

simrit® insight.

Issue 2, 2006

The Magazine for Simrit Customers

Industrial diesels
Compliance with
ever stricter
standards

Rod surfaces
**The first contact
is decisive**

EPDM o-rings
**200 °C is
no problem**



David R. Monaco,
Simrit® Americas

The President's message:

Unique product breadth – not only for diesel engines

Welcome to the second issue of "Simrit Insight" for the Americas. Our goal is to provide articles which are both interesting and useful from our customers' perspective and I hope the articles that follow pique your interest in the ways Simrit can provide solutions for your sealing needs.

The cover story highlights our innovations and successes in the diesel engine market. Simrit services a wide range of diesel engine manufacturers from truck engines to ship engines and large stationary industrial engines. Our product breadth uniquely positions Simrit to provide specifically tailored solutions in many locations throughout the engine. In the Americas, we've enjoyed great success with our diesel engine customers and look forward to expanding those relationships.

As we continue to keep you informed on the development of Simrit as the premium global brand for industrial sealing, we focus the spotlight on our activities in China in the "Simrit Global" article on pages 12-13. Simrit manufactures a large portion of the products sold in China locally in our Chinese facilities. This rapidly expanding economy possesses a huge need for sealing solutions and Simrit has a strong presence in China to meet this demand.

"Simrit Insight" is your magazine that gives you a small view into the everyday life of Simrit. We would love to hear what you think of the

publication and encourage you to let us know how we can continue to make it more relevant to your business. Feel free to contact us with your feedback.

And now, enjoy the rest of the magazine. I wish you the best of success in the months to come.

Best regards,

David R. Monaco

Simrit® insight is the magazine for Simrit customers.

Publisher:

Freudenberg-NOK
General Partnership
47690 East Anchor
Court, Plymouth, MI
48170-2455

Managing Editor:

Tim Lomax

Telephone:

(734) 354-5336

Coordination:

Frank Hohenadel,
Frank Menzenhauer,
Thomas Pauly,
Dr. Meike Rinnbauer,
Frank Steep,
Joe Walker,
Hans-Joachim Wendel

Internet: www.simrit.com

Editing & design: Trurnit

& Partner Mediengruppe
Reprinting and reproduction only with approval of the publisher

Print: EPI Printing

Packaging Fulfillment

+++ www.simrit.com +++ www.simrit.com +++ www.simrit.com +++

Cover Story

The spectrum for industrial diesel engines ranges from ship diesels to engines in construction and agricultural machines to aggregates for power generation and emergency power supply. Just as road vehicles must conform to ever stricter exhaust and noise emission regulations, industrial diesel engines must also comply with ever more stricter regulations. The sealing and vibration-related components play an important role with this optimization task.



Peter Neumann/YPScollection.de

Curtiss-Wright Flight Systems

Simrit is top supplier

For the second time in three years, Simrit was presented with the "Supplier of the Year" award from Curtiss-Wright Flight Systems. Curtiss-Wright Flight Systems specializes in the design, manufacture and overhaul of complex precision actuation systems for the commercial and military aerospace and transportation markets. Simrit was recognized at the company's annual supplier conference in Shelby, N.C., for its near perfect delivery and quality record, its cost-saving efforts and for meeting Curtiss-Wright's high performance expectations.

Simrit supplies Curtiss-Wright with radial shaft seals that are used in gearboxes to activate the flaps on commercial aircraft. The seals are produced at the company's manufacturing facility in Bristol, N.H. In addition to shaft seals, Simrit recently began supplying precision o-rings to the global aircraft system supplier.

Contact: vinay.nilkanth@simrit.us

Contents

News

3



Service

6

The current standard parameters for the evaluation of the surface structure of a shaft are insufficient. Simrit is working on enhancements.

Cover Story

7



Simrit Global

12

Simrit is already manufacturing a large percentage of its product range locally for the Chinese market.

Applications

14

The heating technology specialist Viessmann optimizes its solar collector system with a Simrit o-ring connector system.



Service

16

Simrit is not only top with development, but it is also leading with its information transfer.



Materials

18

Fluorine rubbers are used wherever a constant resistance to high temperatures and a wide chemical stability are required.



International Sealing Conference

Status quo and vision



Under the guiding idea "Status quo and vision," the fluid power association of VDMA/Frankfurt (Main), Germany, has set the date for this year's international sealing conference. The entire spectrum of sealing technology questions will be discussed at the top-class event taking place on October 10th and 11th in Stuttgart, Germany.

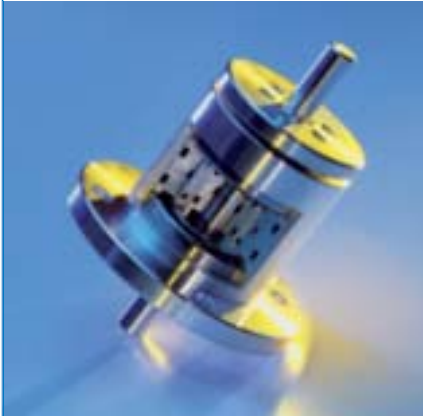
Further information at: www.sealing-conference.com

+++ www.simrit.com +++ www.simrit.com +++ www.simrit.com +++

Magnetic fluid seals

Specialty for wafer production

Magnetic fluid seals are developed for environments where excellent thermal resistance and minimum contamination are required.



The semiconductor manufacturing process can be one of the most challenging environments for any seal. The wet and dry phases

present specific demands on seals, requiring chemical resistance and low extraction or high plasma resistance with low particulation, respectively.

The magnetic fluid vacuum seals Simrit offers to the semiconductor industry are specifically developed for high-performance, low-friction rotary applications where excellent thermal resistance and minimum contamination are required.

Magnetic fluid vacuum seals use magnetic force to maintain a magnetic fluid in a specific position around a shaft.

Magnetic fluids combine the

“ferromagnetism” of magnets with the “fluidity” property of a liquid and provide a liquid sealing barrier to fluids, gases and vacuum. This magnetic sealing method results in a very low-friction hermetic seal which allows very little contamination. Magnetic fluid seals provide superior performance in many semiconductor manufacturing applications including deposition (LPCVD, APCVD, HDPCVD, PECVD, RPCVD, SACVD), ashing, plasma etch, PVD metallization and ion implant.

Contact: patrick.giorda@simrit.us



Did you already know?

Next basic seminar in English from October 9 - 13, 2006, in Weinheim.
All seminar dates at a glance: www.simrit.com/academy

Worldwide cooperation

Carraro chooses Simrit



Antonio Minchio, purchasing manager at the globally acting Italian tractor and component specialists Carraro, chooses Simrit as preferred supplier.

