



- Biax Film & Sheet
- Blown Film
- Cast Film
- Sheet & Foam

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# EXTRUSION

MEASUREMENT AND CONTROL



# Extrusion: The NDC Difference

## NDC: A WORLDWIDE PRESENCE IN EXTRUSION MEASUREMENT & CONTROL

### Extrusion Installations

Blown Film Systems:

- over 800

Biax Systems:

- over 150

Cast Film Systems:

- over 600

Sheet & Foam Systems:

- over 1000

All Extrusion Systems:

- over 2500

### Measurement Sensors for Extrusion

- GBS: 3 designs
- Beta: 3 designs
- Infrared: 3 designs
- Laser: 2 designs
- X-Ray: 2 designs

### Product Control for Extrusion

- Thousands of Machine Direction control systems
- Over 500 Auto Profile Control systems

### Worldwide Support Structure

- Manufacturing facilities in USA and UK
- Direct sales and services facilities in Germany, Italy, China (4 offices), Japan, India and Brazil
- Representation in over 60 countries, all with sales and support

**Each Extrusion Processor faces unique challenges.** Sure, there are some challenges common to all extrusion processes. Like the need to **maximize process uptime**. **Reduce scrap. Squeeze every square inch of yield possible** out of today's high cost resins. And **produce flat product** that meets customer needs.

But NDC recognizes that a gauging system suitable to meet the needs of an 8-meter wide BOPP line is overkill for a blown film line. That's why we offer the widest range of sensors (13), scanners (4) and system platforms (3) of any gauging system provider. We recognize that design flexibility equals choice, allowing you to create a custom gauging system suitable to solve your unique problems, at a price you can afford.

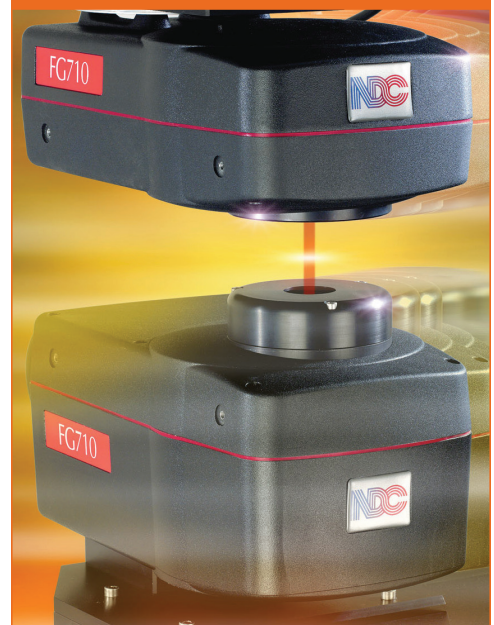
**NDC is in a unique position to provide you with a fully-optimized gauging solution.**

If you produce clear and translucent films, our infrared sensors are ideal for this task due to their accuracy, resolution, simplicity, calibration stability, and reliability. Our infrared sensors are also capable of measuring key components in coextruded films.

If you are producing foam or sheet products, our Gamma and X-Ray backscatter sensors offer superior calibration stability, accuracy, and simplicity combined with low cost.

If you desire a "true thickness" measurement, our single- and dual-sided lasers offer excellent performance, using technology proven in dozens of installations.

### SUPERIOR INFRARED SENSORS



FG710 Infrared Sensor measuring CPP film

### Getting things under control

Once we're measuring your process, we offer machine- and cross-direction controls to optimize product quality and yield. Our Automatic Profile Control regulates a suitably equipped extrusion die to quickly produce flat film or sheet. Machine direction control can reduce resin usage to the minimum. Your result: maximized profitability and product quality.

