



#12 **REP**



**A GLOBAL  
ADVENTURE**  
Emerging Markets  
Localized Customer Service

**AT THE HEART OF  
THE INJECTION**  
Graduated Range  
REP Pack 4.0

**NEIGHBOURING  
TERRITORIES**  
Mould Cleaning  
Customer Reports

# G10 *Ininitely Smart!*

## G10 Core & G10 Extended

WHICH ONE WILL YOU CHOOSE?

Two new product lines of rubber injection molding machines best focused on your specific needs

### G10 core

DESIGNED TO PERFORM  
The Lean Choice  
for Your Simple Processes



### G10 extended

DESIGNED TO EXCEED  
Uncompromised Performance  
for a Leading Edge Process



### Industry 4.0 Highlights

## REP Pack 4.0

including REP Net 4.0 and REP Net App, the 4th generation of the REP Net supervision software and its mobile app: Traceability - Continuous Improvement - Statistical Process Control - Real-Time Monitoring - Workshop Modelling *Ininitely smarter!*

A FULL RANGE FOR ALL YOUR RUBBER PARTS



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# rep

RUBBER IN MOTION

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# Editorial

## Technology and Globalization

Technological development focuses among others on providing new solutions or on enhancing the performance of the resources used by making them accessible to more and more users from the economic, ergonomics or geographical point of view. With that in mind, REP keeps developing its product / service offerings to serve the global market.

With its G10 Extended range, which is interconnected to its near or far operational environment through REP Pack 4.0, REP allows from now on all those who want to reach for such a high level of online integration venturing into the industry of the future (or 4.0).

Concurrently, the localization of the production of premium machines in emerging areas, supplemented by process improvement advice and services enables these industrially accelerating areas to move ahead towards enhanced technical and industrial competitiveness. The sales and industrial results of REP's subsidiaries in India and China demonstrate the benefit of these choices.

Between challenge and opportunity, REP keeps progressing in globalizing its industrial resources and services by matching its offering with the Western technically advanced market requirements on the one hand and the mass market in the emerging areas striving for progress on the other hand.

Such a bet for a medium-sized company is far from being won in advance and should not be put aside, as there is no other way than to win it. Together with our customers, suppliers and partners, we fully concentrate on this goal.

There is no doubt that tomorrow we will say together: "the world is our oyster!"



Bruno Tabar  
Chief Executive Officer  
REP International

The world is our oyster!





# A Global Adventure



# GUIDED TOUR

## FROM THE SALES MANAGER'S DESK



**"Service support runs through our veins and serving you is part of our values."**

We want to provide this service from the development of our customers' project to the final lifetime of their machine ... 30 years later and often far more. That's why we must speak the same language as our customers, be geographically close to them and provide the expected technical level. The only way to get there is to set up a field network as close as possible to our customers, a network of experts throughout the world, who personally know the customers and who are ready to meet their requirements. It also means to make available as many resources as required for the establishment of groups striving for international business. That is the reason for our motivation to continually develop our network and to train our employees and local partners, in order to enable them to serve our customers. Our sincere thanks are hereby given to these valuable collaborators, who make the success of our customers. Browsing through the following pages, we invite you to travel across the world and to discover our network and our customers!

Stéphane DEMIN

## THE POWER OF A WORLDWIDE NETWORK

**5** GLOBAL PRESENCE CONTINENTS



Supplier of comprehensive solutions for the rubber, thermoplastics and other polymers processing industry, REP international designs, manufactures and sells hi-tech horizontal and vertical rubber injection moulding presses intended for the production of moulded rubber and plastic parts.

More than 12,000 REP presses are installed throughout the world, mainly used in vibration and sealing technologies.

Rep international also distributes a range of economic compression presses and injection moulding presses dedicated to the emerging markets.

The company further provides those customers who want to recycle their production waste with rubber devulcanization machines and laser mould cleaning machines.

**12,000**  
MACHINES  
THROUGHOUT THE  
WORLD



## THE SALES TEAM IS GROWING

They are your contact partners in the sales department from the order award of your press to its delivery.

**Pascal SENNEGON** is the Export Manager in charge of a region extending from Turkey to North-Africa, including the Near East and India.



*Guillaume*  
**BEAURIN**

*Yves*  
**POPPÉ**

*Pascal*  
**SENNEGON**

**Yves POPPÉ** is the Sales Manager for France and in charge of the Export business with Tunisia, Belgium, Switzerland, Scandinavia, Russia and the Baltic States.

**Guillaume BEAURIN** is the Sales Manager for Italy, the United Kingdom and marketing support.



**Sandrine BOUTIER**



**Émilie CHIROUZE**

**Sandrine BOUTIER** and **Émilie CHIROUZE** joined us to reinforce the sales administration team.



**THE AFTER-SALES TEAM ALWAYS AT YOUR DISPOSAL**

A new Manager has joined us, **Sylvain MAUGENDRE** whom you will hear about soon.

**INFLUX OF YOUNG TALENTS**

As an international company and market leader, REP attracts **6** young talents, more particularly newly graduated engineers from prestigious schools, such as INSA, ECAM and l'École des Mines in Saint Étienne.

The sound financial situation of the company that keeps investing and developing abroad with production sites in India and China undoubtedly contributes to the successful REP brand as an employer.



In 2017 the staff members increased by 15% at the head office in Lyon Corbas. Concurrently with the retirements, these newly hired employees will result in younger teams, thus enhancing dynamism and giving rise to new perspectives!

**INVESTMENTS**

To cover all markets and cope with the new industrial and economic challenges, REP keeps concentrating on the improvement of its competitiveness by extending and revamping its production facilities, but above all by modernizing its production and management tools. Not less than 5 million euros have been invested in production tools over the past three years.

**MODERNIZING OUR MANAGEMENT TOOL**

The former CAPM is currently being replaced with a new industrial ERP tool, SYLOB 9, a comprehensive and collaborative solution for the production management.

**MODERNIZING OUR PRODUCTION FACILITIES**



*Mazak HCN 8800*

After the acquisition of a first machining centre, TOYODA, in 2014, a second centre, FSX800, has been purchased. In 2017, a MAZAK HCN8800 machining centre with a 10-station palletizer, a vertical lathe, JOHNFORD VTC1600, and a horizontal lathe, DOOSAN, have been installed. The travelling cranes and various tools have been renewed.



**Hervé REVEL**, Vice President and Operational Manager tells us more about:

"This equipment will enable REP to produce all strategic parts of high added value by their own and to be able to quickly manufacture any type of parts at any time. The company's intention consists however in preserving responsiveness thanks to a network of subcontractors with whom we work together based on a technical partnership.

Our goal is to keep the production of the injection units in Corbas regardless of the partnerships. This year for example, we have produced 270 injection units, which means as many junction blocks and cast injection housings, etc. both for G10 machines manufactured in Corbas and URP machines, the closing units of which are manufactured by URP in China. These new facilities will provide more flexibility, as we can program them for new series parts, and to meet customized requirements. We actually cope with daily customer driven customization requirements. More than 90% of our machines sold include specificities. For 40% among them, the customer even demands up to three reviews during the order processing! We are very proud to meet such requirements. If we had to fully subcontract the production of all these special parts, we would simply not be able to satisfy our customers. All in all, these investments will enable REP to support the yearly business growth of 20% over several years."



*Johnford VTC1600*



*Horizontal lathe Doosan*

**REP HAS RENEWED 100% OF ITS MACHINING EQUIPMENT WITHIN A FEW YEARS!**



# MEETING THE NETWORK

## ARGENTINA



Sofraterc has been representing REP in Argentina for more than forty years. The company holds a stock of spare parts and cares about after-sales service in Argentina, Chile, Bolivia, Peru and Uruguay.

Thanks to their strong presence on the South-American continent and their technical and sales assistance services, Sofraterc today ranks among the leaders on the machine and equipment supplier market dedicated to the rubber industry.



*Mariano WELLER*

Striving to consolidate this leadership, **Mister Mariano Weller**, engineer in plastics processing and elastomer technology and graduated in strategic company administration has joined Sofraterc in his capacity as a managing partner. Drawing on his sixteen-year long experience in the rubber industry, his widespread know-how in the industrial sector enabled Sofraterc to extend their offer, particularly with the supply of industrial raw materials.

