

# INSIDE

*The customer and staff magazine of the FISCHER PRECISE Group*

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Photo ©: JANIČKI Industries, USA

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## Technology leadership

### Dear Customers, Staff and Partners of the FISCHER PRECISE Group

The FISCHER PRECISE Group keeps its products at the cutting edge of technology. We're kept on our toes by our customers and their requests, but our technicians are just as keen to showcase their ideas. This year we again premiered innovations that allowed our customers to optimize their products and processes.

But what exactly is the definition of technology? Technology is the science whereby technical means are deployed to convert materials – raw or otherwise – into finished products; in a wider sense it involves skills and abilities. We focus daily on deploying our skills and capabilities to surmount the physical limitations inherent in powerful, high-speed and precise rotation. This latest issue of INSIDE gives you an idea of what's involved.

Customers are keen for us to expand our range of shaft-cooled spindles. We present our latest development in this issue.

Whenever we talk to customers, they always mention the resilience of rotary unions and the degree to which they wear. FISCHER has spent the past few years developing a non-wearing union, which we're beginning to incorporate in some of our products.

In line with our corporate strategy, we established another service and repair company in Russia at the beginning of September. In association with a local partner, we chose the Novosibirsk region. We now look forward to serving the important Russian market with our services.

Training has always assumed an important role throughout the group. Trainees make up more than 10 percent of our workforce. Taking FISCHER FORTUNA as an example, we explain why it's vital to nurture the next generation.

Finally, this issue has a report on how we migrated to SAP's latest ERP technology to keep us improving our processes.

The FISCHER PRECISE Group has been a user and developer of complex technology for more than 70 years. You can depend on us to work hard on developing our products going forward – after all, we want to keep our customers satisfied. Thank you for the confidence you place in us.

**Daniel Schmid, CEO FISCHER PRECISE Group AG**

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Author: Alexander Denisjuk, FISCHER AG

The global financial and economic crisis has brought home to Russia the fact that things cannot go on the way they are. When oil and gas prices hit record highs, the country booms – when prices fall, the economy goes bust. This is set to change. In the future Russia wants to make headlines with innovation rather than oil and gas. It wants to encourage the development of innovations and products fit for the world market and at the same time attract more high-tech to the country. This Russian modernization drive represents excellent business opportunities for the FISCHER PRECISE Group and our OEM customers.

## FISCHER PRECISE AS KNOW–HOW SPECIALIST

### in Russia

The FISCHER PRECISE Group began making moves toward establishing a subsidiary in Russia three years ago. We viewed various sites and discussed them with a range of partners.

Russian OEM customers had for some time been complaining of the distances and high logistical costs involved when their highly complex spindles needed repair. Those same factors had led to the establishment of service companies in the USA twenty years ago, in France ten years ago and in China six years ago. The FISCHER PRECISE Group finally opened its eighth subsidiary in Novosibirsk, Siberia, early in September 2010.

What benefits does the new Novosibirsk-based company, FISCHER Spindle Technology, bring to the Group and its OEM and end customers?

#### Good prospects for mutual growth and improved competitiveness

FISCHER Spindle Technology is starting out in Russia with five employees.

Our staff have been intensively trained with the aim of providing our customers with the best possible service.

The subsidiary shares the site of the Novosibirsk Science Academy's test facility. This helps boost its image in Russia and is of great interest in terms of possible

research and development projects and collaborations with Russia's scientific and business communities.

#### Know-how transfer and synergy effects

Our technological products are destined to bring about a raft of synergies in Russia. Opened just a few months ago, the training center at the Science Academy test facility underscores Russia's determination to invest in a new technological era and continue to move the country's economy further along the road of modernization.

#### Local service and repair support for our OEM and end customers

The activities of OEMs in Russia are of special interest to the FISCHER PRECISE Group. A number of OEMs have been able to sell new machines to Russian industry on the back of various investment schemes that form part of the government's modernization programs. A large section of our current customers, in particular those in the aviation industry, are behind the Urals in and around Novosibirsk. It therefore made sense to esta-

lish a spindle support service exactly where it is most needed.

Our mission to be as close as possible to important production markets has taken another step in Russia.



