June 2021

QIAsymphony® DNA Maxi Handbook

For purification of genomic DNA
from human whole blood
using the QIAsymphony SP

Sample to Insight

QIAGEN

Contents

Kit Contents

QIAsymphony DNA Maxi Kit **Catalog no.** **No. of reactions**	**(96)** **937266** **96**
Reagent Cartridge*†	2
Piercing Lid	2
Buffer ATE†	1 x 20 ml
Buffer QSB1 concentrate	4 x 95 ml
Proteinase K solution	1 x 50 ml
Reuse Seal Set‡	2

* Contains guanidine salts. Not compatible with disinfectants containing bleach. See page 6 for Safety Information.

† Contains sodium azide as a preservative.

‡ A Reuse Seal Set contains 8 Reuse Seal Strips.

Shipping and Storage

QIAsymphony DNA Maxi Kits are shipped at room temperature (15–25°C)and should also be stored at room temperature upon arrival. Do not store reagent cartridges at temperatures below 15°C. QIAsymphony DNA Maxi Kits contain ready-to-use Proteinase K solution that can be stored at room temperature.

When stored properly, the kit is stable until the expiration date on the kit box. Partially used reagent cartridges can be stored for a maximum of 2 weeks, enabling cost–efficient use of reagents and more flexible sample processing. If a reagent cartridge is partially used, replace the cover of the trough containing the magnetic particles and seal the buffer troughs with the provided Reuse Seal Strips. Transfer remaining Proteinase K enzyme solution to a resealable container.

To avoid reagent evaporation, the reagent cartridge should be open for a maximum of 15 hours (including run times) at a maximum environmental temperature of 30°C. Running batches with low sample numbers (<24) will increase both the time that the reagent cartridge is open and the required buffer volumes, potentially reducing the total number of sample preparations possible per cartridge. Avoid exposure of the reagent cartridges to UV light (e.g., used for decontamination), as exposure may cause accelerated aging of the reagent cartridges and buffers.

Intended Use

The QIAsymphony DNA Maxi Kit is intended for molecular biology applications. This product is not intended for the diagnosis, prevention, or treatment of a disease.

All due care and attention should be exercised in the handling of the products. We recommend all users of QIAGEN products to adhere to the NIH guidelines that have been developed for recombinant DNA experiments, or to other applicable guidelines.

Safety Information

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. For more information, please consult the appropriate safety data sheets (SDSs). These are available online in convenient and compact PDF format at **www.qiagen.com/safety**, where you can find, view, and print the SDS for each QIAGEN kit and kit component.

CAUTION: DO NOT add bleach or acidic solutions directly to the sample-preparation waste.

Buffers in the reagent cartridge contain guanidine salts, which can form highly reactive compounds when combined with bleach. If liquid containing these buffers is spilt, clean with suitable laboratory detergent and water. If the spilt liquid contains potentially infectious agents, clean the affected area first with laboratory detergent and water, and then with 1% (v/v) sodium hypochlorite.

Quality Control

In accordance with QIAGEN's ISO-certified Quality Management System, each lot of QIAsymphony DNA Maxi Kit is tested against predetermined specifications to ensure consistent product quality.

Introduction

The QIAsymphony DNA Maxi Kit is designed for automated purification of total DNA from human whole blood samples up to 4 ml. Proven, performance-leading magnetic-particle technology provides high-quality DNA that is suitable for direct use in downstream applications, such as amplification or other enzymatic reactions or storage for later use. Purified DNA is free of proteins, nucleases, and other impurities. Up to 36 samples can be processed in a single run without re-loading of tips.

Principle and procedure

QIAsymphony technology combines the speed and efficiency of silica-based DNA purification with the convenient handling of magnetic particles (Figure 1). The purification procedure is designed to ensure safe and reproducible handling of potentially infectious samples, and comprises 4 steps: lyse, bind, wash, and elute (see flowchart on next page). The user can choose between different elution volumes depending on the protocol. DNA yields depend on sample type and storage.

