



®

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 length**, while the desire to reduce weight and cost remains. Dow's polyolefin portfolio offers a full range of polyethylene products, polyolefin elastomers, EPDM and functional polyolefins, coupled with Dow's expertise in polymer design and engineered polymer modification to allow the **development of new materials for the long-term optimization** of BEV glycol fluid pipe and hose systems.



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

Dow multilayer thermoplastic (MLT) prototype

BYNEL™ Adhesive Resin versatility is demonstrated by the MLT prototype, a combination of PE/PA tie layer technology (BYNEL™) with high-temperature polyethylene technology (DOWLEX™ PE-RT) for optimized flexibility and cost/performance.

Layers in BEV hose	Challenges	Dow Solutions
Polyamide layer	Toughness Flexibility Hydrolytic stability	FUSABOND™ Functional Polymers ENGAGE™ Polyolefin Elastomers
Adhesive layer	Adhesion Processability Toughness	BYNEL™ Adhesive Resins
Polypropylene layer	Toughness Processability	ENGAGE™ Polyolefin Elastomers INFUSE™ Olefin Block Copolymers

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

Key offerings

- Tie layer and adhesive resin chemistry
- Polyethylene solutions in pipes and hoses
- Elastomers with flexibility and high temperature resistance



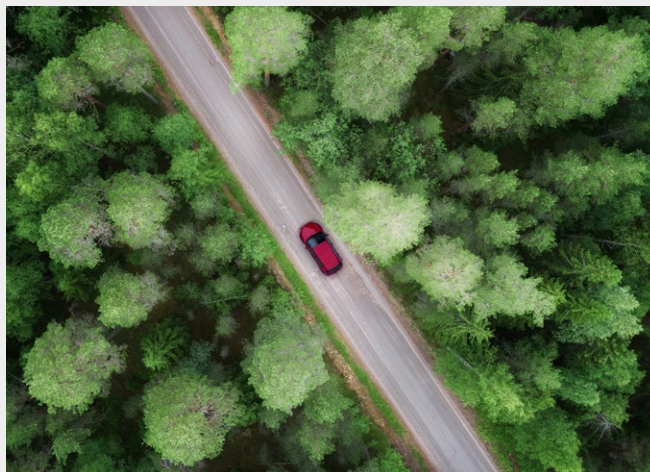
Long-chain polyamide (40%)

BYNEL™ Tie Layer (15%)

DOWLEX™ HDPE (45%)

Climate protection

- Enhanced tie layer performance in toughness and temperature resistance with BYNEL™ Adhesive Resin for bonding polyolefin layers to polar layers like polyamide
- Combined with high-temperature polyethylene technology (DOWLEX™ PE-RT) 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
- Enabling design for flexibility, temperature resistance, processability and recyclability



Made with:



About Dow

Dow (NYSE: DOW) combines global breadth; asset integration and scale; focused innovation and materials science expertise; leading business positions; and environmental, social and governance leadership to achieve profitable growth and help deliver a sustainable future. The Company's ambition is to become the most innovative, customer centric, inclusive and sustainable materials science company in the world. Dow's portfolio of plastics, industrial intermediates, coatings and silicones businesses delivers a broad range of differentiated, science-based products and solutions for its customers in high-growth market segments, such as packaging, infrastructure, mobility and consumer applications. Dow operates manufacturing sites in 31 countries and employs approximately 37,800 people. Dow delivered sales of approximately \$57 billion in 2022. References to Dow or the Company mean Dow Inc. and its subsidiaries. For more information, please visit www.dow.com or follow [@DowNewsroom](https://twitter.com/DowNewsroom) on Twitter.

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