

# SEALS

TECHNOLOGY



0113

客户杂志 *Magazine for customers and partners*



**High class  
sealing materials.  
RGD-proved.**

Sales and Services

High class sealing materials

Quality Benefits





亲爱的读者：

在第一季度即将结束之时，2013 年最新一期的 SEALS Technology 满载着众多新颖的全新产品和我们公司的相关信息如期呈现在您面前。

在几周之前，我们已经开始全力以赴地为我们将于四月举行的公司内部展会进行筹备工作。由于在全球范围内接收到大量的踊跃报名，因此我可以确定这次展会无疑是一个让人们非常感兴趣的活动。我已经迫不及待地期盼着在下一期刊物中对这次活动的盛况进行详细报道。因为当供应商需要跨越数千公里来维护其与客户之间的关系时，必须偶尔从侧面面对这种关系进行深入地观察。如果您无法亲临此次展会，我们仍欢迎您随时造访我们公司。

在本期 SEALS Technology 中，除了专业性主题外，我们还将以一次密封件订购为例介绍我们公司的工作流程。请参照连环画观察在从报价到交付的整个过程中所牵涉到的人员以及相应的工作步骤。

此外，您将看到有关我们为石油和天然气行业提供的 RGD 材料的最新信息。三种材料（两种不同的氢化丁腈橡胶和一种氟化橡胶）均已享有极高声誉的 MERL 研究院（三菱电气研究实验室）按照 NORSOK（挪威石油标准化组织）的相关规定进行了检验，并允许在要求苛刻的条件下使用这些材料。

另外让我感到非常高兴的是，我们在本期刊物中将有幸为您介绍 Seal Maker 的又一个成功的合作伙伴。“Central Hidráulica”在几年前已经成为我们在中美洲的客户。该公司在 2012 年购买了 SML 500e，由此使我们之间的合作更为密切，从而推动该公司在通向成功的道路上继续迈进。

作为“最后一个要点”，您将了解到我们公司内部的广告和 IT 有限公司的最新情况，该公司在几个月前已经成为一家完全隶属于 Seal Maker 的子公司，并已取得了初步的成功。

希望本期刊物的内容能够带给您愉快的心情！

您的  
Johann Glocknitzer

Dear readers,

to coincide with the end of the first quarter I'd like to present you with the newest issue of SEALS Technology 2013, filled with lots of interesting news and information about our company.

For several weeks now the preparations for our in-house exhibition, which will take place in April, have been in full swing. Thanks to the many international registrations we've already had I can promise that it is shaping up to be a very interesting meeting. I am already looking forward to reporting about it in more detail in the next issue because, especially when maintaining a supplier-customer relationship over thousands of kilometres, it is hugely important to look behind the scenes now and again. If you can't be here this time, you are of course very welcome to visit us any other time.

In this issue of SEALS Technology we have also tried to offer an insight into the workings of our company, using the example of the process involved in ordering a seal, alongside various specialist topics. Read our illustrated article to discover the people and the work procedures involved, from the offer to the distribution of a seal.

Further on you will also find the latest information on our RGD materials for the oil and gas industry. All three materials (two different H-NBRs and an FPM material) have now been tested by the renowned Institut MERL in accordance with NORSOK's relevant specifications and released for use under these demanding conditions.

I am also particularly pleased that in this issue we are able to introduce you to another of Seal Maker's successful partners. "Central Hidráulica" has already been a customer of ours in Central America for several years. With the purchase of an SML 500e in 2012 we were able to work together more closely and continue the company's successful journey.

And last but not least – read the latest news about our in-house advertising and IT company, which has been a 100% subsidiary of Seal Maker for several months now and is already showing initial positive results.

Happy reading!

