

**FILM
SHEET**

HOLLOW PROFILE SHEET



LEADER EXTRUSION MACHINERY IND.CO.,LTD.

Hollow Profile Sheet



Taichung

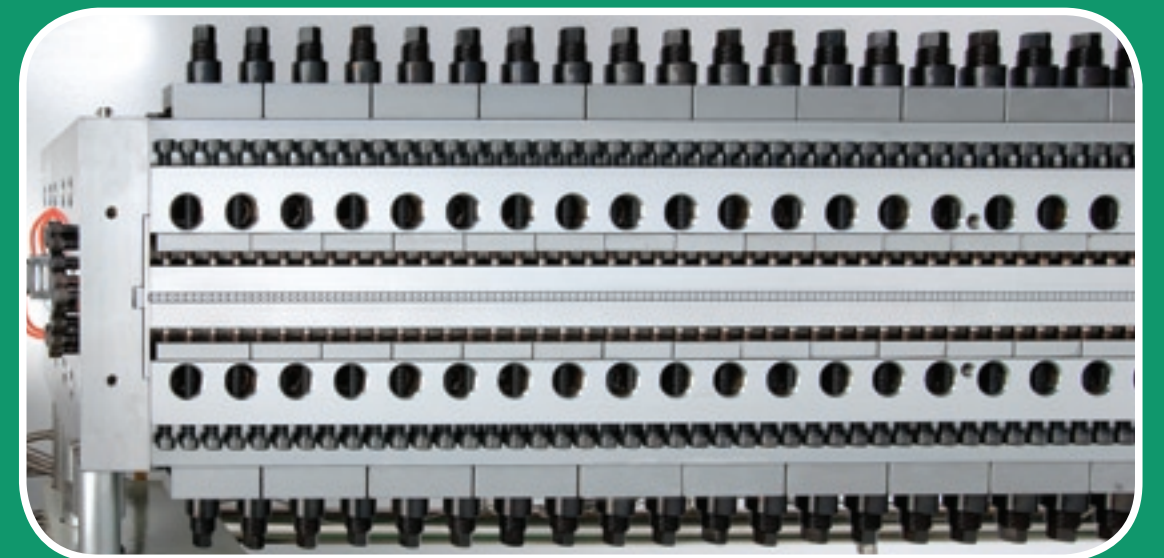
LEADER EXTRUSION MACHINERY

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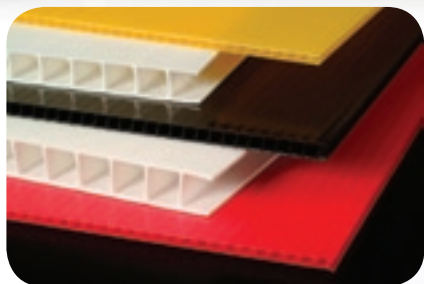
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COMPANY PROFILE

