QIAvac Handbook

For
QIAvac 24
QIAvac 6S
QIAvac 96
Vacuum Regulator

October 2010

QIAGEN

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Storage Conditions

QIAvac vacuum manifolds should be stored dry at room temperature (15–25°C). Please refer to the handling guidelines for QIAvac manifolds on pages 12 (QIAvac 24) and 22 (QIAvac 6S and QIAvac 96).

The vacuum regulator should be stored upright at room temperature to prevent condensation from collecting inside the unit.

Product Use Limitations

QIAvac manifolds are designed for vacuum processing of QIAGEN spin columns in parallel.

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.

Always use caution and wear safety glasses when working near a vacuum manifold under pressure.

Product Warranty and Satisfaction Guarantee

QIAvac manifolds are backed by a 1-year warranty. QIAGEN guarantees the performance of all products in the manner described in our product literature. The purchaser must determine the suitability of the product for its particular use. Should any product fail to perform satisfactorily due to any reason other than misuse, QIAGEN will replace or repair it free of charge or refund the purchase price. We reserve the right to change, alter, or modify any product to enhance its performance and design. If a QIAGEN product does not meet your expectations, simply call your local Technical Service Department. We will credit your account or exchange the product — as you wish.

A copy of QIAGEN terms and conditions can be obtained on request, and is also provided on the back of our invoices. If you have questions about product specifications or performance, please call QIAGEN Technical Services or your local distributor (see inside front cover).

Technical Assistance

At QIAGEN we pride ourselves on the quality and availability of our technical support. Our Technical Service Departments are staffed by experienced scientists with extensive practical and theoretical expertise in molecular biology and the use of QIAGEN products. If you have any questions or experience any difficulties regarding QIAvac manifolds or QIAGEN products in general, please do not hesitate to contact us.

QIAGEN customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at QIAGEN. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance and more information please call one of the QIAGEN Technical Service Departments or local distributors (see inside front cover).

Introduction

QIAvac manifolds facilitate sample handling for QIAGEN 8-well and 96-well components as well as for QIAprep®, QIAquick™, MinElute™, RNeasy®, and QIAamp® spin columns. They eliminate tedious pipetting, centrifugation, and transfer steps. QIAvac 6S and QIAvac 96 are designed to permit direct elution into collection microtubes or 96-well microplates. QIAvac manifolds simplify handling for preparation of plasmid DNA, single-stranded phage DNA, RNA, genomic DNA, and viral nucleic acids, as well as for DNA cleanup from PCR and other enzymatic reactions. Each QIAvac manifold is designed for processing specific QIAGEN modules:

QIAvac 24 (page 8) — for up to 24 spin columns

QIAvac 6S (page 13) — for up to six 8-well strips or up to 24 spin columns on luer adapters

QIAvac 96 (page 19) — for 96-well plates

QIAvac Selection Guide

	Vacuum Manifold		
Application/Kit	**QIAvac 24**	**QIAvac 6S**	**QIAvac 96**
For plasmid minipreps:			
QIAprep Spin Miniprep Kit	**YES**	**YES***	no
QIAprep 8 Miniprep Kit	no	**YES**	no
QIAprep 8 Turbo Miniprep Kit	no	**YES**	no
QIAprep 96 Turbo Miniprep Kit	no	no	**YES**
QIAwell® 8 Ultra Plasmid Kit	no	**YES**	no
QIAwell 96 Ultra Plasmid Kit	no	no	**YES**
R.E.A.L.™ Prep 96 Plasmid Kit	no	no	**YES**
For ssDNA purification:			
QIAprep Spin M13 Kit	**YES**	**YES***	no
QIAprep 96 M13 Kit	no	no	**YES**

** Requires use of QIAvac Luer Adapters*

Application/Kit	Vacuum Manifold		
	QIAvac 24	QIAvac 6S	QIAvac 96
For DNA cleanup:			
MinElute PCR Purification Kit	**YES**	**YES***	no
MinElute Gel Extraction Kit	**YES**	**YES***	no
MinElute Reaction Cleanup Kit	**YES**	**YES***	no
QIAquick PCR Purification Kit	**YES**	**YES***	no
QIAquick Gel Extraction Kit	**YES**	**YES***	no
QIAquick Nucleotide Removal Kit†	**YES**	**YES***	no
QIAquick 8 PCR Purification Kit	no	**YES**	no
QIAquick 96 PCR Purification Kit	no	no	**YES**
For total RNA isolation:			
RNeasy® Mini Kit	**YES**	**YES***	no
RNeasy 96 Kit‡	no	no	**YES**
For isolation of genomic DNA from blood:			
QIAamp DNA Blood Mini Kit	YES§	YES**	no
QIAamp DNA Mini Kit	YES§	YES**	no
For isolation of viral RNA from cell-free body fluids:			
QIAamp Viral RNA Mini Kit	YES§	YES**	no

* *Requires use of QIAvac Luer Adapters*

† *Vacuum processing is not recommended for radioactive samples*

‡ *Can also be used with the QIAGEN 96-Well-Plate Centrifugation System. Please inquire for more information.*

§ *Requires use of VacConnectors and VacValves (provided in the QIAamp Vac Accessory Set)*

** *Requires use of QIAvac Luer Adapters with VacConnectors*

QIAvac 24 Vacuum Manifold

Applications

QIAvac 24 is designed for fast and efficient vacuum processing of up to 24 QIAGEN spin columns in parallel (Table 1). Samples and wash solutions are drawn through the column membranes by vacuum instead of centrifugation, providing greater speed and reduced hands-on time in purification procedures. QIAprep and QIAquick spin columns are inserted directly into the luer extensions of the QIAvac 24 manifold, while QIAamp mini spin columns are processed on QIAvac 24 using VacConnectors and VacValves to avoid cross contamination. For maintenance of QIAvac 24, please refer to the handling guidelines on page 12.

