Automatable on QIAcube

# QIAamp® virus kits

## For purification of viral DNA and RNA from a wide range of sample materials

QIAGEN's proven QIAamp Kits set the standard for purification of viral DNA and RNA. QIAamp virus kits enable rapid and efficient purification of high-quality viral nucleic acids from a diverse variety of sample materials for a broad range of downstream applications.

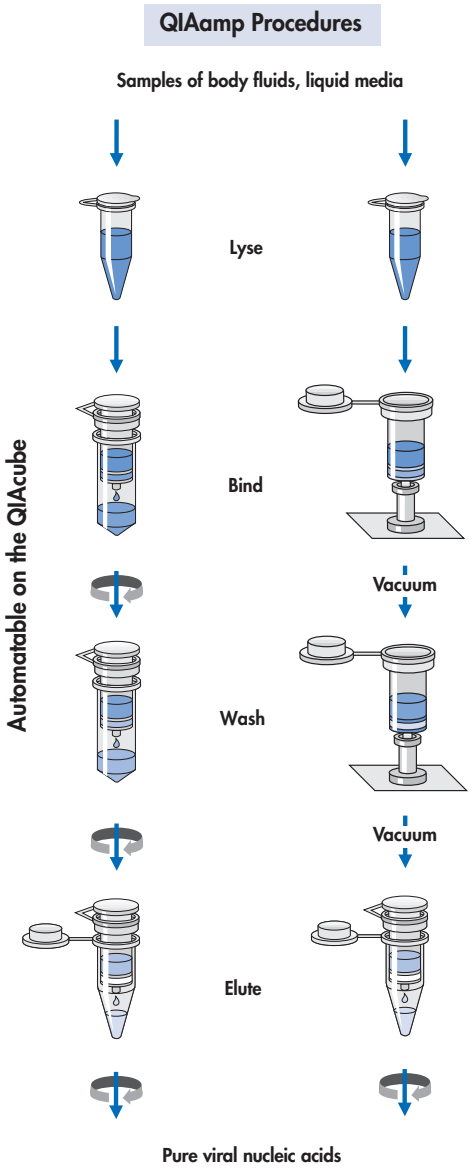
**QIAamp virus kits provide:**

- Rapid and reliable purification of high-quality viral DNA and RNA
- Fast procedures and easy handling
- Highly efficient recovery of viral DNA and RNA
- Pure DNA and RNA ready for downstream applications
- No phenol–chloroform extraction or time-consuming alcohol precipitation

## Rapid and reliable purification

QIAGEN provides a variety of QIAamp virus kits for fast, efficient, and easy purification of viral DNA and RNA. Protocols can be carried out manually (using either a microcentrifuge or a vacuum manifold*) or fully automated on the QIAcube®. Manual protocols require minimal user interaction and yield purified viral nucleic acids in less than an hour after sample lysis. Automated protocols on the QIAcube enable walkaway processing. The manual and automated procedures are designed to ensure that there is no detectable sample-to-sample cross-contamination and to allow safe handling of potentially infectious samples. The simple procedures are ideal for rapid simultaneous processing of multiple samples.

* Requires use of the QIAvac 24 Plus with VacConnectors (see ordering information).



## Selecting the optimal kit for a wide range of sample materials

QIAamp virus kits utilize the selective binding properties of the unique QIAamp silica membrane to isolate pure viral DNA and RNA. After lysis in an optimized buffer and adjustment of binding conditions, the sample is loaded directly onto a QIAamp spin column. Viral DNA and RNA are bound to the silica membrane, and contaminants are completely removed in 2 wash steps. Pure viral DNA and RNA are eluted in small volumes of a low-salt buffer or water, ready for use in downstream applications.

The QIAamp UltraSens® Virus Kit provides a proprietary technology to concentrate viral nucleic acids in plasma and serum samples followed by nucleic acid purification using proven QIAamp technology.

