



# In tune with your DNA evidence

Automate crime solving with  
QIASymphony® SP/AS



Sample to Insight

## Process case samples with minimum effort and maximum results

Working in a busy forensic laboratory, you know better than anyone else about the significant challenges faced in adhering to stringent and required standards. Laboratories like yours need the flexibility to process batches of multiple sample types with the highest possible quality standards and unquestioned first-pass success rates, while maintaining cost and throughput within defined limits. To meet the need of modern forensic laboratories, we have designed the QIASymphony SP/AS to ensure that the effort involved in processing valuable case samples is kept to a minimum. Now you can spend less time processing your case samples and more time adding value to the DNA analysis process.

The QIASymphony SP (sample prep) module streamlines and automates sample purification, taking crude lysates and delivering PCR-ready DNA. Continuous loading of up to 4 batches of 24 samples and optimized protocols for different sample types provide a high level of flexibility, while delivering reproducible results you can rely on. Downstream assay setup is integrated and automated by the QIASymphony AS (assay setup) module. For normalization of DNA, assay setup for real-time quantification, or STR PCR, the QIASymphony AS module minimizes the need for tedious and error-prone manual pipetting steps and ensures accurate and reproducible results every time.



### QIASymphony SP/AS provides:

- Sample preparation for as many as 4 x 24 batches
- Flexible input formats of tubes and plates for up to 96 samples
- Normalization and PCR assay setup
- Built-in touchscreen and software for step-by-step sample preparation and assay setup
- Easy-to-use, prefilled reagent cartridges
- Liquid-level detection, active cooling and UV lamp for decontamination
- Applications for QIAGEN Investigator® Kits and in-house assays
- Protocol customization service and support
- Quality assurance using QIAGEN's forensic-grade kits
- Installation, IQ/OQ documentation and validation support

\* Not available in all countries; please inquire.



## Have confidence in your results with our Forensic Grade products

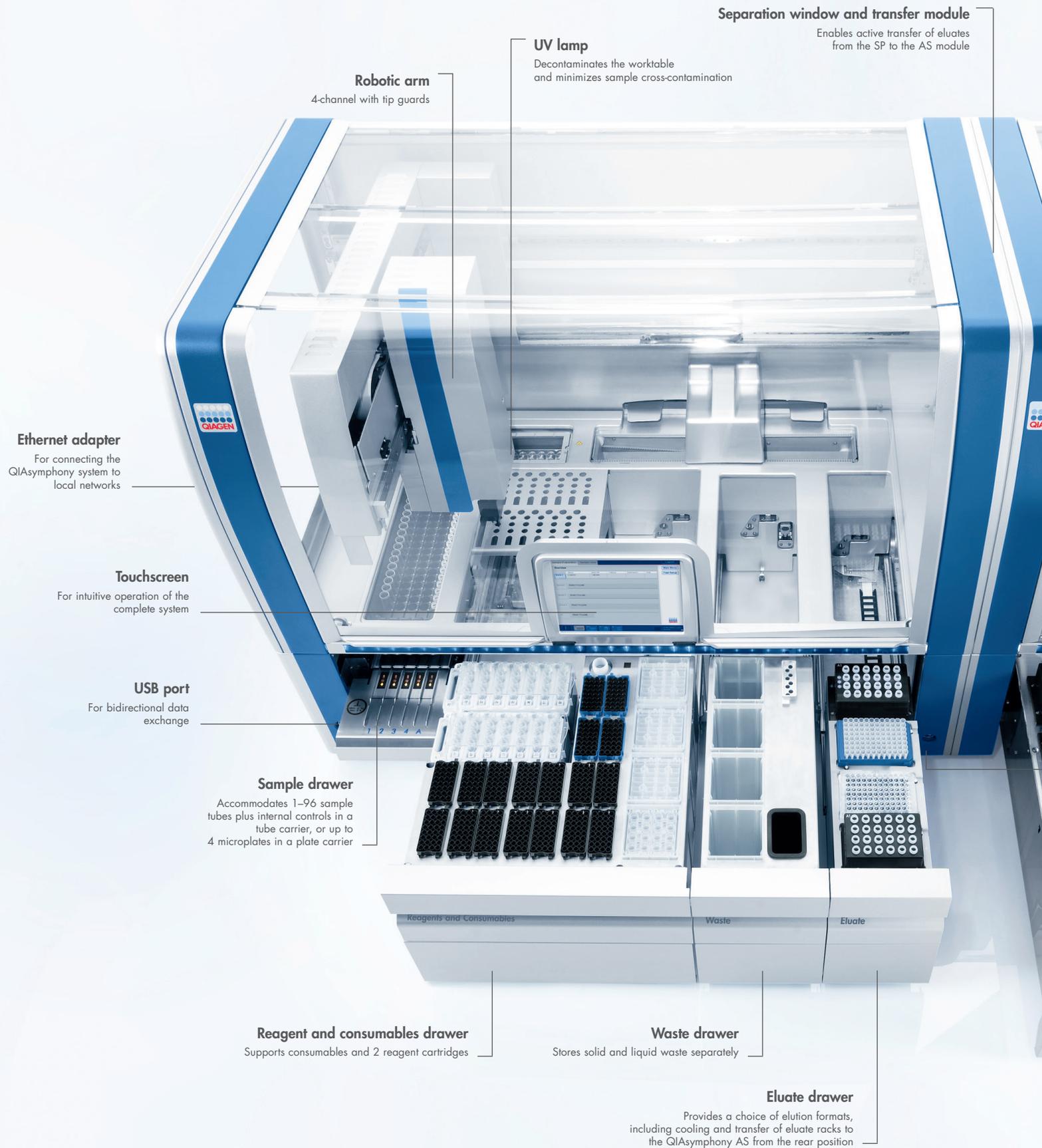
Our Forensic Grade labels indicate quality assurance and our dedication to the strictest quality control measures for human ID and forensic testing. The entire Investigator product line meets the Forensic Grade Quality standard, which includes:

- Production in clean room environments
- Automated manufacturing and EO treatment where possible
- Testing for absence of human DNA post production
- Contamination exclusion database service
- Certificate of analysis
- Product validation according to SWGDAM and ENFSI

QIAGEN is also an active contributor at the International and German organizations for standardization (ISO and DIN) that work towards implementing international standards. Our commitment to the highest possible quality levels allows you to have confidence in your results.



