

# MESYS

## INTRODUCES SOFTWARE VERSION 07/2020

A new version of the *MESYS* shaft and rolling bearing analysis software including new functionality is available. The bearing analysis software allows the calculation of the load distribution within the bearing and bearing life according ISO/TS 16281, and it is integrated in a shaft system calculation with additional possibilities like modal analysis, strength calculation for shafts and interfaces to gear calculations. Currently the software is used by customers in 26 countries on four continents.

### General Extensions

The COM-Interface allows easier usage with Python as additional methods were added. Several new methods were added allowing easier access to elements in the shaft calculation.

As CHM-files for help cannot be used over network connections, a new help viewer was added, which can be activated using `helpFormat=EXE` in `'mesys.ini'`.

Calculations with large load spectra or 3D-elastic parts, which take a long time, can now be cancelled using a button in the status bar.

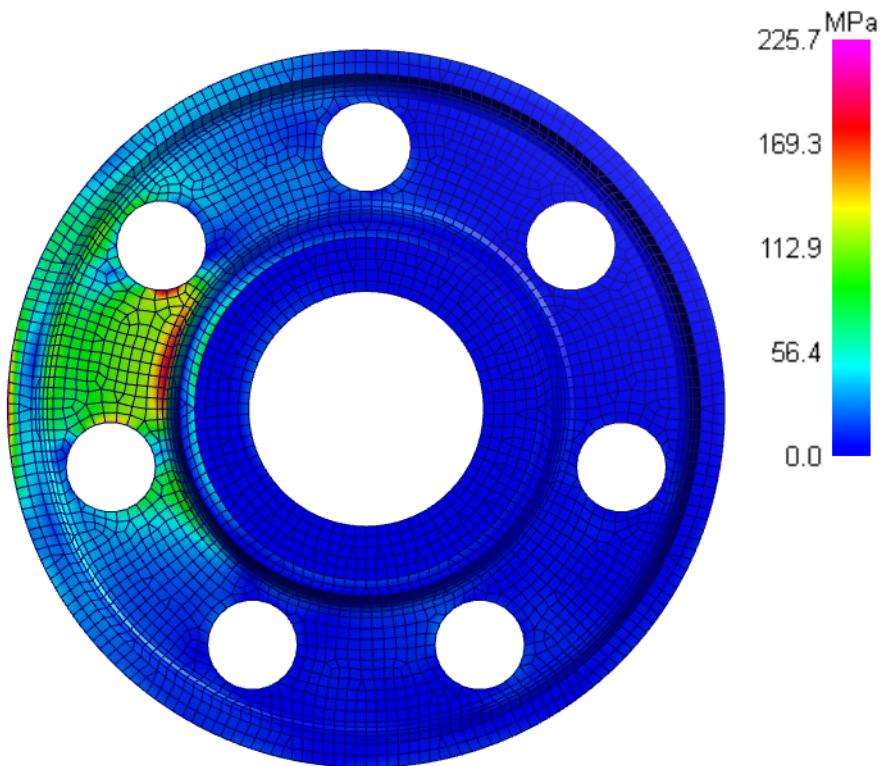
Turkish was already added as an additional language in an update for version 07/2019.

### Extensions in the Bearing Calculation

The bearing databases containing catalog data from Schaeffler (FAG, INA) and SKF are updated. The inner bearing geometry is approximated by the software for these databases.

The database including inner geometry by HQW was updated and now also includes bearings from Barden (UK). The database now contains spindle bearings with diameter 3 to 80 mm and several double-row axial angular contact bearings. In addition, a database for spindle bearings from CSC was added which contains internal geometry and diameters from 10 to 160 mm. Further databases from GMN and IBC are available on request from the manufacturer.

The list for bearing tolerances was



extended. Now tolerances like 'FAG P4S-K5', 'SKF VQ253', 'GMN UP+', 'HQW X11' can be selected for spindle bearings.

Profiles for rollers and races can now be defined using equations.

A diagram for reliability of a single bearing was added to the bearing calculation like what has been available in the shaft calculation for several versions. A 2D-graphic for orthogonal shear stresses was added.

Using a new custom input for the position in the tolerance field, the parameter variation allows to show results using different positions in the tolerance field.

### Extensions in the Shaft Calculation

In this shaft calculation the geometry import as STEP is now possible in case of several parts in one file. Gaps or undercut in the geometry in STEP or DXF-Import can be eliminated by selecting the lines and pressing the key 'c'.

The REXS-Interface is updated to version 1.2. For planetary gear stages still only the import is supported, no export.