To set up and operate QIAvac 24 for a particular application, please refer to the instructions given on:

- page 9 for QIAprep, QIAquick, MinElute, and RNeasy spin columns
- page 10 for QIAamp mini spin columns

as well as the detailed vacuum protocols provided in the individual kit handbooks.

Table 1. Kits containing spin columns that can be processed on QIAvac 24

Application	Kit	Accessories
Plasmid minipreps	QIAprep Spin Miniprep Kit	—
M13 ssDNA purification	QIAprep Spin M13 Kit	—
DNA cleanup	MinElute PCR Purification Kit	—
	MinElute Gel Extraction Kit	—
	MinElute Reaction Cleanup Kit	—
	QIAquick PCR Purification Kit	—
	QIAquick Gel Extraction Kit	—
	QIAquick Nucleotide Removal Kit*	—
Genomic and viral DNA isolation from blood and body fluids	QIAamp DNA Blood Mini Kit	VacConnectors and VacValves†
	QIAamp DNA Mini Kit‡	VacConnectors and VacValves†
Total RNA isolation	RNeasy Mini Kit	VacConnectors§
Viral RNA isolation from cell-free body fluids	QIAamp Viral RNA Mini Kit	VacConnectors and VacValves†

** Vacuum processing is not recommended for radioactive samples.*

† Provided in the QIAamp Vac Accessory Set.

‡ Vacuum protocol is not suitable for processing of tissue samples.

§ Recommended for use with the RNeasy Mini Kit to avoid cross contamination.

Processing QIAprep, QIAquick, MinElute, and RNeasy spin columns on QIAvac 24

For processing spin columns on QIAvac 24, set up the manifold as follows (see also Figure 1):

1. **Place the QIAvac 24 lid on top of the QIAvac 24 base. Make sure that the gasket fits tightly in the groove of the QIAvac 24 lid.**
2. **Insert up to 24 spin columns into the luer extensions of the QIAvac 24 lid. Close unused positions with luer caps.**
3. **Connect QIAvac 24 to a vacuum source. For DNA purification follow instructions for the QIAvac 24 vacuum protocol in the relevant handbook.**

   After the vacuum is switched on it may be necessary to press down on the QIAvac 24 lid in order to achieve a tight seal.
4. **After sample processing, discard the liquid waste in the QIAvac 24 base, clean QIAvac 24 components with water, and either air dry or dry with paper towels.**

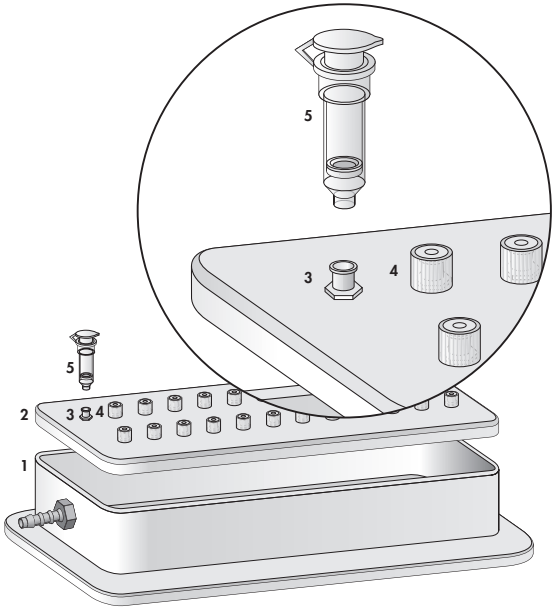

Figure 1: *Setting up QIAvac 24 with QIAprep, QIAquick, MinElute, or RNeasy Mini spin columns.*

1. QIAvac 24 base
2. QIAvac 24 lid
3. Luer extension of QIAvac 24
4. Luer extension closed with luer cap
*5. Spin column**

** Not included with QIAvac 24. Included in appropriate kits.*

Processing QIAamp mini spin columns on QIAvac 24

For the vacuum protocol, a vacuum pump capable of producing a vacuum of –800 to –900 mbar (e.g. KNF Neuberger LABOPORT® type N 840.3 FT 18) is required.
QIAamp mini spin columns are processed on QIAvac 24 using VacConnectors and VacValves. VacValves are inserted directly into the luer extensions of the QIAvac 24 manifold and ensure a steady flow rate, facilitating parallel processing of samples of different nature (e.g., whole blood and plasma), volumes, or viscosities. They should be used if sample flow rates differ significantly in order to ensure consistent vacuum. VacConnectors are disposable connectors that fit between the QIAamp mini spin columns and the VacValves. They prevent direct contact between the spin columns and the VacValves during purification, avoiding any cross contamination between samples. VacConnectors are discarded after single use.

For processing QIAamp mini spin columns on QIAvac 24 using VacConnectors and VacValves, set up the manifold as follows (see also Figure 2):

1. **Place the QIAvac 24 lid on top of the QIAvac 24 base. Make sure that the gasket fits tightly in the groove of the QIAvac 24. Connect QIAvac 24 to a vacuum source, placing a vacuum trap between the manifold and the source.**
2. **Insert a VacValve into every second luer extension of the QIAvac 24 lid. Close unused luer extensions with luer caps.**

   Sample processing is most convenient if only 12 samples are processed in parallel (i.e., every second luer extension). VacValves should be used if flow rates of samples differ significantly to ensure consistent vacuum.
3. **Insert a VacConnector into each VacValve.**

   Perform this step directly before starting the purification to avoid exposure of VacConnectors to potential contaminants in the air.
4. **Place a QIAamp mini spin column into each VacConnector on the manifold.**
5. **For nucleic acid purification follow instructions of the vacuum protocol in the appropriate QIAamp handbook. Discard the VacConnectors appropriately after use.**

   After the vacuum is switched on it may be necessary to press down on the QIAvac 24 lid in order to achieve a tight seal.

