SUPPLIER BULLETIN

PARTNER EDITION

GRENADIER

INEOS

AUGUST 2021

CONTENTS

PROCUREMENT & SCM DIRECTOR

OLIVER FRILLE

Dear Partners,

I am delighted to share the second edition of our Supplier Bulletin.

When we started our journey and entered the automotive market back in 2017, I spent a good portion of my time explaining that we are a credible, serious automotive company. Now, four years later, we are publishing our PARTNER EDITION and we have a robust ecosystem of committed partners. The passion for the Grenadier we see in your organisations makes us immensely proud.

As our supply network has matured over the last few years, we have made real progress in our overall business model. We will share more details on this later in the year – and also during the next Partner Day. There is now only one year left before we launch. Needless to say, we are entering the phase where we all need to deliver against our milestones. I strongly believe that together, we will make the Grenadier a success.

Enjoy reading this edition of the Supplier Bulletin. As always, we really appreciate your feedback.

Stay healthy.

Yours faithfully,

PARTS SUPPLIERS

ADLER PELZER GROUP
Floor Trim

AKG THERMAL SYSTEMS INTERNATIONAL
Engine Cooling

APTIV
Wiring Harness

ARLINGTON ENGINEERING SYSTEMS
Brake Pedal Box

MAGNA STEYR FUEL SYSTEMS
Fuel Filler Pipe

BASF POLYURETHANES
Bump Stop, Spring Bed

BASF COATINGS
Coatings

BERGSTROM
HVAC

BF GOODRICH
Off-Road Tyres

BMW
6 Cylinder Diesel and Gasoline Engines

BOSCH
ADAS, Engine ECU, ESC, Steering and Brake Elements

BRANO
Fuel Filler Flap and Bowl

BREMBO
Brake Discs

BREMBO POLAND
Pads and Calipers

BRIDGESTONE EUROPE
Versatile All-Terrain Tyres

CARCOUSTICS
Acoustic Treatments

CARRARO GROUP
Axles

CASCO AUTOMOTIVE (SUZHOU)
Sensors and Power Outlets

COFLE
Shift Lever and Cables

CONTINENTAL AUTOMOTIVE
Control Modules and Sensors

DOGA
Wash and Wiper System

EATON INDUSTRIES (KOREA)
Differential Locks (Front and Rear)

PUREM BY EBERSPÄCHER
Exhaust System

EDSCHA AUTOMOTIVE KAMENICE
Door Arresters

EGR EUROPE
Accessories

EIBACH UK
Coil Spring and Stabiliser Bar

FACIL
Fasteners and Fixings

FRAP
Links and Rods

GESTAMP
Ladder Frame and Body Structures

GOODRIDGE
Hoses

HABERL ELECTRONIC
Gateway

HENGLONG USA CORPORATION
Steering Pump and Reservoir

HENKEL
Foam Parts

HI-LEX EUROPE
Door Cassette

HUTCHINSON
Engine/Transmission Mount

ICS AUTOMOTIVE
Skid Plates

PARTS SUPPLIERS

INTERNATIONAL AUTOMOTIVE COMPONENTS
Cockpit Structures, Door Panels and Overhead System

IRISH PRESSING
Body Structures

JOKON
Lighting

JÖRN
Body and Frame Connection

LANDER AUTOMOTIVE
Hoses

LUMEN EUROPE
Control Units and Power Outlets

MAGNA MIRRORS ESPAÑA
Exterior and Interior Mirror

MARELLI AUTOMOTIVE ELECTRONICS (GUANGZHOU)
Control Units

MAXION INCI JANT SANAYI
Steel and Aluminium Wheel Rims

MERGON
Raised Air Intake

MULTIMATIC EU-MATIC
Door Hinges

NAMYANG NEXMO
Steering System

NEUSOFT TECHNOLOGY SOLUTIONS
Infotainment

NEXANS
Engine Harness

NOLDEN CARS & CONCEPTS
Front Lighting

PILKINGTON AUTOMOTIVE
Glazing

PLASFIL - PLÁSTICOS DA FIGUEIRA
Grab Handles and Sun Visor

PLASTIC OMNIUM AUTO INERGY FRANCE
Fuel Tank

RECARO AUTOMOTIVE
Seating

RED WINCHES
Winch

REHAU
Plastic Bumper

SCHWEIKERT/MB SPRITZGUSS
Steel Bumper

SEG AUTOMOTIVE
12V Starter and Generator

SHANGHAI JTR AUTOMOTIVE ELECTRONICS
Steering Column Module

SPICER AYRA CARDAN/DANA
Prop Shafts

STABILUS
Oil Damper

STANDARD PROFIL SPAIN
Sealing Systems

THYSSENKRUPP BILSTEIN
Steering Damper

TREMEC
Transfer Case

U-SHIN
Door Locks and Handles

VITESCO
Fuel Delivery Module

VOESTALPINE AUTOMOTIVE COMPONENTS
Body Structures

WEDO PLASTICS
Mouldings

WÖLFLE
Centre Stack

YANFENG AUTOMOTIVE SAFETY SYSTEMS CO.
Passive Safety and Switches

ZF FRIEDRICHSHAFEN
Transmission and Suspension Systems

EXCELLENT PROTECTION FOR EVERY ADVENTURE

How BASF is helping to protect every Grenadier from the rigours of real-world work.

The Grenadier will have a lot to deal with in the field. Built for all weathers as well as all terrain, its exterior needs to be tough – which means that even the paint finish must be able to cope with everything from rain, sunlight, heat and cold, to the everyday scuffs and scrapes sustained when driving off-road. And all in a finish no thicker than a human hair.

