

NEW Scientific Mini

3 and 5 layers

Co-Extrusion Film Blowing Line Type LMF-200 CO-EX

with 3 and 5 Extruders respectively



200 MM NIP-ROLL
WIDTH FOR MAX LAY FLAT
WIDTH OF 180 MM



WITH 16 MM, 30 L/D EXTRUDERS FOR PROCESSING MANY RESIN TYPES AND ALLOWING OPTIMUM DISPERSION OF ADDITIVE MASTERBATCHES

Our new **Mini LMF-200 CO-EX** film blowing line is a viable low cost alternative to our regular co-ex film blowing lines. The line has either 3 or 5 extruders of lowboy type connected to a three respectively five layer pancake type film blowing die. It is equipped as standard with an oscillating nip-roll haul-off system where the entire film tower including the wind-up section oscillates 360° back and forth over the die assembly.

THE LINE FEATURES:

- Mini design taking up a minimum of floor space of only 1.8 x 1 meter.
- Entire line mounted on a sturdy steel podium eliminating the need to secure the extruders and tower to the floor, steel platform containing all major supply cables, hoses and air ducts giving a very clean appearance with very few visible connections to the extruders and tower.



- Tower assembly mounted on low friction rails enabling easy access to the die and air ring.
- Lowboy type extruders aligned with the low height of the die for convenient assembly and operation.
- The tower is adjustable in height with a turning wheel from 2.02 to 2.42 meter of the tower nip gap with collapsing frame for flexible blow-up ratios and optimum bubble cooling applications (Optional).
- Modular pancake die assembly which is custom designed in consultation with our Canadian expert designer for optimum co-ex film applications using your specific types of polymer.
- Air ring for optimum cooling efficiency.
- Easily adjustable stabilizing cage with Teflon rollers for various film bubble diameters.
- Compact oscillating film tower which greatly minimizes the effects of film gauge variations for quality film rolls
- Surface wind-up station with air shafts for easy changeover of rolls.
- All units are designed to occupy minimum space and optimize the workspace.
- Fully computerized.

LMF-200 CO-EX
Compact Film Blowing Tower

Tower Structure

- Assembled on a heavy-duty steel support frame fixed on a steel base floor. Standard height is 1.92 meters from floor to the haul-off nip-rolls and collapsing frame. Optional adjustable from 2.02 to 2.42 meter
- 200 mm roll width with 180mm maximum film lay-flat width.
- Equipped with four guide rollers to maintain suitable tension before windup.

Air ring and blower



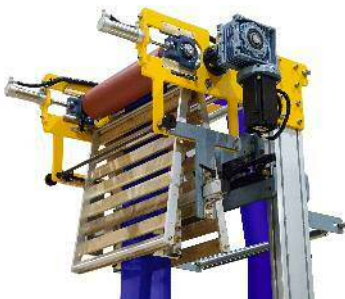
- High efficiency cooling ring for optimum cooling efficiency and high stability of the film bubble.
- Supplied with a streamlined air distribution manifold.
- The cooling air is supplied from a variable speed 0.37 kW turbo blower. The RPM of the blower is controlled with a turning knob on the tower’s control panel and is regulated by an AC frequency inverter. The fan speed regulation optimizes the cooling of the film. Streamlined air distribution nozzles to ensure even airflow all around the cooling ring.

- Equipped with analogue air pressure and temperaturemeter
- Flexible hoses connected to the air ring and blower.



Bubble Stabilizing Cage

- 4 levels of cage arms covered with free-rotating Teflon rollers.
- Easily adjustable cage size via a knob for various film bubble diameters where all Teflon roller arms are moved synchronously.

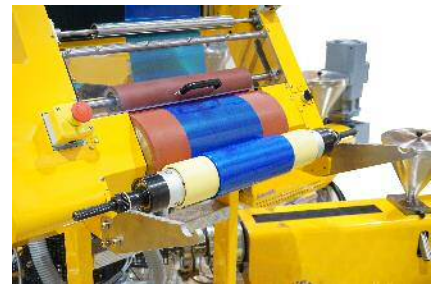


Tower with Collapsing Frame and Haul-off Nip Rolls

- **Collapsing frame** consists of polished teak wood slats for smooth guiding of delicate films.
- **Pneumatically-operated nip rolls** consisting of a wear-resistant rubber idle lay-on roll, and a hard-chromed, surface polished roll driven by a heavy-duty, infinitely-variable-speed servo motor drive and inverter.