The QIAamp Circulating Nucleic Acid Kit simplifies isolation of viral and free-circulating DNA and RNA from plasma, serum, or urine, offering efficient purification and concentration from starting materials that contain low concentrations of mostly fragmented DNA, RNA and viral nucleic acids.

| Application | Sample type | QIAamp Viral RNA Mini Kit (Page 5) | QIAamp MinElute Virus Spin Kit (Page 6) | QIAamp MinElute Virus Vacuum Kit (Page 6) | QIAamp Circulating Nucleic Acid Kit (Page 7) | QIAamp UltraSens Virus Kit (Page 8) | QIAamp MinElute Media Kit (Page 9) | QIAamp Viral RNA Mini Kit (Page 5) | QIAamp MinElute Virus Spin Kit (Page 6) | QIAamp MinElute Media Kit (Page 9) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Manual | | | | | | Automatable on QIAcube | | |
| Viral RNA purification | Human plasma, serum, and CSF | ■ | | | | | | ■ | | |
| Viral RNA and DNA copurification | Human plasma and serum | | ■ | ■ | ■ | ■ | | | ■ | |
| | Human CSF and other cell-free body fluids | | ■ | ■ | ■ | | | | ■ | |
| Viral DNA purification | Liquid transport media | | | | | | ■ | | | ■ |
| | Urine | | | | ■ | | ■ | | | ■ |

■: Recommended kit.

| | Sample Input Volume | | | | | | Processing | |
|---|---|---|---|---|---|---|---|---|
| | 140 µl* | 200 µl | 250 µl | 500 µl | 1 ml | up to 5 ml | Spin | Vacuum |
| QIAamp Viral RNA Mini Kit | ■ | | | | | | ■ | ■ |
| QIAamp MinElute Virus Spin Kit | | ■ | | | | | ■ | |
| QIAamp MinElute Virus Vacuum Kit | | | | ■ | | | | ■ |
| QIAamp Circulating Nucleic Acid Kit | | | | | ■ | ■ | | ■ |
| QIAamp UltraSens Virus Kit | | | | | ■ | | ■ | |
| QIAamp MinElute Media Kit | | | ■ | | | | | ■ |

* or up to 560 µl if multiple loading

# Fully automated viral nucleic acid purification

The QIAamp MinElute Virus Spin Kit, QIAamp MinElute Media Kit, and QIAamp Viral RNA Mini Kit can be fully automated on the QIAcube (Figure 1). The innovative QIAcube uses advanced technology to process QIAGEN spin columns, enabling seamless integration of automated, low-throughput sample prep into any laboratory workflow. Sample preparation using the QIAcube follows the same steps as the manual procedure (i.e., bind, wash, and elute) enabling purification of high-quality viral nucleic acids.

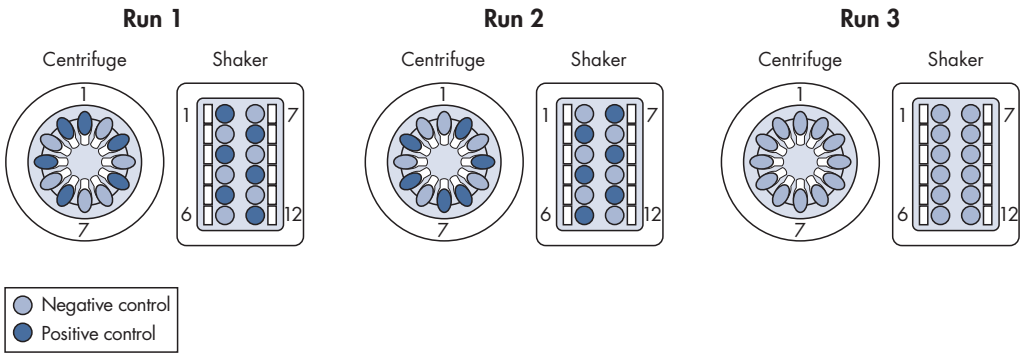
The standardized, automated purification procedure helps to eliminate human error, providing results that are comparable between experiments and labs. This gives you more time to focus on downstream analysis.