- 1989** Founded in Taichung County, we were originally a designer & manufacturer of plastic flat sheet Dies, gear box and other auxiliary parts of extrusion line.
- 1990** Invested in development of PP hollow profile extrusion line, and the whole plant of sheet, film, and coating machine. We hired foreign and domestic scholars in macromolecule and chemistry field as technical consultants. We also successfully built PVC shrink film tenter at this time.
- 1993** Succeeded in manufacturing the first domestic self-made PC, UVPC three-layer sheet co-extrusion Die, and A.B.A & A.B collective Feed Block, which were installed coordinately on a Japanese machine.
- 1995** Successfully released the first self-made widest PP hollow profile plant (W: 2,150 mm) in Southeast Asia, and officially stepped into mass production.
- 1996** Successfully developed environmental friendly LDPE coating machine to replace PVC adhesive tape.
- 1997** Achieved mass production of saleable PP/ PS sheet lines for stationery, thermoforming, and print purposes, and released A, B, C three-layer co-extrusion line in which B is PP foamed layer.
- 1998** Developed and put PE/ EVA/ LDPE five-layer film co-extrusion automatic production line in the market.
- 1999** Accomplished our mission on building the first domestic self-made PC hollow profile co-extrusion line with its width of 2,130 mm, and the product thickness range was from 4 to 20 mm. Great strides had been made in domestic PC hollow profile field.
- 2000** Launched two-extruder co-extrusion line for PC, UVPC super clear sheet of 1,220 mm × 2,121 mm width, and product thickness: 0.8mm~12mm. Meanwhile, we developed and put our new PETG multi-layer film automatic production line in the market.
- 2001** Successfully launched to market: 1. PP two-extruder, A.B.A three-layer hollow profile line which was the first self-made line in Southeast Asia. 2. World first PC/ PET/ PP share hollow profile extrusion line with product thickness range: 2 ~ 20 mm. 3. APET sheet extrusion line and PC corrugated sheet extrusion line stepped into mass production.
- 2002** Launched PC/ PET/ PMMA/ PBT/ PEN multi-layer film automatic extrusion line and PETG/ APET/ PETG three-layer sheet extrusion line which were both first plant ever made in Taiwan. We achieved PP curved hollow profile production line of width from 1,350 ~ 2,950 mm, and over 500kg/ hr output. Its special structure is approved by the Patent Office.
- 2003** LEADER successfully developed TPU/ EVA membrane automatic extrusion line, and PE/ EVA protection film automatic extrusion line for sheet protection use.
- 2004** Independently built the world first 2-meter wide, 700 layer film plant with its product thickness of 0.06 mm. Furthermore, we developed PP/ PE three-layer(A/B/C) foamed sheet extrusion line.
- 2005** Cooperated with a Japanese company and released the first PC multi-layer diffusion sheet extrusion line made in Taiwan, and first PC thin sheet extrusion line of 0.5 mm product thickness domestically made. At the same time, LEADER put the lines below in the market:
- * W: 2,121 mm PMMA sheet co-extrusion line
 - * W: 1,600 mm PMMA/ PS/ PC/ MS optical sheet extrusion line
 - * Protection film extrusion line for optical sheet use
 - * PC/ ABS sheet co-extrusion line for suitcase/ baggage/ luggage application, which its product is going to substitute ABS sheet because of its lightweight advantage.
- 2006** LEADER researched, designed, and produced the first PET multi-layer shrink film line made in Taiwan, and the first PLA multi-layer bi-orientation film production line and first PLA thermal-setting film production line in Southeast Asia.



LEADER PP Hollow Profile Extrusion Line

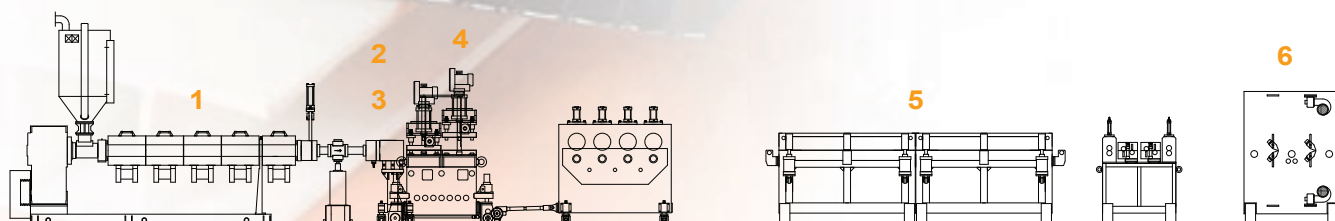
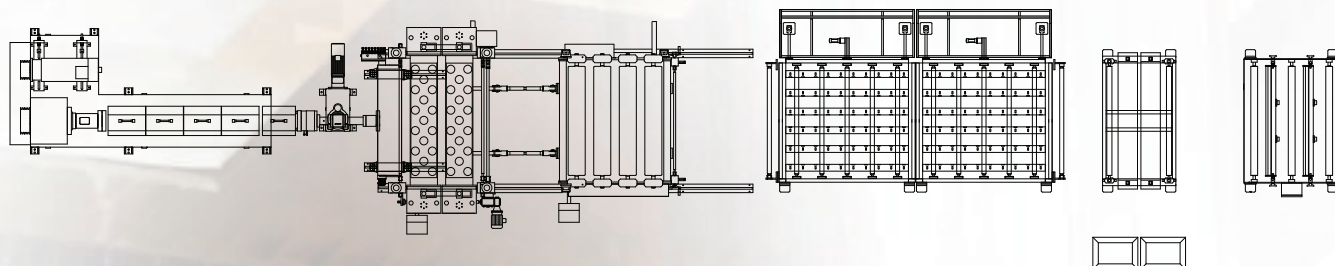
PP is one of the most versatile polymers. Its low density (0.905) high flexural modulus, rigidity made it become the best material for Reusable, Returnable, Collapsible, and Stackable shipping Packaging and graphic art applications. Using LEADER PP corrugated/ Hollow sheet extrusion line to produce the Hollow sheet material become the most economic investment way for the graphic and packaging industry. Compared with other "High output, high quality" brand

