

## **Conveyor Belt Solutions**

for every mining task

ContiTech

### ContiTech Conveyor Belt Group



We are a leading manufacturer of conveyor belts, integrated in the ContiTech AG organization and thus part of Continental AG and the Continental Corporation.

We offer complete solutions - from textile and steel cable conveyor belts to special products and service materials. With our locations close to our customers, we are able to provide comprehensive support for your conveyor belts and systems - worldwide. With high-end conveyor belt technology from ContiTech, materials handling systems run reliably and cost effectively and are environmentally friendly.

As a leading development partner with innovative conveyor belt technologies, we support the mining, machinery and equipment construction industries, as well as a host of other industries.

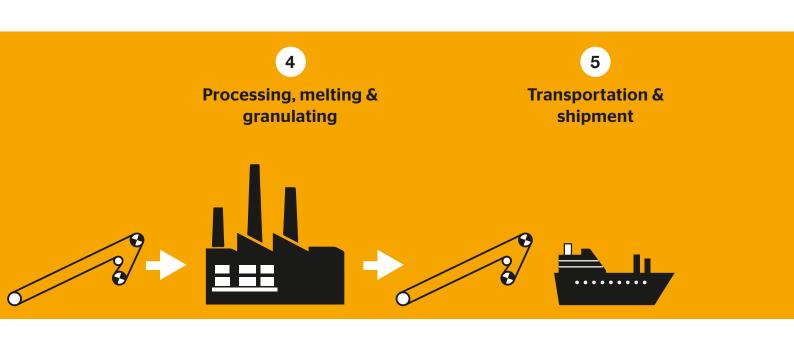
### Content

of iron concentrate	4
Flowchart of mining, processing, combustion of coal and further utilisation or disposal of fly ash at a mining and power plant company	6
Conveyor belts for every mining application	8
Challenges & solutions	
Extreme temperatures / Superior heat- and cold-resistant conveyor belts	10
Fire / Flame-resistant and self-extinguishing conveyor belts	11
Rips & breakthrough caused by impact / Reinforced cut- and gouge-resistant conveyor belts	12
Long-distance transportation / High- strength energy-optimized conveyor belts	13
Topographically difficult terrain / Closed-troughed conveyor belt systems Sidewall belts	14
High-elevation short-distance conveying / Steep-angle conveyor belts	16
Vertical conveying / Maximum elevation single-flight conveyor belts	18
Underground mining / Certified conveyor belts for underground application	19
Separating fluid and solid components / Vacuum filter conveyor belts	20
Efficient field service when required / Global field service - 24/7	21
Necessary engineering services / Application support	22
Detecting wear, break and tear / Prognostic maintenance	23
Swift maintenance / Service materials & equipment available around the world	24
ContiTech Conveyor Belt Group Worldwide	26

## Flowchart of mining and manufacturing of iron concentrate



5





Flowchart of mining, processing, combustion of coal and further utilisation or disposal of fly ash at a mining and power plant company







## Conveyor belts for every mining application

ContiTech is a multinational corporation with operations in almost all countries around the world. We provide a wide range of conveyor belts and related products, longtime experience, comprehensive technical and project management expertise and technical solutions for all conveying issues. ContiTech produces a variety of high-quality products including steel cord belts, e.g. STAHLCORD® with a nominal breaking strength of up







Challenge	Extreme temperatures	Fire	Rips & breakthrough caused by impact
Solution	Superior heat- and cold-resistant conveyor belts	Flame-resistant and self-extinguishing conveyor belts	Reinforced cut- and gouge-resistant conveyor belts







Challenge	Underground mining	Separating fluid and solid components	Efficient field service when required
Solution	Certified conveyor belts for under- ground application	Vacuum filter conveyor belts	Global field service - 24/7

to 10,000 Newton per mm belt width or shortly N/mm (St10,000), and fabric belts, e.g. CONTIFLEX® with a nominal breaking strength of up to 4000 N/mm (EP4000/5). ContiTech is not only a belting manufacturer, but also a service and development partner for a variety of industrial branches, OEMs, mining, steel and energy companies.