Yours  
Johann Glocknitzer

## Central Hidráulica S.A. de C.V.

### 在通向成功的道路上！

Central Hidráulica S.A. de C.V. 是中美洲最大且最知名的一家密封件贸易公司，多年以来一直作为 Seal Maker 的合作伙伴和客户。自 2012 年四月起，该公司开始借助一套 Seal Maker CNC 成套系统 SML 500e 自行生产液压密封件和气动密封件。

该公司由 Don Hernán Galdamez 和他的两个儿子 Hernán Galdamez Q 和 Eric Galdamez 于 1997 年创办。Hidráulica 家族企业拥有 60 多名员工，目前已发展成为一家极具知名度的公司。安全、成功、节约、可靠和友好作为公司的基本原则确保了公司外部和内部良好的运作环境，并使公司保持良性发展的态势。

公司总部位于萨尔瓦多首都圣萨尔瓦多，业务范围覆盖了整个国家的三家分公司确保该公司在国内市场中居于领先地位，并确保公司可以最大程度地贴近客户。

Central Hidráulica S.A. de C.V. 的主营业务包括三大领域：

- ▶ 生产液压密封件和气动密封件
- ▶ 生产液压缸
- ▶ 销售液压组件。

液压密封件和气动密封件的生产被视为该公司的核心竞争力。该公司在市场上不断推出自己的创新和研发成果。其中的一个例子便是采用金属外壳和聚四氟乙烯芯子的高压轴密封圈。借助该密封圈可以使泵以及液压马达取得最佳的工作成效。特别让 Galdamez 先生感到自豪的是由公司新研发出的软件“Software Price Seal”；该软件使得密封件贸易公司可以自动计算机加工密封件的价格。

由于占据了优越的地理位置，Central Hidráulica S.A. de C.V. 在三个毗邻的国家（危地马拉、洪都拉斯和尼加拉瓜）也拥有众多客户。公司在本年度内计划新增两个分公司和 6 个新商务代办处；通过建立覆盖整个区域的销售网络，公司将在不久的将来成为中美洲最大的机加工密封件制造商和贸易商。

“使用全新的 SML 500e 和 Seal Maker 所提供的工具和半成品保障了最高的品质和稳定性。相互之间完美协调统一的 Seal Maker 成套系统不论在技术方面，还是在经济性方面都带来了最佳的收获。客户对我们的肯定让我们坚信，与 Seal Maker 的合作将我们引向通向成功的道路。”

引语，Eric Galdamez, Central Hidráulica S.A. de C.V., 2013 年 2 月

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### On the road to success!

Central Hidráulica S.A. de C.V., one of the largest and most well-known seal distributors in Central America, is a long standing partner and customer of Seal Maker. Since April 2012 the company has been producing its hydraulic and pneumatic seals with the help of a Seal Maker CNC Complete System SML 500e.

The business was founded in 1997 by Don Hernán Galdámez and his two sons Hernán Galdámez Q and Eric Galdámez. With more than 60 employees, the Hidráulica family has grown into an impressive business. Safety, success, efficiency, reliability and friendship are factors which ensure a positive atmosphere, both externally and internally, and help keep the company on an even keel.



The company headquarters are in San Salvador, the capital of El Salvador, while three branches in various locations in the rest of the country ensure a strong presence on the local market and guarantee optimum customer proximity.

Central Hidráulica S.A. de C.V.'s range comprises three main areas:

- ▶ The production of hydraulic and pneumatic seals.
- ▶ The production of hydraulic cylinders.
- ▶ The sale of hydraulic components.

The production of hydraulic and pneumatic seals is the company's core competence. Innovations and new developments are continually being brought onto the market, for example the high pressure rotary shaft seals with metal housing and PTFE core. Excellent results can be obtained with the help of these sealing rings, which come with both pumps and hydraulic motors. Mr Galdámez is particularly proud of the company's newly-developed "Price Seal" software which offers seal distributors the possibility of automatically calculating prices for turned seals.

