



From Polymer
to Information



**LABORATORY AND PILOT PLANTS
FOR PROCESSING POLYMERS**

Mono Axial Stretching Lines

The optimum combination of maximum functionality and flexibility with operational safety



MDO-I Single-Gap Stretching Line for polymer film
MDO-II Two-Gap Stretching Line for breathable film

MDO-Stretching Lines

Dr. Collin GmbH offers laboratory and pilot lines for stretching of films for a wide range of polymers and

compounds. These lines serve for quality-control and development of new products and process, but these units

can also be used for the low-volume production of small films.

MDO-I Single-Gap Stretching Line

Application

A wide range of polymers, especially PE, PP but also PA are stretched mono-axially in order to substantially increase the mechanical, optical and barrier properties. Stretching is performed, in general, in a short gap stretching system with the length of the stretching gap being adjustable.

Design

The basic design is shown in the schematic diagram. Main functional element is a single stretching gap with a number of preheating rolls before and annealing and cooling rolls after.

Users

All producers of basic thermoplastic resin, as well as film converters.

Roller-groups:

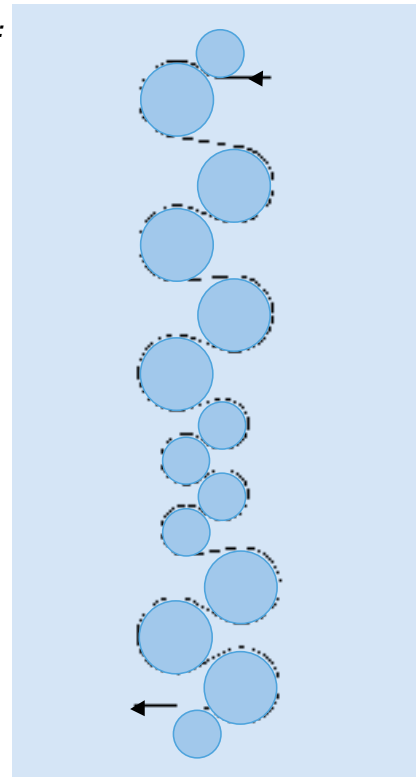
Preheating

Holdback

*Stretching Gap
Stretching*

Annealing

Cooling



MDO-II Two-Gap Stretching Line

Application

This system of a Two-Gap Stretching Line has been developed in the industry for the production of breathable film. The main aspect of this product is a high content of mineral filler. Stretching of this type of material requires a different design of the machine and different parameters for the process.

Design

The schematic shows the basic arrangement of the groups which is characterised by two sequentially positioned stretching gaps with annealing groups in between and behind.

Users

The line is usually dedicated for quality control and product development for producers of mineral fillers, compounders and film converters for breathable film.

*Preheating and
Holdback*

Stretching Gap 1

Stretching 1

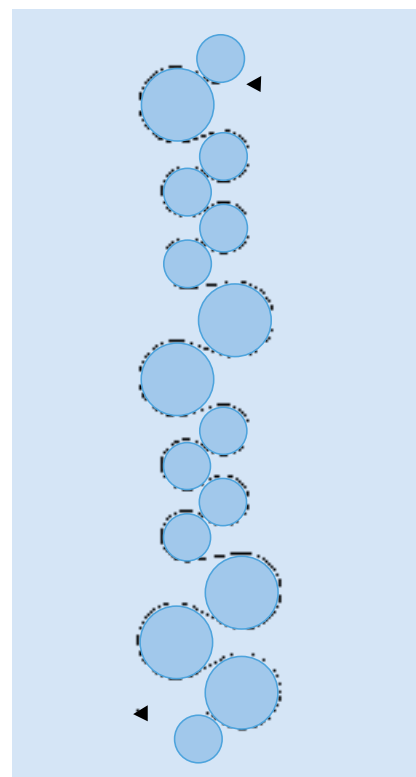
*Annealing 1
Holdback 2*

Stretching Gap 2

Stretching 2

Annealing 2

Cooling



Pilot-Extrusion Cast-Film Line with Inline MDO-Unit

Extrusion

Single Screw Extruders

of different diameter and active length grant for a stable plasticising process. Shear and mixing zones increase the homogeneity of the melt. Screen inserts hold back impurities in order to prevent film break in the following process.