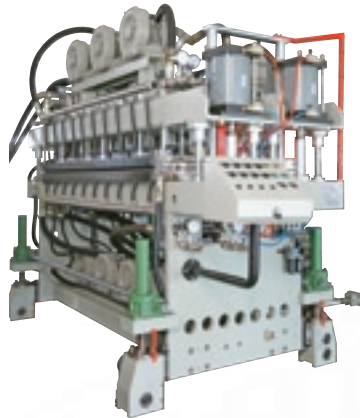
name from Germany and Italy manufacturer, We, LEADER makes the way for the investor. We combine the price and quality for you. Just try to remember all the difficulty you had with those so called "High output" Manufacture, You tried very hard to get the result of good quality finish products. But, you can only get 50 to 65% of their guarantee output. LEADER provides all the service to let you got what you want. Your investment return will be 50% faster than other provider.



1. PP extrusion design: Leader design the screw based on the material viscosity and shear force. It's LD for each section is carefully calculated. High rpm, temperature consistency, with best mixing zone makes the melt material stable in the die head. The designed auto gear pump with static mixer decreases the temperature range near screw and barrel. Matched output with selected motor makes the torque stable from smaller rpm to higher rpm.

2. GMA extrusion dies design: We can customize the die for customer. Depend on customer's flute design. Customer can select thicker Rib or skin for its special applications. The die is coat hanger design for best flow and less dead spot, easy to change color and specifications.





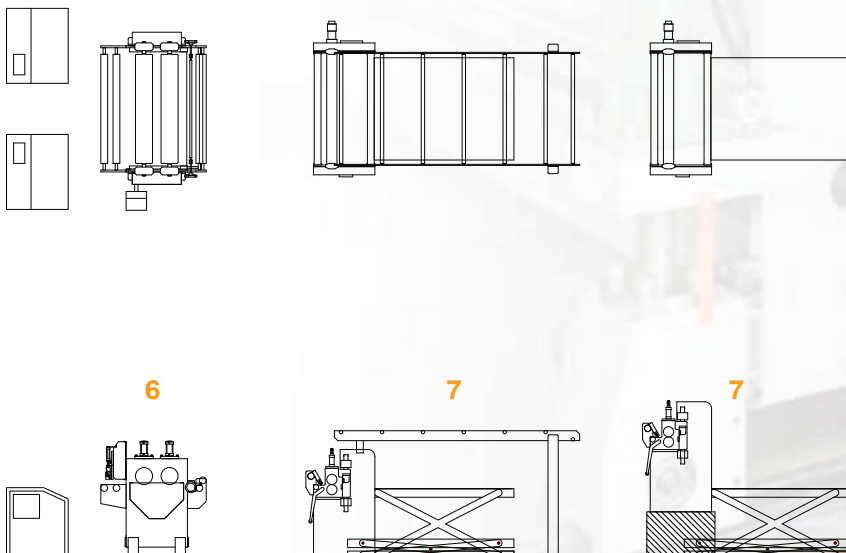
3. Air regulator for Spinneret hole: The individual air regulator can make each section of the profile even and easy control. The individual regulator with air volume stabilizer which makes it easier to control one section and not affect to other sections. The combinations make the material into the calibrator easier to adjust than other manufacture. The design reduces the adjustments time and makes the product quality increase.