   VacValves should be closed for sample loading, and opened just before the vacuum is switched on. Each VacValve can be closed individually when the sample is completely drawn through the spin column, allowing parallel processing of samples of different volumes or viscosities.
6. **After processing of samples, discard the liquid waste in the QIAvac 24 base appropriately, clean QIAvac 24 components with water, and either air dry or dry with paper towels.**

   Note: Buffers AL, AVL, and AW1 used in QIAamp procedures are not compatible with disinfecting agents containing bleach.

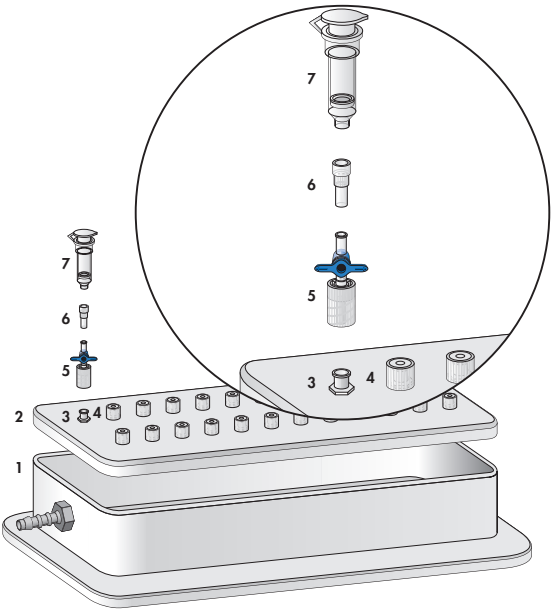

Figure 2: *Setting up QIAvac 24 with QIAamp mini spin columns using VacValves and VacConnectors.*

1. QIAvac 24 base
2. QIAvac 24 lid
3. Luer extension of QIAvac 24
4. Luer extension closed with luer cap
*5. VacValve**
*6. VacConnector**
7. QIAamp mini spin column†

** Not included with QIAvac 24. Must be purchased separately.*
† Not included with QIAvac 24. Included in appropriate kits.

Handling Guidelines for QIAvac 24

The following guidelines should be followed when working with QIAvac 24.

- Always place QIAvac 24 on a secure bench top or work area. If dropped, the QIAvac 24 manifold may crack.
- Always store QIAvac 24 clean and dry. To clean, simply rinse all components with distilled water and allow to air dry or dry with paper towels.
- The components of QIAvac 24 are not resistant to certain solvents (Table 2). If these solvents are spilled on the unit, rinse it thoroughly with water.
- To ensure consistent performance, do not apply silicone or vacuum grease to any part of the QIAvac 24 manifold.
- Always use caution and wear safety glasses when working near a vacuum manifold under pressure.
- Contact QIAGEN Technical Services or your local distributor for information concerning spare or replacement parts.

Table 2. Chemical resistance properties of QIAvac 24

Resistant to:		Not resistant to:
Chlorine Bleach	Acetone	Phenol
Hydrochloric acid	Chromic acid	Benzene
Sodium chloride	Concentrated alcohols	Chloroform
Sodium hydroxide	Chaotropic salts	Ethers
Urea	SDS	Toluene
Acetic acid	Tween® 20	

QIAvac 6S Vacuum Manifold

Applications

QIAvac 6S provides all manifold components for processing QIAGEN 8-well strips. Up to six 8-well strips fit into the QIAvac 6S top plate, allowing up to 48 samples to be processed in parallel (Table 3). Alternatively, up to six QIAvac Luer Adapters (available separately, see Ordering Information on page 29) can be inserted into the QIAvac 6S top plate allowing convenient processing of up to 24 spin columns in parallel (Table 4). QIAprep, MinElute, RNeasy, and QIAquick spin columns fit directly into the Luer Adapters, while QIAamp spin columns are processed using QIAvac Luer Adapters plus VacConnectors. Samples and wash solutions are drawn through the spin columns by vacuum instead of centrifugation, providing greater speed in purification procedures. For multiwell procedures using QIAvac manifolds, we recommend monitoring the vacuum pressure (see page 26) using a vacuum regulator such as the one supplied by QIAGEN (Cat. No. 19530, see page 23). For maintenance of QIAvac 6S, please refer to the handling guidelines on page 22.

To set up and operate QIAvac 6S for a particular application, please refer to the instructions given on the following pages as well as the detailed vacuum protocols provided in the individual kit handbooks.