Good and reliable suppliers with constant high quality are decisive for business success in today's economy with its extreme division of labor productions. The globally acting Italian Carraro Group, a manufacturer of transmissions and components for agricultural and construction machinery, concentrates on a few suppliers with a global presence who can supply the same quality on all continents. Simrit, as “preferred supplier” for sealing and vibration-related products and solutions, was thus selected by Carraro. We strive for a long, stable and fair partnership.

Contact: sergio.maritano@corcos-simrit.it

Simrit at the MD&M East show

Highlighting LSR, HCR and LIM

Over 1500 companies were exhibiting at the Medical Design & Manufacturing East event held June 6-8 at Jacob K. Javits Convention Center in New York City. Simrit was also on display, featuring products for the healthcare/medical market including catheter tips, o-rings, thin wall diaphragms and a wide variety of custom molded parts.

Many of the products on display were based either on liquid or high-consistency silicone (LSR, HCR) because silicone's biocompatibility and material characteristics make it a perfect choice for many healthcare and medical applications. Compared to other biomedical materials, silicones are compatible with most chemicals, and have far better low temperature flexibility, greater heat resistance and lower compression set. Simrit also explained the advantages of Liquid Injection Molding (LIM) technology for producing complicated designs with very tight tolerances. LIM is often used with liquid silicone, but can also be utilized in molding other proprietary elastomers which fit in the LIM process.

Contact: tim.lomax@simrit.us

Successful conference in the southern Ural mountains

Simrit meets with the steel industry in Magnitogorsk

About 100 participants came to a sealing seminar held by the Russian Simrit branch office in Magnitogorsk. The city in the southern Ural mountains, 2000 kilometres from Moscow, was the largest steel manufacturing location of the Soviet Union (the first smeltery was built in 1929) and today houses with MMK the largest steelworks in the Russian Federation (60,000 workers). At the first seminar in 2005, decision makers from the repair and maintenance departments as well as technical purchasing participated. Not only MMK employees

attended this year's seminar; management from other steelworks in Russia and successor countries from the former Soviet Union (CIS) also participated. Beyond that, employees from companies that produce machines for steel manufacture and processing were present. Steelworks have an especially great need for hydraulic and shaft seals due to the extreme operating conditions. Simrit was able to double its turnover in the last year specifically in the CIS region.

Contact: svetlana.viktorenko@simrit.ru

Plug & Seal connectors

Combining several functions in one component

Reliable sealing of media flows over a wide temperature, pressure and media range is a high priority for numerous applications such as diesel engines, engine auxiliaries and steering, tank or exhaust systems. A simple and cost-effective installation is equally important. In all these aspects, Plug- & Seal connectors from Simrit significantly surpass many other products with regard to technical efficiency and costs. These innovative components are rubberized on the outer surface with sealing coils and sound-absorbing

decoupling stop dampers that connect the fluid and gas flows between two housings without leaks. Moreover, they compensate for the assembly offset significantly better than the o-ring-type configuration they commonly replace. For specific customer requirements Simrit offers customized Plug & Seal product solutions. Thanks to special product design it is possible to combine several specific functions in one component.

Contact: tim.lomax@simrit.us



Simrit trade show dates for the months July through October 2006

Month	Date	Trade show/event	Location	Country	Internet link
September	19-22	Industridagene – Trade show for industrial technology	Oslo	Norway	www.messe.no
	18-22	MSV – International manufacturing systems engineering trade show	Brno	Czech Republic	www.bvv.cz
October	3-6	Aandrijftechniek – Trade fair for drive technology	Utrecht	Netherlands	www.aandrijftechniek.nl
	3-7	TIB – International trade fair Bucharest	Bucharest	Romania	www.romexpo.org
	10-13	PTC ASIA International exhibit for pneumatics, hydraulics, fluid technology, drive technology	Shanghai	China	www.ptc-asia.com
	24-27	MIIF – International industrial fair	Moscow	Russia	www.miif.ru
	31-Nov 2	SAE Commercial Vehicle Expo	Chicago	USA	www.sae.org/events/cve



Further information at www.simrit.com

Optimized manufacture of rod surfaces

The first contact is decisive

The surface structure of the rod is an important parameter for the functioning and long operational life of a hydraulic system. The current standard parameters are insufficient for this. Simrit is working on enhancements.

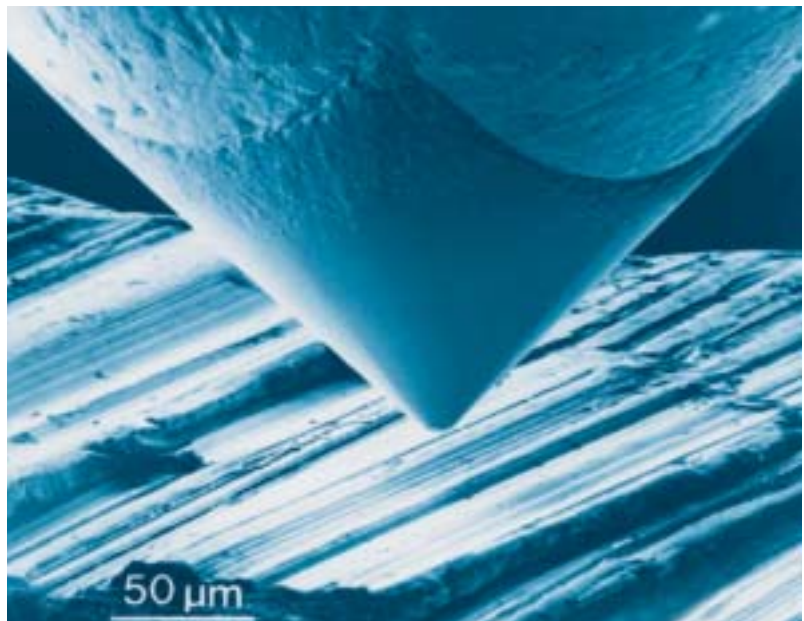
Two essential partners must be optimally matched to each other in order to ensure that a hydraulic system can seal reliably over the long term:

- the sealing element with a running ring made from PTFE compound, polyurethane or elastomer and
- the counter surface made from a coated or hardened steel.

Practice has shown that the very first contact between the counter surface and the sealing element is decisive for the longevity of the sealing element in a sealing system.

