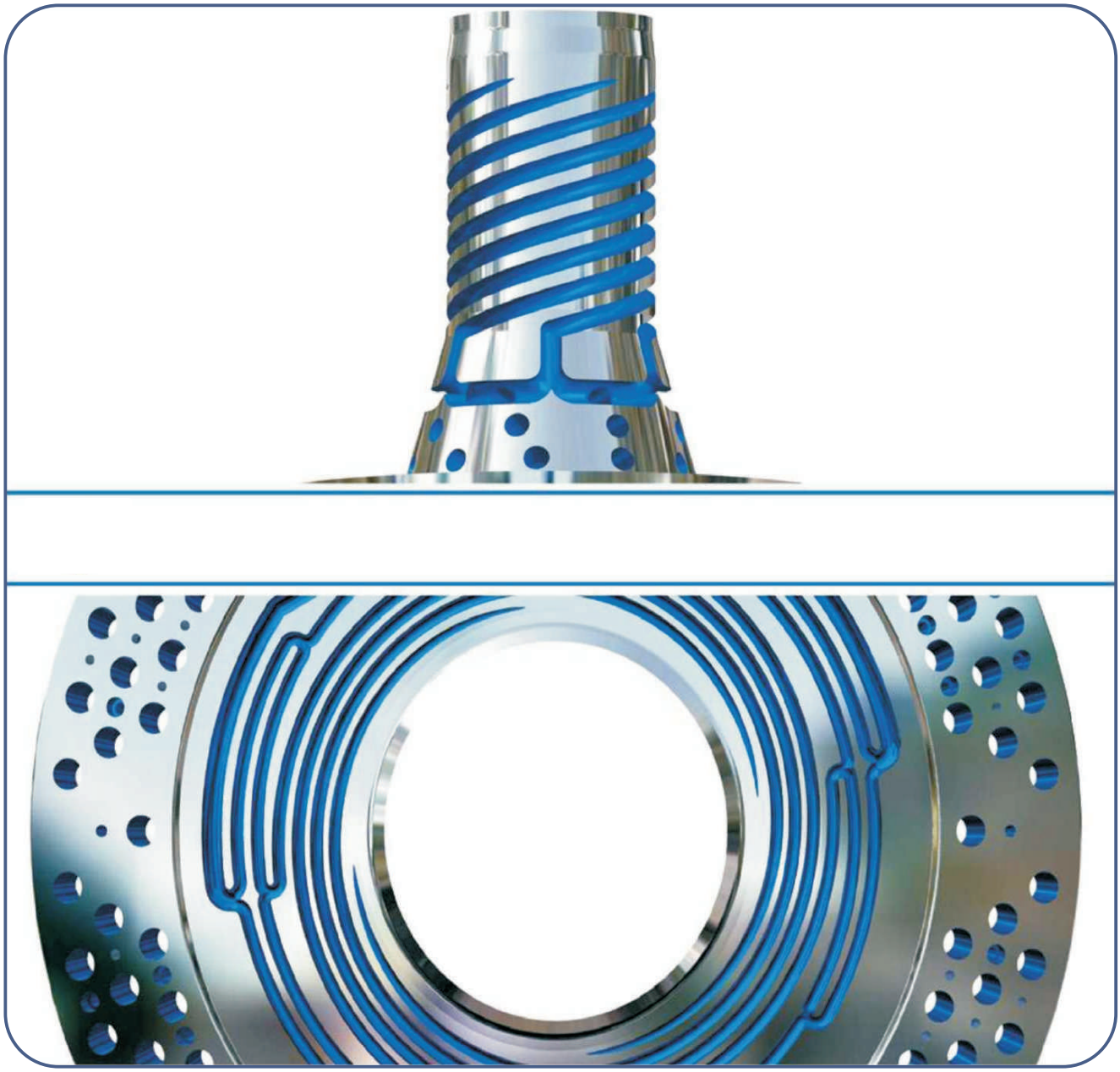
YOUR VISIBLE VALUE

ALPHA MARATHON
FILM EXTRUSION TECHNOLOGIES INC.