Table 3. Kits that require the use of QIAvac 6S

Application	Kit
Plasmid minipreps	QIAprep 8 Miniprep Kit QIAprep 8 Turbo Miniprep Kit QIAwell 8 Ultra Plasmid Kit
DNA cleanup	QIAquick 8 PCR Purification Kit

Table 4. Kits containing spin columns that can be processed on QIAvac 6S

Application	Kit	Accessories required
Plasmid minipreps	QIAprep Spin Miniprep Kit	QIAvac Luer Adapters
M13 ssDNA purification	QIAprep Spin M13 Kit	QIAvac Luer Adapters
DNA cleanup	MinElute PCR Purification Kit	QIAvac Luer Adapters
	MinElute Gel Extraction Kit	QIAvac Luer Adapters
	MinElute Reaction Cleanup Kit	QIAvac Luer Adapters
	QIAquick PCR Purification Kit	QIAvac Luer Adapters
	QIAquick Gel Extraction Kit	QIAvac Luer Adapters
	QIAquick Nucleotide Removal Kit*	QIAvac Luer Adapters
Genomic and viral DNA isolation from blood and body fluids	QIAamp DNA Blood Mini Kit QIAamp DNA Mini Kit†	QIAvac Luer Adapters plus VacConnectors
Total RNA isolation	RNeasy Mini Kit	QIAvac Luer Adapters plus VacConnectors‡
Viral RNA isolation	QIAamp Viral RNA Mini Kit	QIAvac Luer Adapters plus VacConnectors

** Vacuum processing is not recommended for radioactive samples.*

† Vacuum protocol is not suitable for processing of tissue samples.

‡ Recommended for use with the RNeasy Mini Kit to avoid cross contamination.

Components of QIAvac 6S

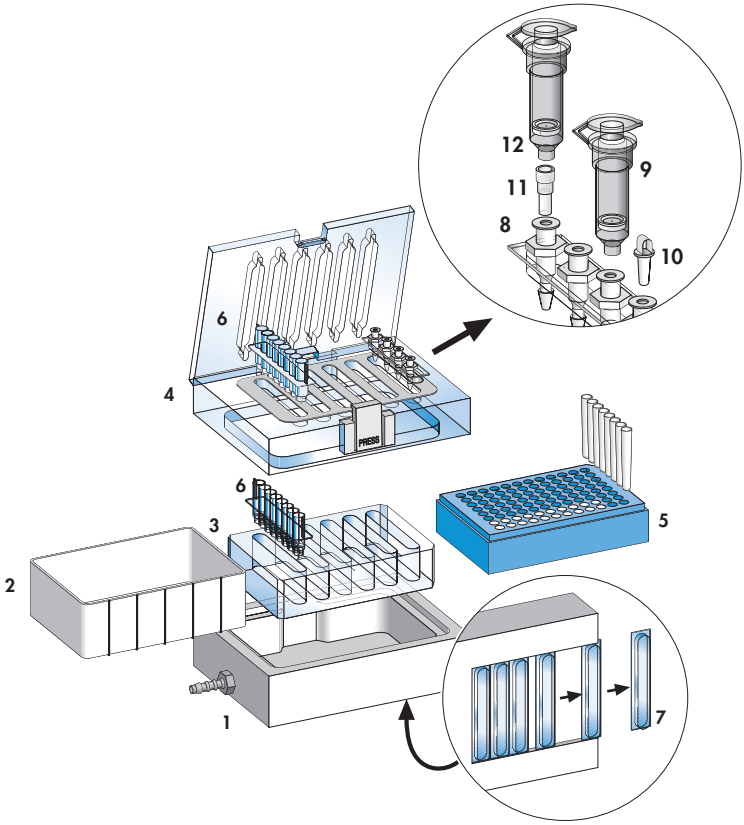

Figure 3. *Components of the QIAvac 6S manifold.*

1. *QIAvac base, which holds a waste tray, a strip holder, or a microtube rack*
2. *Waste tray*
3. *QIAvac strip holder to hold 8-well strips*
4. *QIAvac top plate with slots for 8-well strips or QIAvac Luer Adapters*
5. *Microtube rack*
6. *8-well strip**
7. *Blanks to seal unused slots*
8. *QIAvac Luer Adapter with 4 luer connectors for spin columns†*
9. *Spin column**
10. *Plug to seal unused luer connectors†*
11. *VacConnector†*
12. *QIAamp mini spin column**

** Not included with QIAvac 6S. Included in appropriate kits.*

† Not included with QIAvac 6S. Must be purchased separately.

QIAvac base (1)

The QIAvac base holds a strip holder, a waste tray, or a microtube rack either containing collection microtubes or with a 96-well microplate placed on top. To place components in the QIAvac base:

1. **Remove the QIAvac 6S top plate from the base.**
2. **Place the required component (strip holder, waste tray, or collection microtube rack) in the base.**
3. **Close the QIAvac 6S by placing the top plate squarely over the base.**

   Make sure that strips in the top plate line up with strips or collection microtubes positioned underneath.

Waste tray (2)

Place the waste tray into the QIAvac base.

The waste tray collects liquid waste during adsorption and washing steps.

Strip holder (3)

Place 1–6 strips into the slots of the strip holder as required, and place the strip holder into the QIAvac base.

The strip holder is used in procedures where samples from strips in the top plate are eluted directly into another set of strips for further processing. For example, in the QIAprep 8 Turbo procedure, samples are transferred directly from TurboFilter™ strips (clear with blue rings) into QIAprep strips (blue), and in the QIAwell 8 Ultra procedure, samples are transferred directly from QIAfilter™ strips (yellow) into QIAwell strips (clear), and from QIAwell strips (clear) into QIAprep strips (blue).

Ensure that the number of strips in the strip holder is equivalent to the number of strips in the top plate.

Note: As the strip holder is not symmetrical, ensure that outlet nozzles of the upper 8-well strips are correctly aligned with the wells of the lower 8-well strips.

QIAvac 6S top plate (4)

The top plate of QIAvac 6S can hold up to six 8-well strips (6) for parallel purification of up to 48 samples. Alternatively up to six luer adapters (8) can be inserted for processing of up to 24 spin columns (9+12). Unused slots are sealed with blanks (7). To load 8-well strips or QIAvac Luer Adapters into the QIAvac top plate:

1. **Open the top plate lid by pressing on the lower part of the spring lock while simultaneously lifting the front edge of the flip-up lid.**

   A slight backward movement of the lid before lifting may facilitate release from the lock mechanism.

