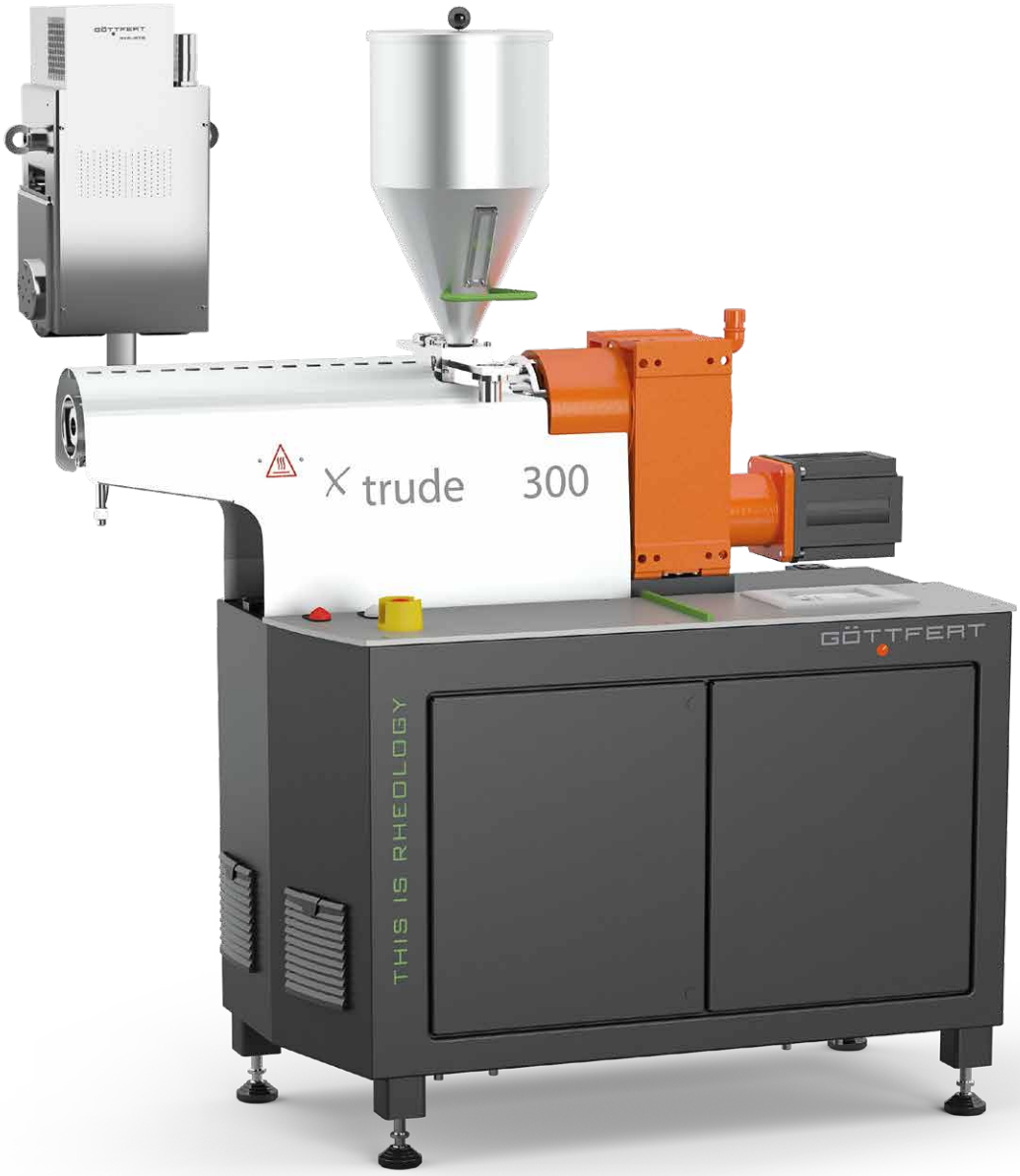
viscosity

continuous process

AT-LINE ANALYSIS



GÖTTFERT

THIS IS RHEOLOGY

ONLINE ANALYSIS

AT-LINE-RHEOMETER

AT-LINE-RHEOMETER enable the continuous measurement of powder, fine granules or pellets for monitoring polymerization processes. For fully automatic process control, the system delivers the rheological parameters for evaluating the polymer in real-time operation.