Let's assume that Mariano's technical expertise and human qualities will contribute to increasing benefits and modernity of Sofraterc on behalf of the customer.

Website: [www.sofraterc.com.ar](http://www.sofraterc.com.ar)

## UNITED STATES

### NEW HIRES AT REP CORPORATION

REP Corporation has employed a new regional Sales Manager with **Brian Boyle**.



*Brian BOYLE*

Brian brings with him extensive injection and industry knowledge backed by a strong sales territory management expertise exceeding all expectations.

With his appointment, REP Corporation will be able to strengthen its business position in Ohio, Arkansas, Pennsylvania, Missouri, Louisiana, Mississippi, Kentucky, Western Virginia, Tennessee, Kansas and Oklahoma. REP Corporation also appreciated the

comeback of **Derek Williams** as the national Sales Director. Derek brings with him 20+ years of extensive rubber industry knowledge backed by a strong technical and processing acumen.

Current and future clients will benefit from his hands-on, real world experience and product knowledge coupled with REP's leading edge offerings.



*Derek WILLIAMS*

## ROMANIA

### A NEW TECHNICAL AGENT

Since 2016, REP and the Romanian company **MATE-FIN SRL** have set up a partnership with the goal to provide short-term high-level technical support to our Romanian customers in an ever growing market.

This healthy and technically skilled company is currently mainly working in the nuclear and medical fields, but also in more conventional industry sectors, including the automotive industry.



MATE-FIN Team

They provide there a high quality support to demanding customers, thanks to an experienced technical team (maintenance and solution provider).

Website: [www.matefin.com](http://www.matefin.com)

The sales activity for rubber moulding presses (injection & compression) remains under the management of REP France through the Export Manager Pascal SENNEGON.

Website: [www.stieps.ma](http://www.stieps.ma)



First presses installed by STIEPS with REP at SONOFET in Morocco.

whole territory, in order to provide highly responsive services. OTRA is a well-known major player in providing advanced technical solutions.

Website: [www.otra.co.kr](http://www.otra.co.kr)

## MOROCCO

### A NEW TECHNICAL AGENT

STIEPS, the exclusive technical partner of REP for the Moroccan market, enjoys broad expertise in the maintenance of injection moulding presses (plastic and rubber) and in other manufacturing industries.



STIEPS Team

The company led by Mr. **Hamid ALOUANI** is based in Tangier. From there, very reactive support is provided to the customers of the area, but also to other places of the country.

## KOREA

### A NEW AGENT

As a supplier of high-precision machines and technologies for more than forty years, OTRA mainly works in the automotive, electronic, semi-conductor, medical and aerospace industry.

The company, whose head office is in Seoul, employs thirty collaborators and enjoys a good reputation for its engineering service to provide technical assistance in the development of new projects and manufacturing processes.

This modern company shaped by dynamic and pertinent ingenuity in the solutions proposed regularly organises technical multi-level training sessions and seminars in its technical centre. Its particularly reactive and highly-qualified customer care covers the



## MOROCCO, A FAST-GROWING MARKET

The economic development of Morocco is impressive. Thanks to the rationalisation of the industrial sector, the growth of the GDP led to reduced dependence on agriculture. At the beginning of our century, the country has built a deep-water port giving access to one of the most navigated sea roads.

The arrangement of free trade areas in the vicinity of the port coupled with the steady

and attractive environment have sealed the deal. In addition to the subcontracting activity in the aerospace industry, the automotive sector has grown to become Morocco's leading export sector overtaking phosphates.

The automotive industry in Morocco will keep growing thanks to double leveraging. The automotive production is increasing: Renault +20% within a year, Peugeot

is building a factory for 2019 and other manufacturers are sourcing parts in Morocco for export purposes.



Port of Tanger Med - Morocco



## SOMETHING BEGINS TO HAPPEN IN ALGERIA TOO

With the purchase of an RT9-150Y10 press featuring a silicone stuffer for the injection of rubber and pasty silicone as well, Labiodplast company is venturing into the rubber industry. The procurement of moulds and compound is made sure with first-rank suppliers. At this point it is worth saying that there are several car manufacturers in Algeria, even though the quantities produced remain low: Renault, Hyundai, Volkswagen, Mercedes.



## AUSTRALIA

### BDAM, OUR AGENT IN AUSTRALIA INTRODUCES HIMSELF



"My name is **Silvano LOVRECIC**.

In a brief summary, my career began with Bridgestone Australia.

I then accepted an assignment with Tadmansori Rubber SDN BHD (Malaysia) for 2 years. On returning to Australia I joined Maplas and Plaspacific. I travelled and met with Directors and personnel in companies in Europe, South East Asia and the United States to discuss and exchange information and ideas for other assignments.

Over the past 35 years, my duties varied from technician to project manager in maintenance, after-sales and customer care. My association with REP started in 1995 when I worked at Maplas, that's why it seems quite logical today to take over the customer care for Australia and New Zealand and to represent the products of REP. I hope for further and enhanced growth of REP and endeavour to maintain the high quality service and sales that embody REP around the world."

#### BDAM

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## NEWS FROM INDIA



REP has been working in India for many years; some customers have got REP presses for more than 25 years and they are still producing!

the next phase as scheduled.

With the G9A range, REP meets the requirements of the local market. Our technology is now available in India under the Indian brand "Made in India" and without any import costs.



Salon IRE Chennai 2017

In order to better serve the Indian customers, REP established in India in 2014 and is now producing locally. The factory is growing and REP enhances its investments in Bangalore to increase the production capacity and to optimize the manufacturing processes. We move on to



S709A Made in India



Production site REP India

# IRAN

## A NEW MARKET TO CONQUER



Teheran: Azadi Tower

Iran is a promising market where large groups like Airbus, Boeing, companies from the petrol and gas industry and car manufacturers have already begun to foster long-term relationships.

Rubber part manufacturers are also preparing to welcome the new car manufacturers investing in Iran. With the increasing demand in terms of part quality, the local industry turns to high-technology equipment. Right after the trade show in Düsseldorf in October 2016, REP started selling machines to Iran and introduces hereinafter three of these new customers to you.



Stéphane Demin and RayaGostar in Düsseldorf

RayaGostar is a company located in Tehran. Relying on the company's broad experience in the production of moulded rubber parts for the automotive industries, RayaGostar has a compression moulding department and has opened an injection moulding department with high capabilities in terms of productivity, part quality and flexibility.

Already very famous in Iran, RayaGostar is also export-oriented with a dynamic sales approach. You will probably cross their brand soon!

Vulcan Sanat is another customer from the automotive industry with its head office in Isfahan. In 2017, after 20 years in the



Pascal Sennegon and the representative of Vulcan Sanat



rubber industry, the company invested in a new factory-building and new equipment for high-capacity mixing and rubber moulding. With solid industrial foundations, Vulcan Sanat is a reliable partner for the automotive industry in Iran.

The company is involved in continuous improvement and has number of certificates proving how much customer satisfaction is their motto.



Pascal Sennegon and Bargh Gir Toos Company

Bargh Gir Toos Company (BTC) was founded in 2001 and manufactures power transmission equipment and isolators (see related article). Located in Mashhad, the country's second largest city in the north east of Iran, the manufacturing site covers more than 4,000 m<sup>2</sup>.

BTC is the one and only producer of metal varistors in Iran and as of now owns more than 30% of the total market for surge arresters in Iran. BTC's mission is to produce high quality products based on research, hard work, national and international collaboration.

## MOULDING ISOLATORS

REP has developed various special presses in all dimensions for this type of application, whether LSR, silicone or even EPDM. Thanks to the step-by-step method, high voltage isolators (550 kV) of a diameter of 660 mm and a length of 2,600 mm can be moulded in one shot in one or two cycles, thus drastically increasing productivity and part reliability. The cold runner block technology, which is essential for parts of such sizes, helps going even farther.

The press S24 was especially designed for this type of isolators.

