

THE REINFORCER

KORDSA GLOBAL | BULLETIN | N.01 | JUNE 2014 TURKEY

Determined to Create Value

KORDSA GLOBAL

INVESTMENTS

TECHNOLOGY

NEW PRODUCTS

SERVICE INNOVATION

NON-TIRE





MISSION

Deliver high value added reinforcement solutions, globally.

VISION

Agile Kordsa Global in high value businesses for sustainable growth.

THE REINFORCER

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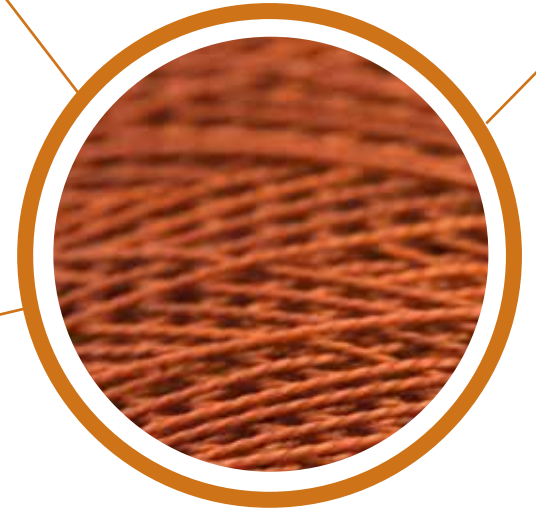
How We Reinforce

Products and Technologies
by Kordsa®

Reinforced by **KORDSA**®

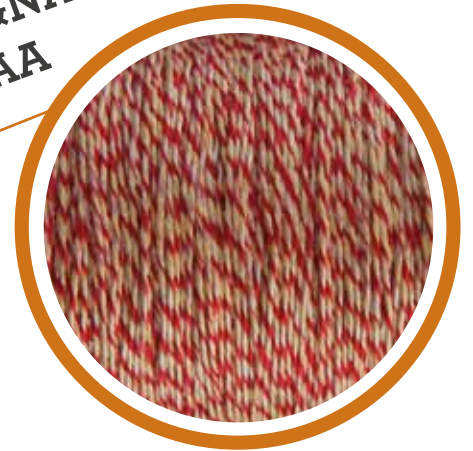
Nylon 6.6 Products | Yarn and TCF

- Kordsa® T728
- Kordsa® T802
- Kordsa® T728 SEC
- Kordsa® SA164 Technical Yarn
- Kordsa® NY 6.6
- Kordsa® SA147 Airbag Yarn

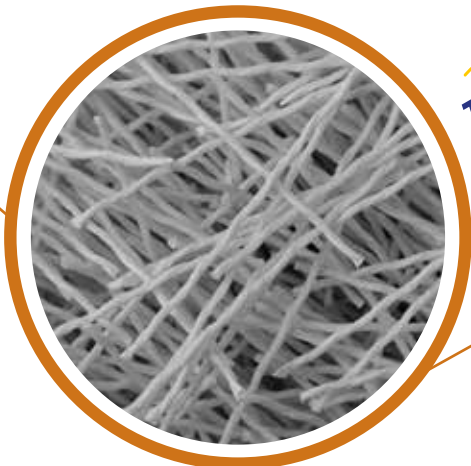


PET Products | Yarn and TCF

- Kordsa® 4G HMLVLS AA&NAA
- Kordsa® 3G HT-HMLS AA&NAA
- Kordsa® 2G HMLS AA&NAA



Kordsa® Specialty Products and Technologies



Twixtra[®] hybrid solutions
Capmax[®]
MONOLIX[®]
InterPlast[®] InterCord[®] KRATOS[™] HARtech



**REINFORCED BY
KORDSA[®]**

Owing to its receptiveness to adapt to changes and new developments, Kordsa Global entered 2014 with a fresh vision. We position ourselves as “The Reinforcer”





**CEO
CENK ALPER**

Kordsa Global has evolved into a global company that differentiates itself in the market with the quality of its services, products and technology. And has become a strategic partner for its clients by providing value for them.

We are highly proud of the position that Kordsa Global has reached in its sector today. Having started as a tire cord fabric manufacturing facility in Izmit, Turkey 41 years ago, today it has production facilities in 9 countries across the world. Kordsa Global is a major supplier of the reinforcement materials for the world's top tire producers. Our company has successfully emerged as a global player by accurately analysing the developments in the world trade and by making prestigious partnerships and acquisitions.

Since its establishment, Kordsa Global has continuously developed in strength and motivation through its principles and values. Understanding clients' needs correctly and presenting the best solutions to these needs have made Kordsa Global a world leader. On the other hand, regardless of the conditions of the industry and the global economy, thanks to our agile teams that we were able to ride over the storms without losing our focus.

Starting out as a tire reinforcer, Kordsa Global has evolved into a global company by differentiating itself from the market with the quality of its people, services, products and technology. Kordsa Global has become a strategic partner for its clients and consistently creates value for them. It's these principles that will carry us to the future.

Owing to its ability to quickly adapt to the changes and new developments, Kordsa Global entered 2014 with a fresh vision. We position ourselves as "The Reinforcer". We are expanding our field of activities through the "reinforcement" positioning. This is also the name of our journal. Since 1973 we have gained much experience and developed in advance technologies in tire reinforcement

sector by serving the world leaders and cooperating with top industry and academy partners. Now we are developing this reinforcement knowledge in the construction and composite industries. Meanwhile we are sustaining our commitments to our core business, tire industry by continuously developing new technologies and bringing new service solutions. Our goal is to advance in these new fields by continuously investing in our employees, customers and shareholders and by developing new, high value added technologies through our innovation culture.

As widely known in the highly challenging environment of the business world today, any new comer can set up production facilities and supply to the world easily by transferring know how from outside. However, only committed and outstanding companies that successfully differentiate themselves from the others can respond to the high expectations and help their clients to differentiate in their industries. Superior product and service quality, seamless logistics, effective and efficient R&D, crisis management and business continuity, capability to supply from multiple locations, relentless efforts to create a sustainable world and most importantly people driven by core principles and values are the indispensable elements of differentiation. Kordsa Global strives for excellence in all of these to sustain its leadership position.

We are happy to share the latest developments and successes in our business with you in "The Reinforcer". We still have a long journey to walk through and we would like to unite, develop together and prosper together.

Happy reading,



REINFORCED BY KORDSA®



*We are working for
her safety*

KORDSA GLOBAL

In First Quarter 2014

FINANCIAL RESULTS

Kordsa Global increased its revenues by 24% in the Q1

Kordsa Global, the world leader in reinforcement industry, increased its revenues by 24% in the first quarter compared to same period of last year and reached \$200 m TL. Net profit of the company is \$16.2 m TL (March 2013: \$0.2 m TL).

Profit before tax, interest and amortisation (EBIT) was \$30 m TL in the same period, which corresponds to an increase of 209%.

Cenk Alper, Chief Executive Officer, when commenting on the results, underlined the role of operational efficiency, discipline in business processes and commercial excellence in the success of the first quarter. Mentioning also the positive effects of the exchange rate on the profits. Alper stated that they will continue on this path throughout the year.

He said: "As Kordsa Global we have recently focused on operational efficiency. We primarily targeted at controlling our fixed costs. Now we are harvesting the results of this strategy.

Despite the shifting markets in the global economy and the shrinkage in the industry accordingly, with our modest, quick and active teams we reached successful figures by improving efficiency in our internal processes. On the other hand, by focusing on marketing activities we acquired commercial excellence, which also has an effect on profits. As a supplier of the world's top tire producers for more than 40 years and as a world leader in the reinforcement industry, we achieve this status by consistently targeting improvement. With this vision we will continue this positive course and plan to increase our revenues by 20% by the end of the year, compared to 2013."



VALUES

Kordsa Global Is Awarded For Its Ethics Processes and Their Implementations For The Second Consecutive Year

Kordsa Global was once again awarded by the Ethics Values Center Foundation (EDMER), as one of the most important ethics associations in Turkey, following the evaluations regarding a variety of topics such as; brand management, corporate governance/

management, corporate social responsibility, integration management, leadership and creativity; within ETIKA 2013 Turkey Ethics Awards.