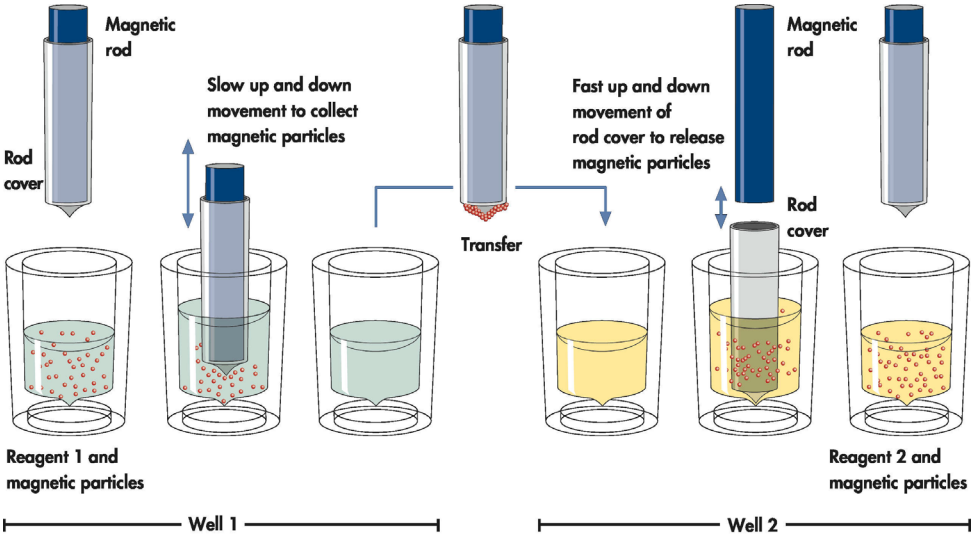
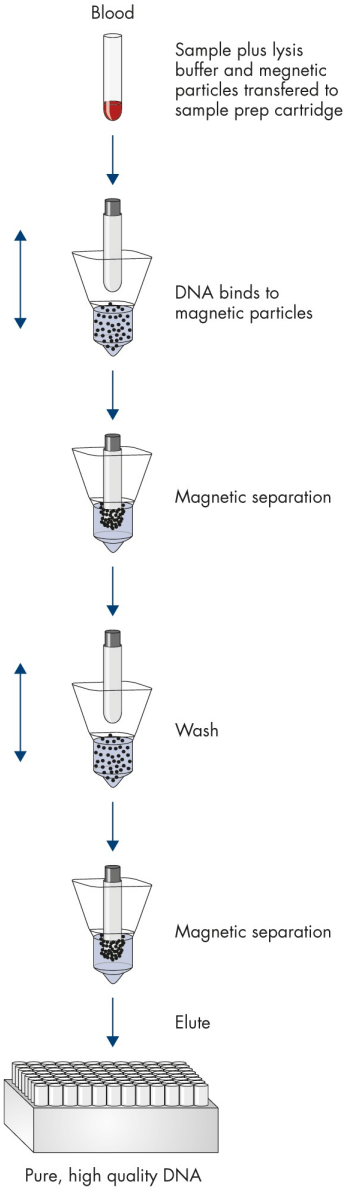


Figure 1. Schematic of the QIAsymphony SP principle. The QIAsymphony SP processes a sample containing magnetic particles as follows: A magnetic rod protected by a rod cover enters a well containing the sample and attracts the magnetic particles. The magnetic rod cover is positioned above another well and the magnetic particles are released. The QIAsymphony SP uses a magnetic head containing an array of 24 magnetic rods, and can therefore process up to 24 samples simultaneously. Steps 1 and 2 are repeated several times during sample processing.

QIAsymphony DNA Maxi Kit Procedures



Equipment and Reagents to Be Supplied by User

When working with chemicals, always wear a suitable lab coat, disposable gloves, and protective goggles. For more information, consult the appropriate safety data sheets (SDSs), available from the product supplier.

- Sample Prep Cartridges, 8-well cartridges (cat. no. 997002)
- 8-Rod Covers (cat. no. 997004)
- Filter-Tips,1500 µl (cat. no. 997024)
- Sample tubes or racks. Compatible primary and secondary tubes are listed at **www.qiagen.com/QIAsymphonyDNAMaxiKit**. Labware lists are available under the Resources tab in this page.
- Elution tubes or racks. Compatible elution tube and rack formats are listed at **www.qiagen.com/QIAsymphonyDNAMaxiKit**. Labware lists are available under the Resources tab in this page.
- Phosphate-buffered saline (PBS, may be required for diluting samples)
- Vortexer
- **Optional**: DNase-free RNase A (if RNA-free DNA is required)
- Sample tubes for loading of Proteinase K (internal control slot). Compatible primary and secondary tubes are listed at **www.qiagen.com/QIAsymphonyDNAMaxiKit**. Labware lists are available under the Resources tab in this page.
- Accessory Trough (cat. no. 997012) for loading of Buffer QSB1 on the tip rack of the "Reagents and Consumables" drawer

Important Notes

Regarding the QIAsymphony DNA Maxi Kit

The QIAsymphony DNA Maxi Kit was designed to enable purification of genomic DNA from whole blood volume of up to 4 ml. In order to do so, you may encounter special instructions for the use of the QIAsymphony DNA Maxi Kit compared to the Mini and Midi Kits. This chapter provides a short overview.