High-strength energy-optimized conveyor belts



Topographically difficult terrain

Closed-troughed conveyor belt systems



High-elevation shortdistance conveying

Steep-angle conveyor belts



### **Vertical conveying**

Maximum elevation single-flight conveyor belts



Necessary engineering services

**Application support** 



Detecting wear, break and tear

Prognostic maintenance



**Swift maintenance** 

Service materials & equipment available around the world



### Challenge

### **Extreme temperatures**

Conveying bulk materials with extremely high temperatures of up to  $+800\,^{\circ}\text{C}$  or in environments with extremely low temperatures of up to  $-60\,^{\circ}\text{C}$  puts man and machine under great stress. This is where maximum temperature resistance is required to ensure material (e.g. iron ore pellets) does not burn through the conveyor belt, thus enabling long operating times.







#### **Solution**

## Superior heat- and cold-resistant conveyor belts

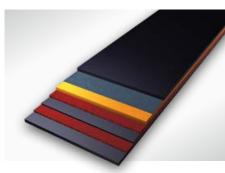
ContiTech provides a wide range of steel cord and fabric conveyor belts with rubber compounds designed for very low or very high temperatures, e.g. for conveying hot ash at temperatures of up to +220 °C, oil or sands in Canada or raw materials in northern parts of Russia at temperatures of down to -60 °C.

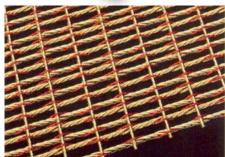
For high-heat applications ContiTech's belts CONTIFLEX feature the heat-resistant rubber compound Vulcan Prime, basalt or glass layers and/or an innovative insulation Heat Control layer inside the top cover. Field tests at the manufacturing facilities of a Swedish iron ore supplier showed that these conveyor belts display excellent resistance to the high-heat bulk material. CONTIFLEX® IW/TW/SW heat-resistant conveyor belts have a Fleximat® carcass made of a combination of fabric and steel cords, and represent an "intermediate" level between fabric and steel cord belts.





Even if the rubber top cover is destroyed, no iron ore pellets burn through the belt, and the conveyor can still be used for a long time.





CONTIFLEX® IW with Fleximat® carcass made of a combination of fabric and steel cords



### Challenge

### **Fire**

Burn-offs have to be avoided in opencast as well as underground mines not only to save human lives, but also to prevent production downtimes and thus to protect investments. This is where flame-resistant equipment and fire-extinguishing features are required.



#### **Solution**

# Flame-resistant and self-extinguishing conveyor belts

ContiTech has developed, tested, certified and successfully applied flame-resistant and self-extinguishing conveyor belts. In the unlikely event that these do actually catch fire, they prevent fire propagation along the conveyor belt. This protects not only investments, but – most importantly – human lives. ContiTech conveyor belts made of rubber compounds adhere to the requirements of most national and all international standards (EN 12882, EN 14973, AS 4606, etc.), and are authorized by state mine supervisory administrations around the world, including MSHA (USA), UTS for underground applications (EU), RosTechNadzor (Russia), DPI (Australia).









**Burn Test Laboratory** 



### Challenge

## Rips & breakthrough caused by impact

Short and middle-distance belt conveyors in surface mining as well as conveyor belts used in heavy mining machinery at very high speeds are often particularly stressed by coarse and sharp-edged bulk material. Such heavy impacts can cause rips and cut-throughs in the belts, thus causing cumbersome downtimes to carry out the necessary repairs.







Prevent or minimize production downtimes

#### **Solution**

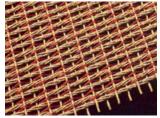
## Reinforced cut- and gouge-resistant conveyor belts

ContiTech has a variety of fabric, aramid and steelcord reinforcements (breakers), which can be incorporated in the top (carry side) cover of a conveyor belt. STAHLCORD® Barrier and CONTIFLEX® RipProtect with steel cord breakers in the cut-resistant rubber top cover provide the most cost-efficient protection against cut-through damages, carcass destruction and longitudinal belt rips for short and middle-distance conveyor belts or conveyor belts used in heavy mining machinery at very high speeds of up to 12 m/s.

CONTIFLEX® IW/TW/SW belts with the Fleximat® carcass can also be used as impact and cut-through resistant belts. Fleximat® is a special carcass made of a combination of fabric and steel cords and takes an "intermediate" level between fabric and steel cord belts.



CONTIFLEX® TW - with a Fleximat® carcass



CONTIFLEX® SW - with a Fleximat® carcass





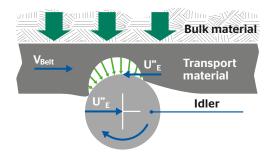


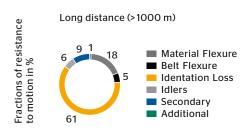
#### Challenge

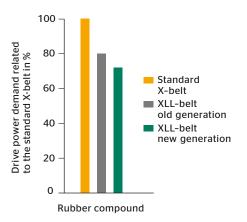
### Long-distance transportation

In horizontal long-distance (>1000 m) belt conveyors, the indentation rolling resistance (IRR) accounts for 50 to 70 % of the total resistance to movement. In order to save energy and generate lower installation, maintenance and logistic costs, this resistance has to be reduced as far as possible.