BASF Automotive Colour Trends 2019-2020

BASF Coatings is the Grenadier's chosen partner for exterior paint finishes. Together with INEOS Automotive, they have developed a range of 12 colours for the vehicle, from Metallic Red to Solid Black.

The process begins with the Chemetall Oxsilan® pre-treatment technology, which helps the paint adhere while also providing a first barrier against corrosion. Next comes the CathoGuard 800 e-coat, which provides extra corrosion protection for the surface, edges, and cavities. Only then can the vehicle be painted with the final topcoat, which gives the car its colour.

BASF is a flexible partner, too. When plans for Grenadier production shifted from the Estarreja plant to Hambach, the team were able to make changes to the paint technology, moving from a conventional process to one designed specifically for the Grenadier project and the way the vehicle would be built in its new home. It's all part of a shared attitude and a mutual commitment to getting the job done.

FRANCO CALVO

CARRARO

HOW DID CARRARO APPROACH THE GRENADIER PROJECT?

We joined the Grenadier project via Magna, one of the world's leaders in the construction of body and chassis for the automotive sector. We had been talking to them about other matters, so they already knew us. They approached us for our expertise in off-highway automotive axles.

WHAT MAKES CARRARO SUCH A GOOD FIT FOR THE GRENADIER?

As a new, uncompromising off-road vehicle, the Grenadier is very close to the Carraro soul. Since our very first seed drill ploughed the fields of Campodarsego, our company has been focused on reliability and robustness, in highly challenging contexts. This remains an integral part of our ability to develop transmissions and axles that guarantee productivity and efficiency, at any latitude.

WHICH SKILLS AND COMPETENCES WERE ESSENTIAL FOR THE PROJECT'S SUCCESS – ESPECIALLY IN THE TRIANGLE OF COLLABORATION WITH INEOS AND MAGNA?

We see this 'triangle team' as a successful case history, both in how it began and how it continues to work. At its core lies the solid technical know-how of each member of the team. Day to day, however, the empathetic relationship that developed between members of the teams was key.

Both physically and virtually, we have combined different skills and cultures – and everything worked smoothly and efficiently. The shared desire to work towards a common purpose emerged naturally regardless of the hat any one of us wore. This is how we have managed to overcome issues related to remote working in the context of the global emergency we are experiencing. In practical terms, virtual validation has played a key role in defining product specifications and design.

"In this way, a kind of intra-company, extended team was created, focused on a single goal: to create a 4X4 vehicle of excellence and without compromise, via the contribution of excellent partners."

WHY DO YOU THINK THE PROJECT HAS BEEN SO SUCCESSFUL SO FAR?

We immediately understood that this was not going to be a traditional customer-supplier relationship. From the INEOS side, there was a clear intention to empower the project's technology partners, which demonstrated considerable esteem for the professionalism in the supply chain. In this way, a kind of intra-company, extended team was created, focused on a single goal: to create a 4X4 vehicle of excellence and without compromise, via the contribution of excellent partners. It is a unique and motivating mode of engagement, for everyone on the Carraro team.

WHY ARE BEAM AXLES THE BEST CHOICE FOR THE GRENADIER?

Our beam axles represent the ideal solution for a vehicle that has been conceived from the very beginning to face the most extreme conditions. Thanks to our deep expertise in off-highway sectors such as agricultural and earth moving machinery, we develop solutions that are particularly suitable for demanding environments. Our axles are robust, less vulnerable to damage and reliable without compromise.

"Our beam axles represent the ideal solution for a vehicle that has been conceived from the very beginning to face the most extreme conditions."

DESCRIBE INEOS AUTOMOTIVE IN THREE WORDS.

It's difficult to stop at just three words. I'll give you three three-word phrases: new icebreaker player; ambitious but conscious; uncompromising for excellence.

HOW WOULD YOU DESCRIBE THE PROCESS OF COLLABORATING WITH INEOS?

Our relationship is unique in its high level of intimacy. We understand that we are dealing with a lean structure capable of being highly dynamic. A structure that is also young, when you consider the timing of the foundation of the automotive division, but mature, when you consider the professional way we have achieved our shared objectives.

FINALLY, A PREDICTION. WHAT ARE THE THREE MAJOR AUTOMOTIVE TRENDS FOR THE COMING 10 YEARS (NOT INCLUDING EV POWERTRAINS, SELF-DRIVING VEHICLES OR CONNECTIVITY)?

In predicting trends we must always consider the differing pace of innovation in different parts of the world. As for the more developed areas (e.g. the EU, the US etc.), it is clear that vehicles with endothermic powertrains will become a niche reference point for enthusiasts, in the long term. But over a 10-year horizon, we will likely see the coexistence of different types of propulsion, as well as different levels of technological evolution in connectivity. However, the scenario in today's emerging countries will be different. Here it is likely that for the next decade, most vehicles will continue to have internal combustion engine powertrains and entry-level electronic specs. To be more specific, I would say the three biggest trends will be HMI, big data/AI and additive manufacturing.

THE OFF-ROAD SUSPENSION EXPERTS

Nobody knows more about springs than high-performance suspension supplier Eibach.

As a serious 4X4, the Grenadier was always going to need heavy-duty springs for its suspension system – and nobody knows more about heavy duty springs than Eibach.

With a trading history that goes back seven decades, Eibach is a world leader in suspension components. As well as supplying the motorsport and premium automotive industries, the company makes everything from playground springs to the shock absorbing coils installed beneath skyscrapers to protect them from earthquakes. But it was Eibach's expertise in the professional off-road sector – spanning from defence to disaster relief – that convinced the INEOS Automotive team they had found the right partner. Eibach supplies all the springs and stabiliser bars used in the Grenadier's suspension – part of a multi-link system with separate coils and dampers, to maximise traction and wheel articulation.