Loading Buffer QSB1 into the "Reagents and Consumables" drawer

Buffer QSB1 is provided as a concentrate. Before using for the first time, add isopropanol as instructed on the bottle. For purification of genomic DNA from whole blood, the user needs to provide 150 ml of QSB1 per batch (24 samples) via the accessory troughs (see Ordering Information, page 26) in positions 5 and 12 of the "Reagents and Consumables" drawer next to the tip racks.

Note: Please disregard the inventory screen in the instrument software stating that the accessory troughs contain ethanol.

Loading Proteinase K enzyme solution in the "Sample" drawer

For sample lysis, the QIAsymphony Maxi Kit contains ready-to-use Proteinase K enzyme solution. For one batch (24 samples à 4 ml), we recommend loading 12 ml of Proteinase K solution in slot A (IC) of the "Sample" drawer using 14 ml Falcon polystyrene round-bottom tubes. “ProteinaseK” then needs to be selected on the touchscreen of the QIAsymphony SP.

Table 1. Preparation of Proteinase K in IC tubes of slot A

Sample number	DNA_Blood_2000*	DNA_Blood_4000*
8	min. 2.7 ml	min. 4.3 ml
24	min. 5.9 ml	min. 10.7 ml

* For each sample, 200 µl Proteinase K solution for DNA_Blood_2000 and 400 µl Proteinase K solution for DNA_Blood_4000 are required, plus an additional void volume of 1100 µl [(n x 200 or 400 µl) + 1100 µl] independent of the tube used to load the Proteinase K solution.

Number of samples per run

Each reagent cartridge in the kit is sufficient for processing 48 samples of up to 4 ml of blood. However, the number of pipetting tips available on the instrument limits the number of samples that can be processed in one run.

Automated purification on the QIAsymphony SP

The QIAsymphony SP makes automated sample preparation easy and convenient. Samples, reagents and consumables, and eluates are separated in different drawers. Simply load samples, reagents provided in special cartridges, and preracked consumables in the appropriate drawer before a run. Start the protocol and remove purified DNA from the "Eluate" drawer after processing. Refer to the user manual supplied with your instrument for operating instructions.

We recommend following the maintenance instructions given in the user manual to reduce the risk of contamination.

The range of protocols available is continually expanding, and additional QIAGEN protocols can be downloaded free of charge at **www.qiagen.com/QIAsymphonyDNAMaxiKit**. Labware lists are available under the Resources tab in this page.

Loading reagent cartridges into the "Reagents and Consumables" drawer

Reagents for purification of DNA are contained in an innovative reagent cartridge (see Figure **2**). Each trough of the reagent cartridge contains a particular reagent, such as magnetic

particles, lysis buffer, wash buffer, or elution buffer. Partially used reagent cartridges can be closed with Reuse Seal Strips for later use, which avoids generation of waste due to leftover reagents at the end of the purification procedure.

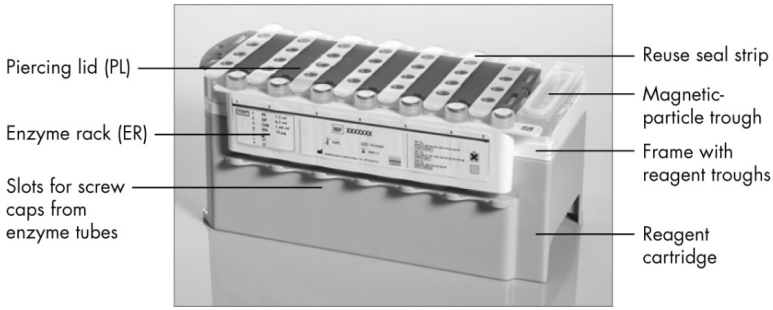


Figure 2. QIAsymphony reagent cartridge. The reagent cartridge contains all reagents required for the protocol run.

