34 YEARS

EXTRUSION CONTROL SOLUTIONS

RELIABLE AUTOMATION AND OPTIMIZATION OF EXTRUSION PROCESSES

PLASTCONTROL
For more than 30 years PLAST-CONTROL has been automating extrusion processes. From the onset we focused on the supply of equipment for blown film extrusion lines expanding into other extrusion processes. Today we are the leading manufacturer in this worldwide market.

PLAST-CONTROL is the only company in our market which produces all critical components in-house. This in-depth knowledge of the principles and hardware gives you the customer the chance to use your process knowledge to the greatest effect.

Our position of being able to design and build complete control systems without using third party devices and software is unique for the industry.

Complete responsibility of the control technology and the ability to produce custom made applications offers unrivalled experience and technical competence.

Advantages:
- Waste reduction and material savings
- Fast product changes
- Higher outputs
- Reproducible products
- Reduction of operator faults
A FAMILY OF SYSTEMS...

GT3, GDCn, ACS

The **GT3** is an economic but yet powerful system for the gravimetric control of an extrusion line. It is designed for the control of up to 3 gravimetric weighing hoppers (e.g. a mono line with a main hopper and 2 dosing units, or a 3-layer co-ex line with 3 main hoppers without dosing units).

The process data is displayed with a 5.5” LCD display.

The **GDCn** is the compact specialist. The system handles up to 15 gravimetric weighing hoppers, temperature control or the profile measurement and control.

For a simple profile measurement and control system, the GDCn is the economic solution. Production data is displayed on an easy to read 10.4” color TFT display with optional touch screen control for specific functions.

The powerful computer grants a fast and efficient control. GDCn is the right choice for simple gravimetric batch-blending systems or continuous gravimetric dosing systems up to 15 components. Additional functions as IBC and width measurement and control can be integrated.

**ACS** is the ultimate solution of the product range and can include all of the functions and features that PLAST-CONTROL offers in one package. The operation is simple and very easy to use with the large 19” color TFT touch screen display.

And there are more benefits. In addition, all PLAST-CONTROL systems can handle these functions:

- Capacitive online gauge measurement
- Width measurement and control
- IBC control
- Material flow control MFC (vacuum loading)
- Connection to data collection
- Modem connection for online service

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1. System GT3
2. System GDC-N
3. System ACS
4. System ACS

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PLASTCONTROL
GRAVIMETRIC EXTRUSION CONTROL & CONTINUOUS DOSING

All of our automation principles over the last 30 years have been based on gravimetric extrusion control. The “loss in weight” principle guarantees precise measurement of throughput and control designed for all types of extrusion processes. This approach of control is suitable for all mono- and co-extrusion applications.

Extrusion control has proven to be an essential first step for establishing a stable extrusion process.

Fully modular construction allows up to 6 dosing units plus main material to be fitted to each extruder (including co-extruders). Precise dosing of costly additives and master batches takes place directly above the extruder throat – eliminating the problems of de-mixing and inconsistent homogenization associated with batch blenders.

All dosing units outputs are synchronized with the main hopper output to guarantee an accurate product recipe.

The latest generation of dosing unit now incorporates a high torque motor delivering a wide speed range. This minimizes the need for dosing screw changes. Advanced software control guarantees accurate control from very low to high output rates.

The new MICRO-DOSING units follow the trend to more components and smaller dosing amounts. The new units can cover a range from 100 g/h up to 8 kg/h.

Advantages:
• Independent from bulk density
• Fast product change
• Rigid construction
• Precise dosing of small volumes
• Easy operation and simple target entry
• Customer tailored solutions
• Up to 7 components per extruder
• No dosing screw changes necessary
• Easy cleaning due to removable hoppers
GRAVIMETRIC EXTRUSION CONTROL & BATCH BLENDING

The PLAST-CONTROL batch blenders can be used off-line as a general purpose blender, online or online with extrusion control.

PRO-BATCH units including PB 422 and PB 624 are an enhanced development of the basic batch blending principles for mixing and blending plastic pellets. Double slide gates for each minor component provide high precision in each batch; double weighing chambers provide high output rates in a compact unit.

Slide gates are provided in two sizes; innovative software determines the correct gate to open based on needed output rate, all without operator intervention.

A conical (PB) or horizontal (NANO) mixing hopper blends the weighed batches prior to feeding the extruder. The mixing hopper is typically fitted with a load cell for „Loss-in-Weight“ extrusion control.

Advantages:
- Higher throughput with double chamber technology
- Improved precision for critical additives
- Unique economic combination
- Excellent possible safety features

The NANO-BATCH blender is an economic alternative to the PRO-BATCH series. This blender uses one weighing chamber instead of two.

Additionally, only one slide gate is used per component.

The combination of both dosing principles (batch & continuous) is unique on the market and enables us to supply a tailor made solution for each application.