Author: Dr. Tobias Moser, FISCHER AG

When it comes to tool and mold making, the motorized spindle is vital in the drive to deliver optimal accuracy and surface finish. The ultra-high quality of machining now achievable in this segment means being able to do away with entire process steps. FISCHER shaft cooling solutions offer excellent thermal performance and stability. With more than 1000 spindles in the field, FISCHER's patented shaft cooling is proven, tried and tested.



# New-generation shaft cooling system

## CSC: Compact Shaft Cooling

FISCHER showcased a 120 mm spindle equipped with a new generation shaft cooling system at the AMB in Stuttgart, Germany:

### CSC: Compact Shaft Cooling.

In an effort to further improve its products in terms of stability, performance, compactness and ease of maintenance, new advances have been made in FISCHER's shaft cooling technology. The new design incorporates three significant developments:

#### 1. Bearing-free feedthrough

The gasket kit is very compact and straightforward to exchange during a repair intervention. Based on the patented FISCHER solution, the technology sets new standards for rotary feedthroughs in high-speed spindles.

#### 2. Hydraulic cylinder in the shaft

Tool changing is effected by a hydraulic cylinder newly integrated within the shaft. This makes for a very compact design. It also means that no additional cooling circuit is needed as the cylinder uses the same medium as the shaft cooling system.

#### 3. Process cooling

The spindle now incorporates a rotary union for the tool and process cooling. This FISCHER-designed solution features air sealing for safe operation. It can accommodate all types of medium up to maximum speed. The use of air or minimum quantity lubrication facilitates the optimization of machining strategies.

Moreover, the spindle features a monolithic chuck and can be equipped with any kind of sensor.

### HSK-40 portfolio

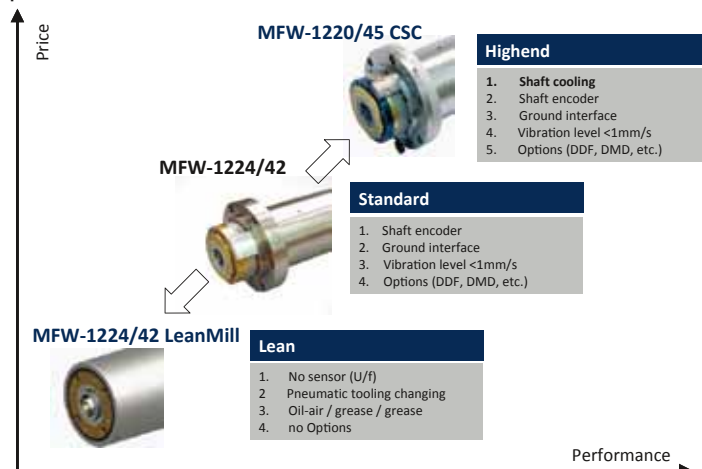
The picture below right shows the three standard FISCHER 120 mm spindles. The customer can choose the product that best suits his requirements from the portfolio. The MFW-1220/45 CSC is designed for highend requirements and caters to the upper segment. The MFW-1224/42 corresponds to the FISCHER standard. The LeanMill, meanwhile, is due for launch in spring 2011 and covers basic applications requiring no options.

#### MFW-1220/45 CSC key data

- Speed 45,000 rpm
- Power S1 11 kW
- Torque S1 5.5 Nm
- Rotary feedthrough (CL, MQL, air)
- High balancing (<1 mm/s)
- Sensor system
- Interface ground ready-assembled

#### Options

- Secondary cooling and flange cooling for optimized thermal insulation between the spindle and machine structure
- DMD (dilatation measuring device)
- Vibration sensor



FISCHER's versatile portfolio of standard spindles features a diameter of 120 mm and caters to a wide range of applications.

Author: Doug Kranz, FISCHER PRECISE USA

**A company founded and operated by engineers, Janicki Industries designs, builds, and programs proprietary large-scale high precision CNC machines tailored to customer projects in the aerospace, marine, wind energy, and transportation markets.**

## Machining for Aerospace . . . and More

### JANICKI INDUSTRIES, WASHINGTON STATE

#### From boats to planes

Founded in 1993 by Peter Janicki, Janicki Industries (JI) started out by providing machined composite molds and tooling to the marine industry. This was a faster and less expensive solution than the typical hand lay-up techniques at the time. From this early success in composite machining, the company has continued to grow and expand to over 400 employees with its own line of proprietary 5 axis machines and custom-developed CNC software.

