

ATR

Golden Gate™ ATR

The Golden Gate™ single reflection ATR is the world's most versatile infrared sampling system.

It analyzes all sample types from hard solids to corrosive liquids and is fast, sensitive and robust.

Outstanding sensitivity is achieved using high pressure contact against a solid, type IIIa diamond, selected for its unparalleled sensitivity as a single reflection ATR element together with its unique physical and chemical stability.

The accessory can be used to analyze a range of samples from single particles and fibers to corrosive liquids. While the large working area sample platform is ideal for macro sampling.

The diamond is high temperature bonded into its tungsten carbide mount, giving performance and strength to withstand the high pressures required for maximum optical contact with hard samples.

The quick lock and release bridge allows for fast sample change around. The built-in pressure control mechanism means reproducible results are obtainable and optimum sample clamping is achieved.

Applications

- QA on pharmaceutical powders
- Analysis of hard and soft polymer pellets
- Forensic sampling, paint chips and single fibres
- Hard samples, e.g. rock and geochemicals
- Corrosive liquids
- Coated wires
- Air sensitive samples



Product Highlights

- High sample throughput - no sample preparation
- Rugged type IIIa diamond ATR metal-bonded into a tungsten carbide mount
- Hard, inert, sapphire self-levelling pressure anvil
- Pressure bridge for highest sensitivity
- Wide choice of available options
- Quick release bridge with safety interlock
- Built-in pressure control for reproducible results

Illustrations, descriptions and specifications in this datasheet were correct at the time of going to press. However, Specac's policy is one of continuous product development and we reserve the right to change descriptions and specifications at any time.

For the latest details please contact your local Specac office or representative.

ATR

Golden Gate™ ATR

Schematic of the Golden Gate™ Single Reflection ATR System

The Top-plates of the Golden Gate™ Single Reflection ATR Series are supplied on an optical unit which contains mirrors and a choice of beam condensing optics (ZnSe or KRS-5). All Top-plates are interchangeable with the optical unit.

A schematic is shown opposite of the beam path through the Golden Gate™ optical system. The symmetrical design coupled with the use of the Benchmark™ base-plate system means that the Golden Gate™ can be used in most commercially available FTIR instruments.

Reproducibility and Sensitivity of the Golden Gate™ Single Reflection ATR System

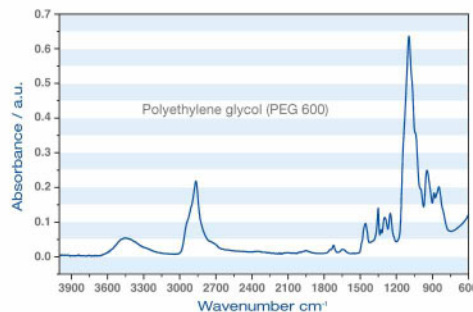
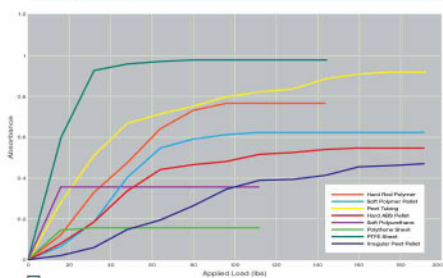
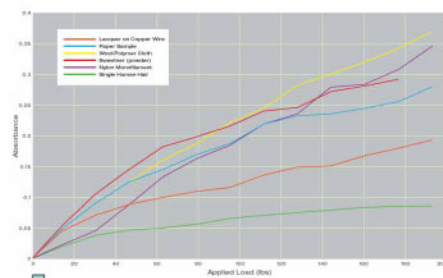
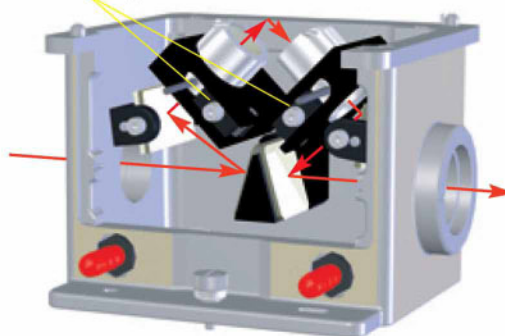
A key feature of the Golden Gate™ Single Reflection ATR System is the outstanding contact achievable with solid samples to the diamond crystal.

As the load is increased via the bridge clamping mechanism and optical contact between the diamond and the sample increases, there is a critical load at which the optimum optical contact is achieved. Thereafter, no increase in absorbance intensity is possible and maximum sensitivity of the measurement is achieved.

With accessories capable of applying only small loads there is uncertainty as to whether the maximum optical contact has been achieved. Therefore, sensitivity for the technique is also compromised. In addition, until optimum contact is achieved, there is no control over experimental reproducibility.

Low load measuring devices on low load ATR units are not sensitive to changes in the sample properties under applied load. The unique high load capability of the Golden Gate™ Diamond ATR ensures that maximum sensitivity is achieved reproducibly.

Beam Condensing Lenses



ATR

Golden Gate™ ATR

Germanium Top-plate

Traditionally difficult samples, such as those containing high concentrations of carbon black, require controlled penetration of the infrared beam. The high refractive index of germanium makes this ATR material an ideal choice for these samples. Optimum sensitivity is achieved using a 4mm x 4mm germanium crystal cemented into a rugged stainless steel disc for maximum strength and support.

