Parker Prädifa

ENGINEERING YOUR SUCCESS.

June 2012

SealingReport

Contents

SealingReport

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Welcome to Achema 2012

We are pleased to welcome you again to our stand A36 in Hall 9.0 this year and look forward to presenting to you our latest products and materials that we have developed exclusively for you as users in the chemical and process industries. At Achema 2012, the Parker Seal Group with its worldwide network of in-house material laboratories and development teams will again be showcasing new, attractive solutions to enhance your productivity and efficiency.
In this issue of the Sealing Report you can gain an initial impression and find out more about our new proprietary TPU and FKM materials, for example. Drawing on our expertise from more than 50 years of experience in material development, we will again be on location with our product developers and sales experts for you, look forward to your visit and to informative discussions. Please approach us – we will be pleased to assist you.
In keeping with our promise:

ENGINEERING YOUR SUCCESS.

Jochen Nigge
General Sales Manager
Seal Group Europe

For harshest process conditions

The new generation of Parofluor® high-performance perfluoroelastomers

Elke Vöhringer-Klein,
Market Manager Chemical
and Processing Technology,
O-Ring Division Europe

Perfluoroelastomers are successfully used in many industrial manufacturing processes for which conventional elastomers are not suitable due to insufficient chemical and temperature resistance. With a new generation of Parofluor® high-performance elastomers, Parker-Prädifa offers sealing materials with properties that have been significantly improved yet again compared with their predecessors. Thanks to these improvements the new compounds guarantee that the particularly challenging requirements in chemical and pharmaceutical process equipment and other demands are successfully met.

Process reliability is a requirement that all components used in process equipment of the chemical and pharmaceutical industries – including seals and sealing systems – have to meet without ifs or buts. Yet more aggressive and concentrated cleaning agents and hot processes lead to consistently increasing demands made on sealing materials. In addition, legal requirements in the pharmaceutical and food industries demand materials that are pure and inert to the media used in these industrial applications.

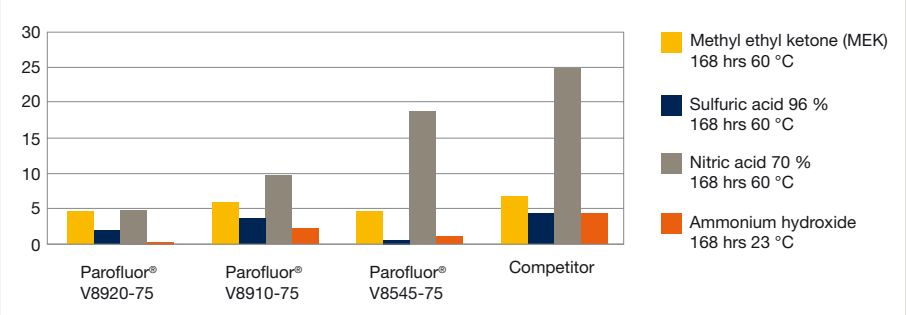
Permanent elasticity and outstanding resistance

Compared with conventional perfluoroelastomers the new Parofluor® materials exhibit outstanding permanent elasticity and further improved chemical resistance in aggressive acids, alkaline solutions, solvents, amines and many corrosive chemicals. In addition, they offer exceptionally high temperature resistance up to 325 °C.

Parofluor® materials are particularly reliable not least due to their very low compression set. Compression set denotes the lasting deformation of a standard sample or finished part that has been deformed under specific conditions after relieving the load. It is a measure for the loss in resilience of an elastic material. In practice, low compression set translates into significantly prolonged service life of a sealing element, higher sealing effectiveness over a longer period of time and thus minimisation of the risk of leakage.

Proved in practice

The new Parofluor® materials have proved their viability in practice as demonstrated by positive field tests and a large number of customer approvals that have already been granted. Another plus from which the customer profits is their optimal price-performance ratio.
Parker-Prädifa's in-house Parofluor® development, elastomer production, design, tooling and manufacturing operations are further valuable benefits for the customer. They assure, for example, that the entire Parofluor® manufacturing process from the base polymer through to the finished sealing element conforms to the stringent quality management standards of DIN EN ISO 9001:2008. All formulation ingredients are fully traceable and seal designs are optimised by means of computer-aided product development (Finite Elements Analysis).



Volume change of various Parofluor® compounds and a competitor material in %

Application matrix for the new Parofluor materials

Compound data								
Compound name	**V8920-75 Parofluor®**	**V8921-75 Parofluor®**	**V8930-75 Parofluor®**	**V8931-75 Parofluor®**	**V8950-75 Parofluor®**	**V8951-75 Parofluor®**	**V8910-75 Parofluor Quantum®**	**V8911-75 Parofluor Quantum®**
Nominal hardness (Shore A)	75	75	75	75	75	75	75	75
Colour	black	white	black	black	black	white	black	white
Temperature range (°C)	-15/260	-15/260	-15/325	-15/310	-15/240	-15/240	-15/220	-15/220
Approvals					FDA	FDA, USP Class VI		
Resistance	Wide range of chemical resistance							
	Standard compound, very good suitability for hot water, steam and amines	Purity compound, for oxidising media such as fluorine gas	High-temperature compound, not suitable for amines and steam	High-temperature compound, also suitable for amines and steam	Purity compound	High-purity compound	Standard Quantum compound	Standard Quantum compound
Applications								
Bio-pharmaceutical Process Technology – Mechanical seals	X						**X**	
Pumps	**X**	X	X	X	X	X	**X**	X
Valves	**X**	X	X	X	X	X	**X**	X
Reactors	**X**	X	X	X	X	X	**X**	X
Agitation and mixing systems	**X**	X	X	X	X	X	**X**	X
Tank systems	**X**	X	X	X	X	X	**X**	X
Transport and refineries	X	X	X	X	X	X	**X**	X
Inking and printing systems	X						**X**	
Paper manufacturing	**X**		X					
Paint production & processing							**X**	
Clean manufacturing processes (acc. to FDA CFR Section 21 N0. 177.2600)					**X**	X		
High-purity manufacturing processes (acc. to USP Class VI)						**X**		
Steam applications >150 °C	**X**						X	
Energy, Oil and Gas – Oil drilling (sour gas)	**X**						X	
High-pressure gas applications (explosive decompression)	V8588-90							
Sludge drilling	**X**						X	
Amine-based media	**X**			**X**			X	
Geo-thermal applications			**X**					