An interface to the online SKF Bearing Module was added. This adds two results for bearing life and frictional torque to the results. The

SKF-Bearing life is using aSKF instead of aISO and is usually larger compared to Lnmh according to ISO 281.

For gear connections an interface to Hexagon ZAR3, ZAR5, ZAR6 for worm gears, planetary gear stages and bevel gears was added. Before only the interface to Hexagon ZAR1 for cylindrical gear pairs was available. For bevel gears a data exchange with KiMOS was added.

For 3D-elastic parts an orthotropic material can be defined for shafts now, and an evaluation of surface stresses has been added. On geometry import as mesh, multiple materials can be used for one part. Additional possibilities for contact between two 3D-elastic shafts have been added. Now displacements, tilting angles and reaction forces are reported for all condensation points. For geometry import as STEP, a preview dialog was added, allowing deleting or merging of parts or remeshing with different settings.

### For more information:

MESYS AG  
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# KTR

## INTRODUCES HYSTERESIS COUPLING WITH WEAR-FREE OVERLOAD PROTECTION

KTR developed a coupling that transmits the torque contactless via magnetic forces limiting the torque free from wear in case of overload; in addition, the coupling can be applied as a brake. The hysteresis coupling MINEX-H is currently available in three sizes for overload torques from 1.2 to 6 Nm.

MINEX-H is a permanent-magnetic hysteresis coupling transmitting the torque synchronously and contactless between the internal and external rotor via magnetic forces.

The particular feature of this new product is the integrated overload protection: When the operating torque exceeds the selected torque, the coupling slips while ensuring wear-free torque limitation. This process generates a relative speed between driving and driven side while the polarity of the hysteresis material is continuously reversed, and the material is heated up. The holding



torque remains almost constant with overload yet may lightly increase with a rising relative speed and the eddy current effects related thereto.

Apart from that the coupling can be applied as a brake in permanent slipping operation. In this case one rotor side is fixed while the other rotor side limits the tensile force set.

The internal rotor of MINEX-H is a hub made of stainless steel which the nickel-plated permanent magnets are arranged on. The external rotor is made up of an aluminum body that the hysteresis rings are located on. The new series is currently available in three sizes for overload torques from 1.2 to 6 Nm with a maximum speed of 1,800 rpm.

Main fields of application of the hysteresis coupling are low speed applications with frequent or permanent slipping; these include, *inter alia*, filling plants, winding, and unwinding plants as well as medical and materials handling technology.

### For more information:

KTR Corporation  
Phone: (219) 872-9100  
[www.ktr.com/us](http://www.ktr.com/us)

## Michell Bearings

### IMPROVES HYDROPOWER STATION WITH THRUST BEARING CONVERSION

Michell Bearings has completed a PTFE conversion of white metal thrust pads at a hydroelectric power plant in Tennessee.

Constructed in the mid-1930s, the Norris Dam was the first major project for the Tennessee Valley Authority (TVA). Its purpose was to bring economic development to the region and control the flooding that had long plagued the Valley.

TVA worked with Michell Bearings after experiencing numerous thrust bearing failures over the life of one of the two generator units. The failures of the original white metal bearings

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resulted in excessive downtime and associated loss of revenue.

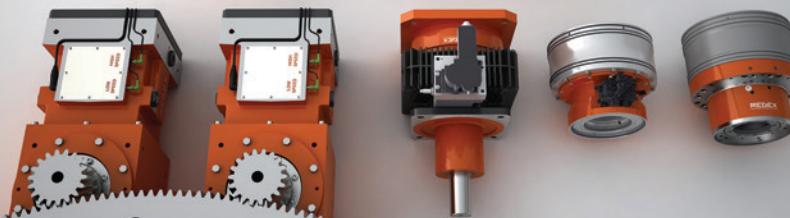
Michell Bearings was awarded a design contract to investigate the potential problems with the 1930s design, which had been subject to various attempts over the years to improve reliability. The engineers at Michell Bearings created a 3D model of the thrust bearing support structure and performed a finite element analysis to determine any issues affecting the bearing's performance.

Michell Bearings' in-house performance prediction software was used to evaluate the performance of the existing white metal pads.