JI has also become a major player in both commercial and military aerospace manufacturing. This has led to successfully solving complex machining projects in various challenging materials, such as invar, ceramic, and titanium. "Our customers come to us for state of the art machining solutions, which keeps our engineering team challenged and engaged", says Kathleen Olson, Marketing Director.

#### Reliability is key in high-end applications

Fulfilling the unique application requirements in these high precision markets first led JI to FISCHER PRECISE in 2003. "We were looking for the right spindle design to meet our needs" says Alex Voron, Engineer, "and it was the responsiveness of FISCHER PRECISE USA that really impressed us. From our first contact, that same day we had an outline drawing, and the next day a complete

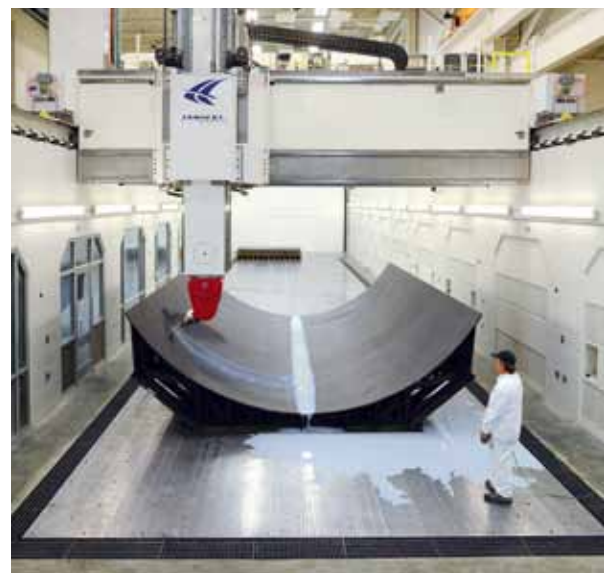
proposal. The reliability of the product has pleased us since." Since that first installation of an MFW-1709/20 (33 Nm S1, 20,000 rpm, HSK-63), JI has gone on to use additional spindle models including the MFW-1709/30 (40 Nm S1, 30,000 rpm, HSK-63) and MFW-2306/24 (70 Nm s1, 24,000 rpm, HSK-63). JI will also use FISCHER spindles in two more mills as it expands its role as a provider in the F-35 Joint Strike Fighter program.

JI will complete construction in mid-2011 of a facility near Salt Lake City to handle the additional capacity needed to take on this work. These new 5 axis mills will make a total of six machines utilizing FISCHER Spindles.

#### Emphasis on customer needs and service

JI's work in composite and other exotic materials continues to push the boundaries in precision machining, and taking risks is what has led to many of JI's greatest successes. "The future holds great promise for growth in strong lightweight materials. Our customers come to us to solve their most difficult engineering challenges – this business model drives our innovations" states Brian Holmes, VP Aerospace. This emphasis on the customer is also apparent by JI's service capabilities, including engineering design, metrology, rapid prototyping, finite element analysis modeling and more.

As JI continues to push forward and develop new machine, materials, and process innovations working with exotic materials, FISCHER PRECISE appreciates the opportunity to be pushed as well to provide spindle products that keep up with JI's needs.



*A high-precision carbon fiber aerospace tool being machined in Janicki mill 6. This mill can exceed tolerances of  $\pm 0.005$  inches.*

Author: Peter Jain, FISCHER FORTUNA GmbH

Almost 7000 students are enrolled at the Baden–Württemberg Cooperative State University (DHBW) in Stuttgart. DHBW collaborates with 2500 screened companies and social institutions to offer 20 nationally and internationally accredited bachelor degrees covering economics, technology and social work. The dual work/study concept improves graduates' chances of landing jobs and establishing successful careers.

# TRAINING MODEL OF THE FUTURE

## FISCHER FORTUNA, DHBW partner

FISCHER FORTUNA is working with the Baden–Württemberg Cooperative State University (DHBW) to bring about the dovetailing of theory and practice within the context of a two–way practice-integrated study concept. The training concept involves students moving freely between theory phases at the university and phases involving practical work in the real world.

### Theory and practice

In the classroom, students learn subject-specific principles and application-oriented methodological skills, and develop the ability to think theoretically and systematically. Their internships are an opportunity for putting what they have learned into practice.