All blenders are supplied with clever features for maintenance and handling.
PLAST-CONTROL provides software and hardware to deliver plastic pellets within a plant.

PLAST-CONTROL engineers can design plant-wide layout or individual system configurations. A properly designed system eliminates dust and angel hair. Minimizing conveying distances and maximizing throughput rates while reducing energy needs are primary considerations of the design layout.

If your requirements are to convey small amounts of a single material over a short distance, or a production hall central vacuum system with several tons per hour demand - we have the technical solution and the appropriate equipment.

Material Minimizing Control (MMC) has been developed to reduce the amount of scrap and waste due to changeover of products and recipes. The program makes sure that the material storage hoppers of the dosing units are empty when the changeover is initiated and that only a small amount of material is left in the weighing hoppers.

Advantages:
- Layout for low abrasive wear
- High flexibility
- Centralized control
- Waste reduction with MMC
- Integrated bypass valve
Dust and contamination filtration

Dust and contamination of the virgin material often creates problems in the extrusion process. Long transport distances and many elbows between the silos and the machines produce angle dust and angle hair. These contaminants must be removed before entering the extruder by use of filtration devices.

More and more extrusion companies are changing to a centralized vacuum supply. Advantages like energy efficiency, noise reduction at the work station and a significant higher output at lower cost for investment are only a few reasons. The uptime is increased while the maintenance effort is decreased.

PLAST-CONTROL engineers always choose the optimum solution according to the application. Solutions can include conventional side channel, root, or claw pumps. Customers layout needs can be simulated in the PLAST-CONTROL test facility. Simulation tests verify conveying requirements of pellets with 38/50/70 mm (1.5”/2/2.5”) tubes and distances of up to 130 m (425”) horizontal and 14 m (46”) vertical.

PIPE IDENT was developed to eliminate the incorrect connection of material feed hoses.

PIPE IDENT uses a wireless sensor (RFID) on the removable flex hose which does not need a power source. The fixed pipe side is connected to the control system. The flex hose and the fixed pipe side are paired via the system software. If the hose is connected to the wrong pipe then a visual indication is displayed on the coupling as well as on the operator display. In this case the start-up of the loading system is not allowed.

Advantages:

- 360° positioning of the vacuum and material connections
- Optional application of full or low level sensors
- Optional angel hair/dust absorber
- Optional controlled feeding of repelletized trim
REAL TIME PLANT-WIDE MONITORING WITH PCC

The PLAST-CONTROL Central PCC plant-wide connection of your extrusion lines provides a powerful and convenient tool for accessing and storing all production data – in real time.

All production data is displayed centrally and optionally on Personal Computers integrated into your plant-wide network. Optionally, production specific data from your system network can be sent to the PCC.

Precise material balance sheets, quality control, central data saving and production supervising are possible without the need of large Information Technology budgets.

The basic software package includes a number of sophisticated data logging and order database applications. Custom screens can be implemented for a specific customer request.

A good example is the implementation of an OEE-Software. This tool enables the user to localize problems in the production and stop them from reoccurring.

Advantages:
• Access to production data in real time
• Material balance sheet
• Central data storage and retrieval
• Quality control tool
• Online access to all production parameters
• Material database capability
• Scrap accountability
• Central logging of machine status and alarms
• PLAST-CONTROL remote support via modem
• Connection to plant network

PCC

1. PCC terminal
2. GT3 system
3. GDC system
4. GDC-N system
5. ACS system
6. Systems from other suppliers
7. Connect to Local Area Network
8. Remote support
PROFILE-MEASUREMENT
PRO-FIL

New Non-contact AirCC sensor
PLAST-CONTROL’s experience in building and designing measurement sensors for the on-line gauge measurement of films has given rise to several new technologies. The new patented sensor AirCC was developed especially for sticky and surface sensitive films. The AirCC has two parallel working sensors which creates different capacitive fields. This combination allows calculation of film thickness regardless of distance. A constantly changing air gap (range 100 to 350 µm) does not influence the result.

Fast-Scan versions (approx. 20 sec. for 4 m bubble circumference) are available.

New C-SCAN solutions for Barrier and Cast film
A new technology for the effective alternative to radioactive sourced measurement: The C-Scan is mounted after the collapsing frame on blown film lines or after the chill rolls on cast lines and measures across the web.

By using a new and patented algorithm, the system calculates the transverse profile in full 360° view. Barrier Films with a capacitive system can now be measured without restriction.

Advantages:
• The right measurement solution for all applications
• Measurement of sticky (i.e. EVA) and soft film without damage
• Long service life
• Several sensor surfaces available
• Integrated film temperature measurement
• Barrier film measurement with C-Scan
• Non-contact measurement of overall thickness
• Non-contact measurement of total barrier layers
As one of the pioneers in the development of automatic systems for the reduction of transverse direction (TD) profile tolerances, PLAST-CONTROL has continuously developed and refined its systems.