4. Cooling vacuum calibrator: Design enough chill water capability to match with high output. Patterned Vacuum air flow design make the material inside the calibrator stable across the traversal direction. High scratch resistance surface treatment makes the calibrator become more stable and last longer than other manufacture.

5. Annealing oven: The special designed temperature profile control makes the machine possible to control the lay flat and even surface after annealing. The design can reduce the cross direction variation to less than 5 mm. (Based on 4 mm output)

6. Pull off and cooling section: The cooling section with temperature controlled air knife which makes it possible to have same product on different weather and room temperature. The material is cooled enough for the stable storage.

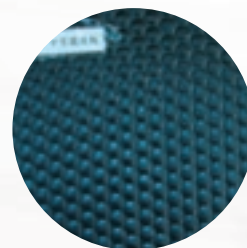
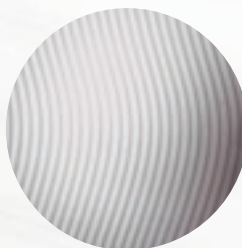
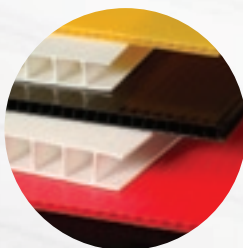
7. Cutter and stacker: The automatic cutter can be automatic adjust the length with the speed increasing. The auto stacker is adjusted the height by the material speed. And the setup length and time will have alarm for the operator to work efficiency.





LEADER hollow profile extrusion lines of 1.5 ~ 1.7 meters width achieve the best efficiency of investment/output through our belief: simplicity and precision. We constantly improve our machines and strive for perfection; furthermore, Leader develops different design of hollow profile such as "Honey comb" "Controlled curved flute" type to match the requirement of downstream processing. For example, Honey comb reinforces the compression resistance and bending limit, it suits every intensive lamination sheets. And controlled curve flute suits for recyclable box because of its curve form makes it not easy to split or break. It enables the fluid to stay longer inside, and it has an advantage of heat exchange of water. It even supports solar power energy application.

LEADER not only designs the Fluted hollow sheet machine, the Curved fluted and Honeycomb designs are also available. Due to its specific design know-how, please contact our sale technical department for more detail information. But, we have the following information for your reference:



4 MM 750 GSM DIFFERENT DESIGN HOLLOW SHEET

	Straight Fluted	Curved Fluted	Honeycomb Hollow
ECT(Edge crush Test) lb/in	90-95	90-94	95-120
Compress strength	4-6	6-8	8-10
Notched impact (D256) 23 C ft.lb/in	2.2	3	3.1-3.4
Tear Strength g	1700	2000	2500
Live Hinge Test (Cycle)	18000	22000	19000
MD Bending test(LD231) Kg.	0.6	0.6	0.6
TD Bending test (LD231) Kg	0.2	0.4	0.6