## Walkaway spin-column processing

The fully automated QIAcube, equipped with a 12-bucket centrifuge, eliminates manual centrifugation steps, giving you more time for other tasks. Innovative disposable rotor adapters hold spin columns and collection tubes in the centrifuge (Figure 3). Highly pure nucleic acids are eluted into collection tubes, ready to use in sensitive downstream applications.

The QIAcube is preinstalled with protocols for purification of viral nucleic acids and also for genomic DNA, plasmid DNA, RNA, and proteins. The range of protocols available is continually expanding, and additional QIAGEN protocols can be downloaded free of charge at www.qiagen.com/MyQIAcube.


**Figure 1. Fully automated nucleic acid purification using QIAamp virus kits.** The QIAcube enables walkaway automation of many QIAGEN spin-column procedures. Visit www.qiagen.com/MyQIAcube for more information.




| Run | Position | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | 19.5 | x | 19.4 | x | 18.8 | x | x | 19.0 | x | 19.1 | x | 19.8 |
| 2 | x | 19.1 | x | 18.9 | x | 18.8 | 18.7 | x | 19.2 | x | 18.9 | x |
| 3 | x | x | x | x | x | x | x | x | x | x | x | x |

**Figure 2. Automated processing with no detectable cross-contamination in the following experiment.** The cross-contamination test was performed using a quantified parvovirus B19 sample. The viral load of positive samples used for the carry-over tests was 1.0 x $10^9$ IU/ml. For dilution of positive samples and as negative control samples, a human parvovirus B19 negative EDTA plasma pool was used. Parvovirus B19 DNA was detected and quantitated using an in-house parvo B19 PCR assay. Mean $C_T$ value of all samples: 19.1 ± 0.31 (CV = 1.6%), X: Unresponsive after 45 PCR cycles.

**Figure 3. Freedom from laborious manual tasks.** The QIAcube is equipped with an automated centrifuge and pipetting system. No manual handling steps are required.

# Rapid and reliable isolation of viral RNA

The QIAamp Viral RNA Mini Kit simplifies purification of viral RNA from cell-free body fluids such as plasma, serum, and urine with fast spin-column or vacuum procedures.

**The QIAamp Viral RNA Mini Kit provides:**

- Rapid isolation of high-quality, ready-to-use RNA
- No organic extraction or alcohol precipitation
- Highly efficient recovery (>90%) of viral RNA at any titer (Table 1)
- Complete removal of contaminants and inhibitors

Proven QIAamp silica-membrane technology enables rapid isolation of viral RNA in as little as 20 minutes. The high-quality viral RNA performs well in a wide range of downstream applications, including viral genotyping, viral epidemiology, and infectious disease research.

Purification can be fully automated on the QIAcube (Figure 4).

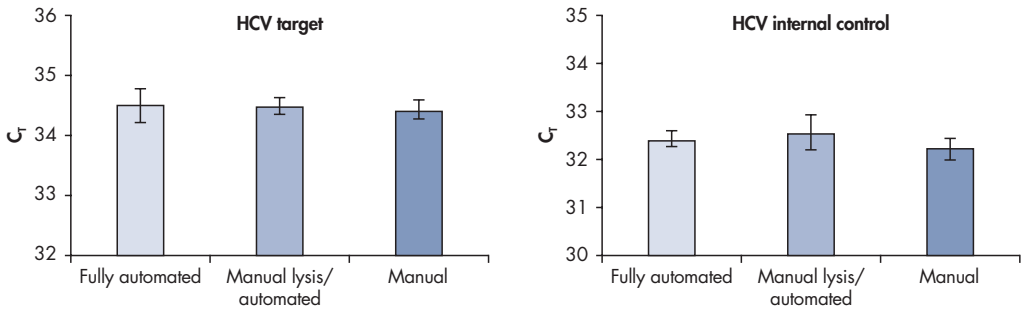



**Figure 4. Comparison of automated and manual purification of HCV RNA using the QIAamp Viral RNA Mini Kit.** Negative human plasma was spiked with 5 x $10^4$ IU/ml HCV, and viral RNA was purified in 6-fold replicates using the QIAamp Viral RNA Mini Kit following either the manual protocol, manual lysis followed by automated purification, or the fully automated protocol on the QIAcube. HCV RNA was detected using an in-house, real-time PCR assay on the Rotor-Gene® 3000.