Framework plans are used to match the theory and practice–based contexts, so that students also acquire social

and decision–making skills alongside their technical and methodological capabilities. The contents of the degree programs reflect the latest scientific findings as well as the changing requirements of the world of work as represented, in our case, by FISCHER FORTUNA.

Each DHBW student at FISCHER FORTUNA is given a trainee contract to sign and receives a monthly allowance throughout the period of study.

Students benefit from a raft of advantages through their involvement with FISCHER FORTUNA and DHBW. Tuition is conducted in small groups for optimal efficiency and ease of contact with lecturers and fellow students. A variety of lectures, workshops, projects, excursions and business games enhances the learning experience.

FISCHER FORTUNA and the DHBW's Stuttgart campus at Horb are currently focusing on the Business Administration and Engineering program. The Business Administration and Engineering course teaches both technical and business skills. Graduates are capable of coordinating technical projects and have a thorough grounding in economics, law and languages / intercultural affairs, all of which allows them to handle negotiations and conclude contracts.

### Wide–ranging program content

The programs consist of around 50% technical content, 40% business admini-

nistration and around 10% languages and intercultural issues.

### Interesting stages abroad

Our students are given the chance of spending semesters abroad during their theoretical or practical stages. While there, they are able to brush up generally on their languages and find out about the local culture but, more importantly, they focus on specific industrial terminology, which they apply both in theory and in practice.



Michael Breuning, Business Administration and Engineering student at FISCHER FORTUNA

### Employment avenues for graduates:

- Cost planning and control
- System planning and project engineering
- CRM, key account management and after-sales service
- International marketing and distribution
- Process data management
- Benchmarking
- HR development and controlling

Author: Rudolf Walter, FISCHER PRECISE Group AG

Rotary unions are mechanical precision-built components designed to feed cooling lubricants or other media through rotating machine parts. FISCHER PRECISE offers highly innovative unions featuring contactless sealing.

# FISCHER rotary union:

## advancement through innovation

### The properties of rotary unions are often underestimated

Essentially, the rotary unions available on the market are better than they are made out to be. That said, they can be over-sensitive to high levels of vibration as well as to media of an insufficiently high quality. The latter is a real headache for machine and spindle manufacturers, as they have no direct control over the purity of the media used by end customers. The latter frequently misunderstand why they are constantly being reminded to keep their media clean, and unfortunately this often leads to an impasse. In the end, they respond by demanding more robust systems.

### Efficient chip removal

The growing demand made on the functionality of rotary unions in use today is leading to innovative solutions: for example, the feedthrough of cooling lubricants, minimum quantity lubrication and air up to the maximum speed of the spindle (i.e. up to 45,000 rpm) appears to be becoming a new standard. In tool and mold making, the use, in particular, of air for small-diameter machine tools brings clear benefits when it comes to chip removal in deep cavities: it aids the removal of chips from the cutting zone and leads to a much-reduced risk of broken tools due to jammed chips. Moreover, end customers often request higher pressures than those currently realized as standard (80 bar). Tool wear can be reduced through the use of internal high-pressure cooling, especially when working on low machinability materials such as titanium alloys.

### Non-wearing FISCHER rotary unions

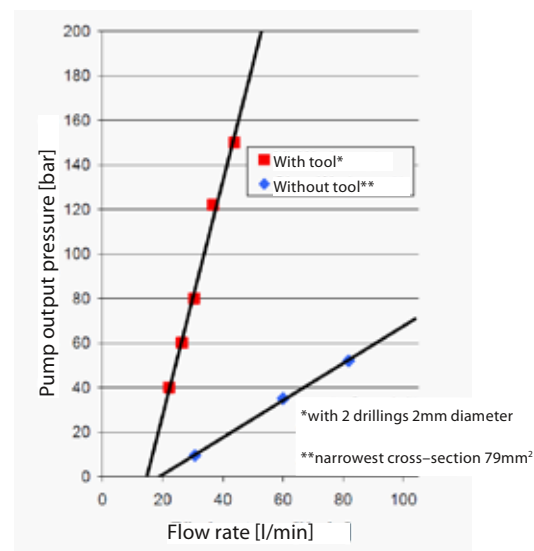
Bearing in mind the downsides of conventional unions, FISCHER rotary unions represent a welcome innovation. Development work focused on enhancing the resilience of the rotary unions system and offering new features. The FISCHER system benefits from a contactless sealing system, which means it is non-wearing. The number-one cause of failure in rotary unions is thus eliminated. Moreover, the non-wearing, non-contacting sealing system supplies the tool with air without constraining the speed. Another benefit: the sealing design allows the admission of up to 150 bar of pressure.

