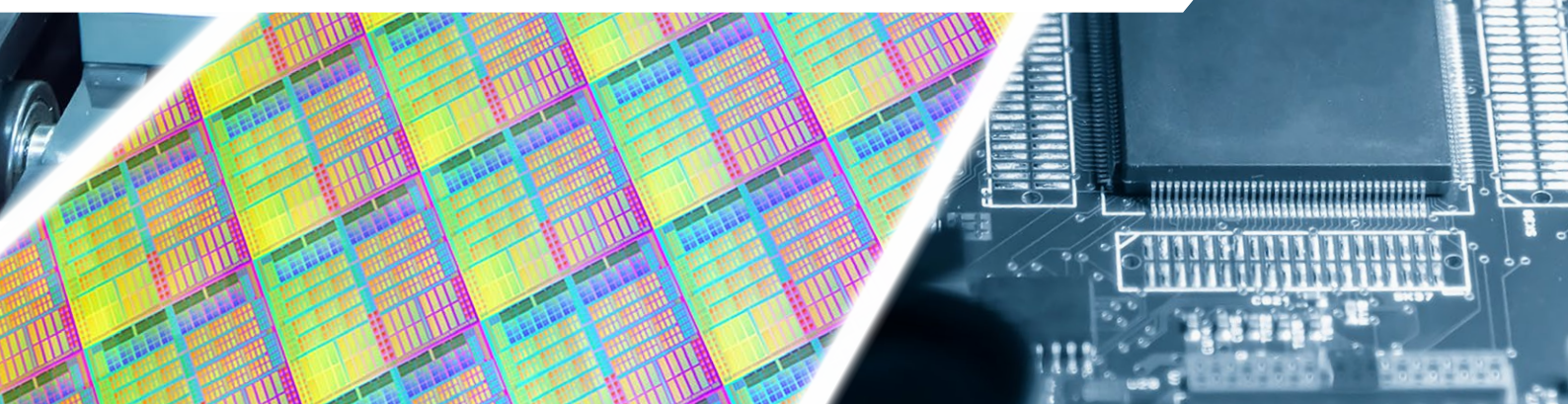
PRECITEC

INTERFEROMETRIC SENSORS

See your smart factory run more efficiently
with our high-end optical sensors



THE EYES OF SMART INDUSTRY

What does industry need to meet the fast-moving demands of smart manufacturing? On the one hand, automated manufacturing processes; on the other hand, individual machines that are transformed into intelligent cyber systems by integrating smart sensors. In all these processes optical measuring technology offers many advantages, not least data volume, speed, and flexibility for status and process monitoring applications as well as high-end quality control in the required cycle times.

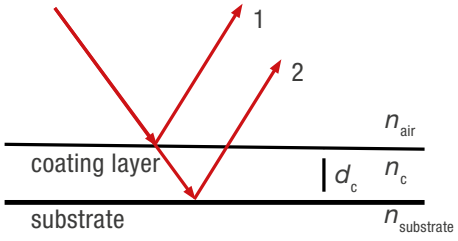
INTERFEROMETRY SEES MORE

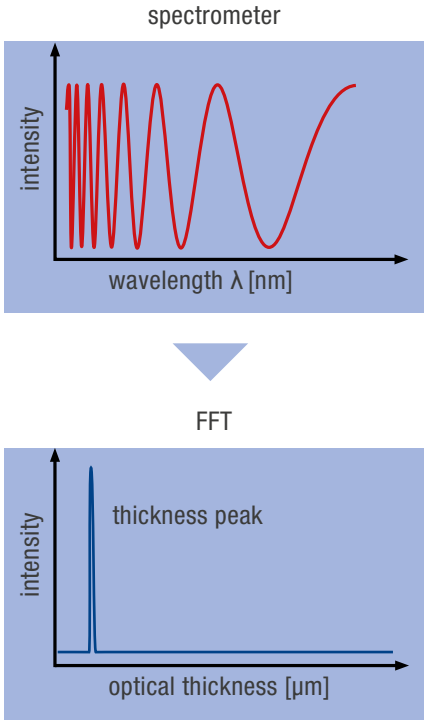
In precision metrology interferometry can be used for high-precision measurements of distance or displacement of up to 20 mm, and for microstructure measurements with sub-micrometer resolution. Interferometry is also suitable for quality assurance-, surface- and thickness-, and speed-measurements. As one of the fundamental building blocks of today's smart factories, intelligent sensors are key enablers for production resources that configure, control, manage and optimize themselves. As reliable ultra-precise sensor data are crucial for production environments, interferometric sensors serve as pairs of eyes for smart production machines in state-of-the-art factories.