The first stroke is decisive

This first contact influences both gliding partners, both the sealing element and the hardened counter running surface. The counter surface is smoothed and abrasive parts are removed. The sealing edge can be irreversibly damaged even by the first strokes of the hydraulic cylinder through the abrasive properties of the counter



Up to now, standard parameters for a comprehensive description of the counter surfaces are insufficient.

surfaces which can reduce both the sealing effect and the longevity. A second seal set as replacement usually runs without a problem over the once smoothed counter surface. One main cause for the premature failure of hydraulic seals is thus clearly the surface structure of the counter surface.

Parameters insufficient

For describing the counter surface in contact with the sealing element, Simrit currently recommends the limits for the established surface parameters R_a , R_z and M_r for C_{ref} 0%.

The evaluation of the material part M_r for C_{ref} 0% takes into consideration peaks that in hard-soft contact influence the run-in

behavior. The standard approved evaluation of the material part M_r for C_{ref} 5% in contrast allows possible peaks to go unconsidered. As practice shows, these parameters are, however, insufficient for a comprehensive description of the counter surfaces. Simrit is therefore working with extra effort on an enhancement of the surface parameters.

The specialists from the Merkel product area are currently working to recognize surfaces that have an abrasive effect on the sealing edge, assuming via parameters from the R_k -group in the Abbot curve. Thus future early failures can be avoided and the reproducibility in the manufacturing process of the rod surfaces can be improved.

In Brief

- The first contact influences both gliding partners – increase of the longevity.
- Up to now, standard parameters for a comprehensive description of the counter surfaces are insufficient.
- Simrit is working on the enhancement of the surface parameters.



Contact: frank.steep@freudenberg.de
Further information at:
www.simrit.de/E/insight



Seals and bearings for industrial diesel engines

Compliance with ever stricter standards

Industrial diesel engines have to comply with ever-tougher exhaust and noise emissions standards. Sealing and vibration-specific components play an important role in the optimization tasks facing engine manufacturers.

Professor Franz X. Moser, executive member at AVL List in Graz, Austria, makes this clear: "Fulfilling the legal requirements for the further reduction of exhaust and noise emissions is going to be

a technical challenge not only for the respective engine manufacturers, but for parts suppliers as well. Because of their broad product offering, Simrit is particularly in demand for sealing and

"Together with Simrit, we have developed modern sealing solutions for our new diesel engine series, which we will be bringing to market next year. These seals display outstanding performance in the field tests. We are convinced that the cassette seals from Simrit will also fulfill the increased requirements in practice."

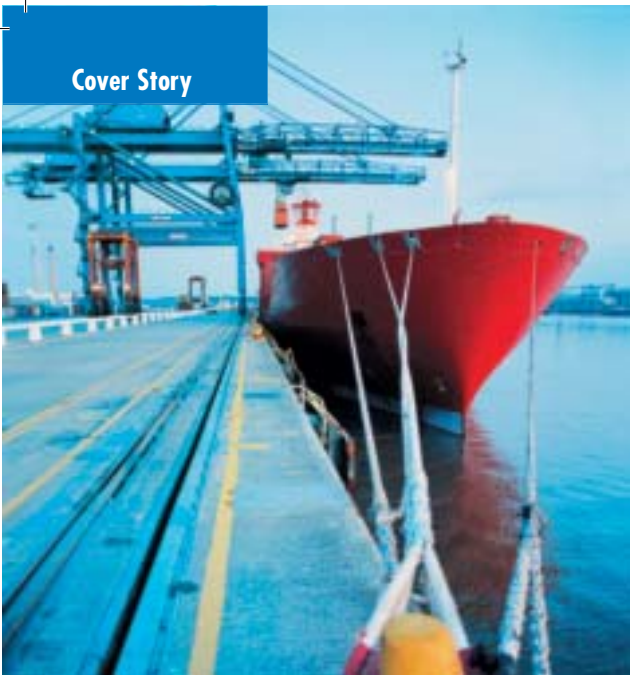
Xu Chang Xin, Engineer Technology Centre, Weichai Power Co., Weifang, Province Shandong/China

the biggest task for manufacturers. It will require more effort than optimizing fuel efficiency." The reduction of exhaust and noise from diesel engines poses

vibration-related parts for many diesel engine manufacturers. The higher combustion chamber peak pressures (up to 250 bar) created by the high pressure fuel in-

Partnerships for the well-being of the customer

Simrit's partnership with the Dutch ship dealer Rubber Design brings more comfort to many vessels. Even today, there is still a large number of diesel ship engines with fixed mounts. A flexible mount with Simrit components, however, offers significant advantages such as considerably increased personal comfort, with lessened possible damage to ship and cargo caused by uncontrolled vibrations. A conversion must not, however, decommission the ship for a long period of time. Rubber Design specializes in fast conversions of fixed mounts to flexible mounts for diesel engines. The procedure's level of efficiency can be attributed to the use of custom scaffolding that keeps the actual conversion time – i.e., the replacement of fixed mounts with flexible ones – to a minimum. The maximum time required for conversion is four days, very reasonable when dealing with engines of this size.



Simrit is the universal supplier to manufacturers of ship diesel engines.



The design engineers placed great demands on the Simrit components for the W35 water-cooled diesel engine from Hatz Engine Works, Germany.

In Brief

- Reduction of the exhaust and noise emission levels of diesel engines is the greatest future task facing manufacturers.
- Timely co-operation of engine designers and the sealing and mount developers is vital.
- In many cases, Simrit works with the user to develop customer-specific solutions, particularly in the specialized sealing product range.
- Vibration-related elements from Simrit improve user comfort and help with fulfilling strict noise limit values.

@ Contact: thomas.pauly@freudenberg.de
klaus.liesegang@simrit.de
 Industrial Diesel Engines brochures can be downloaded at www.simrit.de/E/insight/title

jectors of today's engines place great loads on cylinder heads and crankcases in particular. In order to prevent unfavorable deformations, a close cooperation with engine designers and seal manufacturers is vital. The same is true for vibration technology. As soon as next year, a noise reduction of 3 db (A) (sound power level) will be required for construction machinery in the United States and Europe.

Fulfilling all of these requirements is a technical challenge and requires extensive competency with materials and all the innovative power of the Simrit engineers:

- The aging of seals must not determine the length of the service intervals.
- The seals must be able to withstand significantly higher temperatures than in previous years.

"Deciding parameters in the search for an optimal sealing solution for our ship diesel engines were, among other things, the quite large relative movements between shaft and housing and the compatibility with a non-hardened shaft surface. In timely co-operation with Simrit Switzerland, a suitable solution was found."