**Table 1. Example of viral RNA recovery**

| HIV -1 sample (copies/ml) | Theoretical number of HIV-1 copies in sample | HIV-1 RNA recovered in first elution | |
|---|---|---|---|
| | | % Recovery (mean ± SD) | Number of copies recovered |
| 650 | 91 | 96 ± 4.6 | 87 |
| 1300 | 182 | 98 ± 2.8 | 178 |
| 13,000 | 1820 | 98 ± 1.4 | 1780 |
| 130,000 | 18,200 | 95 ± 1.0 | 17,290 |
| 1,000,000 | 140,000 | 91 ± 2.8 | 126,800 |

To determine viral RNA recovery, 140 µl acid citrate dextrose plasma samples with known HIV-1 RNA copy numbers were applied to QIAamp spin columns. A modified protocol involving two elutions was used to determine the efficiency of the spin columns. HIV RNA was detected by RT-PCR-chemiluminescent assay (data excerpted from Lin, H.J., Twandee, T., and Hollinger, F.B. (1997) J. Med. Virol. **51**, 56).

# Simultaneous purification of viral DNA and RNA from plasma, serum, and cell-free body fluids

QIAamp MinElute Virus Kits simplify purification of viral DNA and RNA with fast spin-column or vacuum procedures.

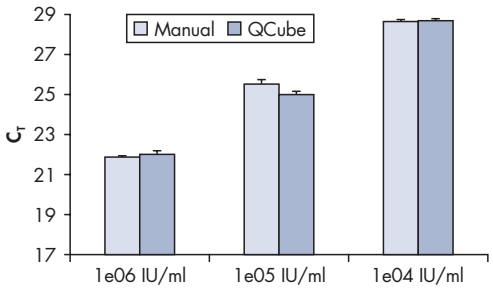



**Figure 5. Comparison of automated and manual purification of viral DNA from plasma using the QIAcube and QIAamp MinElute Virus Spin Kit.** Parvovirus B19 negative samples of plasma were spiked with 8.7 x $10^6$ IU/ml elutions volume of parvovirus B19 control DNA. Isolated parvovirus B19 was detected using an in-house parvovirus B19 PCR assay.

**Table 2. Detection rate**

| | HBV | |
|---|---|---|
| Virus titer (IU/ml) | Replicates | hits |
| 100 | 8 | 8 |
| 50 | 8 | 8 |
| 25 | 8 | 8 |
| 12.5 | 8 | 8 |
| 6.3 | 8 | 8 |
| 3.1 | 8 | 3 |
| 1.6 | 8 | 1 |
| 0 | 8 | 0 |

Sensitivity, serial dilutions of a HBV standard in negative EDTA plasma were processed on the QIAcube. Viral DNA was detected using an in-house HBV PCR assay. Internal controls were added to all samples and were positively detected.

**Figure 6. Comparison of manual and automated purification of HBV DNA and HCV RNA from plasma using the QIAamp MinElute Virus Kit.** Negative human plasma was spiked with 1 x $10^4$ IU/ml HBV or 5 x $10^4$ IU/ml. Samples were purified in 6-fold replicates using the QIAamp MinElute Virus Spin Kit following either the manual protocol, manual lysis followed by automated purification, or the fully automated protocol on the QIAcube. Isolated HBV DNA was detected using an in-house HBV PCR assay on the Rotor-Gene 3000. Isolated HCV RNA was detected using an in-house, real-time RT-PCR assay on the Rotor-Gene 3000.