HOW THESE EYES WORK

After spectrally broadband light is focused on a sample, the reflections from the front and back surface are collected. Interferometric sensors measure the interference between two or more reflected beams from the first and second layer of the measuring sample, which results in a spectrum.

This spectrum displays a modulation with a frequency linked to the thickness of the sample: the thinner the object, the lower the observed frequency. Calculating the Fourier transformation of the spectrum leads to one peak that instantly shows the optical thickness. If the refractive index of the object is known, the absolute layer thickness can be calculated. This technique is also ideally suited to multilayer thickness measurements.





Interferometric measuring technology from Precitec Optronik, the pioneering force in interferometry, offers you multiple advantages:

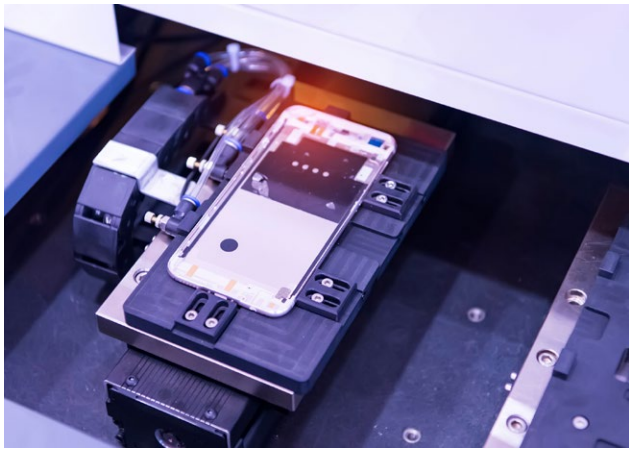
- Ultra-precise thickness measurements from 0.6 - 15,000 µm
- Measurement of all infrared-transparent materials with rough, reflective, transparent or opaque surfaces
- Sensor technology suitable for harsh industrial environments, even for measurements in liquids such as water, oil or acids
- Insensitive to heat, humidity or vibration
- Ideal for high speed inline inspections up to 70 kHz

HOW YOU BENEFIT

- Utmost precision for infrared transparent materials in the µm range
- High-speed real-time processing and analysis for quality control in short cycle times
- Wear-free durability thanks to non-contact technology
- Easy integration into production processes
- Small, compact footprint for use in highly integrated systems or difficult-to-access areas

THE EXPERTISE TO ADVANCE YOUR BUSINESS

The expertise and experience Precitec Optronik has gained in interferometric technology enable us to enhance our customers' production processes and make them more competitive in a wide range of industrial applications.