Standard compounds are set in bold

Forward-thinking and specialised

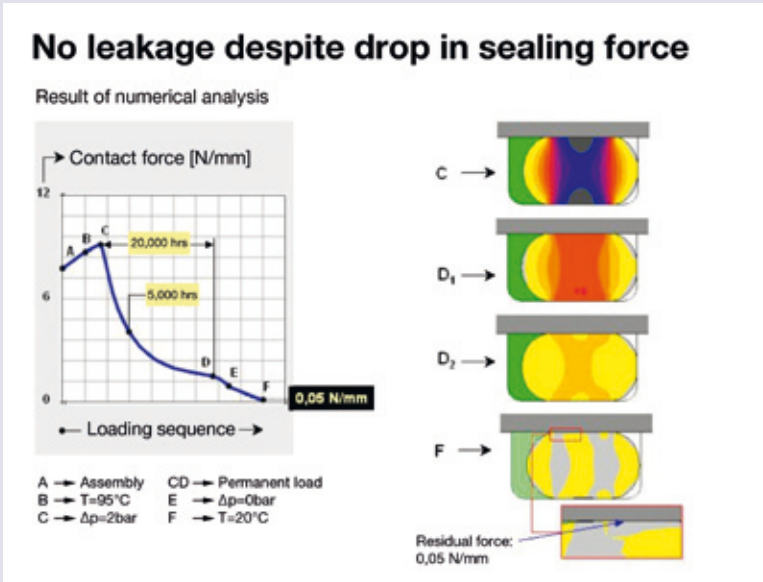
Even though the universal all-purpose material covering a temperature range from -40 °C to 325 °C with suitability for all process and cleaning media plus steam, and conforming to all national and international regulations, is not available yet Parker-Prädifa's material developers are continually working on the solution of this and similarly challenging tasks. Therefore, Parker-Prädifa already offers optimised specialty compounds for any demanding application today, such as the new generation of Parofluor® materials for harshest operating conditions.

Service life calculation of sealing elements made from fluoroelastomer materials

Dr Manfred Achenbach
Manager Technical & Analytical Service / FEA, Packing Division Europe

With respect to their capital expenditure decisions users today increasingly look at Total Cost of Ownership (TCO), in other words the overall operating expenditures they will incur. The service life of a seal, though, is hard to assess. Yet the use of non-linear finite elements programs, complementary to physicochemical ideas of models, allows statements to be made on the aging behaviour of rubber seals. The aging model developed by Parker goes beyond the classic structural-mechanical concept. This makes it possible to establish links to thermal and physicochemical effects in elastomers. Diffusion and swelling of ambient media plus resulting chemical reactions that lead to a change in the elastomer's behaviour can be considered in the aging model by means of the FEM approach.
Based on the findings relating to the influence of aging when using elastomeric seals, Parker is able to take appropriate actions in terms of design and materials which ensure that the customer receives an outstanding sealing product with long service life. Parker draws on proprietary developments of complex micromechanical material models of hyper-elasticity for this purpose. These models are implemented into a finite elements program that simulates the influence of material aging on the long-term performance of seals. The multitude of material data required for such a calculation is obtained through complex measurements of standardised samples focused on aging processes.

A central aspect when examining the aging behaviour of elastomers is the change of the three-dimensional network structure over time. This change may be attributed to chemical reactions in the presence of aggressive media or thermal decomposition, for example. Rupturing of the network structure leads to a reduction in the number of effective chain segments that support the strength and elasticity of the elastomer. In addition to the decomposition of the three-dimensional network, a post-vulcanisation of the elastomer has to be considered as well.
In real-world applications elastomers, after installation, generate a compression-induced contact force in the sealing area which is further increased under pressure and at higher temperatures. The commonly known decrease of this contact force over time in the application can ultimately lead to leakage when its value drops to 0 N/mm. Thanks to the possibility of testing this aspect by means of long-term simulation of the specific application including the relevant media, temperature and pressure conditions Parker is able to offer the best-suited sealing solution right from the beginning. For example, in an extensive aging simulation Parker was able to demonstrate that its proprietary fluoroelastomers provide reliable sealing even after 20,000 hours (aging in a water-glycol mixture in the conditions shown in the chart). ■



Reliability for pharma equipment

Advanced sealing solutions, RFID and customised assemblies

Elke Vöhringer-Klein,
Market Manager Chemical and Processing Technology, O-Ring Division Europe

Manufacturing processes in the pharmaceutical industry make exacting demands on purity, reliability as well as process and product quality to avoid any type of contamination of the product to be manufactured. The Parker Seal Group develops and produces optimised sealing solutions that meet the high quality requirements in the pharmaceutical core processes like Active Pharmaceutical Ingredient (API) manufacturing or biological fermentation plus the supporting processes such as Water for Injection (WFI), Cleaning-In-Place (CIP) or Sterilisation-In-Place (SIP).

WFI stresses and damages materials by trying to extract minerals from them. Only few sealing materials exhibit long-term resistance to deionised ultra-pure water. The interactions between the media to be sealed and aggressive disinfectants and cleaning agents or the hot steam of up to 149 °C used in the sterilisation process are rough on the materials as well and frequently lead to seal failure. Due to the growing trend of reducing or eliminating the use of preservatives cleaning processes are becoming increasingly concentrated and aggressive. Any equipment downtime, even for a period of only 10 minutes to replace a seal, impairs productivity. Experience has shown that the need for reliability and durability of every single component increases along with the number of components used.
The following sealing elements have proved their viability in numerous pharmaceutical processes.

Hygienic Sanitary Gasket

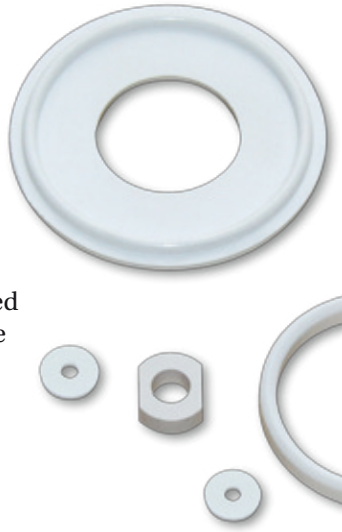
The patent-pending Hygienic Sanitary Gasket is a newly developed two-component flange seal. The flush interface prevents the growth of micro-organisms within a dead space and the resulting contamination of the product. Long-term sealability, outstanding resistance, complete traceability of the materials, easy installation and removal are the outstanding properties of this seal. The design has been awarded ASME BioProcessing Equipment (BPE) certification.