Beat Schumacher, Product Care 2 Cycle Technology, Wärtsilä Schweiz AG

Wärtsilä brings Simrit on board

Victory in the legendary America's Cup isn't the only example of Switzerland's sea power! Wärtsilä Schweiz AG (previously Sulzer Diesel) in the northern Swiss city of Winterthur has been making Switzerland fit for the high seas for over 100 years through their innovative large diesel engines. A few years ago, Wärtsilä brought Simrit on board to solve a camshaft leakage problem which had arisen with a seal from a competitor. An intensive development cooperation was born out of this "call for help." "We don't restrict ourselves to seals only. We observe the entire customer application," says Thomas Pauly, Merkel Process Technology. "When we come to the realization, for example, that the installation on board represents a part of the problem, we have to consider this in the application solution." This open approach to innovation resulted in the creation of a novel non-contact seal from carbon-filled PTFE. An inner ring and a fixed outer ring surrounding the shaft work on the RCD principle: Reject - Collect - Drain. Wärtsilä and Simrit dub this Radiamatic RCD. With this construction, relative movement is between only the freely movable sealing components. This proves to be an immense advantage over the contacting sealing elements originally used.





Indispensable for diesel engines: anti-backlash gear (top), Simmerring BAUM SL (middle) and ultra bushings for vibration damping (bottom)

“For the W35 water-cooled diesel engine, Simrit developed a complete bundle of new solutions. Among them are friction-optimized Simmerrings at the crankshaft and water pump, customized seals in the water circuit as well as Plug & Seal solutions with power and water circuits.”

Chartered Engineer Jürgen Kempf, Design Leader, Hatz Engine Works, Germany

- Today’s fuels and oils require more resistant seals.
- The seals must simultaneously resist a diverse range of media such as oil, water and exhaust gases.
- Seals cannot require expensive preparation and hardening of the shaft surfaces
- Seals should be able to be fitted on an installed engine in the service cases.

Simrit reacts to these challenges and develops customized solutions

in close cooperation with the customer. Examples of this are seen in the conception of the W35 water-cooled diesel engine with Hatz Engine Works (see picture left and quote from design leader Jürgen

Kempf) or with Wärtsilä in the development of a customer-specific sealing solution for large ship diesel engines. Marcelo Gutierrez of Simrit Switzerland brings the point home regarding the potential of these potent cooperations when he says, “As Simrit, we can access our full spectrum of the group’s development capacity for the respective tasks of our customers. That is a decisive advantage when special solutions like those needed for Wärtsilä are required.”

“Simrit has proven itself a reliable and competent supplier for Cummins drive systems. This allows our developers to fully concentrate on the critical points with our new engine developments and frees them from having to deal with sealing and o-ring questions.”

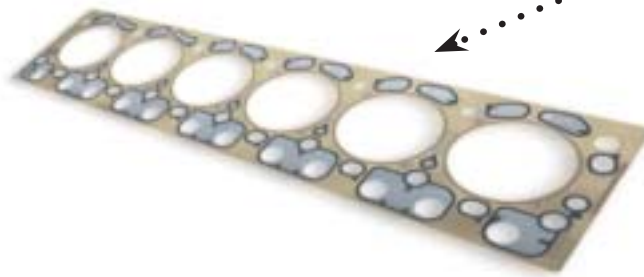
Steve E. Ferdon, Chief Engineer, Materials Science Engineering, Cummins



Diesel engine: Simrit is everywhere

Cylinder head seals

- Less cylinder liner warping
- Reduced concentration of stress in the block and head
- More seal gap movement possible
- Extended engine running times



Simmerring IWDS

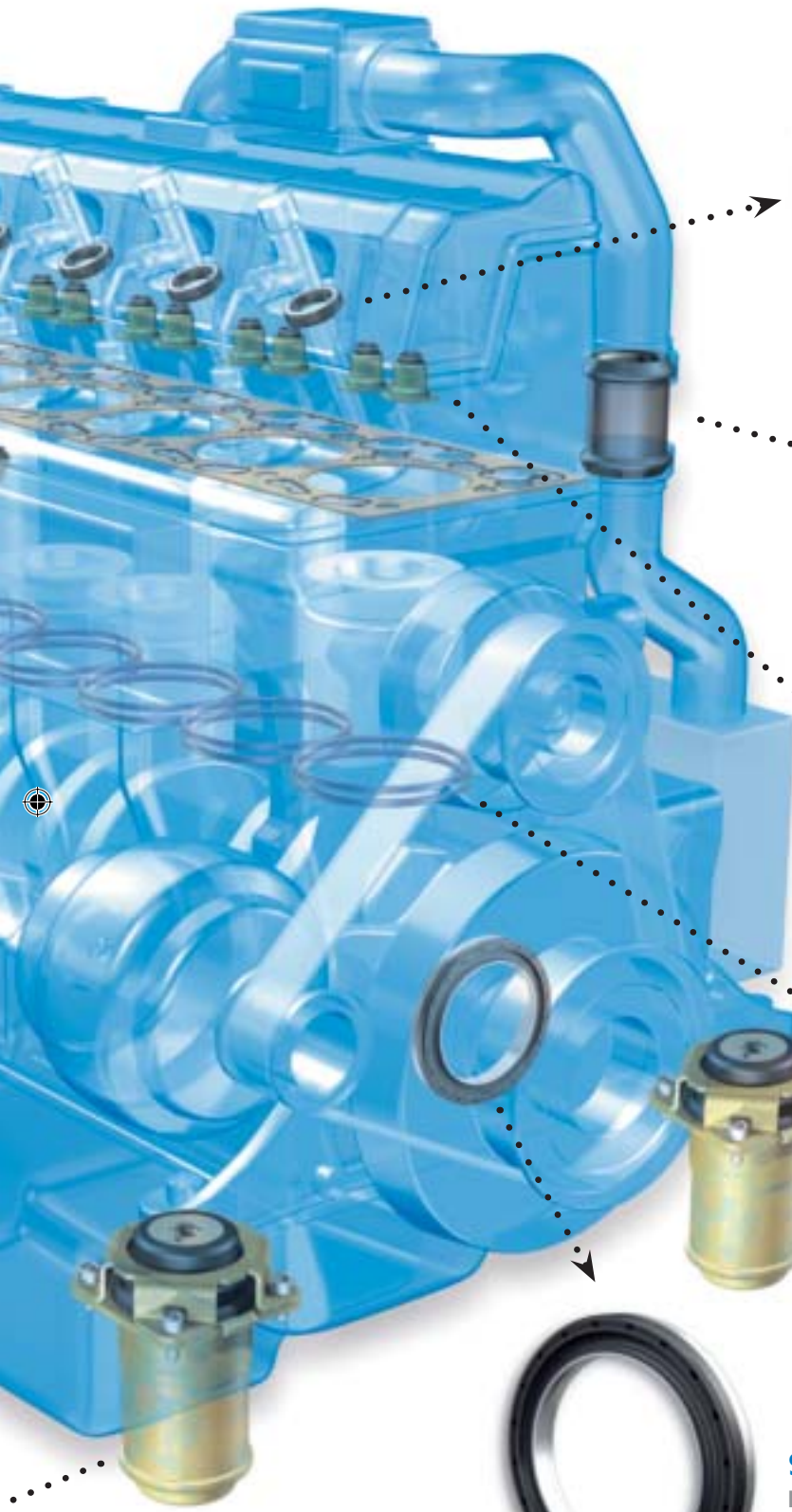
- Integrated seal and encoder function
- Robust sensor and active sensor wheel design
- Precise speed and angle measurement
- Most efficient PTFE seal design on the market