INVESTMENTS

Growth In Asia

Kordsa Global realizes its sustainable profitable growth in Indonesia at the Asian region, making approximately \$100 million of investment as of today

The ongoing capacity increases of Tire Cord Fabric and Polyester production in Kordsa Global Indonesia plant is to be completed by the end of 2014. This capacity expansion will no doubt strengthen Kordsa Global's competitiveness in the Asia region by increasing the reliability of supply, and the quality of the product.



Growth In EMEA

The Kordsa Global Izmit Plant launched the Most Efficient Nylon Facility in the World with Its line 1 Expansion Investment

Designed, produced and installed by Kordsa Global Engineering and Operations teams, the USD 10.4 million project has been completed with zero incidents. In addition to capacity increase and cost advantages, it will provide a significant contribution to the company's growth in businesses with high added value.



TECHNOLOGY

Kordsa Global R&D Center is Awarded by the Ministry of Science, Industry and Technology

Kordsa Global is reaping the rewards of its R&D investments. This is an important link in its strategy to provide value-added products in order to strengthen market leadership and increase its profitability. The Company have outdistanced many vast technology companies in Turkey. Kordsa Global rank second among all industries following Aselsan and rank first in the textile industry having won the Most Successful R&D Center Award among 142 Turkish R&D Centers in the R&D Centers Performance Evaluation carried out by the Ministry of Science, Industry and Technology.

The award is presented by Minister Fikri Işık in a ceremony held in Kocaeli. These awards represent recognition of the success of Kordsa Global's effective and efficient technology investments. We will continue to work in a disciplined way in order to reach our goal. The goal being to win more awards in the future as a result of the intense efforts by the Technology Team, led by İbrahim Yildirim. We aim to make Kordsa Global the leader in technology in this industry.

Kordsa Global is The Champion of the Textile Innovation League

As the technology leader of its sector, Kordsa Global won another award with its Technology Center. Last month Kordsa Global's Technology Center took the second place among 142 R&D centers in the performance evaluation of 'the best R&D centers' of the Ministry of Science, Industry and Technology. And this month Kordsa Global became the champion of

the Turkey Textile Innovation League. During the 6th R&D Project Market, which is organized every year by the Union of Uludağ Textile Exporters, a total of 248 technical textile projects were exhibited. Kordsa Global won the championship of Turkey Textile Innovation League, for the first time this year as part of the Project Market.



Cenk Alper receiving the award presented by Fikri Isik, The Minister of Science, Industry and Technology

Kordsa Global Meets With The Chinese Sector At The China Rubber Conference

Leading supplier of reinforcing rubber and leader of the rubber marketing sector, Kordsa Global met with Chinese rubber producers. Supporting the China Rubber Industry Association's (CRIA) China Rubber Conference with its sponsorship, Kordsa Global organized a luncheon on the second day of the event, on March 25-28 in Qingdao. This event drew a crowd of more than 600 company owners and representatives.

The China Rubber Conference is an annual event since 2006 and is recognized as China's largest international and professional event in the rubber industry. Each year close to 3000 participants from 20 countries attend the conference.

Including Kordsa Global sales executives, the conference in China was also attended by high level executives from Istanbul, Turkey, where the company's headquarters are located. The gathering provided an opportunity for sector activities to be discussed and also reinforced commercial friendships.

In drawing attention to the dynamics of the rubber sector in China, Kordsa Global CEO Cenk Alper stated, "As in every other sector, China stands out with its producers in the rubber sector, the industry that we serve. It has been through our experience in working with China and our friendship with the China Rubber Industry Association that we have had the opportunity to glimpse into the dynamics of the rubber producers here."

Chinese producers constitute a huge market locally as well as all over Asia, not only in terms of population and geographic position, but through their capability of addressing the entire world with their increasing experience in the branding process. "We are indeed happy to be able to support them in this process with our quality products and our principle of maximum customer satisfaction."

Having Led The Intelligent Protective Textiles for a High Risk Professions Project

A kick-off meeting was held for the Kordsa Global's first EU project, titled "Intelligent Protective Textiles for High Risk Professions" in Patras, Greece. All the partners attended. Kordsa Global was represented by Dr. Sezen Gürdağ and Dr. Deniz Korkmaz. The project deals with the development of ballistic protection clothing through the use of MWCNT incorporated PE melt spun monofilaments. These would have the potential to replace some higher cost fibers currently in use. Detailed information can be found on the project web-site: <http://inprotex.iceht.forth.gr/>



Kordsa Global Was At The Center of Attention With Its High Quality Products

During the 11th International Yarn Fair, Kordsa Global displayed its world leader Kordsa® branded yarns globally recognized for their superior quality.

Kordsa's yarns are used in a vast number of applications; such as cord fabric, industrial fabrics, single end cord; and other technical textile products like airsprings, hoses, conveyor belts, V-belts, ropes, geogrid, protective textiles and concrete reinforcement.

Indicated that Kordsa Global is the technology leader along with its sectorial leadership, Kordsa Global CEO Cenk Alper stated that: "We are working systematically on developing new products and bringing our current products to perfection with a strong team in our Global Technology center."

With its production facilities reaching across five continents, Kordsa Global meets the demand for industrial yarn across the world with its best quality products and services. We are together with our customers once again. In addition, it is an opportunity for us to meet with potential customers."

NON-TIRE SOLUTIONS

Kordsa Global Advances in the Composite and Construction Reinforcement Materials

First Turkey-Japan Workshop (JTJW) On Polymeric Composite Materials

Kordsa Global is working hard to develop composites in order to accomplish profitable growth in construction and composite materials industries besides tire sector.

Major Japanese companies in composites industry and globally renowned scientists attended the First Turkey-Japan Workshop on Polymeric Composite Materials between May 12-13 in Sabanci University co-sponsored by Kordsa Global.

We Are Reinforcing The Concrete With Kratos™

The pre-launch of Kratos™, our initial product for the construction industry, aroused excitement at the TURKEYBUILD Istanbul. Kratos™ was created in line with our growth strategy in sub-industries. Many visitors from construction industries showed great interest in Kratos™ and inquired more about its features.

Kratos™, the first product of our Construction Reinforcement Business Unit, developed as a result of the program, which aimed to carry Kordsa Global's leadership in reinforcement to the construction industry. Indicating that they would like to support the construction industry with Kratos™, which was developed to reinforce the concrete. Kordsa Global CEO Cenk Alper stated: "As a company that has already proved its quality and institutionalism, we received great interest from the construction industry for our concrete reinforcement solutions."

While presenting the technical qualifications of Kratos™, Head of Kordsa Global Construction Reinforcement Business Unit, Hakan

Oker stressed on the fact that Kratos™ is the first concrete fiber brand being produced domestically. Oker said: “Kratos™ ensures outstanding robustness if you use 412 thousand pieces or 24 km long fiber per 1 cubic meter.” Stating that Kratos™ is mixed easily which has advantages in work safety, Oker said: “Kratos™ performs effective fracture control in concrete through curing from the inside and homogeneous 3D dispersion. It strengthens the concrete without any need for steel mesh or steel wire. Kratos™ will present Kordsa Global’s quality to the construction industry, thanks to its easy, fast application and time and cost saving properties.”



SUSTAINABILITY

Kordsa Global Signed the Global Compact

Kordsa Global signed the Global Compact, which has been formed by the UN to guarantee universal principles in business with an international compact. It is known as the most important document of corporate social responsibility in the world.

Stated that in Kordsa Global business ethic is a basic principle that is followed comprehensively. Kordsa Global will strengthen its commitment to the company's values once more by signing the UN Global Compact that is composed of ten principles in the areas of human rights, labour, the environment and anti-corruption. The UN Global Compact was placed on the agenda by then UN Secretary General Kofi Annan during the World Economic Forum in 1999. The signatory companies and other private institutions of the UN Global Compact are assumed to include the ten principles of the Compact into their mission, business values and corporate principles. Until now the UN Global Compact has been signed by 8000 institutions in 135 countries.