Twin-Screw Kneader

Upon request compounders, in combination with melt-pumps, can be delivered for direct-extrusion of film.

Coextrusion

Casting of 3-, 5- or 7-layer primary film in connection with special feedback systems and dies for high-class barrier-application.

Film- and Sheet Die

Dies of different width will be used, specially in an angle of 60° or 90°, to cast the primary film.

Module 1 Chill-Roll

This consists of a swivelable roller group for horizontal or vertical slot-die positioning. 2 chill rolls and 1 moveable calender roll allow casting or calendering of film or sheet. A tempering unit, as well



Take-off with winder

as an edge trim unit and winder, are integrated. A light section allows the visual control of the film.

Installation as a finishing calender

Chill-Roll Module 1 and Take-off Module 3 are separate units. These can be separated from the stretching module and then built up into a line for the casting of film or the calendering and finishing of film or sheet.

Module 2 Stretching Unit

The stretching unit is a compact, self contained unit. It consists of a number of rollers with larger diameters in fixed positions for preheating, annealing and cooling and of other rollers with smaller diameters for the stretching groups.

Three of the four rollers of each stretching group are adjustable for setting defined gaps.

All rollers are of double wall design for high temperature accuracy. Rubber coated rollers serve as fixing points at the start and at the end of a roller group.



Electric cabinet with control-board

Electrical control

Start & stop of the drives, reversing of the direction or opening and closing of the gaps is controlled on the stretching module in order to allow extremely easy handling of the film.

See the detailed description of the advantages of the MDO-unit on page 5.

Module 3 Take-off and winder

The unit houses the take-off rollers with drive system as well as the central- or surface-winder.

As an option we offer:

- Edge-trimming and winding
- Measurement of film-thickness
- Corona-treatment or light-box for optical analysis & control

