



VICTOR REINZ®

Sealing Products



Shielding Systems

Advanced Shielding Technology – Challenges and Solutions



Victor Reinz® shielding systems – top quality products for tailor-made solutions



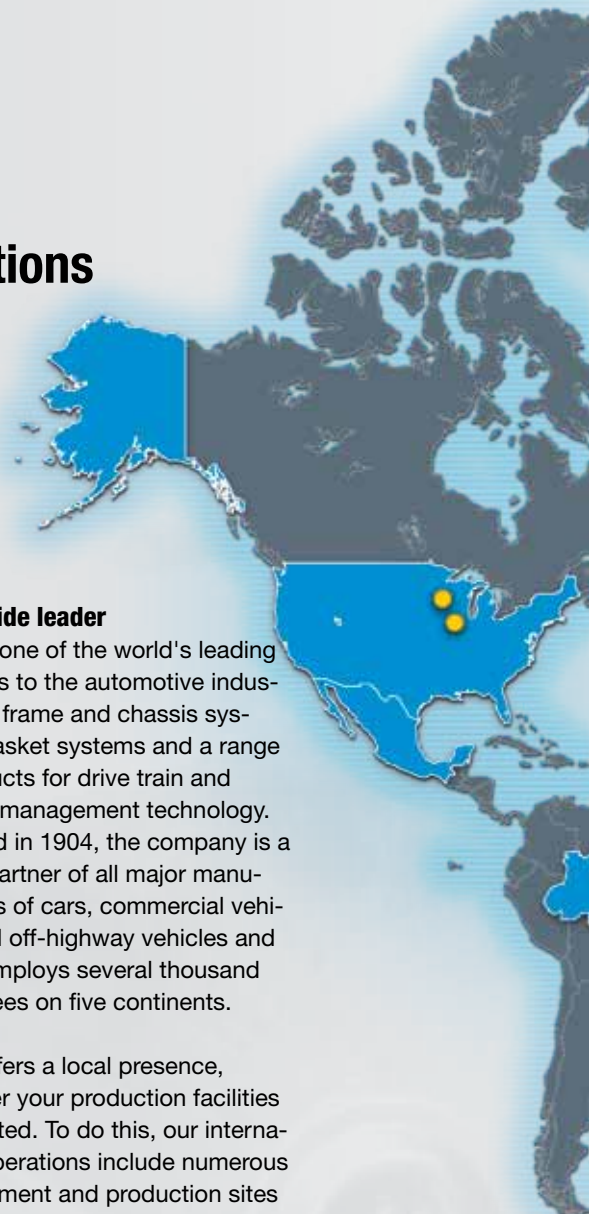
For more than 25 years, the name Victor Reinz has stood for professional shielding systems in the automotive sector. Dana is now continuing this tradition by driving forward the development of innovative solutions designed to help boost efficiency and reduce emissions in the latest generations of vehicles.

The result: top-quality and highly durable shielding systems which can be flexibly adapted to every installation location and combine multiple functions in a single unit. They offer optimum thermal and acoustic protection and can be used as supports onto which attachment parts can be mounted, as well as for protection against various media. Visible elements can also add styling touches.

Worldwide leader

Dana is one of the world's leading suppliers to the automotive industry, with frame and chassis systems, gasket systems and a range of products for drive train and thermal management technology. Founded in 1904, the company is a global partner of all major manufacturers of cars, commercial vehicles and off-highway vehicles and today employs several thousand employees on five continents.

Dana offers a local presence, wherever your production facilities are located. To do this, our international operations include numerous development and production sites with modern, flexible and highly automated production facilities and boast numerous experienced and extremely competent teams of experts. This allows us to respond quickly and individually to your requirements and supply the best possible quality at a competitive price, with short communication and delivery paths.



Contents	4	First time – right design
	6	Production
	8	Product overview
	10	BaseTEC
	11	ReTEC
	12	ProTEC
	13	BiTEC
	14	NaTEC
	15	Attachment parts



Tailor-made solutions

In order to find a shielding system which perfectly meets your needs, we will offer our consultancy services and accompany you all along the way from the first idea to the final product. To do this, we will become a smoothly integrated part of your production processes and offer tailor-made performance – with close-to-series prototype production, virtual and

real testing methods, state-of-the-art production facilities, intelligent quality management and efficient logistics. To gain an initial overview of the many different potential applications of Victor Reinz shielding systems and their benefits, please turn to page 8 in this brochure.