Kordsa Global Introduced Its Forthcoming Eco-Friendly At The Tire Technology Expo 2014

The latest eco-friendly products by Kordsa Global raised considerable attention in the Tire Technology Expo 2014. Kordsa Global has accomplished to producing tire cord fabrics with a cutting-edge technology that supersedes the common formula used all over the world since 1935, which might be harmful to the environment and human health due the chemicals contained. This include those contained such as resorcinol and formaldehyde. Kordsa Global introduced its new products it had developed with an environmental sensitivity under the “green products” program to the tire production and design industry in Tire Technology Expo 2014.

Kordsa Global’s new product left its mark in the Tire Expo, the foremost event in the tire design and manufacturing industries. There were a variety of suppliers and machine manufacturers that attend the event and also highly recognized memos and speakers from the industry. Cenk Alper stated; “Kordsa has accomplished to make a change from the 80-year formula used in the washing of tire cord fabrics. As opposed to the toxic resorcinol and formaldehydes, the new formula we have developed used greener chemicals.” said Mr. Alper.

Nominated For The Award

The new technology developed as a result of a busy research & development period allowing the company to manufacture tire cord fabrics without using resorcinol and formaldehyde. The very special mixture of resin and latex solutions prepared by Kordsa Global is considered as an important milestone in the tire cord fabric processing, a method used ever since 1935. The article entitled “A Processing Technology with No Resorcinol or Formaldehydes” was published in the European Rubber magazine, the leading publisher in the industry. The technology was the finalist for the “Environmental Achievement of The Year”.

A Turning Point in The Tire Cord Fabric Processing Developments

Advantages brought by the technology acclaimed by the suppliers of Kordsa Global, excluding resorcinol-formaldehyde contents are summarized as follows:

- Use of resorcinol and formaldehydes is entirely excluded from the tire cord processing.
- Release of formaldehydes, toxic for humans and nature, is eliminated.
- The desired level of adhesion is reached with less “solid on the cord”.
- Dynamic adhesion performance of the cord fabric is enhanced.

** For more information on our environmentally friendly products, please see page 24*

The objective is clear:
Creating more value,
for our customers
and
stakeholders





COMMERCIAL EXCELLENCE IN KORDSA GLOBAL

VAHE HANAMIRIAN

Global Marketing Director

Commercial Excellence is trend! Because in today's global and highly competitive business world companies require excellence in all aspects. Just like in a hundred meter run, champions are determined today by miliseconds and not by just seconds, as in the past. Today, if one wants to be among the best, one needs to strive for perfection. In the past several tens of years, this philosophy was very well known, but priority was given to operational excellence. In fact, most succesful companies reached such high levels of operational excellence, that differences could hardly be noticed. Just like examining a photo-finish after a race. Only in the recent 5 to 10 years, have companies started to notice that improvements are necessary for their commercial approach too. B2B companies expecially, were resistant to change. Their commercial view was by arguing that they just had a comparably smaller number of customers whom they managed by caring for them in a customized way. Kordsa Global was one of those companies, which had reached a high level of excellence in most operational fields. Being a leader and usually a pioneer, we looked to improve our commercial approach. A few years back, we had established a Market Development Unit within our Technology Department which was carrying out the 'marketing' of new products developed by the Technology Team. Although borders were set and marketing responsibility was not stretched to standard products, still some important sub-proceses such as; Market Intelligence, Marketing Communications, Value Pricing were defined, owned and exercised frequently and quite succesfully.

Within the second half of 2013, we started to discuss how to develop further. Soon it become clear, that

In today's global and highly competitive business world companies require excellence in all aspects. Just like in a hundred meter run, champions are determined today by miliseconds and not by just seconds

an objective assessment was needed possibly under an experienced guidance to avoid a trial-and-error approach. Then we decided to work along side a consultant. From early December to late March a core team of us worked with a consulting company. An objective assessment was made and later reccommendations were designed specifically for Kordsa Global. Management gave full support to the Commercial Excellence Project and implementations proposed to the Executive Team. These were put into effect almost immediately.

Today a Marketing Department is established parallel to the Sales Department. Marketing is reporting to the CEO and has subfunctions such as; Market Intelligence, Marketing Communications, Strategy and Pricing, Product and Service Innovations. Within Sales the responsibility of Segment and Channel Management is owned which plays an important role, as segments define generalised approaches.

Another project team will guide Marketing and Sales through the implementation phase. Of course improvements are endless, so fine tuning will be carried out continuously and more intensively within the next 1-2 years.

The objective is clear:

Creating more value!

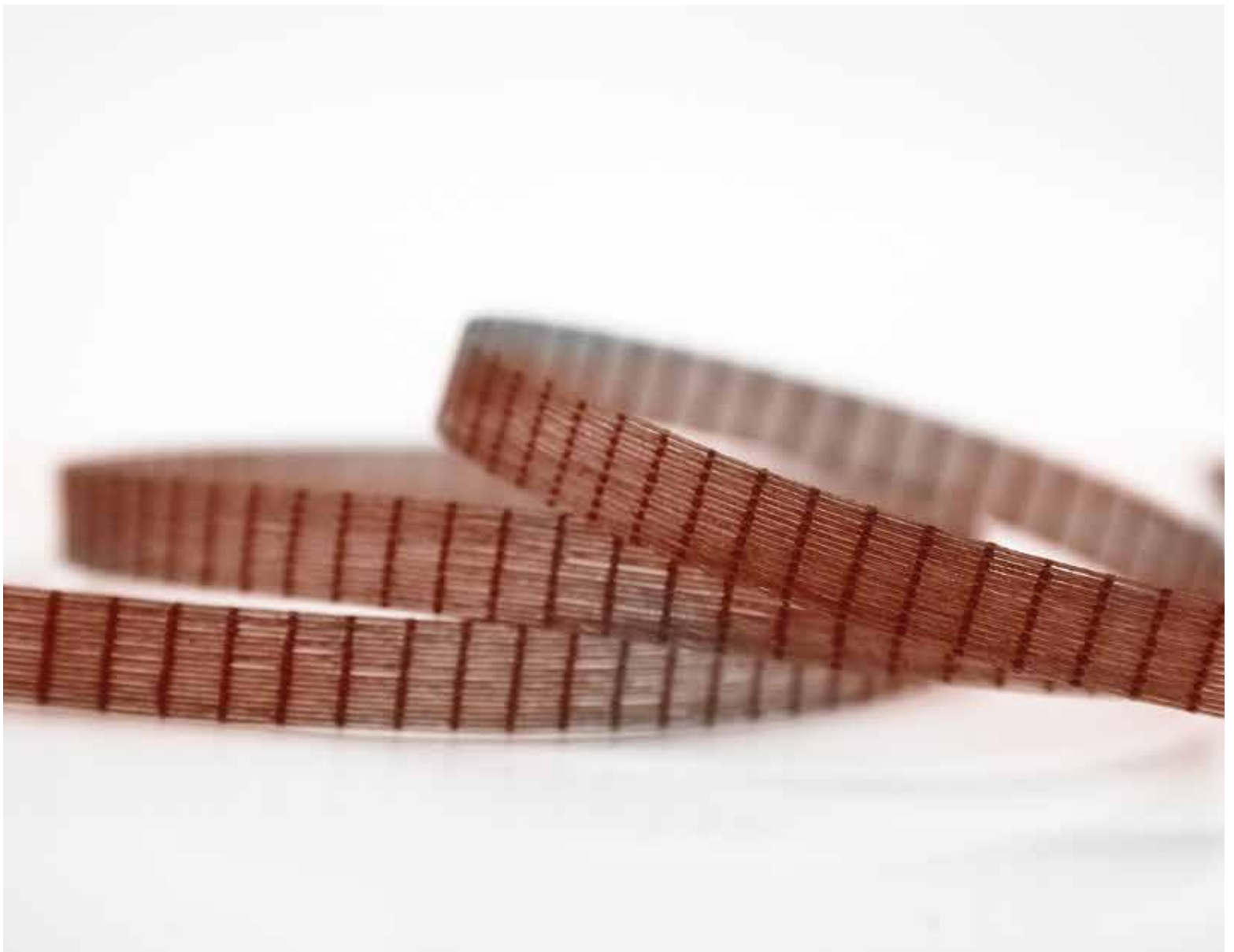
For our employees, customers and stakeholders.

