

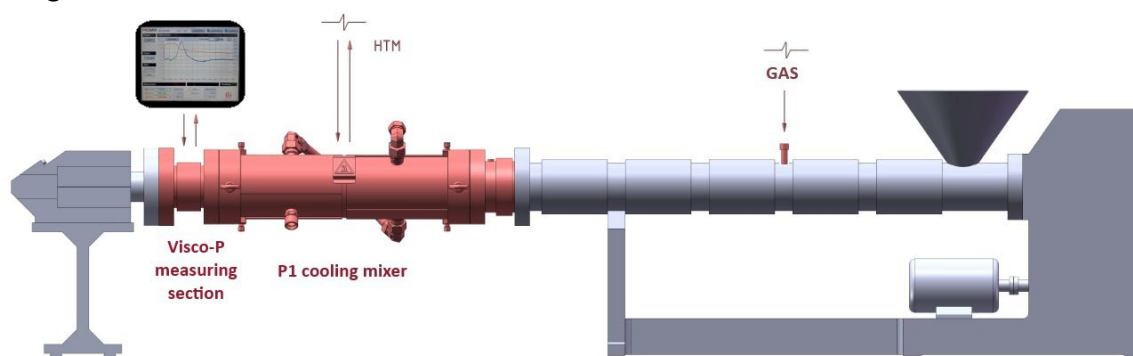
Inline viscosity measurement: The key to optimization in light foam extrusion

Winterthur, Switzerland, November 19, 2024 - Among the technologies developed by Promix Solutions for the plastics industry, the inline viscometer “Visco-P” is gaining increasing interest in the extrusion of foams. This is particularly relevant for companies producing light foams such as XPS, XPE, XPP, and XPET, where line productivity, foam density, and the mechanical properties of the final products are crucial competitive factors.

Starting from the heating phase of the line until standard production conditions are reached, the operator uses the Visco-P in a similar way as an explorer in the forest is tracing his path by using a map and a compass: the displayed graph of the melt viscosity shows in real time the effects of every small change in the process parameters, from temperature and throughput adjustments up to variations in the amount of blowing agent and raw material composition.

The Visco-P in combination with a P1 cooling mixer is the perfect match to improve the process. The P1 cooling mixer allows to homogenize and lower the melt temperature. Together with the Visco-P, this setup allows for precise adjustment and control of melt viscosity just before the polymer enters the extrusion die. This leads to higher output, better cell structure and potentially lower foam densities. In addition, it enables the safe processing of cheaper, lower-viscosity raw materials, which helps to reduce production costs.

Image 1



Caption

The installation of Visco-P and P1 cooling mixer in a foam extrusion line
(Source: Promix Solutions AG)

What sets the Visco-P apart from other inline viscometers is its ability to provide real-time viscosity data for the entire melt flow from the extruder, whether it's a small lab-scale line or a large industrial plant producing over 2000 kg/h.

The picture below shows the viscosity variation at the start-up phase of an XPE pipe insulation production, until stable processing conditions are reached. In this case, the Visco-P measuring module is installed between the P1 cooling mixer and the extrusion die. The viscosity (blue curve) is a function of temperature (red curve) and shear rate (green curve).

At a stable throughput of 42 kg/h (shear-rate = 3,3 1/s) and without the addition of the blowing agent, the corresponding melt viscosity at 130-135 °C melt temperature is between 10,000-11,000 pascal seconds. After lowering the melt temperature from 135 °C to 115 °C with the aid of the P1 cooling mixer, the melt viscosity increases to almost 20,000 Pascal seconds: At exactly this point, the blowing agent (iso-butane) was added, which reduces the melt viscosity to approx. 9,000 Pascal seconds. Further cooling by the P1 is now required to increase the viscosity again. The melt temperature is gradually reduced from 115 °C to 102.5 °C, which corresponds to a viscosity of 10,000 pascal seconds. The target quality for the specific production has been reached.

Image 2



Caption
The Visco-P operator display (Source: Promix Solutions AG)

All the information about how and to what extent the production parameters influence the melt viscosity quickly helps the production manager and his team to gain a better understanding of the process. The Visco-P also supports the plant operator with continuous process monitoring: in the event of deviations from the target state, the inline viscometer immediately triggers an alarm to prevent unnecessary rejects and faulty production.

For more information about Visco-P and P1 visit www.promix-solutions.com/inline-viscometer or contact us at info@promix-solutions.com

About Promix Solutions AG

Promix Solutions AG is the leading supplier of unique key components and solutions in the area of mixing, foaming and cooling in plastics processing and polymer production. Promix serves the industry with effective solutions for the reduction of the environmental footprint, cost savings and quality improvements in extrusion and injection molding. A motivated team with long standing experience and extensive process and application know-how ensures excellent consultancy and service. The product portfolio includes Foam Extrusion Systems, CO₂/N₂ Gas Dosing Stations, nucleation additives, Key Components for the production of Light Foams, Mixing Nozzles, Melt Blenders, Melt Coolers and Inline Viscometers. For more information: www.promix-solutions.com.

Note for editors (not for publication)

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