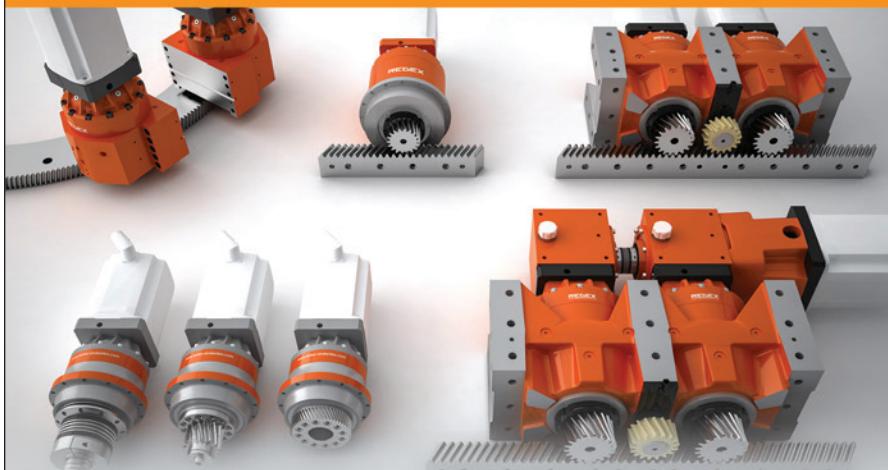
The bearing's thrust pads were replaced using a PTFE-lined alternative as a result of the study. The PTFE material provides



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a greater safety factor when compared with the white metal solution. PTFE is more durable and has a well-established and proven track record within the hydro power sector. The study concluded that the material will also increase the life of the bearing and provide greater reliability.

Steve Dixon, CEO at Michell Bearings, said: "Although the original contract was awarded as a study, we were pleased to hear that our advice was taken on board and led to the supply of the PTFE thrust pads for the Norris unit."

Previously engineering director at Michell Bearings, Dixon took on the role of CEO in May 2020. "We have been researching the advantages of PTFE for over 20 years and so we were confident that the material would solve TVA's problem."

Michell Bearings and TVA are working on an additional two projects at the Cherokee and Douglas hydropower plants. Michell Bearings will be presenting a paper on the findings of this project at the Hydrovision exhibition in June 2021.

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# Rollon

## PRESENTS REDESIGNED PRODUCT LINE

Rollon has introduced its new Compact Rail on the market, now with a Plus version, in addition to the new actuators from the Plus System and Smart System families. These products are the first of a comprehensive technological and aesthetic redesign program that will progressively affect the entire product range. Increased performance and attention to detail to satisfy the needs of manufacturing companies are the main priorities, and now Rollon wants to add functional and original aesthetics.

The first lines to benefit from the new design are the Compact Rail products and, from the actuator catalog,

and resistance to corrosion (they can be treated with Rollon Alloy—passivated electro-galvanization—or nickel-plating or galvanizing ISO 2081). The new Compact Rail also enjoys a long lifespan due to the induction hardened raceways, high performance, solidity and sturdiness guaranteed by the steel slider, and many other features that allow this product to be used in different types of applications.

The new Plus version also guarantees higher performance levels, thanks to the double ball bearings and new rails with convex raceways, which guarantee greater rigidity with increased load capacities up to +170% in the axial di-



the ELM and ROBOT products from the Plus System family and the corresponding E-SMART and R-SMART from the Smart System range. All these products have been technologically and aesthetically renewed. Their appearance was modified to increase performance and opportunities for industrial designers—with regard to production, procedural and economic efficiency—and to offer pleasant looking products that can be integrated perfectly into the factory design.

For Compact Rail, the system of rails with bearings in cold drawn steel with induction hardened and ground raceways whose main strength is being able to manage misalignment, Rollon has introduced a new version that offers great reliability in dirty environments

rection and +65% in the radial direction. Lastly, the entire Compact Rail range, in its renewed version, offers new steel sliders equipped with self-centering raceway cleaners, integrated lubrication systems for the raceway cleaners with a slow-release felt pad for automatic lubrication, lateral seals to protect the internal components and a cover on top to prevent accidental alterations or tampering with the radial ball bearing rollers.

Regarding the actuators, the technological innovation and design process concerns the ELM and ROBOT products from the Plus System family and the corresponding E-SMART and R-SMART from the Smart System range.

Regarding the Plus System family—or rather, the protected linear actuators



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with anodized aluminum profiles, self-sustaining structures and toothed belt transmissions—the main changes concern the introduction of heads with hollow shafts instead of protruding shafts to connect with the locking assembly and reduction gear. Thanks to these new features, the gear motor can be mounted on the actuator directly by the client, a considerable improvement in terms of time, procedures and cost, for the clients themselves, and a substantial reduction in time to market. Therefore, our clients can now remove the cover belt without our intervention, thanks to the quick release of the block integrated into the flange that connects the profile and the actuator head.