Our Profile Control systems utilize the profile measurement devices and transmit profile data to the computer. The software calculates and carries out the correct positioning of the actuators which, in turn, control air flow through the segmented air ring.

Functionally the computer opening or closing of actuators within the PRO-CON air ring will increase or decrease the volume of air in each segment. This influences the melt temperature and in turn the film thickness during film blowing step.

To compensate for the displacement due to the mechanical oscillation in the film line the PRO-CON software measures and calculates “shift” in the measured profile.

This feature adapts itself depending on bubble oscillation and profile scan speed. Accurate and consistent reduction of profile tolerances without operator adjustment is achieved irrespective of product dimensions. The air rings are available in six sizes. In combination with MAGIC FLOW, improvement of at least 50% of the basic tolerances can be expected, along with higher output rates.

More than 1100 PRO-CON have been installed to date.

### Advantages:
- 50% reduction of the basic tolerances
- No additional energy input
- Output increase with MAGIC FLOW
- Simultaneous control of thin and thick film areas possible
- Immediate response
- Easy retrofit
- Retrofits of rotating/oscillating dies possible
- Fast return on investment
- Auto profile shift compensation

<table>
<thead>
<tr>
<th>PRO-CON</th>
<th>Die ø mm</th>
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<tbody>
<tr>
<td>C-200/32</td>
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<tr>
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</tbody>
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**PROFILE-CONTROL**

**PRO-CON**

Profile measurement

Profile control
BETTER COOLING ...

MAGIC FLOW & PRO-CON DUO

PLAST-CONTROL builds more than 80 high performance cooling rings per year and 90% delivered with the new MAGIC-FLOW lip insert. Our air rings are available for die sizes from 80 mm to 2200 mm (3"-86") as a standard with larger sizes available on request.

MAGIC FLOW is the result of extensive research in the increase of cooling capacity for blown film lines. This has been achieved by improving the aerodynamic flow path between the blower, manifold and cooling ring. Additionally extensive developments in the internal geometries of the cooling ring and the complete redesigned lip shape allows higher air speeds and air volumes at the cooling interface. The net effect is that bubble stability is increased, transverse tolerances improved and higher machine outputs are achieved.

MAGIC FLOW really does surpass all expectations: output increases of up to 40% are possible compared to standard double lip air rings.

An additional output increase becomes possible by using PLAST-CONTROL’s double air ring technology, PRO-CON DUO. Mechanical properties will be improved using DUO as well.

Advantages:
- High bubble stability - fast product adjustment
- Perfect basic tolerances
- Significant higher output, up to 40% more than comparable cooling systems
- Fast return of investment
- DUO air ring for increased film strength and higher outputs (machine permitting)
- Better mechanical film properties possible

BLACK MAGIC LIP and fume exhaust

The undesirable low molecular paraffin wax condensation which may occur with higher outputs can be minimized with air ring lips made from a special high performance plastic in combination with a dedicated exhaust system.

BLACK MAGIC LIP prolongs time between the cleaning cycles. Special designed IBC towers for DUO application are available (see page 15).

The Electrical controlled upper air ring elevator allows easy adjustment and accessibility. The combination of “improved output – better mechanical properties” ensures a fast return on investment.
The PRO-JET Profile Control is achieved with a segmented plate that is mounted underneath an existing air ring. Adjustable air valves located below the air ring controls the volume of airflow in each segment. Suitable for stationary and moving dies with diameters from 100 mm - 2500 mm (4”-100”) can be equipped.

The basic tolerances are improved up to 50 %. PRO-JET does not affect output rates.

**Advantages:**
- Economic solution for retrofits
- Immediate response
- Low additional energy input
- Auto profile shift compensation
The *Navigator* operator concept allows a simple graphical touch screen control of your entire extrusion process, including extruder drives, temperatures, blower controls, calibration cage, collapsing frame, haul-off and treater. The NAVIGATOR can be adapted easily to new lines, upgrades or retrofits irrespective of the Original Equipment Manufacturer.

PLAST-CONTROL produces many electronic components and our software package in-house, which sets us apart from on-going technology obsolescence in the ever evolving computer world. This enables us to provide our customers complete service and spare parts for all our products for many years along with a migration to the future product.

NAVIGATOR is simple to use, and includes an alarm handling feature which clearly shows errors and helps the operator quickly address them.

This flexible solution for existing extrusion lines as well as for new lines enables you to implement an identical operation philosophy throughout your entire company. NAVIGATOR is available in many languages.

Safety functions can easily be integrated as well, and will be proven for functionality as a fundamental part of any modifications we make.