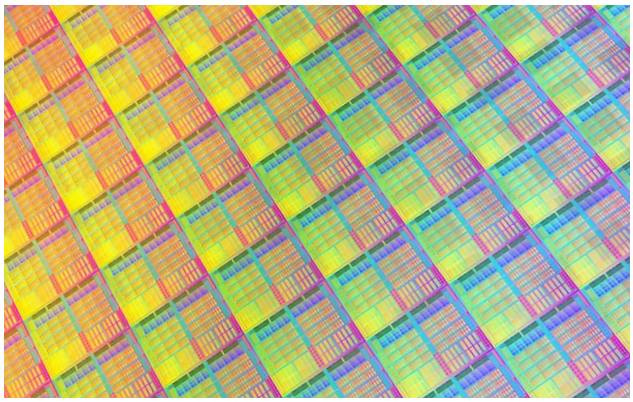


CONSUMER ELECTRONICS

Our interferometric probes enable rigorous quality tests on consumer electronic products (e.g. smartphones, tablets and wearables) for maximal yield through fast, non-contact measurements at unparalleled precision and reliability. Applications include highly accurate inline inspection of the flatness and thickness of components, e.g. cover glasses. Measurements are possible from a large distance, and parts may be moving or covered with protective films. Through ultrafast interferometric scanning of the areas of interest at lateral speeds up to 300 mm/s and the absolute correlation of the data obtained, our sensors make complex inline inspections straightforward.

SEMICONDUCTORS

For more than a decade, our CHRocodile IT series has proven its capabilities in non-destructive optical measurements as the favored technique for thickness measurements of wafers, glues, and coatings. These reliable high-speed tools detect end point thicknesses in-situ during workpiece treatment in CMP, back grinding and spin etching. Consistent end-point detection generates a higher throughput coupled with a more accurate and repeatable product quality. Additionally, optical monitoring makes the process much more efficient, which reduces material waste.



GLASS

To control the surfaces and especially the thickness of glass during production, a contact-free measuring system is needed. For many applications in the glass industry, e.g. architecture glass, the panels can be quite thick, have multiple layers, and also be highly tinted. The only possible solution for contact-free thickness measurement is an interferometric sensor. With its large measuring ranges our CHRocodile 2 IT series can measure distances and thicknesses of 0.6 - 15,000 µm, and with measuring rates of up to 70 kHz can quickly measure large areas. What's more, the measurements are highly accurate with lateral resolutions in the µm-range, thus enabling resolution of even small structures.

MEDICINE

The CHRocodile 2 IT is perfectly suitable for glass tube measurements, e.g. during syringe manufacturing. Thanks to the high measuring range and interferometry selectivity it is impossible to miss the top of the tube. The same is true for plastic tubes – and even more so if the tube is translucent, not transparent. Medical solution bags can also be easily inspected in a lab or on a production line. Around the coronary stents the CHRocodile 2 IT will measure the thickness of the film envelopes or any coatings. Biocompatible or biostable coatings that are often applied to medical devices can also be precisely measured to check if sufficient material has been applied.

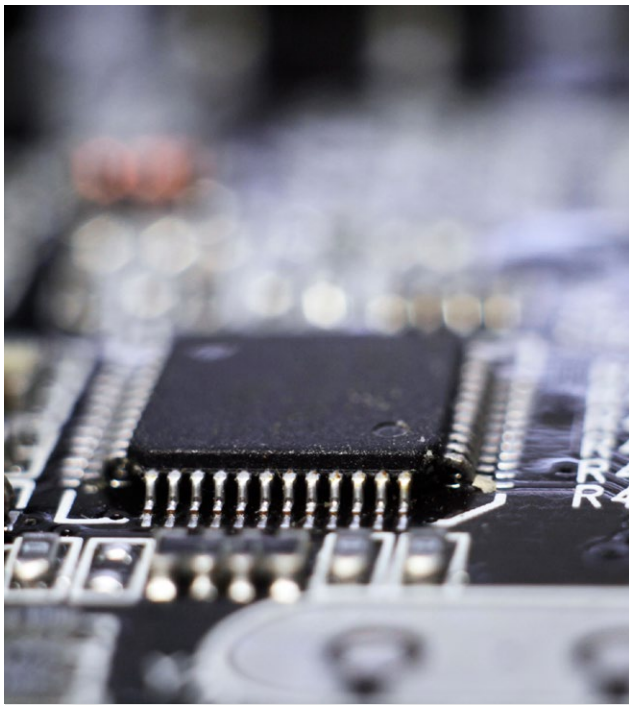
AUTOMOTIVE GLASS

Highly popular technologies such as head-up displays have increased the need for accurately shaped high-quality windshields. The lightweighting trend is another reason for the necessity of quality control, as thinner multi-layer glasses still have to fulfill all safety requirements. Typical state-of-the-art windshields contain a plastic foil between two layers of glass.

