



Cast polyurethane solutions
for mining parts manufacturing





Long-lasting solutions for mining applications

Elastomers to deliver resistance and maximize mining equipment availability

Equipment failure due to a material breakdown is not an option when running a production line continuously. Covestro is a long-term collaborator with mining original equipment manufacturers and provides materials that achieve optimal performance and cost efficiency.

For mining applications, cast polyurethane elastomers from Covestro have been proven to extend the life of metal components by providing both durability and resistance. Furthermore, using Desmodur® cast polyurethane improves working conditions by reducing noise in the mining environment.

Targeted properties

Material strength and durability, as well as chemical and environmental resistance, are important factors in choosing materials

for mining equipment. Our Desmodur® systems possess the highest levels of the following properties :

- Abrasion resistance
- Cut and tear resistance
- Flex fatigue
- Compression set
- Tensile strength
- Oil, hydrolysis and chemical resistance

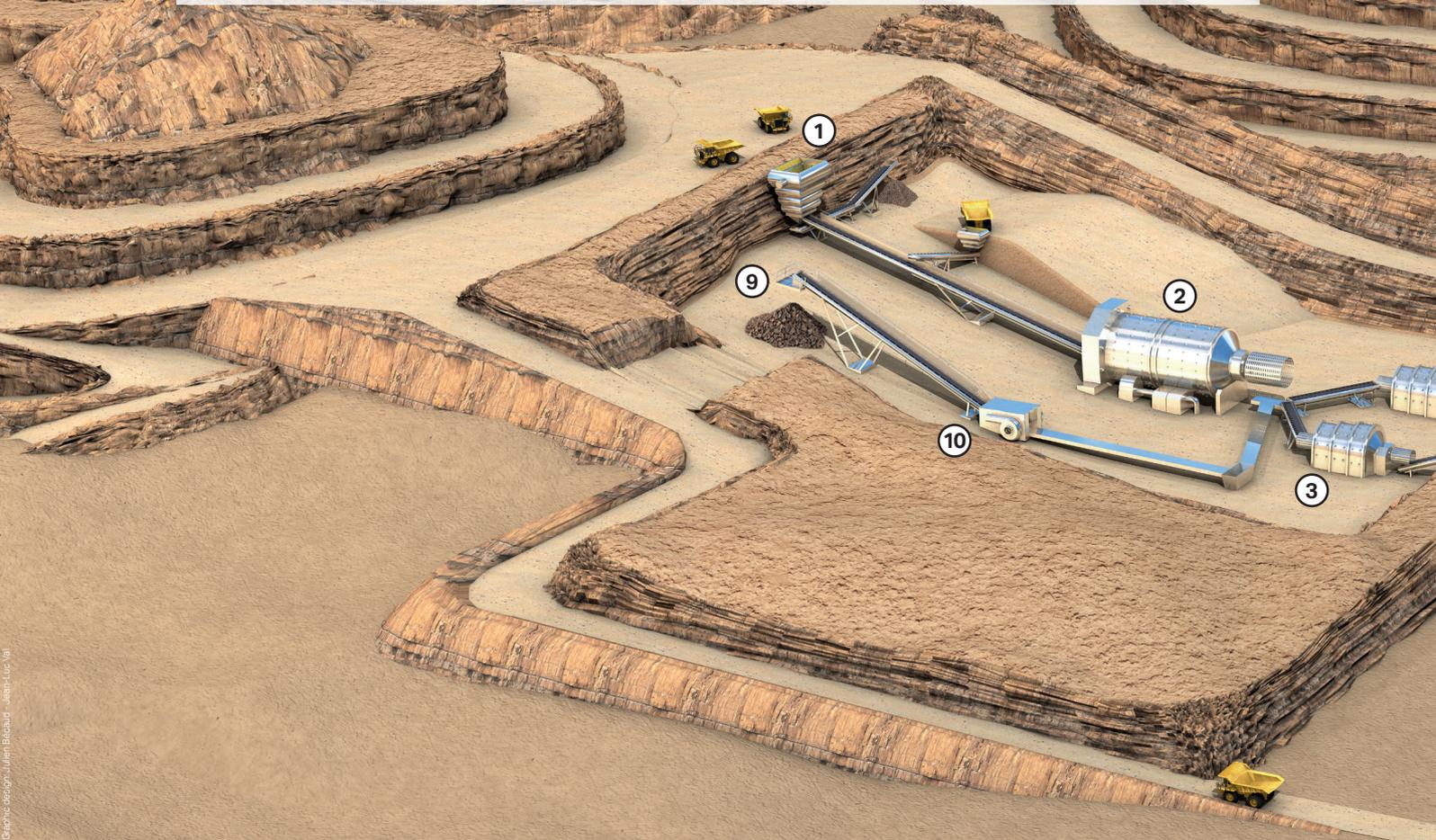
All together, these properties ensure high-performing applications. They enable the final part to last in both wet and dry environments.