But it's not just about the way the system performs. The Grenadier will be put to work in extremely tough conditions, which means it will take punishment. When it comes to components like springs, they need to be easily replaceable – in the field, if necessary. The experience of Eibach's engineering team meant they understood this from the outset – enabling them to deliver suspension components that Grenadier drivers can depend on, wherever they need to work.

HARNESSING THE LATEST TECHNOLOGY

Thanks to Aptiv, every Grenadier is hard-wired for hard work.

Every modern motor vehicle has a wiring harness. But the Grenadier is not just a vehicle. It is a working tool. So in addition to the usual process of designing the harness – not to mention associated electrical elements like the fuse box and plus pole – the chosen electrical supplier would need to accommodate non-standard accessories such as winches and external lighting. There are also the complexities of an overhead console that includes far more switches than usual. The job was certainly never going to be easy.

With 180,000 employees in 44 countries and a whole department devoted to advanced vehicle functionality, Aptiv is one of the few firms with the expertise necessary to contribute at this level. A global leader in next-generation electrical architecture, Aptiv is exactly the right kind of partner for a project like the Grenadier.

Because INEOS Automotive is building a vehicle from the ground up, Aptiv's ability to react to project changes has been critical. Its ECM tooling and EOS processes ensure all changes are tracked in real time, providing accurate ongoing assessment of the engineering impact.

TIME FOR SOME HEAVY LIFTING

RED Winches becomes one of the first accessory suppliers to join the Grenadier project.

It is no secret that when the Grenadier launches, it will be supported by a wide ecosystem of third-party accessories. That's why today, it is not just the component suppliers who are part of the project. Accessory makers also have a vital role to play.

Designed and built in the UK, the company's powerful and durable billet aluminium designs are already taking on tough jobs as part of the Grenadier's tests. When the vehicle finally launches next year, these rugged, uncompromising products will be ready for the first Grenadier customers to put them to work.

Among the first to come on board was RED Winches, one of the world's leading manufacturers of high-performance winches and recovery equipment. Already a major player in the commercial, military and motorsport sectors, the team at RED Winches is now hard at work creating products specifically for the Grenadier. Indeed, the first winch built for the Grenadier testing programme – serial number 0001/2020 – has been emblazoned with the name of Sir Jim Ratcliffe, Chairman of INEOS and the father of the Grenadier project.

BESPOKE TYRES FOR UNBEATABLE GRIP

How Bridgestone has adapted its tyres to meet the unique demands of the Grenadier.

To perform to the required standard both on and off-road, the Grenadier needs tyres created for a working 4X4. The Bridgestone on-road and off-road tyre that will come fitted as standard on production models are a bespoke adaptation of Bridgestone's popular Dueler AT 001 tyre, already trusted by millions of all-terrain drivers around the world.

These proven all-season tyres have been enhanced with an upgraded compound to deliver in all conditions. Their 3PMSF (3-Peak Mountain Snowflake) all-terrain tread improves traction and braking, ensuring the vehicle will perform just as well in the snow as it does in the mud. The construction of the tyre has been uprated too, in order to perform better when the vehicle is fully laden or towing a trailer.

Currently part of the setup that will see the Grenadier prototypes drive 1.8 million kilometres prior to production, these on-road and off-road tyres are being tested to the limit.

Even Bridgestone has expressed admiration at the rigorous nature of the tests, as the Grenadier prototypes are put through their paces.

Bridgestone has already dedicated global resources to the Grenadier's development. Replacement tyres will be widely available after the vehicle's launch, with Bridgestone's unrivalled global service network on hand to support Grenadier drivers around the world.

The growing visibility of the INEOS Group is great news for partners like Bridgestone. Despite the complexity of the Grenadier project, Bridgestone enjoys a strong, two-way working relationship with INEOS Automotive, seeing the new business as an exciting, solutions-focused partner with a real enthusiasm for new ideas.

From the INEOS perspective, the feeling is mutual.

MACARTAN FLANAGAN

GESTAMP

HOW DID GESTAMP APPROACH THE GRENADIER PROJECT?

To be honest, at the time we were approached by INEOS, little was known about the INEOS organisation – it was probably the biggest company that you've never heard of. It was through well-established relationships within the automotive industry that we learned about the project. We were immediately enthused by the passion from these contacts, and raised the opportunity to Gestamp's top management.

CAN YOU REMEMBER THE POINT AT WHICH YOU BEGAN TO TAKE THE GRENADIER PROJECT SERIOUSLY?

It was an early meeting with INEOS Automotive's senior management. This was followed by a series of meetings to learn more about the project. The passion and can-do spirit of INEOS Automotive really came across.

WHY DID YOU SELECT INEOS AS A CUSTOMER, ESPECIALLY AT A TIME WHEN RESOURCES WERE LIMITED?

Market entry costs are so significant in the automotive business that many start-ups enter with good intentions, but soon realise the enormity of the task and withdraw, due to cost and the legislative pressures to bring a vehicle to market. For us, INEOS Automotive provided the reassurance we needed, on all levels and at every stage of our discussions.

WHAT DO THE GRENADIER AND GESTAMP HAVE IN COMMON?

Gestamp is a business with visionary owners, who know what it takes to succeed. INEOS Automotive is similar in that regard. They have a real passion to drive change, always looking for new opportunities and how we can adapt to succeed.

CAN YOU TALK US THROUGH THE DEVELOPMENT OF THE GRENADIER'S LADDER-FRAME?

We began supporting the initial development of the ladder frame chassis at an early concept stage, absent of any specifications. We understood the 'Built on Purpose' direction, even back then. We quickly adapted to the 'Kaizen' spirit of continuous improvement, whereby INEOS Automotive repeatedly challenged the design concept, to meet and exceed market needs.