As our interferometric sensors are capable of resolving all the desired curvatures and thicknesses of all the above-mentioned layers, this technology is superior to tactile sensors. Thanks to the large measuring range and excellent axial resolution our CHRocodile IT products measure thick and highly tinted glasses with excellent precision and without touching any surface.

AUTOMOTIVE COATINGS

Thickness inspection of a conformal coating – created by spraying a dielectric material onto a device component to protect it from moisture, dust, corrosion and other environmental stresses – is necessary to guarantee 100% protection. As these coatings are so thin, our interferometric technology is used to measure their thickness. Our CHRocodile IT products ensure rapid throughput, minimum cycle times and high product volumes in high-precision applications.



PLASTICS

Our dedicated interferometric sensors deliver the thickness and topography values required for various types of plastic foils, containers and PET bottles. This flexibility is very handy, especially during foil production, as different machine parameters can be adjusted instantaneously based on the sensor's values. The infrared light source enables the thickness of different kinds of even optically non-transparent or completely opaque plastics to be measured.

PIONEERS IN INTERFEROMETRY – WHY PRECITEC OPTRONIK STANDS OUT

As an innovation-driven sensor technology specialist for industrial and scientific applications, Precitec Optronik has been developing and manufacturing interferometric sensors for decades. With around 12% of our total turnover spent on research and development (R&D) we employ 25 - 30 R&D specialists in an overall workforce of around 100. Through listening closely to what our customers tell us, we can apply our R&D expertise to develop products that meet their precise needs. And by reacting quickly to our customers' needs, we can apply our R&D expertise to develop products of great interest to several industries. Our experience in the field of interferometry has resulted in developments such as the Area Scan Probe (Flying Spot Scanner), a pioneering point-of-interest area probe featuring a technology that is unmatched in the sensor industry.

UNPARALLELED PRODUCT PORTFOLIO

To meet your needs in high-precision interferometric sensor technology, we offer:

- Point inspection
- Area inspection with a scanning diameter of up to 80 mm
- Probes for special applications, e.g. acid-proof, water-proof or compact spacers
- OEM supplier

STANDARD-SETTING CUSTOMER SUPPORT

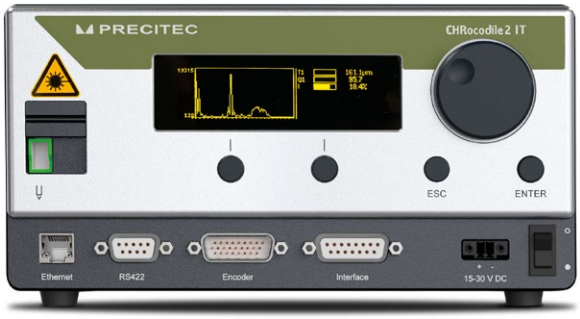
We are not just in the business of selling interferometric measuring equipment. Our goal is to sustainably support your business through the entire lifecycle of our products. That is why we strongly invest in standard-setting customer support via a global sales and service team made up of highly qualified and experienced engineers. For us, 360° customer service and support means:

- Finding solutions for your measuring task through dedicated R&D
- Running test measurements on your samples in five application labs worldwide
- Supporting you in on-site tests
- Providing software and mechanical support to facilitate the integration of our sensors into your production processes

CHROCODILE IT POINT SENSORS – UTMOST PRECISION, HIGH FLEXIBILITY

Precitec Optronik has used its decades of experience to develop a large variety of interferometric controllers and probes with a broad spectrum of infrared light sources. Their flexibility makes them suitable for a wide range of non-destructive measurement applications – from thin to thick materials and small to large measuring areas.