FEATURE

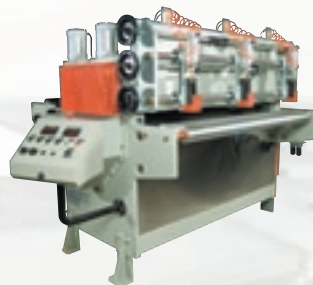
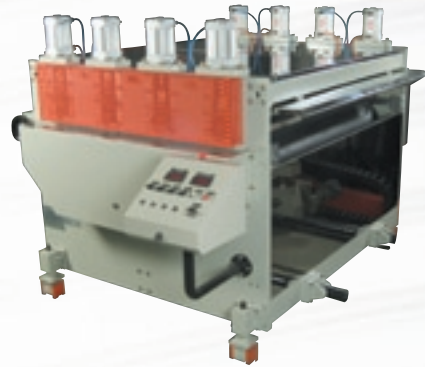
1. The calibrator with wear-resistance and dirty proof and the surface of forming hollow sheet is much easily to be controlled.

2. High speed screw, low horsepower with high rotation speed to match gear pump and stable pressure and the extruded output is 20% higher comparing with other brand extrusion lines.

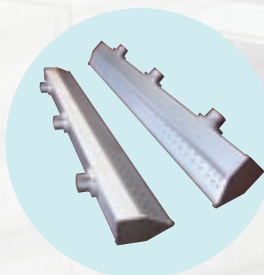
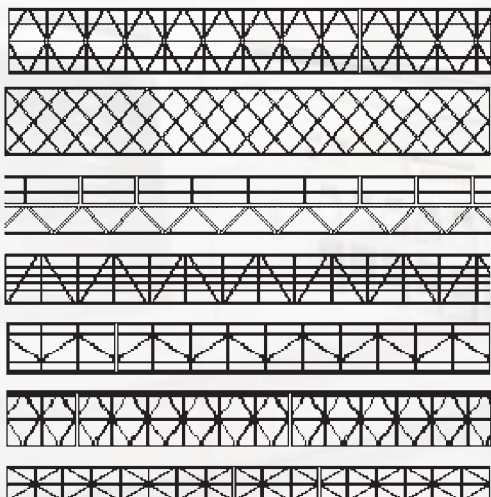
3. Special designed temperature control oven with cross heat shrink forming, which is much easier to be controlled than other brand extrusion lines.

4. In accordance with customer's request, the softness of pull roller could be adjusted to expand its stretch.

5. The air capacity of hollow sheet and low pressure could be adjusted and controlled slightly, which is easily to be controlled than any other brand extrusion lines.



PANEL DESIGN



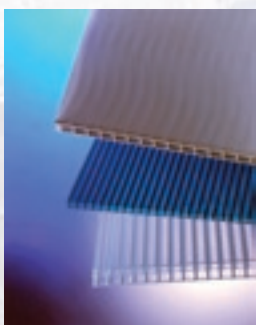


LEADER PC/ PET/ ABS Hollow Profile Extrusion Line



SPECIFICATIONS

Raw Material	PC, PET, ABS
T-Die	1,350 mm ~ 3,000 mm
Product Thickness	2 ~ 10 mm
Product Width	1,220 mm ~ 2,900 mm
Machine Line Speed	20 ~ 180 rpm/min. depend on thickness range
Extruder	
Main Extruder Screw	High Speed, High Compression, High Mixing Screw
	L/D Ratio design upon material characteristics
Aux. Extruder Screw	
Main Extruder motor	40 HP ~ 300 HP
Aux. Extruder Motor	40 HP ~ 500 HP
Electronic Control System	Heating System, User Friendly Control System



FEATURES

1) Lowest investment and maximum profitability. Comparing to European \ American machines, LEADER has a surpassing economic efficiency of investment/ output which is 1.7 times better than our competitors.

2) Unique screw design and reliable temperature control. By using a $\varphi 120$ mm extruder one machine could easily reach over 400 kg/hr effective output.

3) Operation with self-made hollow profile Die and the most efficient calibrator and cooling system makes the best beneficial result and reaches the best performance on quality & output.

※ Three to four zones adjustable vacuum pressure control: which enables sufficient cooling & shaping control on front \ middle and downstream sections.

※ Seven to nine combinations for transverse vacuum plates: This easily attains to "lightweight gsm" for thin product.