What is required is an energy-efficient long-distance belt conveyor system with a lighter and economical conveyor belt, small-sized drive pulleys, steel structure or a reduced drive number to reduce CAPEX/OPEX of the entire conveyor system.







#### **Solution**

## High-strength energy-optimized conveyor belts

- > eXtraLowLoss-Rubber Compound "XLL" reduces indentation rolling resistance (IRR) and offers the possibility to minimize your capital expenditure and operation costs. The power consumption can be reduced up to 30% (depending on the conveyor system).
- > Reduction of several metric tons of CO<sub>2</sub> emission
- > Smaller sized drives, belt, steel structure etc. installation possible
- > Reduction of CAPEX/OPEX up to 45%
- Different types of XLL compounds available depending on the application (different physical and chemical properties), such as Pipe XLL, K XLL, etc.
- > References: approx. 19.2 km long one-flight conveyor system CV-04 at the Luminant Three Oaks Mine in Rockdale (Texas), which is the longest overland conveyor of Americas, two parallel approx. 13.5 km long overland conveyors at the KPC-mine in Indonesia and approx. 27 km long distance overland conveyor in South Africa CV-2301 (Sasol Synfuels plant in Secunda) the currently longest one-flight conveyor in the world!

In case of the second worlds longest belt conveyor (20.3 km) CV-1103 at Westfarmers Curragh Pty Limited's North Curragh mine in Queensland, Australia equipped with the ContiTech belt and commissioned in 2007, the final cost benefits of 41 % operating cost and 39 % capital cost were achieved comparing to a conventional conveyor design!









#### Challenge

## Topographically difficult terrain

Difficult terrains require conveyor systems that can easily negotiate complex infrastructural and geographical hurdles with many tight curves and extreme inclination angles. The conveying routes are frequently built more elevated in comparison to normal troughed conveyors in order to cross roads, rivers or other topografic obstacles and should nevertheless provide an environmentally friendly conveying route.





#### **Solution**

# Closed-troughed conveyor belt systems

ContiPipe®, MegaPipe® and Sicon® conveyor belts with fabric and steel cord carcasses can negotiate tight curves. They are the perfect solution for complex infrastructural and geographical terrains, which may have center distances similar to common long-distance conveyors (10 km and more). With such closed-troughed conveyor belts the environment is reliably protected from the bulk material.

SICON® is ideally suited for short and medium conveying routes and capacities, e.g. for routes inside or between plants with a maximum capacity of up to 500 m³/h at a conveying speed of up to 3 m/s. The main advantage of SICON® is its ability to negotiate very tight curves, which are significantly tighter than those ContiPipe® can handle (e.g. 180° curves with a radius smaller than 1 m). Both technologies can be applied for inclination angles of up to 35° depending on the respective bulk material.

MegaPipe®, with an outer pipe diameter of up to 900 mm, has a maximum capacity of up to approx. 9,500 m³/h at conveying speeds of up to 6.5 m/s and can transport bulk materials with a maximum grain size of up to 350 mm directly after the primary crusher.

In case of long-distance pipe conveyor systems (>1000 m) equipped with ContiPipe® with the bottom cover made of Extra Low Loss XLL-rubber compound, the total energy consumption can be reduced up to 50 %.





Environmental conveying system, which can negotiate high mountains, wide rivers, dense jungle or taiga and other very complex geographical terrains, where no road or no appropriate route can be built and a transport "in the air", is required.





Pictures: © Doppelmayı

### Sidewall belts



RopeCon® is a system developed by Doppelmayr, leader in ropeway engineering. It is a pioneering conveyor system combining belting and ropeway technologies and uses FLEXOWELL® and MAXOFLEX® belts.

The system can transport bulk material with a grain size of more than 600 mm up "in the air". It negotiates distances of over 30 km in one section and inclinations of up to 30° without cleats. Using additional cleats it can handle even higher inclinations. The RopeCon® can achieve transport capacities of up to 25,000 t/h, or cover a vertical rise of up to 1,000 m in one section. Tower spacings of 1,500 m and more are possible.