Note: This figure is just an example. The QIAsymphony DNA Maxi Kit does not contain an Enzyme Rack.

Before starting the procedure, ensure that the magnetic particles are fully resuspended. Remove the magnetic-particle trough from the reagent cartridge frame, vortex vigorously for at least 3 minutes, and replace it in the reagent cartridge frame before the first use. Place the reagent cartridge into the reagent cartridge holder. Before using a reagent cartridge for the first time, place the piercing lid on top of the reagent cartridge (Figure 3).

Note: The QIAsymphony DNA Maxi Kit does not contain an enzyme rack but includes an enzyme bottle.

Important: The piercing lid is sharp. Take care when placing it onto the reagent cartridge. Make sure to place the piercing lid onto the reagent cartridge in the correct orientation.

After the magnetic-particle trough cover is removed (see Figure 2), the reagent cartridge is subsequently loaded into the "Reagents and Consumables" drawer.

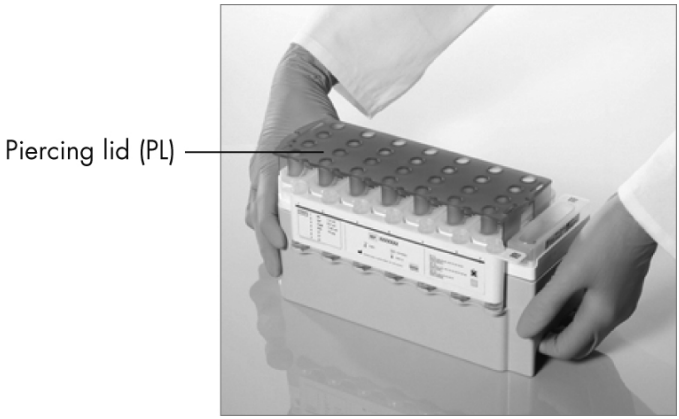


Figure 3. Easy worktable setup with reagent cartridges.

Partially used reagent cartridges can be stored until needed again, see "Shipping and Storage", page 5.

Loading plasticware into the "Reagents and Consumables" drawer

Sample prep cartridges, 8-Rod Covers (both preracked in unit boxes), and disposable filter tips (1500 µl tips provided in black racks) are loaded into the "Reagents and Consumables" drawer.

Note: Make sure to remove the covers of the unit boxes are removed before loading the unit boxes into the "Reagents and Consumables" drawer.

Note: Tips have filters to help prevent cross-contamination.

Note: Do not refill tip racks or unit boxes with sample prep cartridges or 8-Rod Covers before starting another protocol run. The QIAsymphony SP can use partially used tip racks and unit boxes. It may be necessary to reload new tip racks to ensure processing of a full batch.

For the consumables required, see the relevant protocol sheet available at **www.qiagen.com/QIAsymphonyDNAMaxiKit**. Click on the Resources tab. For Ordering Information, see page 26.

Loading the "Waste" drawer

Used sample prep cartridges and 8-Rod Covers are placed in empty unit boxes in the "Waste" drawer. Make sure that the "Waste" drawer contains sufficient empty unit boxes for plastic waste generated during the protocol run.

Note: Ensure that the covers of the unit boxes are removed before loading the unit boxes into the "Waste" drawer. If you are using 8-Rod Cover boxes for collecting used sample prep cartridges and 8-Rod Covers, ensure that the box spacer has been removed.

A bag for discarding used filter-tips must be attached to the front side of the "Waste" drawer. Some QIAsymphony models can use the waste bin that is placed in the cabinet.

Note: The presence of a tip disposal bag is not checked by the system. Make sure that the tip disposal bag is properly attached before starting a protocol run. For more information, see the user manual supplied with your instrument.

A waste container collects liquid waste generated during the purification procedure. The "Waste" drawer can only be closed if the waste container is in place.

Note: Check liquid waste container before starting a run.

Loading the "Eluate" drawer

Load the required elution rack into the "Eluate" drawer. Do not load a 96-well plate onto "Elution slot 4". If eluates should be cooled, use "Elution slot 1" with the corresponding cooling adapter. As long-term storage of eluates in the "Eluate" drawer may lead to evaporation of eluates, we strongly recommend using the cooling position.

