ZYMO RESEARCH
The Beauty of Science is to Make Things Simple

DNA Purification *Made Simple*™

INSTRUCTION MANUAL

Quick-gDNA™ MidiPrep

Catalog No. **D3100**

Highlights

- For the purification of high quality DNA from up to 3 ml whole blood, plasma, serum, body fluids (e.g., semen) and buffy coat, lymphocytes, swabs and cultured cells in less than 20 minutes using innovative *Clean-Spin*™ column technology. Up to 125 µg/prep.
- Compatible with commonly used anticoagulants (i.e., EDTA, heparin, citrate).
- Unique extraction technology excludes the use of Proteinase K and organic denaturants.
- Eluted, inhibitor-free DNA is ideal for PCR, endonuclease digestion, bisulfite conversion/methylation detection, sequencing, genotyping, etc.

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Satisfaction of all Zymo Research products is guaranteed. If you are not satisfied with this product please call 1-888-882-9682.

Product Contents

***Quick-gDNA*™ MidiPrep** (Kit Size)	**D3100** (25 preps.)	**Storage Temperature**
Genomic Lysis Buffer*	2 x 150 ml	Room Temp.
DNA Pre-Wash Buffer**	15 ml	Room Temp.
g-DNA Wash Buffer	50 ml	Room Temp.
DNA Elution Buffer	16 ml	Room Temp.
Zymo-Spin™ V-E Columns w/ Zymo-Midi Filters™	25	Room Temp.
Collection Tubes	50	Room Temp.
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Note **-** Integrity of kit components is guaranteed for up to one year from date of purchase. Reagents are routinely tested on a lot-to-lot basis to ensure they provide maximal performance and reliability.

* *Recommended*: Add beta-mercaptoethanol to 0.5%(v/v) i.e., 750 µl per 150 ml.

**A precipitate may have formed in the DNA Pre-Wash Buffer during shipping. To completely resuspend the buffer, incubate the bottle at 30-37 ºC for 30 minutes and mix by inversion. DO NOT MICROWAVE.

Specifications

- **Sample Sources** – Up to 3 ml (see protocols) whole blood, plasma, or serum from humans, mice, rats, etc. Also, cells from culture as well as a variety of biological liquids are effectively processed using this kit. Tissue already digested with Proteinase K or mechanically homogenized can also be processed.
- **Workflow Overview** – Unique lysis buffer system omits the need for Proteinase K digestion for biological fluids and cell culture samples.
- **DNA Purity** – High-quality DNA is eluted with DNA Elution Buffer or water. DNA is especially well suited for PCR and other downstream applications. A_{260}/A_{280}>1.8
- **DNA Size Limits** – Capable of recovering genomic DNA up to and above 40 kb. In most instances, mitochondrial DNA and viral DNA (if present) will also be recovered.
- **DNA Recovery** – Up to 125 µg total DNA is eluted into ≥150 µl DNA Elution Buffer or water**.** Human whole blood will typically yield 3-7 µg DNA per 100 µl blood sampled. Mammalian tissues already homogenized yield: 1-3 µg DNA per mg skeletal, heart, and brain tissues and 3-5 µg DNA per mg liver, kidney and lung tissues.
- **Product Detergent Tolerance** – ≤5% Triton X-100, ≤5% Tween-20, ≤5% Sarkosyl, ≤0.1% SDS.
- **Equipment** – Centrifuge or vacuum source and manifold, microcentrifuge, vortex

For DNA isolation from biological fluids, cell cultures, and solid tissues utilizing Proteinase K, use the ***Quick*-DNA™ Universal Kit** (D4068, D4069).

For high-throughput purification (96-well, 5 µg DNA/well), use the:

- **ZR-96 *Quick-gDNA*™** (D3010, D3011, D3012) for blood and cells.
- ***Quick*-DNA™ Universal 96 Kit** (D4070, D4071) for biological fluids, cell cultures, and solid tissues.

