# Multilayer thermoplastic hoses for BEV glycol fluid systems

## Enabling new hose structures to deliver the evolving design requirements of battery electric vehicles (BEV) for Scope 3 carbon emission reduction

The industry-driven transition from traditional thermoset rubber hoses for internal combustion engine (ICE) vehicles to thermoplastic solutions is supported by the change in requirements for BEV thermal management systems compared to ICEs in terms of temperature, pressure, level of vibration and coolant exposure time, while the desire to reduce weight and cost remains. Dow's broad portfolio offers a full range of polyethylene products, polyolefin elastomers, EPDM and functional polyolefins. In addition, its expertise in polymer design and engineered polymer modification allow the development of new materials for the long-term optimization of BEV glycol fluid pipe and hose systems.

### Solutions for incumbent multilayer BEV coolant pipes

For use in polypropylene/adhesive/polyamide multilayer BEV coolant pipes, Dow has a variety of solutions overcoming challenges in each individual layer:

| Layers in BEV hose | Challenges | Dow solutions |
|---|---|---|
| Polyamide layer | Toughness<br>Flexibility<br>Hydrolytic stability | FUSABOND™ Functional Polymers |
| Adhesive layer | Adhesion<br>Processability<br>Toughness | BYNEL™ Adhesive Resins |
| Polypropylene layer | Toughness<br>Processability | ENGAGE™ Polyolefin Elastomers |

*BYNEL™ 50E571 Adhesive Resin is qualified in multilayer thermoplastic coolant hoses for electric vehicles.*

*Dow multilayer thermoplastic (MLT) prototype*

### Solutions helping enable further multilayer structures

BYNEL™ Adhesive Resin versatility is demonstrated by Dow's multilayer thermoplastic (MLT) prototype by combining PE/PA tie layer technology (featuring BYNEL™ Adhesive Resins) with polyethylene technology (featuring DOWLEX™ Polyethylene Resins) for optimized flexibility and enabling cost/performance benefits.

### Key offerings

- Tie layer and adhesive resin chemistry
- Polyethylene solutions in pipes and hoses
- Polyethylene with flexibility and good resistance

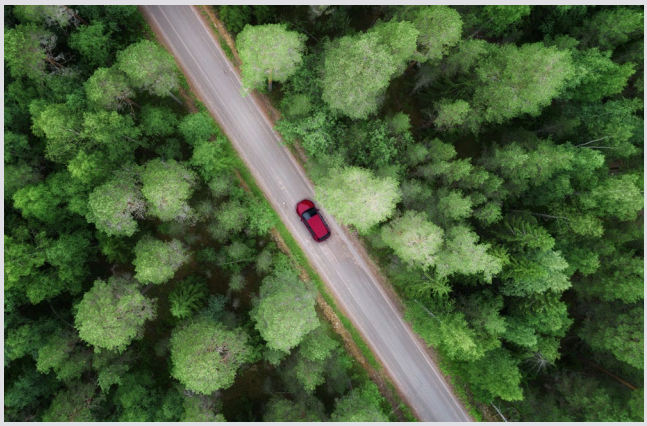
Long-chain Polyamide

BYNEL™ Tie Layer

DOWLEX™ HDPE

## Dow's wide portfolio enables flexibility of design

- Enhanced tie layer performance in toughness and temperature resistance with BYNEL™ Adhesive Resin for bonding polyolefin layers to polar layers like polyamide
- Combines polyethylene technology featuring DOWLEX™ Polyethylene Resins for optimized flexibility and cost-performance balance
- Long-term optimization of BEV coolant hose structures through wide range of high-performance material options and expertise in polyethylene and elastomers
- Supporting design for flexibility, temperature resistance, processability and designed to enable recycling



**Made with:** Bynel™ adhesive resins by DOW; Dowlex™ polyethylene resins by DOW

### About Dow

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