Hydromount KL

- Optimal isolation and damping of high and middle frequency vibrations
- High flexibility for customer-specific adaptations





Fuel injector seal

- Maintenance-free sealing solutions
- High radial oscillations
- Simple and safe fitting process



Plug & Seal

- Regulation or minimization of the lubricant overflow
- Reduction of valve stem wear
- Increase in aggregate performance and operating life



Valve stem seal

- Regulation or minimization of the lubricant overflow
- Reduction of valve stem wear
- Increase of the aggregate performance and operating life



Coated ISC o-rings

- Simple, twist-free fitting
- No damage to the o-ring during installation
- Quick installation, less wear



Simmerring Cassette Seal Casco

- No aging and wear of the shaft
- High functional safety during the operation and installation
- Unrivalled friction reduction



Simrit activities in China

Full program for Chinese customers

Chinese companies expect the highest on-site performance from Simrit, as do international Simrit customers with operations in China. Since mid 2005, Simrit has been offering the complete product spectrum in China and enhancing it with local production.

Together with its long-term partner NOK, Simrit is active in the joint enterprise NOK Freudenberg Group China in the People's Republic of China. The group has a closely knit sales network with offices in Hong Kong, Guangzhou, Wuxi, Shanghai, Tianjin and Changchun. Moreover, a total of 15 authorized dealers with 31 branch offices and shipping warehouses ensure that the entire Simrit and NOK program is fully and readily available. While seals for the automobile industry are still dominant at the production sites in the People's Republic of China, seals for general industrial applications currently provide for an even greater growth rate. The markets range from white goods to presses and injection molding machines.

Changchun Site

At the Changchun site already founded in 1993, PTFE Simmer-



The factory building in Taicang

ring shaft seals, valve stem seals and frame seals for the Chinese automobile industry are produced utilizing state-of-the-art equipment and processes. Manufacturers of agricultural machines, construction machinery like articulated dump trucks and excavators, as well as industrial diesel engines, round out the range of customers. Changchun engages approximately 380 employees.

Wuxi at 10 Years

In 1996, production of Simmering shaft seals began in Wuxi, northwest of Shanghai. The Simmerings are primarily supplied to the fast-growing automobile industry. Moreover, there are numerous general industry customers today such as manufacturers of washing machines and bicy-

cles. The Wuxi site has grown significantly in the last few years, with 730 employees producing o-rings, bellows and dust caps. Today, Freudenberg and NOK not only operate a mixing facility and metal parts machining for seal production, but they also produce a comprehensive range of seals in a total of four local factories.

Further expansion at both sites is planned for the years ahead. "At the end of 2007, we will be able to offer our customers in China a comparable product line to the one our companies in Europe, America and Japan have in their product assortment," says Dr. Michael M. Heidingsfelder, Co-General Manager of NOK Freudenberg in Shanghai.

Simrit produces the same first-class quality in China as it does in the rest of the world.



The newest production site for Simrit products is Taicang, roughly an hour's drive west of Shanghai. Since the beginning of 2006, Merkel, together with the Japanese partner NOK, has been producing high value fabric seals for use in heavy hydraulics like steelworks and the construction machinery industry.

Great advances in general industry

Additional target markets for seals are industrial truck and ground conveyors, presses and injection molding machines and crane systems. The substantial investments in the sites represent an important milestone for Simrit, because applications for hydraulic seals in China play an important role for the expansion of the activities in general industry. The number of Taicang employees, currently at 25, is to be increased significantly and the product assortment is to be incrementally expanded. "We want to offer our customers the same high standards for quality and supply service that we also have in Hamburg," says Dr. Jianjun Tao, General Manager in Taicang.

Discerning Chinese companies expect the highest on-site performance from Simrit, as do international Simrit customers with operations in China. Engineers in the Shanghai and Hong Kong sales offices thus advise customers both directly and through the dealer network that has existed for many years. The expansion of this dealer network is a decisive pillar for the targeted growth of Simrit in China. "Our technical dealers are important partners for us and through demand-oriented warehousing, ensure that our seals are also available in remote regions of the People's Republic," says Frank Hohenadel, manager from Simrit in China. Simrit as technology specialist for sealing and vibration technology is set for above-average growth in the coming years in all the important market segments in China. Alongside the considerable investments in the expansion of the production and dealer network, Simrit is also well represented in technical publications and at trade shows in China. The collective sales organization with NOK made an impressive presentation in November 2005 at the annual in-



Simrit has a presence in all of China.

ustrial trade show PTC Asia in Shanghai. This year, Simrit will once again be there in Shanghai from October 10-13.

NOK Freudenberg Group China
 Simrit Service Center Shanghai
 720 Pudong Avenue
 Shanghai 200120
 People's Republic of China
 Tel.: +86-21-5036-6900
 Fax: +86-21-5036-6307
 E-Mail: hohenadel@nfgc.com.cn
www.simrit.com.cn

Traditional ribbon-cutting ceremony at the opening of the Merkel factory in Taicang last February