Inventory scan

Before starting a run, the instrument checks that sufficient consumables for the queued batch(es) have been loaded into the corresponding drawers.

Using FIX labware

Using liquid–level detection (LLD) for sample transfer allows the use of primary and secondary tubes. However, this requires certain dead volumes in the respective tubes.

In order to minimize dead volumes, secondary tubes may be used without liquid–level detection. Specific FIX labware is available (e.g. SAR_**FIX**_#72.694 T2.0 ScrewSkirt), which can also be selected on the touchscreen of the QIAsymphony SP. This tube/rack type imposes aspiration restrictions. The sample is aspirated at a particular height in the tube that is defined by the volume of sample to be transferred. Therefore it is essential to make sure that the volume listed in the labware list is used.

Sample tubes that can be used with or without liquid–level detection and required sample volumes are listed at **www.qiagen.com/QIAsymphonyDNAMaxiKit**. Labware lists are available under the Resources tab in this page.

Tubes that are using liquid–level detection and tubes that are not using liquid–level detection can be processed within the same batch/run.

Preparation of sample material

The QIAsymphony DNA Maxi Kit is suitable for use with human whole blood samples and should be equilibrated to room temperature (15–25°C) before starting the run. Prevent formation of foam in or on the samples.

For more information about the automated procedure (including information about sample tubes that can be used with specific protocols) and specific sample pretreatments, see the relevant protocol sheet available at **www.qiagen.com/QIAsymphonyDNAMaxiKit**.

Assay Control Sets

A default Assay Control Set is preinstalled for each protocol. When an internal control is used, it might be necessary to create an additional Assay Control Set as described in the *QIAsymphony Management Console User Manual*.

Lysis with Proteinase K

QIAsymphony DNA Maxi Kits contain Proteinase K, which possesses a high specific activity that remains stable over a wide range of temperatures and pH values. Enzyme activity is substantially increased at higher temperatures.

Quantification of DNA

Carryover of magnetic particles may affect the absorbance reading at 260 nm (A_{260}) of the purified DNA. The measured absorbance at 320 nm (A_{320}) should be subtracted from all absorbance readings.

Note: For accurate quantification of DNA by absorbance at 260 nm, we recommend diluting the sample in elution buffer (Buffer ATE). Dilution of the sample in water may lead to inaccurate values.

Yield of purified DNA

DNA yields depend on the sample type, number of nucleated cells in the sample, the quality of the starting material and the protocol used for isolation of DNA. Table 2 lists typical yields obtained from different sample volumes. Elution in smaller volumes increases the final DNA concentration in the eluate, but slightly reduces overall DNA yield. We recommend using an elution volume appropriate for the intended downstream application.

QIAsymphony DNA Maxi Kits copurify RNA and DNA present in the sample. If RNA-free DNA is required, add RNase A to the sample before starting the procedure. The final RNase A concentration should be 2 mg/ml (e.g., add 4 ml of a 100 mg/ml RNase A solution to a 200 ml sample).

Table 2. Typical genomic DNA yields obtained from a range of sample types

Sample types	Sample size	Elution volume (µl)	Typical DNA yield (µg)
Whole blood*	4000 µl	500	60-150
Whole blood*	2000 µl	500	30-80

* For donors with white blood cell counts of 4–11 x 10^6 cells/ml.

Storage and quality of purified DNA

Purified genomic DNA can be stored at 2–8°C before use in analysis and should be kept at –30°C to –15°C or –90°C to –65°C for long-term storage.

QIAsymphony DNA procedures yield pure DNA with A_{260}/A_{280} ratios of 1.7–1.9. Purified DNA is up to 50 kb in size, and is suitable for use in all downstream applications.

Co-purified RNA may increase A_{260}/A_{280} ratios to values of up to 2.2. Treat samples with RNase A according to the protocol if RNA-free DNA is required.

General Purification Protocol

This is a general protocol for using QIAsymphony DNA Maxi Kits. Detailed information for each protocol, including volumes and tubes, is provided in protocol sheets that can be downloaded at **www.qiagen.com/QIAsymphonyDNAMaxiKit**.