For more information visit: [www.qiagen.com/forensicgrade](http://www.qiagen.com/forensicgrade).



**Separation window and transfer module**

Enables active transfer of eluates from the SP to the AS module

**UV lamp**

Decontaminates the worktable and minimizes sample cross-contamination

**Robotic arm**

4-channel with tip guards

**Ethernet adapter**

For connecting the QIAAsymphony system to local networks

**Touchscreen**

For intuitive operation of the complete system

**USB port**

For bidirectional data exchange

**Sample drawer**

Accommodates 1–96 sample tubes plus internal controls in a tube carrier, or up to 4 microplates in a plate carrier

**Reagent and consumables drawer**

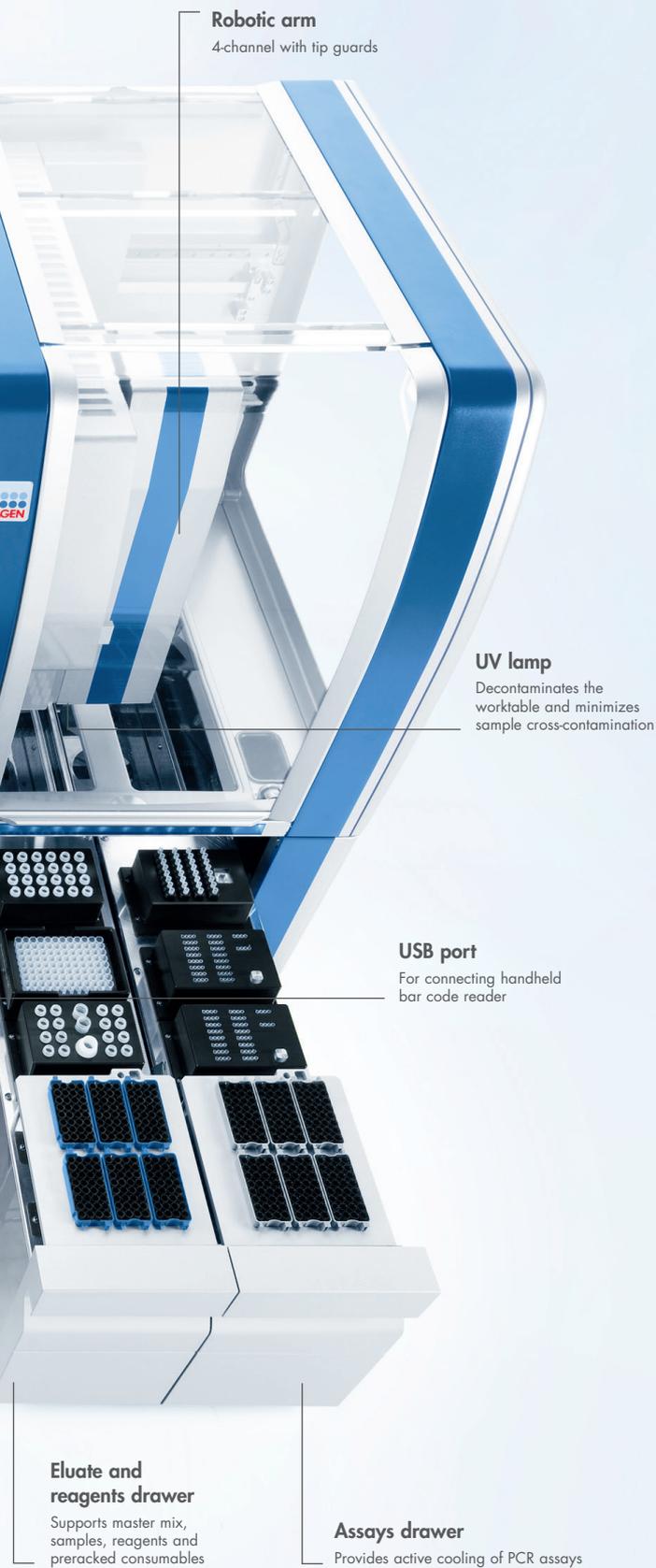
Supports consumables and 2 reagent cartridges

**Waste drawer**

Stores solid and liquid waste separately

**Eluate drawer**

Provides a choice of elution formats, including cooling and transfer of eluate racks to the QIAAsymphony AS from the rear position