Of course, we are also happy to offer personal assistance if you require more information. Every day, we give our best to ensure that we deliver first-class, innovative products so that we can make anything possible for you – today and in the future.

Victor Reinz – redefining performance

- Integrated system competence across the entire development and production process
- Top-quality products with maximum process reliability
- Global organization structure under the umbrella of Dana
- Globally standardized access to services for consultancy, development, production, logistics and servicing

"First time – right design" – the direct path to optimum design



▲
3-D CAD design

As an experienced and successful partner to the automotive industry, we have been working for decades hand-in-hand with vehicle manufacturers and suppliers. As a result, our working processes are perfectly fine-tuned to the high demands of the industry, and they combine maximum flexibility with

the highest possible efficiency. In order to develop a design to series maturity in the shortest possible time, our application engineers work together with developers, designers, design planners and quality planners, logistics specialists and purchasers right from the start. In this way, the full range of

expertise from all of the technical departments and suppliers who are involved can be combined. Unnecessary diversions and distractions in the individual product development phases can thus be consistently eliminated. At Dana, we call this: "First time – right design."

Step-by-step to the ideal shielding system

1 Determination of individual requirements

We place particular emphasis on close contact with our customers. Here, the earlier we can get together and exchange ideas, the better. We can already help you to save time and money during the design phase, and we can also advise on options for efficient integration of additional functions.

2 Forward-thinking design

We can implement standard applications quickly and inexpensively on the basis of empirical data. Already during the design phase, we will also think about the assembly sequence on the production line, servicing requirements, optimum packaging and disposal.

▶
FEA analysis

▶▶
Hot gas test bench

▶▶▶
Infrared analysis

▶▶▶▶
Prototyping



3 Effortless integration in 3-D worlds

Our shielding systems will fit perfectly into your 3-D CAD world. We speak the same language as your design engineers and can provide them with all of the required geometry data in their preferred data format – e.g. for CATIA, Pro/ENGINEER, IDEAS and Unigraphics.

4 Taking advantage of virtual test methods

With the aid of powerful FEA programs like press molding simulation, modal analysis and harmonic and thermal analysis, we can already reliably test the quality of potential systems and components on the computer. This massively reduces development time and saves costs.

5 Close-to-series prototype production

Right from the start, our inexpensive and quick-to-produce prototypes are comparable to the subsequent series production quality.

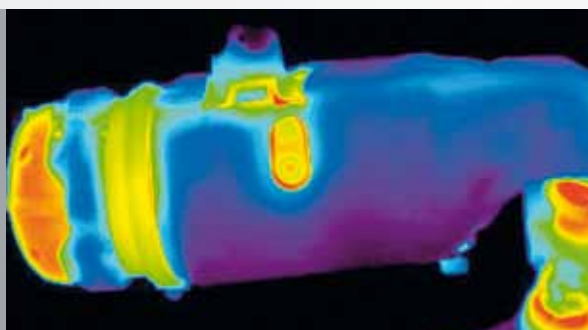
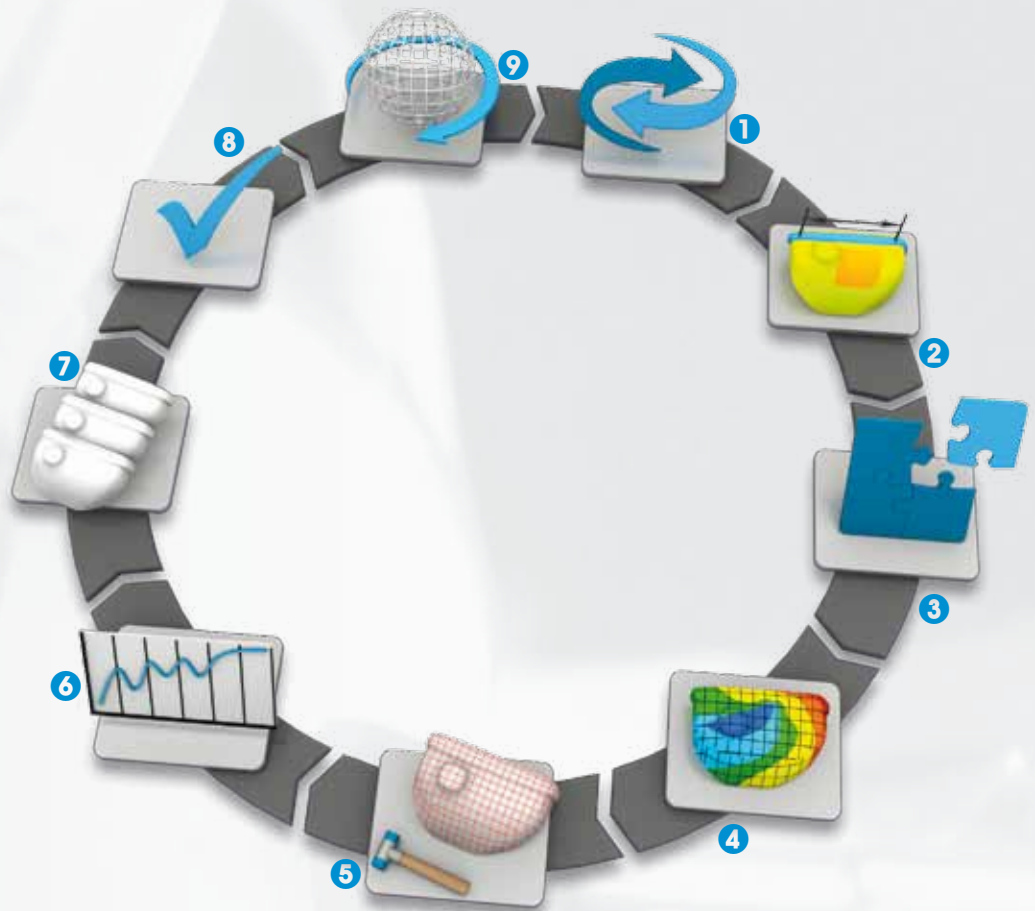
Among other things, this allows you to perform reliable tests on-site, set up fast production of