Important points before starting

- Ensure that you are familiar with operating the QIAsymphony SP. Refer to the user manuals supplied with the instrument for operating and maintenance instructions.
- Before beginning the procedure, read "Important Notes" starting on page 11.
- Ensure that you are familiar with the protocol sheet corresponding to the procedure you want to use (can be downloaded from **www.qiagen.com/QIAsymphonyDNAMaxiKit**).
- Before using Buffer QSB1, make sure that it does not contain a precipitate. If necessary, incubate for 30 minutes at 37°C with occasional shaking to dissolve precipitate.
- Avoid vigorous shaking of the reagent cartridge, otherwise foam may be generated, which can lead to liquid-level detection problems.

Things to do before starting

- Ensure that the magnetic particles are fully resuspended. Vortex the trough containing the magnetic particles vigorously for at least 3 minutes before first use.
- Before loading the reagent cartridge, remove the cover from the trough containing the magnetic particles. Make sure that the piercing lid is placed on the reagent cartridge or, if using a partially used reagent cartridge, make sure the Reuse Seal Strips have been removed.
- Make sure to load Proteinase K in appropriate tubes mentioned in the labware list.
- Add isopropanol to the QSB1 concentrate as instructed on the bottle before use and fill accessory troughs with QSB1.
- If samples are bar coded, orient samples in the tube carrier so that the bar codes face the bar code reader located on the left side of the QIAsymphony SP.
- For information about compatible sample tube and minimum sample volumes for samples in primary and secondary tubes, see the corresponding labware list at **www.qiagen.com/QIAsymphonyDNAMaxiKit**.

Procedure

1. Close all drawers and the hood.
2. Switch on the QIAsymphony SP, and wait until the **Sample Preparation** screen appears and the initialization procedure has finished.

   The power switch is located at the bottom, left corner of the QIAsymphony SP.
3. Log on to the instrument.
4. Ensure the "Waste" drawer is loaded properly, and perform an inventory scan of the "Waste" drawer, including the tip chute and liquid waste. Replace the tip disposal bag if necessary.
5. Load the required elution rack into the "Eluate" drawer.

   Do not load a 96-well plate onto "Elution slot 4".

   If eluates should be cooled, use "Elution slot 1" with the corresponding cooling adapter.

   When using a 96-well plate, make sure that the A1 well of the plate is on the top left corner to avoid sample mixup in downstream analysis.
6. Load the required reagent cartridge(s) and consumables into the "Reagents and Consumables" drawer. Buffer QSB1 needs to be loaded in accessory troughs in slots 5 and 12 of the drawer.

   Note: Please disregard the inventory screen in the instrument software stating that the accessory troughs contain ethanol.
7. Perform an inventory scan of the "Reagents and Consumables" drawer.
8. Place the samples into the appropriate sample carrier, and load them into the "Sample" drawer.
9. Proteinase K needs to be loaded in slot A of the sample drawer. Using the touchscreen, enter the required information for each batch of samples to be processed.

   Enter the following information:
   - Sample information (depending on sample racks used)
   - Protocol to be run (i.e., "Assay Control Set")
   - Elution volume and output position
   - Tube(s) containing Proteinase K solution

   After information about the batch has been entered, the status changes from "LOADED" to "QUEUED". As soon as one batch is queued, the "Run" button appears.

10. Press the "Run" button to start the purification procedure.

    All processing steps are fully automated. At the end of the protocol run, the status of the batch changes from "RUNNING" to "COMPLETED".

11. Retrieve the elution rack containing the purified nucleic acids from the "Eluate" drawer.

    The DNA is ready to use or can be stored at 2–8°C, –30°C to –15°C, or –90°C to –65°C.

    We recommend removing the elution rack from the "Eluate" drawer immediately after the run has finished. Depending on temperature and humidity, elution racks left in the QIAsymphony SP after the run is completed may experience condensation or evaporation.

    In general, magnetic particles are not carried over into eluates. If carryover does occur, magnetic particles in eluates will not affect most downstream applications.

    If magnetic particles need to be removed before performing downstream applications, tubes or racks containing eluates should first be placed in a suitable magnet and the eluates transferred to a clean tube (see "Appendix: Handling, Quantification, and Determination of Purity of DNA", page 24.)

    If the "Eluate" drawer is opened when a batch is running (e.g., if elution racks that contain eluates are removed), the run will be paused and an inventory scan of the "Eluate" drawer will be performed when the drawer is closed.

    Result files are generated for each elution rack.

12. If a reagent cartridge is only partially used, seal it with the provided Reuse Seal Strips, transfer back unused Proteinase K into enzyme bottle, and transfer unused Buffer QSB1 into a sealable bottle of your choice immediately after the end of the protocol run to avoid evaporation.