- Closing force: 24,000 kN
- Plates: 1,500 x 3,000 mm
- Shot capacity: 25,000 cm<sup>3</sup> x 2 (2 injection units)





## URP: THE CHINESE RANGE

2017 mirrored the change in the Chinese market within the business model of REP. Through URP, we can strive for nothing short of doubling the business volume. This change results in various industrial, economic and existential challenges REP decided to meet based on a sound methodology.

Three years after the announcement of its foundation, the Chinese subsidiary is following a strongly growing trend and has exceeded the peak of 100 machines a year.

China is growing rapidly and the market is changing. Even though REP had always been able to meet the needs of the Chinese market either with high-end or with cost-effective presses depending on the customer, it became necessary to find a specific approach for China, which is now striving for locally developed, reliable and performing technologies.

Always aiming at perfectly fitting customers' needs, REP decided to take up the challenge and venture into URP (for United Rubber & Plastic Machinery, named after the subsidiary).

A range of presses manufactured in China, called URP machines, has been launched and is already enjoying great success on the spot.

The URP range of four-column presses currently comprises four versions:

- URP160: 1,600 kN
- URP260: 2,600 kN
- URP300: 3,000 kN
- URP500: 5,000 kN

Depending on their clamping force, these presses can be equipped with an injection unit of 750 to 11,000 cc.

URP also distributes C-frame presses. In 2017, the total production amounted to about one hundred machines. The workforce



Wang XiaoBo, CEO of URP in front of a URP press line in a customer factory

of URP is 42 employees, constantly increasing. An extension of the premises was made necessary by the growth of business and the company now covers a total area of 3,180 m<sup>2</sup>. The possible ongoing extension has already been scheduled.



URP production team



URP production workshop



URP team

## THEY TRUSTED URP

**JunLi** is a company involved in the automotive industry, which was founded in 2003 and set up in the beautiful town of Chongqing in the West of China. It provides among others high-quality sealing gaskets and plastic components. Owing more than 10 proprietary brand products, this innovating company is the first company to introduce graphene composite materials to rubber.



To achieve their industrial development objectives, JunLi has established strategic partnerships with a number of first-class

manufacturing enterprises, among which URP who has already supplied several small and medium-sized injection machines.

The two companies envisage to continue and strengthen this association, which will undoubtedly be profitable to each of them!



The **Ningbo Tuopu Group** is a private-owned company, founded in 1983 and listed on the Shanghai stock exchange. They produce automotive components, such as car suspensions, gearboxes and power steering systems.

This internationally-known group is a supplier of General Motors and a key player in China!

## THE NEW SILK ROAD

REP is sending injection units and machines to China by train: REP international was featured in a TV report on the FRANCE 2 evening news!

To boost exports with China, some companies now rely on rail transport: a new railway line of 11,000 kilometres between Europe and China was commissioned in 2017. With eight countries crossed, it is one of the new silk roads. The journey takes between 18 and 22 days which is much faster than the boat. Moreover, it is a much cheaper means of transport than the plane.

6 trains a week depart from France to China and 12 run the other way.

REP has occasionally used this service to supply REP presses made in France as fast as possible. Indeed, URP is still responsible for the installation and technical support of REP's G10 presses supplied to China from Europe. There were around thirty of them this year, intended for the most advanced processes, such as the dual-compound presses for example.



## A LEAP IN TECHNOLOGY

### ETHIOPIA, THE LAND OF VOLCANOES

The lake Bishoftu is a crater lake located in the centre of Ethiopia in the region of Oromia, 45 km south-west from the capital Addis-Abeba in the south of the main road, which crosses Debre Zeyit, officially known by the Oromo name, Bishoftu. The circular-shaped lake is part of the volcanic field of Bishoftu. It is the deepest (87 m) of the five lakes surrounding the town and is a very popular tourist attraction. Who would have thought finding here, in the middle of Africa, a trace of REP who makes 67% of its sales between the European Union and the USA?

### REP IS EVERYWHERE

There is definitely no doubt about! Since 1980, a G4-type REP injection moulding press has actually been operated in the plant of Dejen Aviation, a company of the aerospace industry that also produces drones.

A beautiful example for the durability of the REP presses, which, if maintained in due form,



G4 REP press

may last 30 years and more! Obsolescence is foreign to REP! Our strategy consists in providing spare parts until the end of the lifespan of the machine.

### A 10% GROWTH

Let's come back to Ethiopia, a country that has slowly recovered with an average growth of 10% since 2004.

A V59 machine (which was replaced in the G10 range with the V510) was delivered to Bishoftu in February 2017 along with a TPS-100 compression press and a mixing unit for the rubber preparation. A comprehensive scope of supply for the production of the bellow opposite.



**Jérôme CONSTANT**, REP After-Sales technician sent out for the installation explains: "A few modifications had of course been necessary to match the moulds of the G4 to the G9, as the centring hole on the fixed traverse was bigger on the G4 machine, but otherwise the installation was fine under local conditions in a new building still under construction."

Hopefully, the very attentive



Factory Dejen Aviation

operators during the training will appreciate the outstanding improvements made within 37 years regarding both ergonomics and productivity!



First hands-on experience with the machine



Dejen Team



# At the Heart of Injection



## MATCHING THE FIELD REQUIREMENTS

Who is the strongest? The answer depends on the context... the full power of the polar bear would be vain in the Savanna. Keeping that in mind, REP tried hard to cover all contexts by diversifying its offering: G10 Core, G10 Extended, RT9, G9A, URP. How to find your way around? It's easy: one range for each need, just like in the wildlife, each one's territory!

### AN UPMARKET IMAGE

Relying on the old tradition of high-performing presses, the image of REP presses is mostly associated with high-performing, reliable, sustainable, though expensive. Some customers think that they can't afford REP's technology and that they don't need specific functionalities, as they produce simple parts. They think that they can't justify the price of such an investment.

### THE DEAL HAS CHANGED

The deal has changed today. REP is now offering competitive prices for all needs with a diversified offer, so as to enable the customer to only invest in what he actually needs.

### ENTRY RANGE

The RT9 press made in association with our partner Tung-Yu makes the entry range and allows for restrained budget injection.



RT9

### LOCALIZED SOLUTIONS

Our solutions made in China (URP) and in India (G9A) constitute a powerful and economic localized alternative.



V59A

### LEAN RANGE

The G10 Core, which was first shown at the end of 2016 and which is accessible to all budgets, meets the lean manufacturing requirements for standard processes without particular complexity while granting the quality, reliability and performance associated with REP.



V710 Core

### PERFORMANCE RANGE

Finally, the G10 Extended, in line with the long-standing tradition of REP is ultra-performing, user-configurable, prearranged for open-ended applications throughout its lifetime and suitable for hi-tech processes, high production rates, automated environments or dual-compound processes.



V410 Extended

Let's now give the floor to Stéphane DEMIN, our Sales Manager: "REP is accessible to all budgets; we have developed machine ranges for all needs whether performance- or budget-related. You'll necessarily find the REP machine you need!"

# NEW HORIZONS

REP keeps concentrating on the implementation of the G10 range with the first horizontal machine, the H610, and the vertical presses of high closing forces such as the V810 and V910.



V810 - 800t



H610 - 400t

## V810 800 t

CLOSING UNIT		
Clamping force	kN	8200
Heater plates	mm	1000 x 1000
Moulds: thickness min. / max. Without sliding platen	mm	435 / 735
Working height	mm	903
INJECTION UNIT		
Volume	cm <sup>3</sup>	from 1000 to 11000
Pressure	bar	from 1500 to 3000

## V910 1000 t

CLOSING UNIT		
Clamping force	kN	10 200
Heater plates	mm	1200 x 1200
Moulds: thickness min. / max. Without sliding platen	mm	435 / 735
Working height	mm	1070
INJECTION UNIT		
Volume	cm <sup>3</sup>	from 1000 to 11000
Pressure	bar	from 1500 to 3000

## H610 400 t

CLOSING UNIT		
Clamping force	kN	4000
Heater plates	mm	750 x 800
Min/max Mould	mm	195 / 525
INJECTION UNIT		
Volume	cm <sup>3</sup>	from 500 to 6400
Pressure	bar	from 1500 to 3000



CMS - 250t: 4 stations

## CMS 250 t

CLOSING UNIT		
Clamping force	kN	2500
Heater plates	mm	630 x 500
Moulds: thickness min. / max. Without sliding platen	mm	350
Working height	mm	1010
INJECTION UNIT		
Volume	cm <sup>3</sup>	from 500 to 6400
Pressure	bar	from 1500 to 3000

The 4-station CMS press (1 injection station, 2 curing stations and 1 stripping station) is REP's solution for large-scale productions with optimized efficiency.