Electrical control

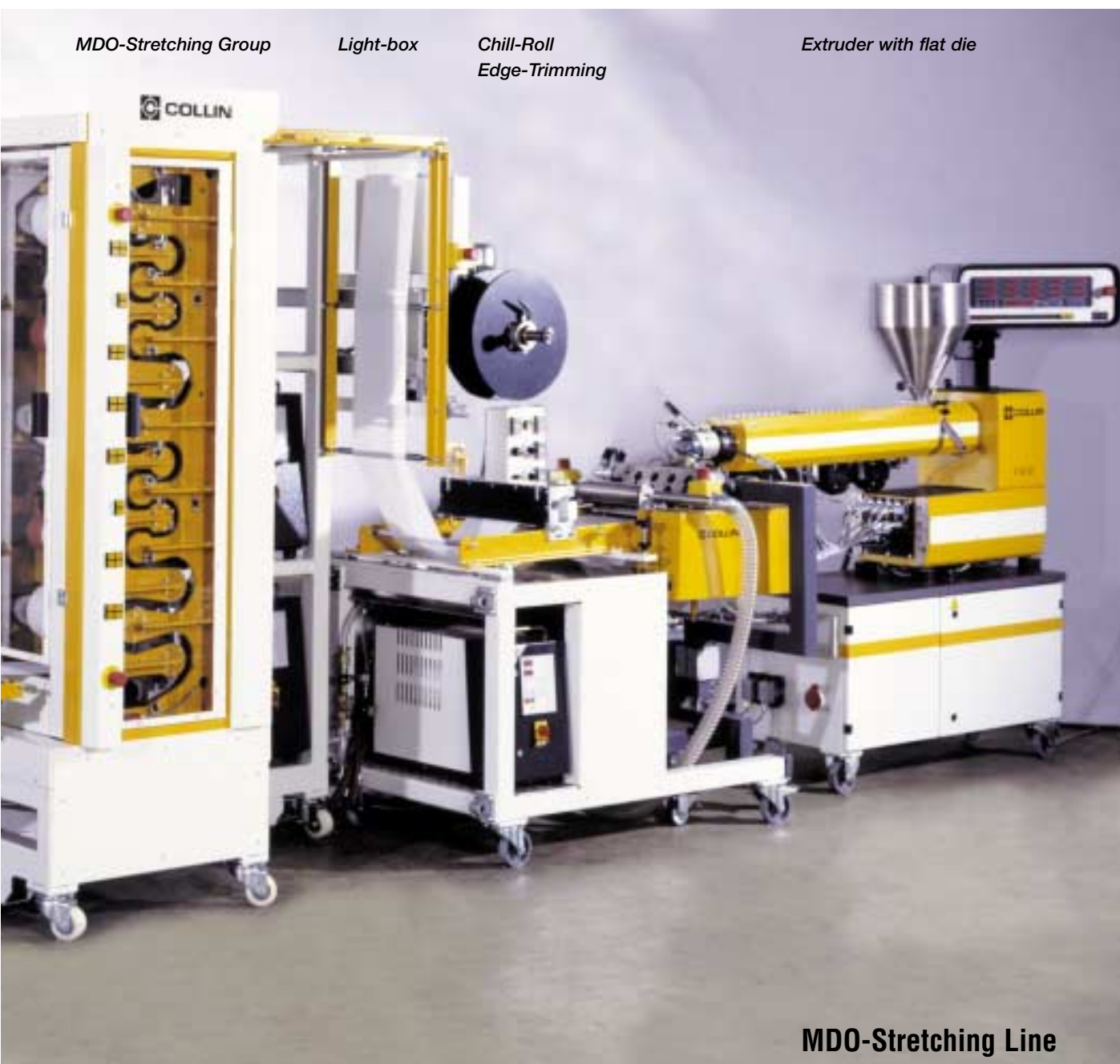
A swivelable control-board allows control and selection of set and actual values, like speeds, frictions, central switchover from synchronous speeds (e.g., for introduction of film) to friction; ramp function for increasing the speed; central synchronisation of all drives with fast-stop and opening of all gaps in an emergency. The interface RS 485 can be connected to a PC for documentation.

MDO-Stretching Group

Light-box

*Chill-Roll
Edge-Trimming*

Extruder with flat die



MDO-Stretching Line

MONO-AXIAL STRETCHING LINES

The Stretching Unit

The Stretching Unit is the basic element of the film stretching line. The new concept combines maximum functionality and flexibility with the highest intrinsic safety level in operation.

High Flexibility

- by choosing 1 or 2 stretching gaps
- by using up to 6 drive-groups for optimal adjustment of speed and friction
- by variation of the stretching roller gap
- by variation of the pressing roller gap
- by variation of temperatures of all roller groups

High Intrinsic Safety level

- by closing all sides with PC-doors by a completely new method of introducing the film
- by an immediate stop of all rollers when opening the doors
- by the ability to set a slow speed for all drives when introducing the film

Easy introduction of film

The front part of the frame is manufactured like a meander; this enables an easy and safe introduction of the film through the whole stretching unit from the inlet to the outlet.

Excellent accessibility for cleaning

- the vertical roll design is easily reached from all sides
- doors can be opened right back
- reversing of all roller groups enables easy rewinding the film after a film-break

Optimum visual control

of the process through PC-doors on the "in-and outlet side".