The overall line initially consists of a combination of an online-rheometer such as MBR, SSR or RTR/RTS-TD and an upstream EXTRUSIOMETER, which serves as a melt feeder. Reliable continuous operation is guaranteed by an optional independently working material feeding system (Online Sampler).

In addition, the open platform offers many extension possibilities for the targeted analysis of the respective customer-specific application.

MEASURING HEAD RTR/RTS-TD FOR DETERMINING RHEOLOGICAL MATERIAL PROPERTIES

Measuring head RTR/RTS-TD for determining rheological material properties

- Measuring head for rheological material characterization
- Determination of rheological parameters, such as MFR, MVR or viscosity
- Exchangeable capillaries with various dimensions
- Adjustable volume flow using high power gear pumps
- Variable pump speed control via servo-motor
- Melt temperature measurement via thermocouple
- Visualization via "ROSWin" software
- Customer-specific modifications possible
- Further details can be found in the "ONLINE-RHEOMETER" brochure

EXTRUSIOMETER

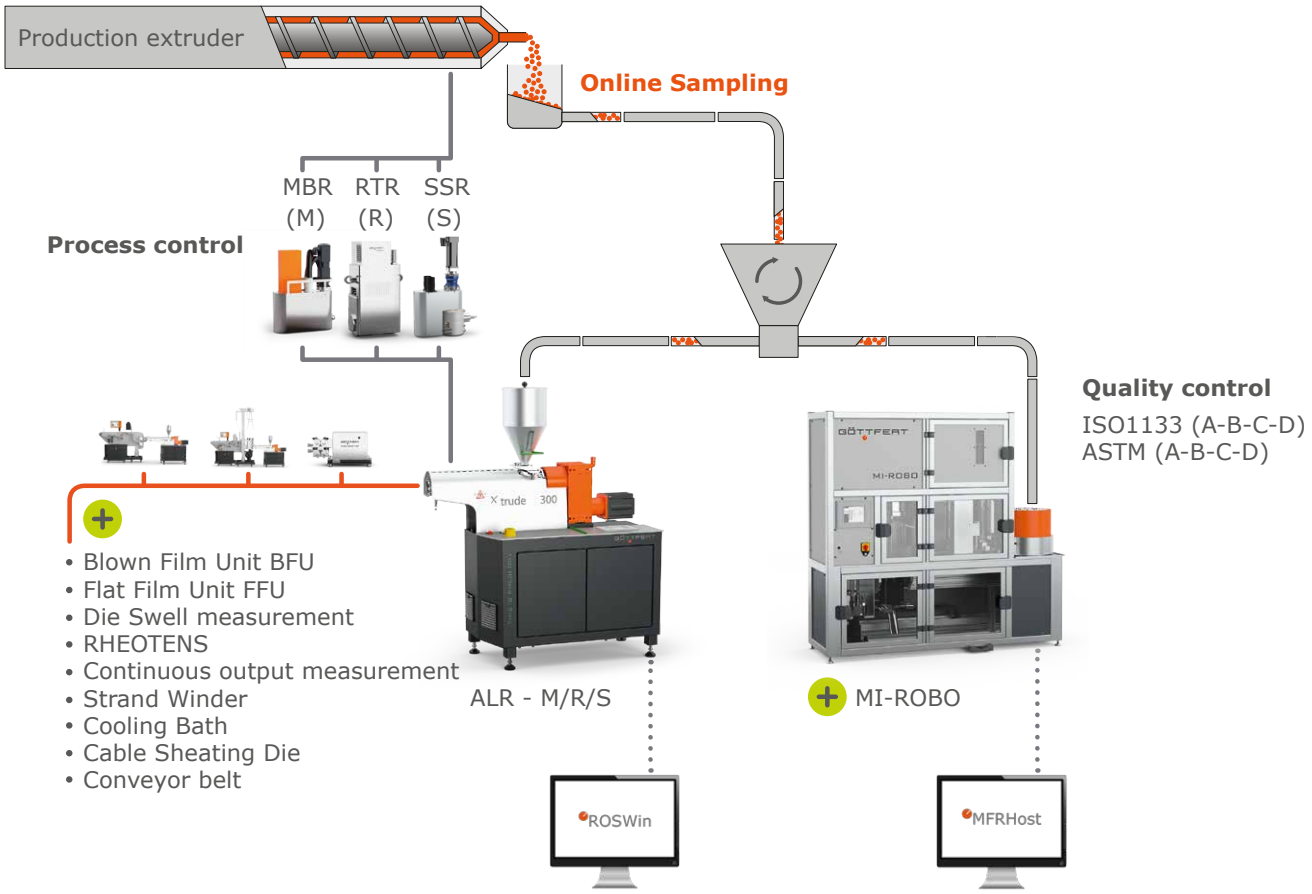
- Variable drive units from 0 to 120 rpm
- Available torque of up to 1400 Nm
- Single cylinder systems
- Simpöe screw geometries in various dimensions
- Very quick product changes due to screw purging (feeding zone)
- Melt pressure sensors with high accuracy and temperature stability
- Melt temperature measurement via thermocouples
- System control with innovative bus technology
- Visualization via "ROSWin" software
- Application-specific modifications possible