**QIAamp MinElute Virus Kits provide:**

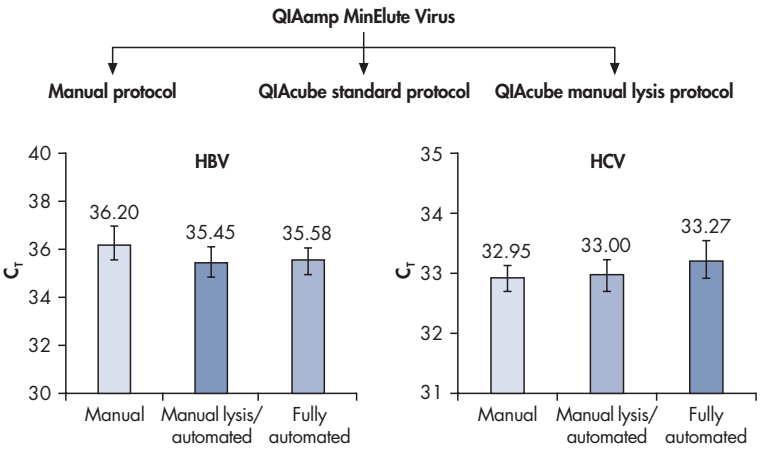
- Rapid purification of high-quality viral DNA and RNA
- No organic extraction or alcohol precipitation
- Consistent, high yields
- Complete removal of contaminants and inhibitor

The QIAamp MinElute Virus Spin Kit uses sample volumes up to 0.2 ml, and the QIAamp MinElute Virus Vacuum Kit can be used with starting sample volumes up to 0.5 ml. Both kits combine the selective binding properties of a silica-based membrane with flexible elution volumes of between 20 and 150 µl. Manual processing time is less than an hour.

Using the QIAamp MinElute Virus Spin Kit, the purification process can be fully automated on the QIAcube. Alternatively, the samples can be lysed manually, followed by automated purification on the QIAcube. Automated processing time requires less than an hour after sample lysis.

The purified viral nucleic acids can be used in a wide range of downstream applications, including:

- PCR and quantitative PCR of DNA viruses (Figures 5 and 6, Table 2)
- RT-PCR and quantitative PCR of RNA viruses (Figure 6)
- Infectious disease research



# Concentration and purification of free-circulating and viral DNA and RNA from human plasma, serum, or urine

QIAamp Circulating Nucleic Acid Kit greatly simplifies the isolation of circulating DNA and RNA, including viral nucleic acids, from plasma, serum, or urine. Downstream applications include viral nucleic acid detection.

**The QIAamp Circulating Nucleic Acid Kit provides:**

- Concentrated nucleic acids, with high input and low elution volumes
- Efficient recovery of fragmented DNA and RNA
- No organic extraction or alcohol precipitation
- Complete removal of contaminants and inhibitors
- Purification of DNA and RNA with high sensitivity

The QIAamp Circulating Nucleic Acid Kit can be used on the QIAvac 24 Plus to enable starting sample volumes up to 5 ml, and flexible elutions volumes between 20 µl and 150 µl allow concentration of nucleic acid species that are present in low concentrations. The kit can also be used for purification and concentration of viral nucleic acids from large sample volumes. The kit provides advanced technology of selective binding to a silica-based membrane for improved recovery of fragmented nucleic acids (Figure 7).

| | HIV-1 RT-PCR | |
|---|---|---|
| Input titer (IU/ml) | Replicates | Hits (%) |
| 80 | 8 | 100 |
| 40 | 16 | 100 |
| 20 | 16 | 94 |
| 10 | 16 | 94 |
| 5 | 16 | 63 |
| 2.5 | 16 | 25 |
| 1.25 | 8 | 0 |
| 0 | 10 | 0 |

| | HBV-specific PCR | |
|---|---|---|
| Input titer (IU/ml) | Replicates | Hits (%) |
| 1 | 8 | 100 |
| 0,5 | 16 | 100 |
| 0.25 | 15 | 93 |
| 0.125 | 16 | 81 |
| 0.0625 | 16 | 81 |
| 0.03125 | 16 | 50 |
| 0 | 8 | 0 |

| | HCV-specific RT-PCR | |
|---|---|---|
| Input titer (IU/ml) | Replicates | Hits (%) |
| 135 | 8 | 100 |
| 45 | 16 | 100 |
| 15 | 16 | 100 |
| 5 | 16 | 94 |
| 1.66 | 16 | 50 |
| 0.56 | 16 | 19 |
| 0 | 8 | 0 |

**Figure 7. Viral nucleic acid detection rates.** Viral nucleic acids were purified from 5 ml human plasma using the QIAamp Circulating Nucleic Acid Kit, with an elution volume of 30 µl. Plasma was spiked with WHO intl. standard material*, and samples prepared according to the standard protocol. Viral nucleic acids were detected using a specific PCR (HPV) and RT-PCR assay (HIC, HCV).