small-volume series production runs and implement a smooth transition from the construction of prototypes to series production.

6 Testing under ideal conditions

Around the world we have access to 20 of our own dynamometers, along with several chemical and

physical testing laboratories in our development centers. In order to optimize the trialing phase, you can for example take advantage of our long-term durability tests and thermal/acoustic analysis tests.



Production

– the ideal design concept for any production volume



7 Modern and flexible production

Dana offers development and production sites all around the world with modern, flexible and highly automated production methods. Our production has a modular structure based on individual production islands – this increases the overall productivity of our plants and guarantees that we can always offer you good value for money.

Our tool concepts are also particularly flexible and can be efficiently matched to the production volume – from low-volume small series production to mass-produced parts.



8 High-quality series production

Even after series release, our intelligent quality management systems ensure that our shielding systems are always manufactured in perfect quality. Every day, our employees do their best to ensure that, in the future, we can continue to live up to the trust which has been placed in Victor Reinz for decades.

9 Hand-in-hand delivery to the production line

Dana will supply your shielding systems packaged ready for installation "just in sequence" to the production line. To do this, we use logistics tracking systems like DDL, CMMS3 and eCAP and optimize all of our packaging in terms of commercial, environmental and logistical aspects.

▲ *One special feature of our production is the all-around edge protection which offers increased stability and eliminates risk of injury during installation.*

Customer awards and certifications attest to our high quality standards.

- GM Supplier of the Year
 - Volvo Cars Award of Excellence
 - Spirit of Innovation
 - Ford Supplier Design Engagement
 - PSA Suppliers' Award – Innovation
 - PACCAR Preferred Supplier
 - Toyota 2010 Certificate of Recognition
-
- ISO/TS 16949: including DIN EN ISO 9001 as well as specific customer requirements from all major manufacturers
 - DIN EN ISO 14001
 - OHSAS 18001
 - Steinbeis Initiative "Kunden bewerten Lieferanten" (Customers Assess Suppliers)