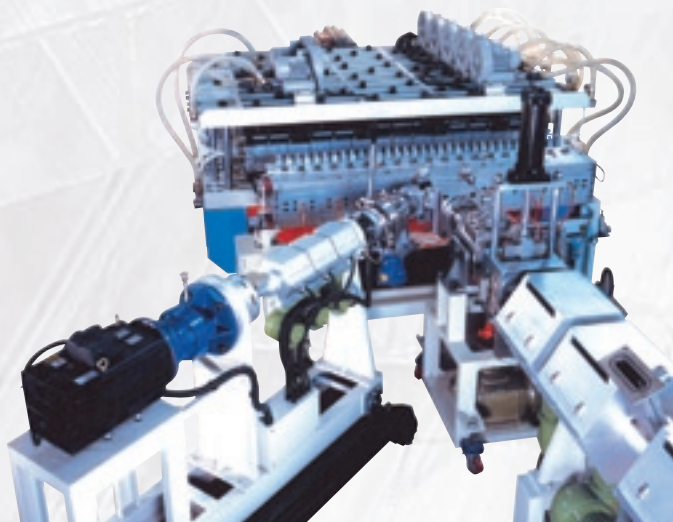
※ Distinctive surface treatment: This makes the surface flat and smooth, and elongates the life of the machine through wear proof and friction control.

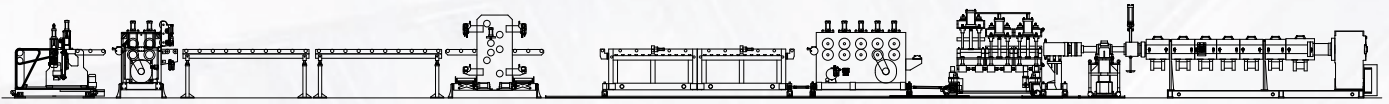
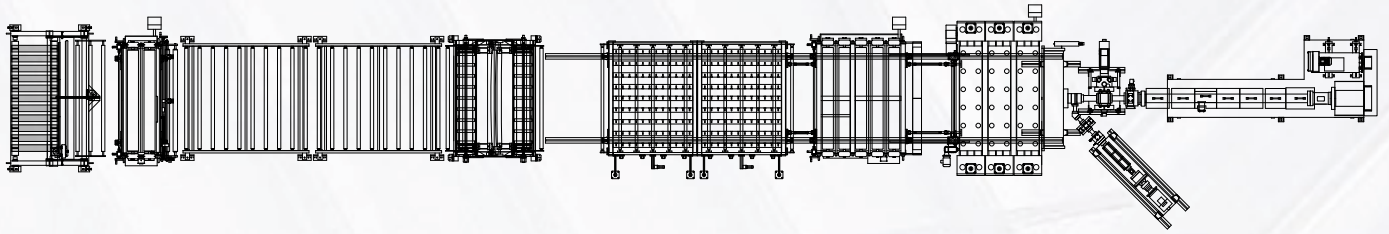
※ Unique design with freezer: This enables best balance of heat exchange during high production.

4) World-class pulling rolls precisely control the pulling ratio and reach the accuracy of product weight.

5) Leading design oven flattens the profile well by temperature control and tempering from heat strain of transverse pulling.

6) After shaped, the effect of cooling comes from the air knife. Air knife stabilizes the measurements of product.