* HIV: NIBSC Code 97/650, HPV: NIBSC Code 97/746, HCV: NIBSC Code 96/798.

# Concentration and isolation of viral DNA and RNA from serum and plasma

The QIAamp UltraSens Virus Kit uses a proprietary technology to concentrate viral nucleic acids in plasma and serum samples, followed by nucleic acid purification using QIAamp technology. The procedure provides increased sensitivity in viral-load monitoring and other applications where high viral nucleic acid recovery is essential.

**The QIAamp UltraSens Virus Kit provides:**

- Viral nucleic acid concentration for increased sensitivity
- No organic extraction or ethanol precipitation
- Rapid isolation of high-quality, ready-to-use viral RNA and DNA
- Consistent, high yields

Starting with sample volumes of up to 1 ml, nucleic acid concentration is achieved by first adding a precipitating reagent to the sample. The reagent forms complexes with nucleic acids, allowing them to be highly concentrated by low-speed centrifugation. This step allows nucleic acid purification from larger sample volumes without requirement of handling large volumes throughout the protocol.

Viral nucleic acids are then purified using QIAamp silica-gel-membrane technology. Lysates are loaded onto the QIAamp spin column. Wash buffers are used to remove impurities and pure, ready-to-use DNA is then eluted in water or low-salt buffer.

The purified nucleic acids perform well in sensitive downstream applications (Figure 8). The procedure provides increased sensitivity in viral-load monitoring and other applications where high viral nucleic acid recovery is essential.

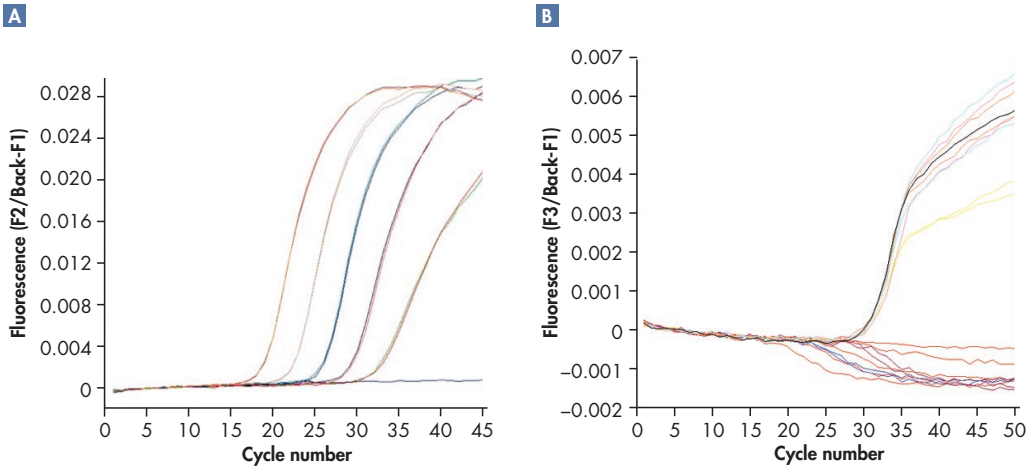



**Figure 8. Sensitive detection of Epstein-Barr virus (EBV).** EBV DNA was purified from serum spiked with serial dilutions of EBV, from $10^6$ to $10^2$ genome equivalents. A EBV DNA was detected using an in-house assay. B Detection of the internal control is used to monitor PCR performance and detect potential PCR inhibition.