ContiTech has supplied several belts for RopeCon® applications. An impressive example for which a ContiTech conveyor belt is used: in Jamaica, the approximately 3.5 km long downhill RopeCon® system, which is used for the transport of bauxite, generates 1,300 kW per hour which can be fed back into the grid.



Pictures: © Doppelmayr



### Challenge

### **High-elevation short-distance conveying**

Open pit and underground mining can often require material to be conveyed across steep inclines over short distances. A particular difficulty lies in increasing the angle of inclination for standard troughed and pipe belts in order to reduce transportation costs and energy consumption for high-elevation conveying.





#### **Solution**

## Steep-angle conveyor belts

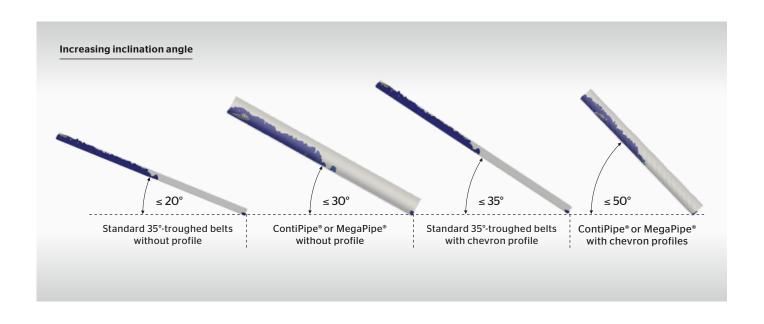
CONTI® chevron belts have wear- and impact-resistant 15 – 50 mm high ribs or cleats which are available in numerous formats. They are particularly designed for steep inclines for troughed as well as pipe belts.

ContiTech has developed an outstanding & cost-efficient solution for open pit mines in cooperation with various business partners. This enables closed-trough transport of primary crushed ores, rock, coal or overburden by using high-strength conveyors with Chevron-MegaPipes® (up to 50° inclination) or troughed belts (up to 30° inclination) with solid heavy-duty chevron ribs for the shortest distances – without the need for a secondary crusher!











CONTI® Sandwich Belts with steel cord and fabric carcasses are able to transport small-grained bulk materials at very high inclination angles of up to 90° and provide capacities of more than 4,000 t/h at mine depths in excess of 250 ml Depending on the material, the carrying belt can be equipped with a steel cord reinforcement to protect the belt against impact.

CONTI® Sandwich Belts with special elastic fabric carcass can transport fine-grained bulk materials at very high inclination angles – even vertically.









### Challenge

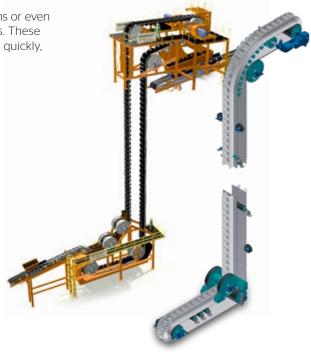
### **Vertical conveying**

The transportation of bulk materials at very high inclinations or even vertically requires special conveyer systems and solutions. These should be able to convey materials in all shapes and sizes quickly, safely and reliably.









#### **Solution**

# Maximum elevation single-flight conveyor belts

ContiTech's FLEXOWELL® and POCKETLIFT® technologies are the ideal solution for the transportation of materials at very high inclination angles or even vertically. FLEXOWELL® conveyor belts are designed for the steep inclined or vertical handling of all kinds of bulk materials – from coarse-sized coal and ore to rock, sand or fertilizers with lump sizes from powdery to 400 mm. Materials can be carried over 500 m in vertical lifts with capacities up to 6,000 t/h.

The POCKETLIFT® system was developed for deep shaft underground applications in the mining and tunneling industry with a lifting height of up to 800 m in one flight. POCKETLIFT® can handle capacities of up to 4,000 m $^3$ /h and transport bulk materials with lump sizes of up to 250 mm.









### Challenge

### **Underground mining**

Underground conveyor belts have to meet particularly strict national as well as international standards, as underground mining leaves no room for error. This is where the issue of fire prevention and extinguishing is of particular importance.