WHAT ARE THE MAIN CHARACTERISTICS OF THE GRENADIER'S LADDER FRAME?

The frame is designed to be best in class, according to the performance characteristics set out by INEOS Automotive. The creation of the Grenadier is comparable to the great engineering achievements of the original 'workhorse' 4X4 vehicles.

WHAT ARE THE KEY CHALLENGES IN A LADDER FRAME ASSEMBLY AND HOW DOES GESTAMP APPROACH THEM?

The key challenges with the ladder frame itself are minimising distortion and maintaining tolerance whilst incorporating several metres of MiG weld through a controlled automated process. When it comes to production, it is all about ensuring the assembly line is future-proofed for updates that may come in response to legislative changes and performance enhancements.

BENJAMIN BRENKEL

PUREM BY EBERSPÄCHER

HOW DID PUREM BY EBERSPÄCHER APPROACH THE GRENADIER PROJECT?

First of all, we were all excited to be part of this amazing project to create a completely new brand and off-roader. It is a unique event. As we already work with most of the world's automotive OEMs, we were able to contribute our breadth of experience and help both INEOS Automotive and Magna to adopt best practice.

WAS THERE A TURNING POINT AT WHICH YOU REALISED THAT THE GRENADIER PROJECT NEEDS TO BE TAKEN SERIOUSLY?

We have taken the project seriously from the very beginning. We see INEOS as an important partner!

WHY DID YOU SELECT INEOS AUTOMOTIVE AS A CUSTOMER, ESPECIALLY AT A TIME WHEN RESOURCES ARE LIMITED?

It was extremely important for us to gain INEOS as a partner. In our 'special and small series' department, we combine the benefits of our experience with short project timelines and special processes. That was a perfect fit with what INEOS were looking for.

WHICH SKILLS AND COMPETENCIES WERE ESSENTIAL FOR THE PROJECT'S SUCCESS – ESPECIALLY IN THE TRIANGLE OF COOPERATION WITH INEOS AND MAGNA?

There was the breadth of our experience and knowledge of best practice, as I explained at the beginning. But it was also very important to structure and harmonise the development of the different products and processes – and to have a common understanding of the timeline.

DESCRIBE INEOS AUTOMOTIVE IN 3 WORDS

Exciting – Promising – Adventure.

WHAT DO GRENADIER AND PUREM BY EBERSPÄCHER HAVE IN COMMON?

We are both driving the mobility of tomorrow with our passion for making things happen.

IN WHAT AREAS DOES INEOS AUTOMOTIVE HAVE THE BIGGEST OPPORTUNITY TO LEARN?

I would turn this around: INEOS has a huge advantage in that it is starting with no legacy – instead it has fast and agile partners.

WERE THERE ANY CHALLENGES IN CREATING AN EXHAUST SYSTEM FOR THE GRENADIER?

Due to some missing targets for the Grenadier, it was challenging to simulate and subsequently create an exhaust system that would fulfil all expectations, first time.

NOW FOR A PREDICTION. WHAT ARE THE THREE MAJOR AUTOMOTIVE TRENDS IN THE COMING TEN YEARS – APART FROM E-POWERTRAINS, SELF-DRIVING VEHICLES AND CONNECTIVITY?

Looking at Purem by Eberspächer and the industry, I would say forthcoming emissions standards such as the EU7, but also the downsizing and redefinition of engines. Modular systems for different OEM platforms will also be important.

WHAT FACTORS ARE REQUIRED TO SURVIVE THE NEXT TEN YEARS IN AUTOMOTIVE?

Ten years is a quite long time in our industry. Constant monitoring of each region's market dynamics will be needed to come up with the right innovations, technologies and product portfolio. Our know-how, our ability to constantly adapt our structures (as well as our production standards) and our global footprint are and will be state of the art in the industry's coming transformation.

ENGINES OF SUCCESS

How two proven straight-six BMW engines are being tuned to the requirements of the Grenadier.

When it comes to building a new vehicle from scratch, the engine is vital. In building a serious 4X4, INEOS Automotive had requirements that would be challenging for any engine supplier to meet. Yet BMW came through with not one but two proven engines – one petrol and one diesel. What the two powerplants had in common was their potential to be tuned to the Grenadier's needs – and deliver the immense levels of torque a true workhorse needs, especially at low revs.

In delivering both of the engines that will power the Grenadier at launch, BMW is a highly strategic supply partner, working in close collaboration with both INEOS Automotive and Magna Steyr. The development and supply contracts for the engines were actually signed two years ago. Since then, INEOS and BMW have built up a strong, collaborative technical relationship to match their strong commercial relationships. BMW has delivered not just the engines, but after treatment systems and approximately one hundred additional parts for engine dress and other functions.

TUNED TO PERFECTION

The engines themselves are modified variants of the same, proven 3-litre inline six-cylinder units: the petrol-powered and the diesel-powered. Using an engine that has already been developed offers INEOS Automotive a number of advantages, not least the fact that the engines are known to meet emissions standards in all markets in which the Grenadier will be sold.

"...the engines would be able to deliver on one particular requirement: extremely high torque, even at low revs. This is critical for a vehicle that will be a working tool, often towing heavy loads, even up hills. Above all, the engines are proven to be robust."

It means the team at INEOS were able to establish at the outset that the engines would be able to deliver on one particular requirement: extremely high torque, even at low revs. Above all, the engines are proven to be robust.