# Purification of DNA from liquid media

The QIAamp MinElute Media Kit provides a convenient vacuum procedure for purification of nucleic acids from liquid media, such as cervical swab transport media.

**The QIAamp MinElute Media Kit provides:**

- Purification from a variety of liquid transport media
- Time-saving vacuum procedure for convenient handling and ease of use
- Flexible elution volumes from 20 to 150 µl
- High-quality DNA with efficient removal of alcohols and other contaminants

The QIAamp MinElute Media Kit uses well-established technology for purification of nucleic acids. The kit combines the selective binding properties of a silica-based membrane with flexible elution volumes of between 20 and 150 µl. The kit is suitable for use with liquid media containing nucleic acids, such as cervical swab transport media (e.g., PreservCyt® or SurePath® solution). Nucleic acids are eluted in Buffer AVE, ready for use in amplification reactions or storage. Purified nucleic acids are free of proteins, nucleases, and other impurities.

Purification of DNA using the QIAamp MinElute Media Kit can be automated on the QIAcube.

The QIAamp MinElute Media Kit can be used for purification of cellular, bacterial, and viral nucleic acids from a variety of sources, including:

- Liquid cytology media containing alcohol (e.g., PreservCyt and SurePath)
- Phosphate-buffered liquid transport media (e.g., M4RT)

## Ordering Information

| Product | Contents | Cat. no. |
|---|---|---|
| **QIAamp Viral RNA Mini Kit — for isolation of viral RNA from cell-free body fluids** | | |
| QIAamp Viral RNA Mini Kit (50)* | For 50 RNA preps: 50 QIAamp Mini Spin Columns, Carrier RNA, Collection Tubes (2 ml), RNase-free Buffers | 52904 |
| QIAamp Viral RNA Mini Kit (250)* | For 250 RNA preps: 250 QIAamp Mini Spin Columns, Carrier RNA, Collection Tubes (2 ml), RNase-free Buffers | 52906 |
| **QIAamp MinElute Virus Spin Kit — for simultaneous purification of viral DNA and RNA from plasma, serum, and cell-free body fluids using spin processing** | | |
| QIAamp MinElute Virus Spin Kit (50)* | For 50 minipreps: 50 QIAamp MinElute Columns, QIAGEN Protease, Carrier RNA, Buffers, Collection Tubes (2 ml) | 57704 |
| **QIAamp MinElute Virus Vacuum Kit — for simultaneous purification of viral DNA and RNA from plasma, serum, and cell-free body fluids using vacuum processing** | | |
| QIAamp MinElute Virus Vacuum Kit (50) | For 50 minipreps: 50 QIAamp MinElute Columns, QIAGEN Protease, Carrier RNA, Buffers, Extension Tubes (3 ml), Collection Tubes (1.5 ml) | 57714 |
| **QIAamp Circulating Nucleic Acid Kit — for concentration and purification of free-circulating DNA, RNA, miRNA, and viral nucleic acids from plasma, serum, urine or other cell-free body fluids** | | |
| QIAamp Circulating Nucleic Acid Kit (50) | For 50 preps: QIAamp Mini Columns, Tube Extenders (20 ml), QIAGEN Proteinase K, Carrier RNA, Buffers, VacConnectors, and Collection Tubes (1.5 and 2 ml) | 55114 |
| **QIAamp UltraSens Virus Kit — for concentration and isolation of viral DNA and RNA from serum and plasma** | | |
| QIAamp UltraSens Virus Kit (50) | For 50 viral nucleic acid preps: 50 QIAamp Mini Spin Columns, Proteinase K, Carrier RNA, Collection Tubes (2 ml), Buffers | 53704 |
| QIAamp UltraSens Virus Kit (250) | For 250 viral nucleic acid preps: 250 QIAamp Mini Spin Columns, Proteinase K, Carrier RNA, Collection Tubes (2 ml), Buffers | 53706 |
| **QIAamp MinElute Media Kit — for purification of DNA from liquid media** | | |
| QIAamp MinElute Media Kit | For 50 minipreps: 50 QIAamp MinElute Columns, QIAGEN Proteinase K, Carrier RNA, Buffers, Extension Tubes (3 ml), Collection Tubes (1.5 ml) | 57414 |