## CUSTOMER ANNOUNCEMENTS

### ERGONOMICS

**+** "The major advantage of the machine lies in its ergonomics with the height-adjusted work table. This is to avoid platforms or working in the pit. This is important, as more and more pieces are added to the rubber parts, which means many operations around the machine: Space around the machine is important to organise the jobs and to move around the machine", according to this French customer, who has 35 presses with 80% of them being REP machines.

### ENERGY CONSUMPTION

**+** "There is no doubt about the great job done by REP. We have an energy feedback system. A 400t press requires as little energy as a 150t machine of former generations." that's what a German customer told us.

### SPACE REQUIREMENT

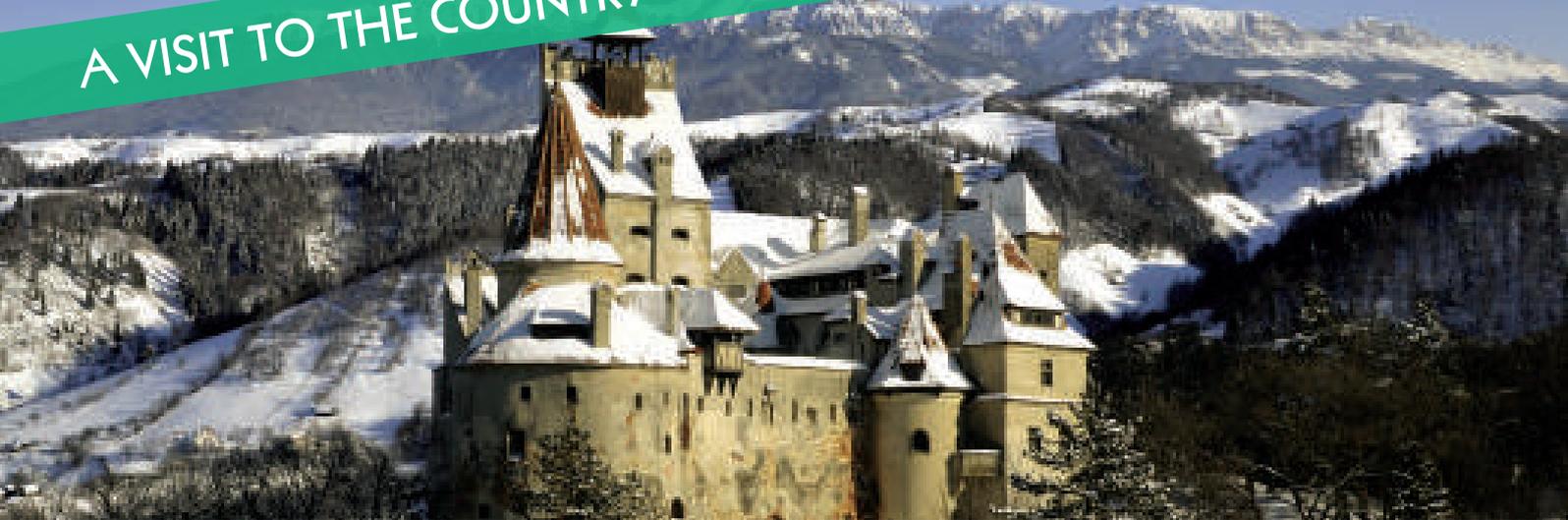
**+** "We really appreciate the minimum space requirement: we were able to install 5 REP machines in the same row compared to only 4 competitor machines", according to this Polish customer, who has more than 200 presses among which approximately one hundred REP presses.

### RELIABILITY

**+** "In our opinion, REP presses are more reliable. We have 1.7% unforeseeable maintenance interventions on REP machines, while the competitor machines amount to 4.7%", that's what explained an American customer.

### THE BLUE INDICATOR LAMP

**!** "The indicator lamp is useful, but we don't know what the blue colour corresponds to", that's what we were asked by several American customers. For those who should have the same question: this indicator lamp makes aware of an operator intervention for stripping. It was green on the G9 machine, but today green is used to show that the machine is running a cycle.



## G10 CORE AND LEAN MANUFACTURING

FENEC Romania - FENEC is a partner company of the SACRED group and has specialized in the design and manufacturing of elastomers (rubber and silicone) and thermoplastic parts. The company has a site in France and in Romania.

As a loyal customer of REP for many years, the Romanian site, which already had many REP presses, has recently purchased a V410 Core from the new G10 Core range.

FENEC Romania is a beautiful example for a durable customer-supplier relationship. Injection moulding and compression presses from 50 to 500 tons operate in their plant.

We can find there different press generations, which were all manufactured in the plant of REP: G4 (we want to point out the durability of this generation, which dates back more than thirty years!), B66, V27, V67, RT9 250, V710 and V410 Core, without forgetting the TYC compression press from our partner Tung-Yu.

With its leading edge offerings REP kept pace with the requirements of Fenec over the years. Fenec is a well-known company in the automotive and gas mask industry. The broad product range of Fenec includes: gas masks for the civil and military protection, rubber seals, LSR seals, protective wiring and steering axles mainly for Dacia and Renault, EPDM rubber caps (for General Motors).

REP's new G10 Core line, particularly designed for simple processes, was likely to find a place in the factory of Făgăraș. Particularly satisfied with the durability and rugged design of our machines, Fenec has chosen the G10 Core line, as it meets all major functionalities while being optimised for lean manufacturing. With the V410 Core, Fenec has chosen REP's cost-optimised expertise to produce rubber parts, which are used for the wiring of Dacia cars.



Various parts



Fenec Workshop

The teams of Fenec - Romania



## FENEC RUBBER EASTERN EUROPE

Strada Negoiu 151,  
Făgăraş 505200, Roumanie  
Tel. +40 268 216 699

Website: [www.fenec-rubber.ro](http://www.fenec-rubber.ro)



## G10 CORE

Stewart KNIGHT, Sales Manager for Romania and Bulgaria makes evident the advantages of the G10 Core line

"These machines are in great demand here. They all feature the cost-optimised REP technology. The G10 Core is a G10, it has the same patented injection unit as the G10 Extended. For customers who need simple solutions without stripping kit, process control or particular features, it is great!



Stewart KNIGHT

The process-control is powerful, they have a 17" monitor with intuitive user guide and are easy to use. The G10 Core is available with three clamping forces from 1,600 to 5,100 kN (V410-V510-V710) and is EC certified."

## SOME GEOGRAPHY?



FENEC is an hour-drive from the famous Bran castle .... better known as Dracula's castle!

## WHY LEAN?

The underutilization of the machine functionality constitutes a waste in a lean manufacturing context.

Investing in a G10 Core machine, the customers will only pay for the functionality they need.

# G10

core

REP TECHNOLOGY  
ACCESSIBLE  
TO ALL!

# NEW INTERFACE ON THE G10 EXTENDED LINE

You'll find hereinafter the new update of the G10 interface to version 9.0. With this new version developed in connection with REP Pack 4.0, REP wanted to best meet the expectations of the end users. A user survey has been conducted by interviewing the users in France, Germany, the United States and Poland directly on their sites, to mention just a few of them. The 9.0 version is the result of this work.

## AN ESSENTIAL ELEMENT OF PRODUCTIVITY

The HMI (Human Machine Interface) is an essential part on high-tech machines, such as REP presses. Everybody knows that a user-friendly and intuitive interface helps learn faster the functionality of the machine, simplifies the use of advanced functions and reduces the risk of mistakes. On the other hand it is less evident to show that a "bad" interface may lead to the disapproval of the machine by the users or to the partial use of the machine and therefore to reduced productivity. Talking about interface necessarily involves the display screen. Clear information, concision, coherence, readability are the key words of a successful interface, which obviously stands for productivity.