Thanks to its favourable geographical location, Central Hidráulica S.A. de C.V. also has many customers in its 3 neighbouring countries of Guatemala, Honduras and Nicaragua. Still to come this year is the setting up of two further branches and the recruitment of 6 new sales representatives while the development of an extensive sales network will soon make the company the largest manufacturer and distributor of turned seals in Central America.

"Using the new SML 500e and the application of the tools and semi-finished products from Seal Maker guarantees high quality and stability. Seal Maker's perfectly compatible complete systems deliver excellent technical and economical results. The positive feedback from our customers convinces us that with Seal Maker as our partner we are on the right track."

Quote, Eric Galdámez, Central Hidráulica S.A. de C.V., February 2013

# New RGD materials

随着新矿层的开辟，石油和天然气行业开始向环境越来越恶劣的地区挺进。人们需要能够适应使用地的诸多影响以及新的原料开采技术的更为耐用的密封材料。Seal Maker 越来越多地致力于研究和开发能够经受极度恶劣条件的材料。除了比较材料相关特性参数和考虑稳定性表格外，在设计密封件时还需具备必要的经验。

The opening up of new deposits means that the oil and gas industry is now penetrating areas where ever more extreme conditions prevail. More robust seal materials, which are able to deal with both the factors on site and the new techniques of raw material extraction, are needed. Seal Maker is increasingly investing in the research and development of materials which can withstand these challenging conditions. In addition to comparing material-specific figures and consulting resistance tables, some experience is also necessary when designing seals:



## 压力

可能的温度范围从 -45° C 到 200° C 以上。压力可能达到几百巴。视地区不同，原油含有差异迥然的化学物质和气体，有时这些化学物质和气体具有极强的腐蚀性。这为材料科学提出了一个极大的挑战，因为可用的材料越来越多地达到其极限，而无法在这样的环境下经受住考验。在这种情况下密封失效是一个非常棘手的问题，因为密封件更换非常耗时且成本极其高昂。

在近海应用中人们已熟知“快速释压” (Rapid Gas Decompression, RGD) 的现象。该问题出现的原因在于，在特别高的压力下，气体分子扩散到弹性体中，并在聚合物基中分离。在出现快速释压时，这些气体会形成气孔并发生膨胀 - 这种效应类似于在打开碳酸饮料的瓶盖时出现的起泡现象。在这种情况下形成的气孔使材料膨胀至应变极限，导致出现裂缝。

## 温度

在高温条件下，不仅会导致材料膨胀程度加强，而且会导致化学作用的反应速度加快。可以针对快速释压应用对不同的弹性体类型进行优化。在这里，非常常见的弹性体类型主要是氢化丁腈橡胶 (HNBR)，因为该弹性体类型凭借其特性具备良好的 RGD 稳定性和良好的硫化氢耐受性。

但只是在温度不超过 150° C 的情况下。为了可以适用于较高的温度范围，往往使用含氟弹性体 (氟化橡胶)。含氟弹性体可以在 210° C 的温度条件下持续使用，由于含氟，所以具备极佳的化学稳定性。然而在这里，其机械特性不及 HNBR。

## PRESSURE

The possible temperature ranges extend from -45°C to over 200°C. Pressures of several hundred bar are possible. Depending on the region, crude oil contains various chemicals and gases, some of which are very aggressive. These represent a particular challenge for material science, since the available materials are increasingly reaching their limits and can no longer withstand these conditions. Seal failure is a huge problem here, as replacing the seal can be extremely complex, time-consuming and also very expensive.

In offshore applications the phenomenon of a sudden decrease in pressure (rapid gas decompression, RGD) is well-known. The problem lies in the fact that under pressure, and particularly under high pressure, gas molecules diffuse in the elastomer and dissolve into the polymer matrix. With a sudden decrease of pressure, these gas molecules form gas bubbles and expand - the effect is comparable with the formation of bubbles when opening carbonated drink bottles. The resulting gas bubbles can stress the material to its limits and cause tears.

