# Almost particle-free in the clean room

## igus: ISO Class 1 for numerous energy chains and cables

**Products used in clean rooms must emit as few particles into the environment as possible during operation. This concerns moving machine elements in particular. New reports by the IPA Fraunhofer Institute awarded a number of energy chains and cables from igus GmbH, Cologne, with the best possible certification, namely ISO Class 1.**

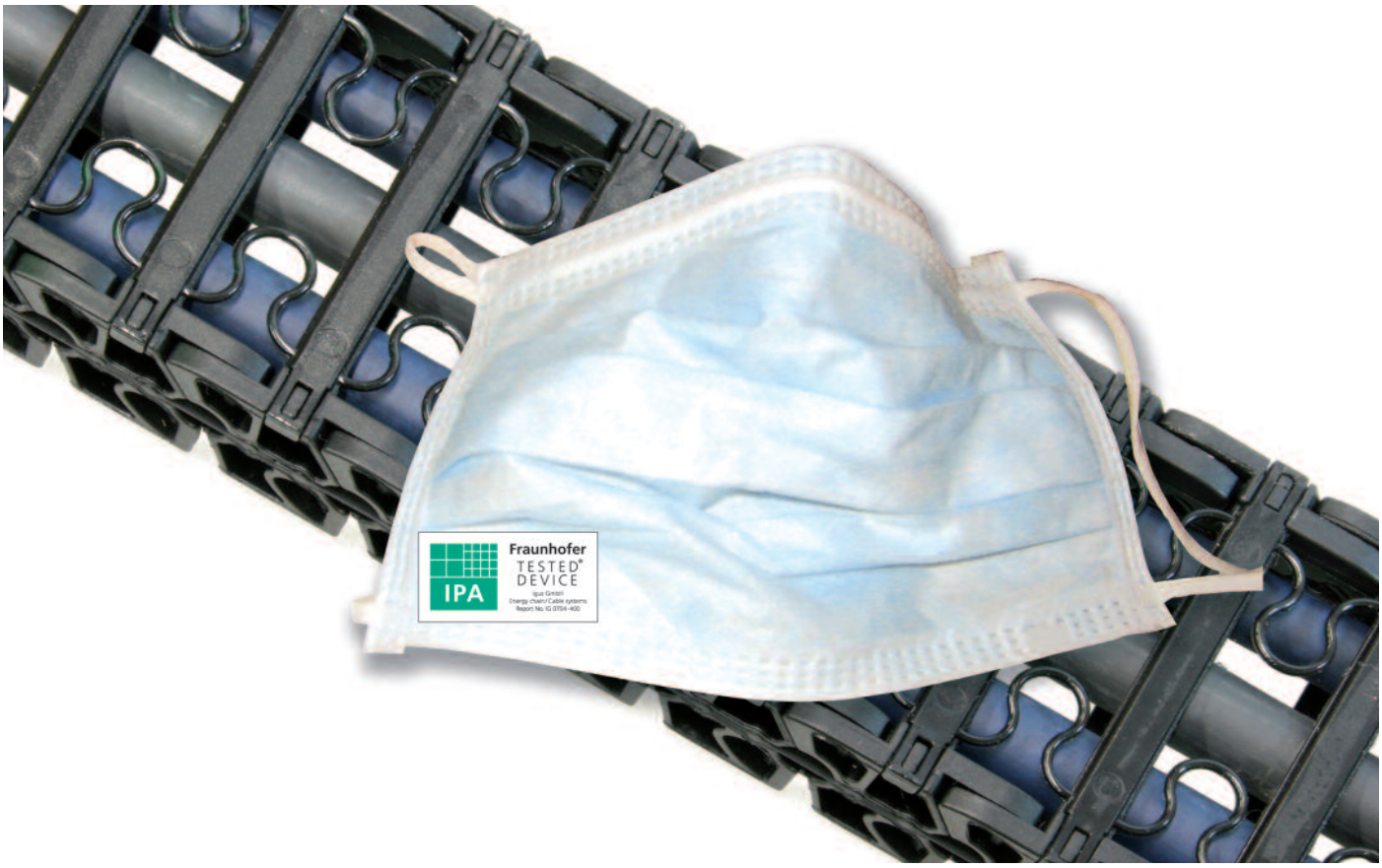
Production, assembly and measurement are taking place under clean-room conditions more and more often in machine and plant construction these days, as well as in the semiconductor industry, medicine, and the food and drinks industry. For this reason, as small or as few particles as possible may be generated by the energy chains and cables used. They need to have a very high abrasion resistance, which – double usefulness – is also an indicator for a long service life. "This is a development aim for all our products," explained igus manager Harald Nehring, presenting new expert reports on the clean-room suitability of energy chains.