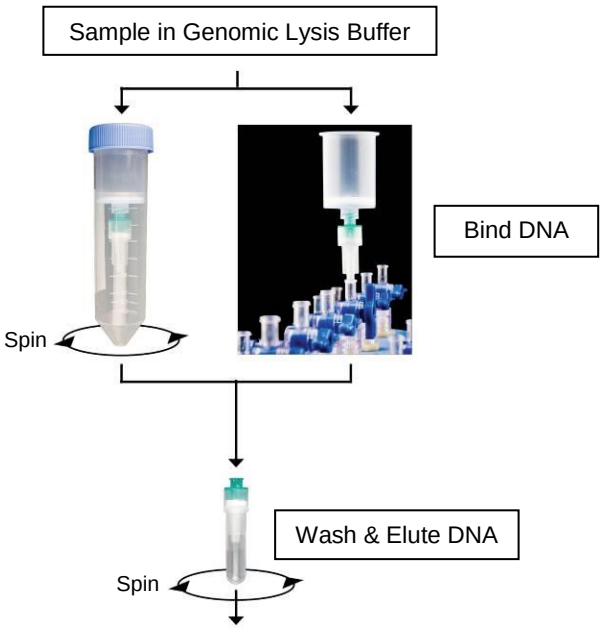
Product Description

The ***Quick-gDNA™* MidiPrep** is a simple procedure for the rapid isolation of total DNA (e.g., genomic, mitochondrial, viral) from a variety of biological sample sources. This product has been optimized for maximal recovery of ultra-pure DNA without RNA contamination and is compatible with whole blood (fresh or stored), serum, plasma, buffy coat, cells from culture, and many biological liquid samples.

For processing, simply add the specially formulated **Genomic Lysis Buffer** to a sample, vortex, and transfer the mixture to the supplied **Zymo-Spin™ Column w/ Zymo-Midi Filter™**. There is no need for organic denaturants or Proteinase K digestion because of the unique lysis buffer system. The product features *Clean-Spin*™ technology to yield high-quality, purified DNA in just 20 minutes (see below). PCR inhibitors are effectively removed during the purification process. DNA purified using the ***Quick-gDNA*™ MidiPrep** is suitable for PCR, nucleotide blotting, DNA sequencing, restriction endonuclease digestion, bisulfite conversion/methylation analysis, and other downstream applications.

Zymo-Spin™ V-E Column w/ Zymo-Midi Filter™

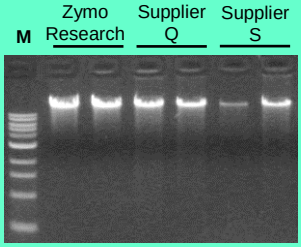
Zymo-Spin™ V-E Column



For routine plasmid DNA purification from *E. coli*, Zymo Research offers the **Zyppy™ Plasmid Miniprep Kit** (D4036) and the **ZymoPURE™ Midi, Maxi,** and **Gigaprep Kits** (D4200, D4202, and D4204).

Zymo Research offers the **EZ DNA Methylation-Lightning™ Kit** (D5030, D5031) for rapid, precise DNA methylation detection and a comprehensive selection of other epigenetic tools.

Looking to isolate RNA? For RNA isolation from TRIzol®, the **Direct-zol™ RNA Kits** (R2050, R2051, R2052, R2053) offer total RNA purification without phase separation in only 7 minutes!



High yield/quality DNA is successfully isolated from porcine whole blood using the ***Quick-gDNA*™ MiniPrep** (D3024). Equivalent amounts (100 µl) of blood were processed without Proteinase K using the ***Quick-gDNA*™ MiniPrep** in half the time as compared to the kits from suppliers Q and S. Equal volumes of eluted DNA were then analyzed (in duplicate) in a 0.8% (w/v) TAE/agarose/ethidium bromide gel. The size marker "M" is a 1 kb ladder (Zymo Research).

For **Technical Assistance**, please contact 1-888-882-9682 or E-mail tech@zymoresearch.com.

Buffer Preparation

✓ *Recommended*: Add beta-mercaptoethanol (user supplied) to the **Genomic Lysis Buffer** to a final dilution of 0.5%(v/v) i.e., 750 µl per 150 ml.

PROTOCOLS

Whole Blood, Serum, and Plasma Samples

The following is for the purification of DNA from up to 3 ml[1] whole blood, serum or plasma (the volumes can be adjusted depending on your requirements). Fresh, frozen, or preserved blood (in EDTA, citrate, or heparin) can be used. If material cannot be processed immediately, the sample can be "stabilized" for later processing (as noted below) although the immediate processing of blood samples is recommended.

For inclusion of small DNAs from serum, add 0.3 volumes isopropanol to the mixture. (*For example, to a 15 ml mixture of serum and Genomic Lysis Buffer add 4.5 ml isopropanol.*)

1. Add 12 ml of **Genomic Lysis Buffer** to 3 ml[1] (4:1) of blood, serum, or plasma. Mix completely by vortexing 4-6 seconds, then let stand 5 minutes at room temperature.

   Note: Add 12 ml Genomic Lysis Buffer to *all* samples < 3 ml.

2. Transfer the mixture to a **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly in a 50 ml tube[2]. Centrifuge the tube at ≥1,000 *x g* (2,000 x *g* max.) for 5 minutes[3].