The Hygienic Sanitary Gasket is made of the high-performance plastic material PPSU with excellent chemical resistance in challenging cleaning agents and disinfectants and a moulded elastomer part that is available in various EPDM, NBR, VMQ and FKM materials, some of which conform to FDA, 3A Sanitary Standards #18-03 and 20-25 and have been awarded USP Class VI and NSF approvals. Each seal has laser-engraved product identification consisting of the respective material code and relevant manufacturing data. Thanks to in-house production of the elastomer compounds complete traceability through to the raw materials used is ensured.

O-rings and moulded parts from hygienically pure materials

Seals used in sterile and hygienic applications have to meet technical requirements and conform to specifications in terms of purity and colour. Parker has developed various elastomers in bright colours for pharmaceutical applications that nearly compare with black materials containing carbon-black fillers. The purity of the elastomers for FDA 21 CFR 177.2600 conformance is another important requirement. In addition, good cleanability and sterilisability with CIP/SIP media plus low swelling in contact with products and process media are important. For permanent sealability, compression set is a key characteristic that indicates the resilience of the elastomer in the application.
For pharmaceutical uses, two completely different types of materials – silicones (VQM) and ethylene propylene diene monomers (EPDM) – are the most prevalent materials. Whereas silicones are used due to their physiological harmlessness EPDM is the material of choice for aqueous polar organic solvents and in hot steam.
In applications involving higher temperatures of up to 200 °C and acids, white bio-compatible fluoroelastomers (FKM) free from Animal Derived Ingredients (ADI) are used.
Parker's highly fluorinated HiFluor® (FKM) materials with very good service life are recommended for applications with temperatures of up to 250 °C in polar and non-polar media in which conventional elastomers fail due to insufficient temperature and chemical resistance.
Where PTFE sealing elements due to their high stiffness and low resilience are not feasible Parker's high-performance perfluoroelastomers of the Parofluor® family with excellent elasticity and long-term sealability in aggressive media such as nitric acid, methylethylketone or ethylendiamines are used. Thanks to special mixture formulations the range includes high-purity Parofluor® materials with maximum resistance up to 240° C which meet FDA standards according to §21 CFR 177.2400, bio-compatibility according to USP Class VI and Regulation (EC) No. 1935/2004.

As technology leader in the development and production of elastomers, Parker offers comprehensive sealing solutions tailored to the respective pharmaceutical processes.



RFID

Radio Frequency Identification (RFID)

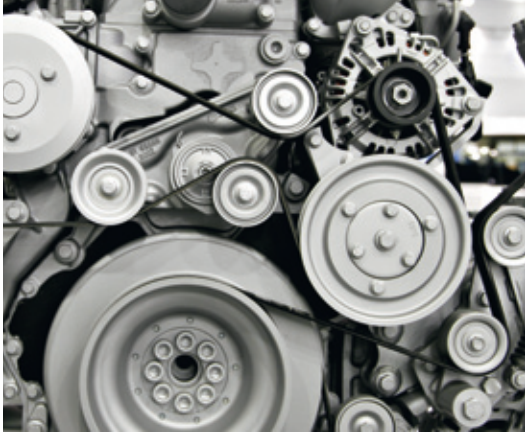
RFID stands for Radio Frequency Identification, i.e. contactless data exchange using electromagnetic waves. RFID systems are used, for instance, to automatically identify and localise data in the form of so called smart labels. This technology is already being used in numerous fields and has now been introduced by Parker as well in sealing solutions for the pharmaceutical industry. The RFID system consists of a transponder (microchip) which in this case is embedded in an O-ring or a customer-specific moulded elastomer part and contains an identification code plus a reader or scanner for data reading. The data, such as manufacturing date, approvals, material or installation information, can be programmed according to the customer's wishes. The patent-pending system can easily locate and access the data in place without removing the seal. This allows the user to improve line maintenance according to GMP (Good Manufacturing Practice) without impairing the sealing function. At temperatures above 121 °C the system switches to sleep mode and "awakens" at temperatures below 121°C. The RFID system can operate at a range of up to 10 metres and assures trouble-free, fast and reliable functionality in pharmaceutical industry applications. The material of the O-rings is selected according to the manufacturing process, cleaning media and temperature. All elastomers with a cord diameter of >3.8 mm are basically suitable for this purpose.

Customised assemblies

With respect to optimising various fluid handling processes the Parker Seal Group supports its customers in the pharmaceutical industry as an expert partner in the field of tube systems, connection technology and sampling systems. In addition to the required clean-room environment, the selection of the appropriate system components and materials according to the respective process parameters is a crucial aspect. Different sterilisation methods play an equally important role in this case as the interaction with fluids passing through the system. A customised qualification matrix for each system assures compliance with all relevant standards (E.P. 3.1.9, USP, ISO 10993, FDA §21 CFR 177.2600). ■

Resistant against fuels and condensates

New FKM material for challenging automotive applications



Rolf Kuschel,
Innovation & Technology /
Material Development,
Packing Division Europe

With V9169-80, the Parker Seal Group offers a new generation of FKM materials that meet extremely challenging requirements in a wide range of applications. The new material that is particularly suitable for automotive applications is characterised by very good cold flexibility down to -30°C and resistance against commercially available fuels and condensates (acetic acid as reference medium). Furthermore, V9169-80 exhibits very good resistance in coolants, engine oils, diesel and bio diesel. Wear resistance (abrasion according to DIN ISO 4649) compared with a standard FKM compound was improved by over 50% as well.

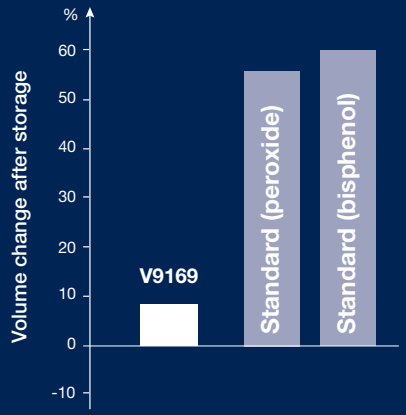
V9169-80 possesses generally improved chemical resistance in comparison to standard FKM compunds. Thanks to its universal uses the large variety of materials in automobiles can be significantly reduced, with carry-over components such as needle-roller bearings being suitable for use in various applications. In addition to simplified warehousing, this offers the main advantage of nearly excluding the risk of mixing up different seals and sealing materials. As mix-ups harbour the risk of seal failure in important technical components which may cause high costs this is a major gain in reliability.
Modern high-performance engines require seals and sealing systems that deliver maximum levels of performance in terms of operating reliability and service life as well. The new V9169-80 material superbly meets these demands. Through an intelligent formulation of the peroxidically linked FKM compound the strength values and tear strength were elevated to yet another level. Tests in which material samples were deliberately damaged and subjected to cyclical deformation have shown that materials optimised in this manner fail only at clearly higher amplitudes and loads than in the past.
For high-load dynamic applications, this leads to a significant increase in reliability. Due to the mechanical strength, improved dynamic properties and outstanding compatibility with numerous media V9169-80 is suitable for a wide range of applications. V9169-80 of course meets the requirements of GADSL, RoHS, WEE and with respect to absence of PAH (polycyclic aromatic hydrocarbons), as confirmed by measurements of common PAHs performed by the DEKRA Laboratory for Environmental and Product Analytics in Stuttgart (Germany).