Whatever the mineral to extract, from coal to precious or non-precious metal, Covestro addresses each mining process by providing customized and cost-effective solutions.



Desmodur[®] elastomers all along the extraction process

Given their large range of performance, cast polyurethanes from Covestro are the solution for various types of mining applications from the primary comminution stage to the refined mineral. These properties empower a mining production line to run continuously and limit equipment downtimes. Covestro developed Desmodur[®] systems matching the requirements of many applications along the whole mining process: conveying, protecting, screening and separating. Some of which are depicted in the display hereunder.



Wear protecting

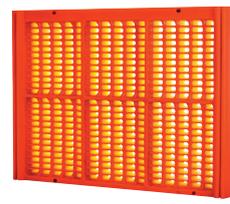
Screening



① Hopper liner



⑤ Pump body



③ Trommel dual layer screen



② Grinding mills liner



⑥ Internal pipe lining



④ Fine mesh screen



Separating



⑦ Flotation cell impeller

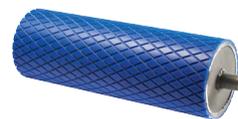


⑧ Hydrocyclone

Conveying



⑨ Scraper



⑩ Conveyor roller (pulley)

Wear protection applications: high robustness for extended lifetime and higher output

Profitable wear protection solutions



Over the whole mining process, whether the minerals are hard or soft, small or large, more or less abrasive, wet or dry, wear will always be around. Using cast elastomers from Covestro proved to be a cost-effective and efficient method to protect the devices subject to different wear conditions: they enable to lower the total cost and enhance the efficiency in terms of output and lifetime.

In that purpose, the Desmodur® based cast polyurethane linings intended to protect the means used to crush and to grind the bigger aggregates provide:

- Good impact resistance
- Excellent tear resistance with nick
- Good abrasion resistance

Furthermore, the devices (like pump bodies or pipes) used for the transportation of slurry, mixture of solids and liquids, benefit from a protection made with polyurethane elastomers from Covestro given their resistance to abrasion and to tear combined with a good resistance to hydrolysis.

Application	Hardness	Recommended system
Grinding mills lining	75 ShA	Desmodur® MX100
Hopper & Truck lining	Top layer: 85 ShA Bottom layer : 60-65 ShA	Desmopan® and Desmodur® composite solution
Internal pipe lining	One layer type: 85 – 90 ShA Dual layer type: Bottom layer: 85 ShA Top layer: 60 - 75 ShA	If temperature is below 45°C: Desmodur® MDQ24163 If temperature is above 45°C: Desmodur® MTX6076 If pipes are buried: Desmodur® MTX6076
Pump body	From 60 ShA to 85 ShA	Regular performance: Desmodur® MDQ24163 High performance: Desmodur® MDQ75164

Screening applications: efficient and continuous sizing of the aggregates

Solutions for a cost-effective sorting of the rocks



Screens separate and sort the aggregates to the size. To be efficient, they require to size precisely and continuously. Given the sharp angles of the rocks and the friction resulting, it necessitates the screens to resist especially well to wear. Not only cast polyurethanes from Covestro are robust and consistent, their processing also provide a efficient method to deliver spare parts on request.