Surface Winder

- **Standard surface wind-up system** with rubber lay-on roll and a polishing roll driven by an independent variable-speed servo motor drive with constant torque for quality film roll winding.
- Separate **3 inch free-rolling, windup air shaft** mounted on the windup rack for easier bobbin handling (*Customer is provided with one unit. Additional air shafts are available to order.*)



Equipped as standard with Compact 360° Oscillating Tower for effective minimizing of film gauge variance



The newly introduced **oscillating tower frame** has a rotary base mounted on a gear assembly driven by a servo drive motor for a full 360° oscillation of the stabilizing cage, collapsing frame and the haul-off nip-rolls to counteract and effectively minimize film gauge variance occurring during the film blowing and nipping process, for high quality film winding with a uniform film roll geometry.

- Simple and smart design uses few moving parts, allowing for easier handling and maintenance.

Computerized Central Control Unit



- Features a **12 inch LCD touch screen control panel** mounted on a sturdy, free-rolling control stand with a sleek design and an angled display for comfortable viewing of line parameters on **Labtech's** fully computerized control interface for the **LMF-200 CO-EX**

- PLC with large processing capacity allows interface connection with multiple extruders, blowers, film tower, and die assembly. Supplied complete and wired to all components of the film blowing line and mounted on a turning pillar for convenient operation of the line.



- **Temperature control and monitoring** of all thermo regulated zones in the line.
- **Speed controls** for the extruders, nip rolls (haul-off), and blower units.
 - ◆ Supports various drive speed control modes for the extruders.
 - ◆ **Sync Co-Ex:** Master-slave extruder synchronized control.
 - ◆ **LIW** (loss-in-weight) auto-override of drive speed for constant feed rate (only applicable for extruders equipped with the optional gravimetric hopper feeder system).
 - ◆ **Sync LF:** auto-sync tower haul-off and pull rolls with extruder drive speeds.
- **Generation of real-time graph trends** of processing temperatures and speeds for comprehensive parameter monitoring and quality control.
- **Integrated alarm system and real-time system diagnostics** with user notifications for easier troubleshooting of the line.
- Save and load pre-set parameters on internal and external memory with the **RECIPE feature**.
- Secure supervisory control with **Authorized User Control Protection** feature which restricts access to advanced settings of the line.

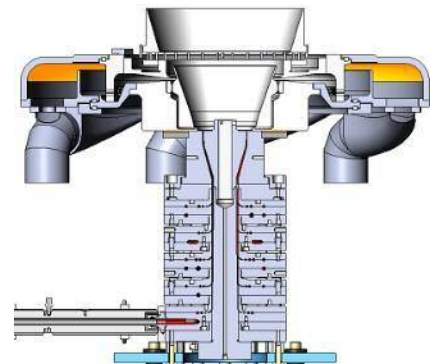
LPD20-40
Multilayer Film Blowing Pancake Die Assembly for CO-EX Lines

Die Design

- Modular die assembly with 5 pancake die layers, each made of high grade tool steel and with low-friction nickel coating and mirror polished channels and mandrels for optimum melt flow performance. Features annular die lip diameter sizes ranging from 20 to 40 mm with easily changeable mandrels suitable for use with Labtech's 16 mm single screw extruders. *(Different die lip rings and mandrels sizes supplied according to customer's specific resin types and layer configuration)*
- We custom design our dies in full conformity to customers' requirements with consultation from Dr. John Perdikoulis of Compuplas, Canada. This ensures a die design with optimal rheological performance and compatibility in accordance to all polymers specified by the customer. The binary distribution and spiral flow channels leading to the mandrel have been analyzed using the latest software analysis technology to optimize the flow properties throughout the entire die and achieving a very efficient, uniform distribution of the melt in each layer.

Optimized Melt Flow Channels

- Melt from the feed ports, coming from the extruders, flows into the outer edge channel of the pancake die, which is then repeatedly divided into binary flow distribution channels (2, 4, 8 and so on) ending with multiple channels running around the die for optimum flow distribution. As they flow near the centre, they enter a spiral flow pattern before converging back together into a single annular area with uniform volume and distribution around the die mandrel, which greatly improves the uniformity and consistency of each layer thickness.
- The melt then flows upwards combined with the other layers in a laminar fashion along the mandrel towards the die exit where the film is externally cooled and blown into a bubble with uniform wall thickness. The die is also equipped with centering bolts for adjusting the die centre position relative to the mandrel for fine tuning the bubble's thickness uniformity.



comes with the assembly.