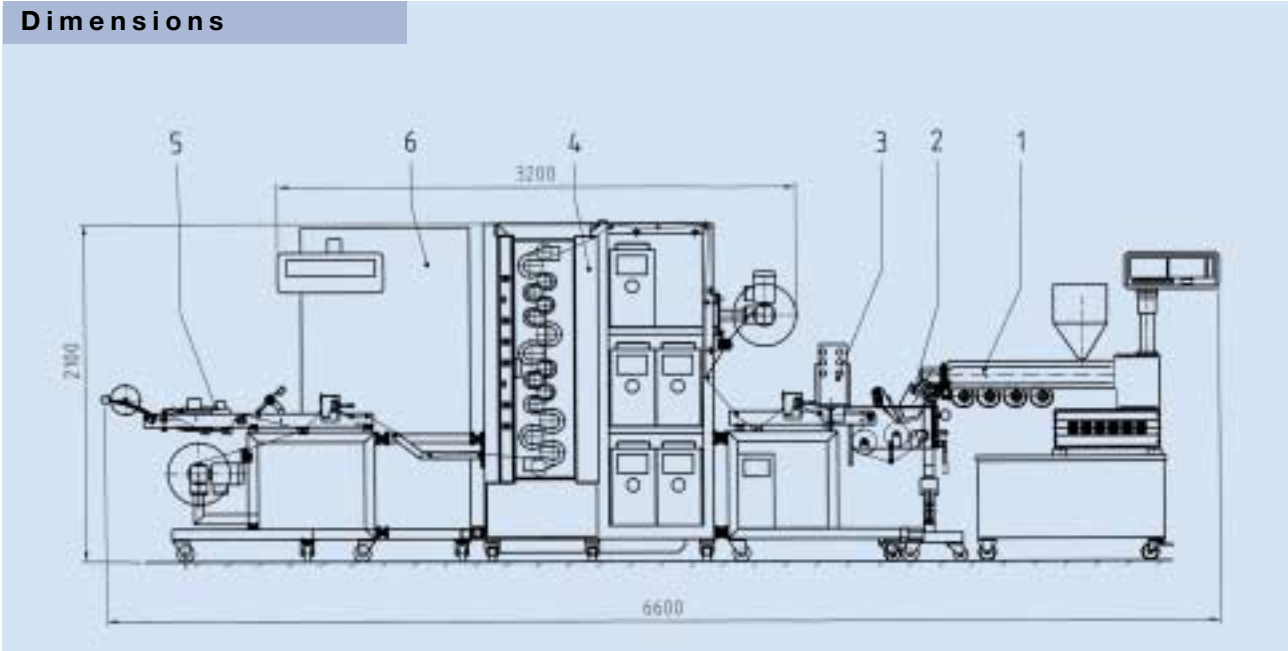
No influence of cold-air

by the completely closed design means a very stable environment within the stretching group.



The Stretching Unit with closed safety-doors. The easy access from all sides enables less downtime for start-up and cleaning.

Dimensions



Pilot-Extrusion Cast-Film Line with integrated MDO-Unit

1.) Extruder
2.) Slot Die

3.) Chill-Roll
4.) MDO-Stretching Unit

5.) Take-off and Winding Module
6.) Electrical Control

Technical Data

Extrusion	Mono-extrusion	Ø Extruder 30 or 45 mm			
	Co-extrusion	2 - 7 Layers, Ø Extruder 20/25/30/45 mm			
Slot Die					
	Working width [mm]	250 - 300		500 - 550	
Chill-Roll	Roll width [mm]	350		600	
	Take-off speed [m/min.]	1 - 10 (20)		1 - 10 (20)	
MDO-Stretching Unit					
		MDO-I	MDO-II	MDO-I	MDO-II
	Roller width [mm]	350	350	600	600
	Number of stretching gaps	1	2	1	2
	Number of roller groups	4	6	4	6
	Number of heating groups	4	5	4	5
	Film width entrance [mm]	230	230	470	470
	Film width exit [mm]	190	140	410	370
	approx. Stretching ratio	up to 1:10	up to 1:10	up to 1:10	up to 1:10
	Speed [m/min.]	3(5)-30(50)	3(5)-30(50)	3(5)-30(50)	3(5)-30(50)
Take-off and Winder					
	Roller width [mm]	350		600	
	Winding speed [m/min.]	3(5)-30(50)		3(5)-30(50)	

Technical modifications reserved

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