The thickness of coated or layered materials is measured from one side in a measuring range of 0.6 - 15,000 µm and a working distance tolerance of almost 100 mm. Their high measuring speed makes these devices perfectly suitable for inline applications, while an integrated pilot laser greatly simplifies the alignment process of the sensor with respect to the measuring sample.



HOW YOU BENEFIT

- Efficiency: Cost- and time-efficient, precise, rapid, non-contact measurements
- Universal: Measures distance and thickness on all surfaces inline and offline with high lateral resolution
- User-friendly and safe: Robust and simple to integrate into production lines for non-destructive measurement
- Automatic light control and pilot laser

PRODUCT OVERVIEW

	CHRocodile 2 IT	CHRocodile 2 IT RW	CHRocodile 2 IT DW
Measuring range	CHR 2 IT 500: 38 µm - 4300 µm CHR 2 IT 1000: 64 µm - 7500 µm CHR 2 IT 1300: 87 µm - 10000 µm CHR 2 IT 1700: 114 µm - 12600 µm	CHR 2 IT RW 500: 44 µm - 4900 µm CHR 2 IT RW 1000: 57 µm - 6400 µm	CHR 2 IT DW 250: 15 µm - 1800 µm CHR 2 IT DW 500: 29 µm - 3000 µm CHR 2 IT DW 1000: 66 µm - 7600 µm
Measuring rate	up to 70 kHz	up to 70 kHz	up to 70 kHz
Main application	wafers, (semi-)transparent plastics	rough wafers, nearly opaque plastics	doped & highly doped wafers, measurements in liquids

	CHRocodile 2 IT HDW	CHRocodile 2 IT HTW	CHRocodile 2 IT LR	CHRocodile 2 K
Measuring range	CHR 2 IT HDW 250: 15 µm - 1800 µm CHR 2 IT HDW 500: 29 µm - 3000 µm	4 µm - 200 µm	16 µm - 2200 µm	up to 1500 µm
Measuring rate	up to 4 kHz	up to 4 kHz	up to 70 kHz	up to 4 kHz
Main application	doped & highly doped wafers, measurements in liquids	thin wafers, thin foils, coatings, adhesives	high lateral resolution/ small spot size, roughness measuring	plastics/ plastic foils

OPTICAL PROBES THAT SIMPLY SEE FURTHER

FLYING SPOT SCANNER

Precitec Optronik's latest optical probe, the Flying Spot Scanner (FSS), enables high-speed OCT imaging for thickness and topography combinable with all CHRocodile 2 IT sensors. The FSS features pioneering one-of-its-kind technology enabling high-speed non-contact area inspection for inline and offline quality assurance and 3D measurements on a wide range of materials and surfaces.

Point-of-interest (POI) inspections have never been simpler thanks to freely definable scan shapes and filters. The integrated software enables you to set up your application easily. You simply define your own measurement procedure by creating a list of areas of interest. The CHRocodile 2 IT sensor stores the customized procedure and automatically controls the probe, while the software visualizes the results and the statistics.

HOW YOU BENEFIT

- High-speed in motion inspection for inline and offline quality control
- Freely definable scan shapes and filters
- Telecentric imaging for best results on all surfaces
- Replacement of x,y motion stages