   Note: If using a vacuum manifold, the processing capacity is reduced to 2 ml of blood, serum, or plasma + 12 ml Genomic Lysis Buffer per prep. This filtration step may take up to twenty minutes when using vacuum.

3. Disconnect the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly and transfer the **Zymo-Spin™ V-E Column** to a **Collection Tube**. Spin at 10,000 x *g* for 1 minute in a microcentrifuge[4] to remove residue from the column.

4. Add 300 µl **DNA Pre-Wash Buffer** to the column and spin at 10,000 x *g* for 1 minute. Discard the flow through.

5. Add 400 µl of **g-DNA Wash Buffer** to the column and centrifuge at 10,000 *x g* for one minute. Discard flow through and repeat wash step.

6. Transfer the **Zymo-Spin™ V-E Column** to a 1.5 ml microcentrifuge tube and add 150 µl **DNA Elution Buffer** directly to the column matrix[5] and allow column to stand for 1 minute at room temperature. Centrifuge at 10,000 x *g* for 1 minute to elute the DNA[6]. The eluted DNA can be used immediately for molecular based applications or stored ≤-20ºC for future use.

Delayed Processing (*Stabilization*) of Blood Samples: The immediate processing of blood with this kit is recommended. However, if blood cannot be processed immediately, samples can be "stabilized" in **Genomic Lysis Buffer** for processing at a later time. To do this, add *four* volumes of **Genomic Lysis Buffer** to *each* volume of whole blood (4:1), then vortex. Blood samples mixed with **Genomic Lysis Buffer** can be stored at room temperature for 1-2 weeks, 0-4ºC for 1-2 months, -20ºC for 6 months to a year, or <-70ºC for many years. Samples stored at ≤4ºC should reach room temperature prior to processing. Begin at Step 2 in the standard protocol (above) when purifying DNA from blood samples stabilized in **Genomic Lysis Buffer**.

Notes:

[1]Processing volumes are up to 3 ml for centrifugation and up to 2 ml for vacuum based manipulations, respectively.

[2]*Caution*: Make sure the connection between the column and filter is secure (finger tight) prior to centrifugation.

[3]Alternatively, the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly can be mounted on a vacuum manifold with a vacuum source set at ≥500 mm Hg.

[4] Leave the rotor cover off the microcentrifuge if clearance with the column tops is a problem.

[5] Elution of DNA from the column is dependent on pH and temperature. If water is used, ensure the pH is >6.0. Also, the total yield may be improved by eluting the DNA with Elution Buffer or water warmed to 60-70ºC.

[6] DNA yields can be increased by performing a second elution and pooling the eluates.

Tissue Samples

Note: *For Proteinase K-digested materials (e.g., tailsnips) follow the protocol for* ***Cell Suspensions and Proteinase K-Digested Samples*** *(pg. 6).*

Otherwise, mechanically homogenize up to 100 mg of fresh or frozen tissue in 2.5 ml of ***Genomic Lysis Buffer****. Increase the reagents proportionally if more than 100 mg of solid tissue is used.*

1. Transfer the lysate to a **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly in a 50 ml tube[1]. Centrifuge the tube at ≥1,000 *x g* (2,000 x *g* max.) for 5 minutes[2].

2. Disconnect the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly and transfer the **Zymo-Spin™ V-E Column** to a **Collection Tube**. Spin at 10,000 x *g* for 1 minute in a microcentrifuge[3] to remove residue from the column.

3. Add 300 µl **DNA Pre-Wash Buffer** to the column and spin at 10,000 x *g* for 1 minute. Discard the flow through.

4. Add 400 µl of **g-DNA Wash Buffer** to the column and centrifuge at 10,000 *x g* for 1 minute. Discard flow through and repeat wash step.

5. Transfer the **Zymo-Spin™ V-E Column** to a 1.5 ml microcentrifuge tube and add 150 µl **DNA Elution Buffer** directly to the column matrix[4] and allow column to stand for 1 minute at room temperature. Centrifuge at 10,000 x *g* for 1 minute to elute the DNA[5]. The eluted DNA can be used immediately for molecular based applications or stored ≤-20°C for future use.

For solid tissues, Proteinase K treatment or mechanical homogenization is required. For purification of up to 25 µg DNA/prep utilizing Proteinase K, use the ***Quick*-DNA™ Universal Kit** (D4068, D4069).

Soft tissue samples are readily homogenized using our **Squisher™-Single**, **Squisher™-8**, and **Squisher™-96** products.

Typical yields are: 1-3 µg DNA per mg skeletal, heart, and brain tissues and 3-5 µg per mg liver, kidney, and lung tissues.