**Confirmed results**

The Stuttgart-based Fraunhofer Institut für Produktionstechnik und Automatisierung [Institute for Production Engineering and Automation], department for clean and micro-production, examines production systems and materials very carefully. For this purpose, test benches are used for materials and operating equipment, especially designed for use in extremely clean reference clean rooms. They guarantee confirmed results on tested energy chains and cables, for example. Measurement is made of the number and size of particles per air unit in accordance with the standard DIN EN ISO 14644-1. The increasing importance of this ISO standard, which has been valid for some years, can also be seen in the fact that it is more stringent and sophisticated in comparison to the American standard US FED Std. 209E.

**Abrasion-resistant energy chains "E6.CR" and "E3"**

The igus energy chain systems "E6.CR" (special material) and "E3" were classified according to ISO Class 1 – IPA.




***Picture PM0809-01: igus GmbH, Cologne***
*As small or as few particles as possible may be emitted into the environment by the energy chains and cables used in clean rooms. The picture shows the igus energy chain system "E3" classified as ISO Class 1.*

Further series have been allocated to ISO Class 2 or 3. This means precise statements about possible clean-room application can be made about almost all common energy chains made by the energy chain expert. The "E6" system ensures extremely quiet movement up to 37 dB(A), is low in vibration and is able to reliably achieve all the high speeds and accelerations demanded by the market. One characteristic of the energy chain is that elastic polymer spring elements connect the sides of the energy chains together. "Since the classic bolt/hole connection is no longer used, friction and abrasion are reduced to a minimum," explains igus manager Harald Nehring. The "E3" system is also classified as ISO Class 1, in this case even in the standard catalogue version. This extremely low-noise energy chain is particularly suitable for small and tiny design spaces. Here, too, a spring strap connector that prevents relative movements between the joints ensures there is almost no wear. The energy chain moves in the clean room quietly, easily and without jolting.

**Top grade for "Chainflex" cables too**

The IPA Fraunhofer Institute has also classified igus' "Chainflex" cables especially for energy chains as ISO Class 1. These are the control cable "CF9", the servo cable "CF27" and the motor cable "CF34". These top-grade "clean-room cables" are suitable for very high speeds, small radii and are resistant to many chemicals. The sheathing materials are abrasion-optimised, matching the energy chain materials. Last but not least, the outer-to-lerated pneumatic hose "CF Clean Air" has also been classified ISO Class 1. This means that valid statements are available about the clean-room suitability of no less than 620 different "Chainflex" cables, when all the igus cables with identical sheathing materials are taken into consideration.

***Picture PM0809-03: igus GmbH, Cologne***
*An "E6" energy chain suitable for clean-room applications speeds up working processes during wafer handling in chip production.*


***Picture PM0809-04: igus GmbH, Cologne***
*The "clean-room" cables from igus are abrasion-optimised, matching the energy chain materials.*

| Result of tests | Energy Chains® | Chainflex®-cables |
|---|---|---|
| Fraunhofer TESTED® DEVICE IPA | ISO Class 1<br>E3.15.040.075.0<br>E6.29.060.150.0.CR* | CF9.15.07<br>CF27.07.05.02.01.D<br>CAPE (CF Clean Air) |
| | ISO Class 2 | CF5.10.07 |
| * Special material CR | ISO Class 3<br>E6.29.060.150.0 | |
| Fraunhofer TESTED® DEVICE IPA | ISO Class 1 | CF34.25.04 |
| | ISO Class 2<br>E14.3.038 | |
| | ISO Class 3<br>2500.05.055 | |
| | ISO Class 4<br>280.10.100 | |

***Picture PM0809-02: igus GmbH, Cologne***
*Highly abrasion-resistant: ISO Class 1 for the energy chain systems "E6.CR" and "E3", the Chainflex cables "CF9", "CF27", "CF34" and the pneumatic hose "CF Clean Air" from igus GmbH, Cologne.*

**PRESS CONTACT:**

André Kluth
Corporate Communication Manager

igus GmbH
Spicher Str. 1a
D-51147 Köln
Phone +49-22 03 / 96 49-0
Fax +49-22 03 / 96 49-222
akluth@igus.de
www.igus.de

DIN ISO 9001:2000