With their 21.5 inch multi-window monitor supporting the programming and display of two screen views, the G10 generation machines are already known for their user-friendly and intuitive environment. But REP wanted to go farther in understanding its customers and conducted a user study on its HMI, in order to optimize it and best meet the expectations of the different people working on the machine.

## MEETING THE USERS

Even though the naming may vary from one company to another, the people involved in the use of an HMI of an injection moulding press are the operators, supervisors or team leaders, the injection setters or pilots, the maintenance technicians and finally the process engineers, and sometimes also the quality technicians. Each of them has different expectations with regard to the HMI.



G10 multitask interface

As far as the operators are concerned, some of them are entitled to make changes and parameter settings, whereas others, depending on the companies, don't have this possibility or only within a restricted environment. The operators are mainly involved in the automatic cycle. If they work simultaneously on 2 or 3 presses, they have little time to spend on the interface and no time at all to search for information.

The information they need at a glance is:

- the temperature
- the clearly identified alarm messages
- the number of cycles performed
- the total curing time and the time left

Consequently, the data they use on the monitor are mainly:

- The cycle counter
- The clock for the time left
- The temperature view (production configuration)

Regarding the operations on the control panel, the mould movement and purge control buttons are those which are used the most.

The second user category includes the supervisors and team leaders, who assume a supervisor role and who assist the operators whenever needed (e.g. compound problem, parameter changes required, etc.). The maintenance technicians may also use the HMI for troubleshooting purposes.

The setters, sometimes also called injection pilots, change and clean the moulds and actually need to interact with the monitor approximately using twenty commands. They are actually involved in the series start: They initiate the program and check whether the mould has been mounted in the right way. They generally browse through the parameters.

Finally, the process engineers, whose role consists in setting the parameters for the running production, use the HMI every day. They make changes, observe the process and permanently match the settings to the required conditions:

- Parameter settings for new products
- Parameter adjustments
- Troubleshooting
- Input of tolerances
- Alarm settings
- Final program settings for new references, new moulds, development of the teach-in program (PLC unit).

## THE RESULTING NOVELTIES

The new HMI version 9.0 considers all these requirements. Besides the uniform design of the screen views, the improvements made will simplify the daily work of the different staff members involved. You'll find here below the major improvements:

- New Operator page.
- Production tracking tab added (curing, shot sizing, cycle number).
- HMI language change "on the fly", permanently accessible.
- Activation of the help button.
- "i" button added to display the wording of all parameters of the active page for 10s.
- Possibility to generate screenshots on USB key and to record the files (.csv).
- New programming of the heater clocks.
- Display of the REP Net data of the last 20

cycles (viewable in REP Net 4.0).

- Possible export of the last 1,000 cycles to USB key.

## INDUSTRY 4.0

This new interface version combines different software programs and applications designed for the industry of the future. The software suite "REP Pack 4.0" introduces the new technologies amid the industrial processes of the customers. Made of 11 modules, REP Pack 4.0 is designed for real time supervision and workshop modelling, centralizing the mould parameters, productivity calculations and the statistical process analysis.

The remote connection to the monitor of the press and the control of the interface are from now on possible via REP Viewer 4G. This function is very useful for remote assistance through the After-Sales Support.

Predictive maintenance is of course a key point of REP Pack 4.0 with REP Predict, which supervises the press-inherent parameters, informs about the utilization rate of the components and allows detecting wear and deviations.

REP Sequence complements the teach-in program Mastertrac® and enables the user to freely program the cycles or change the teach-in cycles set.

The user can also display the documentation or his own production files in pdf format directly on the machine thanks to REP PressDoc and REP ProdDoc.

And to learn all about the energy consumption of the machine, part-by-part, hour-by-hour, cycle-by-cycle, REP has developed Rep WattMeter.

Utility programs, such as REP Tag, which

REP Pack 4.0

REP Net 4.0

REP Net App

REP Viewer 4G

REP CostAdvisor

REP PressDoc

REP ProdDoc

REP Sequence

REP Predict

REP WattMeter

REP HandShake

REP Tag

allows reading the bar code or QR code using a hand-held reader (e.g. to make sure the right compound is used) or REP HandShake, which allows connecting the press to an automated system based on the Euromap 67 data exchange protocol, are also available.

Finally, REP Pack 4.0 includes REP Net 4.0 and REP Net App, the 4th generation of the REP Net supervision software (read more about on the next page) and its mobile app.

All in all, REP Pack 4.0 generates various benefits in terms of productivity and quality. The factory becomes a global interconnected system within which the different systems permanently communicate and where traceability is made sure. The overall view of the industrial process leads to increased flexibility and responsiveness.

## REP COSTADVISOR: THE SMART CHOICE!

Which press best suits your production process?

Two tools to support decision-making are made available to you in this module which is designed for the economic modelling of a production process on an injection moulding press and the calculation of the cost price of a part.

Type of software license: Freeware

Available software languages:

French - English - German

Available for free download from our internet site [www.repinjection.com!](http://www.repinjection.com!)





## REP NET 4.0 SUPERVISOR SOFTWARE

REP Net is a supervision software programme used to link presses to a centralised data system. This user-friendly system running Windows checks the process quality in real time, centralises the mould settings and allows retracing of the production schedule. The new REP Net 4.0 features a mobile application called REP Net App that alerts the operator about the status of the injection moulding workshop in real time.



Interview  
with **Sylvain  
KOMMER**,  
Rubber Injection Process  
Development Manager at  
AAM POWERTAIN

Sylvain is a manager in the Industrial Methods department at the Vénissieux factory and he also plays a technical support role in the Quality department. He works upstream of the industrial process on potential ways to implement formulations, and is in charge of costing new projects and developing prototype moulds, large production series and CRB (Cold Runner Block). He is also involved in the continuous improvement of injection, surface treatment and bonding processes. Additionally, he supervises the Initial Sample reports presented to customers.

**Sylvain Kommer, you know REP machines quite well?**

**SK.** Yes I do. REP machines are installed at AAM's POWERTRAIN VCS (vibration control system) division sites in Lyon and Barcelona. In Lyon, we have 20 machines, including 19 REP machines from all generations: four G10, five G9, five G8, five G7 used in a full-shift operation, 5 days a week. To date in Barcelona, we have 17 machines, including 11 from different generations: four G10, five G9, and two G7.

**Do you already use RepNet-win®?**

**SK.** Yes, we do. To date, we use RepNet-win® a lot both on our 19 presses in Vénissieux and on 11 presses in Barcelona.

**Would you please describe for us the parts that you produce?**

**SK.** We produce approximately 1,500,000 parts annually. They are complex antivibration parts for motors mounted on the crankshaft on the front side of the motor that are used to drive elements such as the alternator, water and oil pumps and even climate control – something that all vehicles today have.



The precision and quality of our parts both require a stable process. Issues may arise

from several parameters (machines, mould, injection, surface treatments, etc.) In particular, the part undergoes a very complex bonding stage. Criticality is a major concern, because should the part break, the vehicle will stop given that the accessories necessary for it to run are not working.



Crankshaft Isolation Pulley

**Is this the main reason why you particularly appreciate REP Net to ensure process stability and traceability?**

SK. Yes, I use the parameter tracking graphs and traceability a lot. All REP customers involved in automotive technology should have a system like REP Net to keep trace of the cycles. For AAM POWERTRAIN traceability is a critical concern. If a car maker notices a problem, we need to be able to analyse the production data and go back to the right cycle.



REP Net 4.0 is back compatible with older generations of presses (G6, G7, G8, G9) and of course the G10!

**You use different generation presses in your workshops. Can you confirm to us that it is possible to connect older models to the REP Net 4.0 network?**

SK. Yes, we really value being able to connect presses from different generations. To my knowledge, only REP provides this.

**The new REP Net 4.0 highlights connectivity. Is this a vital function nowadays?**

SK. We do use this functionality. Thanks to floating licenses, we had implemented gateways to access REP Net, but we were keen to access this service via a cloud. The Wi-Fi functionality is a big leap forward. Previously you had to go over to the central

terminal, but now you can access the data anywhere.