Co-Extrusion Die Assembly

- 3 or 5 die layers are supplied for the LMF-200 CO-EX line. Each layer has feed ports into which high-pressure, heated pipe adaptors are attached for connecting to designated extruders.
- The pipe adaptors are equipped with heating bands and thermocouples *(fitted in the mid-section)* for monitoring and regulating temperatures up to 300°C.
- Individual thermocouples and heater bands for each die layer (module) allows for individual monitoring and temperature control up to 300°C. Each layer is partially isolated from the next layer to minimize heat transfer from one layer to another.
- All temperature-controlled parts are monitored and set on the LCC computerized touch screen control panel. Thermocouples and heater band cables are organized and connected to a separate signal control cabinet that

30 L/D Mini Single-Screw Extruders with 16 mm diameter type LME16-30/C-HA

Mini non-vented extruders for processing all available types of film blowing resins



General Design

- New "Single Pillar" versions where the barrel and motor drive is mounted on a single heavy-duty pillar support. The lowboy cantilever barrel design conveniently fits into the lower pancake layer (module) positions for more convenient assembly of the heated pipes to the die.
 - Narrow and streamlined body minimizes space consumption for easy maintenance.
 - Heavy-duty, compact base for securing the fixture to the base platform.
 - C-clamp on the terminal flange allows for quick and secure connection to adaptor pipes and die layers
- Extruder can easily be swung to the side for removal of the screw.
 - Internal and external steel parts coated with heavy duty epoxy paint.

Barrel and Screw

- Barrel and screw made of high-grade quality steel with nitride hardened surface
- The 16 mm screws are with an L/D of 30
- Full steel cover over the barrel with air venting grilles on the sides.

Barrel Heating and Cooling System

- 2 thermo-regulated barrel zones for the 16 mm diameter extruder.
- Each zone with high wattage heaters and efficient cooling fan.
- Standard maximum heating temperature of 300°C, or optionally 400°C high heat option.
- Water-cooled feed section to prevent premature melting of resins

Infinitely Variable-Speed Servo Motor Drives on all extruders

- High performance vector drive motor with high torque through the entire speed range for precise feed-rate of melt to the die layer resulting in a high layer thickness precision and better tolerances even at low feed-rates. The servo drive motor allows for infinitely variable speed adjustments from 0 up to the max RPM ensuring a very even resin flow at low RPM which is particularly important to obtain very thin film layers.
- Screw shaft driven by a reducer gearbox mounted directly on a heavy-duty thrust bearing housing

Touch Screen Control Interface

- The entire line with extruders, die layers and downstream equipment is fully computerized and controlled on a large touch screen. The touch screen is mounted on a free standing cabinet.

Hopper

- Polished stainless steel hopper with lid mounted on a slide valve plate.

Technical Data for Mini Single-Screw Extruders

| Technical Data | Mini Extruder Models |
|--|----------------------|
| | LME16-30 |
| Screw Diameter | 16 mm |
| Standard Screw L/D Ratio <i>(other sizes available upon customer's request)</i> | 30 : 1 |
| Servo Drive Motor Power | 0.75 kW |
| Servo Drive Speed Range | 0-150 rpm |
| Number of Barrel Heating Zones | 2 |
| Max Processing Temperature | 300°C |
| Forced Air Cooling System on Heating Zones | YES |
| Maximum Output <i>(based on high-pressure LDPE film blowing process)</i> | 700-1,000 g/hr |

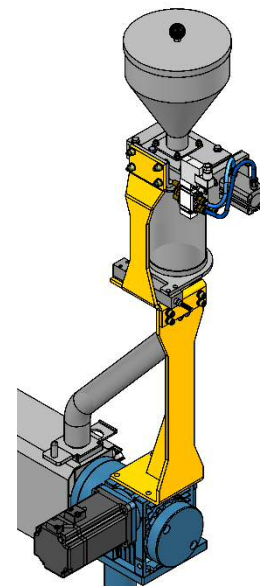
| Mini Extruder Models | | | |
|----------------------|----------------|-------------------|---|
| Extruder Type | Screw Diameter | Servo Drive Motor | Option |
| | | | High Heat Version <i>(max 400°C)</i> |
| LME16-30 | 16 mm | 5,330 | - |

OPTION: Weighing Hopper Feeder With Computerized Control System for precise control of individual layer thickness and distribution to the die assembly

In order to achieve a precise control of the layer thickness in co-extrusion lines, you need to feed each layer with a precise amount of resin. This can best be achieved by using our weighing hopper system.

Our very favourable priced and very accurate system features our computerized **loss-in-weight (LIW) type weighing hopper** system, where each extruder hopper will deliver a user-set amount of resin *(in weight units per minute)*, in which the feed rate is simply keyed into a separate touch screen central control unit. This system is much easier to use than using melt pumps, since no calculations are needed, while still maintaining a very high accuracy.