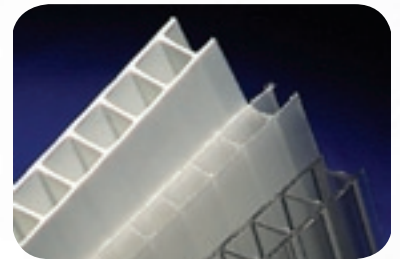
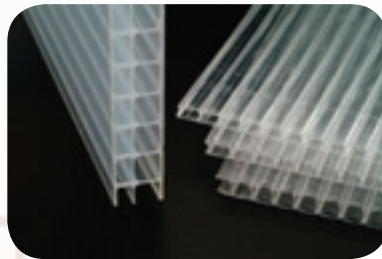
POLYCARBONATE HOLLOW PROFILE

Polycarbonates are strong, hard, tough, transparent engineering thermoplastics that can maintain rigidity up to 145°C and impact down to -20°C. The material is amorphous, excellent transparency mechanical properties and dimension stability. Due to its high optical property, LEADER makes every efforts to develop the PC hollow profile, and PC optical sheet for diffuse board and guide sheet.



PC SPECIFICATION

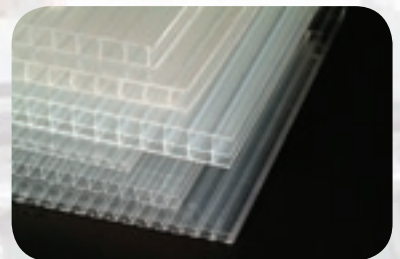
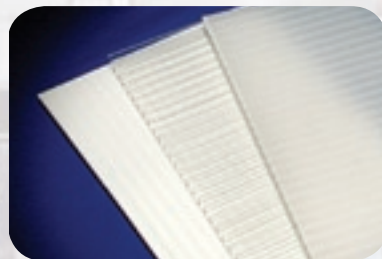
TEST METHOD	PROPERTY	UNFILLED	30% GLASS
D792	Density(g/cm ³)	1.2	1.43
D638	Tensile strenght(psi)	9,500	19,000
D790	Flexural modulus(psi)	375,000	1,100,000
D256	Notched impact ft-lb/in	13	2
D3418	Tg °C	145	149
D648	Heat deflection temp°C	132	146



HOLLOW PROFILE SPECIFICATION

Thickness / Weight (msg)

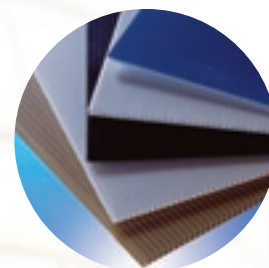
	PP	HDPE	PC	PET
2 mm	400	450		
3 mm	500	650		
4 mm	750	800	1000	1200
5 mm	900	1050		
6 mm	1200	1200	1300	1500
8 mm	1500	1300	1500	2000
10 mm	2000	2000	1700	2700
12 mm	2200	2200	1900	2900



APPLICATIONS

PP HOLLOW PROFILE

1. Protection baffle: Packing proof and carpeting for electrical products, building material, glass porcelain, etc.
2. Electrical housing material: Conduct electricity of electrical component, antistatic carriage and card inserting board.
3. Vegetable and fruit box: a box for vegetable, fruit, and flower to store and transfer, which is waterproof and using recyclable.
4. Billboard: A base plate and of billboard, usually seen in market advertisement, nameplate, etc.
5. Other application: Vegetable warm canopy, partition, thermal insulation material, screen, etc.



PP, PC, PET BASIC CHARACTERISTICS FOR RAW MATERIAL

	Unit	PP	PC	PET
Density	g/ cm ³	0.9	1.2	1.34
Tensile stress	N/ m m ²	22~35	62~67	50~60
Elongation at break	%	500~1000	12~60	200
Notched impact	KJ/ m ²	-	20~35	3~6
Brinell hardness	N/ mm ²	49~70	95~105	110~130
Temperature for use	°C	105	135	100
Crystallite-melt Temp.	°C	160	-	255
Melting Temp.	°C	160	220	240

BRIEF INTRODUCTION

LEADER Extrusion Machinery company is one of the leading companies in plastic extrusion field which specializes in the design, production, and development of extruding system. LEADER has more than 30 years' technical experience in the manufacture of plastic products, and our staffs have made research into a variety of plastics such as PC, PP, PE, PI, PET, PLA, PS, K-resin, PMMA, PBT, EVOH, Ecoplast, PA6, etc, and have developed our distinctive extruders, Dies, MDO, TDO, winders and other processing facilities.