    For more information about storage of partially used reagent cartridges, see "Shipping and Storage", page 5.

13. Discard used sample tubes, racks, and waste according to your local safety regulations.

    See page 6 for Safety Information.

14. Clean the QIAsymphony SP.

    Follow the maintenance instructions in the user manuals supplied with your instrument. Clean the tip guards regularly to minimize the risk of cross-contamination.

15. Close the instrument drawers, and switch off the QIAsymphony SP.

Troubleshooting Guide

This troubleshooting guide may be helpful in solving any problems that may arise. For more information, see also the Frequently Asked Questions page in our Technical Support Center: **www.qiagen.com/FAQ/FAQList.aspx**. The scientists in QIAGEN Technical Services are always happy to answer any questions you may have about either the information or protocols in this handbook (for contact information, visit **support.qiagen.com**).

	Comments and suggestions
General handling	
Error message displayed in the touchscreen	If an error message is displayed during a protocol run, refer to "Troubleshooting" in the user manual supplied with your instrument.
Precipitate in reagent trough of opened cartridge	
a) Buffer evaporation	Excessive evaporation can lead to increased salt concentration in buffers. Discard reagent cartridge. Make sure to seal buffer troughs of a partially used reagent cartridge with Reuse Seal Strips when not being used for DNA purification.
b) Improper storage of Buffer QSB1	Storage of Buffer QSB1 below 15°C may lead to formation of precipitate. If necessary, incubate for 30 min at 37°C with occasional shaking to dissolve precipitate.
Low DNA yield	
a) Magnetic particles were not completely resuspended	Before starting the procedure, ensure that the magnetic particles are fully resuspended. Vortex for at least 3 min before use.
b) Frozen blood samples were not mixed properly after thawing	Thaw frozen blood samples quickly in a 37°C water bath with mild agitation to ensure thorough mixing.
c) Incomplete sample lysis	Before use, check that Buffer QSB1 do not contain precipitates. If necessary, remove the trough containing Buffer QSB1 from the reagent cartridge and incubate for 30 min at 37°C with occasional shaking to dissolve precipitate. If the reagent cartridge is already pierced, make sure that the trough is closed with a Reuse Seal Strip, and incubate the complete reagent cartridge for 30 min at 37°C with occasional shaking in a water bath.

	Comments and suggestions
d) Clogging of pipet tip due to insoluble material	Insoluble material, such as undigested cartilage, was not removed from the digested sample prior to starting the QIAsymphony DNA purification procedure. To remove insoluble material, centrifuge the sample at 300 x *g* for 1 min, as indicated in the protocol, and transfer the supernatant to a new sample tube.
e) Clogging of pipet tip due to sample overload	Reduce the sample input volume.
f) Low leukocyte count in the whole blood sample	Low cell count results in lower than expected yield.
DNA does not perform well in downstream applications	
a) Insufficient DNA used in downstream application	Quantify the purified DNA by spectrophotometric measurement of the absorbance at 260 nm (see" Appendix: Handling, Quantification, and Determination of Purity of DNA", page 24).
b) Excess DNA used in downstream application	Excess DNA can inhibit some enzymatic reactions. Quantify the purified DNA by spectrophotometric measurement of the absorbance at 260 nm (see" Appendix: Handling, Quantification, and Determination of Purity of DNA", page 24).
c) Degraded DNA obtained from tissue samples	Too much sample might have been used. Overloading with too much sample may lead to insufficient lysis and therefore insufficient inactivation of potential DNAses. For recommended sample sizes, refer to the protocol sheet at **www.qiagen.com/QIAsymphonyDNAMaxiKit**. Click on the Resources tab.
A260/A280 ratio for purified DNA is low	
Absorbance reading at 320 nm was not subtracted from the absorbance readings at 260 nm and 280 nm	To correct for the presence of magnetic particles in the eluate, an absorbance reading at 320 nm should be taken and subtracted from the absorbance readings obtained at 260 nm and 280 nm (see" Appendix: Handling, Quantification, and Determination of Purity of DNA", page 24).

Appendix: Handling, Quantification, and Determination of Purity of DNA

Storage of DNA

Purified genomic DNA can be stored at 2–8°C before use in analysis and should be kept at –30°C to –15°C or –90°C to –65°C for long-term storage.

