As a result of our dedication to the continuous advancement of extrusion technology, Cloeren has more patents than any other flat die manufacturer in the world.
Cloeren dies feature the most advanced technologies. With more than 25 patents issued, and many more pending, Cloeren is the acknowledged leader in the industry. We understand the complexities of polymer processing and consider many details when designing a die. Important considerations include:

- Process and product requirements
- Yield requirements, including product width and thickness
- Polymer Theology
- Flow rate
- Thermal characterization.

Our comprehensive knowledge of visco-elastic fluid flow, supported by state-of-the-art technologies such as proprietary 3D flow modeling, Finite Element Analysis and CAD, are employed in the custom design of your die.

FOR EVERY APPLICATION Cloeren dies are available from as narrow as 4 inches (100 mm) to as wide as 33 feet (10 meters) to produce film that is a few microns thick or to produce sheet that may be over an inch thick. Whether your application requires a conventional coat-hanger manifold, the patented Epoch’TM designs or one of our specialty dies, Cloeren has the product line to meet your requirements.

COAT-HANGER DIES The Cloeren coat-hanger die is the die of choice for sheet applications above 0.100 inch (2.5 mm). The coat-hanger design, the traditional industry workhorse for custom sheet manufacturers, can be specified with or without a restrictor bar. The restrictor bar is invaluable to the sheet processor of wide ranges of polymers because it provides an external means of changing die pressure distribution.
Cloeren offers the patented Epoch™ die, designed to improve gauge uniformity in thin film extrusion applications.
Our exclusive Edge Bead Reduction (EBR™) Internally Deckled Die with internally adjustable deckles substantially reduces, and often eliminates, the extruded edge bead in coating and laminating processes.
The Cloeren Vane Die™ is widely used in laboratory and pilot development applications because it can run the widest range of materials and is easily adjustable.
EPOCH SINGLE MANIFOLD DIES

The Cloeren Epoch' Die features a unique manifold geometry complemented by a patented two-stage pressure compensating prelatic]. This exclusive combination provides heretofore unattainable individual layer uniformity in feedblock coextrusions. The nonlinear pressure compensation between the two stages of the preland is designed to complement the pseudoplastic signature of the polymer(s) being extruded, ensuring absolutely uniform flow distribution across the die width. The unique design of the manifold and preland permits a constant wetted surface area, while providing a unitoi in pressure distri-bution across the die width. The resulting zero offset clam-shelling of the die ensures the die lip gap is unaffected by changes in throughput or operating pressures.

EBR DIES

Our Edge Bead Reduction ([BRTM) Internally Deckled Die consists of three independently adjustable components a patented, full-length solid deckle plug, a solid deckle blade and a profiled deckle rod. This system affords the processor the ability to reduce or eliminate the extruded edge bead and edge trim in extrusion coating and laminating processes. It also allows operators to change the width of the extrudate, on the fly, with reduced downtime. The [BR system will literally pay for itself in a matter of a few months in material savings alone, not to mention the noticeable increase in productivity.

VANE DIES

The patented Vane DlēTM, originally developed by Cloeren in 1978, is most often used in laboratory applications or pilot development programs because of its unequalled flexibility.
Our multi-manifold sheet dies are often used to produce sheet stock for thin skin applications because of their superior ability to uniformly distribute individual layers.
Cloeren specialty coating dies are available in a variety of innovative designs, including flexible lip dies and fixed-lip slot dies, and can be customized for your unique needs.
Our patented AutoGauge™ V die employs a thermal bolt assembly that automatically adjusts the die gap, providing superior cross-directional gauge uniformity.
Cloeren specialty coating dies are manufactured to the most exacting tolerances in our climate-controlled precision grinding and lapping room, where laser inspection certifies dimensional accuracy. We offer a wide range of construction materials to suit your application from mold steel and stainless steel to wear-resistant tool steel.

STRAND DIES Strand dies are used to produce resin pellets after the polymerization process, to repelletize in-line thermoforming scrap, edge trim and post-consumer scrap, and in the manufacture of nonwoven fabrics. There are two basic designs available — the fishtail style for low-output, narrow-strand plates and the split-body style for wider, high-output rates. The split-body design
incorporates a preland to ensure uniform flow through each hole of the strand plate. Cloeren offers a variety of strand-plate configurations to suit different polymers and applications. Wear-resistant tool steel or stainless steel are the materials most frequently used. Hole diameter and angle of egress are designed per your specifications.