**Advantages:**
- Modular
- Safety function
- High dependability
- Easy operation, handling
- Safety assurance of E-Stop circuitry
- Cost attractive retrofit and exchange of all types of controls
- Complete line control via touch screen
- Implementation of customer tailored solutions

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**NAVIGATOR**

- Touch Screen Navigator
- Cabinets for CoEx-line
- Power distribution
- Drive control
- Winder connection

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**STATE OF THE ART LINE CONTROL WITH NAVIGATOR**

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**NAVIGATOR**

- 1. Touch Screen Navigator
- 2. Cabinets for CoEx-line
- 3. Power distribution
- 4. Drive control
- 5. Winder connection

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**NAVIGATOR**

- Data link to PLC
- Digital I/O analog I/O
- Digital I/O analog I/O
- Digital I/O analog I/O
- Digital I/O analog I/O
- NIP drive
- Auxiliary drives
- Layflat system
- Calibration basket
- Blowers
- Drive(s)
The IBC-control system **PRO-SONIC** can be integrated into all PLAST-CONTROL systems or can be supplied as a stand-alone system.

For accurate control of the bubble diameter, speed is everything. PRO-SONIC incorporates non-contact high quality ultrasonic sensors processed by ultrafast signal processing hardware and software. Bubble diameter calculated within 100 ms per update.

Stepper motor driven air Throttle Valve (STV) supplies instantaneous response to the control required by the system. Layflat width variations are reduced to a minimum. Startup requires minimal operator interaction.

Edge trim and start up waste can be reduced and nominal thickness is maintained.

**Ultra-Sonic Sensors**
We have achieved width tolerances of less than +/- 2 mm on existing lines using the latest generation of Ultra Sonic sensors combined with the newly developed air control valve.

**PRO-SONIC Control Principle**

- **New IBC-Control**
- **Ultrasonic sensors**
- **Signal converter**
- **Frequency converter**
- **STV Air valve**
- **Blower**

**Advantages:**
- fully integrated
- cost effective solution
- high resolution ultrasonic sensors
- high speed air valve

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**Diagram:**

1. IBC stack
2. STV control flap with servo drive
3. IBC Node PC 17
4. 3x ultrasonic sensors
5. Calibration basket
6. Option 1: frequency converter
7. Sensors on frostline level
8. IBC in
9. IBC air valve STV
10. IBC out

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**PLASTCONTROL**

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**Calibration Cages**

The calibration cage is possibly one of the most overlooked items in regard to the influence it has on film quality and profile tolerance.

The **PRO-CAGE** range of cages offers an innovative design with a rigid construction and precision control of the cage position throughout the operational range. Two types are offered, the M series with high precision double pivot self centering, easily exchangeable rollers and L series with single pivot operation. Both devices feature a choice of roller surfaces for different applications.

**Advantages:**
- precise width control
- various roller surfaces
- rigid construction
- compact design
- with wide adjustment range
- easy maintenance
GAUGE MEASUREMENT WITH PRO-LAB II

The PRO-LAB II has a touching sensor for the absolute, real thickness measurement of film profiles according to the norms DIN 533370/ISO 4593/ASTM-D 6988-08.

In addition to the touching sensor the system is available with a capacitive sensor for a continuous measurement mode or with a combination of both sensors.

To analyze the thickness distribution a film strip is put into the holding device of the PRO-LAB II system. The measuring value is taken with the mechanical detection head at selectable distances or continuous with the capacitive sensor.

The maintenance free stepper motor moves the film strip step by step by the mechanical detection sensor.

When the capacitive sensor is supplied the film is moved in a continuous mode.

To avoid a cross movement of the film strip, if different widths of film strips are measured, a guiding frame keeps the film strip in position.

Additionally the system will be delivered with a container to put the film strip in. This container keeps the film off of the floor to help keep dust and dirt from contaminating the film. Small contaminants will be eliminated by a unit at the entrance of the device (not usable with sticky film surfaces).

The use of commercial anti-static tissues is required.

Advantages:
- Measurement acc. DIN/ISO/ASTM
- Easy handling
- Automatic mode
- Easy calibration

The PRO-LAB II basic system is equipped with a serial interface, so that the system can be connected to a customer PC. The software package is Windows based and has a user friendly environment allowing a professional profile analysis.

Based on meaningful profile graphics, average values, min. and max. values, the tolerance of the pre-selected set points will be easily detected.

With the help of Windows these measuring results can be documented with product or order numbers, archived or recorded.
With over 8000 systems installed worldwide, PLAST-CONTROL is the leading manufacturer of automation systems for plastics extrusion.

Since the company’s inception in 1979 we have continuously developed innovative technologies that have set the standards for managing plastics extrusion.

Today, we offer our customers a complete range of products for extrusion automation, including gravimetric Dosing and PRO-CON, our automatic profile control system for blown film lines.

PLAST-CONTROL has representation throughout the world and maintains regional offices in the USA, Great Britain and Taiwan.