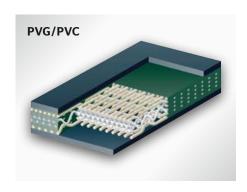
#### **Solution**

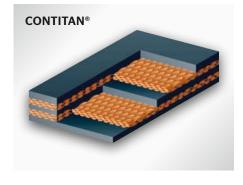
## Certified conveyor belts for underground application

ContiTech supplies a wide range of special underground one or two-ply conveyor belts (e.g. standard PVG and PVC belts), one or two-ply fabric belts (e.g. CON-MONTEX E/P - B - PB 1250/1 or CON-BITEX E/P P 800/2) and CONTITAN®, which uses various fabric carcasses such as EP, E/P-P, EP-B-PB. All these belts are manufactured with self-extinguishing rubber compounds (e.g. V, FRAS, A, B1, B2, C2, LITC, etc.) and meet strict national and international standards for underground conveyor belts.

CONTITAN® combines all the advantages of standard fabric belts and PVG and PVC belts, has an excellent troughability as well as impact and slit-resistance, and fulfils the necessary tough requirements in terms of splice strength with detachable fasteners. However, CONTITAN® has none of the disadvantages of PVG and PVC belts, such as wet-slide behavior, a tendency to cracking or high wear.

STAHLCORD® steel cord belts with self-extinguishing rubber compounds are also available in our portfolio. (e.g. 1400 ST7500 10T:12T V-belt installed in a 3.7 km long steep inclined underground conveyor system in a german hard coal mine)







### Challenge

### Separating fluid and solid components

An area in which fluid and solid components have to be separated is primary raw material extraction – the washing of coal and ore in mining operations. This generally includes two distinct tasks that have to be fulfilled:

1) the drying of concentrate and processing of tailings

2) the drying of heavy and coarse materials and ores in mining operations.





#### **Solution**

## Vacuum filter conveyor belts

CONTI® Vacuum Filter Belts separate solids and liquids. If required, this can be accompanied by rinsing, leaching or acid washing. The belts form a continuously circulating trough that holds and transports the filter cloth, the filter cake, the suspension and the washing solvent and removes the filtrate. The force of gravity and the vacuum generated cause the filtrate to be siphoned off via the belt grooves and through the drainage holes in the center of the belt. Beside a good chemical resistance and high temperature stability the CONTI® Vacuum Filter Belts have a non-textile suction zone made of cover rubber compound, which has same resistance properties as cover rubber. Consequently, punching of center holes does not result in exposed fabric.







### Challenge

### Efficient field service when required

In order to secure long uptimes and thus profitable operations, a range of services are required. These include belt and conveyor system inspections, audits and life time predictions, splicing, site management during new installations or belt replacement, commissioning, maintenance, operation and repair of conveyor belts.









21



#### **Solution**

## Global field service - 24/7

ContiTech has Service Centers located around the world. These provide a comprehensive range of field services to help keep your operations running. Furthermore, ContiTech also acts as an OEM company for certain conveying solutions by providing complete site management services, i.e. shipment, erection, installation and commissioning of entire conveyor systems. (Turnkey solutions)









### Challenge

### **Necessary engineering services**

Cost-efficient conveyor systems with cutting-edge technical properties are required in order to fulfil the primary economic and engineering demands of customers: low capital and operational expenditures (CAPEX/OPEX), maximum availability and minimum downtimes. Furthermore, ongoing support is also necessary to continuously improve operations, remedy damages and carry out recurring inspections.



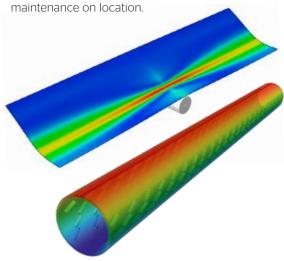




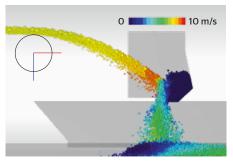
#### **Solution**

# Application support

ContiTech provides comprehensive Engineering Services focused on CAPEX/OPEX to ensure the best-possible availability. From calculation and design of conveyor belts and conveyor systems for a variety of customer needs, to project handling including belt splicing, installation and commissioning, ContiTech provides just the right support. Further services include the design, analysis and improvement of conveyor systems with the help of CAD, DEM and FEM, as well as inspection and predictive









### Challenge

### Detecting wear, break and tear

All moving parts, no matter what they are used for, are subject to wear, break and tear. Naturally this also applies to conveyor belt systems, no matter how well they are designed and constructed. This is where the global electronic monitoring of possible damage to conveyor belts and the respective splices is required – ideally before any such damage leads to serious downtimes.