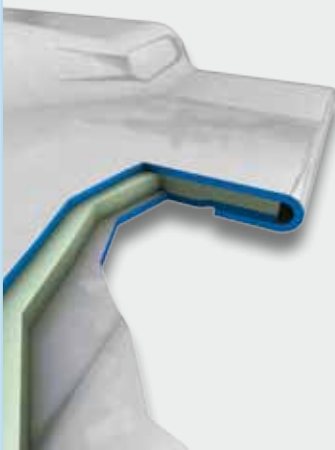


A coordinated shielding system – the perfect solution for every application

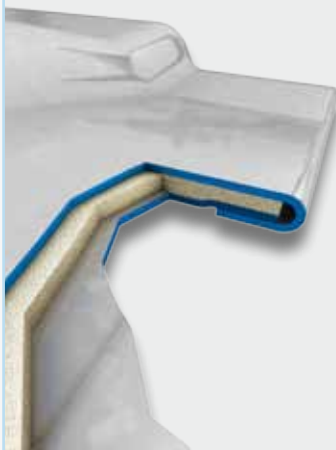
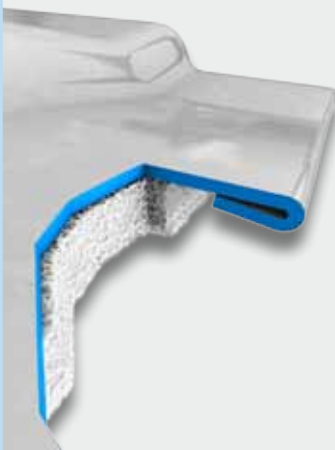



Our product lineup ranges from high-performance one, two or three-layer shielding systems to innovative, direct-insulating and noise-absorbing technologies. The choice of the particular system which is best suited to your individual requirements depends on the intended installation location and the required function. With the aid of the table below, you can directly compare the key features of our shielding systems. Detailed information about the individual products can be found on the next pages.

Our experts are also on hand and happy to help answer any queries in person. You can rest absolutely assured that we will supply you with the perfect shielding system for your requirements.

Technology	BaseTEC	ReTEC	
			
Structure	One layer of metal or two layers of metal	Two layers of metal with fiber board inlay	
Thermal shielding effect	++	+++	
Maximum application temperature (exhaust gas)			Depending
Noise reduction	+	++	
Vibration resistance	++	+++	
Weight	+++	++	
Recyclable	+++	++	



ProTEC	BiTEC	NaTEC
		
Two layers of metal with mica inlay	Metal layer + direct-insulating fiber mat on the inside	Absorbent, micro-perforated metal layer with embedded noise-absorbing fiber mat + outer shell
+++	+++	+++
g on the material composition: up to 1,100°C		
++	+++	+++
+++	+++	+++
++	+++	++
+++	++	++

The right material for every application

Numerous parameters of our Victor Reinz shielding systems can be fine-tuned to flexibly adapt them to your requirements, and this will allow you to individually influence their performance capability and cost-effectiveness. Depending on the system, you can often choose between a variety of metal layers and insulating materials made from different material qualities and thicknesses. In addition, a wide range of attachment parts can be added as an efficient way to upgrade any system and minimize packaging space requirements in the vehicle.

All of the materials used in Victor Reinz shielding systems satisfy the relevant requirements of the European Directive on end-of-life vehicles and the generally applicable environmental requirements.

The perfect combination for any requirement

Of course, all Victor Reinz shielding systems and attachment parts can be easily combined with each other. The perfect shielding system for your application.

BaseTEC

– cost-effective and reliable basic protection



Application locations

- Vehicle areas with reduced vibration loads and moderate shielding demands – such as the underbody area or the bulkhead, but also the areas around the manifolds and turbochargers

Properties and options

- Structure: Metal only, in a single or double layer; two-layer option delivers improved damping and increased rigidity
- Optionally smooth or dimpled; the dimpled surface option increases basic rigidity and allows material thicknesses to be reduced
- Optionally available with a partial or all-around edge protection for greater safety
- Metal quality: Deep drawing sheet steel panels with hot-dip aluminium coated or aluminium-plated surface, stainless steel or aluminium



Structure

- Metal thicknesses 0.15 – 1.2 mm
- Edge protection

Advantages

- Low unit costs
- Low tool costs
- Variable material profile
- Fast realization
- Low weight

ReTEC

– the globally successful sandwich solution



Application locations

- Perfectly suited to all applications with tough operational demands
- Areas with a high shielding effect – e.g. manifolds or turbochargers – which are also subject to high vibrational loads

Properties and options

- Structure: Tried and tested sandwich construction with two layers of metal and a fiber board inlay
- Metal quality: Deep drawing sheet steel panels with hot-dip aluminium coated or aluminium-plated surface, stainless steel or combined materials
- Inlay quality: heat-resistant and variable according to the requirements profile