Differentiating keyword will continue to be INNOVATION in Products, Services and Approaches.

- SPECIALTY TIRE SOLUTIONS -

Capmax[®]

Tires manufactured with Capmax[®]
consume less resources such as
energy and raw
materials by reducing
the carbon
footprint of a tire





READY, EASY AND FRIENDLY CAP PLY FOR YOUR NEW GENERATION TIRES IS NOW ON THE ROAD

EVREN GUNER

Product Leader

If we ask any of our customers what their dream reinforcement product is, they always ask for the same qualities: ready to use, easy to handle&process and being cost&environmental friendly. In order to meet those expectations, we have developed cap ply material branded as Capmax® with significant benefits to our customer's daily life.

Thanks to our exclusively developed dipping solution and production technologies, Capmax® can be easily applied at the tire building machines by replacing your existing compound coated cap ply strips. Since there is no need for the calendaring and cutting processes, processing costs are cut and capital investment costs are lowered. Tire manufacturers can use excess calender capacity for the production of other components. As a result of green tackiness which eliminates cap ply compound usage by keeping the adhesion within the required specifications, the total rubber cost can also be reduced significantly. The scrap coming from calendaring and cutting process can also be eliminated with the advantage of precisely cut strip according to the customer specifications. Tires with Capmax® can result in less tire weight around 200-400 gr per tire.

In terms of performance, Capmax® has been evaluated by many customers so far and test results in different aspects have successfully met the requirements. Overall endurance level of tire with Capmax® is same as the reference one. It has been also successful in meeting the same customer's internal Hi-Speed test limits. Both, Endurance and Hi-Speed test results are higher than min of D.O.T. requirements. In addition to extended Endurance

Thanks to our exclusively developed dipping solution and production technologies, you can simply apply Capmax® at the tire building machines by replacing your current cap ply strips

and Hi-Speed test results, Capmax® has been tested in terms of "fatigue" level comparison in long-run drum test by performing same with respect to reference in "fatigue requirements". Capmax® tire's dimensional stability tests and measurements are also in equal level with respect to the reference. It also proved its performance on real environment fields by reaching equal mileage performance compare to standard reference tires.

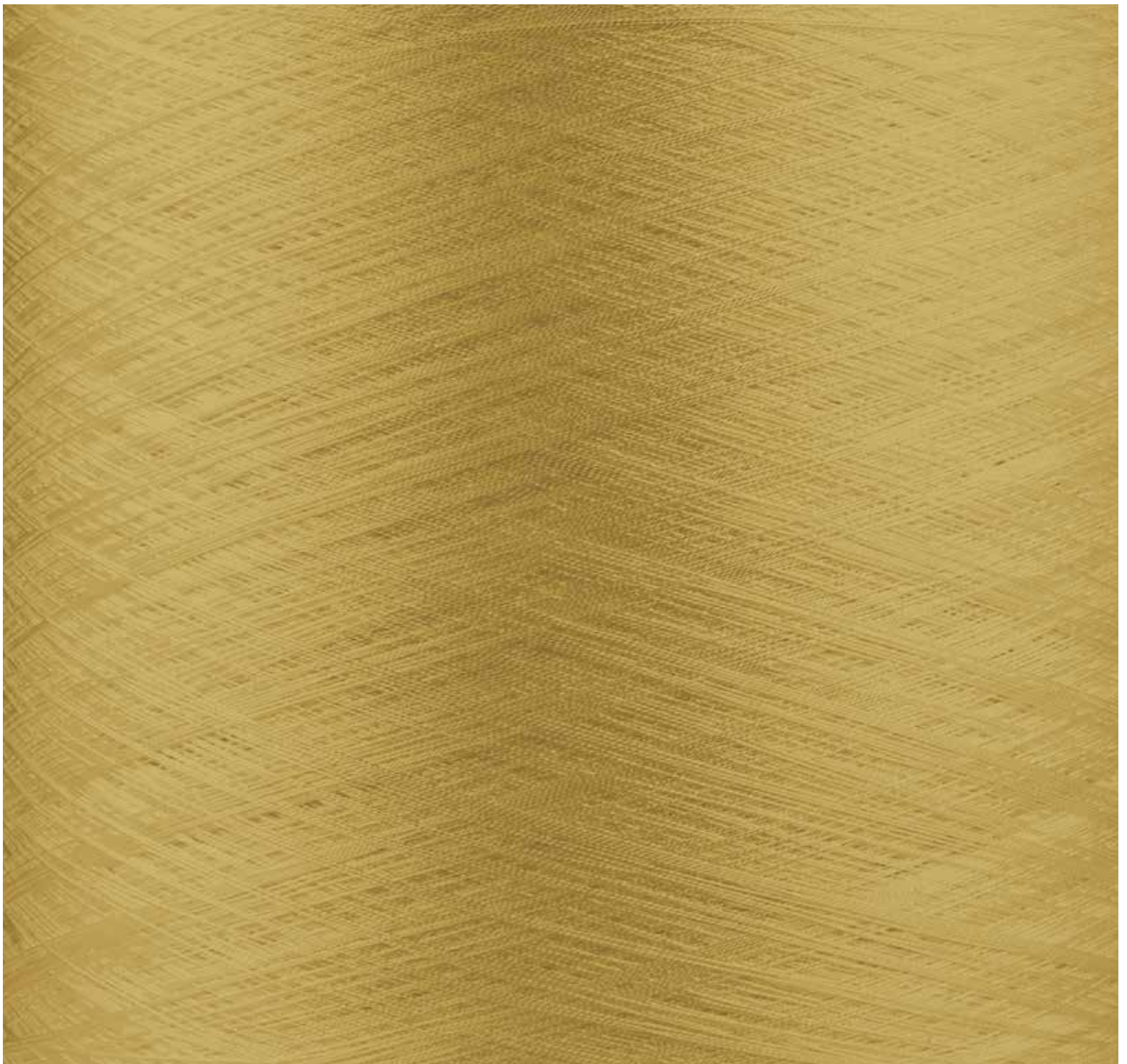
Overall, tires manufactured with Capmax® consume less resource such as energy and raw materials by reducing the carbon footprint of a tire. Because of the fact that engineered chemical dip eliminates rubber usage in cap ply, it contributes to weight reduction of your new generation eco-friendly green tires.

To discover Capmax® more, please visit www.capmax.com.tr or directly contact us at:
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- SPECIALTY TIRE SOLUTIONS -

Twixtra®

Twixtra® product portfolio is developed for ultra high performance tires to deliver performance and safety at the highest level





“HYBRID CORD SOLUTIONS” LIGHTER CORDS, FASTER TIRES

BURAK ILGUN

Product Leader

AUTOMOTIVE INDUSTRY

Engine downsizing of the passenger car segment is the driving force of the automotive industry as a response to emission regulations and fuel efficiency. We observe many engine sizes as 0.9l, 1.0l, 1.2l, 1.4l and 1.6l. These engines have capability to produce 90hp to 180hp. Besides, crossovers and SUV segment is becoming more popular since people are buying “customized” cars for day to day usage and to use as a family.

Since the high speed capability of cars in known segments such as luxury sport cars increase, it is obvious that the primary idea is to obtain an ultimate customized driving experience with optimized consumption. While engines are becoming smaller, the cars are getting faster. Strict regulations pushes all tiers to deliver more efficient components to the OE manufacturer than ever. As a consequence, tires should contribute to the driving efficiency while serving performance on demand.

UHP TIRE TRENDS

It is a fact that V,W,Y,Z rated UHP tire demand will boom according to above mentioned trends. UHP tires were the nich segment and the most profitable segment compared to slow speed tires. Comparing to the market place today and looking back 5 years back we see that all tire makers have a huge desire to increase their market share in this enlarging segment.

UHP tires are the a segment of tires that should deliver performance and safety at the highest level.

