



## Impact Modification of Polyacetal with PARALOID™ EXL Core-shell Impact Modifiers

### Regional Product Availability

- North America
- Europe
- Asia-Pacific
- Latin America

### Applications

Polyacetal, also called polyoxymethylene (POM), is a semi-crystalline thermoplastic produced from formaldehyde.

Two types of polymers are available:

- Homopolymers of formaldehyde
- Copolymers of formaldehyde and ethylene oxide

Several grades are available with varying melt flow indexes for injection or extrusion applications. POM provides excellent wear resistance, high modulus, good chemical resistance and dimensional stability.

These polymers are used in several industry segments. For example:

- Automotive- loudspeaker grills, valves, instrument panel and engine components
- Medical applications, like inhaler systems
- Kitchen accessories

POM, however, displays poor low temperature impact strength, which limits its potential use in demanding applications. Furthermore, POM is prone to degradation during processing by unzipping, yielding potential release of undesirable formaldehyde.

Processing and modification strategies must, therefore, take into consideration this important latter point.

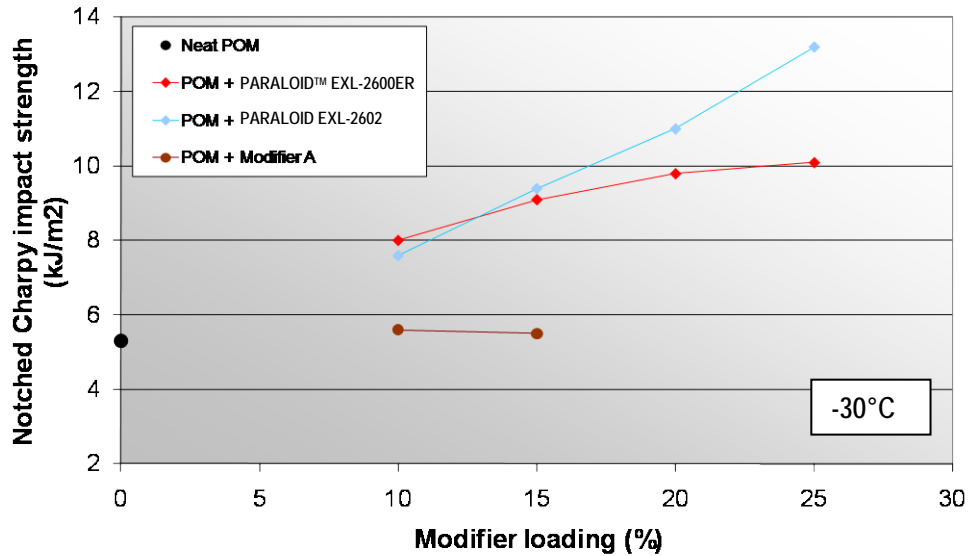
### Dow Technology

Dow Plastics Additives has developed impact modifiers which are well suited to improve toughness of POM without impairing its processability or chemical resistance. Two PARALOID™ EXL MBS core-shell particle (methylmethacrylate-butadiene-styrene) grades are available for POM modification, covering a large range of market impact strength needs.

- PARALOID EXL-2600ER for low temperature impact performance and low formaldehyde emissions.
- PARALOID EXL-2602 for superior low temperature impact performance.

