Breaking the mold

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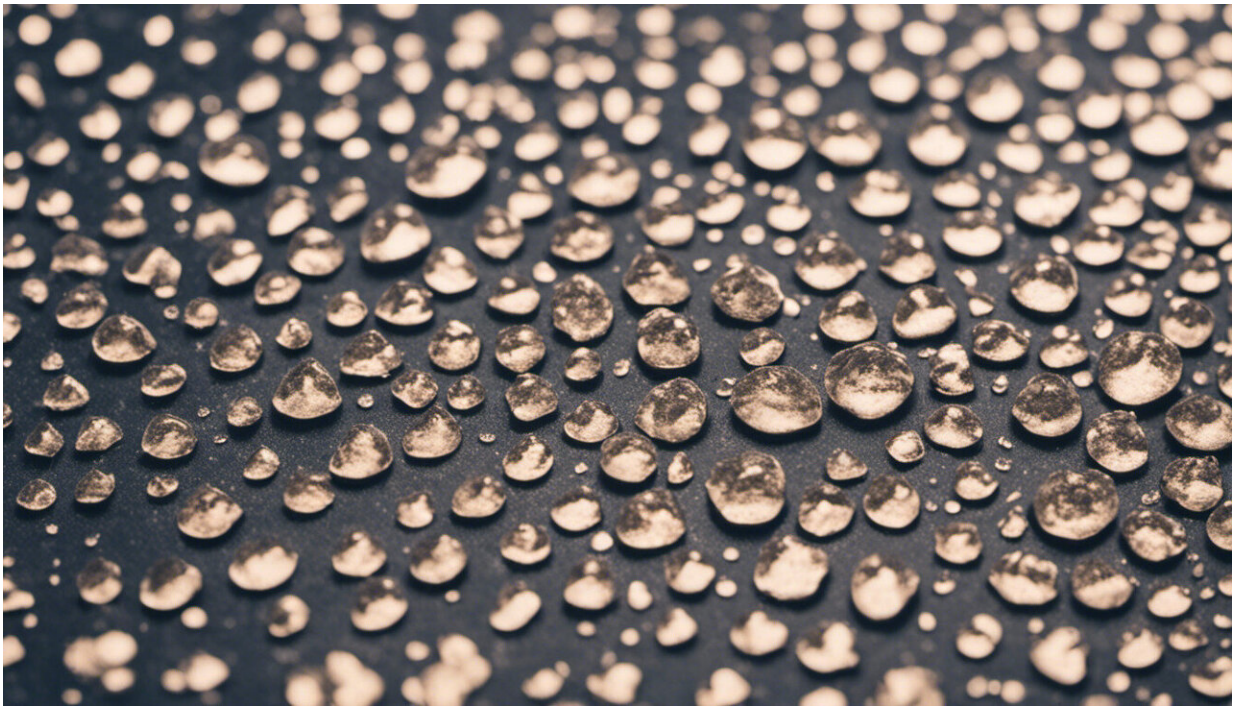

Credit: AI-generated image (disclaimer)

National Physical Laboratory, after over nine years of extensive research, has developed a world-leading pvT (pressure-volume-temperature) and thermal conductivity test kit that can be used to help improve the design and processing of plastics.

The equipment can measure the thermo-physical properties of polymers and can help improve the injection molding process by allowing

designers to find the exact pvT (pressure - volume - temperature) and shrinkage properties of a material. Although plastics are the main material tested, other more unusual materials such as soap and even chocolate have also been analyzed.

The pvT instrument operates at pressures ranging from 200 bar to 2500 bar, and is the only equipment in the world that can test materials at ultra fast cooling rates of up to 280 °C/min and down to temperatures approaching −100 °C. NPL found that at higher pressures polymers can conduct heat up to 20% more efficiently, leading to faster cooling rates and shorter cycle times.

Research on polymers such as HDPE (high-density polyethylene) and PBT (polybutylene terephthalate) is vital to manufacturers and it was found that they can increase their production rates and gain a higher profit by filling a polymer with glass - as this cools faster, reducing the time that the polymer needs to stay in the mould. The less time the polymer stays in the mould, the faster the output rate of products.

pvT testing kits are essential for the improvement in design and processing of ubiquitous, everyday plastics and for more specialised polymers with advanced applications. NPL is the only laboratory where manufacturers can send materials for testing using this advanced equipment and this work has improved the reliability and accuracy of measuring pvT data.

More information: www.npl.co.uk/science-technolo … ials-areas/polymers/

Provided by National Physical Laboratory