Tire specification is strictly limited if this is an OE tire. At high speeds the steel belts will expand due to circumferential forces. Stabilization of steelbelts is vitally important in UHP tires considering that characteristic speeds of 200 km/h will be exceeded on

Twixtra® product portfolio has high modulus and low gauge reinforcement offerings that boost the performance while minimizing some concerns during tire design and material selection

highway drives, where it is allowed. Speed is not the only parameter that should be considered; of course load carrying capacity is the other key factor effecting tire integrity.

Twixtra®, hybrid cord reinforcement solutions of Kordsa, creates many alternatives to UHP tires to enhance performance and minimize raw material consumption. Twixtra® product portfolio has high modulus and low gauge reinforcement offerings that boost the performance while minimizing some concerns during tire design and material selection. Higher capability to stabilize belt layers with less compound leads to lower rolling resistance tires with UHP characteristics.

Combination of aramide and Nylon 6.6 yarns at elevated dtex's range offers an unlimited design matrix for high performance cap ply application.

Kordsa Global has the core competency on cord design, fabric/SEC processing with unique technology. Twixtra® team serves the industry with broad tire segment application knowledge. Since as being Kordsa Global we have a global understanding of the needs of our customers.

To discover Twixtra® more, please visit www.twixtra.com or directly contact us directly at:
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- SPECIALTY TIRE SOLUTIONS -

Monolyx®

Monolyx® is the innovative protective shield for tires that enhances endurance and durability under severe conditions



With Its Superior Properties Such As Cut Resistance, Impact Absorbtion And Lateral Stiffness, Monolyx® Is An Outstanding Protective Reinforcement Material Alternative Without A Corrosion Problem

Monolyx® “TIRE PROTECTIVE SHIELD”

BURAK ILGUN Product Leader

Protected Mobility

Tire industry delivers revolutionary products throughout its history, nevertheless a perfect tire has not yet been built. Therefore, it is always a challenge to advance the industry that triggers innovation. Beyond many different deliverables of tire; effectively contributing to mobility of the vehicle is the core function.

Monolyx® is the cord structure of twisted monofilament yarns that are designed for improved mobility. Conventional protection methods are of course well known materials that are available in the industry such as steel or aramid cord. These may be applied as a belt/breaker layer or sidewall insert; creating an additional concern for either weight or cost. As being the solution partner to the tire industry,

Monolyx® has been innovated as a result of Kordsa Global's continous technology development programs and as a result of dedication to the industry. Monofilament type of NY66 yarn has superior cut resistance compared to multifilament yarns like aramid or nylon. This unique property of Monolyx® enables choices for tire designer to improve the cut resistance of tires. Modulus is the other parameter that NY66 based Monolyx® has advanced properties compared to equivalent dtex level of conventional multiply NY66 cords. Having the monofilament characteristics, each filament has increase lateral stiffness in Monolyx®.

Higher lateral stiffness leads to better force distribution and so protection, on reinforcement layers. Due to the nature of Nylon66, Monolyx® it

has advanced energy absorption compared to steel and aramid which enables impact resistance. Of course, in being a polymeric material, Monolyx® does not have “corrosion” problems. Monolyx® acts as a protection layer for consecutive steel layers. Monofilament structure prohibits early loss of total breaking strength due to filament breakages at the cord interface since they are stronger than tiny multifilaments.

Monolyx® holds superior properties such as cut resistance, impact absorbtion and lateral stiffness that are positioning Monolyx® as an alternative protective reinforcement material without corrosion problems. To date, outdoor test results on various tire segmens (Truck Radials, Passenger Radials, OTR) proved to all to be above mentioned properties.

Brief Highlights:

TBR 4th Belt Layer, replaced by Monolyx®; obvious improvement of cuts via through tread, minimized belt seperation. Total protection for steel belts and carcass, improved tire initial life and the ability for retreading.

Passenger Radials, application as cap ply reinforcement leads to improved performance compared to multiply NY66 cords thanks to higher modulus. Superior cut resistance under severe road conditions will improve A/T performance.

Off the Road tires require ultimate protection for cuts and damages. Either breaker/belt or sidewall insert application of Monolyx® increases efficiency of vehicles by avoiding down time.

Farm rear tires, aircraft tires are the next category positive test results are being expected for in the near future.

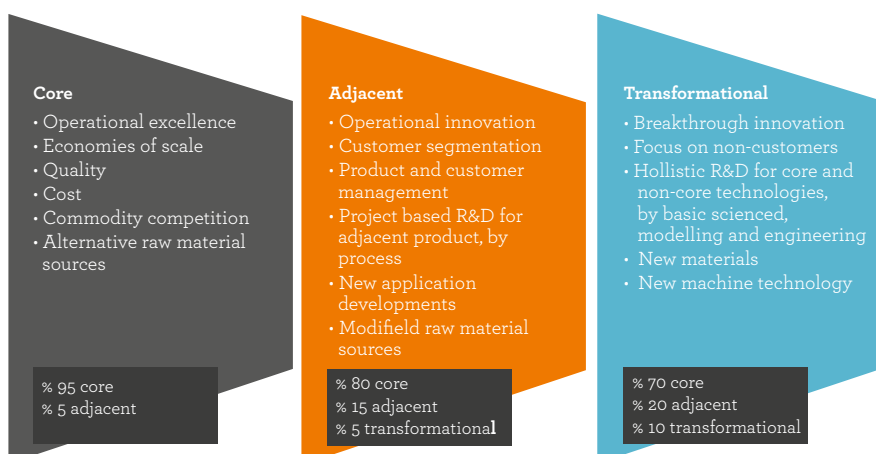
Overall, Monolyx® is the innovative protective shield for tires that enhances endurance and durability under severe contidions. Within these delivered values, it is applicable to all tire segments where protection is cruial.

To discover Monolyx® further, please visit www.monolyx.com or directly contact us directly at:
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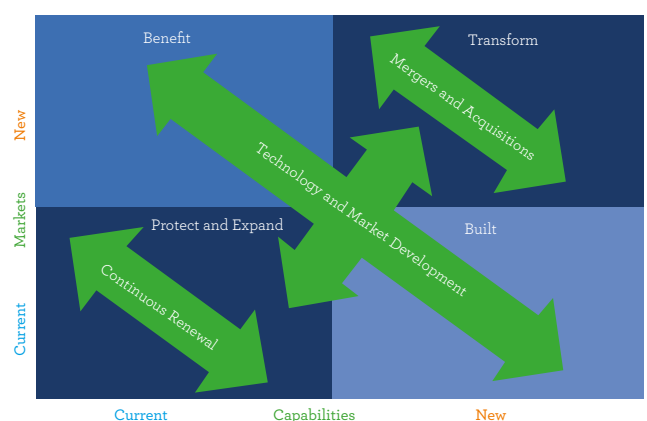
Companies of the future will be those keeping up with the competition by leading in technology while creating the change



Evolution of Innovation



Sustainable Profitable Growth Model



IBRAHIM OZGUR YILDIRIM

Chief Technology Officer

The universe is continuously changing. Each change triggers another. In fact every single particle is affected by another within a single Cosmos. From this viewpoint, in order to maximize the benefits of this change around us, it's primarily necessary to be "aware" of what's happening.

If we can not comprehend the signes of change, all that is left for us is to watch. Every crisis and fluctuations in the market conditions, technological developments manages us unless we are aware of them. We simply look inside the vehicle passing by (sometimes passing over). This is called "mismanagement of change".

The first condition of change management is to be aware of the changing environment and this requires vision. Awareness is not sufficient alone. If we are not open to change and we continue in conservative manner to maintain our current situation, then we lack flexibility and are easily broken when the change arises.

We miss the opportunities in front of us just because we do not make our move on time.

It is possible to say that the most profound difference between the successful companies and the individuals from others is that they are prepared for the consequences of change; moreover they create the change themselves.

Individuals attaching importance to creative thinking, seeking better solutions, analyzing opportunities and threats in favor of themselves create a difference.

Such individuals are well aware that "the only thing that is constant is change" and they lead and catalyze the transformation.