EPDM o-rings in combination with solar collectors

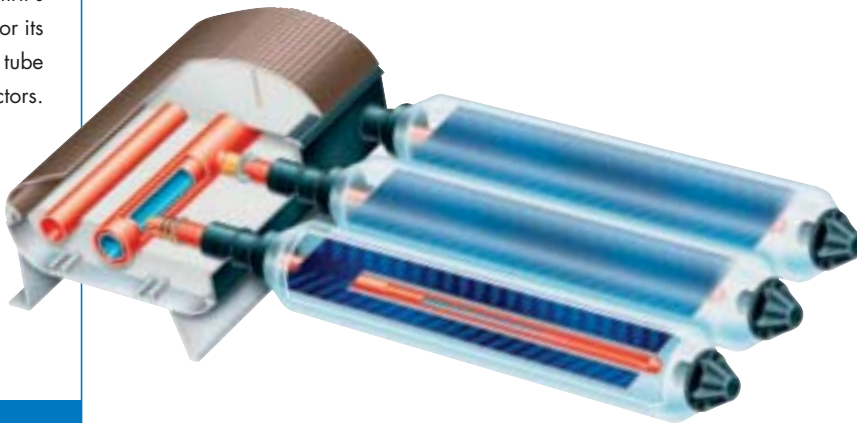
200° Celsius - No Problem

To facilitate the installation of solar collectors, heating technology specialists Viessmann and Simrit technicians came up with an innovative ISC o-ring connector system to enable hydraulic connection between individual collectors. A high heat-resistant sealing system with two ISC o-rings made from the elastomer 70 EPDM 291 sits at the connection points.

With the solar collectors Vitosol 100, 200 and Vitosol 300, the heating technology system contractor Viessmann developed systems for hot water generation and heating support that combine long operating life with an attractive price. Vitosol 100 is a

flat collector, Vitosol 200 is a direct flow vacuum tube collector and 300 is a vacuum tube collector designed on the heatpipe principle. Because multiple collectors are usually mounted adjacent to each other, Viessmann developed a quick installation

The heating technology system contractor Viessmann relies on Simrit's ISC o-ring for its flat and tube collectors.



In Brief

- Simple plug system for connection of the individual flat or vacuum tube collectors
- High-temperature-resistant and long-term stable ISC o-rings made from 70 EPDM 291
- Double sealing of the heat transfer medium and ambient air
- 70 EPDM 291 has a very low compression set, a high temperature stability and long-term stability.

@ Contact: frank.menzenhauer@simrit.de

system, an innovation that called for Simrit expertise and the ISC o-ring. To facilitate a fast and simple installation on the roof or facade, the Viessmann design engineers worked with the sealing specialists from Simrit to design an innovative o-ring connector system with obvious advantages as utilized in the new



115 Vitosol 200 vacuum tube collectors with a total of 3450 individual tubes deliver solar energy for the new German Federal Environmental Agency in Dessau near Berlin.

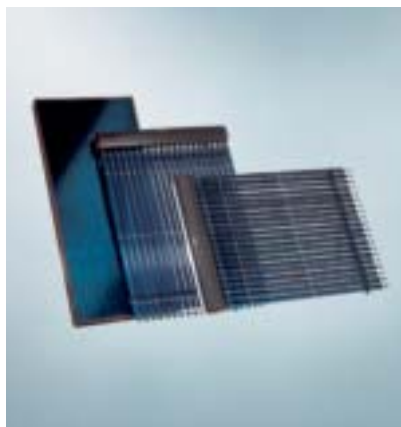
Vitosol 200 vacuum tube collector. "The tubes are simply inserted into the distribution tube without the need for tools," describes Werner Böhle, Viessmann Department Manager for Regenerative Energy Systems. The individual tubes can also be rotated axially and can thus be exactly positioned to the sun.

Highly stable materials

Two high-temperature-resistant and long-term stable ISC o-rings made from the elastomer 70 EPDM 291 at the connection points ensure that the tubes are sealed against air from the outside and against the heat transfer medium from the inside. "This is a sealing system with two seals, each with a specific function, not just a seal with an additional spare seal," emphasizes Frank Menzenhauer from Simrit Service Center West



in Dortmund, Germany. Viessmann design engineer Richard Freitag describes the high demands that are placed on the ISC o-rings of the plug connectors: "In summer above all, when the sunshine is especially intense, and when the user does not draw off any hot water for longer periods of time, for example, during vacation, even temperatures of 200 °Celsius can arise in the collector and at the connection points. This demands materials with real top-class stability characteristics." Viessmann precisely and extremely tests the behavior of all functional parts and materials used in the solar collectors, as described by Werner Böhle: "We operate a so-called stagnation system here that is filled with heat transfer medium and on which we put all parts through their paces."



Far left:
The innovative plug system for the Vitosol 200 enables the easy and fast installation of the tubes in any position.

Left:
Flexible corrugated pipes with double ISC o-ring seal connect the Vitosol flat collectors.

70 EPDM 291: Versatile application possibilities and heat-resistance

ISC o-rings made from 70 EPDM 291 achieve the overall best values in compression set, high-temperature resistance and long-term stability. At 200 degrees Celsius and thousands of hours in water and air, ISC o-rings made from this elastomer exhibit only extremely small deformations and thus fulfill the very high requirements of the W534 in the norm EN 681/1. The range of application possibilities for o-rings made from 70 EPDM 291 is very versatile thanks to further approvals (e.g. FDA conformity, USP VI, 3A Sanitary Standard Class II) and ranges from sanitary fittings, plumbing connections and solar technology to use in foodstuffs and medical technology.

Live Online Seminars at Simrit

The right stuff for your technology update

The live online seminar demonstrates how Simrit goes beyond brilliant technology development and is also leading the way in user-friendly technical content transfer.

Let's start with the one-million-dollar question: How can the electromagnetic compatibility of rubber compounds be significantly improved? The fact that you understand the question is impressive in itself. You're obviously quite fit when it comes to questions dealing with sealing and vibration-related technology. Yet, you are also aware that the half-life of our technical knowledge gets shorter and shorter. Is it five years? That number was probably correct five years ago. One can probably assume a time period of three years in many sectors in which half of the knowledge is disposed of and must be replaced by new facts and interrelationships – or at least should be replaced if one wants to maintain a competitive edge. That's why a small refresher course never hurts. The Simrit Academy exists to help you obtain the necessary knowledge in sealing and vibration-related

technology or to refresh your existing knowledge. Again, the specter of time is usually the only hindrance. You would certainly love to hop over the pond to Weinheim but there's always a fire to be put out somewhere at your company which demands your presence.

Live online from your desk or workstation

Simrit not only recognized the problem here, we also solved it. With the Live Online Seminars (LOS), Simrit Academy brings you all the information directly to your PC at your workstation. Using an Internet-based online system from Simrit, all seminar participants are linked together with the seminar leader and each other as you view and hear the learning material in real time. You not only see presentation slides but can work on them. The content is the same as that in the



individual professional seminar modules conducted in Weinheim. Each individual module can be booked in German or English at your discretion.