### A LEADER IN BIAX CONTROL



Installation of NDC scanner on 10.5 m wide BOPP line



# NDC Capabilities for Extrusion Processes

## Measurement Sensors for Extrusion Applications

SENSOR	RANGE	APPLICATION
GBS: 101	6-25000 gsm	Sheet
GBS: 102	6-6500 gsm	Sheet Biax (Cast End)
GBS: 103	6-1500 gsm	Sheet Biax (Cast End) Cast Film (Narrow) Blown Film
The GBS (Gamma Backscatter) gauge is perfect for sheet and thick film. Its only limitation is scan speed, and so is ideally suited for narrower webs.		
Beta: 301	100-5500 gsm	Sheet Biax (Cast End)
Beta: 302	25-1200 gsm	Biax (Film End) Cast Film Thin Sheet
Beta: 303	0-200 gsm	Biax (Film End) Cast Film
Beta gauges have long been accepted for their trouble-free measurement performance. They work well on sheet, cast and biax applications.		
IR: TFG710	2-60 gsm	Biax Capacitor Film
IR: FG710	10-5000 gsm	Biax Film Cast Film Blown Film
IR: FS710	20-80 gsm	Pigmented Films
NDC has revolutionized Infrared gauging technology; these non-nuclear sensors have exceptional performance, and are ideal for cast and biax film.		
XRT: 312A	5-8000 gsm	Sheet Biax Cast Film
XRB: 318	5-25000 gsm	Sheet Biax Cast Film
X-Ray sensors offer another non-nuclear alternative for a wide range of extrusion applications.		
Laser: 172	0-40 mm	Sheet
Laser: 170	0-40 mm	Sheet
Laser gauges are ideal for sheet processes where density is not constant and a true thickness measurement is desired.		

## Control Options for Extrusion Processes

**Machine Direction Control (Nominal):** This control package takes current average scan thickness and compares it to a set target (Nominal Target). It then automatically adjusts either extruder or line speed (user-selectable) to drive the average thickness to the desired target.

**Automatic Target Optimization Control (ATO):** Like MD control, ATO drives the average thickness to a target; however this target is dynamically adjusted based on the current variation in the product as measured by the scanning sensor(s). If variation is high, the target will be increased to protect against making under-spec product. When both CD and MD variations are optimized, ATO control will drive the target downwards while still protecting the lower limit, resulting in significant raw materials savings while protecting against scrap product.

**Ratio Control:** On coextrusion processes ratio control will insure that all extruders maintain the same relative output to maintain layer ratio balance.

**Automatic Profile Control (APC):** APC works with specially-equipped extrusion dies to automatically adjust actuators (such as die bolt heaters) and control the lip opening across the width to create a flat sheet. This technology can be applied to blown film, sheet, cast film and biax processes. For the biax application, our Asynchronous Integrated Mass (AIM) algorithm insures that the film and cast scanners are appropriately mapped to provide fast, responsive control to film thickness upsets.

### Other System Options

- FFT (Fast Fourier Transform) analysis
- SPC charting
- 3D profile displays
- Various reporting and data storage options

Note: this document briefly mentions pertinent product features for Extrusion processes. More details on these individual product features are usually available on separate data sheets.



# NDC Worldwide Presence: Ready to Support You...

**From Initial Contact, Through the Life of the System,** NDC's customer support team is ready to provide you with the answers, response and support you need.

**Sales Team:** Includes NDC personnel based in 10 countries, combined with a representative network based in over 60 countries. Each of these people is highly trained in gauging and its application in the extrusion business. They will discuss your product measurement and control needs with you and work with our staff to provide a customized solution for your application. They are uniquely qualified to provide their customers with best-in-class measurement and control solutions that provide the lowest total lifetime cost of ownership.

**Project Management Team:** Our Project Management team works to insure that the system you have ordered is built to meet your exacting needs. They work with our in-house manufacturing and quality control team to make sure that all system aspects are built to specifications.

**Customer Care Team:** Our Customer Care team arrives on site and assists you in getting your system installed. They then work with you to optimize the measurement, control and other system functions to meet your needs. They train your operating and support personnel to insure you can maintain peak system performance long after we complete our start-up work.

In the rare case that you do have a problem, our systems are designed to be user-serviceable. Or our phone-based technical support team can usually get your system running again without a visit to your site. We also have local, affordable support in most places around the world.

### **NDC: A profitable, growing process controls supplier**

Since 1965, NDC has installed over 7,000 systems and over 20,000 measurement sensors on a wide range of processing applications. Gauging is all we do – it is our ONLY focus. We are the largest gauging company in the markets we serve, with a worldwide presence.

In 1997, NDC Systems was purchased by Spectris plc and merged with Infrared Engineering (another Spectris company) to form NDC Infrared Engineering. Spectris plc is a profitable process controls and instrumentation company with over \$1 billion in annual revenues. This stability assures you that we will be here to support your measurement and control needs, now and in the future.



NDC Infrared Engineering is represented in over 60 countries worldwide

a **spectris** company

[www.ndc.com](http://www.ndc.com)

ISO9001:2000

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