Lately, many notions are used related to change. Initially "creativity" in business life was the term. In time we started to hear (and still are) "innovation" consisting of creativity and adding the commercialization to the frame.

Recently entrepreneurship concept is placed on top of them. During the current information era, companies find themselves in such fierce competition that the current business life span shrank dramatically.

New versions of products and services in the market may be launched before we are aware of them.

Imitation became business as usual. Information is accessible like never before. Under these circumstances, in order to survive, the companies need to access up-to-date information, produce brand new information, sustain continuous renewal and should differentiate their products and services.

This continuous profitable growth can only be accomplished by "entrepreneurial", "creative" and



"innovative" employees.

And just at this point, technology management becomes prominent by finding the right information at the right time.

In order to be at the forefront of the market and the competition, increased utilization of the current products with new applications based on the advances of information is secured on one hand and continuously new competencies are developed to be ready for change on the other.

And finally successful companies "transform", meaning they continuously renew themselves with new markets and competencies. The companies of the future will be those that keep up with the competition by leading technology while creating change".

On the road to continuous renewal, Kordsa Global will sustain to be the pioneer and the leader as a technology producing company.

It is possible to say that the most profound difference between the successful companies and the individuals from other companies is that they are prepared for the consequences of change; moreover they create the change themselves

- GREEN TIRE SOLUTIONS -

GLOBAL TIRE REPORT-RESORCINOL-FORMALDEHYDE-FREE DIP TECHNOLOGY FOR ADHESION

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Technology Manager (Adhesion&Chemicals)*

Cord reinforcement of rubber is crucial to many applications, such as high-pressure hoses, transmission belts and conveyor belts. The largest application of cord-rubber composites is the tire

With growing demand for longer-lasting high-performance tires, constant improvement is needed in the performance of reinforcing elements, elastomeric materials and adhesive coating systems. The main role of the adhesive is to prevent separation at the cord-adhesive and rubber-adhesive interfaces, and within the adhesive itself. This is achieved by employing appropriate cord dipping procedures, which depend on the type of reinforcing elements.

Synthetic fibres are generally difficult to adhere to rubbers, due to differences in polarity and other chemical properties between rubber and fiber. These hinder the formation of a direct bond between the species (ref. 1).

Cord-to-rubber adhesion

The basic requirements for an adhesive to secure satisfactory cord-to-rubber adhesion are as follows (ref. 2):

- Good bonding to both cord and rubber
- Modulus intermediate between those of cord and rubber
- Rapid bond formation
- High fatigue resistance in cured adhesive
- No chemical damage to cord by adhesive
- Compatibility with a range of rubber compounds
- No brittleness or flaking during processing

Good adhesion between cord and rubber is an absolute prerequisite for satisfactory tire performance. Coating the cords using a resorcinol-formaldehyde latex (RFL) treatment provides sufficient adhesion to rubber compounds. Aqueous RFL dips have the advantage of low viscosity and

Component	Dry parts per 100 parts of dry latex
Resin solution	11
Resorcinol	6.0
Formaldehyde	0.3
Sodium hydroxide	17.3
Total	17.3
Final RFL dip	
Vinylpyridine latex	100
Resin solution	17.3
Total solid	20

A terpolymer of butadiene (70 percent), styrene (15 percent) and vinylpyridine (15 percent)

thus good wetting-out at the beginning of the curing process. When cured, they become insoluble. The latex imparts the necessary flexibility to the adhesive and reactivity to the rubber, while the resorcinol-formaldehyde formulation provides the required heat and fatigue resistance by forming a three-dimensional matrix (ref. 3).

RFL formulation and hazards

The RFL formulation to be used depends on the type of tire cord; Table 1 shows an example for Nylon66 and Figure 1 outlines the production process.

Among the ingredients of RFL adhesive, formaldehyde is highly toxic to all animals, regardless of mode of intake. Ingestion of as little as 30 ml of a solution containing 37 percent formaldehyde has been reported to cause death in an adult human (ref. 5).

Formaldehyde is an eye, skin and respiratory tract irritant. Inhaling its vapour can narrow the bronchi, causing fluid to accumulate in the lungs. Aqueous solutions of formaldehyde are very corrosive, and their ingestion can severely injure the gastrointestinal tract, primarily the pharynx, oesophagus and stomach (ref. 5).

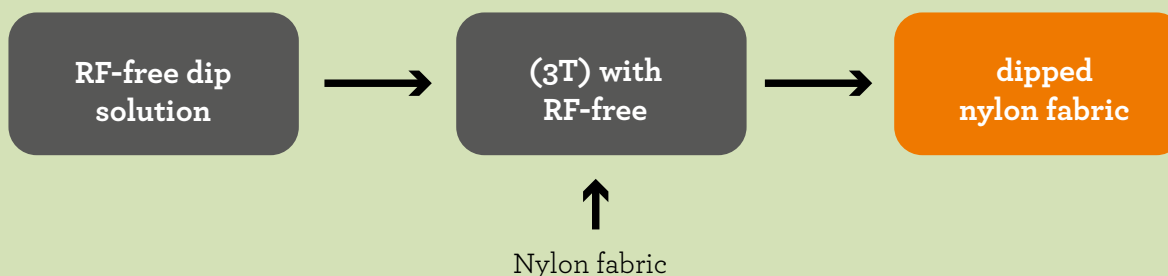


Figure 1: Production of tire cord fabric with RFL adhesive dip solution

For these reasons, the acceptable levels of formaldehyde emission from products such as wood panels have been reduced continuously. The driving forces for this reduction have been increased public awareness and hence consumer demand for non-hazardous products, and corresponding government regulations. The recent reclassification of formaldehyde by the Internal Agency for Research on Cancer (IARC) as “carcinogenic to humans” has triggered further concern and responses by trade unions, consumer associations, “green” lobbies, regulatory authorities and the industry itself

Regulation

Within the EU, formaldehyde is currently classified as a category 3-R40 substance (limited evidence of carcinogenic effect); this is the lowest available EU classification for suspected carcinogens. The classification of formaldehyde in the EU was reviewed under its REACH (registration, evaluation, authorisation, and restriction of chemical substances) regulatory regime on chemicals and their safe use. In the United States the current classification by the Environmental Protection Agency (EPA) is that of a “probable human carcinogen” (ref. 6). REACH came into force on 1 June 2007, and aims to improve the protection of human and environmental health from risks posed by chemicals. Formaldehyde is defined as a “substance of very high concern” (SVHC) in Europe under REACH (ref. 6).

Formaldehyde is an eye, skin and respiratory tract irritant

In principle, REACH applies to all chemical substances; not only those used in industrial processes but also in day-to-day domestic life, for example in cleaning products, paints, as well as materials for goods such as clothes, furniture and electrical appliances. The regime therefore has an impacts on most companies across the EU. REACH places the burden of proof on to the companies. To comply with the regime, companies must identify and manage the risks linked to the substances they manufacture and market in the EU. They have to demonstrate to the European Chemicals Agency (ECHA) how the substance can be used safely, and they must communicate risk management measures to users.

If risks can not be managed, authorities can restrict the use of substances in various ways. In the long run, the most hazardous substances should be substituted by less dangerous ones. Formaldehyde standard 29CFR 1910.1048 of the Occupational Safety & Health Administration (OSHA) and equivalent regulations in states with OSHA-approved national plans to protect workers exposed to formaldehyde. It applies to all occupational exposures to formaldehyde in liquid and vapour forms, its solutions and materials that release formaldehyde. The permissible exposure

limit (PEL) for formaldehyde in the workplace is 0.75 parts per million of air (0.75 ppm) measured as an eight hour time-weighted average (TWA) (ref. 7). The standard includes a second PEL in the form of short-term exposure limit (STEL) of 2 ppm, which is the maximum exposure allowed during a 15 minute period.

RF-free dip solution prioritised to meet future regulatory requirements

Despite increasing environmental and safety concerns, no other adhesive system has so far been developed as an alternative to resorcinol-formaldehyde-based adhesives, which have been widely applied since 1935. Even though all necessary precautions against formaldehyde emission have been taken at Kordsa Global sites so far, developing an RF-free adhesive dip solution was prioritised with a view to meeting future regulatory requirements.