### Major advantage for low machinability materials

The ability to work at high pressures is a key advantage when working on low machinability materials. It means, for instance, that titanium chip removal can be accelerated without increasing tool wear. At a pressure of 150 bar, around 40 l/min of coolant can flow through a tool equipped with two 2 mm bores. We are now testing systems offering up to 300 bar. Two well-known machine manufacturers are already having success with FISCHER rotary unions. As you see, our innovative union can comfortably withstand increasing pressures for enhanced efficiency.

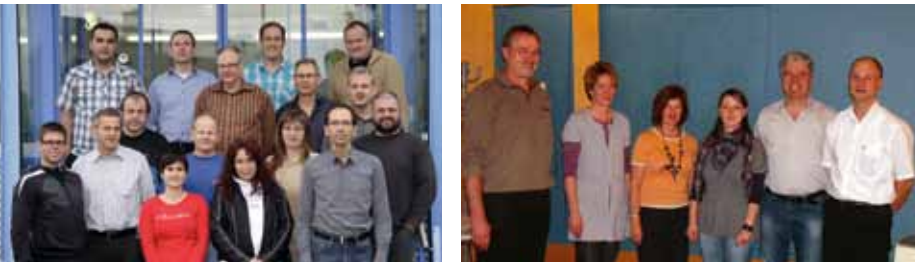


FISCHER rotary union with contactless sealing system



Link between achievable flow rate and pump output pressure with FISCHER rotary union.

Author: Reto Mösching, FISCHER PRECISE Group AG



SAP project teams: FISCHER AG, Herzogenbuchsee (left), and FISCHER.FORTUNA Deutschland GmbH (right)

The FISCHER PRECISE Group adopted SAP for its enterprise resource planning 10 years ago. However, even ERP systems need refreshing every so often: as ours needed an urgent overhaul, we opted for the unusual step of migrating from SAP to SAP A1

# NEW FUTURE–ORIENTED ERP

## for the FISCHER PRECISE Group

FISCHER AG was the first to adopt SAP, since then time three other group companies have been linked into the system. An analysis showed that the system was no longer fit for a company with international scope: an overdue upgrade, processes that were below standard, new processes that needed to be implemented – all this prevented us from simply converting the system.

### Best–practice processes as a cornerstone

The changeover called for the re–introduction of SAP based on best–practice processes, data migration and new formulae. We also wanted to implement all the key points highlighted by the analysis. The project allowed us to eliminate the undesirable elements of the old system and realize our wish list in the new one.

### We called the project SAP A1 and launched it at the end of February 2010.

Our job was to mirror the existing processes against the best–practice processes while retaining and implementing the modifications. We were able to adopt most of the best–practice processes with small modifications here and there. It meant we saved a considerable amount of time.

able amount of time.

The challenges facing us were the overall timeframe and the requirement to integrate two sites and four companies.

### Launch brought forward

The project had been planned to last six months from kick–off to go–live. After about 1½ months, however, the buoyancy of the economic situation prompted us to contemplate going live one month earlier, on August 1, 2010, i.e. during the company holidays. Relevant steps were taken to make it happen. The fact that SAP expertise was available at all of the sites helped speed things up and ensured that the new ERP system could be rolled out successfully across them all.

The challenge of compressing six months' worth of project into five months was met, thanks to the determination of the in–house project teams and of the external SAP specialists. Project SAP A1 went live on August 1, 2010 as planned: customers could receive deliveries and products could be manufactured, raw materials and subassemblies purchased and invoices paid.

Since that time, we have been keen to keep the momentum going by loo-

king into the possibility of introducing further process enhancements. These include establishing straightforward and resilient processes consisting of well–balanced combinations of organizational measures and SAP settings.

### Forward–looking solution

The FISCHER PRECISE Group now benefits from a new ERP system that is fit going forward, that has been flexibly expanded, and that, as a production factor, is capable of providing optimum support for the group's processes.