New manufacturing process for hoses with large diameter, high load resistance

In order to discover new applications for Desmopan and attract new customers, Bayer MaterialScience (BMS) makes a point of seeking out collaborations with innovative family-run SMEs. One such example is the long-standing cooperation with Mecklenburgische Kunststoffmaschinen GmbH, or Mekuma for short.

The company has made a name for itself worldwide as a provider of, among other things, customised speciality solutions for extrusion machines. For example, Mekuma has developed a process known as **DuoPent** that enables the extrusion of very strong, fabric-reinforced plastic hoses. Ideally, this process is based on thermoplastic polyurethane. During extrusion, the melt is pressed through a specially prepared fabric and then smoothed both inside and out. The coating thicknesses can be selected freely over a wide range.

The result is a completely sealed hose whose fabric weave is fully permeated with TPU to form a material bond. As a result, the lining of the hose is bonded perfectly with the reinforcing fabric. The DuoPent process also enables the manufacture of hose-shaped components with reinforcing fabrics of a larger diameter. This makes it easy to produce hoses in diameters ranging from 19 mm to up to 1,000 mm.

BMS has customised various TPU grades based on standard grades of Desmopan to suit this process. The main task was to ensure that the flowability and stability of the melt are perfectly matched, says the company. The TPU materials enable safe, stable and reproducible hose extrusion to a consistently high standard of quality. According to BMS, the company was also careful to ensure that processing remains cost-effective.

TPU hoses manufactured using the DuoPent process display a number of advantages over their counterparts with conventional linings. Due to the abrasion resistance of Desmopan, they are particularly suitable for hose-shaped components where the medium flowing through them exerts a high mechanical load on the lining. They can also be used for hoses that have to withstand high external stresses caused by friction, light and chemicals, or are exposed to strong fluctuations in temperature. Here, too, the strengths of Desmopan – such as its good low-temperature flexibility, media resistance, tear strength and compressive strength – really come into their own, says BMS.

Mekuma had to overcome two principal challenges when developing the DuoPent process. The extrusion equipment had to be designed in such a way that the internal lining and external coating of the fabric could be produced in a single operation that ensured dimensional stability. In addition, the extrusion machines had to be able to cope with the interruption of the extrusion process during the yarn change.

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