Aesthetically speaking, Plus System products now have a blue finish and radiated heads, instead of squarish heads. The Rollon logo placed on the heads

looks like the raceway cleaner head on the new Compact Rail. An updated version of the carriage has also been introduced, with heads on both sides.

The new features introduced in the Plus System product family are also present in the Smart System range, a family of linear actuators closely connected with the Plus family, which offer a very convenient price-quality ratio, high performance and a very simple and precise construction. Products from the Smart line now have a black transmission belt and new carriages. These also have radiated heads, with a groove that gives a sense of continuity to the line formed by the transmission belt.

#### For more information:

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[www.rollon.com](http://www.rollon.com)

## FVA GmbH

### RELEASES WORKBENCH 6.0

FVA GmbH has released the latest version of its simulation platform for drive systems. The software combines innovative, research-based calculation methods with user-friendly presentation of results.

With the *FVA-Workbench 6.0*, released on July 28, 2020, mechanical and hydraulic systems can be optimized, the precision of analyses



increased, and development processes made more efficient.

Key features include: scientifically proven calculations—high precision thanks to validated methods based on the current state of research; scalable

levels of detail—precise analysis of individual gearbox elements through to comprehensive system calculations; maximized efficiency—easy-to-understand graphical reports for fast and accurate interpretation of results.

The new *FVA-Workbench* calculation methods were developed and validated in the Forschungsvereinigung Antriebstechnik e.V. (FVA, The

Research Association for Drive Technology), the largest drive technology research and innovation network. Through member contributions and public funding, the FVA generates 17 million euros annually in research projects at leading research institutions. The *FVA-Workbench* serves as a platform for the practical and efficient application of knowledge gained in FVA research projects.

#### For more information:

FVA GmbH  
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[www.fva-service.de/en](http://www.fva-service.de/en)



## NORD

### RELEASES HOLLOW SOCKET SHAFT DESIGN FOR GEAR UNITS

NORD DRIVESYSTEMS introduces a new hollow socket shaft design for NORDBLOC.1 single-reduction gear units. This shaft design mounts directly to a pump without the need for couplings, significantly reducing installation time and maintenance, greatly extending the operating life of the unit, and drastically reducing revenue loss as a result of unexpected downtime.

Couplings have always been a challenge, and they are a common failure point within drive systems. Keeping shafts aligned not only eliminates vibrations, but also prevents additional load and wear-and-tear on drive units. Unfortunately, this is easier said than done, as even the most seasoned technicians are required to adjust and shim, sometimes for hours, to get as close to perfect alignment as possible, knowing that even the slightest misalignment will ultimately shorten the lifecycle of the gear unit.

NORD initially approached PSG, a Dover company, with the idea of a coupling-free system for their Blackmer Series pumps. After many months of collaboration, the design was finalized

for a hollow socket shaft for Blackmer's GNX and GNXH products. The new turnkey design reduced the time and costs of integrating new units to almost zero, making it a preferred pump solution that earned PSG a net revenue improvement of 47 percent.

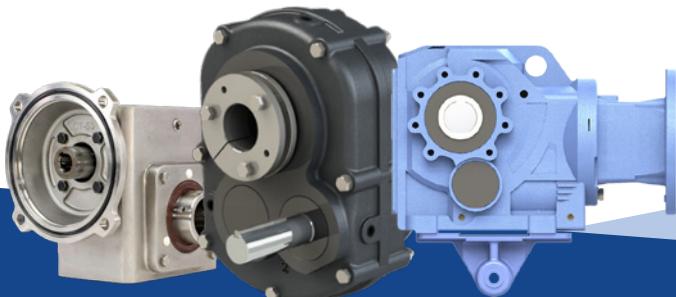
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The Type SDA-V Caged Ball Screw is ideal for a wide range of applications, from small electronic component machinery to large general industrial. Fifty-nine products are available with a combination of shaft diameters from  $\varnothing$ 12 to  $\varnothing$ 50 and leads from 4 mm to 50 mm. Clearance can be selected, including an axial clearance of 0 or less.

The Type SDAN-V Caged Ball Screw is designed with higher axial rigidity than the Type SDA-V. It is suitable for use with NC machine tools and precision equipment when it is necessary to minimize displacement from the force of cutting. Shaft diameters range from

$\varnothing$ 31 to  $\varnothing$ 50 and leads from 10 mm to 20 mm. A double nut is used to achieve axial clearance of 0 or less. Full-ball versions are available for both the Type SDA-V and the Type SDAN-V.