**Robotic arm**  
4-channel with tip guards

**UV lamp**  
Decontaminates the worktable and minimizes sample cross-contamination

**USB port**  
For connecting handheld bar code reader

**Eluate and reagents drawer**  
Supports master mix, samples, reagents and preracked consumables

**Assays drawer**  
Provides active cooling of PCR assays

## Unmatched flexibility

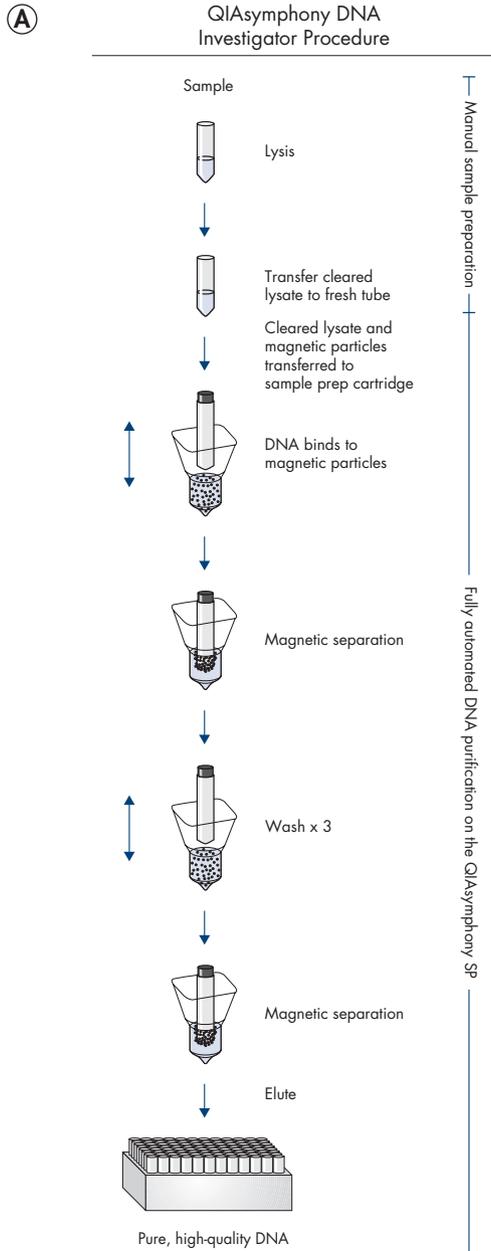
- 1–96 samples processed in each run
- Sample volumes up to 1 ml
- Supports a variety of sample tubes, microplates and blocks
- Continuous loading in batches of up to 24 samples
- Ability to run different protocols for each batch
- Elution in either tubes or 96-well plates

## Optimized workflow

- Higher sample throughput per day
- Saves precious primary samples
- Optimal batch-to-batch reproducibility
- Standardized process permits global comparability of results
- Laboratory information management systems (LIMS) compatibility
- User management for record of responsibility

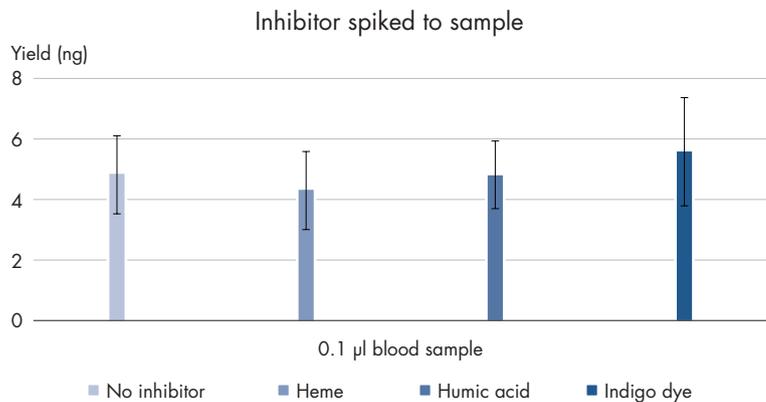
## Convenience

- Eluate splitting for different analysis panels
- Minimization of cross-contamination
- Active cooling of reagents and eluates
- Automatic inventory scanning
- Effective UV worktable decontamination
- Bar code reader for exact sample tracking



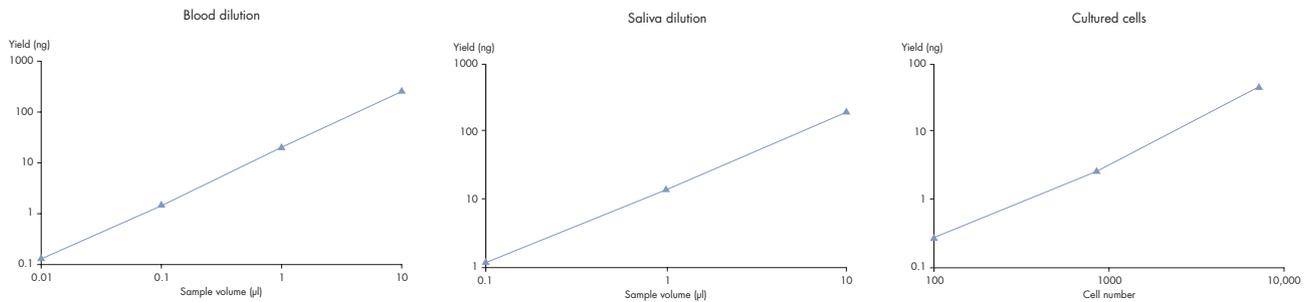
## Standardize sample preparation and analysis with our cutting-edge QIASymphony system

QIAGEN provides you with everything you need to standardize and fully automate your routine sample preparation and analysis workflow. The QIASymphony DNA Investigator Kit enables automated purification of genomic DNA from 1–96 samples on the QIASymphony SP. This dedicated procedure (Figure 1) combines the speed and efficiency of silica-based purification of genomic and mitochondrial DNA with the convenient handling of magnetic particles. With the QIASymphony DNA Investigator Kit, high concentrations of commonly encountered PCR inhibitors (Figure 2) are effectively removed, enabling sample preparation of DNA from a wide range of typical forensic samples including blood, saliva and cellular material (Figure 3). By making automation of such a wide range of samples possible, the QIASymphony SP and the QIASymphony DNA Investigator kit can save you time and money, while maintaining the high success rates required for such important samples.



**Figure 2. Effective removal of PCR inhibitors.** PCR inhibitors (2.5 µg heme, 0.6 µg humic acid and 125 µg Indigo dye) were spiked into a 0.1 µl blood sample. Samples were processed using the QIASymphony DNA Investigator Kit and the Casework 200 µl protocol. No inhibitory effects were detected as quantified by real-time PCR.

**Figure 1. QIASymphony SP sample purification.** **A.** Flowchart of the QIASymphony DNA purification procedure, using magnetic particles. **B.** Close up of the QIASymphony SP black magnetic rods, protected by Rod Covers, moving into the purification solution in the Sample Prep Cartridge to remove the magnetic beads.



**Figure 3. DNA yields from blood, saliva and cultured cells show a linear correlation with input sample amount.** Sample dilutions were purified using the Casework 200 µl protocol. DNA was eluted in 50 µl ATE buffer and quantified by real-time PCR.