The company’s new adhesive system performs better than an RFL dip. The RF-free dip solution is prepared by mixing resin and latex solutions. Cord fabric is passed through the RF-free dip solution and then heat-treated in drying and curing ovens. Residence time, temperatures and tension are optimised to obtain the desired strength and adhesion properties.

RF-free dipped fabric is whitish in colour, whereas RFL-dipped fabric is brown (Figure 3). Nylon cords and fabrics treated with.



Figure 4: RF-free (left) and RFL treated cords (right) after vulcanisation in rubber compounds

RF-Free, Only One Product Multiple Solutions

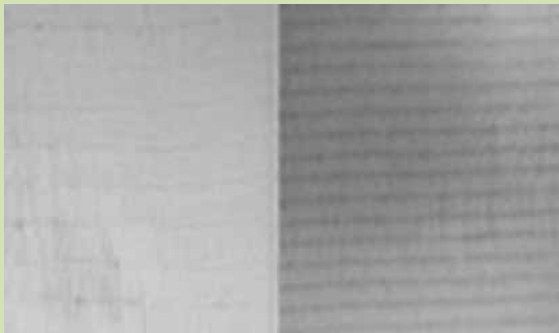


Figure 3 Tire cord fabric dipped with RF-free (left) and RFL solutions

RF-free adhesive were embedded in an uncured rubber compound which was then cured for adhesion testing. Static adhesion tests were based on the standards ASTM D4776 (H-adhesion), ASTM D4393 (peel adhesion) and CRAST (according to

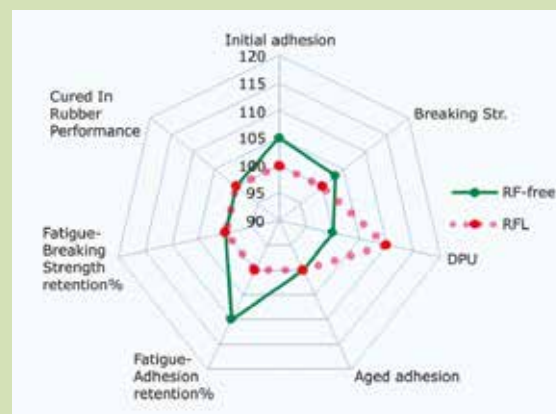
a method provided by the customer). The cord appearances after the adhesion tests are shown in Figure 4. A dynamic adhesion test according to the ASTM D430 protocol provided information on the fatigue life of the cord-rubber composite under cyclic strain.

The required adhesion was obtained with a lower dip pick-up (DPU) when an RF-free dip was used. DPU values for nylon fabrics were determined as 3.0-3.5 percent.

The advantages of RF-free dip solution over RFL dip solution are as follows:

- Resorcinol and formaldehyde use are completely eliminated

- Formaldehyde emission is eliminated
- RF-free dip is compatible with REACH regulations
- Desired adhesion is achieved with lower DPU
- Fatigue adhesion performance is improved. Figure 2 Production of tire cord fabric with RF-free adhesive dip solution.



The mechanical properties of RF-free-dipped Nylon-66 fabrics were either superior or comparable to those of RFL-dipped fabrics. Figure 5 shows that initial adhesion was 5-7 percent higher, and up to 10-15 percent more fatigue adhesion retention was attainable with RF-free dip-treated fabrics.

Performance testing of tires made with RF-free dipped fabrics is in progress.

RF-free dip adhesive formulations for PET cords are also under investigation. The principal aim is to eliminate the pre-dip activation step for PET fabrics and use only one type of RF-free adhesive solution for all types of tire cord fabric.

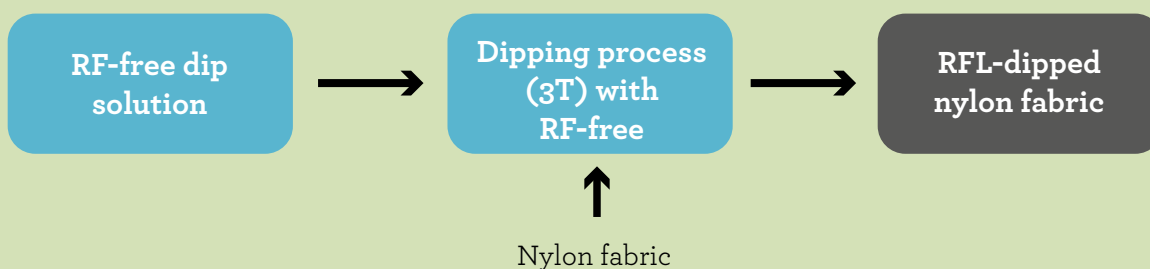


Figure 2: Production of tire cord fabric with RF-free adhesive dip solution

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7. <https://www.osha.gov> United States Occupational Safety & Health Administration (accessed 1 October 2013) Drs Cevahir and Sen are with Kordsa Global

For a greener world

Resulting from our commitment to deliver environmentally friendly solutions, we introduced a state-of-the-art RF Free dipping technology.

This new technology completely eliminates Resorcinol and Formaldehyde use achieving higher initial adhesion, better adhesion retention and better fatigue adhesion compared to RFL.

As a solution partner, we offer tailor made solutions to our customers through our continuous research and development efforts in textile reinforcement technologies and a thorough understanding of our customer's unique needs.