2. **Insert up to six 8-well strips or luer adapters into the slots of the top plate.**

   Close unused wells of strips with caps or unused wells of the luer adapter with plugs. Ensure that strips or luer adapters are properly seated on the foam gasket.

   Note: As the QIAvac 6S top plate is not symmetrical, ensure that the outlet nozzles of the 8-well strips in the QIAvac top plate align with the wells or collection microtubes underneath.

3. **Place blanks in any unused slots.**

   The blanks are conveniently stored under the base of the QIAvac 6S when not in use. Do not store the blanks in the slots of the top plate as this can cause deformation of the gasket.

4. **Close the lid of the top plate.**

   Ensure that the front clasp locks securely so that the unit will seal under vacuum.

Collection microtube rack (5)

Place the required number of 1.2 ml collection microtubes in the appropriate rows of the collection microtube rack, and place the microtube rack in the QIAvac base.

The collection microtube rack is used during the final elution of purified nucleic acids. Collection microtubes should be placed in every second row (positions A–H in rows 2, 4, 6, 8, 10, and 12) and aligned with the corresponding strips in the top plate. For storage of eluted samples, see page 25.

Alternatively, samples can be eluted into a 96-well microplate placed on top of an empty collection microtube rack in the QIAvac base. See page 25 for details.

QIAvac Luer Adapters for spin columns (8)

Insert up to six QIAvac Luer Adapters into the slots of the QIAvac 6S top plate (see "QIAvac 6S top plate"), and insert spin columns into the luer connectors.

QIAvac Luer Adapters are available as an accessory (see Ordering Information, page 29) to facilitate processing of multiple spin columns. Each Luer Adapter holds 4 spin columns, and six Luer Adapters can be inserted into QIAvac 6S, enabling up to 24 spin columns to be processed in parallel on QIAvac 6S. QIAprep, QIAquick, MinElute, and RNeasy spin columns have luer outlets that fit directly into the QIAvac Luer Adapters, while QIAamp mini spin columns are processed on QIAvac 6S using QIAvac Luer Adapters with VacConnectors (see next section).

VacConnectors (11)

Insert a VacConnector into every second luer connector of the QIAvac Luer Adapters on QIAvac 6S immediately before starting the protocol. Insert a QIAamp mini spin column into each VacConnector on the manifold.

VacConnectors are available as accessories (see Ordering Information, page 29) for processing QIAamp mini spin columns on QIAvac 6S using QIAvac Luer Adapters (see previous section). VacConnectors are disposable connectors that fit between the outlet nozzles of QIAamp spin columns and the QIAvac Luer Adapters. They prevent direct contact between the spin columns and luer connectors during purification, avoiding any cross contamination between samples. Sample processing is most convenient if only 12 samples are processed in parallel (i.e., every second luer connector). VacConnectors are discarded after single use.

QIAvac 96 Vacuum Manifold

Applications

QIAvac 96 is designed to efficiently process QIAGEN 96-well plates (Table 5). Up to 96 samples are processed in parallel with minimum handling, providing speed and convenience in high-throughput nucleic acid purification. For multiwell procedures using QIAvac manifolds, we recommend monitoring the vacuum pressure (see page 26) using a vacuum regulator such as the one supplied by QIAGEN (Cat. No. 19530, see page 23). For maintenance of QIAvac 96, please refer to the handling guidelines on page 22.

To set up and operate QIAvac 96 for a particular application, please refer to the instructions given on the following pages as well as the detailed vacuum protocols provided in the individual kit handbooks.

Table 5. Kits that require the use of QIAvac 96

Application	Kit
Plasmid minipreps	QIAprep 96 Turbo Miniprep Kit QIAwell 96 Ultra Plasmid Kit R.E.A.L. Prep 96 Plasmid Kit
M13 ssDNA purification	QIAprep 96 M13 Kit
DNA cleanup	QIAquick 96 PCR Purification Kit
Total RNA isolation	RNeasy 96 Kit*

**Can also be used with the QIAGEN 96-Well-Plate Centrifugation System. Please inquire for more information.*

Components of QIAvac 96

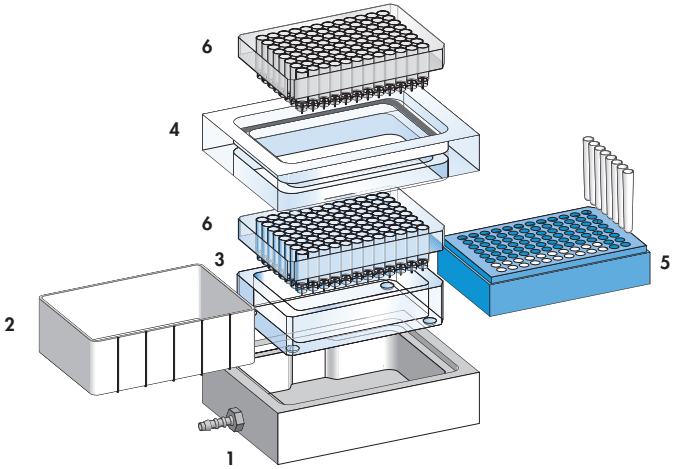

Figure 4. *Components of the QIAvac 96 manifold.*

1. QIAvac base, which holds a waste tray, plate holder, a plate or a microtube rack
2. Waste tray
3. Plate holder (shown with 96-well plate)
4. QIAvac 96 top plate with aperture for 96-well plate
5. Microtube rack
*6. 96-well plate**

** Not included with QIAvac 96. Included in appropriate kits.*

QIAvac base (1)

The QIAvac base holds a plate holder, a waste tray, or a microtube rack either containing collection microtubes or with a 96-well microplate placed on top. To place components in the QIAvac base:

1. **Remove the QIAvac 96 top plate from the base.**
2. **Place the required component (plate holder, waste tray or collection microtube rack) in the base.**
3. **Place the QIAvac 96 top plate squarely over the QIAvac base.**

Waste tray (2)

Place the waste tray into the QIAvac base.