## Save time and costs with our easy-to-use reagent cartridges

The QIAasymphony Investigator DNA Kit is safe and exceptionally easy to use. Ready-to-run, bar code-labeled reagent cartridges are prefilled with all reagents required for the purification procedure, including accessory enzymes. Workable setup is rapid and saves you valuable time. Simply place up to two reagent cartridges in the QIAasymphony drawer. Reagent cartridges are then automatically opened by the instrument and only reagent volumes sufficient for the selected number of samples are used, giving you complete cost control.

## Improve crime case turnaround times with flexible sample processing

The QIAasymphony SP enables flexible loading of new samples during a run, with continuous loading in batches of up to 24 samples including internal controls. Each batch can be assigned a different protocol, depending on the requirements of the samples in each batch, ensuring the highest success rates. In addition, by streamlining the laboratory's DNA purification efforts, it is possible to batch multiple cases more effectively. For example, property crime or sexual assault samples can be processed together, improving turnaround times for both serious and volume crime cases.

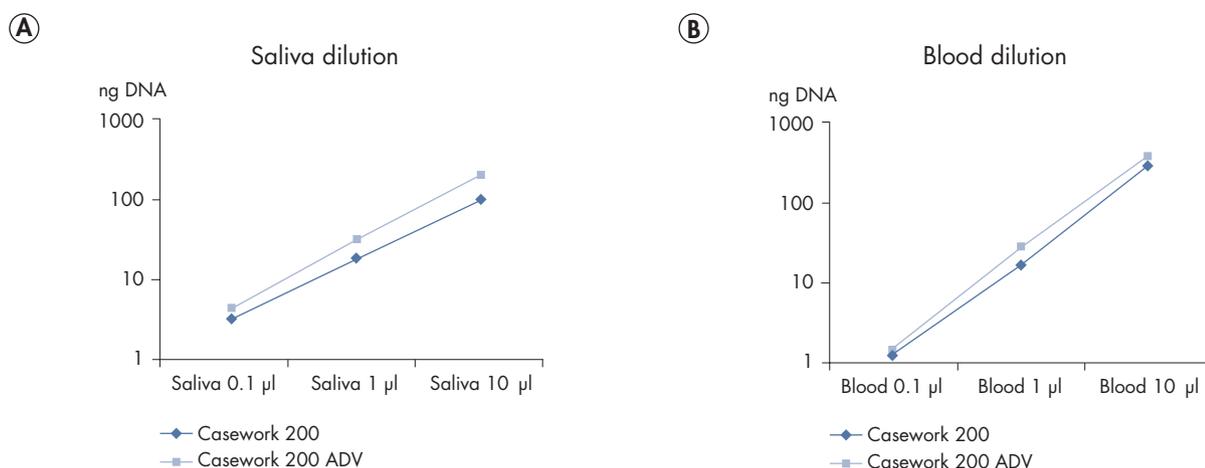
For further information on sample preparation using the QIAasymphony SP instrument, in combination with the QIAasymphony DNA Investigator Kit, watch our webinar "Successfully overcoming challenges in forensic sample preparation" at [www.qiagen.com/forensics-webinar](http://www.qiagen.com/forensics-webinar).



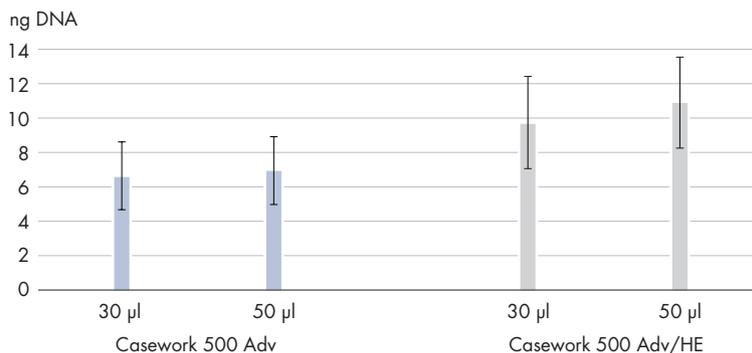
## Maximize DNA yield from the most difficult case samples

QIAGEN has developed protocols that meet the specific challenges of forensic samples, ensuring the highest possible first-pass success rates. Advanced protocols (ADV) use a heated binding step and increased binding time to maximize yields of pure DNA from some of the most difficult samples (Figure 4). High Efficiency (HE) protocols address the challenge of recovering sufficient DNA from touch samples and other low-template samples. TopElute Fluid

used in these protocols also enables elution of DNA in as little as 30  $\mu$ l, minimizing dead volumes and maximizing sensitivity for these difficult samples (Figure 5). Protocols are ready to use upon QIAAsymphony installation and enable flexible lysis volumes, allowing scientists to apply appropriate volumes for whichever sample types they are processing. The full range of forensic protocols is described in Table 1.



**Figure 4. Improved DNA yields using the Casework Advanced protocol.** A. Series of saliva or B. blood dilutions (4 replicates each) were purified using the Advanced protocol (Casework 200 ADV), which includes a heated and prolonged binding step, or the standard protocol (Casework 200). The Investigator Quantiplex™ Kit was used for DNA quantification.



**Figure 5. Increased DNA recovery with small elution volumes.** Blood samples of 1  $\mu$ l were purified in elution volumes of 30  $\mu$ l and 50  $\mu$ l using the Casework 500 ADV protocol and the Casework 500ADV/HE protocol, which includes an oil overlay. The Investigator Quantiplex Kit was used for DNA quantification.

