

# Opti-Plate™ Blown Film Dies

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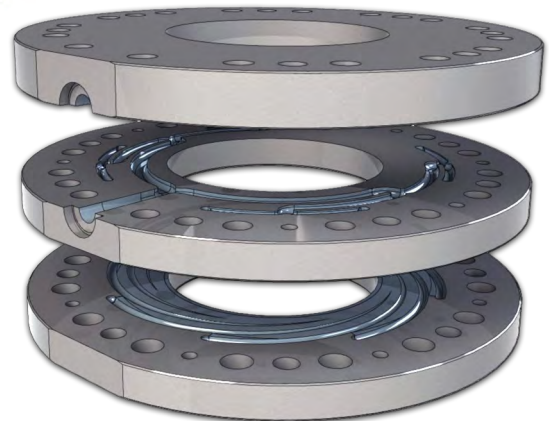
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## ***The Opti-Plate™ Blown Film Die***

Today's high demand for quality and efficiency in blown film production requires the highest standards in design and engineering. These heightened standards come together in the Opti-Plate™ die from Nordson Extrusion Dies Industries—Premier Coating Division.

Most current blown film dies used today are composed of a series of machined spiral nested mandrels. While this style can be utilized to produce multi-layer films, the technology has limitations resulting in significant film gauge variation and long changeover times. Moreover, the traditional designs require sophisticated control systems to either the cool the air or the final gap in order to minimize the variation around the circumference of the bubble.

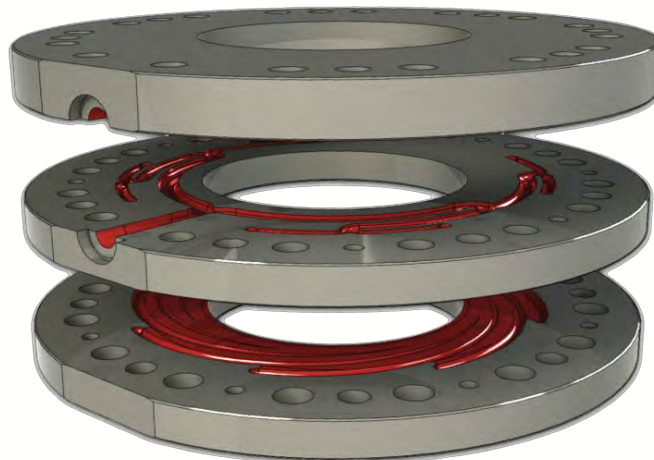
The Opti-Plate™ blown film die brings a new plate style design to the flat plate blown film market. This pioneering die merges the expert design knowledge from blown film engineers with the high precision machining and manufacturing capabilities that Nordson Extrusion Dies Industries applies to its high precision flat dies. The results of this combination are unequalled.

### ***High Precision Manufacturing Meets Blown Film Die Manufacturing***

The design of the Opti-Plate™ allows for efficient and precise manufacturing of the individual components. In order to minimize thickness variation, it is necessary to minimize any variation in the actual dimensions of the channels themselves. The individual plate components, which channel the polymer flow for each layer, are designed to fit precisely against each other with no requirements for slip fit joints. The flow surfaces and center pin are manufactured to tight tolerances:

- The round inner diameter flow surfaces of the plates are ground to exact size and roundness to tolerances of less than 0.0005" (0.0127mm)
- The center pin is ground to exact size and round to less than 0.0005" (0.0127mm)

The resulting flow channels, formed in the spaces between the components, are uniform and accurate.



## The Opti-Plate™ Advantage

The Opti-Plate™ offers the following performance enhancements:

- Improved film quality: Thickness variation of +/- 0.0002" or better without automatic profile controls
- More streamlined flow channels resulting in:
  - Reduced Polymer Hang-Up
  - Low Residence Time Distribution (RTD)
  - Rapid Purging Time
- Reduced waste through shortened changeover times and less off-spec material processed
- Reduced maintenance costs through elimination of seals. Designed for simplified disassembly and assembly.



## Die Features

- Die ranges from three (3) to eleven (11) layers
- Processes Nylon, EVA, EVOH, Polyurethane, HMWHD, and more
- Option porting for internal bubble cooling
- Optional rotating upper lip for gauge randomization



The Opti-Plate™ improves the performance and efficiency without the need for a completely new blown film line.

The Opti-Plate™ die easily retrofits onto most blow film lines.