The central control unit has a setup screen, as shown here, where you can set all the required feed rates for each individual weighing hopper as well as the layer ratio, thickness and even the total system output *(kg/hr)*. Density values for the various resins can be inputted to enhance automatic layer ratio control. The control panel has a multitude of screens with various functions and a graphic illustrations of the extrusion control trends.



The system is connected as a closed loop system with extruder drive speed control. Thus, when keying in the exact feed rate on the central control panel for a specific extruder, the weighing hopper on the extruder will sense the amount being fed to it, and the controller automatically regulate the screw RPM so that it feeds exactly

the amount of weight units per minute as previously set on the panel. If the control system is linked with the LCC Central Control Unit as a sub-system, the **LIW speed control mode** is integrated on the LCC control panel where it can be enabled and disabled.

Weighing Hopper Features

- The weighing hopper is constructed in such a way that it is possible to put a ‘foreign’ hopper or hopper loader on top of it.
- The weighing hopper has a load cell for accurate sensing of the hopper weight.
- Above the weighing hopper is a stainless-steel refill hopper mounted on top of a pneumatic slide gate which will open automatically to refill the feeder tank whenever the material level is low.
- The weighing hopper has a volumetric capacity of 3 liters and a material weight capacity of 1.5 kg of pellets.
- The refill hopper has the same volume as our regular extruder hoppers (*depending on extruder size*) and is also equipped with a sight mirror for easy viewing of the resin level.
- The maximum feed rate of the weighing hopper unit is 1 kg/hr. Larger weighing hoppers can be supplied on request.

Touch Screen Control Unit Features

The weighing hoppers are controlled with a compact LCD color touch screen panel with easy to read and understand graphics. All feeding parameters for the weighing hopper units are easily keyed in on the panel where you also have screens showing real time data, etc.

The unit also has a sounder beacon for alarm indication combined with LED flashing light and an electronic sound alarm up to 106dB.

For systems with more than one feeder you will need to add the price of each additional feeder and control box module, shown below:



Main Weigh Hopper with Touch Screen Control and knife gate
Price per unit (Ex Works)
Includes: Refill hoppers with automatic feeding valve
US\$ 7,925.00

Additional Weigh Hopper with Blind Control and knife gate
Price per unit (Ex Works)
Includes: Refill hoppers with automatic feeding valve
US\$ 6,615.00

Price for 3 and 5 Layers with 3 and 5 Extruders respectively Co-Extrusion Film Blowing Line

| # | Description : | 3 layers | 5 layers |
|---|--|-------------------------|--------------------------|
| BASIC LINE COMPRISES THE FOLLOWING: | | | |
| 1 | Mini Film Tower type LMF-200-COEX | 1 set | 1 set |
| 2 | Compact Oscillating Tower System for the LMF-200 | 1 unit | 1 unit |
| 3 | LPD20-40 Pancake die 5 layers | 1 unit | 1 unit |
| 4 | Central Control unit with 12 inch LCD touch screen control panel | 1 unit | 1 unit |
| 5 | 16 mm Compact Extruder LME16-30 with servo motor drive | 3 units | 5 units |
| Total Price for a complete mini film blowing line US\$ | | <u>86,940.00</u> | <u>102,380.00</u> |

| | OPTIONAL ITEMS: | 3 layers | 5 layers |
|---|--|----------|----------|
| a | Add-on Price for Computerized Weighing Hopper Extruder Feeding System Including the touch screen and blind controller for 5 layers | 21,150 | 34,340 |
| b | Additional air shaft unit for wind-up (3 inch) per unit | 1,345 | 1,345 |

ADD for Canada: US\$ 12,000 to meet Canadian CSA Electrical Requirements.

All prices quoted are Ex Works Bangkok.

We will be pleased to quote you a CIF to your destination
as soon as we know of your exact requirements.

Delivery time: Presently 5 months, Ex Works
Payment terms: 30% deposit with order
70% by L/C at sight or T/T prior to shipment
Validity: This quotation is valid for a period of 3 months from the date of issue

Two Years Warranty on all our Machines

Our machines are now warranted for two years, valid from the date of startup or two months after the shipment date, whichever is the earliest.

The two-year warranty covers all mechanical, electrical, hydraulic and pneumatic parts with a few exceptions where the warranty period is for only one year. The exceptions cover intricate parts like inverters, PLC and electronic instruments, which our suppliers only warrant for one year. We also warrant our heaters for one year even though they are not warranted by our supplier.

We will be pleased to give you a copy of our warranty certificates with full details for your kind consideration.