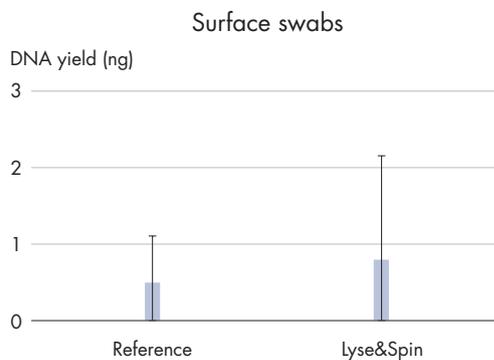
Table 1. QIAGEN's high efficiency forensic protocols

Protocol	Lysis volume options	Enhanced binding	Eluate volume	TopElute Fluid
Reference	200, 500 $\mu$ l	No	100–400 $\mu$ l	No
Casework	200, 500, 1000 $\mu$ l	No	100–200 $\mu$ l	No
Casework ADV	200, 500, 1000 $\mu$ l	Yes	100–200 $\mu$ l	No
Casework HE	200, 500, 1000 $\mu$ l	No	30–80 $\mu$ l	Yes
Casework HE ADV	200, 500, 1000 $\mu$ l	Yes	30–80 $\mu$ l	Yes

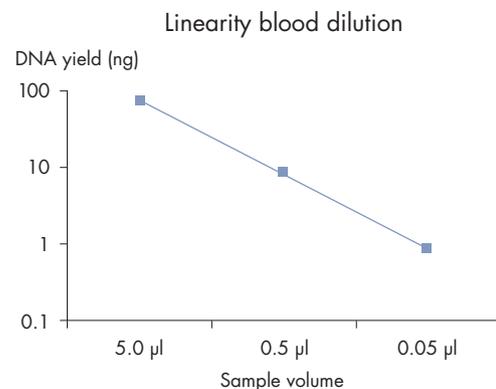
## Combine sample lysis and separation in one simple procedure

The Investigator Lyse&Spin Basket Kit can be used for pretreatment of forensic samples in combination with the QIASymphony DNA Investigator Kit. It permits the combination of sample lysis and separation of solid sample substrates in one simple procedure. Due to its pre-assembled configuration, there is no need for tedious handling steps during sample transfer, resulting in increased process safety.

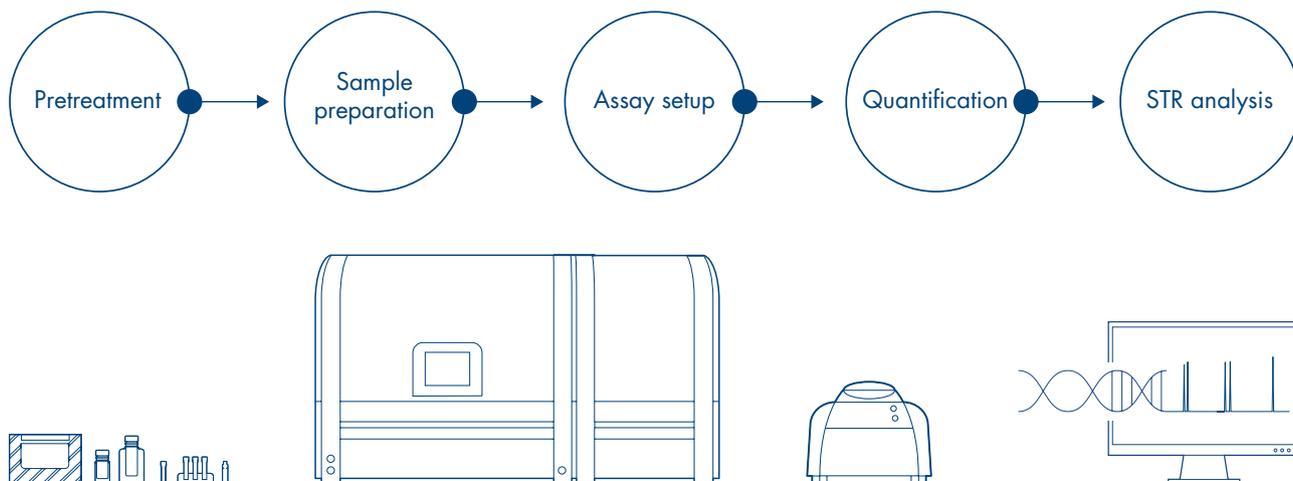
This procedure can be used for swabs, pieces of fabric or leather, paper, cigarette butts, chewing gum, small tapes or other sample types. DNA yields are increased by using the Lyse&Spin Basket Kit and correlate with the amount of sample used for purification (Figures 6–7).



**Figure 6. Higher DNA yields.** Surface swabs taken from different computer keyboards were analyzed. Purification was carried out using the QIASymphony SP with the Investigator Casework 500 ADV protocol, and 50  $\mu$ l elutions. The Investigator Quantiplex Kit was used for quantification of human DNA. Deviations were due to donor-to-donor and sample-to-sample variation (n=12).



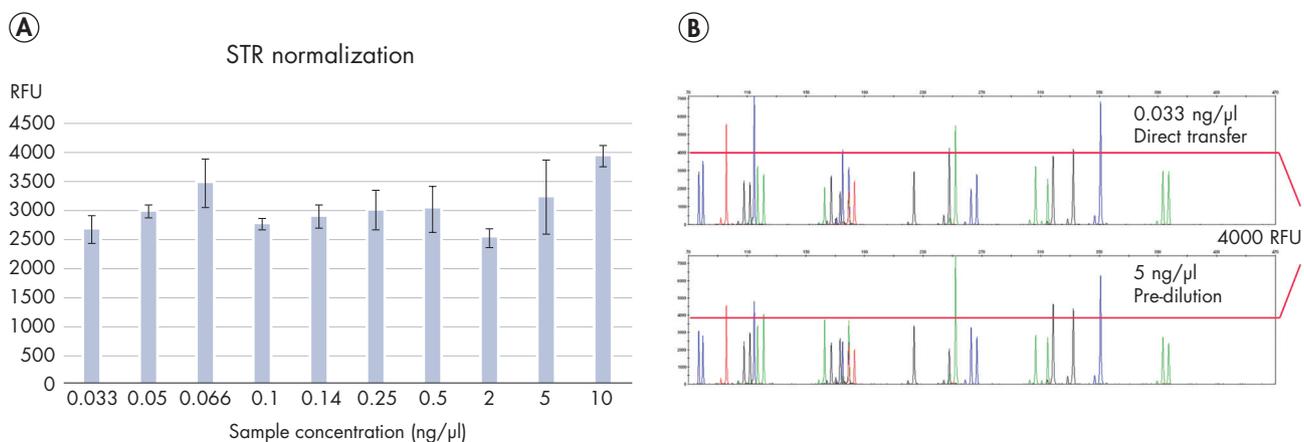
**Figure 7. Linear correlation of sample and yield.** Lysis and filtration of blood samples was performed using the Investigator Lyse&Spin Basket Kit. Purification was carried out on the QIASymphony SP with the Investigator Casework 500 ADV protocol with 50  $\mu$ l elutions. The Investigator Quantiplex Kit was used for quantification of human DNA.