POLYSYSTEM

FLOW MIXING CHANNEL

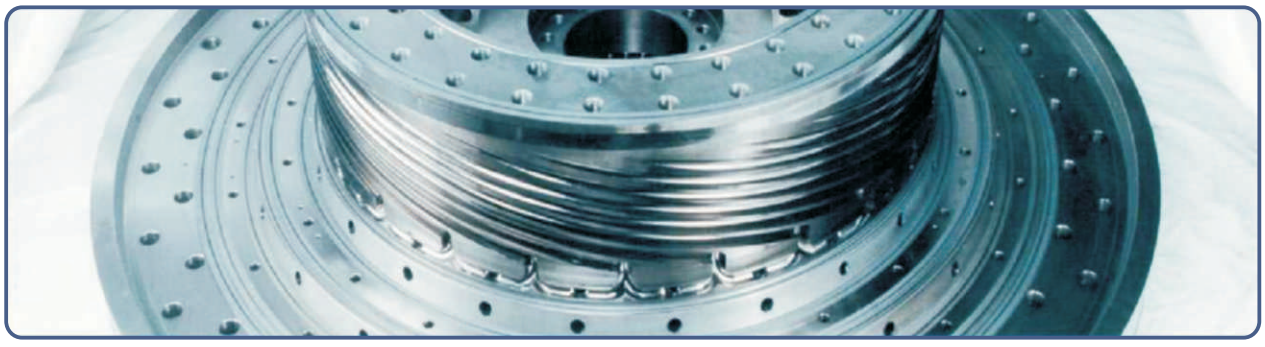


Advanced spiral entry design for blown film dies

Regardless of uniformity leaving the extruder screw, the melt traveling through a system of pipes and die ports will generally tend to stratify. This stratification introduces a differential in the melt temperature and residence time along with creating a varying thermal history within the melt stream. A traversing melt temperature probe will show temperature variations ranging anywhere from 40° to 80°F (approximately 22° to 45&C) from the wall to the center of a melt pipe. Because of the geometry at the point where the melt enters the die ports from the block, the thermal gradient will be maintained on entering the spiral section. The flow pattern within the channel itself is consistent with the temperature profile and viscosity would be pushed out first, leaving the colder melt in the spiral section. This cold material will only be forced over the spiral land near the end of the distribution section, thus creating the potential for optical defects and inconsistencies in temperature around the circumference of the die lip.

A patented system to alleviate this problem, referred to as a Flow Mixing Channel, simply stated, each spiral is fed from two ports and each port feeds two spirals to properly homogenize the melt entering the spiral by taking advantage of this layering effect to effectively control the flow mechanism in the channel. As the melt reaches the diameter of the spiral, the flow splits in either direction, maintaining the thermal bias. Directly below the spiral start, the coldest material is sandwiched between layers of hot melt and forced away from the walls of the die. Since the wall of the channel is now coated with hot melt, there is no tendency for preferential flow due to viscosity and the melt is thus forced out of the channel. In this manner, the coldest material (the material which has undergone the longest residence time in the system) is fed into the leakage flow over the full length of the spiral, instead of exiting in localized areas as in the conventional die. The benefits realized to date indicate an improvement in optics, gauge control and film properties, all as a direct function of the increased mixing inherent in this configuration. In addition, it has been found that any changeover from one resin to another or to an alternate color can be achieved far more rapidly.

In a change over from color to clear on a conventional resin the color would decrease between ports but continue as a distinct band at each of the ports, these remaining lines would then require a long time to fully disappear. With the Flow Mixing Channel, the color dissipates around the full circumference of the bubble immediately.



170 Hanlan Rd | Woodbridge, Ontario | L4L 3P6 Canada
Phone: (905) 265 - 2055 | Fax: 905 265 - 8817
e-mail: alpha@alphamarathon.com