Technical requirements

No specialized PC knowledge required! Modules are geared to run on a standard computer (330 MHz, 64 MB RAM) with the Windows operating system. Your monitor resolution should be at least 1024 x 768 pixels, with 16 bit color depth. Naturally, your com-

In Brief

- With the Live Online Seminars (LOS), Simrit brings you all the information directly to your PC at your workstation.
- All seminar participants are linked with each other from their respective workstations.
- You don't need specialised PC knowledge. A standard computer (330 MHz, 64 MB RAM) with the Windows operating system is all that is needed.
- You can also order a recording.



Contact: hans-joachim.wendel@simrit.de

Live Online Seminar "Merkel Hydraulic Components." It consists of ten one-hour parts and is broadcast beginning on October 9, 2006, on a weekly basis.

More detailed information:
www.simrit.com/academy

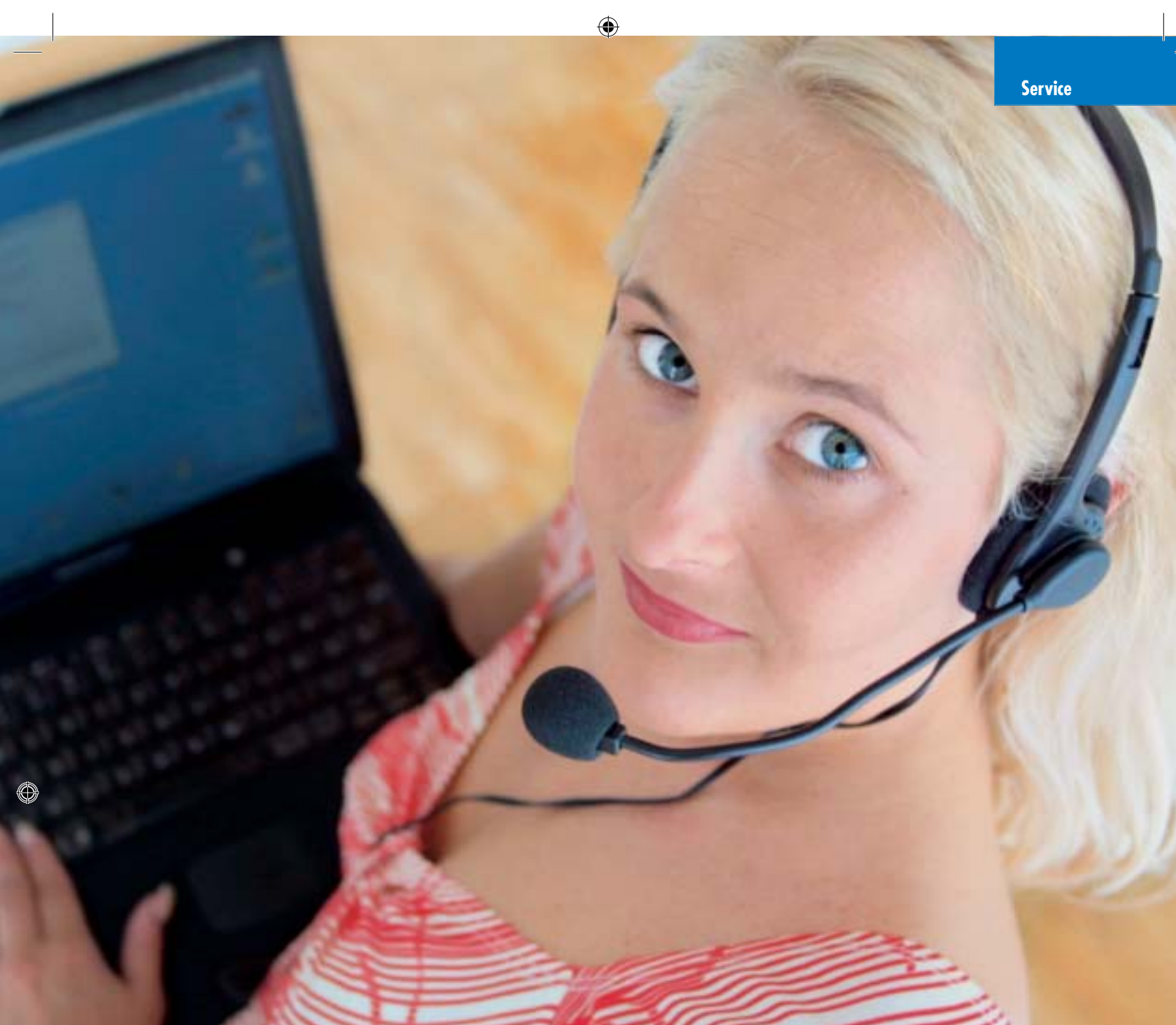





Photo: KPA

puter should have a sound card or integrated sound capability so that you can connect headphones or speakers to it. Your Internet connection should have bandwidth capability of at least 33.6. kBit per second. Lastly, if the demands of your company keep you too busy to participate during the seminar times, you can also order a recording of them. The goal is to make it as flexible for you as possible. You will receive a participation certificate after the Live Online Seminar via traditional postal mail.

Here's how to proceed if you want to participate

-  **Step 1:** Select a seminar and register via the Simrit Homepage at www.simrit.de/los/.
-  **Step 2:** You will receive a registration confirmation with password. This password will enable you to download the seminar materials.
-  **Step 3:** At least ten minutes before the beginning of the stated seminar starting time (in CET, CEST), log in at the Internet address listed above.

FKM seals have been used for many years in diverse forms in the steel industry.



Media and temperature resistance of fluorocarbon rubber

Wide spectrum of FKM mixtures

Fluorocarbon rubbers are used wherever a constant resistance to high temperatures and a wide chemical stability are required. Besides the standard types, Simrit also offers low-temperature-resistant fluorocarbon rubber compounds.

In Brief

- FKM is distinguished by its permanent resistance to high temperatures and a wide spectrum of chemicals.
- FKM compounds exhibit weakness solely when in contact with polar solvents such as methanol, ketones, esters and amines.
- The higher the fluorocarbon content, the better the chemical resistance.
- With increasing fluorocarbon content, the temperature resistance decreases.
- The Simrit material 60 FKM 251452 can be used at temperatures up to minus 40 degrees Celsius.



Contact: joe.walker@simrit.us

Compounds from fluorocarbon rubbers (FKM) are used, among other things, for the manufacture of seals in the engine construction, space, aeronautical and chemical industries, as well as for hydraulic applications.

The thermal and chemical stability of the fluorocarbon rubbers is based on the high bond energy of the carbon-fluorine bond compared with the carbon-hydrogen-bonding Simmerrings from fluorocarbon rubber as well as the shielding of the carbon chains by the fluorine atoms.