The shallow depth of penetration with no band distortion overcomes difficult quantitative analysis of strongly infrared absorbing materials. Similarly, corrosive samples, thin films and surface coatings can also be analyzed.

Applications

- Very strongly absorbing polymers and rubbers
- Thin films on semi-conductors and other substrates
- Surface coatings
- Corrosive liquids
- Macro and micro sample volumes
- Forensic Science

Anvil Options

A variety of special anvils are available for use with the Golden Gate™ Top-plates. The use of an appropriate anvil improves the sample handling capabilities of the Golden Gate™ Single Reflection System.

1 Reactive Sample Anvil

Samples which are sensitive to air or moisture can be loaded and pressed in a dry box. The anvil has a seal which compresses as the sample is pressed, thus keeping it in an inert environment while the spectrum is being run.

2 & 5 Grooved Anvils (Narrow & Wide)

To study the coating on transformer wire the grooved anvils hold the wire exactly in the middle of the diamond

3 Sapphire Anvil

This is the standard anvil use for most sample types. It has the advantage of being very hard, and easy to clean to prevent sample carry-over. It is also self-levelling to accommodate non-flat samples.

4 Stainless Steel Flat Anvil

This is used for fibers or fine wires. It is not self-levelling, which can be an advantage with this type of sample.

Features

- 45° single reflection germanium crystal
- 4mm x 4mm cement bonded stainless steel mount
- Working range 5000-550 cm⁻¹
- Pressures up to 2 kbar
- High throughput
- Good chemical resistance
- Suitable for use with DTGS detectors
- Full compatibility with Golden Gate™ ATR series



6 Pellet Anvil

Polymer pellets are held firmly in position with this concave anvil. With a flat anvil they could move when pressure is applied.

7 Volatiles Cover

If liquid samples are very volatile the cover is useful to minimize evaporation.

8 View-Thru Anvil

The View-Thru Anvil allows the sample to be viewed through a 4x lens system with built-in reflective illuminator.

9 Flow-Thru Anvil

This micro flow cell anvil seals under pressure around the diamond. It's volume is 28 microlitres and it can operate at 1000 psi. It may be used as a flow cell or as a micro reaction chamber.

ATR

Golden Gate™ ATR

Ordering Information

Complete Golden Gate™ ATR System

GS10500	Golden Gate™ ATR with Diamond Top-plate and ZnSe Lenses
GS10515	Golden Gate™ ATR with Diamond Top-plate and KRS-5 Lenses
GS10516	Golden Gate™ ATR with Germanium Top-plate
GS10523	Golden Gate™ ATR with Micro Specular Reflectance Top-plate
GS10524	Golden Gate™ ATR with Wire Holder Top-plate
GS10525	Golden Gate™ ATR with Reaction Cell Diamond Top-plate
GS10542	Golden Gate™ ATR with Heated Top-plate (200°C)
GS10586	Golden Gate™ ATR with Supercritical Fluids Diamond Top-plate
GS10592	Golden Gate™ ATR with Low Temperature Top-plate (-150°C)
GS10642	Golden Gate™ ATR with High Temperature Top-plate (300°C)

A complete Golden Gate™ ATR Mk II System consists of an Optics Unit with Lenses, Top-plate, Benchmark™ Baseplate and purge Bellows. Please specify Spectrometer and model, also specify voltage and country of use for controllers

Anvil Options

GS10503	Volatiles cover
GS10531	Sapphire anvil
GS10532	Pellet anvil
GS10536	Reactive sample anvil
GS10547	Grooved anvil - narrow guage
GS10548	Grooved anvil - wide guage
GS10549	Stainless steel flat anvil
GS10567	Large stainless steel anvil for Germanium Top-plate
GS10568	Micro Reaction / Flow Cell anvil
GS10569	View-Thru anvil / bridge assembly

Top-plate Options

GS10563	Diamond Top-plate
GS10566	Germanium Top-plate
GS10514	Micro Specular Reflectance Top-plate
GS10565	Wire Holder Top-plate
GS10507	Reaction Cell Diamond Top-plate
GS10540	Heated Top-plate (200°C)
GS10585	Supercritical Fluids Diamond Top-plate
GS10590	Low Temperature Top-plate (-150°C)
GS10640	High Temperature Top-plate (300°C)

Please specify voltage and country of use for controllers

Other Spares and Options

GS10552	ZnSe lens upgrade kit 6500 - 650cm ⁻¹
GS10508	KRS-5 lens upgrade kit 6500 - 400cm ⁻¹
GS10707	Purge bellows
GS10550	Golden Gate™ ATR Accessories Essential Spares Kit
GS10527	Golden Gate™ Microspecular ATR Essential Spares Kit
GS10528	Golden Gate™ Reaction CellATR Essential Spares Kit
GS10529	Golden Gate™ Supercritical Fluids ATR Essential Spares Kit
GS28000	RS232 Connection kit
GS28001	USB Connection kit
GS28002	RS485 Connection kit
GS12510	Benchmark™ polarizer mount