



# Akulon<sup>®</sup> XS: designed for cost effective flexible food packaging solutions

Akulon XS is making it easier and more cost effective for processors to make polyamide 6 blown films for flexible food packaging, leveraging the unique barrier and mechanical properties of polyamide 6.

As awareness of the need for food waste reduction and shelf life extension grows, demand for barrier films for flexible food packaging continues to increase.

Barrier films can be produced in different ways. One way is to coextrude them on blown film lines, where structures with seven, nine and even 11 layers are now quite common. This technology provides a cost-effective way of combining various functionalities, such as barrier, printability, sealability and impact resistance.

The materials that are generally used in these types of applications include Polyolefins for sealing and water barrier; EVOH where a very high oxygen barrier is required; and tie-resins to bond the layers.



Polyamide 6 (PA6) is a very interesting option for use in such films, owing to its good barrier properties and its mechanical strength. However, the high crystallization rate of polyamide 6 can limit its processing window. Processors have to either compromise on productivity or obtain improved processability by blending the PA6. The total investment of this blending solution requires a higher investment of the processors, for both raw materials and polyamide copolymers.

DSM applied its Bright Science to develop Akulon XS, a PA6 material specifically designed for blown films in flexible food packaging. Akulon XS has a low crystallization rate, which gives it unique processing characteristics for improved performance and productivity gains. As well as making it easier and more cost effective for processors to make polyamide 6 blown films for flexible food packaging, the material leverages the unique barrier and mechanical properties of polyamide 6. Key benefits include mechanical strength, puncture resistance and barrier properties. Compared to solutions with inferior mechanical and/or barrier performance, Akulon XS offers properties equal to PA6. This also allows for downgauging, creating a thinner film, contributing to overall sustainability goals with benefits in terms of weight and costs – as well as waste reduction.

### What is Akulon XS?

Akulon XS is a PA6-based copolymer with a low amount of an aromatic co-monomer. The choice of the co-monomer was based on an extensive crystallization study into the effectiveness of several candidates. The solution was validated at a major equipment supplier in the market, confirming the value proposition of the material. Meanwhile, several customers have also confirmed and have approved it for use on their blown film lines. Other areas of interest, such as biaxially oriented PA6 film are currently being investigated.

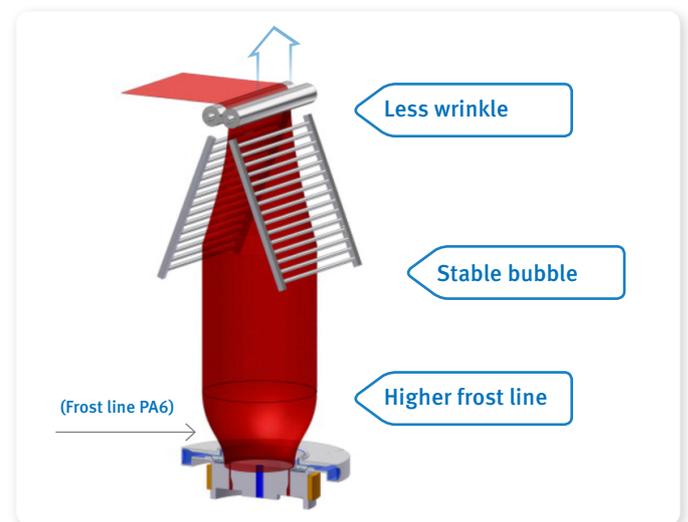
Akulon XS crystallizes much slower in the film bubble than conventional PA6 — closing the gap in crystallization temperature with other layers in the structure. This creates a more stable bubble and gives processors more leeway in their processing conditions. It also reduces the curling of asymmetric multi-layer concepts for the same reason. Because of its better stretchability, the Blow Up Ratio (BUR) can be increased by 10% compared to linear PA6. Moreover, the lower stiffness during lay flat, lowers the tendency for wrinkle formation significantly.

Akulon XS is based on DSM's Akulon, a high-performance polyamide 6 used extensively for film extrusion in food, medical and industrial packaging. The semi-crystalline structure of Akulon provides a strong barrier against oxygen and aromas; while the material also offers exceptional mechanical strength and durability. It is the material of choice for film formulators looking for an excellent barrier material that can significantly extend the shelf life of packaged food – and thus avoid the environmental and financial cost of food waste.

### Applications

Current approvals include 7 and 9 layer multi layered blown films for food packaging, curing films for Sheet Molding Compound (SMC) applications.

DSM provides Akulon XS customers with a special service from its technical experts to maximize the advantages of this innovative new material. The company is offering support to optimize film structure designs, based on its DSM Multilayer Calculation Model. This model predicts the barrier properties of different film structures, even after retort processing, and enables blown film producers to find the optimal layer structure and processing conditions for Akulon XS. Its benefits extend beyond blown film. In BOPA, but also in fibers and filaments, Akulon XS enables improved tenacity, drawability, processing and transparency – as well as better surface qualities for injection molding.



## DSM Engineering Plastics

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