

Chemical blowing agents

to produce foamed films and sheets: advantages and application

ENG

Advantages and application

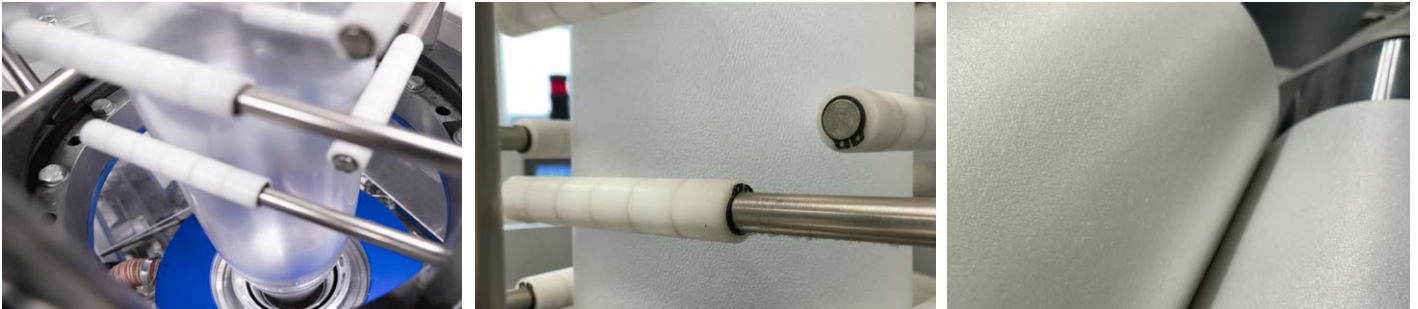
The production of foamed films and sheets has become increasingly important in recent decades. This is mainly due to the wide range of applications for these materials, from the packaging industry to the construction industry. Physical or chemical blowing agents are generally used to create the desired foam structure. In this article, we focus specifically on chemical blowing agents and their advantages in the production of foamed plastics.

- **Precise control of the cell structure**
- **Variety of plastics that can be used**
- **Increased efficiency and productivity**
- **Cost and material savings**
- **Thermal and acoustic insulation**
- **Efficiency**

How chemical blowing agents work

Chemical blowing agents are substances that release gases through chemical reactions when heated. These gases form fine bubbles in the melt of the plastic, which lead to the formation of the cell structure in the material. Typical gases that are released in the process are carbon dioxide (CO₂), nitrogen (N₂) or water (H₂O). The structure and density of the foam cells can be influenced by a targeted selection and combination of chemical blowing agents, temperature conditions and dosages.

The most used chemical blowing agents include azodicarbonamide, sodium hydrogen carbonate and organic acid compounds. These substances decompose in the plastic melt at defined temperatures and produce controlled gas bubbles.



Special features of chemical blowing agents

Chemical blowing agents can be used to achieve a number of advantages when foaming films, profiles or sheets:

Precise control of the cell structure

The cell structure of the foams can be controlled very precisely by thermally activating the chemical blowing agents. Different polymers and applications require specific foam structures, e.g. fine-cell or coarse-cell foams. Chemical blowing agents make it possible to fulfill these requirements flexibly by adapting the blowing agent specifically to the required melting temperature and the processing method.

Variety of plastics that can be used

Chemical blowing agents can be used in a wide range of thermoplastics, including polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC) and polystyrene (PS). Especially for materials with higher processing temperatures, such as polyamide (PA) or polyethylene terephthalate (PET), chemical blowing agents are a preferred choice as they have more stable and controllable decomposition processes than physical alternatives.

Increased efficiency and productivity

Another advantage of chemical blowing agents, compared to physical blowing agents, is their easy integration into existing production processes. They are added directly to the polymer granulate in the form of powders or masterbatch concentrates. This leads to an even distribution in the material and enables a high production adjustment speed without complex technical adjustments.

Cost and material savings

Foamed plastics have a significantly lower density than their solid counterparts. The use of chemical blowing agents makes it possible to reduce the amount of material without significantly affecting the structural properties of the end product. This lowers raw material costs and simultaneously reduces the weight of the material, which is particularly advantageous in the packaging and construction industries.

Thermal and acoustic insulation

The gas bubbles contained in foamed plastics give the material excellent insulating properties. In the construction industry, foamed sheets are often used as insulating materials, as they effectively insulate both heat and sound. Chemical blowing agents make it possible to develop materials with optimized insulating properties that are both economically and ecologically advantageous.

Efficiency

Chemical blowing agents offer outstanding efficiency in terms of dosage and effect. In many applications, even a small addition of less than 0.5% of blowing agent in the plastic pellets can be sufficient to achieve significant results. In practice, such a small amount of chemical blowing agent often leads to a weight reduction in the end product of more than 10%. This not only means a significant saving in raw materials, but also a reduction in manufacturing costs. At the same time, the mechanical properties of the material are largely retained, which further underlines the effectiveness of this technology. This high efficiency makes chemical blowing agents a preferred choice in the industry, especially when it comes to achieving maximum results with minimal use of additives.

Conclusion

Chemical blowing agents are an efficient and versatile option for the production of foamed films and sheets. They offer numerous advantages, including precise control of the foam structure, the possibility of material savings and high compatibility with various plastics. The continuous optimization of processes will help to minimize the ecological footprint of the plastics industry and at the same time produce innovative, high-performance materials.



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