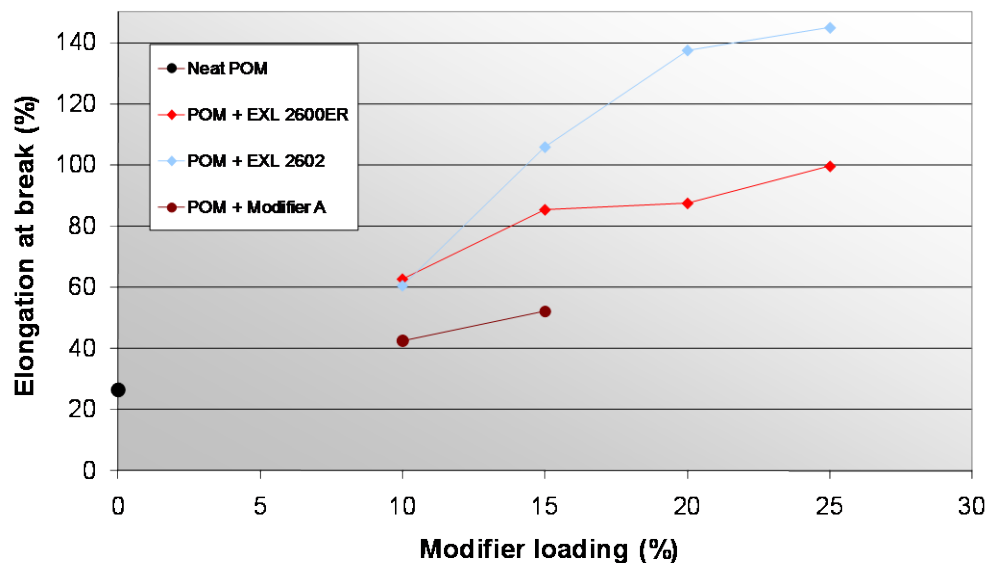
### Improved Low Temperature Impact Strength with MBS Core-shell Modifiers

The low temperature impact strength of POM can be substantially increased by the addition of PARALOID™ EXL-2600ER Core-shell Impact Modifier, while managing the emission of formaldehyde to a low level in compliance with the most stringent norms used in the industry (VDA 275). PARALOID EXL-2600ER outperforms standard modifiers used in the market for this application. State of the art scavengers can also be used in combination with PARALOID EXL-2600ER for enhanced emission performance. PARALOID EXL-2602 gives a superior impact performance for the most demanding applications in term of impact strength.



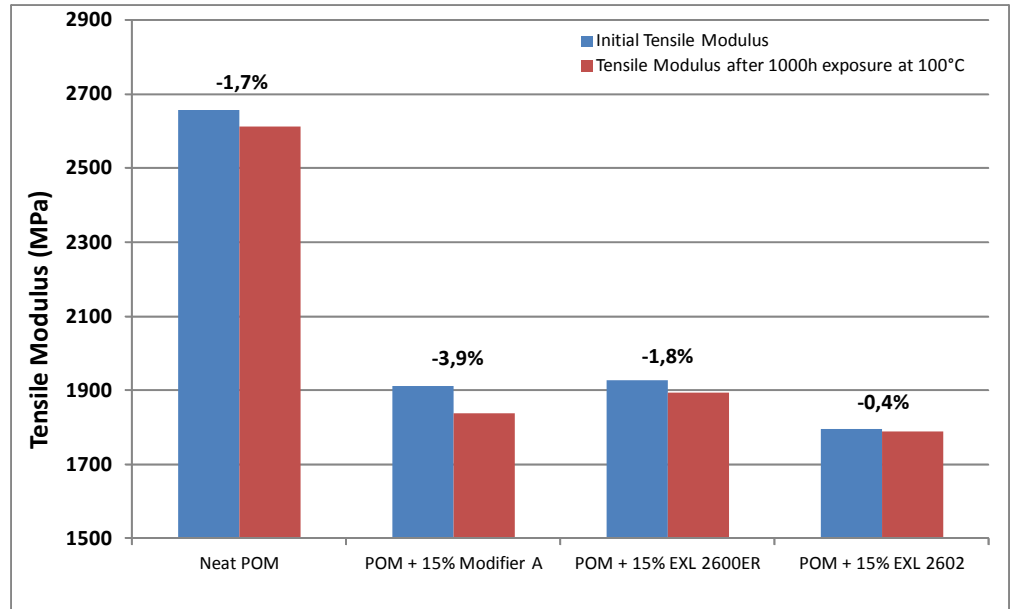
### Improved Elongation at Break

In a similar fashion, the addition of PARALOID™ EXL-2600 ER increases elongation at break by a factor of more than 2x at 10% addition level and up to 4x at 25% addition level. PARALOID EXL 2602 exhibits even higher performance, in this regard.