Properties

- Good low- and high-temperature performance
- Very good resilience, for high-load applications
- Wear and abrasion resistance, prolonged service life
- Very good resistance in many available fuels
- Resistant to engine oil
- Resistant in coolants (to be tested on a case-by-case basis)
- Contains no organically bound silicone
- Resistant to acetic acid (resistant to exhaust gas condensates)
- No banned or declarable ingredients according to GADSL, SVHC,
- Contains no perfluorooctane sulfate (PFOS)
- Conforms to RoHS, WEEE
- No detectable PAHs. Measurements obtained according to ZEK 01.4-08 (GS) QMA 2001.1284 are below the determination limit of 0.2 mg/kg. ■

Condensate resistance

The chart shows the volume change of the new V9169 material after storage in acetic acid pH3 (500 hrs/100° C) compared with standard FKM materials with peroxide crosslinking or bisphenol crosslinking. Acetic acid pH3 (Ph2.5) serves as a reference fluid for evaluating resistance in exhaust gas condensate.



TPU materials for biodegradable pressure fluids

Interactions require specific modification and selection

Dr Uwe Wallner, Innovation & Technology / Material Development,
Packing Division Europe

Leaking hoses, tubes, connections or seals and improper disposal of media pose latent risks to the environment. These hazards plus the constant rise of petroleum prices are the reasons why industry has started to increasingly use synthetic and biodegradable pressure fluids.

These substances not only have positive effects, though. Equipment failures due to gumming of biodegradable oils or paint that dissolves when exposed to polyglycole fluids indicate that other chemical reactions occur between these oils and the materials they come into contact with. This also means that the sealing materials – such as thermoplastic polyurethanes (TPU) – have to be modified according to the different chemical compositions of the biodegradable oils.

Selection of materials

As a hydraulic seal is completely or partially surrounded by the pressure medium interactions between the sealing material and components of the pressure medium are inevitable.

The purely physical intrusion of pressure fluid components into the material changes its volume, which results in volume swelling. If components such as plasticisers are dissolved from the material this will lead to shrinkage. In reality, both volume effects occur simultaneously. Swelling or shrinkage takes place depending on which of the two processes predominates. As a consequence of these volume effects the properties relating to the material's service such as hardness, elasticity, tensile strength or ultimate elongation change as well.

By comparison, material shrinkage has a higher tendency to cause critical operating conditions than swelling. Therefore, a good material is the one that leads to lower swelling in service.

TPU materials that are relevant to sealing technology are typically produced without plasticizers.
In addition, chemical effects overlap the physical ones. Components of the pressure medium may react with and degrade the material under certain conditions. Examples include reactions with water (hydrolosis), low-molecular alcohols, glycoles or organic acids. These reactions significantly affect hardness, elasticity, tensile strength, ultimate elongation and wear, causing brittleness and/or cracking of the TPU material.

Proper interaction between the sealing material and the pressure medium is a prequisite for good functional performance and long service life of the seal.

Thermoplastic polyurethanes as sealing materials

Thermoplastic polyurethanes (TPU) are frequently used in the sealing industry today. This is primarily due to their very good mechanical properties and the resulting high wear and extrusion resistance. Materials can be tailored to meet the needs of the particular application through a targeted selection of the basic components. For example, TPU materials with much better properties in terms of thermal stability and resistance to hydrolytic or chemical attacks have been developed for the challenging requirements in hydraulic systems.

Traces of water cannot be excluded in any hydraulic system. In an interaction with temperature and/or additives the polymer chains may hydrolytically degrade. Degradation products such as alcohols, acids or alkaline additives can react with TPU and degrade the polymer chains, resulting in a significant reduction of the mechanical properties. That this degradation does not necesssarily coincide with a change in volume or hardness is a typical characteristic of TPUs. Special TPU materials such as the Parker-Prädifa Ultrathan® materials P5000 and P5001 may even be used in water-based HFA and to some extent in HFC pressure fluids. They are designed for use in humid environments (i.e. in mining).

HEPR – polyalphaolefines (PAO)

The HEPR group includes low-molecular polyalphaolefines. In terms of their chemical structure the non-polar molecules are similar to mineral oils1b). However, such base oils cause seals made of standard NBR materials to shrink, which is the reason why swelling additives (e.g. ester-based control oils) are frequently added. These additives, though, may degrade standard polyurethanes. Therefore, an exchange of mineral oils for PAOs has to be tested carefully.

HEPG - polyglycoles

Polyalkylenglycoles (PAG) are mainly polyethers consisting of ethylenoxide (EO) and/or propylenoxide (PO). The composition of the resulting polyethylenglycole (PEG) and/or polypropylenglycole (PPG) homogenous or mixed polymerisates (PEPG) have a major influence on the polarity of the oils.

The molecular weight has effects on the swelling tendency of the sealing materials. In particular, low-molecular components and degradation products created in service conditions may degrade TPUs.

Esters

Esters belong to a different chemical class. Typically, these are condensation products from an organic acid and an alcohol that react to form an ester by abstracting water. In service conditions, acids and alcohols can be created, which may react with sealing materials accordingly. The natural esters and the most important synthetic esters are discussed below.

HETG – natural triglycerides

Chemically, the vegetable oils such as rape oil are glycerin esters of higher-grade fatty acids. Fatty acids typically contain one or more C=C double bonds that are vulnerable to oxidative attacks. When exposed to higher temperatures and contact with oxygen HETG fluids exhibit thickening and gumming tendencies.
Like all esters, HETG fluids in combination with water are subject to gradual hydrolytic degradation into their components, glycerin and fatty acids. When using ester based polyurethanes, even without water, the sealing material may degrade through transesterification reactions.

