possible quality and consistently developing innovative solutions.

## 

## The igus ${ }^{\circledR}$ lab

The industry's largest test lab $\left(2,750 \mathrm{~m}^{2}\right)$ conducts more than two billion test cycles per year on a total of 107 test rigs.

- Extensive test databases
- Customised tests upon request
$今$ www.igus.eu/test


## For any task - in any batch size

Different industries need different solutions. Whether in mechanical engineering, automotivemanufacturing or in the robot industry - igus ${ }^{\circledR}$ offers customised support for specialised applications. igus ${ }^{\circledR}$ already has many years of experience and specialised resources in many industries.
f www.igus.eu/industry



# $001: 2008$ 1'16949:2009 

igus ${ }^{\circledR}$ 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.

## 'newsletter <br> Free of charge! Discover more about the latest

 trends and innovations from the world of igus ${ }^{\circledR}$ motion plastics ${ }^{\circledR}$. Many exciting applications and videos for your industry.Register here: www.igus.eu/newsletter

## contact

Your contact person for your industry and your country: www.igus.eu/contact

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    - Monate Garantie Qcocrocol