Thus, FKM materials have outstanding thermal and chemical resistance as well as good ozone and resistance to atmospheric corrosion. The application temperatures in hot air reach up to 200 °C for continuous use and short-term up to 275 °C. The mechanical characteristics such as the restoring force of the seal remain preserved even after longer exposure times. The temperature application is dependent on the polymer structure and the interlacing systems. Commercially available

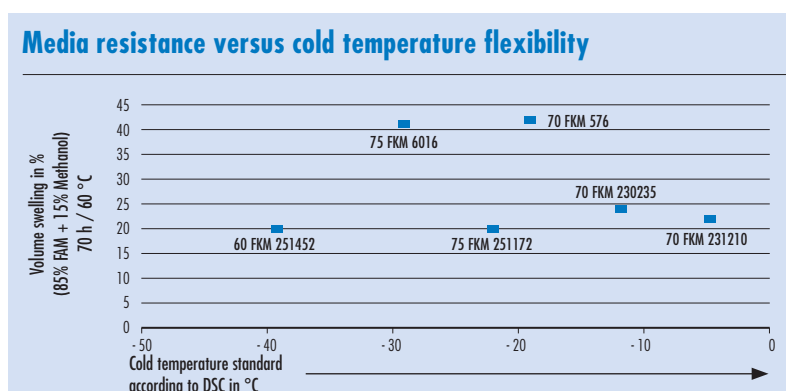
FKM rubbers carry the following names Viton®: (DuPont), Tecnoflon®: (Solvay Solexis), Dyneon® or previously (Dyneon®) or DAI-EL®: (Daikin).

Mixed polymerizates

Fluorocarbon rubbers are mixed polymerizates that are built up from multiple monomers. According to the proportion and combination of monomers, a differentiation is made between copolymers, terpolymers and tetrapolymers. The fluorine content for copolymers usually lies between 65 and 67 percent, depending on the type. Terpolymers have a higher fluorine content of 66 to 71 percent. Tetrapolymers are created through the additional integration of so-called "cure-site" monomers that enable a specific cross-linking of the highly fluoropolymer. The general rule of thumb applies: the higher the fluorine content, the better the chemical resistance. FKM compounds exhibit weakness only when in contact with polar solvents such as methanol, ketones, esters and amines. Thus, copolymers are unstable in methanol. Terpolymers with 70 percent fluorine are swell-resistant.

Cross-linking chemistry

The interlacing of fluorocarbon rubber can occur with diamines, bisphenols or peroxides. The cross-linking of FKM with aliphatic



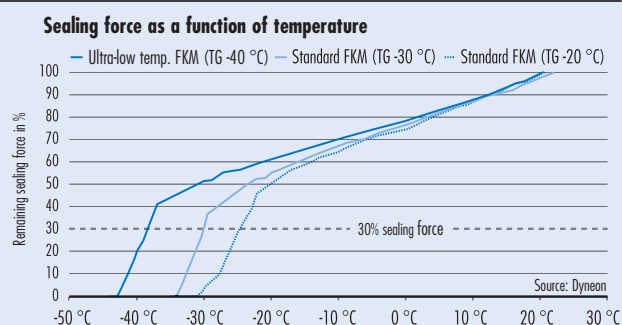
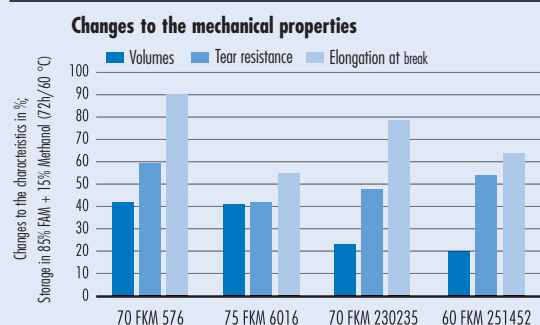
diamines has the disadvantage that the scorch time is very short. Furthermore, diamine cross-linked FKM compounds are not water vapor resistant, but do exhibit a good bonding ability to metals. Significantly better hydrolysis resistance and a lower permanent deformation is achieved with vulcanizates that are cross-linked with bisphenols. In contrast, this material is less resistant to fuels with methanol additives or lubricants with amine-containing additives. Peroxide cross-linked materials are distinguished by their good water vapor and hydrolysis resistance as well as through a low swelling behavior in lubricating oil additives containing amine or in fuels containing methanol. But with increasing fluorine content, the low temperature flexibility of the FKM material declines. Standard FKM types are generally only useable up to -20°C .

In order to optimize the flexibility of the material at lower temperatures, the design and structure of the FKM polymer is specifically modified so that application temperatures of up to -30°C for dynamic and up to -40°C for static applications is achieved.

Low-temperature FKM

Thus the Simrit-developed low temperature compounds 75 FKM 6016 and 70 FKM 134347 have good swelling behavior and excellent wear resistance as well as very good relaxation behavior. For even lower application temperatures up to -40°C for dynamic applications, the top material 60 FKM 251452 is available. The portfolio of FKM materials from Simrit ranges from standard types to specifically modified mixtures with the lowest swelling characteristics, to materials with low temperature flexibility.

Changes of the mechanical characteristics for thermal aging and media influence





No matter what your industry,
we promise a perfect fit.

Simrit's technology expertise is more than experience. It's innovation.

Whichever field of technology you work in, sooner or later the success of every application depends on the integrity of the materials that seal it.

Our mission in serving all sectors of the technology spectrum is to provide the most comprehensive range of sealing solutions for

8 6 6 - 2 SIMRIT

specific applications, and to be ready with creative solutions when you develop new technologies.

As both leader and dynamic innovator in the sealing industry, Simrit's unique global network allows for the continual expansion of our products and services, just as we're discovering new materials

www.simrit.com

and exploring future processes. It's our way of enabling you to go further out on that cutting edge, whichever edge it may be.

simrit[®]
A Division of Freudenberg-NOK
Your Technology Specialist

exceptional customer service • field engineering support • total sealing solutions

Freudenberg-NOK

INTERNATIONAL SEAL 

DISOGRIN
MERKEL

WILLIAM LEIDENTHAL DESIGN

Client/Ad: Simrit FNGP Simrit Branding Ad "Perfect Fit"
Trim Size: 21 x 28 cm Live: na
Color: 4 color Fonts: Futura

415 332 6858

Date: 06-27-06
Bleed: + 3 mm
Pubs: Simrit Insight Magazine, Vol 2/2006