Advantages

- Very good damping properties and long-term stability under load (high vibration loads)
- Sandwich construction for increased rigidity
- Highly temperature-resistant
- High cost efficiency



Structure

- Sandwich construction
- Metal cover layers 0.15 – 0.6 mm
- Internal fiber board inlay (standard: 0.7 mm)

ProTEC

– the environmentally aware sandwich solution



Application locations

- Perfectly suited to all applications with tough operational demands
- Areas with a high shielding effect – e.g. manifolds or turbochargers – which are also subject to high vibrational loads

Properties and options

- Structure: Sandwich construction with two layers of metal and a mica inlay
- Metal quality: Deep drawing sheet steel panels with hot-dip aluminium coated or aluminium-plated surface, stainless steel or combined materials
- Inlay quality: Mica is a natural product which is installed as a flat, binder-free inlay. It is even more thermally stable than fiber board and better at absorbing vibrations. The contour of the inlay can be freely designed.



Structure

- Sandwich construction
- Metal cover layers
0.15 – 0.6 mm
- Mica inlay
(standard: 0.7 mm)

Advantages

- Very good damping properties and long-term stability under load (high vibration loads)
- Sandwich construction for increased rigidity
- Very high temperature resistance
- High cost efficiency at large production volumes
- No outgassing under the effects of high temperatures (zero emissions)
- Fully recyclable

BiTEC shielding systems

– direct insulation and encapsulation

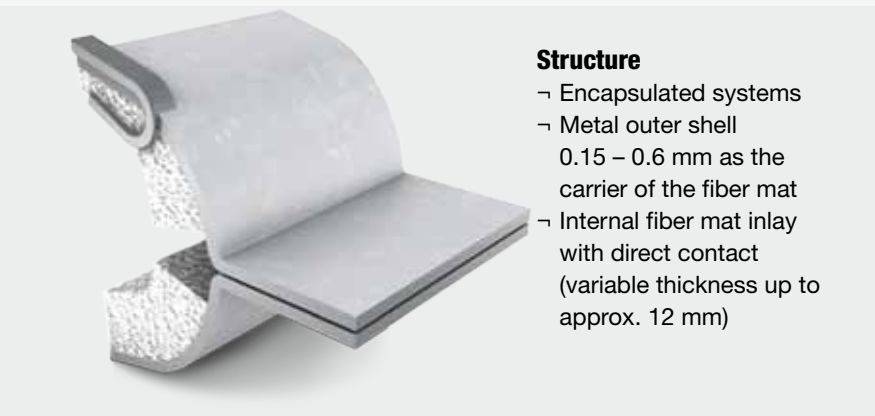


Application locations

- Highly efficient thermal shielding of hot components in the area of the engine and exhaust system
- E.g. on the catalytic converter and on downstream purification systems for compliance with the latest exhaust emissions regulations

Properties and options

- Structure: Composite structure comprising an internal fiber mat and a metal covering layer. It is installed with full contact directly onto the component which is to be shielded, without separate screwing points
- Metal quality: Deep drawing sheet steel panels with hot-dip aluminium coated or aluminium-plated surface, stainless steel, aluminium; optionally available with a dimpled surface for increased basic rigidity and reduced material thicknesses
- Fiber mat inlay quality: Various types of fiberglass mats or ceramic fiber mats for extremely high-temperature applications



Structure

- Encapsulated systems
- Metal outer shell 0.15 – 0.6 mm as the carrier of the fiber mat
- Internal fiber mat inlay with direct contact (variable thickness up to approx. 12 mm)

Advantages

- Reduction of emissions through faster heat-up times
- Reduced thermal losses in start/stop mode and in hybrid mode
- Low space requirements
- No conventional fastening with screws/bolts required – multiple alternative mounting concepts are possible (flanging, welding, clinching, etc.)
- Noticeably reduced transmission of vibrations
- Reliable protection against escaping flammable fluids and gases
- Improved sound insulation