HEES – synthetic esters

The class of synthetic esters, HEES, is a very interesting one. Both organic acids and alcohols can be used to control product properties. Cold performance, thermal and hydrolytic stability or seal compatibility can be specifically set through a skilful combination of the wide range of raw materials. This breadth of possible variations, though, also makes any prediction of a seal's compatibility with HEES fluids nearly impossible.

The most frequently used synthetic esters[1b)] are based on dicarbonacid esters with long-chain alcohols, polyolesters (e.g trimethylolpropane (TMP) esters with monocarbon acids) or complex esters (polyester with one or more dialcohol or dicarbonacid components).
Fully synthetic, saturated ester oils based on TMP, polyole or complex esters exhibit the best technical properties due to their very good oxidative resistance and tribological performance. As varied as the oils themselves is their effect on sealing materials.
HEES fluids in combination with water are subject to gradual hydrolytic degradation into the components

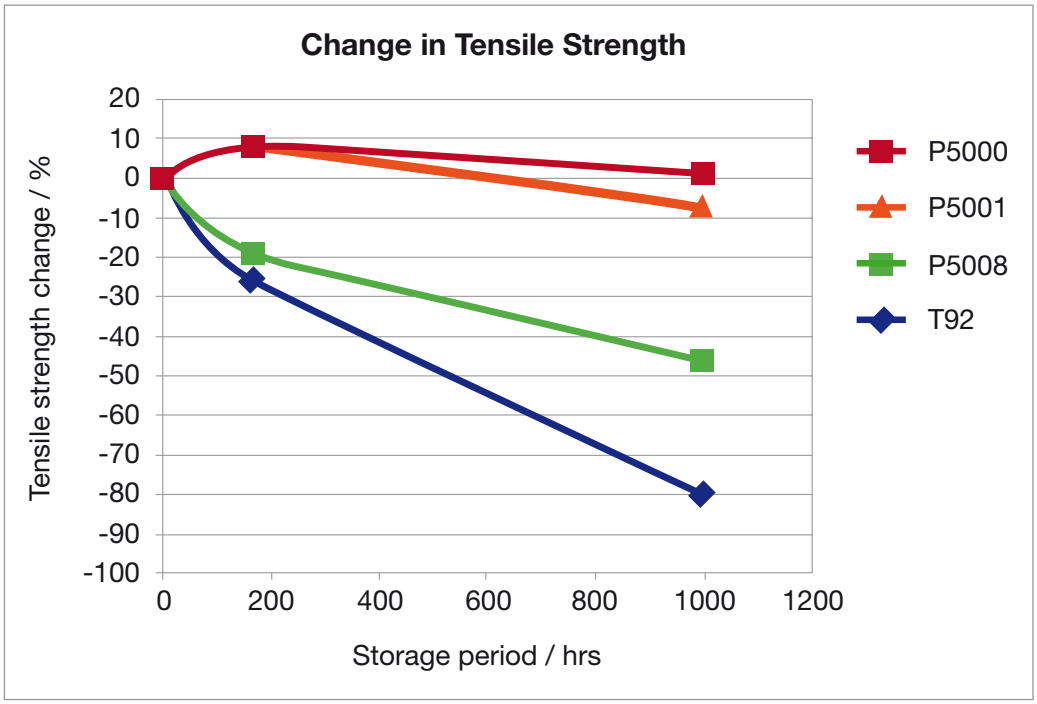


Fig.1 Compatibility of TPU materials with a synthetic ester from manufacturer 1 (168 and 1000 hrs at 80 °C)

alcohol and carbon acids as well. In addition, transesterification reactions with polyester-based polyurethanes may lead to a degradation of the sealing material. Hydrolosis-stable special materials can resolve this issue.
The test at Figure 1 demonstrates the capabilities of modern hydrolysis-stable TPU materials. Whereas the standard materials such as P5008, exhibit significant signs of degradation after 1000 hours at 80 °C the hydrolysis-stabilised TPU materials (P5001 and P5000) are practically unaffected. They are well suited for this medium.

Additives

Pressure media have to possess a multitude of properties in terms compressibility, wear, friction, corrosion protection, service temperature, stability, service life etc. which cannot be achieved strictly by the base oil.
Special chemical additives[1a, 2)] extend the performance capabilities of pressure fluids.
Ester oils are frequently used as base oils (control oils) for additive packages, as polar additive components dissolve very well in these oils, resulting in mixtures of various base oils. This approach makes the search for a suitable sealing material more difficult for the seal manufacturers. Therefore, control oils should always chemically correspond to the base oil used.
According to all findings available to date regarding the interactions between sealing materials and different types of oils, the general approval of a considerable amount of a different oil type as an additive may cause problems.

Summary

Existing field experience and the results discussed show that the selection of the right material for use in biodegradable pressure fluids is difficult. Therefore, a compatibility test must always be performed for a more detailed statement. Generally, hydrolysis-resistant materials can offer clearly higher levels of reliability. ■

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b) Teil III, O + P Ölhydraulik und Pneumatik, 11-12/2004