**Which REP Net 4.0 functionality do you use the most?**

SK. I think it's great that a single tool can centrally store mould settings, perform the SPC analysis and the cycle visualisations, as well as supervise the process and monitor the workshop! The ability to control alarms to stop production when necessary; the ability to track changes to the set value; and the ability to easily visualise the status of the machines over the previous ten cycles make life a lot easier for all users.

**Most of those functions were already available with RepNet-win®, which do you see as the most significant evolution?**

SK. Without a doubt, the real bonus with REP Net 4.0 is its flexibility and user friendliness! REP Net was somewhat difficult to use for some people which hampered the utilization of its full functionality. Now, you can configure the screens for each user, operator, driver or quality technician. For example, the quality technicians used to spend 45 minutes every day on REP Net analysing the cycles across all of the machines. With REP Net 4.0, the status of the default overnight cycles can be displayed in one click.



Interconnectivity with the database, flexibility and ease of use

**What do you mean by flexibility?**

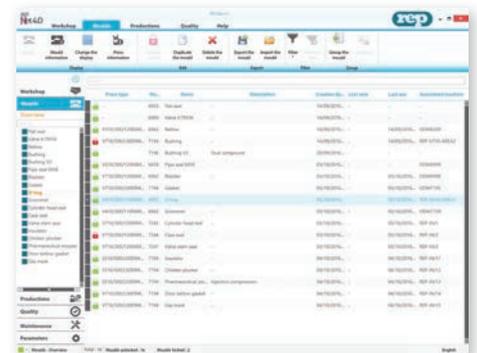
SK. Being able to recover the data and organise it according to the needs of the client. I know what I'm looking for and I can find it immediately. The ease of comparison, especially using the graph. The fact that the database can be connected to the tool that manages the machines is ideal for ERP, and SQL is a very open format. Beforehand, we had to use pdf versions, screen-shots and even Excel sheet exports which meant you were always working after the fact. Now we can have everything in real time! This is really handy for monitoring another production site remotely such as Barcelona in our case.

Thank you Sylvain Kommer for your presentation!

## REP Net 4.0



Real-time follow-up



Centralised settings



Supervision of process conformity

## FOUR GENERATIONS OF REP NET!

A pioneer in its field, REP was offering software to network presses and the data collection process as long ago as:

- 1986 Repnet® (running DOS)
- 1994 Rep-Next (running Unix)
- 2000 RepNet-win® (running Windows)
- 2017 REP Net 4.0



## AAM - AMERICAN AXLE & MANUFACTURING

AAM is a premier global supplier of driveline, metal forming, powertrain and casting technologies operating at more than 90 facilities with more than 25,000 employees around the world, including at its four POWERTRAIN VCS sites in Europe:

1. An R&D centre in Dieburg, Germany which also handles short run production for luxury vehicles (Aston Martin, Ferrari, etc.)
2. Two plants in France employing 330 people in Vénissieux and Décines. Vénissieux is an assembly line site that also has operations in: surface preparation, metal insert adhesion, and all rubber injection (bonded or otherwise) mass production activity for clients including: BMW, Renault-Nissan, PSA, Ford, FCA, etc.) This site also supplies rubber parts to other Group locations (in India and China) for the assembly of rubber dampers. Décines is an assembly line site (no injection) that is entirely devoted to the BMW client. The Vénissieux site is composed of the factory and an R&D centre (calculations and dynamic test benches to validate designs and processes)
3. One site in Barcelona, Spain where 120 people are employed. The products manufactured here are mainly for MIBA, Renault-Nissan, Daimler-Benz, Porsche and Audi.
4. One site in Halifax, England dedicated to the manufacturing of viscous dampers. The technology used is liquid poured silicone rather than injection.

More info: [www.aam.com](http://www.aam.com)



Site in France - Vénissieux



Assembly Line Site - Vénissieux

## CUSTOMERS' VOICES



*"The competitors don't offer this service. If they developed such a service, it would be much more expensive."*

*"I like tracking all cycles."*

*"I think it's a good training tool, while most of the people use it to store formulations: it may show events (parameter settings and their impact) to the operators."*

*"REP Net enables us to implement tolerances, to draft records and statistics, to justify maintenance costs, and if there are compound losses, REP Net can display them."*



*"As the production manager, I use it to show the operators their production rate."*

*"It's great to be able to see everything from a single PC."*

*"We use REP Net for troubleshooting and for the storage of parameters and formulations. It is very easy to use and makes it possible to keep the initial formulation."*

*"We use REP Net when needed for customer audits."*



REP offers all year long  
**TRAINING COURSES**  
For MOLD DESIGNERS,  
MOLD DESIGN DRAUGHTSMEN,  
and METHODS MANAGERS

LEARN HOW TO OPTIMIZE YOUR PROCESS!

Training Workshop  
“Adjustment of the Molding Parameters”

or

Training Workshop  
“Process and Mold Design”

Program and duration can be customized upon request

**REP TRAINING** The smart choice!



RUBBER IN MOTION

[www.repinjection.com](http://www.repinjection.com)

HEADING OFF TO THE AMERICAN DREAM



## HIGH PRECISION PARTS THANKS TO THE G10 EXTENDED

RAHCO Rubber Company is a customer centric, quality focused company that provides outstanding quality with unmatched customer care. They deliver best in class products for nearly 50 years. Beginning in 1967, they became a molder of miniature, high precision rubber components for phonograph needle and cartridge assemblies.



Steve Anton, President of RAHCO

The Anton Family founded the company it runs today. They've grown from their initial 5,000 sq. ft. space to their current 60,000 sq. ft. modern facility in Des Plaines, IL just minutes from O'Hare Airport.

The company has specialized over the years in the moulding of high-precision rubber parts: low waste transfer moulding and flashless injection moulding.

RAHCO Rubber Company has been a customer of REP Corp for over 15 years. Since that time, a particularly close relationship has grown up between the two companies, based on a shared knowledge of rubber technology and a technical exchange of information in terms of tooling, production, maintenance and process improvements. After purchasing several rubber injection molding machines and compression presses in the past years, RAHCO has recently invested in two high-tech V710 machines of the latest G10 generation to support the company's growth.

“ On this occasion, Tim Graham, President of REP Corporation, says: "We are proud to count amongst our clients ambitious and ever-growing companies like RAHCO. Beyond high-technology, our ability to demonstrate our sensitivity to RAHCO's needs and to work in close association with RAHCO's team is certainly part of our exemplary customer buyer relationship".

REP presses enable RAHCO to produce zero-fault energy-efficient rubber parts. As announced on their website [www.rahco-rubber.com](http://www.rahco-rubber.com), RAHCO has



