The innovative alternative to MOCA cured systems
Versatile and easy processing systems

covestro

Challenges with alternatives to MOCA cured systems

The processing of cast polyurethane systems may involve aromatic amines such as MOCA. Widely used as a chain extender for TDI based prepolymers, MOCA develops several advantages in terms of mechanical properties. However, while being easy to process, various constraints due to the REACH regulation may be applied to its handling in the near future.

Chain extender alternatives

To anticipate on these upcoming constraints, the first idea is to shift to another amine chain extender instead of MOCA. However, this replacement often impacts both the processing conditions and the performances in a rather disadvantageous way.

Prepolymer alternatives

The other alternative is to look for less constrained alternatives based on MDI prepolymers. These systems allow to target specific performances. However, manufacturers generally have to observe the processing parameters with meticulous accuracy when using MDI based prepolymers.

Health & Safety agenda

Sustainability and safety drive innovation at Covestro. We are focused on enlarging our product offering with more enhanced sustainable systems. Furthermore, the continuous development of our safety culture is the cornerstone of our corporate responsibility.

Generally speaking, systems that are solely based on MDI prepolymers present significant benefits:

1. Compared to chain extenders for TDI based prepolymers, the usual curatives for MDI based prepolymers are less demanding regarding Health & Safety
2. As MDI based prepolymers have a low vapor tension, their handling conditions are easier and less constrained compared to TDI based systems.

Performing and easy handling solution

Aiming to offer the best solutions in terms of flexibility, properties, process and Health & Safety, Covestro made a significant push on MDI based systems to provide molders with performing solutions. These systems combine the best balanced advantages of both TDI and MDI based systems.

Easy processing and excellent performance

As for TDI based systems cured with MOCA, they provide easy processing and mechanical properties enabling them to suit a large variety of applications. On the other hand, like any MDI based system, they allow to target a specific performance and enable the access to a large hardness range with the same three components.

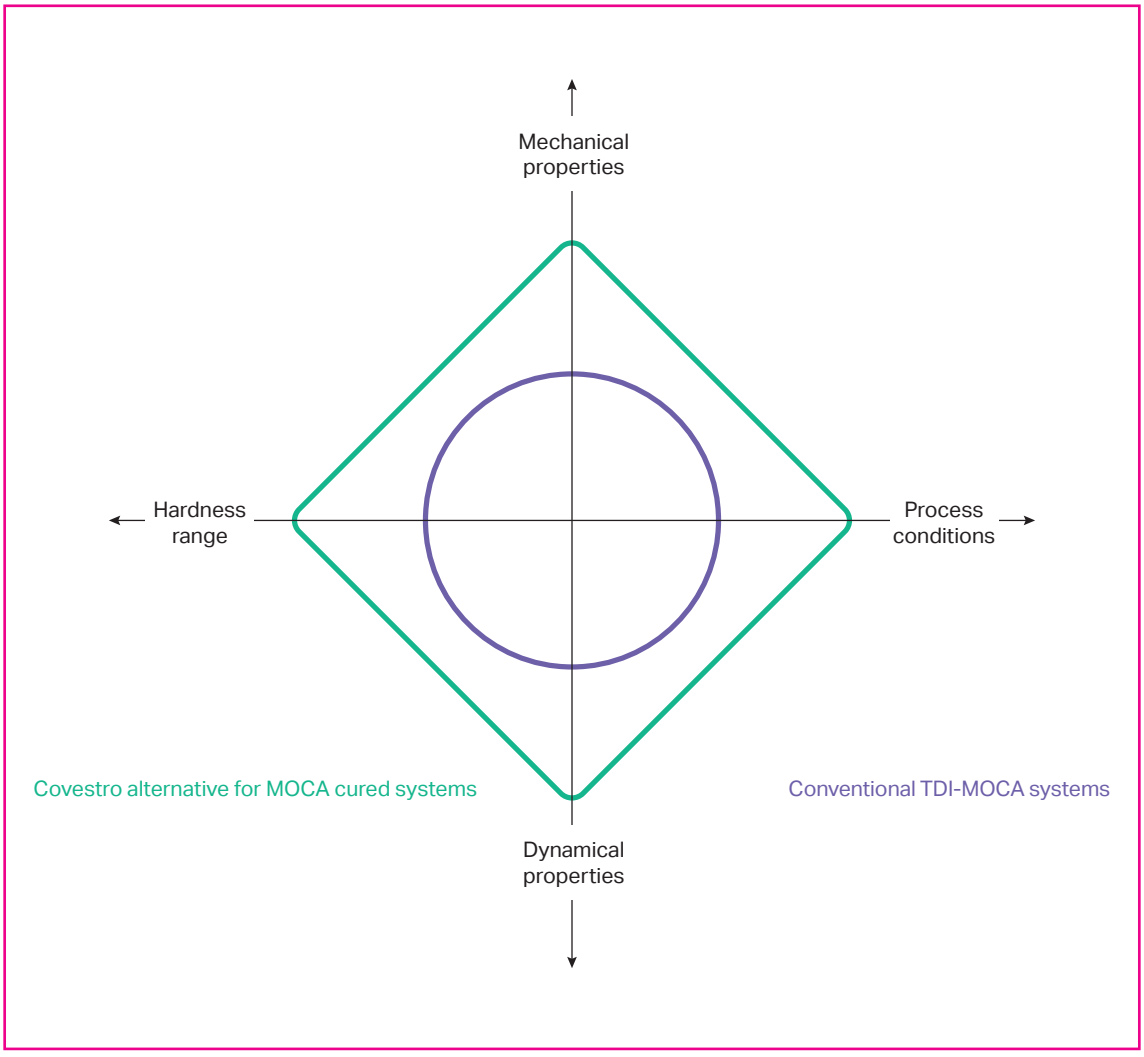
These products represent an innovation that provides manufacturers with an easy handling solution for producing polyurethane cast elastomers with an overall excellent range of properties.