LEADING TECHNOLOGY

◎ Extrusion plant design:

- a. Single layer, sheet, film, corrugated sheet, hollow profile, foam and other complete set of forming system.
- b. Multi-layer (two to seven layers) co-extrusion lines, customer-oriented design.
- c. Turnkey design system.
- d. Standard design, option design, modulus design.
 - (1) Precision Motor
 - (2) Digital Control
 - (3) Vacuum Ventilation
 - (4) Vacuum Calibrator—Water cooling type: direct or indirect; Gap control type
 - (5) Screen Changer
 - (6) Gear Pump
 - (7) 4D Static Mixer
 - (8) Flexible Die Set—Automatic or Manual, fixed lip or flexible lip, adjustable “fast gap” lip, Choke bar; multi-layer dies, and double slit design.
 - (9) Computer design Screw base on different material and exclusive combination.
 - (10) Polishing Roll: Independent transmission, oil pump control, and freeze roll temperature control; horizontal, vertical or 45 degree; variable position of the third roll, rapid change of the rolls; special embossed rolls.
 - (11) Edge Trim Cutter
 - (12) Crusher
 - (13) Winding Machine: Surface winding machine—pressurized type, oblique angle type and direct winding type. Central winding machine with tension control—contact control, gap control.
 - (14) Feeding System: Batch type. Continuous type—volumetric dosing system, integrated gravimetric system.
 - (15) Oven: Sheet type. Film: Bi-orientation type. Cross elongation oven: auto clamp.
 - (16) Corona Treater—Single side, double side.
 - (17) MDO
 - (18) Pulling Roller Unit.
 - (19) Thickness Scanning System: * β -ray (Kr 85, Sr 90) * Eddy Current. * Infrared rays. * Software to control with Auto Die.
 - (20) Cutting System: Longitudinal cutting, cross cutting.
 - (21) Dancing Storage Roller Set with Accumulator.
 - (22) Pelletizing Machine.

◎ Rear section shaping 、shrinking 、leveling 、stretching roll set: Flexible shrinkage percentage control — specific design according to the hardness 、transparency 、tension of the product, such as S-wrap, three-roller, five-roller, seven-roller and hoist type roller.

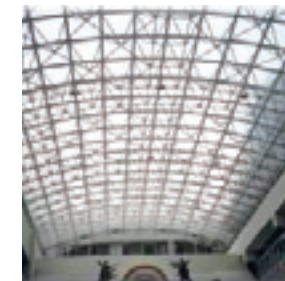
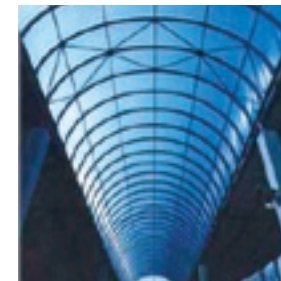
◎ Control Interface Design:

- (1) Computer display and control.
- (2) DDC design panel and control cabinet with push button and switch on/ off control.



PC/PET HOLLOW PROFILE

1. Public works: Ambient light hallway, atrium, concourse, and service protection on highway and bridge, in airport, harbor, station, stadium, park, etc.
2. Large-scale building: open space, commercial building, exhibition fair, wall mat, gas station, hospital, spot, designed natural light marquee.
3. Commercial application: Booth, fascia, billboard, etc.
4. Storefront show: Show case in watchmaker's shop, bank, and places putting precious products.
5. Industrial application: Windscreen, defense shield, faceplate of spare part, manufacturing.
6. Agricultural application: Building natural light greenhouse for growing and breeding working place.



LEADER LAB MACHINE

In order to decrease the waste of test material, LEADER develops the Lab test machine, output range from 10 kg/hr ~ 35 kg/hr. The performance can decrease test material about 90 %.