Melt feeder EXTRUSIOMETER
X-trude 1400

AT-LINE STATION

» ONE SYSTEM – VARIOUS SOLUTIONS! «

OPEN PLATFORM FOR RHEOLOGICAL ONLINE ANALYSES



MATERIAL FEEDING – ONLINE SAMPLER

Pellets, fine granules, powder and more – reliable from A to B!

In order to ensure fully automated operation of the AT-LINE STATION, the system can be designed either with material feeding from a silo or with sampling directly from the product tube.

In both application cases, a sample is taken by the sending unit and transferred by inert gas (e.g. nitrogen as the carrier medium) to the receiving unit.

- For long distances, if necessary, transmit amplifiers are used to ensure a continuous material feed.
- Smooth continuous operation is guaranteed by an exact adaptation of the complete system to the on-site conditions during commissioning.
- A wide range of hardware and software adjustments allow optimum configuration even when changing products or operating conditions later on.

Rheometer measuring heads and Online Sampler systems are also available in an explosion-proof design!

LABORATORY EXTRUDER

Not only melt feeders but also independent measuring instruments – therefore EXTRUSIOMETER!

HIGHLIGHTS

- Wide torque range
- Various cylinder and screw designs
- Up to 16 heating and 3 cooling zones
- 0–350° temperature curve with 0.1 °C resolution and a calibration accuracy of less than 0.4 %
- Measuring range of pressure transducer: 0 - 100, -200, -500, -1000 bar at a deviation of +/- 0.5 % from the set value
- Control via external PC, industrial workstation or optionally with integrated touch panel
- Visualization via "ROSWin" software
- User-specific modifications possible

LABORATORY EXTRUDER

More than a half century of experience in rheological extrusion technology are incorporated in our EXTRUSIOMETER range. Various standard cylinder sizes as well as customer-specific cylinder systems are available. The EXTRUSIOMETER may be equipped with multiple pressure transducers and temperature sensors, just one of the many important characteristics of the device. The liquid cooling system avoids the plastification of the material in the feeding zone. The torque measurement greatly enhances the range of measurements possible. Shear rate, shear stress and viscosity are continuously displayed. The new X-trude Series comes with the torque extensions X-trude 300, 600 and 1400 nM, which in combination with various downstream systems form an open platform for rheological online analyses.

The GÖTTFERT EXTRUSIOMETER of the "X-trude" series are compact extruders and designed for laboratory application to test and produce polymers.
The range of applications extends from simple melt feeder for online rheometers (determination of the melt index, the MVR, IV or the viscosity) or for downstream units, such as film analyzers (ALS), to fully automatic rheological measuring extruders (ALR) with continuous material feeding (Online Sampler).

FURTHER SPECIFICATIONS

- Variable use of available components
- Optimization and coordination of drive data, cylinder system and options according to customer requirements
- Contact our sales department or, if applicable, our application technology department

BLOW FILM UNIT BFU

Unit for blowing, cooling, drawing out and winding up extruded tubes

HIGHLIGHTS

- Roll width 320/420 mm
- Flat film width 300/400 mm (more on request)
- Die diameter 30/50/60/80/120 mm
- Pull-off force 0.1–50 m/min
- Decoupling unit
- Electronic presetting of the maximum pull-off force of 50 N
- Controlled film pull-off without influencing the pull-off unit
- Central lifting unit for easy height adjustment

BLOW FILM UNIT BFU 300/400

The blown film unit is a compact system for inflating, cooling, drawing out and winding up extruded tubes. It is used in production control to determine how well the dispersion works in batch runs on extruders and compounders as well, as in incoming quality control for color and spot distribution. Additionally, it plays an integral part in development, to control the maximum pull-out capability of the polymer and to test the suitability of polymers and polymer blends in the laboratory. Alternatively, it can be used to produce small film tubes of various thicknesses, for example in the packaging or food industry, where large-scale production systems are often not profitable.