Quantification of DNA

The concentration of DNA should be determined by measuring the absorbance at 260 nm (A_{260}) in a spectrophotometer. Absorbance readings at 260 nm should fall between 0.1 and 1.0 to be accurate. An absorbance of 1 unit at 260 nm corresponds to 50 µg of DNA per milliliter (A_{260} = 1 → 50 µg/ml). The ratio between the absorbance values at 260 nm and 280 nm gives an estimate of DNA purity (see "Purity of DNA" on page 25). Measure the absorbance at 320, 280, and 260 nm. Subtract the absorbance reading obtained at 320 nm from the readings obtained at 260 and 280 nm to correct for effects of background absorbance.

Concentration of DNA sample = 50 µg/ml x (A_{260} – A_{320}) x dilution factor Total amount of DNA purified = concentration x volume of sample in milliliters

Carryover of magnetic particles in the eluate may affect the A_{260} reading. If the purified DNA is to be analyzed (e.g., by fluorescent capillary sequencing, the tube containing the eluate should first be applied to a suitable magnetic separator and the eluate transferred to a clean tube:

- Apply the tube containing the DNA to a suitable magnetic separator (e.g., 12-Tube Magnet, cat. no. 36912) until the magnetic particles are separated. If DNA is in microplates, apply the microplate to a suitable magnetic separator (e.g., 96-Well Magnet Type A, cat. no. 36915) until the magnetic particles are separated.
- If a suitable magnetic separator is not available, centrifuge the tube containing the DNA for 1 minute at full speed in a microcentrifuge to pellet any remaining magnetic particles.

- Once separation is complete, carefully withdraw the purified DNA and transfer to a new tube or rack.

  Note: For accurate quantification of DNA by absorbance at 260 nm, we recommend diluting the sample in the corresponding elution buffer. Dilution of the sample in water may lead to inaccurate values. Elution buffer has high absorbance at 220 nm, which can lead to high background absorbance levels if the spectrophotometer is not properly zeroed. Evaporation of eluates potentially increases the risk of impact on the measurement especially when low amounts of eluates are used undiluted. Extra elution buffer to blank the spectrophotometer is provided in a separate bottle with QIAsymphony DNA Maxi Kits.

Purity of DNA

Purity is determined by calculating the ratio of corrected absorbance at 260 nm to corrected absorbance at 280 nm; that is, $(A_{260} - A_{320})/(A_{280} - A_{320})$. Pure DNA has an A_{260}/A_{280} ratio of 1.7–1.9.

Ordering Information

Product	Contents	Cat. no.
QIAsymphony DNA Maxi Kit (96)	For 96 preps of 4000 µl each: Includes 2 reagent cartridges, enzyme bottle, QSB1 concentrate, and accessories	937266
QIAsymphony DNA Midi Kit (96)	For 96 preps of 1000 µl each: Includes 2 reagent cartridges and enzyme racks and accessories	931255
QIAsymphony DNA Mini Kit (192)	For up to 192 preps of 200 µl each: Includes 2 reagent cartridges and enzyme racks and accessories	931236
Related Products		
Accessory Trough (10)	For use with the QIAsymphony SP	997012
Reagent Cartridge Holder (2)	For use with the QIAsymphony SP	997008
Cooling Adapter, tubes, 2 ml, Qsym	Cooling adapter for 2 ml screw-cap tubes for use in the QIAsymphony "Eluate" drawer	9018088
Cooling Adapter, EMT, Qsym	Cooling adapter for EMT racks for use in the QIAsymphony "Eluate" drawer	9018086
Cooling Adapter, MTP, RB, Qsym	Cooling adapter for round-bottom microtiter plates (MTP) for use in the QIAsymphony "Eluate" drawer	9018085
Cooling Adapter, PCR, Qsym	Cooling adapter for PCR plates for use in the QIAsymphony "Eluate" drawer	9018087
Adapter, tubes, 2 ml, Qsym	Adapter for 2 ml screw-cap tubes for use in the QIAsymphony "Eluate" drawer	9018577

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** or can be requested from QIAGEN Technical Services or your local distributor.

Document Revision History

Date	Changes
12/2020	Initial release.
06/2021	Added note on use of Accessory Trough in the “Equipment and Reagents to Be Supplied by User” section. Added table for preparation of Proteinase K in IC tubes of slot A.

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