But this doesn't mean they have simply been picked off the shelf. Both powerplants are currently undergoing a prolonged period of testing and calibration – a process that will have lasted almost three years by the time the Grenadier goes on sale. Every component is under scrutiny, from the air intake system to the fuel supply. Sensors fitted throughout the engines are monitoring everything from pressure to fluid flow rate. By the end of the testing programme, the Grenadier prototypes will have travelled 1.8 million kilometres, across all terrain and in all conditions, powered by their BMW engines throughout.

"Every component is under scrutiny, from the air intake system to the fuel supply."

A FUTURE-FOCUSED RELATIONSHIP

A testing and tuning programme on this scale relies on strong business relationships, which must in turn be based on clear roles and responsibilities. At BMW, all commercial contact is managed by the company's dedicated Powertrain Systems Business Customers Division in Munich. The engines themselves are built and supplied by BMW Group Plant Steyr in Austria, with loose parts supplied by BMW Group Plant Wackersdorf in Germany. Together, these disparate divisions form a tight team with INEOS Automotive and Magna Steyr, ensuring that the Grenadier continues to grow in capability as it proceeds towards launch.

THE INTERIOR

MICHELE ORLANDI

INTERNATIONAL AUTOMOTIVE COMPONENTS UK

HOW DID IAC GET INVOLVED WITH THE GRENADIER PROJECT?

First of all, our UK team brought their colleagues in mainland Europe and India up to speed on the story behind the Grenadier and the vision for the product. From there, the enthusiasm really grew to become part of enabling that vision.

To us, the idea was genuinely bold. When we saw the quality of the INEOS Grenadier team – and their diverse automotive backgrounds – it became clear that success was feasible. Later on, the acquisition of the Hambach plant reinforced that view.

WHAT MADE THE GRENADIER PROJECT SO ATTRACTIVE TO IAC?

How many times do you come across a brand new OEM? What a great opportunity it represents – to contribute to its success by applying the lessons we have learned over the years, by redefining best practices and lean methods. It was as clear then as it is now that this is a truly exciting project.

> "We are a global company with a full-service supply capability. Having common business processes across our organisation meant we could hit the ground running."

WHAT CHARACTERISTICS DO THE TWO COMPANIES HAVE IN COMMON?

I like to see IAC as an organisation ready to take on any challenge, together with our customers – just as a Grenadier will be a reliable partner on any journey.

OF ALL YOUR COMPANY'S CORE COMPETENCIES, WHICH PROVED ESSENTIAL TO THE PROJECT'S SUCCESS?

We are a global company with a full-service supply capability. Having common business processes across our organisation meant we could hit the ground running. We operate with a high level of core team empowerment, which keeps things moving. Nevertheless, having senior management fully engaged meant that issues requiring a swift decision or direction from the top were discussed and processed in a timely and robust fashion. Regular, timely and open communication with INEOS Automotive and Magna Steyr continue to be crucial. This cooperation with both the OEM and their vehicle development partners is not unusual in the OEM world today and we have a great deal of experience working with multiple stakeholders. Very early in the process we established a tri-lateral senior decision forum enabling INEOS, Magna Steyr and IAC to review topics requiring cross-functional decisions on a weekly basis.

WHAT DO YOU THINK ARE THE BIGGEST CHALLENGES FACING INEOS AUTOMOTIVE?

There is a lot to learn when you're designing and building a vehicle from scratch – and much of this process still lies ahead. It will include the fine tuning of the vehicle to meet customer demands and really 'living' the new brand. These are the factors that will determine how well the Grenadier differentiates itself in what is a fiercely competitive market. It involves answering a lot of fundamental questions about what to make standard and what to offer as an optional feature – and how to provide customised solutions to a diverse customer base.

WHAT ARE THE ADVANTAGES OF BEING RESPONSIBLE FOR A COMPLETE VEHICLE INTERIOR?

Being responsible for the complete vehicle interior provides a greater degree of freedom and allows the optimization of the fit and function as individual elements come together. Another advantage is the immediate visibility you have of any issues as they arise. Our proven IAC business processes and procedures ensured our programme delivery teams worked to a high level of consistency and ensured robustness in our developments. Our responsibility for the entire interior also made things simpler for INEOS and Magna Steyr, who could focus on the overall programme as a result.

HOW DID YOU STRUCTURE YOUR PROJECT TEAM TO SUPPORT THE ENGINEERING PROCESS FOR A COMPLETE INTERIOR?

Our approach to the Grenadier programme – in spite of its many unique aspects – was similar to other programmes, in the sense that we divided our engineering team according to the different zones of the vehicle (Cockpit System, Greenhouse System etc.). Due to the wide scope, we additionally implemented several senior roles to enhance our vehicle system approach and to co-ordinate delivery in line with INEOS Automotive's expectations. These senior roles allowed INEOS and Magna Steyr to discuss and review any vehicle-level challenges that arise throughout development.

WHAT DID YOU DO DIFFERENTLY TO SUPPORT SHORT TIMELINES LIKE THIS?

When supporting any timeline, the team – both internal and external – need to be fully abreast of the deliverables for each gateway, the steps that need to be taken to get there, and the correct structure and guidance to ensure that delivery is achieved.

Our gateway and deliverables management was robustly monitored and assessed throughout all phases of the project. From the start, our organisational structure was resourced to ensure the programme timings were met, but as always, you meet unexpected challenges along the way. With the outbreak of Covid 19, we increased our UK-based resource to mitigate the resulting organisational and logistical challenges, so we could keep to our delivery deadlines.

"If creating a new vehicle is a challenge, then creating a whole new automotive company is probably the adventure of a lifetime."

WAS THERE ANY SPECIFIC PHASE THAT WAS EXCEPTIONALLY CHALLENGING?