Die Options

UP ADJUSTMENT FEATURES Cloeren die technology also includes optional hp adjustment features which may be applicable to your particular process. These innovative Features are designed to give you optimum control of the die gap for better thickness uniformity and to rapidly adjust the die gap opening.
COMPUTER-CONTROLLED AUTOMATIC UP FOR GREATER PRECISION

The Cloeren AutoGauge® Automatic Lip adjustment system, in conjunction with a computerized automatic profile control (AK) package, comprises a highly responsive thermal bolt system. This combination enables you to get on spec faster and produce tighter thickness tolerances than ever before. The AK continuously monitors thickness and automatically adjusts the die lip for optimum cross machine gauge uniformity. The AutoGauge system helps reduce thickness variation to tighter tolerances, so that less raw material is required to meet product specifications.

QUICKGAP UP ADJUSTING MECHANISM FOR EXTENDED UP OPENING RANGE

Our QuickOar lip adjustment mechanism, in combination with the Cloeren flexible die hp, easily adjusts the die gap as much as 0.300 inch (7.6 mm). Instead of multiple lip adjustments or lip changes requiring excessive downtime, QuickGap allows you to extend the lip adjustment range by
0.200 inch (5.0 mm) from a single operating point. Results are extremely accurate and repeatable. Medium to hemi-gauge sheet producers also use this device to achieve better control over machine-direction orientation. The QuickGap lip option can also be used as a quick-clean device, opening the lips to flush contaminants from the die.

PROPRIETARY DECKLE SYSTEMS Cloeren dies can be further customized to control the extruded product width, reduce edge trim anti neck-in, and even to create monolithic edges on coextended products. We offer a complete range of deckling systems, including numerous internal deckle systems for cast film and thin sheet applications, as well as multiple external deckle systems for Film and sheet.
IDS Cloeren's patented Internal Deckle System (IDS") enables you to easily adjust the width of the extruded product with a minimal amount of downtime. IDS features a solid manifold plug and blade that eliminate polymer degradation by filling the deckled area. The die-to-roll position is unaffected by the IDS because the deckle does not increase the cross-sectional size of the die.

EDS Our patented Encapsulating Deckle System (EDSTM) features the same benefits as IDS, while also providing the ability to produce monolithic edges. This allows for the elimination of expensive materials in the edge trim area. Since encapsulated edge trim is made up of a single polymer, it is more suitable for recycling. EDS can also be employed to stabilize film edges and reduce the amount of neck-in in some processes, resulting in the production of more usable film.
FIXED WIDTH INTERNAL DECKLES

Fixed width internal deckles provide a cost-effective solution for processors who do not need an infinitely adjustable range of deckling. The deckle inserts are easily placed into the ends of the die flow channel to allow custom product widths without excessive edge trim. These deckles are also very beneficial for medium-range sheet producers running low-melt strength polymers because the nip-to-lip distance is not increased as with conventional external deckles.

EXTERNAL DECKLE SYSTEMS

In addition to our internally located deckle systems, Cloeren offers three external deckle systems. These alternative systems include the fixed-side and flex-side external systems and our latest advancement, the Power Wedge™
Fixed-width internal deckles provide a cost-effective solution for processors who do not need an infinitely adjustable range of declding.
POWER WEDGE DECKUNG

The Power Wedge™ deckle system, available for both new and retrofit dies, is an excellent choice for the medium to heavy-gauge sheet producer, who wishes to make on-line width changes. This deckle is a durable system that can be fully retracted to the ends of the die, permitting lip removal, die cleaning and maintenance. This system is comprised of a heavy-duty threaded rod for width adjustment, positive guide rails, a sliding wedge and a special encapsulated seal strip for years of trouble-free, leak-free service.

MISCELLANEOUS DECKLING SYSTEMS
In addition to the popular deckle systems described above, Cloeren offers several deckling choices:

- External sliding wedge for film and coating
- Standard external deckles fitted to either the flex or rigid lip
- Low profile boat deckles for film and coating.