OPTIONS

- Thermostat
- Dual-lip cooling ring
- Air cushion with central adjustment
- Optical film analysis (contamination and inhomogeneities)
- Tubeless winding
- Film rip control
- Edge remover
- Film thickness measurement
- Gloss measurement
- Transparency (haze)

KEY FUNCTIONS AND DATA

The blown film head/die is connected to the EXTRUSIOMETER using a deflection head. Due to the long die land, the melt is sufficiently homogenized when being transported to the die outlet. An air cooling ring with either one or two finely adjustable blow levels ensures sufficient and evenly distributed cooling air. This way, very narrow thickness tolerances can be achieved. The instrument frame is stable, mobile and fixable and features a central telescopic profile lifting system. The cooling ring, film layering and height are universally adjustable and guarantee pull-off speeds of up to 50 m/min.

Film thickness

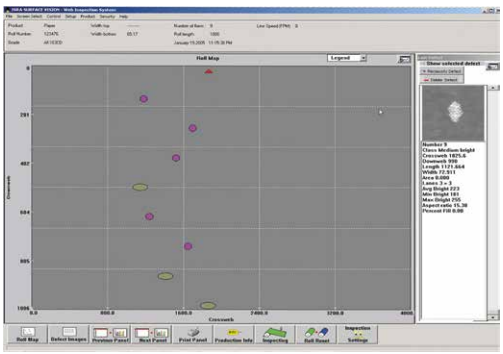
The laser distance measuring head operates with very high precision across the entire adjustable measuring range. Its set-up can be optimized to cover a wide range of materials and surfaces. A direct good/bad evaluation, averaging, eccentricity or min/max values are integrated in the software.

Film gloss

The entire spectrum from dull to high-gloss can be covered by the multi-angle gloss measurement. Using intelligent calibration and continuous self-diagnostics, long-term stability and test value accuracy are assured. Continuous gloss statistics, the simultaneous display of various geometrical shapes, averages, min/max values or standard deviations are also available.

Inhomogeneities – spot detection

The complete detection of irregularities in the film analysis is essential to ensure the homogeneous quality in production. The laboratory system runs parallel to the process either with the same material or in the pilot-plant procedure.



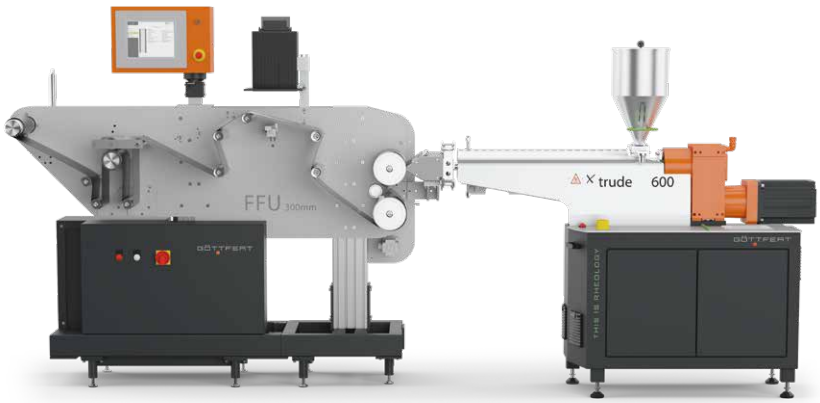
Arrow | Fisheye | Bubbles | Gel arrow | Hole | Nugget | Polymer Nugget

FLAT FILM UNIT FFU

Unit for pulling off, cooling and winding up flat films made from PP, PE and other types of plastics

HIGHLIGHTS

- Wide slit die 150/320/420 mm (more on request)
- Film width up to 400 mm (wider on request)
- Pull-off speed 0–50 m/min
- Max. draw-off roll diameter 600 mm
- Stepless height adjustment
- Controllable shaft for tubeless winding



FLAT FILM UNIT FFU 150/300/400

The FFU is a compact unit for pulling off, cooling and winding up flat films made from PP, PE and other types of plastics. It is used for testing and checking flat films, e.g. as a small production line, or for use in the development of new polymer blends.