To answer the requirements in terms of lifetime and availability, the Desmodur® based cast polyurethanes developed for the various screens perform:

- Good impact resistance
- Excellent abrasion resistance
- Excellent tear resistance with nick
- Good resilience

Depending on the feed size of the aggregates, the parts have to develop different level of performance. For top deck screening medias with large apertures, resistance to tear has to be especially high, while bottom deck screens with smaller apertures are requiring better abrasion.

Application	Hardness	Recommended system
Top deck screen	70 ShA	Desmodur® MDQ75164
Bottom deck screen	85 or 90 ShA	Regular performance: Desmodur® MDQ24163 High performance: Desmodur® MDQ75164
Dual layer screen	Bottom layer: 85 ShA Top layer : 60 ShA	Regular performance: Desmodur® MDQ24163 High performance: Desmodur® MDQ75164
Trommel screen	Bottom layer: 85 ShA Top layer : 60 - 75 ShA	Desmodur® MDQ75164

Separating applications: reliable selection of valuable minerals from the slurry

Solutions for an accurate collection of the minerals



The purpose of the separation process is to extract the valuable minerals from the slurry. Separation can be achieved with several technologies:

- using density: impurities are removed by gravity;
- using the flotation process: minerals are made hydrophobic and become attached to air bubbles introduced into the pulp. They are carried to a froth layer above the slurry, thereby being separated from the hydrophilic (wetted) particles.

As for the transportation of slurry, the various devices involved in the separation process must develop the following characteristics:

- Good resistance to hydrolysis
- Good resistance to oil and chemicals
- High abrasion resistance
- Excellent tear resistance
- Excellent resilience

Cast polyurethanes from Covestro provide the performance required by the separation devices.

Altogether, they confer the efficiency and the reliability expected: they enable the various applications to increase their reliability and lower the operating costs.

Application	Hardness	Recommended system
Flotation cell impeller	80 - 85 ShA	Desmodur® MTX6076
Hydrocyclone	Low pressure type: 85 ShA	If temperature is below 45°C: Desmodur® MDQ24163 If temperature is above 45°C: Desmodur® MTX6076
	High-pressure type: 60 - 65 ShD	Desmodur® MTX6076

Conveying applications: keep the process flow stable

Solutions for an efficient dispatch of bulk materials



Belt conveying is an excellent mean for the continuous transportation of bulk materials. Especially relevant for difficult terrain, conveyors are the efficient transportation manner over long distances, passing through curves and rough relief areas. Among the accessories required to maximise transport performance, belt idlers and belt pulleys are vital for the conveying process.

Covestro offers appropriate cast polyurethane elastomers for both type of rollers. To fulfill the requirements of the applications, they develop the following properties:

- Excellent resistance to wear
- Excellent compression set
- Good abrasion resistance
- Excellent tear resistance with nick

Desmodur® based cast polyurethanes are also the material of choice for belt cleaning. They provide the required characteristics for all types of scrapers:

- Capacity to dissipate heat build up
- Abrasion resistance
- Hydrolysis
- Tear resistance
- Good dynamic behavior
- Hot and low temperature resistance
- Oil and chemical resistance

Application	Hardness	Recommended system
Scraper	85 - 90 ShA	Desmodur® MD1680
Conveyor roller	Pulley: 60 ShA	Regular performance: Desmodur® MDQ24163
	Idler: 80 ShA	High performance: Desmodur® MDQ75164

Covestro's field proven system solutions

Multiple chemical profiles available

Covestro's cast polyurethane systems are designed to meet requirements of a wide range of demanding mining applications. Through in-depth research into elastomer behavior in various environments, our team has developed the most accurate and effective solutions.

Desmodur® MD1680 based systems

System nature : MDI-Ester
 Hardness range : 60A - 90A
 Processing temperature: < 80°C

Desmodur® MDQ24163 based systems

System nature : Quasi MDI-Ester
 Hardness range : 55A - 55D
 Processing temperature: < 50°C