## Obtain reproducible STR results with our automated PCR setup

The QIAasymphony AS extends the capabilities of the QIAasymphony SP by integrating automated PCR assay setup, for both real-time quantification and traditional STR assays. In combination with the Rotor-Gene® Q or other commonly used thermal cyclers, Investigator Quantiplex Kits and Investigator STR Kits enable you to complete your

automated PCR workflow and maximize your efficiency — from sample to result. Normalization on the QIAasymphony AS module provides reproducible and consistent STR results over a wide range of input concentrations, ensuring a high first-pass success rate and minimizing costly and time-consuming sample re-runs (Figure 8).



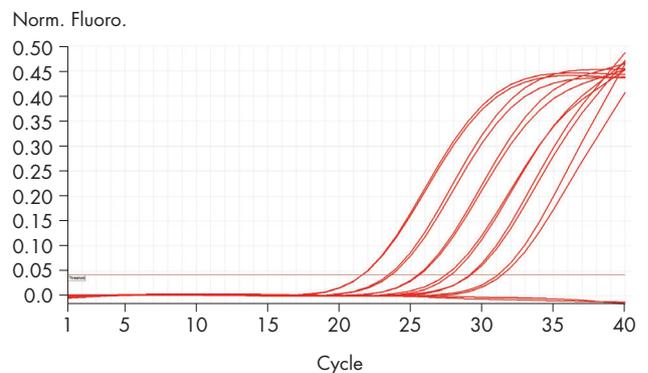
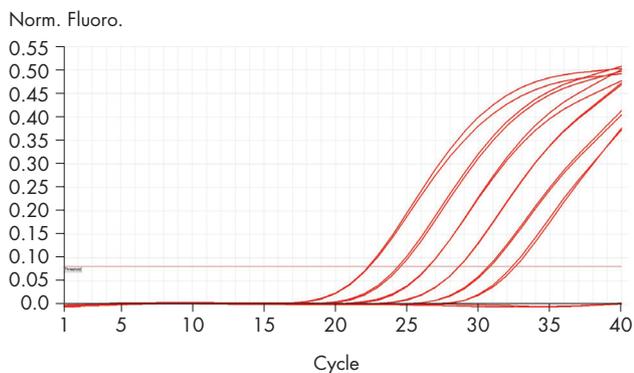
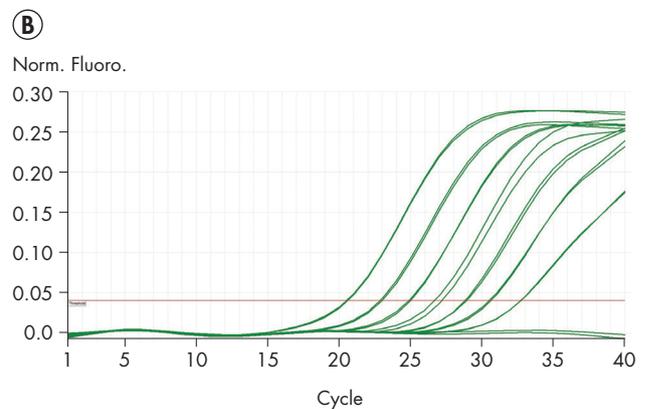
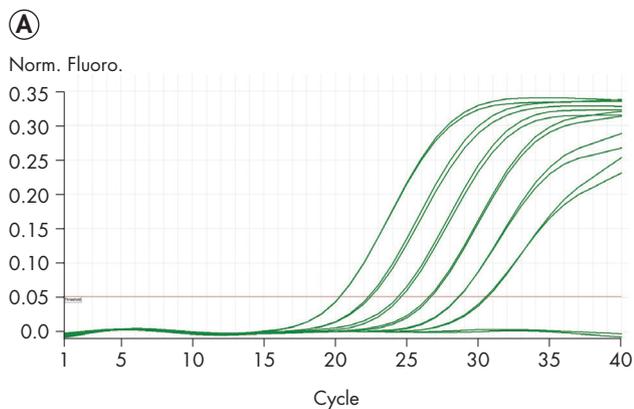
**Figure 8. Normalized STR results.** A dilution series of DNA resulting in concentrations of 33 pg/µl to 10 ng/µl was prepared. Samples were loaded on the QIAasymphony AS module (4 replicates each) and an Investigator ESSplex Plus reaction setup with a target input of 500 pg/reaction was performed. DNA was amplified by PCR and analyzed by capillary electrophoresis. **A.** Comparison of average peak heights across all 16 ESSplex markers. **B.** Profile examples.