KORDSA GLOBAL

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KORDSA

Nylon 6.6 PET HMS

CapmaX

Twixtra

MONOLYX

InterPlast*

InterCord*

Kraos™

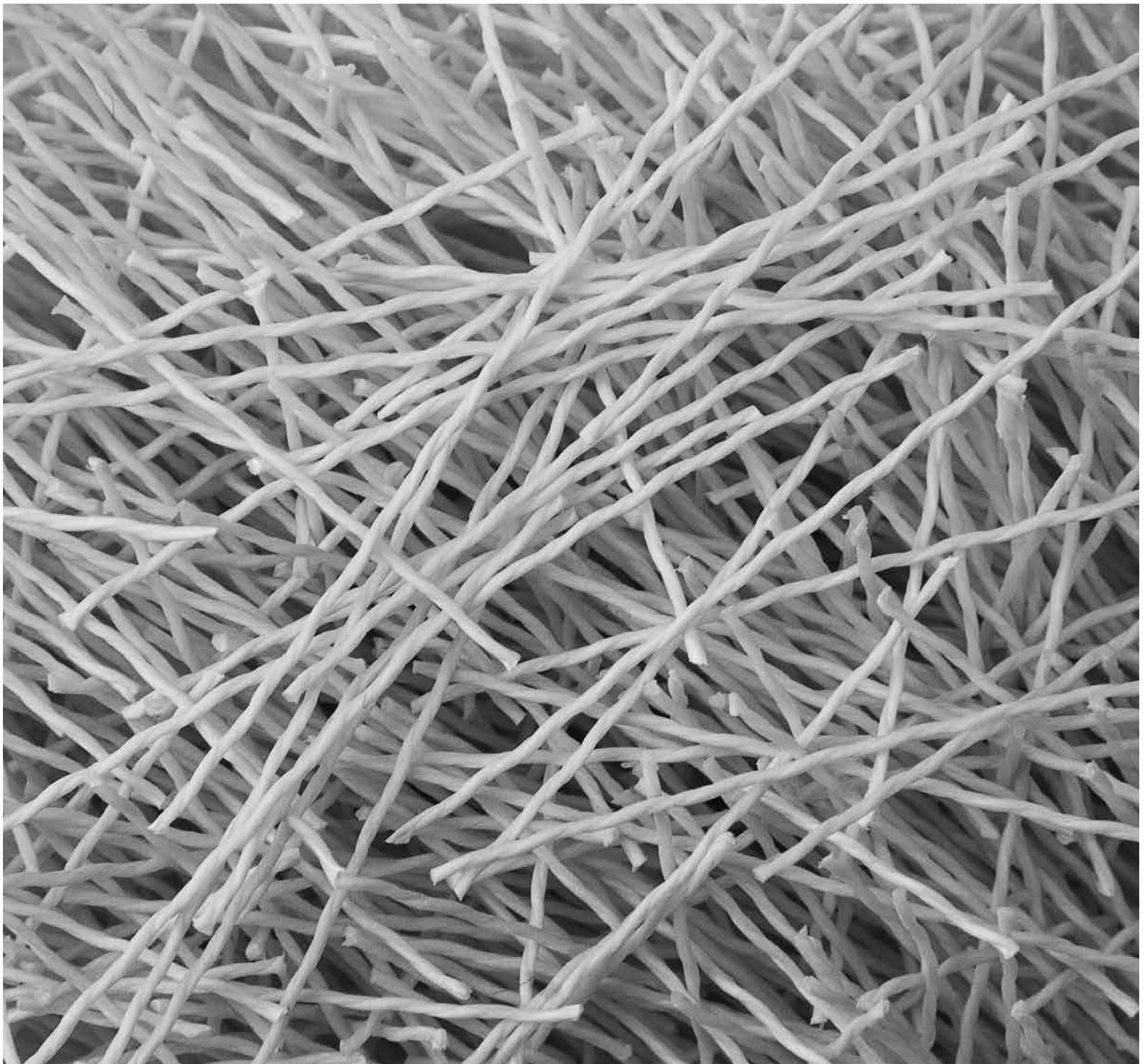
HARtech



- CONSTRUCTION SOLUTIONS -

Kratos™

We are also proud that Kratos™
will be the first polyamide
fiber reinforcement
made in Turkey



Kratos™ is a "Polyamide Fiber Reinforcement", developed with an exclusive coating formula, increases quality of performance and serviceability on concrete. Its name is inspired by the God of Strength and Power in Greek mythology

“THE REINFORCER MAGAZINE INTERVIEW”

HAKAN OKER

Head of Business Unit
Reinforcements for Construction

Over 40 years, Kordsa Global has been transformed into a global leader in nylon and polyester yarn, cord fabric and single end cord production, serving tire reinforcement and mechanical rubber markets, motivated by the increased success.

In a world which is growing and changing continuously, we all must analyse the needs for our time and the demands of innovation. We must use our resources efficiently and generate solutions which serve civilizations in the most efficient ways.

On this account, we as Kordsa Global, keep our internal dynamics and enthusiasm for discovery. With such an intentions, Kordsa Global keeps ahead of developments and demands in the construction sector worldwide, with an innovative vision. We therefore established the ‘Reinforcement for Construction Business Unit’ as a new structure in our company.

Our intention is to strengthen the construction sector by our resources and awarded Global R&D function which is experienced in new product development. Starting with reinforcing the driving force of the industry, concrete, and then other fields of application in the sector. We supply practical solutions with awareness of occasional limitations and costs, in construction. Our biggest motivation has been in high demand. That being macro and micro fibers for concrete, in many pretigious superstructure and infrastructure



construction projects, both in Turkey and worldwide. We primarily observed solid performance of our products which have been developed with a certain quality for our R&D Technologies, in association with concrete, thus decided to step into the market. In line with this objective, we developed our first product, “Kratos™”. Kratos™ is a ‘Polyamide Macro Fiber Reinforcement’, developed with an exclusive coating formula, increases quality of performance and serviceability in concrete. Its name is inspired by the God of strength and power in Greek mythology.

Our product aims to eliminate macro crack generation, one of the biggest vulnerability points of concrete, and to serve as primer and/or secondary reinforcement in many applications in early and late age of concrete.

We are also proud that Kratos™ will be the first synthetic macrofiber reinforcement made in Turkey, taking its strength from its affordable, high performing, easy and direct applicable structure.

While working with Kratos™, we also developed micro fibers which eliminate micro cracks by reason of shrinkage in early-aged concrete, besides, our studies to enlarge the new product group and to offer sustainable solutions for other fields of applications in the construction sector is in progress.

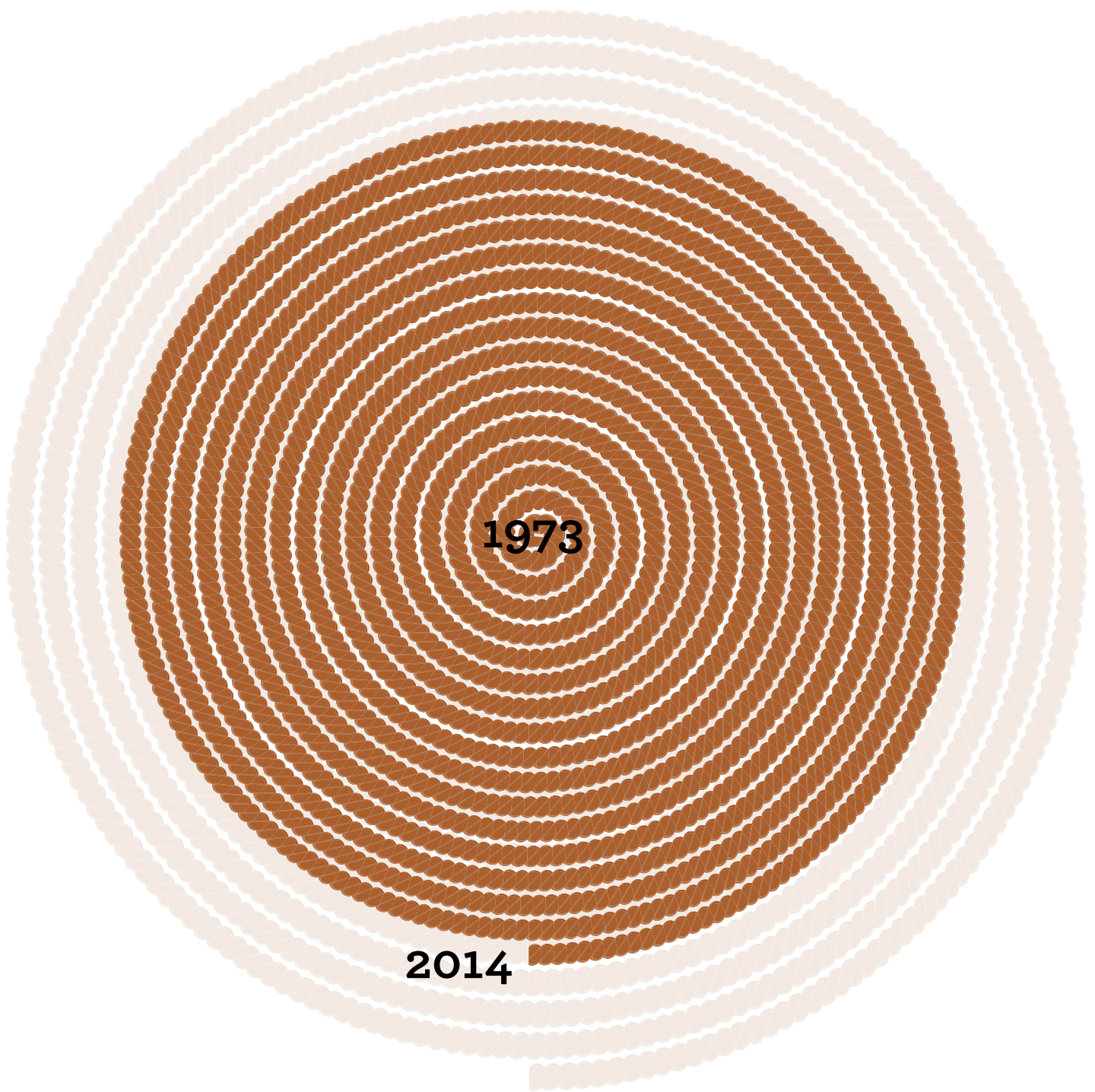
Our further aim is to increase the Business Unit as one of the powerful functions in Kordsa Global with our know-how, resources and above all, our enthusiasm to generate.



*Every 2 out of 3 plane
tires are reinforced
by Kordsa[®] tire
cord fabrics*



REINFORCED BY KORDSA®



*Kordsa Global is proud to be of service to
the reinforcement industries
for more than 40 years.*