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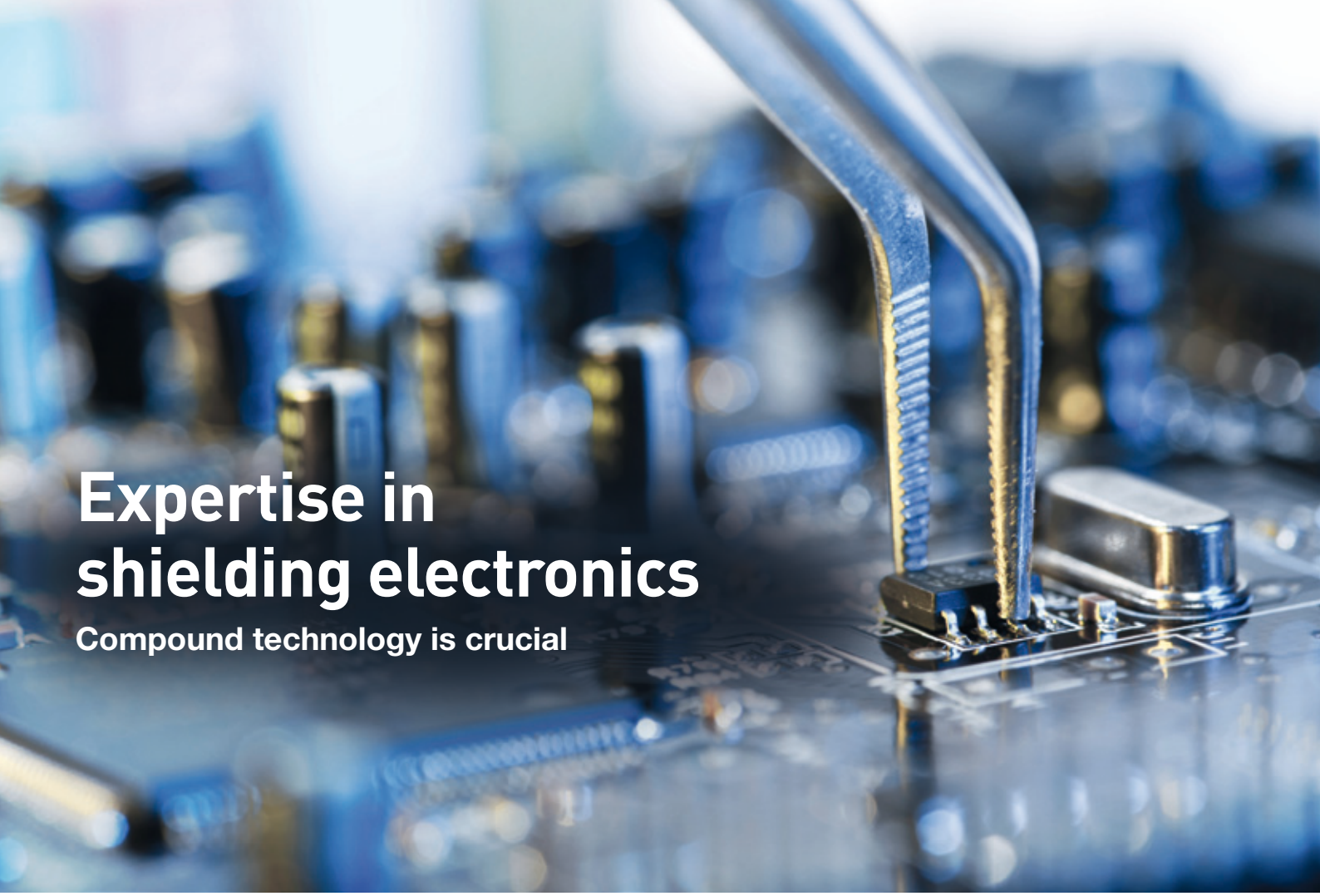
New distributor in Switzerland

The Swiss company Kubo Tech AG was appointed as a Parker Hannifin "Authorized Distributor" in January 2012. The business that was founded in 1980 has a total of 50 employees at its Effretikon location and enjoys an excellent position in the Swiss marketplace.

Kubo Tech AG possesses comprehensive expertise in sealing technology, from consultancy relating to the use of materials through to the design of complex sealing systems. The company produces flat gaskets in-house, manufacturing small-volume series on program-controlled fully automatic cutting machines and large-volume series on punching machines with tools. The customer portfolio on the Swiss market ranges from the pharmaceutical and chemical industries, medical technology, the food industry, energy and power-plant sector, mechanical and plant engineering through to valves and fittings manufacturers, the watch industry as well as the catering sector and household appliance manufacturers.
Kubo Tech AG, which is certified according to ISO 9001 / ISO 14001, attaches maximum importance to reliability and quality, preferably entering into long-term partnerships with renowned manufacturers for this purpose.

In line with this philosophy the company regards the collaboration with Parker, which is now based on contractual agreements, as another milestone in its long-term success strategy. In return, Parker now has a quality supplier in Kubo Tech who enjoys an excellent position in the Swiss marketplace and high acceptance as a consulting and distribution services provider.
Parker sealing products sold by Kubo Tech AG include the entire Parker-Prädifa O-ring portfolio plus the complete range of hydraulic and pneumatic seals, radial, axial and face seals. ■

From left:
Bernd Wemmer, Sales Manager Central Europe, Parker Seal Group
Urs Müller, Sales Manager, Kubo Tech AG
Dr. Thomas Raible, Managing Director, Kubo Tech AG
Rolf Freiburghaus, General Manager, Sales Company Switzerland,
Marcelo Gutierrez, Key Account Manager, Parker Sales Company Switzerland



Expertise in shielding electronics

Compound technology is crucial

Bruno Chaigneau, Application Engineer, Chomerics Division Europe

The Chomerics Division of the Parker Seal Group Europe has developed its conductive elastomer materials technology over many years. From the earliest silver and silver-plated copper- filled silicones to the latest and more cost-effective silver-plated aluminium and nickel-plated graphite composites, the materials have been continually enhanced and tailored to meet the demands of modern electronics.

The prominence of electronics in both the personal and work lives of the industrialised world's population has grown beyond what anyone would have imagined twenty or thirty years ago. Sectors including automotive, medical, military, aerospace and communications have seen electronic content proliferate with benefits such as increased functionality, greater convenience, and smaller form factors.

Whilst digital and analog technology has evolved with increasing performance from smaller geometries, the shielding challenges that arise from densely packed circuitry that puts power and sensitive digital in close proximity have increased. The use of elastomers combined with various fillers to enhance their performance has given engineers a wide and diverse range of materials that provide the dual function of a seal between two mating surfaces and EMI shielding.

Multidisciplined engineering capability

Parker Chomerics has many decades of experience in the electronics industry and employs multi-disciplined teams of chemists, engineers, technologists, plus marketing and sales teams with deep engineering knowledge. Together they are able to understand the exact needs of the customer, allowing them to develop shielding materials that accurately match technical requirements, add value, and enhance the performance and reliability of end products.

Diverse applications

The diverse range of applications and environments in which electronic equipment can be used means EMI shielding materials need to be carefully selected. For example, an automotive application might see

exposure to a range of oils and lubricants as well as temperature excursions as low as -55 °C and as high as +100 °C. Meanwhile, applications in the food industry may see contact with an even wider range of substances that could include coffee, sauces and beverages.
EMI shielding materials used on equipment designed for indoor use are placed under limited demands from an environmental perspective, whereas outdoor applications will typically see greater extremes of temperature and be affected by factors such as corrosive sea salt, airborne pollutants, and high humidity.