The development kick-off in early 2020 coincided with the global health crisis. This was a challenge in terms of working locations, infrastructure for the teams and being able to deliver functions and responsibilities. Cooperation between the different IAC regions enabled our teams to relocate from the office to remote working scenarios, which itself meant design stations in team members' homes. Throughout this challenging period, our global teams have maintained communication as well as the tracking of project gateways and deliverables.

We were impressed and motivated by the proactive communication from the INEOS management team, who made it clear that the Grenadier project would continue in spite of the global uncertainty in the second quarter of last year.

WHAT MAKES WORKING WITH INEOS AUTOMOTIVE DIFFERENT?

If creating a new vehicle is a challenge, then creating a whole new automotive company is probably the adventure of a lifetime. We were attracted by the spirit that drove this project in the first place and it has kept our motivation high throughout. As suppliers, we are grateful to INEOS Automotive for always treating us as respected partners and equally empowered members of this incredible team.

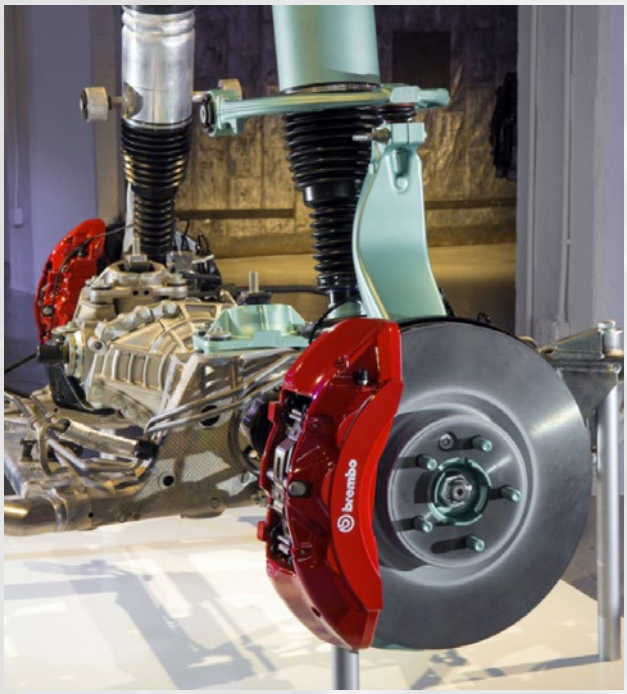
STOPPING POWER

Brembo delivers a braking system built specifically for a working 4X4.

As a leader in the production of high-performance braking systems, Brembo needs no introduction. The company has built a worldwide reputation for brakes that deliver in the most challenging conditions – and that makes Brembo a perfect fit for the Grenadier project.

INEOS Automotive needed a supplier who could deliver robust, efficient, off-road brake designs. That's because not only is performance critical when working in the field – but safety is too.

The company is supplying the disc brakes, calipers and CU-free brake pads that the Grenadier will depend on. Engineering teams from both Brembo and INEOS are now hard at work testing the 2B prototypes in extreme conditions from Sweden to Africa, to ensure that the Grenadier can get the job done in the harshest environments – and crucially, it can stop when it needs to.



CONNECTING EVERYTHING IN THE VEHICLE

Electronics supplier Haberl delivers the most important systems of them all.

Haberl Electronic supplies two essential components for the Grenadier – the entry system and the gateway that connects the engine to the electronic architecture. Together, they make it possible to switch the engine on and off – which is about as vital as it gets.

Haberl had already partnered with BMW, the Grenadier's engine supplier, on numerous projects. But Haberl was used to delivering bespoke systems for smaller series of vehicles, such as sirens for fleets of police cars. Working on a global project like the Grenadier would be something new.

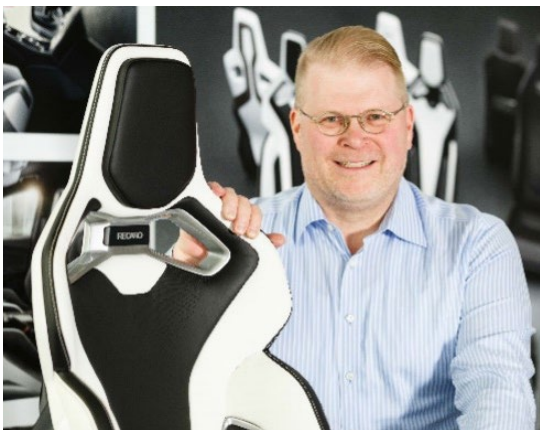
As it turned out, this made Haberl a great fit for the Grenadier. While INEOS has ambitious sales goals for its tough 4X4, it began the project as a start-up, with no tried-and-tested processes. It needed partners who could be agile and flexible.

Working closely with INEOS and BMW, Haberl rose to the challenge. The systems the company has developed are proving reliable already, despite the extreme conditions the Grenadier prototypes are up against in testing. By combining an entrepreneurial, start-up culture with the expertise to get the job done, Haberl is playing a crucial part in the story of the Grenadier.

THE SEATS

ULRICH J. SEVERIN

RECARO AUTOMOTIVE



TELL US ABOUT YOUR INTRODUCTION TO THE GRENADIER PROJECT

Our first exposure to the project was at a very early stage during a supplier event in Sindelfingen in 2018. The exact specifications of the car were not yet clear. From then on, we kept an eye on the project via social media and any other information that found its way into the public domain.

WHY DID YOU DECIDE TO WORK WITH INEOS AUTOMOTIVE?

We were certainly a little sceptical at first. We wondered if a petrochemical company like INEOS would really enter such a competitive sector – a market that was already undergoing a dramatic technological and cultural change with the move to BEVs. But we soon came to realise INEOS were very serious!

