COEX flex® BARRIER

Coextrusion system for the production of 5, 7 and 9 layers blown film
FLEXIBLE - MODULAR - EFFICIENT
The history of the production of barrier films, is mainly associated to three-layer co-extrusion lines, with a barrier of nylon, bound to the structural polymer by means of the interposition of a tying layer.

While being suitable for required purposes, these early structures showed a strong tendency to curl (curling effect), made even worse by the substantial thickness of the layer required to ensure that the barrier was sufficient. This intrinsic defect was the main driving force to quickly move towards the production of geometrically balanced structures, bringing the nylon in the core central position, thus developing a five layer symmetric structures, produced by three extruders, which universally and definitively opened and developed the barrier film industry.

The arrival of EVOH, together with the development of more performing tie resins in the application fields, gave way to the design of the first asymmetric structures, with a sealing layer different from the main structural body. Systems with four extruders and one head with five layers were the almost standard line layout, which remained a benchmark of setup.

At the same time there were developments and improvements as far as packaging was concerned, with the consequent need to extend the application range of available films. Above all, sterilising treatment in autoclave identified the limits of a single barrier products, whether PA or EVOH, in terms of sensitivity to moisture and relevant drop in the oxygen barrier values.

Macchi had to give an answer to a number of requirements to be faced in the same time:

- need to produce a barrier structure made by the simultaneous usage of both PA and EVOH
- process strongly asymmetrical structures
- produce structures using two or three different barriers to optimise the film performance and allow further thickness reduction

Briefly, these are the reasons which have led us to the present production of five, seven and nine layer machines, along with the development of extrusion screws, innovative head concepts and a total re-designing of the entire system, from take-off units to winding systems.
The main feature of this technology is that the residence time of the melt inside the head was highly reduced.

The density of the assembly, the moderate volume with the additional advantage that this design allows for the same flow-path on all the layers, offer an excellent flexibility for the choice of polymers which can be used and also leading to an improvement of the time requested for product changeover, with a significant reduction in the purging process.

The word “barrier film” immediately brings to mind the food packaging sector, whilst there are many non-food applications, like the pharmaceutical-medical, automotive or industrial specialities.

And it goes without saying that, besides the extrusion process, these kinds of expensive films must be wrapped and transformed in perfectly wound reels with the degree of attention and technology that they deserve. Macchi has a full array of technology-oriented devices to fully complement such very dedicated production systems.
Extruders configuration

5 layers

7 layers

9 layers