Elastomers

The elastomer base used in extruded and moulded EMI shielding materials is typically a silicone, fluorosilicone or fluorocarbon or Ethylene Propylene Diene Monomer – better known as EPDM. Each elastomer has particular attributes that make it suitable, or indeed unsuitable, for specific applications. In terms of the cost of the finished conductive elastomeric material, the main contributor, and by a significant margin, is the filler used rather than the base elastomer.

Siliconeis well suited to applications where there are extremes of both high and low temperature. Its suitability for outdoor applications is further enhanced by excellent weathering, ageing and ozone resistance characteristics. Silicone also exhibits good dielectric properties.

Fluorosilicone exhibits high and low temperature characteristics similar to silicone as well as excellent weathering, ageing, ozone resistance and dielectric properties. In addition, very good resistance to fuels, oils, aliphatic solvents, water, dilute bases and acids makes the use of fluorosilicone in harsh or unpredictable indoor and outdoor applications a good choice.

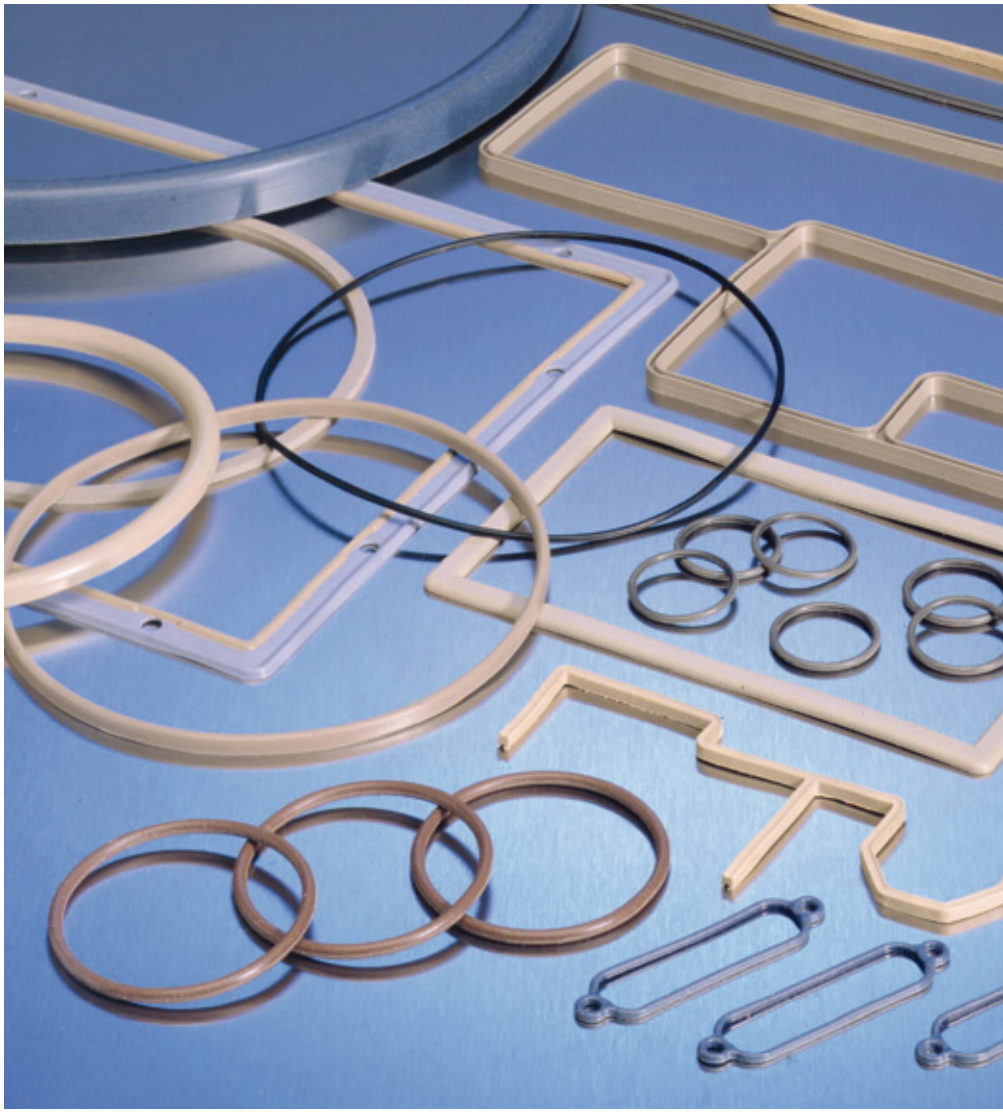
Fluorocarbon has excellent compression set making it useful in assemblies that may need to be taken apart and re-assembled at times during their working lives. Excellent resistance to oil, fuels, aliphatic, aromatic and chlorinated solvents and acids, plus very low gas permeability are the key attributes of fluorocarbons. They also have good high and low temperature resistance.

EPDM exhibits excellent resistance to weathering, ozone, dilute bases and acids. It can also be used effectively in applications where water and steam are present.

Fillers

The metals that are combined with the base elastomer – also known as fillers determine the shielding performance of the finished extruded or moulded part. Their precise, uniform dispersion within the binder produces materials with stable and consistent electrical and physical properties. Some of the commonly used materials and their primary properties and degree of performance are described below.

Nickel / Carbon (Ni/C) provides low-end shielding and ESD protection with very limited corrosion and fluid resistance.



Nickel / Aluminium (Ni/Al) is able to resist the highest levels of electromagnetic pulse (EMP) induced current. It is ideal for high-end commercial applications in non-corrosive (usually indoor) environments.
Silber / Aluminium (Ag/Al) when combined with a fluorosilicone elastomer, is ideal for military-grade applications where high shielding performance and resistance to corrosion are high priorities.

Silber (Ag) is an expensive option, but provides a very high level of shielding and through conductivity performance. This filler is suited to use in non-corrosive environments. When combined with silicone it provides a solution with low closure force and high shielding effectiveness.. The compromise is low tear strength and limited fluid resistance.

Moulded versus extruded

Moulded seals can be made with very narrow tolerances for precision applications. However, designers need to factor in the cost of tooling when deciding whether to opt for a moulded rather than extruded approach. Extruded seals have larger tolerances and are offered in a wide range of cross-sections. Compared to moulded seals they require longer set-up and secondary processes to cut and splice the seal to the desired finished length.

Once used mainly to shield critical defence and aerospace electronic systems, extruded and moulded shielded seals are now required in a much broader spectrum of both military and commercial applications. Parker Chomerics conductive elastomers have become popular with packaging designers of consumer, telecommunications, business, industrial equipment, automotive, medical devices and much more.