INTERFEROMETRIC OPTICAL PROBES

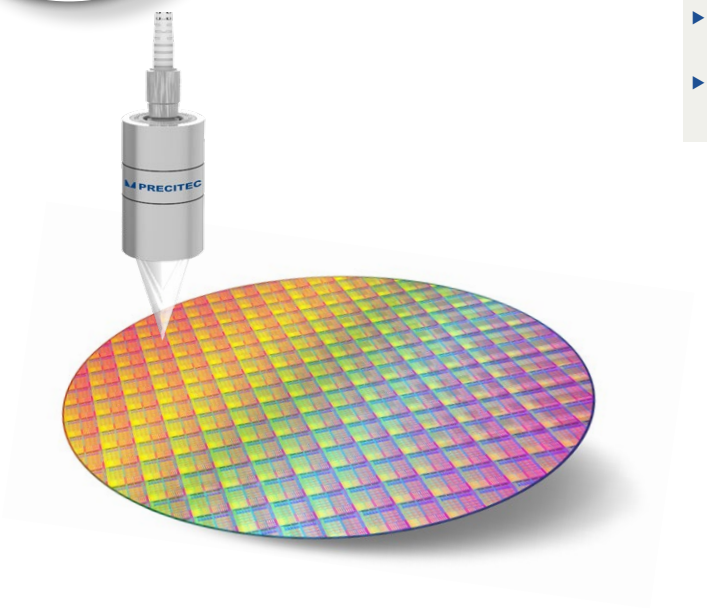
Our expertise in the field of optics has enabled us to develop high-precision optical probes that deliver excellent performance for interferometric distance and thickness measurements.

Thanks to the very small spot size we reach lateral resolutions down to a few µm, which allows even small and complex structures to be accurately measured.

The small dimensions of the interferometric probes and the possibility to choose between working distances of 40 mm and 100 mm ensure the probes are easy to integrate, even in production environments with tight spatial requirements. Both optical probes are, of course, compatible with all interferometric CHRocodile sensors.

CHROCODILE 2 SENSOR – THE EYES THAT SEE MORE

Our white-light interferometry takes you beyond the limits of confocal chromatic technology to measure the thickness of thin, transparent layers, e.g. coating, varnish, silicone or transparent films in the 2 - 180 µm range. Another unique feature of these white-light interferometric sensors is that users can switch from one scanning technology to another – a standard feature at Precitec but not available in competitors' products.



CHROCODILE 2 S/2 SE

HOW YOU BENEFIT

- The allround sensor for non-contact distance and thickness measurements
- High speed at up to 66,000 measurements per second
- Simple to integrate into product lines, maintenance-free and robust
- CHRocodile 2 SE option designed for use of high-intensity external light sources for high-speed measurements

CHROCODILE 2 S HS

HOW YOU BENEFIT

- Designed for a maximum signal-to-noise ratio
- Extraordinarily high dynamic response at up to 4,000 measurements per second
- Specially designed for measuring surfaces with differing reflectivity and high incident angles
- Simple to integrate into product lines, maintenance-free and robust

WHERE YOU CAN PROFIT FROM OUR KNOW-HOW

In a wide variety of industries our interferometric products are giving customers clear competitive advantages and making a decisive difference in the industries listed below. If your industry features here, get in touch with us to find out how we can help to enhance your efficiency and make you more competitive.

- ▶ CONSUMER ELECTRONICS
- ▶ SEMICONDUCTOR INDUSTRY
- ▶ GLASS INDUSTRY
- ▶ COORDINATE MEASURING MACHINES (CMM)
- ▶ PLASTIC AND RUBBER PROCESSING
- ▶ MEDICINE
- ▶ AUTOMOTIVE
- ▶ MACHINE TOOLS
- ▶ PHOTOVOLTAICS
- ▶ FINE MECHANICS
- ▶ TOOL MANUFACTURING
- ▶ AEROSPACE

PRECITEC

EUROPE

GERMANY /
HEADQUARTER

Precitec Optronik GmbH
Schleussnerstraße 54
63263 Neu-Isenburg
Phone:+49 (0)6102 3676 100
Fax:+49 (0)6102 3676 126
info@precitec-optronik.de
www.precitec-optronik.com