#### **Solution**

## **Prognostic** maintenance

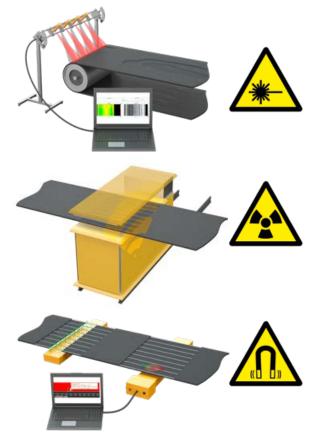
ContiTech's highly reliable electronic CONTI® PROTECT and CONTI® INSPECT systems are designed to detect possible damage to heavy mining applications according to automotive standards before any such damage can cause unforeseen downtimes.

The CONTI® PROTECT series consists of the systems *CordProtect*, *RipProtect*, *SpliceProtect*, *MultiProtect* and *TotalProtect*. These are permanently installed and monitor the belt continuously during the operation. If any irregularities are detected, the system automatically stops the conveyor belt.

The CONTI® INSPECT series includes the *WearInspect*, *CordInspect* and *SurfaceInspect* systems, which are mobile and can be used for all appropriate conveyors. The CONTI® INSPECT series is designed to detect wear and damages to the conveyor belt during conveyor operation.



All data collected by the electronic systems outlined above can be stored and analysed by the web and app service platform ContiPlus located on the cloud, which is the smartest way to monitor performance of your conveyors: www.contiplus.net





### Challenge

### Swift maintenance

In order to carry out planned maintenance services smoothly with a minimum of downtime, all the required standard and special service materials and equipment should be readily available. Only in that way scheduled maintenance as well as unscheduled repairs can be carried out swiftly and efficiently.





#### **Solution**

## Service materials & equipment available around the world

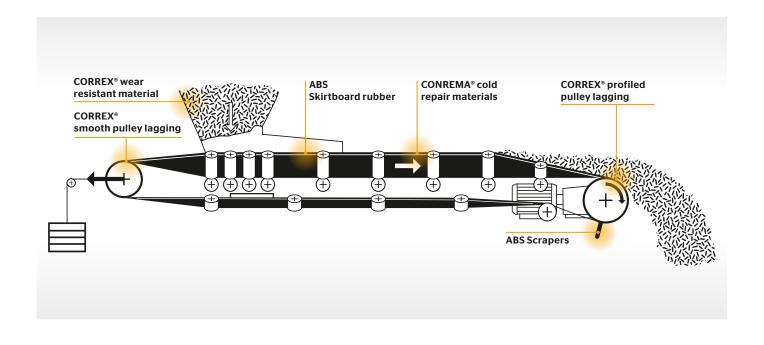
Continental's Service Centers around the world have all the necessary tools and equipment readily available to perform any kind of belt related service work on short notice. That includes vulcanizing presses, belt winders, pulling tables, belt clamps etc. On stock is also all the required material to service your conveyor belt system, such as splice material, CORREX® lining and lagging material, CONREMA® repair material and hot and cold bonding solutions. Preform® splice panels can be produced upon order to fit your belt.

In addition, your splice or maintenance teams can be supplied with all of Continental's tools, equipment and material. Experienced engineers are available to advise on the best fit and to supervise any work performed on site. Furthermore, Continental provides professional training by qualified technicians and splicers in various different areas.











## ContiTech Conveyor Belt Group

Global competition and the technological changes are challenges. We as a manufacturer of conveyor belts and systems, position ourselves in the fore front of these challenges. Our internal and geographic network assists to us in this in a synergy that can be very productive.

Our innovation ability, the most modern technologies and comprehensive services close to customer make us the partner to mining, machine and investment constructions as well as many other industries in the world. Integrated in the division ContiTech, we are a part of the Continental AG, with their financial power and synergy potentials.





We provide support through all stages of every order, worldwide. Our flexible organization in easy reach of our customers assures speedy access to our products and our qualified service.

Experienced fitting teams splice conveyor belts using the most modern vulcanization equipment, above and below ground.

## Worldwide Locations for Production, R&D and Engineering





### **ContiTech**

#### **Conveyor Belt Group**

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Your local contact www.contitech.de/contactlocator

The ContiTech division of the Continental Corporation is one of the world's leading industry specialists. As a technology partner, our name is synonymous with expertise in development and materials for components made of natural rubber and plastics and also in combination with other materials such as metal, fabrics or silicone. By integrating electronic components, we are also generating solutions for the future.

Beyond products, systems and services we also provide holistic solutions and have a formative influence on the industrial infrastructure. We see digitalisation and current trends as an opportunity to work with our customers to add sustainable value - for both sides and for good.