NaTEC shielding systems

– sound-absorbing for additional noise protection

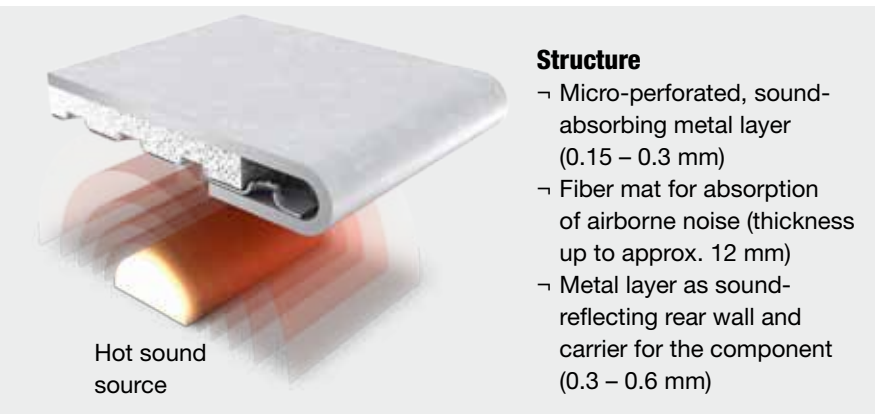


Application locations

- Applications requiring acoustic absorption in addition to thermal shielding
- E.g. manifolds and turbo-chargers

Properties and options

- Structure: Sandwich construction with two metal layers and inlay; micro-perforated metal layer facing the sound source, fiber mat for absorption of airborne noise and a sound-reflecting outer metal layer
- Two variants:
 - Variable and made to measure for optimized sound absorption; structure formed from separately molded inner and outer shells
 - Cost-effective sandwich construction with a constant thickness of up to 3 mm



Structure

- Micro-perforated, sound-absorbing metal layer (0.15 – 0.3 mm)
- Fiber mat for absorption of airborne noise (thickness up to approx. 12 mm)
- Metal layer as sound-reflecting rear wall and carrier for the component (0.3 – 0.6 mm)

- Metal quality: Deep drawing sheet steel panels with hot-dip aluminium coated or aluminium-plated surface, stainless steel or aluminium
- Fiber mat inlay quality: Fiberglass mats in various designs and thicknesses (depending on the requirements profile)

Advantages

- Delivers the performance of a conventional heat shielding system plus excellent sound absorption
- Flexible adaptation of metal panels, fiber mats and spacing to the sound source for tailor-made sound absorption

Attachment parts – small parts for complex systems

Victor Reinz shielding systems can be configured with numerous attachment parts and functional connections to peripheral components to individually adapt them to any vehicle-specific requirements. This guarantees perfect seating, adds functionality and reduces the overall packaging space required for the components, perfectly in tune with our "Advanced Shielding Technology" philosophy.

Range of available elements

- Brackets
- Rivet nuts, punched nuts and beaded nuts
- Setscrews
- Captive screws
- Damping elements
- Integrated flange gaskets
- Spacer sleeves
- Push-type clamps
- Retaining clips
- Cable clips
- Reinforcing washers
- Sliding seats
- Fabric
- etc.

Advantages

- Optimally matched, high-grade attachment parts
- Large selection with many combination options
- Increased stability, added functionality and improved long-term durability
- Efficient use of available mounting space



▲ Retaining clip



▲ Integral vibration damper



▲ Integral flange gasket with ThermoGlide™ coating



SPICER®

Drivetrain Products

Axles
Driveshafts
Off-highway transmissions

VICTOR REINZ®

Sealing Products

Gaskets
Valve cover modules
Thermal/acoustic shielding systems

LONG®

Thermal Products

Transmission oil coolers
Engine oil coolers



About Dana Holding Corporation

Dana is one of the world's leading suppliers to the automotive industry, offering drive train components, gasket systems and thermal management products. The company is a global partner of all major manufacturers of cars, commercial vehicles and off-highway vehicles. The company was founded in 1904 and today employs several thousand employees on five continents.

What can Dana do for you?

Dana supplies top-quality product solutions in three core areas of vehicle technology – i.e. drive train components, gasket systems and thermal management technology. For vehicle manufacturers, the ability to source all of this technology from a single supplier offers the ultimate in global flexibility – whether in key automotive centers or in new markets – and ensures that the products are kept up-to-date with the state of the art and are appropriately adapted to the relevant markets. With technology centers all around the world, the Dana engineers have access to the best possible resources for development, design and manufacturing, and this allows them to satisfy all of our customers' individual requirements. Thanks to this close cooperation, Dana is able to manufacture everything from sophisticated individual parts to fully integrated modular systems.

Power Technologies Group

REINZ-Dichtungs-GmbH

Reinzstraße 3-7

89233 Neu-Ulm

Germany

www.reinz.com



VICTOR REINZ®

Sealing Products