* Fully automatable on the QIAcube. See www.qiagen.com/MyQIAcube for protocols.

| Product | Contents | Cat. no. |
|---|---|---|
| **QIAvac 24 Plus — for fast vacuum-driven processing of up to 24 spin columns** | | |
| QIAvac 24 Plus | Vacuum manifold for processing 1–24 spin columns: includes QIAvac 24 Plus Vacuum Manifold, Luer Plugs, Quick Couplings | 19413 |
| VacConnectors (500) | 500 disposable connectors for use with QIAamp spin columns on luer connectors | 19407 |
| Vacuum Pump<br>(115 V, 60 Hz)*<br>(110 V, 60 Hz)†<br>(230 V, 50 Hz)‡ | Universal vacuum pump (capacity 34 L/min, 8 mbar vacuum abs.) | <br>84010*<br>84000†<br>84020‡ |
| QIAvac Connecting System | System to connect vacuum manifold with vacuum pump: includes Tray, Waste Bottles, Tubing, Couplings, Valve, Gauge, 24 VacValves | 19419 |
| Vacuum Regulator | For use with QIAvac manifolds | 19530 |
| VacValves (24) | 24 valves to regulate sample flow rate; for use with the QIAvac 24 Plus | 19408 |
| **QIAcube — for fully automated sample prep using spin-column kits** | | |
| QIAcube<br>(110 V)*†<br>(230 V)‡ | Robotic workstation for automated purification of DNA, RNA, or proteins using QIAGEN spin-column kits, 1-year warranty on parts and labor | <br>9001292*†<br>9001293‡ |
| Warranty PLUS 2 Full, QIAcube | 3-year warranty, 48-hour (2 working days) priority response, all labor, travel, and repair parts | 9240834 |
| Starter Pack, QIAcube | Pack includes: reagent bottle racks (3); rack labeling strips (8); 200 µl filter-tips (1024); 1000 µl filter-tips (1024); 1000 µl filter-tips, wide-bore (1024); 30 ml reagent bottles (18); rotor adapters (240); rotor adapter holder; 1.5 ml elution tubes (240) | 990395 |
| QIAamp MinElute Virus Accessory Set | Additional Buffers and Reagents; for use with at least 9 x QIAamp MinElute Virus Spin Kits (50), catalog number 57704, on the QIAcube | 1043367 |
| QIAamp Viral RNA Mini Accessory Set | Additional Buffers and Reagents; for use with at least 11 x QIAamp Viral RNA Mini Kits (50), catalog number 52904, or 5 x QIAamp Viral RNA Mini Kits (250), catalog number 52906, on the QIAcube | 1048147 |

* US and Canada.

† Japan.

‡ Rest of world.

QIAamp virus kits are also available in 24- and 96-well-plate automated formats for medium- to high-throughput applications; please inquire.

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.

**Find out more about QIAamp virus kits at www.qiagen.com/goto/QIAampVirus!**



**www.qiagen.com**

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**Belgium** ■ 0800-79612
**Brazil** ■ 0800-557779
**Canada** ■ 800-572-9613
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**Denmark** ■ 80-885945
**Finland** ■ 0800-914416
**France** ■ 01-60-920-930
**Germany** ■ 02103-29-12000
**Hong Kong** ■ 800 933 965
**Ireland** ■ 1800 555 049
**Italy** ■ 800-787980
**Japan** ■ 03-6890-7300
**Korea (South)** ■ 080-000-7145
**Luxembourg** ■ 8002 2076
**Mexico** ■ 01-800-7742-436
**The Netherlands** ■ 0800-0229592
**Norway** ■ 800-18859
**Singapore** ■ 1800-742-4368
**Spain** ■ 91-630-7050
**Sweden** ■ 020-790282
**Switzerland** ■ 055-254-22-11
**UK** ■ 01293-422-911
**USA** ■ 800-426-8157