## The Opti-Plate™ Die Flow Design

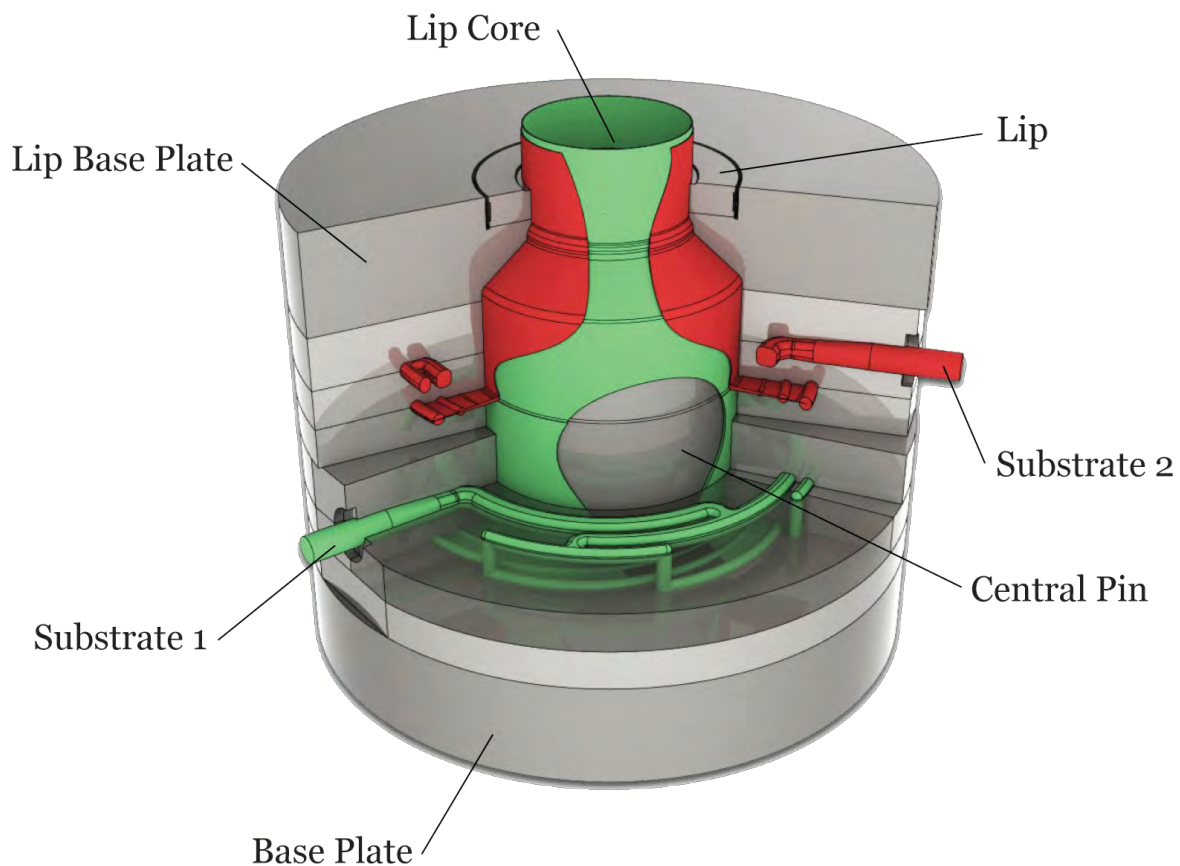
The Opti-Plate™ die is designed to achieve optimal flow distribution and thermal uniformity. The Opti-Plate™ incorporates a set of three round plates, with each plate being precisely aligned with the plate below using special tapered expanding pins. This pin design results in uniform gaps to minimize flow variations as well as repeatable precise alignment of all parts.



**Top Plate  
(Flow Splitting)**

**Middle Plate  
(Flow Splitting)**

**Bottom Plate  
(Spirals)**



Lip Core

Lip

Lip Base Plate

Substrate 2

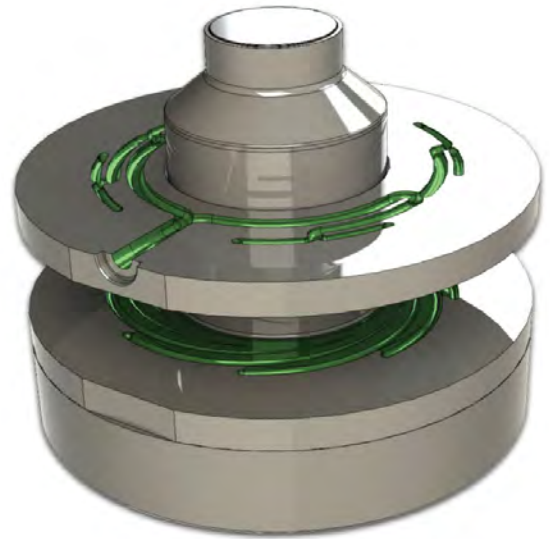
Central Pin

Substrate 1

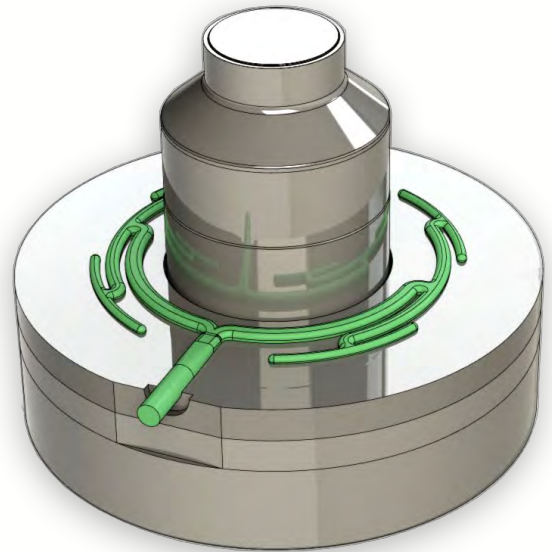
Base Plate

## The Opti-Plate™ Die Flow Design

Polymer is distributed around the flow splitting channels located between the top and middle plate. Traditional designs place these channels around the outer circumference of the die and direct the feed inward toward the center of the die. The Opti-Plate™ flow channel design results in almost a 20% reduction in the length of each channel compared to two-plate flat die arrangements.



The flow splitting channels direct the polymer from the die entry location to each flow splitter. The flow splitting is performed in such a manner that the length of the channel is the exact same for each individual splitter. The die uses round cross-section flow splitting passages up to the spiral distribution zone to prevent dead zones and hang-up locations.



The spiral distribution zone, located between the second and third plates, is incorporated to provide better mixing, thermal uniformity and polymer distribution. The polymer flows across the spiral distribution zone toward the central pin. When the polymer reaches the central pin, it runs 90 degrees upward to the next layer or die lip. The central pin has internal heaters to aid in start-up and maintain process control.