## Free up your time and eliminate human error with automated pipetting

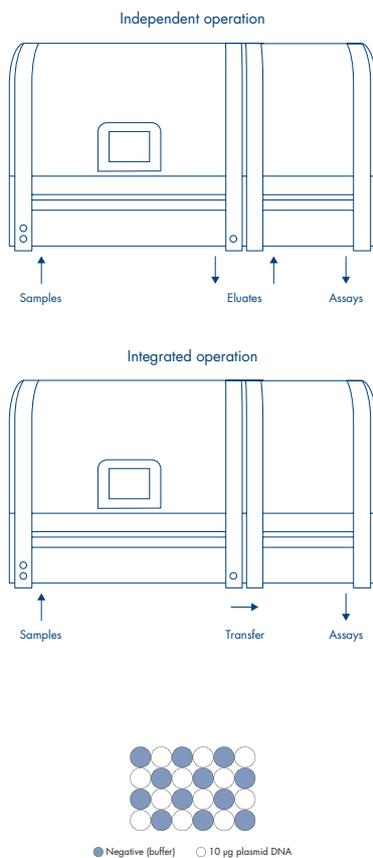
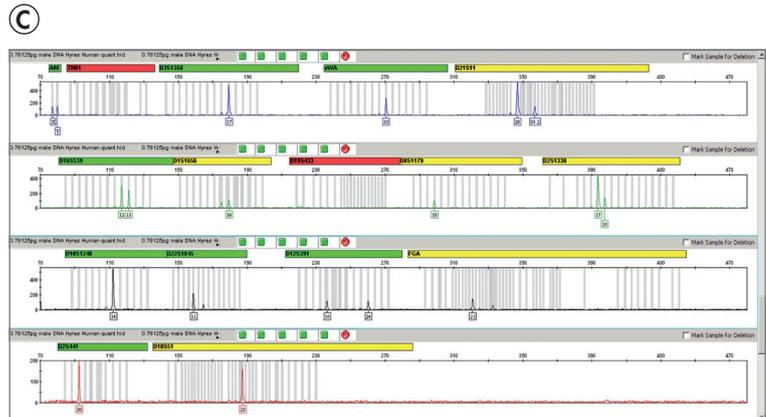
The QIASymphony AS uses a four-tip arm with liquid-level sensing, a UV lamp for decontamination, active-cooling adapters, 6 available slot positions and 50  $\mu$ l, 200  $\mu$ l and 1500  $\mu$ l tips. Standardized pipetting schemes can be adapted as required by contacting Technical Service or your local sales representative. A choice of output adapters enables use of different real-time PCR cyclers (e.g., Rotor-Gene Q<sup>®</sup>, 96-well cyclers) for detection.

Manual pipetting steps that are prone to human error are eliminated, so the QIASymphony AS delivers accurate pipetting on a day-to-day basis comparable to highly experienced laboratory staff (Figure 9). Pipetting of master mix and sample transfer for 96 samples takes less than 25 minutes — saving valuable hands-on time.

For technical specifications visit: [www.qiagen.com/goto/QIASymphony](http://www.qiagen.com/goto/QIASymphony).



**Figure 9. High pipetting accuracy and reproducibility.** Investigator Quantiplex HYres Kit quantification standards and no-template controls were set up in duplicate manually **A.** and using the QIASymphony AS module **B.** Real-time PCR was performed on the Rotor-Gene Q with the standard protocol. **C.** Correlation of quantification and STR results. A DNA sample was quantified using the Investigator Quantiplex HYres Kit. The male DNA concentration was determined to be 0.8 pg/μl. A 15 μl aliquot of template corresponding to 12 pg DNA was used for STR analysis with the Investigator ESSplex Plus Kit. As expected, a good partial profile of 19/29 alleles was obtained when applying a 100 RFU threshold.



**Figure 10. No cross-contamination of samples.** Lysis buffer was spiked with 10 μg plasmid DNA. Samples were placed in a checkerboard pattern of 10 μg plasmid DNA with negative control samples. Samples were purified using the Casework 200 μl protocol and eluates were quantified using real-time PCR. No sample carryover was detected.

## Prevent case sample contamination

Whether operated in an integrated mode or as two separate modules, the QIASymphony architecture prevents cross- and operator-contamination, ensuring complete sample integrity (Figure 10). To reduce manual handling steps and minimize the risk of sample contamination, samples processed on the QIASymphony SP can be transferred automatically to the QIASymphony AS (integrated operation). The QIASymphony system also includes a number of additional safety features. These include: optimized design and protocols, moving UV light and drop catchers, a hooded system with magnetic lockers and separate and safe waste disposal.

## Increase sample processing flexibility with our modular QIASymphony system

Laboratories already operating a QIASymphony SP can easily upgrade their system onsite with a QIASymphony AS module. The QIASymphony AS directly interfaces with the QIASymphony SP, delivering fast, highly reproducible PCR setup, as well as normalization. For extra flexibility, the QIASymphony SP and AS can also be operated independently and concurrently allowing simultaneous purification of samples, while performing quantification or STR assay setup of previously purified samples. Samples that have been processed earlier in the day, or that have been processed on a different QIASymphony SP, can be manually transferred to the QIASymphony AS.

## Setup sample assays easily with our user-friendly software

QIAAsymphony operating software guides the user through setting up a sample preparation or assay setup run in a step-by-step fashion, with options to select and adapt standardized protocols. Required volumes of buffers, reagents, master mix and controls are automatically calculated, and the user is informed of the number and type of consumables to be loaded. Transfer of sample loading information between the QIAAsymphony SP and the QIAAsymphony AS is convenient and reduces the number of steps required for assay definition, thus minimizing the risk of error and sample loss.

## Integrate your QIAAsymphony system into LIMS with our standardized, LIMS-compatible data exchange

The QIAAsymphony system provides standardized communication interfaces. Work lists and rack files can be imported, enabling automatic run definition before samples are received in the laboratory. After assay setup, sample lists can be exported to selected real-time PCR cyclers, including the Rotor-Gene Q. This bidirectional data exchange allows integration of QIAAsymphony systems into LIMS. For technical specifications visit: [www.qiagen.com/goto/QIAasymphony](http://www.qiagen.com/goto/QIAasymphony).