The Type SDA-V/SDAN-V features patented THK Caged Technology for smooth and quiet motion. Caged Technology employs a synthetic resin cage with a patented curvature that cradles each ball and separates it from the next. The spaces between the rolling elements retain grease and act as a lubrication system for long-term maintenance-free operation. Other Caged Technology benefits include increased speed and accuracy, decreased noise levels, low dust generation and long life.

The Type SDA-V/SDAN-V complies with conventional JIS (Japanese Industrial Standards) as well as ISO (international standards) and DIN (German industry standards).

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With linear forces up to 200 N, speeds up to 4 m/s, accuracy to +/- 4  $\mu$ m per meter and bi-directional repeatability as low as +/- 25  $\mu$ m depending on deceleration profile, ServoBelt RA performance compares favorably to linear motors that cost thousands more.

ServoBelt RA has been built from the ground up for moving chassis installation in both horizontal and vertical Z-axis orientations. Its drive unit features standard or custom mounting hole patterns to make it easy to integrate ServoBelt RA into your machines. A range of standard motor offerings enables the replacement of pneumatic cylinders simply by connecting DC power and rerouting servo-valve signals to the ServoBelt RA.

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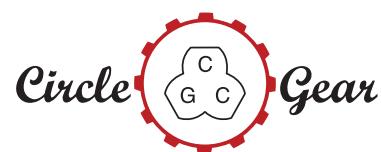
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# Maxon Motors

## RETURN TO MARS

In July, NASA sent its fifth rover to Mars. Its main mission is to collect soil samples that will be analyzed on Earth at a later time. The rover will also carry a helicopter that will perform the first flights on the Red Planet. Maxon's precision DC and BLDC motors will be used for numerous mission-critical tasks.

Maxon drive systems are very

familiar with Mars. These drives have been used in virtually every successful robotic mission over the last three decades. There are now more than 100 of them on the Red Planet and there are likely to be more soon. The launch window for NASA's next mission opens on July 22nd. An Atlas V rocket will launch the new Perseverance rover on its way to Mars, where it will be searching for



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signs of previous life on the planet. Its most important job is to take multiple soil samples, seal them in containers and deposit them on the surface of Mars so that a future mission can return them to Earth. Several Maxon motors will be used to handle the samples inside the rover. For example, Maxon DC motors are installed in the robotic arm, which moves the samples from station to station. Maxon motors will also be used for sealing and depositing the sample containers.

NASA's Jet Propulsion Laboratory (JPL), is carrying out the mission, and have asked Maxon to produce 10 drives for the rover. As with almost all previous Mars missions, these drives are based on standard products from Maxon's catalog with modifications. For the first time, NASA is using brushless DC motors, including: nine EC 32 flat and one EC 20 flat in combination with a GP 22 UP planetary gearhead. Working closely with JPL specialists, Maxon engineers developed the drives over several years and tested them thoroughly to achieve the highest standards of quality. "We've learned a lot from this exciting project," says Robin Phillips, head of the Maxon SpaceLab. "We now have very broad expertise in space applications and have established quality assurance processes that meet the expectations



in a simulated test environment in the JPL laboratory. Whether it will lift off on Mars remains to be seen. First, other obstacles, such as the rocket launch, must be successful.

"We hope that everything goes well and that we'll soon see our drives in action on Mars," says Maxon CEO Eugen Elmiger. "We're all keeping our fingers crossed."

of the industry. Customers from other industries such as the medical sector, where requirements are often similar, can also benefit from this know-how." Space missions place the highest demands on drive systems. This includes vibrations during the rocket launch, vacuum during the journey, impacts on landing, and the harsh conditions on the surface of Mars, where temperatures fluctuate between -125 and +20 degrees Celsius and dust penetrates everywhere.

The Perseverance rover is expected to land on Mars on February 18, 2021—but it won't be alone. A drone helicopter called Ingenuity will be attached to the underside of the rover. It weighs 1.8 kilograms, is solar powered and will perform several short flights, as well as take aerial images. The main goal of this experiment is to test the concept for further drones of this kind. Maxon has six brushed DCX motors with a diameter of 10 millimeters controlling the tilt of the rotor blades and the direction of flight. The drives are very light, dynamic and highly energy-efficient. These properties are crucial, because every gram counts on the Mars helicopter. Flying on Mars is not easy. The atmosphere is extremely thin, roughly comparable to the conditions on Earth at an altitude of 30 kilometers. The drone helicopter has flown

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