The waste tray collects liquid waste during adsorption and washing steps.

Plate holder (3)

Place a 96-well plate into the plate holder as required, and place the plate holder into the QIAvac base.

The plate holder is used in procedures where samples from a 96-well plate in the top plate are eluted directly into another 96-well plate for further processing. For example, in the QIAprep 96 Turbo procedure, samples are transferred directly from the TurboFilter plate (clear with blue rings) into the QIAprep plate (blue), and in the QIAwell 96 Ultra procedure, samples are transferred directly from the QIAfilter plate (yellow) into the QIAwell plate (clear), and from the QIAwell plate (clear) into the QIAprep plate (blue).

QIAvac 96 top plate (4)

Place the required 96-well plate into the aperture of the top plate, and place the top plate squarely over the QIAvac base.

Collection microtube rack (5)

Place one rack of collection microtubes in the QIAvac base.

The collection microtube rack is used during the final elution of purified nucleic acids. For storage of eluted samples, see page 25.

Alternatively, samples can be eluted into a 96-well microplate placed on top of an empty collection microtube rack in the QIAvac base. See page 25 for details.

Handling Guidelines for QIAvac 6S and QIAvac 96

The following guidelines should be followed when working with QIAvac 6S or QIAvac 96.

- QIAvac 6S and QIAvac 96 operate with house vacuum, a vacuum pump, or a water aspirator.
- Always place QIAvac 6S or QIAvac 96 vacuum manifolds on a secure bench top or work area. If dropped, the manifolds may crack.
- Always store QIAvac 6S or QIAvac 96 vacuum manifolds clean and dry. To clean, simply rinse all components with water and dry with paper towels. Do not air dry as the screws may rust and need to be replaced. Do not use abrasives or solvents
- The components of QIAvac 6S and QIAvac 96 manifolds are not resistant to ethanol, methanol, or other concentrated alcohols (Table 6). Do not expose the clear acrylic components of the QIAvac 6S or QIAvac 96 manifold (top plate, blanks, and strip or plate holder) to alcohol-containing reagents for long periods of time. Extended exposure of acrylic to ethanol will cause surface cracking. Ensure that no Buffer PE, which contains ethanol, remains in the vacuum manifold after use. Neither acrylic nor Delrin® (QIAvac 6S or QIAvac 96 base) are resistant to phenol or chloroform. If these solvents are spilled on the unit, rinse thoroughly with water.
- To ensure consistent performance, **do not apply silicone or vacuum grease to any part of QIAvac 6S or QIAvac 96**. The spring lock on the QIAvac 6S top plate and the self-sealing gasket provide an airtight seal when vacuum is applied to the assembled unit. To maximize gasket lifetime, rinse the gaskets free of salts and buffers after each use and dry with paper towels before storage.
- Use the blanks provided to close unused slots of QIAvac 6S. Blanks are stored in the underside of the QIAvac base plate when not in use (Figure 3, page 15). Do not store blanks in slots of the QIAvac 6S top plate as this can cause deformation of the gasket.
- Always use caution and wear safety glasses when working near a vacuum manifold under pressure.
- If you have any questions regarding the performance or maintenance of your QIAvac manifold, please contact QIAGEN Technical Services or your local distributor.

Table 6. Chemical resistance properties of QIAvac 6S and QIAvac 96

Resistant to:	Not resistant to:	
Chlorine bleach (12%)	Acetic acid	Benzene
Hydrochloric acid	Acetone	Chloroform
Sodium chloride	Chromic acid	Ethers
Sodium hydroxide	Phenol	Toluene
Urea	Concentrated alcohols	

Vacuum Regulator

Applications

The vacuum regulator measures the pressure difference between the inside and outside of a vacuum system in millibars* (Figure 5). QIAGEN products in 8-well strip or 96-well plate formats perform optimally when used with a vacuum source that generates pressures within a specific range (see page 26). Use of a vacuum source that does not generate a vacuum within this range may reduce the yield and purity of the nucleic acid preparation. The use of a vacuum regulator makes it easy to monitor the pressure generated by the vacuum source to ensure that it is sufficient for the appropriate QIAGEN purification chemistry.

Vacuum Regulator

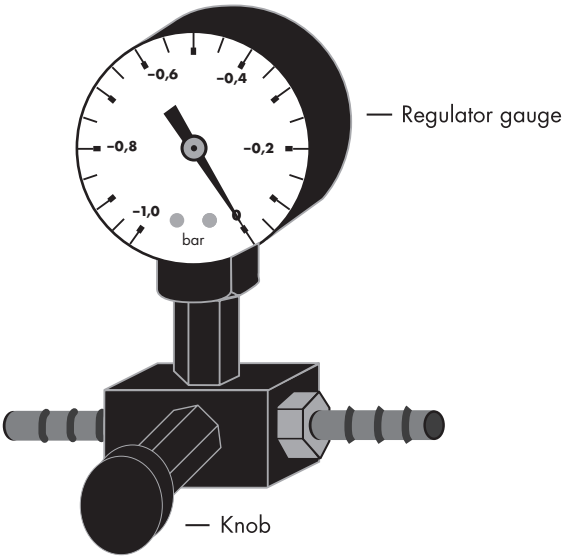

Figure 5. *Schematic diagram of the Vacuum Regulator.*

** Note: the design of the scale is subject to change. The vacuum pressure may be indicated in millibars or in bars (as seen in the figure).*

Storage conditions

The vacuum regulator should be stored upright at room temperature to prevent condensation from collecting inside the unit. Dry thoroughly with absorbent paper after each use to remove any external moisture.

