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-P r e s s R e l e a s e for the Hanover Trade Fair
Cold-formed aluminium lead screws
(approx. 8'000 characters, incl. spaces / 2 figures)

((Heading))
Cold-formed aluminium lead screws: A groundbreaking idea works

((Lead))
When new products are launched, they are often deemed to be revolutionary in order to generate attention. But sometimes it's more a matter of evolution than revolution. The Eichenberger product development for new lead screws out of aluminium, however, clearly involved revolutionary progress. It's well known that in an age of automation and miniaturisation, mechanical drive elements have to meet continuously changing demands. And additional or higher requirements are often added as well. Lightweight design, for example, has become one of the key future technologies in the aerospace, automotive and mechanical engineering fields. The rising demand for material and energy efficient products is also a driving force behind the continual further development of manufacturing processes at Eichenberger Gewinde AG. A lead screw is actually a simple design element. If it meets the highest quality and dimensional tolerance requirements and consists of a groundbreaking material, however, it creates exceptional application opportunities in particular in all automotive industry fields and in the medical industry.

((Subheading))

Material versatility recognised

((normal text))

Aluminium, the silvery-white ductile metal obtained from bauxite. It is the most common metal in the earth's crust and the third most common element after oxygen and silicon. Aluminium is the most-used metallic material after steel. Through a broad range of alloys and alloying additions, such as the combination of aluminium with other metals, the material covers an enormous spectrum of unique properties. One could easily call aluminium a material database. Among other things, it has an extremely low density and is therefore very lightweight. Plain aluminium forms an oxide layer on its surface in air, which then makes it corrosion resistant. This self-passivation, the combination of light weight and stability, the outstanding machinability and the fact that aluminium is non-magnetic is increasing the importance of more and more new application fields. Over 70 % of the aluminium ever produced is still being used. The material is extremely recyclable, since the depreciation is very low on account of the energy stored in the aluminium.

((Subheading))

The dialogue with our customers drives our innovations

Magnetic resonance tomography is a medical technology used for imaging. It is able to provide very detailed images of organs and tissue in order to assess these for potential changes. This examination method, also called magnetic resonance imaging, uses magnetic fields and high frequency electromagnetic waves instead of x-rays. An image of the body's structures can be created in this manner, with a contrast agent injection

being required in some cases. As the name "magnetic resonance tomography" suggests, the tomography devices use very powerful magnets and alternating magnetic fields which operate in the radio frequency range. It is obvious that these highly precise and complex systems must meet the highest requirements: One fundamental prerequisite is the use of non-magnetic individual components.

In this case the exceptional challenge was to develop the perfect solution for the demanding, non-magnetic injector drive unit. Eichenberger took advantage of this opportunity and mastered it. The Rondo cold-rolled round thread lead screw out of aluminium, with a diameter of 12 mm and a lead of 5 mm, meets these high-tech requirements. Thanks to the targeted exchange of information and ideas between the two development departments, it was possible to understand and implement the customer's special requirements and ideas. "Short imaging times combined with absolute safety require that the right amount of contrast agent has to be applied at the right location and at the right time." This is the basic principle. In addition to a dialogue and customer oriented approach, flexibility and a large amount of development and manufacturing process know-how are often required. It was possible to design an aluminium lead screw which guarantees and performs the absolutely safe and reliable transfer of contrast agent into the human body. Astoundingly fast and precise feeding is possible through extremely efficient translation of the rotary movement.

((Subheading))

Solution: An aluminium lead screw

The thread specialist looks for non-standard thread geometries to solve problems. Depending on the requirements and dimensions, customised cold-formed high-helix and round thread lead screws can be implemented with enormous lead values. Uniquely high linear speeds can be

implemented with surprisingly low rotary speeds. Eichenberger high-helix Speedy lead screws have a helix angle of over 60°. In comparison, a metric M 20 thread only has a helix angle of 2.48°. Nowadays exceptional customer solutions are developed upon request, such as the to date most extreme manufactured dimension for high helix lead screws with a diameter of 8 mm and a phenomenal lead of 600 mm. The combination of these properties with the lightweight, lead-free and non-magnetic material aluminium allows the Speedy and Rondo lead screw series to access an even broader range of applications.

((Subheading))

A step ahead

Eichenberger manufactures new round and high helix lead screws out of aluminium. While this may sound easy, it's a big step forward which is only possible when research, development, production and quality assurance work hand in hand.

There are two challenging obstacles to overcome: - Like all metallic materials, aluminium can also be strengthened through alloying. Even small amounts of precipitated alloying elements affect the tensile strength. It takes a lot to achieve the ideal strength values. - Furthermore, while aluminium is a material distinguished by good machinability, it is still quite demanding when it comes to accurate and controlled cold-forming of threads. Aluminium easily spalls during thread rolling. Intuition is needed, not only for careful selection of the optimal raw material and a suitable alloy. The geometry and design of the tooling used for the forming process is also key to a technically perfect and high quality product.

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Aluminium is three times as light as steel

With dwindling resources and a growing world population, the trend of searching for metallic lightweight construction materials will continue unabated. At 2.7 Kg/dm³, the weight of aluminium is one-third that of conventional steel. Lower weight results in fuel savings and longer range, in short: Aluminium leads to cost and energy efficient drive solutions and higher profitability. The perfect material combination of the corrosion-resistant aluminium lead screw and plastic flange nut even guarantees unlubricated operation (dry running) for certain applications and with the corresponding coating. The combination of an aluminium lead screw and plastic flange nut is also distinguished by its high wear resistance, a low coefficient of friction and by being absolutely maintenance-free. Depending on the customer requirements, the friction and efficiency can be even further optimised through additional surface treatments.

The initial results and knowledge gained from this small aluminium lead screw milestone are remarkable. The results are convincing. The designers at Eichberger have recognised the applications. Encouraged by the communicative partnership with the customer and the solution-oriented exchange, further enhancements are ongoing. There is no way past the aluminium lead screw.

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((Captions))

Speedy lead screws out of aluminium, ø16 mm, lead 90 mm.

Speedy lead screws out of aluminium, ø26 mm, lead 6 mm.

((Portrait))

Development service provider

Eichenberger Gewinde AG is a company with clear goals: The rolling - as in cold forming - of threads and the manufacturing of lead screw assemblies (lead screw and flange nut). Eichenberger supports "the customer's" innovations through the use of state of the art production methods and by developing new dimensions.

«Carry»:

Ball screw for applications where large loads need to be moved.

«Carry *Speedline*»:

Wear-free high-helix ball screw for high traversing speeds.

«Carry *Speedline*» Type E:

The high-helix ball screw with patented recirculating design combines low mass with a good price.

«Speedy»:

The high-helix lead screw provides maximum linear speeds at low rotational speeds.

«Rondo»:

The round thread lead screw with very quiet running properties.

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