APPLICATIONS

Production control

- For monitoring the dispersion performance of compounders or extruders used in batch production
- For inspecting incoming goods for color and spot distribution

Development

- For controlling the maximum pull-out capability of the polymer
- For monitoring the suitability of polymers or polymer blends in the laboratory

Production

- Production of small flat films, e.g. for the food and the packaging industry, where large-scale production systems are often not profitable.

OPTIONS

- Flat film unit on a movable frame or rail system
- Air knife for cooling the film
- Thermostat for tempering the draw-off rolls
- Edge remover
- Optical film analysis (contamination and inhomogeneities)
- Film thickness measurement
- Gloss measurement
- Transparency (haze)

SOFTWARE

ROSWin – Multifunctional software system for the complete control of our ONLINE-RHEOMETERS, measuring extruders and downstream units

FUNCTIONS

The Rheo Online Software for Windows, in short ROSWin, is the operating and visualization software for all continuously measuring ONLINE-RHEOMETER and measuring extruders (Extrusiometer). Downstream units can be easily integrated.

Easy usage, flexible views and open interfaces make ROSWin the standard solution in online technology. Beside analog data transmission, interfaces such as Modbus RTU/ASCII, Profibus DP and OPC Server are also supported.

The Rheo Online Software comes with an extensive evaluation package; the proven software "WinRheo II" can be used for post-editing of measurement data.

TECHNICAL SPECIFICATIONS

- Configuration of the rheometer for various measurement procedures via parameter sets
- Storage of all parameters and measurement data in databases
- Rheological evaluation of the measurement data (extended evaluation with WinRheo II)
- Display of all measured variables in tables as well as diagrams and trends
- Freely definable protocol printouts of test values, alarms and parameter files
- Access rights and freely definable window arrangements for individual visualization
- Automatic calibration of the rheometer to preset MFR/MVR set values
- Adjustable limits for all measured variables
- Digital output of operational states
- Network connection