### Improved Retention of Mechanical Properties after Thermal Ageing

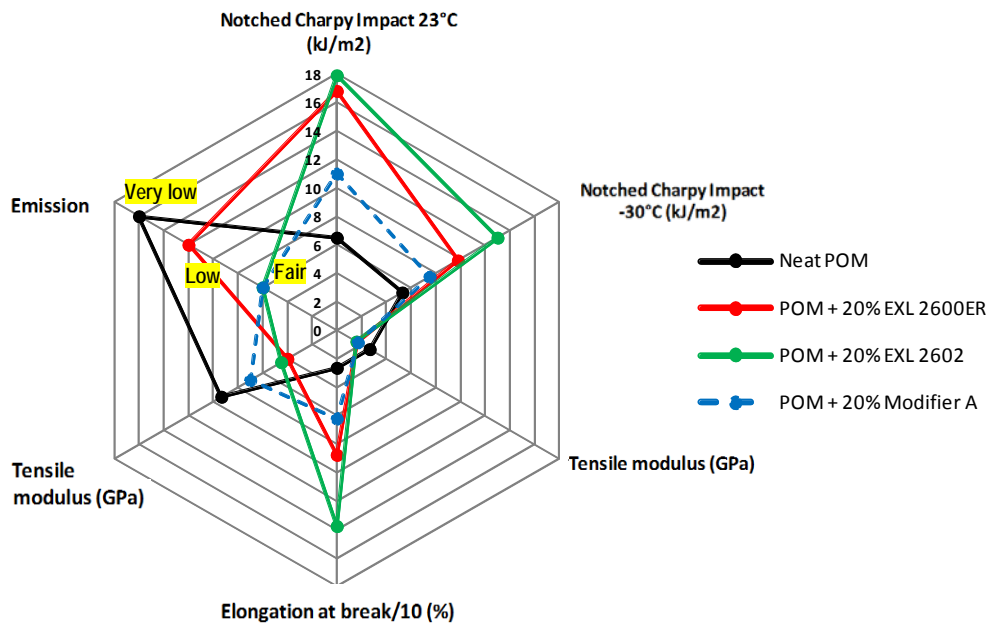
PARALOID™ EXL Modifiers are also particularly useful for stabilizing mechanical properties after thermal ageing. A modified POM compound with PARALOID EXL-2600ER exhibits a comparable evolution in tensile properties than the neat resin. PARALOID EXL 2602 even yields a stable modulus after 1000 hours of exposure whereas traditional modifiers yield a more pronounced decrease in modulus, which is an indication of potential polymer degradation.



## Upgrading POM with PARALOID™ EXL Core-Shell Impact Modifiers

Several modification strategies are available for polyacetals with the Paraloid EXL product range :

- PARALOID™ EXL-2600ER is particularly recommended for improving impact strength at low temperature, managing formaldehyde emissions at a low level,
- PARALOID EXL-2602 can be used for the most demanding impact specifications at sub-zero temperatures.



Best values are noted on the outside of the axis

Very low	< 5 ppm
Low	< 10ppm
Fair	> 10 ppm

## Handling Precautions

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

**CAUTION!** Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

**CAUTION!** Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

## Storage

Store products in tightly closed original containers at temperatures recommended on the product label.

## Medical Applications Policy

NOTICE REGARDING MEDICAL APPLICATION RESTRICTIONS: Dow will not knowingly sell or sample any product or service ("Product") into any commercial or developmental application that is intended for:

- long-term or permanent contact with internal bodily fluids or tissues. "Long-term" is contact which exceeds 72 continuous hours.
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- Use as a critical component in medical devices that support or sustain human life; or
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## Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Plastics Additives Technical Representative for more information.

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Note on  
Asia-Pacific  
Product Line

Product availability and grades vary throughout the countries in Asia-Pacific. Please contact your local Dow representative for further information and samples.

Product  
Stewardship

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Impact Modification of Polyacetal / Plastics Additives

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