Covestro solution

Covestro developed two solutions as part of our alternative to MOCA cured systems. They both provide excellent properties and processing even for large parts :

- Desmodur® MTX6076 systems
- Desmodur® MT99xx systems

Compared with conventional TDI-MOCA systems, together, they offer a beneficial alternative in terms of high properties and easy handling.



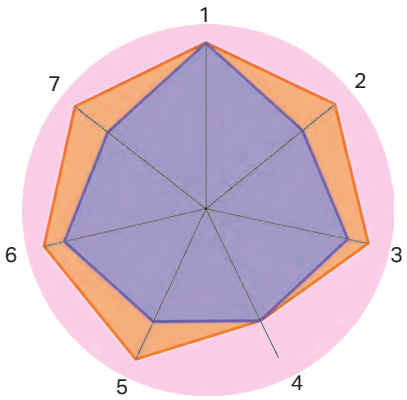
Desmodur® MTX6076: a versatile and easy to process product

The Desmodur® MTX6076 systems are more than just an easy handling alternative to TDI-MOCA systems. In fact, these products provide molders with an easy processing solution for producing polyurethane elastomers with an excellent range of properties. Compared with conventional TDI-MOCA systems, they develop better overall mechanical properties and are processed with more ease and comfort.

Excellent overall mechanical performance

The overall mechanical properties of the Desmodur® MTX6076 systems make it a unique product. The systems cover a broader spectrum of key properties than conventional TDI-MOCA systems:

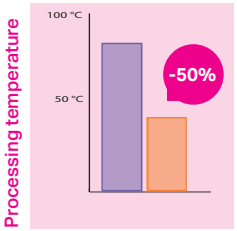
1. Tensile strength
2. Elongation at break
3. Tear strength
4. Resilience
5. Abrasion resistance
6. Compression set
7. Hydrolysis resistance

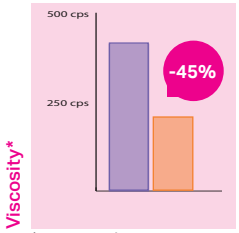


Desmodur® MTX6076 system - 95ShA
Conventional TDI-MOCA system - 95 ShA

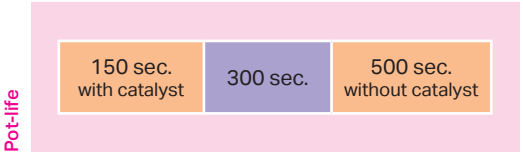
Adjustable process

The Desmodur® MTX6076 systems have been developed to be easy to process with adjustable pot-life, low processing temperature and short demolding time. These systems are thus suitable for hand casting and machine casting of large parts.