WHAT DO THE GRENADIER AND RECARO HAVE IN COMMON?

Both brands are focused on the best ergonomics, especially given the Grenadier's status as a working tool.

We are both focused on design and styling while at the same time delivering a robust, durable, powerful product.

Our brand promise is 'performance in every aspect'. You could say something very similar for the Grenadier.

WHICH SKILLS WERE MOST IMPORTANT IN WORKING TOGETHER WITH INEOS AND MAGNA?

Well, RECARO and Magna had worked together on several projects in the past, so we knew each other well. For a project like this, all parties need the ability to be exceptionally flexible. We all have highly motivated teams and well-established expertise in multinational projects, so we knew we could contribute to making the Grenadier a success.

WHAT DID YOU HAVE TO DO TO ACCOMMODATE A TIMELINE OF JUST 19 MONTHS FROM CONCEPT TO SERIES PRODUCTION?

The people at RECARO are used to supporting tight schedules, but what I think is really key is the close interaction with the team around Oliver Frille and Hauke Tiedemann. Their willingness to collaborate is really exceptional.

HOW DID YOU GO ABOUT DESIGNING SEATS FOR BOTH ON AND OFF-ROAD DRIVING?

A seat for an off-road vehicle or an SUV is always a compromise between sufficient side and shoulder support for rough terrain and a comfortable ride on regular roads – not to mention easy entry and exit of the car! For the Grenadier seat we have chosen a seat cushion with low side bolsters to allow for easy ingress and egress, while also allowing some freedom of movement, so the driver can control the pedals during off-road driving. For the backrest cushion, we added pronounced side bolsters to enclose the body from pelvis to thorax, without obstructing the arms. In the second row of seats, we continued with this principle, but the need for the backrest to fold down forced us to reduce the side support slightly. To achieve the best result, we thoroughly investigated the curvature of the center back cushion and the lowered side bolsters, until we found the perfect solution.

TELL US ABOUT THE PROCESS OF REPLICATING THE GRENADIER DESIGN LANGUAGE IN THE GRENADIER SEATS?

From the outset, we understood that INEOS is designing the Grenadier to fit into the gap left by the original working 4X4s. The vehicle is supposed to be a tool that serves people and keeps its promises. The seats are therefore designed to support the drivers in doing their jobs, supporting but also meeting the requirements in terms of durability, robustness and riding comfort. All this was achieved thanks to the right ergonomic foam design, the right colour scheme and the right material selection, combined with the right approach to craftsmanship. We are proud to display the RECARO logo on the Grenadier's seats.

THE OVERALL DESIGN OF THE GRENADIER GIVES THE IMPRESSION OF SIMPLICITY AND ROBUSTNESS. DID THE INTERIOR AND THE SEATS HAVE TO TELL THE SAME STORY?

Yes they did. We created every visible surface of the seats with respect to these styling and ergonomic requirements. The centre-line, which mirrors the human spine area, is the most important feature in the seat. But side support is essential too. Even though the Grenadier is an off-road vehicle rather than a sports car, this feature is important here too! During a process of producing several prototype seats for comfort and style evaluation, the contours were gradually refined until we arrived at a perfectly balanced seat.

"Our brand promise is 'performance in every aspect'. You could say something very similar for the Grenadier."

DURABILITY IS IMPORTANT FOR THE GRENADIER. HOW HAVE YOU MADE THE GRENADIER SEATS DURABLE?

Through extensive testing and selection of the right materials, in close cooperation with the teams from INEOS, Magna and the interior design studio.

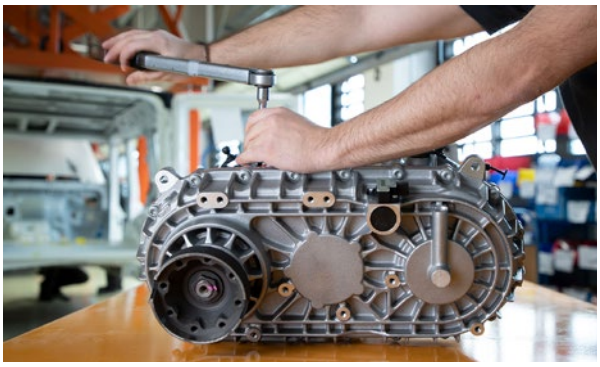
CAN YOU NAME THREE KEY AUTOMOTIVE TRENDS FOR THE COMING TEN YEARS?

- As society ages, comfort and ergonomics will become more important – especially offering individualised mobility solutions for people with special needs.
- Customisation and individuality.
- Neo-ecology: green materials and vegan leather.

GEARING UP FOR SUCCESS WITH TREMEC

Transmission specialist Tremec has delivered a heavy-duty transfer case unlike anything else on the market.