## TEMPERATURE

High temperatures can cause the material swelling to intensify or the reaction rate of a chemical attack to accelerate. Different elastomer types which are suitable for RGD applications can be made. Hydrogenated Nitrile Butadiene Rubber (HNBR) is especially common because when evaluated against the characteristics spectrum, it displays very good RGD stability as well as good resistance to hydrogen sulphide.

However this only allows maximum temperatures of 150°C. To be able to operate at higher temperature ranges, fluorine elastomers (FPM, FKM) are frequently used. These have a usual operating temperature of 210°C and, thanks to their fluorine percentage, very good chemical stability. However their mechanical characteristics do not match those of HNBR.

## FEEDBACK

我们的研发团队感谢您的反馈。请把您的经验、需要和想法告诉我们：  
office@seal-maker.com

Our R&D team would appreciate your feedback pertaining to our products. Please let us know your experiences, suggestions and wishes:  
office@seal-maker.com

## 稳定性

为了可以模拟快速释压时的损坏机理并进一步研究对密封材料产生的影响，研发出了 Norsok M710 试验标准。

为了检查一个弹性体在周期性快速释压条件下的稳定性，在一个压力室内使用甲烷和二氧化碳的混合气体从四面对 O 形环进行冲刷，并通过压力和温度变化对其施加作用。在规定的仓储期过后，以指定的减压比率进行一次可控的释压。此循环通常重复十次。接着，O 形环被分割为四段，并根据指定的评价表评估截面的损坏（裂缝、气孔、...）。

### RGD (快速释压) 测试的常规试验条件

测试气体:	10% CO <sub>2</sub> / 90% CH <sub>4</sub>
温度:	100° C
压力:	150 bar
释压:	20 bar/min
周期:	10

除了 RGD 测试外，Norsok M710 中还介绍了用于评估化学稳定性的方法。酸性气体在这里具有特别重要的意义。在这里，试样在不同的温度条件下暴露在由硫化氢、甲烷和二氧化碳构成的混合气体中，并在不同的接触时间后确定试样机械特性的变化。最终通过阿伦尼乌斯定律可以评估弹性体在不同条件下的使用寿命。

化学稳定性由基体聚合物的化学结构所决定。视聚合物类型的组合以及接触流体不同，存在两种影响乃至损坏材料的机理可能。一方面，分子可以嵌入聚合物基内，并导致材料膨胀，从而破坏材料的机械特性。除了膨胀效应外，在材料与介质不相容的情况下，还会导致聚合物链的化学分解。这会导致材料失去机械特性。

## 已通过测试!

“每种密封材料的化学组成决定了其具有一定的极限。高明之处在于针对所需的应用目的找到理想的化学组成”，Seal Maker 负责研发的化学研究人员 Markus Gossmann 解释说。

由此，Seal Maker 研发出三种可以成功通过 RGD 测试的材料：

- ▶ HNBR HN900-B85-RGD
- ▶ HNBR HN901-B85-RGD-LT
- ▶ FPM F800-B85-RGD

这三种材料均已享有极高声誉的 MERL 研究院 (三菱电气研究实验室) 按照 NORSOK (挪威石油标准化组织) 极其苛刻的要求进行了检验，Seal Maker 由此得到 MERL 研究院颁发的测试证书。



## RESISTANCE

The NORSOK M710 test standard was developed in order to simulate the damage mechanism in RGD and to examine the effects on the seal material more closely.

To examine the stability of an elastomer in cyclic RGD, O-rings are exposed to a mixture of methane and carbon dioxide in a pressure chamber and subjected to pressure and temperature. After a specified storage time a controlled pressure release with a defined decompression rate takes place. This cycle is usually repeated ten times. Finally, the O-rings are cut into four segments and the damage to the cut sections (tears, blisters...) is evaluated using a predetermined evaluation scheme.