## Trace your samples effortlessly throughout the entire sample assay

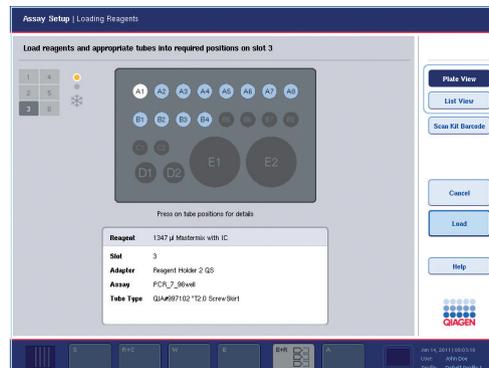
Bar code reading of samples and reagents enables full sample tracking throughout the entire purification and assay setup procedure. The inventory scan performed on drawers during run preparation, ensures that the instrument is in a secure state before starting. The scan checks availability of consumables and liquid levels, reads bar codes of reagent cartridges and prevents loading errors. The sample traceability feature provides chronological, electronic documentation of results, including information about sample IDs, their positions on the worktable and the lot number and expiration date of sample preparations. Multi-level user management provides a record of which user was responsible for sample processing. Electronic result files are produced in HTM and XML formats and can be automatically printed via a networked printer, downloaded using a USB stick for archiving purposes, or automatically transferred via a network connection for integration into LIMS.



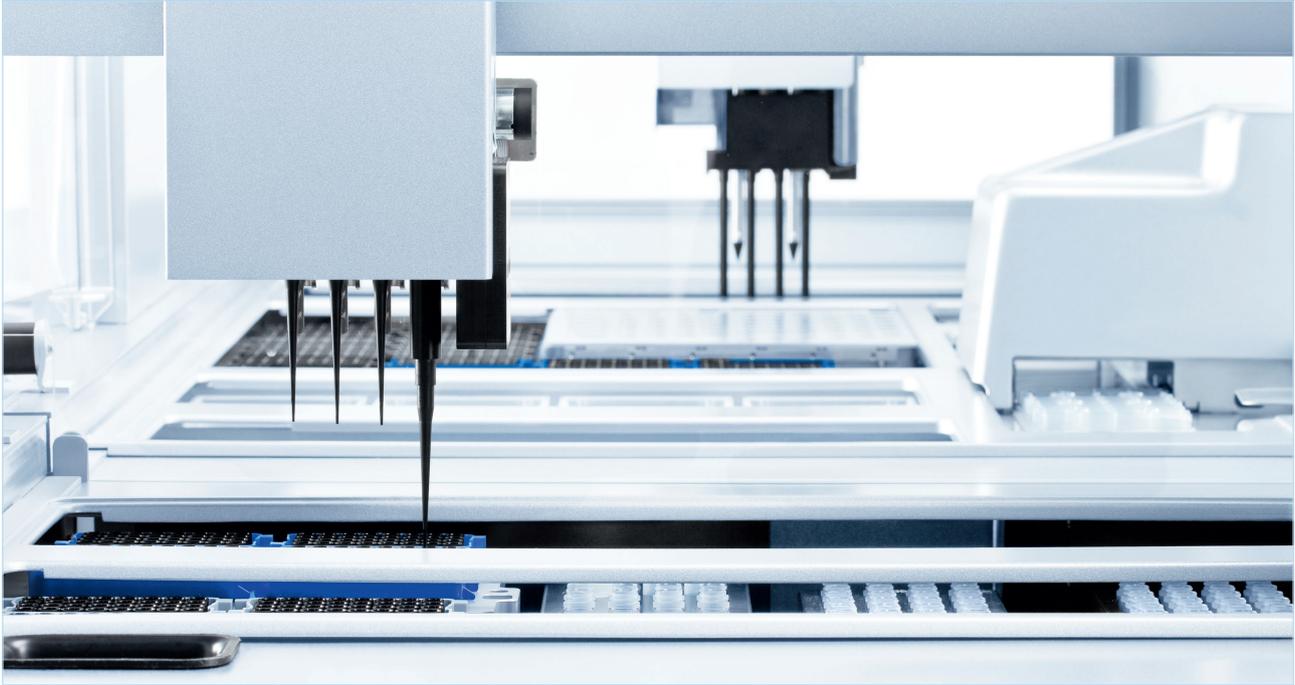
Sample information after sample loading.



Assay definition of 2 PCR assays.



Reagent loading information for the QIAAsymphony AS.



Tailor QIASymphony to meet your specific needs, quickly and easily, within a week of installation!

The QIASymphony system is highly suited for laboratories that analyze samples on a day-to-day basis, with solutions designed to meet the needs of smaller laboratories, as well as higher throughput facilities. The continuous loading feature enables laboratories with different throughputs and workflows to quickly adapt the QIASymphony to meet their own specific needs. With QIASymphony Investigator Kits, that can be automated and have predefined forensic protocols for sample preparation and PCR setup, the

QIASymphony system is extremely easy to implement. The QIASymphony can be operational within a week after installation, enabling you to rapidly benefit from optimized workflows and increased laboratory throughput. The QIASymphony SP is already the first choice for many laboratories, and with the high level of standardization that the QIASymphony system achieves, allows you to directly compare your results between runs in your own laboratory, and with other laboratories around the world.

## Ordering Information

Product	Contents	Cat. no.
QIASymphony SP	QIASymphony sample prep module, 1-year warranty on parts and labor	9001297
QIASymphony AS	QIASymphony assay setup module, 1-year warranty on parts and labor	9001301
QIASymphony DNA Investigator Kit (192)	For 192 preps of 200 µl each from casework and reference samples: Includes 2 reagent cartridges and enzyme racks and accessories	931436
Sample Prep Cartridges, 8-well (336)	8-well sample prep cartridges for use with the QIASymphony SP	997002
8-Rod Covers (144)	8-Rod Covers for use with the QIASymphony SP	997004
Investigator Lyse&Spin Basket Kit (50)	50 pouches containing 50 baskets and 100 collection tubes	19597

For up-to-date licensing information and product-specific disclaimers, see the respective QIAGEN kit handbook or user manual. QIAGEN kit handbooks and user manuals are available at [www.qiagen.com](http://www.qiagen.com) or can be requested from QIAGEN Technical Services or your local distributor.

Learn more about our human identity and forensic testing solutions at [www.qiagen.com/forensics](http://www.qiagen.com/forensics).

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