Desmodur® MDQ75164 based systems

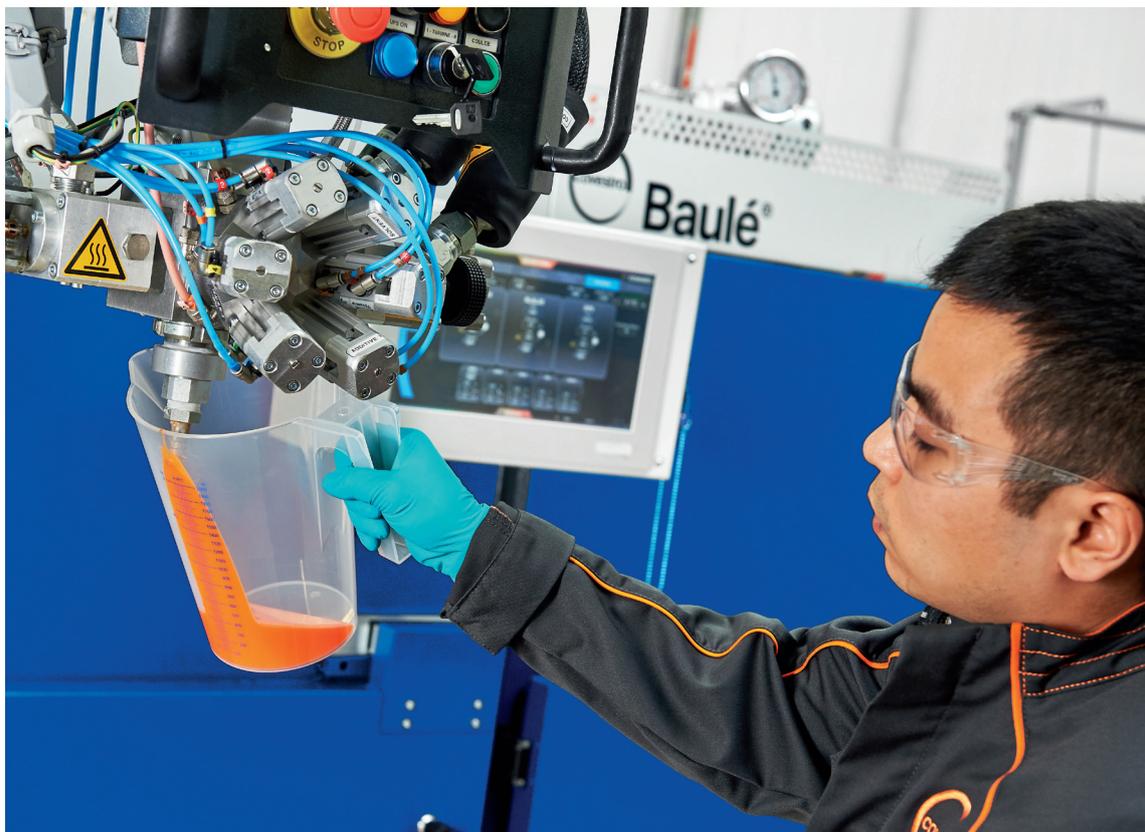
System nature : Quasi MDI-Ester
 Hardness range : 55A - 95A
 Processing temperature: < 70°C

Desmodur® MTX6076 based systems

System nature : Quasi MDI-Ether
 Hardness range : 60A - 75D
 Processing temperature: < 50°C

Desmodur® MX100 based systems

System nature : Quasi MDI-Ester
 Hardness range : 55A - 95A
 Processing temperature: < 70°C



Summary

Covestro offers several solutions approved for mining applications. Considering the applications environment, among the various properties required, resistance to wear is a must. However, all these solutions exhibit other mechanical properties and distinguish also themselves upon their processing.

	Desmodur® MD1680	Desmodur® MTX6076	Desmodur® MDQ24163	Desmodur® MDQ75164	Desmodur® MX100
Impact resistance					★
Abrasion resistance	★	★	★★	★★★★	★★★★
Tear resistance	★★	★	★★	★★★★	★★★★
Resilience	★★	★★★★	★★	★★	★★
Hydrolysis resistance		★			
Chemical resistance	★	★			
Dynamic properties	★				
Heat build up resistance	★				
Compression set				★	★
Applications	Scraper	Internal pipe lining Flotation cell impeller Hydrocyclone	Internal pipe coating Pump body Screen Hydrocyclone Conveyor roller	Pump body Screen Trommel Conveyor roller	Grinding mills lining



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