### Usual test conditions for the RGD test

Test gas:	10% CO <sub>2</sub> / 90% CH <sub>4</sub>
Temperature:	100° C
Pressure:	150 bar
Decompression:	20 bar/min
Cycles:	10

Procedures for evaluating chemical stability are also described in NORSOK M710 alongside the RGD test. The acid gas test is particularly relevant. For this, test bodies are exposed to a mixture of hydrogen sulphide, methane and CO<sub>2</sub> at different temperatures and the changes in the mechanical characteristics are determined according to different contact times. Using the Arrhenius approach it is finally possible to measure the lifespan of elastomers under different conditions.

The chemical resistance is given by the chemical structure of the base polymer. Depending on the combination of the polymer type and the contact fluid, there are two possible mechanisms through which the material can be affected and subsequently also damaged. On the one hand, molecules in the polymer matrix can embed themselves and lead to material swelling, which causes the mechanical characteristics to deteriorate. As well as the swelling effect, if the material is incompatible with the medium, this can result in a chemical degradation of the polymer chains. This leads to damage to the mechanical characteristics.

## TEST PASSED!

"Certain limits are set for each seal material on the basis of its chemical composition. The art lies in finding the ideal composition for the desired application", explains Markus Gossmann, chemist with Seal Maker responsible for development.

Seal Maker has therefore developed three materials which successfully passed the RGD test:

- ▶ HNBR HN900-B85-RGD
- ▶ HNBR HN901-B85-RGD-LT
- ▶ FPM F800-B85-RGD

All three Seal Maker materials were tested against the strict NORSOK requirements and awarded with the test certificate from the prestigious Institute MERL.



# Sales and Services

## 灵活而快速地找到适用的密封件!

为了尽可能缩短从厂方到客户的交付时间，需要采取一个非常通畅的流程。凭借现代化的生产工艺，我们可以针对广泛的密封应用提供最佳的产品和解决方案。Seal Maker 让人们了解了从半成品到成品密封件的整个过程。

## Finding the right seal – flexibly and quickly!

Keeping the delivery time from the factory to the customer as short as possible requires a series of smooth process cycles. Our modern production technology puts us in the ideal position to handle a broad spectrum of seal applications. Seal Maker offers an insight into the stages a seal goes through, from the semi-finished product right up to the finished seal.

1.

根据客户需要制订相应的流程。

An appropriate quote is provided at the customer's request.



2.

销售内勤部门得到一宗密封件生产的客户订单。

The internal sales team logs a customer order for seal production.



3.

完美密封件的生产从选择最佳的原材料开始。在工作准备阶段制订半成品的仓库提货文件，同时，销售部向客户确认供货期限。

The manufacturing of the perfect seal begins with the selection of the most suitable raw material. In the production planning department the stock withdrawal documents for the semi-finished product are provided, while the sales department sends a confirmation of the delivery date to the customer.



4.

在 Seal Maker，数千种货品可以根据需要随时调配。先进的垂直升降货柜设备简化了仓库提货的工序。

Thousands of articles are available on demand at Seal Maker. The Lean Lift plant is used to shorten the work steps during stock withdrawal.



5.

由于存在众多高品质材料可供选择，所以我们可以专门针对您的使用条件提供最佳解决方案。业务订单一经签发，半成品随即到达生产部门。

A large selection of high-quality materials provides the ideal solution for your specific operating conditions. Once the order has been issued, the semi-finished product arrives for manufacturing.



6.

这时将通过 Seal Maker 的 CNC 成套系统快速而经济地对半成品进行再加工。

The semi-finished product is processed further, quickly and efficiently, using the Seal Maker CNC Complete System.



7.

在几分钟内可使用： 液压密封件和气动密封件以及各种定制的塑料件。在 SML 系统软件的数据库中可调用将近 150 种标准型材，可能直接符合客户的个性化要求。

Ready within a few minutes: hydraulic and pneumatics seals as well as various made-to-measure plastic parts. Almost 150 standardised profiles are retrievable from the SML system software's database and can easily be adapted to individual customer's requests.