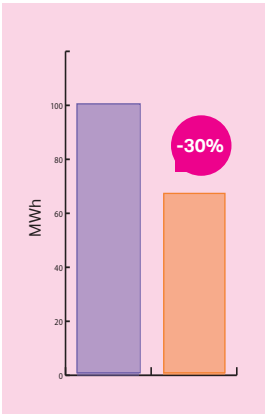


*at processing temperature



Energy savings

The Desmodur® MTX6076 systems require less energy to be processed compared to conventional TDI-MOCA systems: raw materials and mold temperatures are lower. It induces significative energy savings.



The energy required for the process includes the preheating of the raw materials, the heating of the molds and the post-curing. The main energy gain is obtained for the preheating.

Large hardness range

The Desmodur® MTX6076 systems offer a wide range of hardness obtained thanks to the adjustment of the three components ratios.

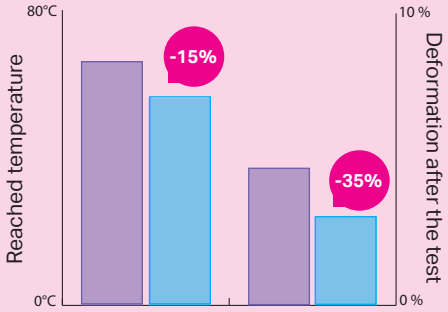
Hardness	60ShA	65ShA	70ShA	75ShA	80ShA	85ShA	90ShA	95ShA	60ShD	75ShD
Desmodur® MTX6076	●	●	●	●	●	●	●	●	●	●
TDI-PTMEG systems					●	●	●	●	●	●

Desmodur® MT99xx: advanced and flexible systems with high dynamics

Thanks to their performance and especially their high dynamic properties, the Desmodur® MT99xx systems represent a solid alternative to TDI-MOCA systems. Moreover, these products are easy to handle and to process. With an excellent range of properties, they will be perfectly suited for applications requiring high dynamics such as wheels.

Excellent dynamic properties

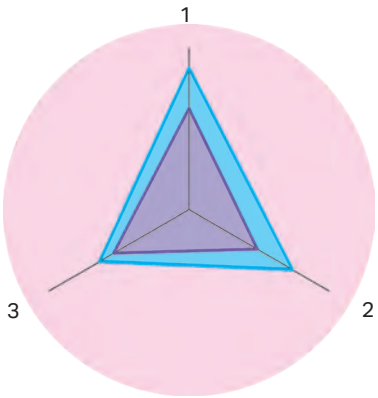
Compared with conventional TDI-MOCA systems, the Desmodur® MT99xx systems develop particularly high dynamic properties.



Hydropulsor test
1 million cycles at 10 Hz, loading of 2000N

Mechanical properties

1. Abrasion resistance
2. Compression set
3. Resilience



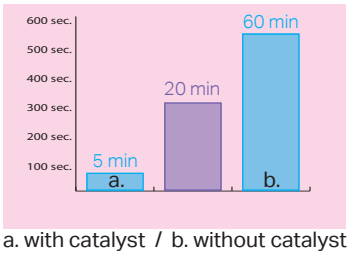
Desmodur® MT99xx system - 95ShA

Conventional TDI-MOCA system - 95 ShA

Excellent flow and processing properties

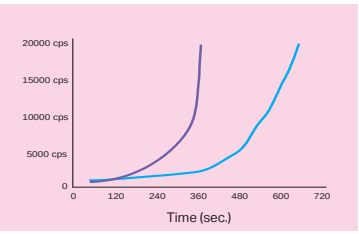
Thanks to its adjustable pot life, Desmodur® MT99xx systems are easy to process. Their low viscosity increase while pouring allows both hand casting and machine casting of large parts.

Pot-life & demolding time



a. with catalyst / b. without catalyst

Viscosity increase: gel timer



Hardness range

The Desmodur® MT99xx systems have a comparable range of hardness with TDI-MOCA systems.

Hardness	60ShA	65ShA	70ShA	75ShA	80ShA	85ShA	90ShA	95ShA	60ShD	75ShD
Desmodur® MT99xx					●	●	●	●	●	
TDI-PTMEG systems					●	●	●	●	●	●

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