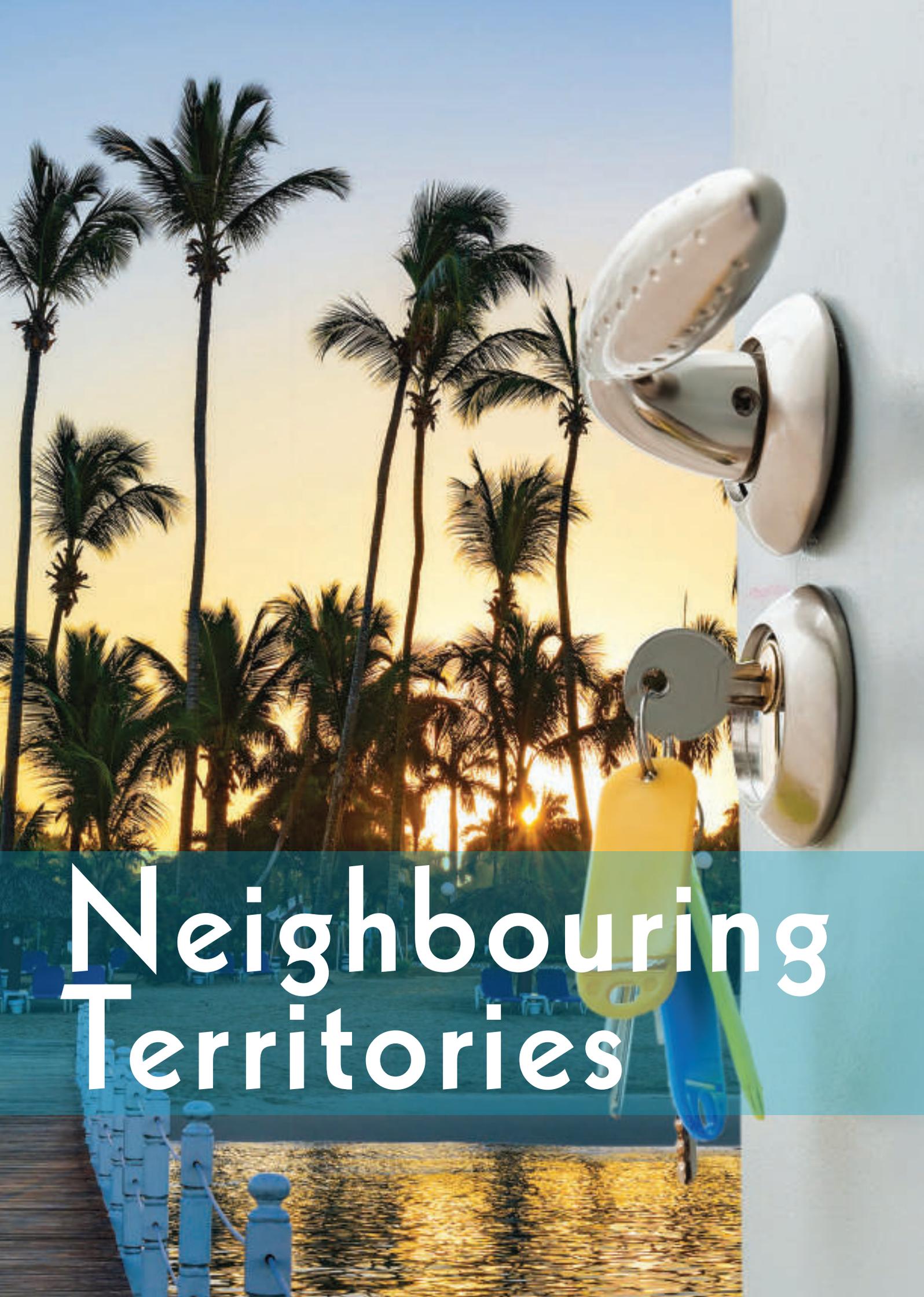
Jack Anton, VP Sales & Marketing and President Steve Anton "Proud Owners of Two New V710 Presses"

found in REP a supplier who provides technical assistance and a responsive support while meeting a wide range of requirements.

Only win-win projects produce total satisfaction, and both REP and RAHCO have known how to build on their complementary expertise and shared values to develop confidence and cement their relationship.



RAHCO RUBBER, Inc.  
1633 Birchwood Ave.  
Des Plaines, IL 60018



# Neighbouring Territories

## A KNOW-HOW FOR THE BENEFIT OF PASTRY-MAKING

Let's now change from the sealing or vibration technology to show you a much more tempting application in the field of cooking with the purchase of a compression press from our partner TUNG-YU by a company specialized in non-stick baking molds. Or how to sustain a French "know-how" in support of pastry-making and gastronomy!

The origin of this new project dates back to 2012. The customer was looking for a new production solution for the manufacturing of big-sized silicone molds, what meant the replacement of a former press. The purpose consisted in rationalizing the production of molded parts by purchasing a dedicated compression press.

REP international supported this potential customer throughout the engineering phases. After a first bidding round, REP was chosen for the manufacturing of sophisticated parts. The large dimensions of the prototype mold implied that we had to find an existing sufficiently dimensioned press among our customers. "Baltijas Gumijas Fabrika" in Latvia accepted to make available an appropriate press for the test runs, which took place in March 2017. Thanks to the active involvement of our Latvian customer the tests could be performed successfully.

Upon the order award, Mr. Stewart KNIGHT, Technical Manager of the partnership between REP and Tung-Yu, coordinated the whole project and accompanied the customer's delegation to Taiwan for the acceptance tests of the press.

Manufacturing tests were performed with a new mold to verify the operation of the press and the quality of the parts produced. Once again, the appropriateness between the equipment made by Tung-Yu and the production issue of the customer was proven and confirmed: after the second shot the parts were as expected!

The heating power of this dual-station press and the vacuum bell contributed to the efficient and very fast process finalization.

The customer particularly appreciated:

- the simplicity of use,
- the vacuum bell, which efficiently solves manufacturing problems,
- the big-sized heater plates, **800x950 mm**
- the assistance and support throughout the "turnkey" project.



*The compression mold ...*



*... The baking mold! After the moulding process, the baking mold undergoes a curing operation in an oven for two hours for the purposes of hygienic safety.*

**TungYu**  
FORMING INNOVATION

### IDENTITY FORM OF THE PRESS

Manufacturer and partner: **Tung-Yu**  
Type: **TYC-V-22-2-S-PCD (CE)**  
Clamping force: **500t**  
Number of work stations: **2**  
Size of the heater plates: **800x950 mm**  
Distance between plates: **700 mm**  
Stroke: **620 mm**  
Vacuum bell: **Yes**

### THE POSTCARD FROM THE CUSTOMER



“ We were very impressed by your production capabilities and the follow-up of your machine production and quality! Moreover, the professional and at the same time pleasant atmosphere that governs your teams means to me the guarantee for the durability of your company.

I would also like to thank you for the quality of the technical and sales-related exchanges made possible both in the field of injection moulding and compression. All that makes me think that our decision to choose REP for the purchase of the Tung-Yu compression press was right.

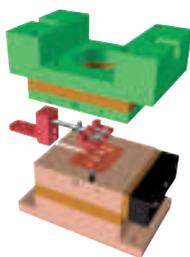
## AUTOMATION PROCESS WITH 100% SUCCESS

Welcome to WIXOM, Michigan, where the Great Lakes Rubber company (GLR) is established. GLR is one of the first customers in North America to purchase 3 micro-injection machines Microject: one used for prototyping and lab testing and two machines integrated into an automated production line.

Great Lakes Rubber Company is a manufacturer of precision, custom molded rubber products and prototypes since 1979. They specialize in producing close tolerance dynamic seals and bonding rubber to other materials. The markets served are mainly the automotive, military, medical and transportation industries with applications in the field of sealing and vibration control.

In this case, the objective of the project was to produce a pneumatic valve with metal insert. Apart from the difficulties related to bonding rubber to metal (see related article), **the challenge was to have a full automated process without operator intervention.**

The selected configuration was an automated cell made of one robot and two Microject machines equipped with a 2-cavity mold and the following cycle sequence:



• Inserts positioning 3D view of the mold

and orientation through vibrating bowls

- Camera monitoring system for checking the inserts orientation
- Inserts loading by the robot
- Overmolding and curing
- Parts stripping by the robot
- Camera monitoring: to check both parts have been demolded
- Removal of the feed sprue by a gripper
- Start of a new cycle

After several months in operation, the MicroJect is performing as expected. The staff likes the machine and is planning to expand its Microject program.

President DeMallie confirms that cost competitiveness shows improvements especially when running smaller parts with compounds exceeding \$100 USD/lb.



Metal-Rubber part types



The micromachine integrated in a robotized cell (including the gripper for the withdrawal of the feed sprue and a system for the optical control of the parts in the foreground, and the insert loading handling unit in the background)

Don DeMallie, President of GLR and staff have been a vital part working with the REP Group and WEXFORD AUTOMATION to conduct this project which was truly a team effort.

**GREAT LAKES RUBBER COMPANY**

P.O. Box 930199  
30573 Beck Rd  
Wixom, MI 48393, USA

Website: [www.greatlakesrubberco.com](http://www.greatlakesrubberco.com)



## PLUG & PRODUCE



The **Microject** is a 6-ton closing force micromachine designed for molding and overmolding small parts.

Perfectly adapted to very small precision parts, it can be easily integrated into automated assembly lines and suits to prototyping or lab testing.

Usability and flexibility

- Installed in 30 minutes sharp
- Very short mould set-up time
- Intuitive interface with touchpad

The **Microject** is ultra-compact for easy integration. The only requirement is a connection to the power supply!

The **Microject** is available in rubber version, TPR version or LSR version.