IMPORTANT NOTE: If the vacuum regulator is not kept dry, it may rust and will then no longer operate according to specifications. Rust inside the regulator cannot be removed and the unit cannot be repaired. A vacuum trap can be used to protect the vacuum regulator from volatile reagents.

Procedure for use

1. **Connect the vacuum regulator between the vacuum source and the QIAvac manifold using vacuum tubing.**
2. **Make sure that the knob of the regulator is in the "closed" position (turned completely clockwise) when checking the vacuum pressure.**
3. **Refer to the kit handbook for optimal vacuum or see Table 7 on page 26.**
   - **If the vacuum is too weak, use an alternate vacuum source.**
   - **If the vacuum is too strong, adjust the vacuum pressure by turning the knob on the vacuum regulator counter-clockwise.**

Appendix A: Considerations for Multiwell Vacuum Procedures

Removal of ethanol from 8-well and 96-well modules

It is important that all traces of ethanol from wash buffers are removed prior to elution of purified nucleic acids. Residual ethanol, if carried over, can reduce the elution efficiency and inhibit subsequent enzymatic reactions. Ethanol can be removed efficiently from 8-well strips and 96-well plates by increasing the vacuum to maximum and/or tapping the modules onto a stack of paper towels to absorb the remaining ethanol. Please refer to the protocols provided in the kit handbooks for a detailed description of the ethanol removal procedure.

Elution into 96-well microplates

In multiwell purification procedures on QIAvac 6S or QIAvac 96, samples can be eluted from 8-well strips or 96-well plates into 96-well microplates instead of into the provided 1.2 ml collection microtubes. To elute into a 96-well microplate:

1. **Place an empty blue collection microtube rack into the base of the QIAvac 6S or QIAvac 96 manifold.**
2. **Place a standard 96-well microplate (see Ordering Information on page 30) on top of the rack.**
3. **Reassemble the manifold, making sure that the outlet nozzles of the strips or plate line up with the wells of the microplate.**
4. **Apply appropriate vacuum to elute the samples.**

Storage of eluates

Eluates can be stored in the 1.2 ml collection microtubes provided, which can be closed with the caps provided. Alternatively eluates can be transferred from collection microtubes to 1.5 ml microcentrifuge tubes either by pipetting or by separating the individual collection microtubes, placing them upside down in 1.5 ml microcentrifuge tubes, and centrifuging for ~3 seconds.

Eluates can also be stored in 96-well microplates sealed with adhesive tape such as a tape sheet from QIAGEN Tape Pads. QIAGEN 96-Well Microplates RB come with lids for convenient storage of eluted samples (see Ordering Information on page 30).

Appendix B: Vacuum Pressures for Multiwell Procedures

Vacuum pressures for QIAGEN multiwell procedures should be assessed before beginning the procedure by applying the vacuum to **empty** 8-well strips or 96-well plates on QIAvac manifolds (Table 7 and Figure 6). The optimal vacuum pressure for a particular multiwell chemistry depends on the porosity of the membrane and the viscosity of the samples being applied. It is not necessary to regulate the vacuum pressure for spin column procedures.

The vacuum pressure is the pressure differential between the inside of the manifold and the atmosphere (standard atmospheric pressure: 1013 mbar or 760 mm Hg) and can be measured using a vacuum regulator (see page 23). Vacuum recommendations are given in negative units to indicate the required reduction in pressure with respect to the atmosphere (Figure 7). Table 8 provides pressure conversion to other units.

Table 7. Recommended vacuum pressures for QIAGEN multiwell procedures

Procedure	Application	Module used for checking pressure*	Vacuum pressure‡	
			mbar	mm Hg
8-well procedures on QIAvac 6S				
QIAwell 8 Ultra	Ultrapure plasmid minipreps	QIAfilter 8 Strip(s)†	–200 to –300	–150 to –225
QIAprep 8	High-purity plasmid minipreps	QIAprep 8 Strip(s)†	–100 to –530	–75 to –400
QIAprep 8 Turbo	High-purity plasmid minipreps	QIAprep 8 Strip(s)†	–100 to –530	–75 to –400
QIAquick 8	PCR cleanup	QIAquick 8 Strip(s)†	–200 to –600	–150 to –450
96-well procedures on QIAvac 96				
QIAwell 96 Ultra	Ultrapure plasmid minipreps	QIAfilter 96 Plate	–200 to –300	–150 to –225
QIAprep 96 Turbo	High-purity plasmid minipreps	QIAprep 96 Plate	–40 to –200	–30 to –150
R.E.A.L. Prep 96	Standard-purity plasmid minipreps	QIAfilter 96 Plate	–200 to –300	–150 to –225
QIAprep 96 M13	M13 ssDNA minipreps	QIAprep 96 Plate	–40 to –200	–30 to –150
QIAquick 96	PCR cleanup	QIAquick 96 Plate	–100 to –600	–75 to –450
RNeasy 96	RNA minipreps	RNeasy 96 Plate*	–800 to –900	–600 to –675

* *Vacuum pressure should be regulated using **empty** modules on the manifold. For RNeasy 96, an **empty plate sealed with non-porous tape** should be used for checking pressure.*

† *Regulate the vacuum using the same number of 8-well strips that will subsequently be used for the purification.*

‡ *During the working procedure the vacuum pressure may exceed the values indicated.*