8.

从我们公司发出的每个密封件均经历过多次质量检验。

Each individual seal, leaving our company, goes through repeated quality controls.



9.

在短短几小时内，产品抵达发货部门，接着以最快捷的方式直接发送给客户。

Within only a few hours the product arrives in the despatch department and is finally delivered as quickly as possible to the customer.



# Quality Benefits

Seal Maker 始终致力于改良现有材料以及开发新材料，以便尽可能满足我们客户在所有应用领域中的需求。用于生产橡胶半成品的一个重要设备是蒸汽高压锅。在这个超大尺寸的高压锅内对原料混合物进行硫化处理，从而使原料混合物获得相应的机械特性，这些机械特性对于密封件来说至关重要。

在 2012 年 10 月，材料研发部门和质量保障部门开始着手于“高压锅”项目。在此期间，所有控制硬件被一个全新的单元取代。接着由我们公司内部的编程和技术部门顺利完成了控制软件的编程和电路图的编制。在 2013 年 2 月中旬，该高压锅成功投入使用。

## 优点汇总：

- ▶ 通过精确的过程控制达到质量的改善。
- ▶ 对测量值进行持续记录和图形显示。
- ▶ 可以简单地更改配方。
- ▶ 通过电子邮件通知重要信息和警报。
- ▶ 通过远程访问读取测量值实现便捷的过程监控。

Seal Maker constantly works on improving its existing materials and on creating new materials in order to provide for as many of our customers' areas of application as possible. An important piece of equipment for the production of semi-finished rubber products is the steam autoclave. In this oversized pressure cooker, the raw mixture is vulcanized, which gives it the mechanical characteristics which are essential for a seal.

In October 2012 the material development and quality assurance departments launched the “autoclave” project. In the course of this project, all the control hardware was replaced by a new unit. This was followed by the programming of the control software and the production of the connection diagrams with the help of our internal programming and technical departments. In mid-February 2013, the autoclave was successfully put into operation.

## An overview of its advantages:

- ▶ An improvement in quality thanks to a more accurate process control.
- ▶ On-going recording and graphic representation of the measured values.
- ▶ The formulas can easily be changed.
- ▶ Notification of important information and alarms by email.
- ▶ Simple process monitoring – read off the measured values via remote access.



MEMBER OF SEAL MAKER GROUP  
**LOGORHYTHMUS**<sup>®</sup>  
 AGENTUR FÜR WERBUNG UND IT

## 这样的“节奏感”是否令人满意呢？

去年 11 月，我们公司内部的广告代理发生了变化。由“c-more”更名为“LOGORHYTHMUS”的公司是一个完全隶属于 Seal Maker 的子公司。软件和 IT 专家、网络专家、广告和设计专家 - LOGORHYTHMUS 是一支在广告和 IT 领域非常老道干练而又富有活力的团队。由此我们将自己在广告和 EDV（电子数据处理）方面的专长结合在一起，为邻近的中小型企业提供服务。

### LOGORHYTHMUS 正式联网！

这一全新网站于二月中旬正式顺利联网。作为进一步的大众传播手段成功建立了可以与该地区 3000 家潜在客户企业联系的定向邮件系统，从而引起人们的高度关注。

## Need to communicate?

Last November we made some changes to our in-house advertising agency. “c-more” was renamed “LOGORHYTHMUS” and is now a 100% subsidiary of Seal Maker. LOGORHYTHMUS is a dynamic team of software and IT specialists, web experts and advertising and design professionals with a keen understanding of advertising and IT. LOGORHYTHMUS allows us to combine our advertising and IT competencies and offer our services to small and medium-sized local enterprises.

### LOGORHYTHMUS goes online!

Our new website at [www.logorhythmus.at](http://www.logorhythmus.at) was launched in the mid-February. An eye-catching direct mailing was also sent to 3000 potential companies in the region.