FRANCE

Precitec France Sarl
Les Carrés du Cengle Bât E
Chemin de la Muscatelle
13790 Châteauneuf-le-Rouge
Phone:+33 (0)442 502 303
contact@precitec.fr
www.precitec.fr

ISRAEL

KBZ Technologies LTD
4 Imanuel Kozidalo st.
49387 Petach Tikva
Phone:+972 (0)54 2644 015
kobi@kbztechnologies.com
www.kbztechnologies.com

ITALY

Precitec Vision GmbH & Co. KG
Rotfarb 3
8413 Neftenbach
Phone:+41 (0)52 5441 200
Fax:+41 (0)52 5441 209
Italy@precitec.de
www.precitec.ch

A.B. Esse spa
Service Partner / End Customer
Via Larga, 15/8
40138 Bologna
Phone:+ 39 (0)51 515508
Fax:+ 39 (0)51 4202473
info@abesse.com
www.abesse.com

UNITED KINGDOM /
IRELAND

Armstrong Optical Ltd
31 Caxton House Northampton
Science Park, Kings Park Rd
NN6 3LG Northampton
Phone:+44 (0)1604 654220
Fax:+44 (0)1604 654221
iar@armstrongoptical.co.uk
www.armstrongoptical.co.uk

SWITZERLAND

Precitec France Sarl
Les Carrés du Cengle Bât E
Chemin de la Muscatelle
13790 Châteauneuf-le-Rouge
Phone:+33 (0)442 502 303
contact@precitec.fr
www.precitec.fr

CZECH REPUBLIC

Safibra s.r.o.
Cernokostelecka 1621
251 01 Ricany
Phone:+420 323 601615
Fax:+420 323 606007
ladislav.sasek@safibra.cz
www.safibra.cz

ASIA

CHINA

Precitec Laser Technologies (Shanghai) Co., Ltd.
No.558 Chuantu Road, Building No.6
Chuansha Town, Pudong New Area
201202 Shanghai
Phone:+86 21 64955366
Fax:+86 21 50718558
CHR_sales@precitec.cn
www.precitec.de/cn

JAPAN

Precitec Japan Ltd.
5-1-11 Osaki, Shinagawa-ku
141-0032 Tokio
Phone:+81 (3) 6420 3955
Fax:+81 (3) 6420 3977
precitec@precitec.de
www.precitec.de/jp/

SOUTH KOREA

Precitec Korea
#703, Mapo Tower 41
Mapo-daero 4da-gil
Mapo-dong, Mapo-gu
04177 Seoul
Phone:+82 (0)2 711 2275
Fax:+82 (0)2 711 2276
k.kim@precitec.co.kr
www.precitec.co.kr

SANTEC
#M-1001, Songdotechnopark IT
Center,
32, Songdogwahak-ro, Yeonsu-gu
21984 Incheon
Phone:+ 82 (0)32 812 1162
Fax:+82 (0)32 209 8066
trade@santec.co.kr
www.santec.co.kr

TAIWAN

Precitec Asia Ltd.
SHOWROOM
11F.-2, No.79, Sec. 2, Shuangshi Rd.
Banqiao Dist.
New Taipei City 220, Taiwan (R.O.C.)
Phone: + 886 2 22542503
a.lin@precitec.tw
www.precitec.com

AMERICA

USA

Precitec Inc.
28043 Center Oaks Ct.
Wixom, MI 48393
Phone:+1 (248) 446 8100
Fax:+1 (248) 446 9409
sales@precitec.com
www.precitec.com

CANADA

Precitec Inc.
28043 Center Oaks Ct.
Wixom, MI 48393
Phone:+1 (248) 446 8100
Fax:+1 (248) 446 9409
sales@precitec.com
www.precitec.com

Hoskin Scientifique Limitée
300 Stinson
QC, CANADA H4N 2E7 Saint-Laurent
Phone:+1 (514) 735-5267
Fax:+1 (514) 735-3454
glabrie@hoskin.ca
www.hoskin.qc.ca