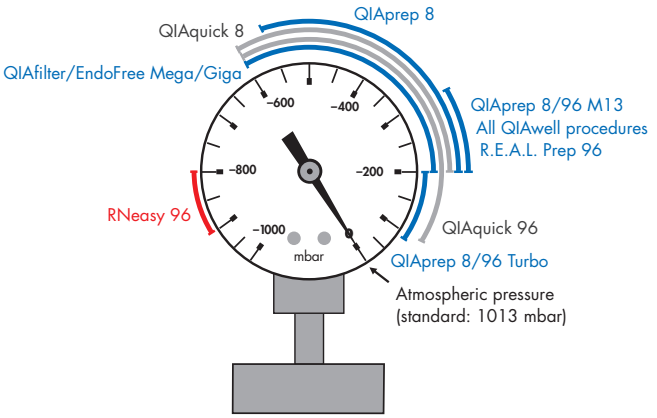

Figure 6. *Schematic representation of recommended vacuum pressures for QIAGEN procedures.*

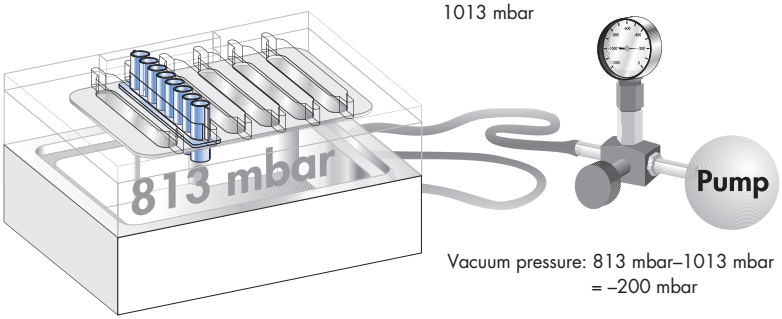

Figure 7. *Definition of vacuum pressure*

Table 8. Pressure conversions

To convert from millibars (mbar) to:	Multiply by:
Millimeters of mercury (mm Hg)	0.75
Kilopascals (kPa)	0.1
Inches of mercury (inch Hg)	0.0394
Torrs (Torr)	0.75
Atmospheres (atmos)	0.000987
Pounds per square inch (psi)	0.0145

Appendix C: Recommendations for Vacuum Source

The following vacuum sources are recommended for QIAGEN purification procedures on QIAvac manifolds.

Module	QIAvac 24	QIAvac 6S	QIAvac 96
QIAquick Spin **QIAprep Spin** **MinElute Spin** **RNeasy Spin**	House vacuum Waterpump 11 liter/min membrane pump 18 liter/min membrane pump	House vacuum 11 liter/min membrane pump 18 liter/min membrane pump	—
QIAamp Spin	18 liter/min membrane pump 34 liter/min membrane pump	18 liter/min membrane pump 34 liter/min membrane pump	
QIAquick 8 **QIAprep 8** **QIAwell 8** **TurboFilter 8** **QIAfilter 8**	—	House vacuum 11 liter/min membrane pump 18 liter/min membrane pump	—
QIAquick 96 **QIAprep 96** **QIAwell 96** **TurboFilter 96** **QIAfilter 96**	—	—	House vacuum 11 liter/min membrane pump 18 liter/min membrane pump
RNeasy 96	—	—	House vacuum 18 liter/min membrane pump

Ordering Information

Product	Contents	Cat. No.
QIAvac manifolds		
QIAvac 24	Vacuum manifold for processing 1–24 spin columns: includes QIAvac 24 base, lid, luer caps	19403
QIAvac 6S	Vacuum manifold for processing 1–6 QIAGEN 8-well strips or 24 spin columns on luer adapters: includes QIAvac 6S Top Plate with flip-up lid, Base, Waste Tray, Blanks, Strip Holder, Rack of Collection Microtubes (1.2 ml)	19503
QIAvac 96	Vacuum manifold for processing QIAGEN 96-well plates: includes QIAvac 96 Top Plate, Base, Waste Tray, Plate Holder, Rack of Collection Microtubes (1.2 ml)	19504
QIAvac accessories		
Vacuum Regulator	For use with QIAvac manifolds	19530
QIAvac Luer Adapter Set*	For processing 1–24 QIAGEN spin columns on QIAvac 6S: 6 adapters with 4 luer connectors each, 24 plugs	19541
QIAamp Vac Accessory Set	For processing QIAamp mini spin columns on QIAvac 24: 12 VacValves, 500 VacConnectors	19409
VacConnectors (500)	500 disposable connectors for use with QIAamp mini spin columns on luer connectors	19407
Replacement parts		
QIAvac Strip Holder	Holder for 1–6 QIAGEN 8-well strips, for use with QIAvac 6S	19547
QIAvac Plate Holder	Holder for QIAGEN 96-well plates, for use with QIAvac 96	19548

** Compatible only with QIAvac Top Plates containing flip-up lid.*

Ordering Information

Product	Contents	Cat. No.
Plasticware accessories		
Collection Microtubes (racked)	Nonsterile polypropylene tubes (1.2 ml), 10 racks of 96	19560
Collection Microtube Caps	Nonsterile polypropylene caps for collection microtubes (1.2 ml) and round-well blocks, 960 in strips of 8	19566
96-Well Microplates RB (24)	96-well microplates with round-bottom wells plus lids, 24 per case, for use with QIAvac 6S and 96 and the BioRobot 9600	19581
Tape Pads (5)	Adhesive tape sheets for sealing multiwell plates and blocks: 25 sheets per pad, 5 pads per pack	19570

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.

www.qiagen.com

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