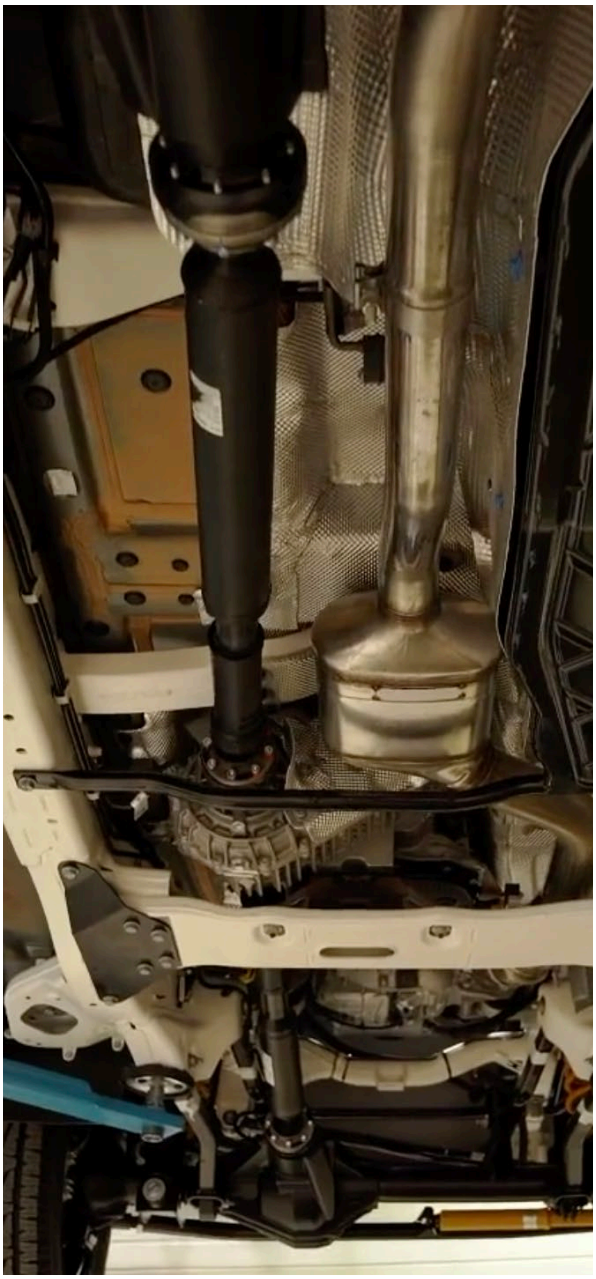
In any serious off-road vehicle, the transmission is vital. The transfer case itself is among the most important parts on the Grenadier.



Despite the prevalence of SUVs on the road today, most are effectively two-wheel drive cars that switch into all-wheel drive when necessary. The Grenadier is a permanent four-wheel drive vehicle with high and low-range gearing. When it came to the transfer case, its requirements were very different from those of a road-going SUV.

The team at INEOS Automotive spoke to suppliers all around the world, over a period of several months – and even looked at designing the component in-house. But ultimately, the best solution came from a company better known in the United States than in Europe. Renowned for building transmission systems for performance pick up trucks and muscle cars, Tremec specialise in high-torque applications – which made them a great fit for the Grenadier. So highly regarded are they in America, that enthusiasts often buy a truck and immediately swap out the gearbox for one made by Tremec. The Grenadier's bespoke transfer case was designed by INEOS Automotive in close collaboration with engineers at Tremec. Built from the ground up for all-wheel drive applications, it allows for manual high and low gear ranges, plus diff lock selection – allowing the driver to send power to just one axle or wheel, if conditions demand it.

For INEOS, Tremec has proven to be a rewarding partner by giving the Grenadier the requisite level of off-road capability. For Tremec, meanwhile, working with INEOS has opened up new opportunities. Transfer cases like this one complement their existing product range, while the Grenadier's profile in the UK and Europe will help them win new customers on this side of the Atlantic.



HANS-BERND EINHOFF

VOESTALPINE AUTOMOTIVE COMPONENTS BUNSCHOTEN

HOW DID YOU GET INVOLVED WITH THE GRENADIER PROJECT?

When we spoke with INEOS Procurement in June 2020, they told us that INEOS Automotive was searching for reliable partners to produce parts. We were enthusiastic to be part of the project – and about the parts we would be producing. The pandemic was already underway and we saw that traditional automotive OEMs were unsure in their announcements of which model lines would be launched, which would be postponed and which would be cancelled altogether. INEOS Automotive was different. Their message was clear. We got the feeling the team appreciated our knowledge and the strength of our group. We were (and still are) proud to be an INEOS partner.

WHAT MAKES THE INEOS/VOESTALPINE COLLABORATION SO SUCCESSFUL?

The most important thing is trust in each other. Both parties have been reliable from the beginning. At the end of the day, the cars must be built. We must, at all times, be open and free of political attitudes. We should never lose sight of the goal but between us, we need to be able to compromise sometimes. Of course, these are all soft skills. Crucial to any project's success is a structured way of working, delivered via experienced project management personnel and a strong engineering department.

HOW DO YOU KEEP YOUR TEAM MOTIVATED IN THE FACE OF CONFLICT AND OBSTACLES?

We are professional. Things must be solved by talking to each other. Our team is always motivated to go further, because they get direct feedback on the work they are doing. Important decisions can be made within days or weeks, while on other projects, that can take years. We never hold grudges when things don't go our way.

WHAT ARE THE MOST IMPORTANT ATTRIBUTES OF INEOS AUTOMOTIVE?

INEOS Automotive is professional. Their working methods are well structured. The experience in their team is a guarantee of success. There is very little in the way of hierarchy in their team, which makes for fast decision-making. Their marketing is also very good.

WHAT DO YOU FEEL IS THE BIGGEST STRENGTH VOESTALPINE OFFERS TO THE GRENADIER PROJECT?

Our experience in highly complex pressed parts and assemblies, for one. We can offer nearly every metal forming technology. Our hands-on, problem solving mentality and commitment to the project are vital assets too. Voestalpine Automotive Components represents the state of the art in forming and joining technology, accompanied by excellent knowledge of the feasibility of parts. Not to forget our globally active network within Voestalpine Group. This helps INEOS by providing a reliable source of high quality parts over the lifetime of its product.

FINALLY, WHAT TRAITS WILL BE NEEDED TO SURVIVE THE NEXT TEN YEARS IN AUTOMOTIVE?

Lean production, continuous improvement, innovative thinking, strong marketing and of course, finding your niche.


GRENADIER
GRENADIER
BFGoodrich
All-Terrain T/A