SPECIFICATIONS



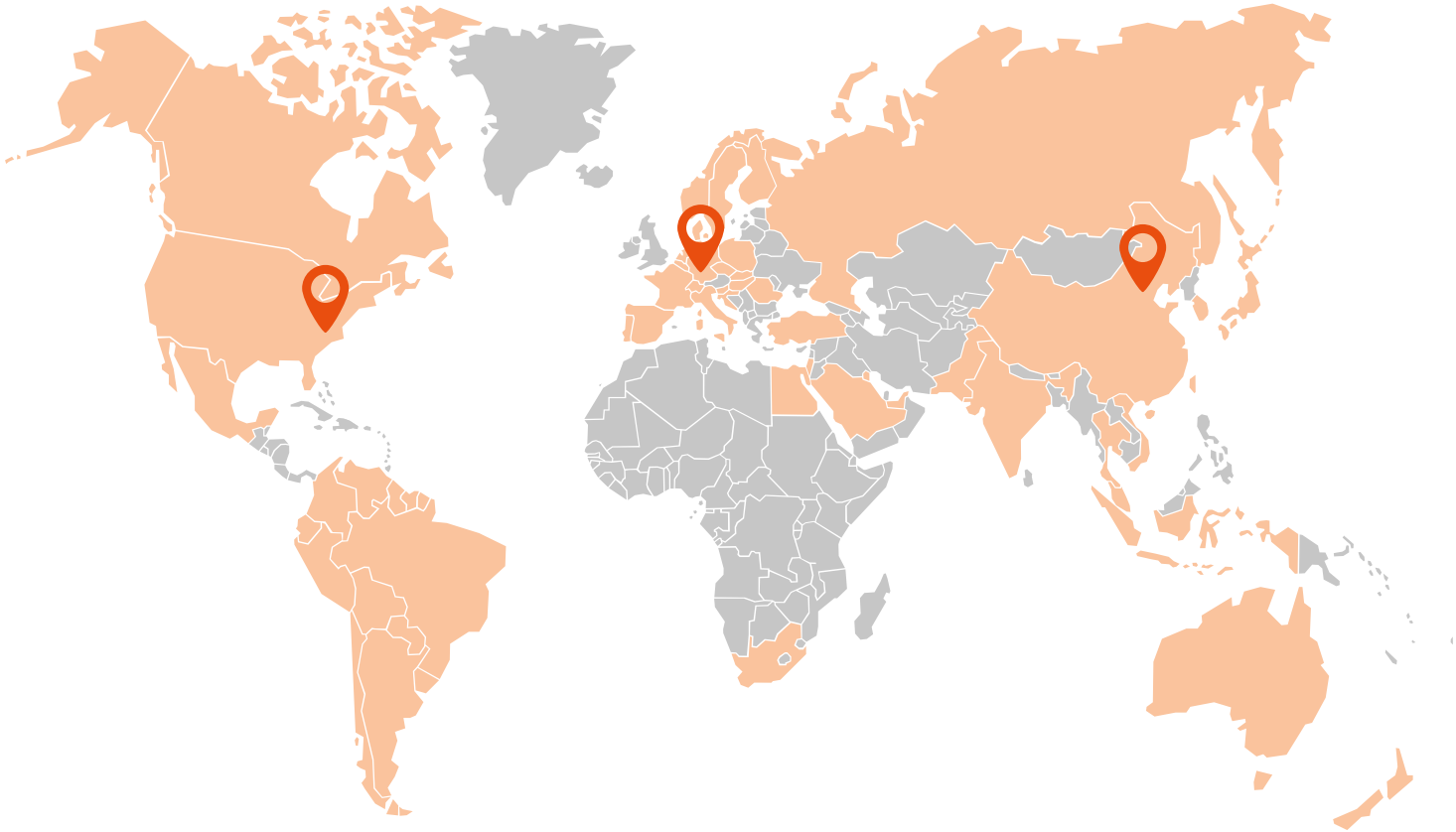
Model	X-trude 300	X-trude 600	X-trude 1400
Power output	5.18 kW	9.42 kW	16.59 kW
Maximum torque*	300 Nm	600 Nm	1400 Nm
Screw speed*	0 to 120 min^{-1}	0 to 120 min^{-1}	0 to 120 min^{-1}
Screw geometry	20 mm, 1", 30 mm, and other	20 mm, 1", 30 mm and other	45 mm, and other
Screw back pressure	350 bar (optional 600 bar)	350 bar (optional 600 bar)	750 bar
Exchangeable bushing for powder/fine granules	•	•	•
Rubber cylinder	•	•	•
Cylinder tempering	60 ... 350 °C (+/- 0.5 °C)		
Variable number of heating/cooling circuits*	•	•	•
Variable number of heating/cooling circuits	•	•	•
Variable number of melt temperature sensors	•	•	•
Torque measurement	•	•	•
Measuring mode: constant speed/pressure	•	•	•
Microsoft Windows® Software "ROSWin"	•	•	•
Optional add-on and Downstream units			
• Fully automated material feeding for pellets, fine granules or powders (Online Sampler)			
• Metering unit with agitation and tamping mechanism			
• Round hole die, slit die, wide slit die			
• Analog/digital signals, OPC, Profibus, Modbus interfaces for coupling to higher level IT systems			
• Adapters for blown film, cable coatings, pipes and deflection head			
• Filter measuring head			
• Filter, pelletizer, roll-up, cooling bath			
• Continuous extrusion measurement			
• ONLINE-RHEOMETER (RTR/RTS-TD, MBR, SSR) with FTNIR measurement			
• Melt extension (Online-RHEOTENS, HAUL-OFF), die swell measurement, counter pressure chamber			
• Flat film unit (150, 220, 300, 400 mm)			
• Blown film unit (up to 550 mm), calender stack			
• Camera system (for detecting inhomogeneities and contamination)			
• Film analysis: Gloss measurement, film thickness, haze and color			
• Remote maintenance			

Further applications and modifications on request, subject to technical changes.

* Maximum deviation from end value 0.2 %

Rev. E - 09/2022

THIS IS RHEOLOGY



GOETTFERT Inc.

Rock Hill, SC 29730
USA
+1 803 324 3883
info@goettfert.com

GÖTTFERT | Werkstoff-Prüfmaschinen GmbH

74722 Buchen
+49 (0) 62 81 408-0
info@goettfert.de

GOETTFERT (China) Ltd.

Beijing 100027
CHINA
+86 10 848 320 51
info@goettfert-china.com

www.goettfert.com