## THE POSTCARD FROM THE CUSTOMER



“ Hi REP,  
Some news of our new **Microject** machines that have performed very well, repeatability remains excellent! Our people like the machine and have adopted it well. When encountering some initial start-up challenges, the REP support was exemplary and went to our satisfaction. Overall, we are quite satisfied and will expand this line of presses in the future!

GLR Wixom Michigan

## FOCUS ON RUBBER-METAL PARTS

by **Matthieu Wolff**

The manufacturers of rubber-metal parts are facing major difficulties in bonding rubber to the insert and the consecutive sealing.

### ADHESION, BOND AND BONDING

Adhesion may be defined as the physical and/or chemical phenomenon that generates a bond between two materials which are firmly stuck together.

Gluing may be defined as a technical joining process performed at ambient temperature and under low contact pressure.

Bonding is a technical operation performed under temperature and high pressure the result of which is called adhesion.

### ADHESIVITY

The cohesive force of a material is the intermolecular attractive force, whereas the adhesive properties generally relate to interface mechanisms.

Rubber adhesivity means the trend to stick to another material (to the metal of the implemented equipment for example) and to itself.

In the same way as rubber is formulated depending on the expected compromise of properties, in the case of a chemical adhesion system the bonding agent corresponding to a group of elastomers will also depend on the curing system, the environment responsible for the joining process to perform, the nature of the substrate, the moulding method and the part geometry. The bonding agent in turn is also subject to formulation.

Adhesion is proven to be enhanced when the molecules of a surface (substrate) are very close to the molecules of the other material (adhesive), the result of intimate contact at molecular level. This interfacial molecular contact leads to the diffusion of the macromolecular chains across the two interface levels, thus generating an entwined interfacial area.

Primary chemical bonds to strengthen the interactions and often the mechanical strength of the assembly are generated during this interphase, or failing that, at interfacial level.

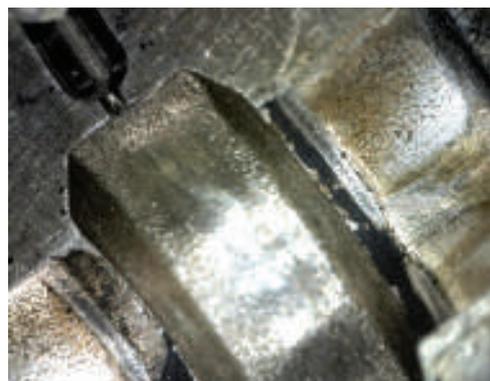
Considering that rubber/metal parts are operating in more and more stringent environments, the quality of the rubber/metal bond therefore depends on the initial mechanical strength and on the resistance to corrosion. The prior surface cleaning of the parts to bond is essential to anticipate contamination or corrosion.

Bonding agents shall be designed for the major part of processes, for protection against corrosion of the substrate and for ageing resistance.

### INSERT SEALING

To limit leaks from the rubber compound to the insert, knives or indenters are used to mechanically stop any possible compound leak.

The knives or indenters are responsible for compressing the insert in specific areas to ensure leak tightness. The dimensions of these knives shall compensate for the dimensional tolerances of the insert.



*Knives (raised parts) - responsible for the leak tightness of the insert*



## ROTOCURE: IDEAL FOR POLYMER-COATED FABRICS

Rotocure is a continuous curing machine. Manufactured by our Taiwan partner TUNG-YU and sold by REP, it is designed to cure rubber rolls intended for various industrial, domestic or leisure applications.

Rotocure is the abbreviation for "Rotary Curing Press". This machine is designed for the continuous curing of rubber, silicone or technical polymer-coated textile rolls, also called "coated fabrics". There are multiple and various applications, such as coatings for roofings and floorings, textiles and nautical accessories, rain wear, airbags or bellows for busses and trains, conveyor belts.



*The common point of all these facilities: they are made of coated fabrics manufactured on Rotocure*

### THE PRINCIPLE OF ROTO CURE

The compound is placed on a steel conveyor belt and brought in touch with a rotary drum, which is heated from inside by a steam generator to 150-200°C and from outside through infrared heating. The compound to cure is led between the drum and the steel belt. It is firmly pressed against the drum and fed forward very slowly through the rotation of the drum. Curing is caused through the combined action of the drum temperature and

the pressure exerted on the compound by the steel belt. The roll diameter and its speed determine the curing time. The Rotocure system may operate in a closed loop. In this case, the speed is controlled by the tension of the compound strip.

The separating foil inserted in-between the raw material roll layers to prevent the rubber from sticking to itself is wound onto the unwinding station at the beginning of the process. At the end, a new separating foil

is introduced when winding the finished product. A third winding/unwinding system may be used to insert a raised pattern paper for the possible engraving of the rubber. For the rubber engraving another possible option may be the use of an engraved drum.

A typical continuous curing line generally includes one or several winding/unwinding systems (for the raw material, the raised pattern paper and the protective foil), a Rotocure system and a winding system for

the finished product. The perfect alignment is essential to keep the process parameters within the tolerances, to ensure homogeneous curing and a good winding quality.



## PARTNERS SINCE 2004

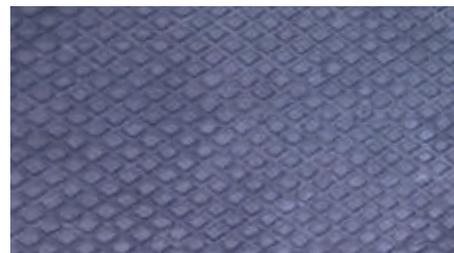


Relentlessly striving for inventiveness and innovation, Tung-Yu has developed different types of vacuum curing presses and moulding machines (from 10 to 14,000 tons) eliminating most of the hardly controllable flaws generated in the production of rubber products.

The results are very positive, as evidenced by the favourable feedback of our customers. Tung-Yu is not only leader in Taiwan, but also the preferred supplier of renowned manufacturers in Europe, in the USA and Japan. Moreover, Tung-Yu massively exports to China, South-East Asia, Australia and New Zealand.

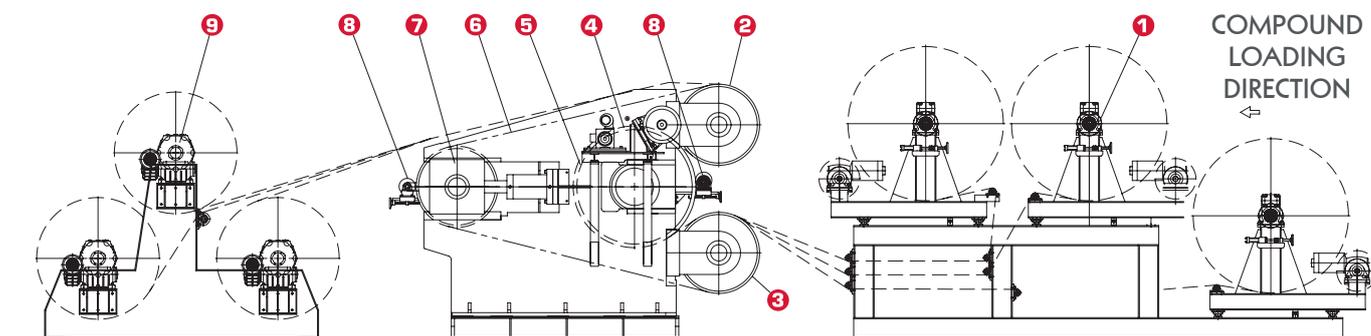
With the ISO 9001 certification and the compliance with the European standards, Tung-Yu keeps progressing in the fields of Research & Development, manufacturing, after-sales management and support with the major goal to provide customers with the best possible quality and a first class service.

To learn more: [www.tungyu.com](http://www.tungyu.com)



Continuous curing installations in the field

Example for a rubber sheet with patterns generated thanks to an engraved drum



- |                              |  |
|------------------------------|--|
| 1. Raw material feeding unit | 6. Steel belt or cold-drawn steel belt |
| 2. Upper drum                | 7. Rear drum                           |
| 3. Lower drum                | 8. Cleaning unit                       |
| 4. Main heating drum         | 9. Product recovery unit               |
| 5. Ancillary heating unit    |  |

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RUBBER IN MOTION