Event Calendar

ACHEMA	Frankfurt, Germany	18.06. – 22.06.2012
Farnborough Air Show	Farnborough, England	09.07. – 15.07.2012
Elmia Lastbil	Jönköping, Sweden	22.08. – 25.08.2012
ONS	Stavanger, Norway	28.08. – 31.08.2012
International Engineering Fair	Brno, Czech Republic	10.09. – 14.09.2012
HUSUM WindEnergy	Husum, Germany	18.09. – 22.09.2012
Gastech	London, England	08.10. – 11.10.2012
OTD	Bergen, Norway	17.10. – 18.10.2012
ADIPEC	Abu Dhabi, United Arabian Emirates	11.11. – 14.11.2012
Foodtech	Herning, Denmark	13.11. – 15.11.2012
Electronica	Munich, Germany	13.11. – 16.11.2012
COMPAMED	Düsseldorf, Germany	14.11. – 16.11.2012

We look forward to your visit.

Your wish is our (printing) command

Customer-specific product labels add value

Not to worry, Parker-Prädifa has not changed its line of business. We continue to be your reliable and innovative partner for top-quality sealing products that enhance your productivity and efficiency. And this promise and commitment is exactly why we are now offering you a completely new additional service on request: the customisation of your product labels!

In the information age data are increasingly used to automatically control a wide range of manufacturing and logistics processes. Barcodes have proved their viability for these purposes thanks to being machine-readable. Therefore, the inclusion of information such as manufacturing data, packing slip or article numbers in our product labels in the form of barcodes has long become standard practice.
In addition, we are now able to offer the customisation of your product labels as a special service to you thanks to proprietary labelling software we have specifically developed for this purpose.
Using our new 2D barcode program we are able to integrate desired data such as the article numbers you use, storage locations, purchase order numbers or items etc. in the product marking label. Even graphic elements like logos are possible.
This provides you with obvious benefits. Through automatic acquisition of the batch information relating to the shipment plus your own data you can simplify the process flow in your receiving department, for example, to save time and costs.
The fact that you can forward shipments – such as spare part supply – directly in our packs has a beneficial effect on time and costs, plus on the environment, as well. Repackaging is no longer required.

Last but not least, the option to integrate your logo allows you to highlight your product presentation in line with your corporate design. If you choose this option we will be pleased to not only print but also handle the entire artwork of the label based on your wishes.

If interested please contact our Service Centre team who will be pleased to provide you with additional information (sci.seal.europe@parker.com). ■

Sealing technology in motion

New videos on product development and testing technology

Moving images and sound are a viable means of explaining complex subjects. Therefore, Parker-Prädifa is now presenting two exciting groups of topics in two recently published videos in a vivid and easy to understand form.

In the film titled **"Innovative Sealing Technology / Product Development"** Dr Manfred Achenbach, Manager Technical & Analytical Service and specialist for elastomers at Parker-Prädifa, guides viewers through the development and design process of various sealing solutions while providing basic information on sealing technology as well as materials and designs.

"Final Exam in Physics / Sealing Systems Put to the Test" is the motto of the video in which Thomas Papatheodourou, Technical Service Manager of the Packing Divison Europe, explains how the predicted properties of a seal design can be subjected to exacting performance tests using state-of-the-art test rig technology and simulation, how damage analyses are carried out and much more.

Each film is about 3-4 minutes long and has been produced in a German and an English language version. ■

www.parker-praedifa.com/video_GB.html
www.youtube.com/parkervideo

Parker People

- **New management for Southern European sales region: Stefano Comi assumes responsibility for South East Europe and Hakim Houhou for South West Europe**
- **Claudio Soccodato is new Market Manager for "Energy, Oil and Gas / Fluidpower at O-Ring Division Europe**
- **Stefan Reichle assumes role of Market Unit Manager "Industrials / Consumer Goods and Chemical Process Industry" at Packing Division Europe**

On 1 July 2011 **Stefano Comi** assumed the role of Regional Sales Manager for the South East Europe sales region based in Corsico, Italy. Comi joined the European Sales Group in 1991, initially working in inside sales and subsequently as an application engineer. Since October 2000 he was responsible for developing and strengthening the automotive market in South East Europe.
Stefano Comi earned his degree in mechanical engineering in Milan, Italy. Prior to joining Parker he worked as a design engineer for a company that manufactures electromechanical actuators and cylinders. His achievements at Parker include the patented design of a sealing solution (so called "bone seals") for HVAC connections.

Claudio Soccodato joined the Parker Seal Group as the O-Ring Division Europe's Market Manager Energy, Oil and Gas and Fluidpower on 15 November 2011. After successfully completing his studies of business administration with a major in marketing at the University for Applied Sciences in Offenburg, Germany, and earning an MBA from the University Carlos III in Madrid, Spain, Soccodato worked for a number of years as a sales engineer in Germany, Mexico and the United States and most recently held the position of a key account manager in a company with international activities.

Hakim Houhou assumed responsibility for the South West Europe sales region on 1 March 2012. Hohou joined Parker in 1990 as a sales engineer with responsibility for Paris and the north of France. After promotion to the role of Semiconductor Market Specialist in January 2002, he was instrumental in the successful deployment of the European Seal Group's strategy for the semiconductors market. From July 2005, he was responsible for cultivating the aerospace business as Market Specialist and thanks to his experience appointed as coordinator of all European key account managers for this market.
Hakim Houhou earned his engineering degree majoring in materials science from the Engineering School of Lille, France, in 1987.

Stefan Reichle assumed the role of Market Unit Manager Industrials / Consumer Goods / Chemical Process Industry at the European Packing Division on 1 March 2012. Reichle initially worked as an application engineer in the Automotive market segment and most recentlyas a development engineer in the Innovation and Technology function. After studying mechanical engineering at the Technical University Kaiserslautern, Germany, with a major in micro systems engineering and initial project work for Faulhaber, Opel, BMW and Daimler he gathered his initial professional experience as a doctoral student at BMW where as part of the project landscape in the field of chemical process technology he worked on the development of mobile fuel cells in automobiles at the German Aerospace Centre (DLR) and the Jülich Research Centre (FZJ). He subsequently continued his work at the FZJ as a research engineer before joining the Parker Packing Division Europe in January 2009 as a project manager and application engineer in the Automotive market unit. In this role he gathered extensive experience in the field of dynamic seals in automotive engineering applications. ■

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