Notes:

[1] *Caution*: Make sure the connection between the column and filter is secure (finger tight) prior to centrifugation.

[2] Alternatively, the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly can be mounted on a vacuum manifold with a vacuum source set at ≥500 mm Hg.

[3] Leave the rotor cover off the microcentrifuge if clearance with the column tops is a problem.

[4] Elution of DNA from the column is dependent on pH and temperature. If water is used, ensure the pH is >6.0. Also, the total yield may be improved by eluting the DNA with Elution Buffer or water pre-equilibrated to 60-70°C.

[5] DNA yields can be increased by performing a second elution and pooling the eluates.

Cell Monolayer Samples

Generally, no more than $25x10^6$ cells should be sampled, for larger samples will exceed the binding capacity of the spin column.

The following procedure is designed for up to $25x10^6$ (max.) monolayer cells. Although cell types and culture conditions may vary, the protocol will work with high-density growth cells (e.g., HeLa cells) as well as with low-density growth cells (e.g., neuronal cells). The table (below) is provided for estimating cell numbers.

1. Trypsinize or manually scrape adherent cells from the growth surface of a culture flask or plate. Centrifuge the cell suspension at approximately 500 x *g* for 5 minutes. Remove the supernatant and add 2.5 ml of **Genomic Lysis Buffer** directly to the pellet. Resuspend pellet by vortexing 4-6 seconds and let stand for 5 minutes at room temperature.

   Alternatively: Cells can be lysed directly in the culture container by removing the medium and adding the Genomic Lysis Buffer directly to the monolayer surface.

2. Transfer the mixture to a **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly in a 50 ml tube[1]. Centrifuge the tube at ≥1,000 *x g* (2,000 x *g* max.) for 5 minutes[2].

7. Disconnect the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly and transfer the **Zymo-Spin™ V-E Column** to a **Collection Tube**. Spin at 10,000 x *g* for 1 minute in a microcentrifuge[3] to remove residue from the column.

8. Add 300 µl **DNA Pre-Wash Buffer** to the column and spin at 10,000 x *g* for 1 minute. Discard the flow through.

9. Add 400 µl of **g-DNA Wash Buffer** to the column and centrifuge at 10,000 *x g* for one minute. Discard flow through and repeat wash step.

3. Transfer the **Zymo-Spin™ V-E Column** to a 1.5 ml microcentrifuge tube and add 150 µl **DNA Elution Buffer** directly to the column matrix[4] and allow column to stand for 1 minute at room temperature. Centrifuge at 10,000 x *g* for 1 minute to elute the DNA[5]. The eluted DNA can be used immediately for molecular based applications or stored ≤-20°C for future use.

Notes:

[1] *Caution*: Make sure the connection between the column and filter is secure (finger tight) prior to centrifugation.

[2] Alternatively, the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly can be mounted on a vacuum manifold with a vacuum source set at ≥500 mm Hg.

[3] Leave the rotor cover off the microcentrifuge if clearance with the column tops is a problem.

[4] Elution of DNA from the column is dependent on pH and temperature. If water is used, ensure the pH is >6.0. Also, the total yield may be improved by eluting the DNA with Elution Buffer or water pre-equilibrated to 60-70°C.

[5] DNA yields can be increased by performing a second elution and pooling the eluates.

Guidelines for Monolayer Cell DNA Isolation: The above procedure is designed for the processing of up to $25x10^6$ cells. However, cell numbers (growth densities) can vary between different cell types. The table below provides a reference for the approximation of what can be recovered from different culture containers for high-density growth cells like CV1 and HeLa cells.

Culture Plate/Flask Growth Area (cm^2) and Cell Number

Culture Container	Well /Flask Surface Area	Cell Number
96-well plate (each well)	0.32 - 0.6 cm^2	$4-5x10^4$
24-well plate (each well)	2 cm^2	$1-3x10^5$
12-well plate (each well)	4 cm^2	$4-5x10^5$
6-well plate (each well)	9.5 cm^2	$0.5-1x10^6$
T25 Culture Flask	25 cm^2	$2-3x10^6$
T75 Culture Flask	75 cm^2	$0.6-1x10^7$
T175 Culture Flask	175 cm^2	$2-3x10^7$

Cell Suspensions and Proteinase K Digested Samples

The following protocol is designed for up to 1 ml of biological liquid sample including CSF, buffy coat, body fluids (semen), and cell suspensions containing less than 25x10^6 cells as well as lysates derived from Proteinase K digested samples.

1. Add 4 volumes of **Genomic Lysis Buffer** to each volume of liquid sample. (For example, for 1 ml of sample, add 4 ml of **Genomic Lysis Buffer**). Mix briefly by vortexing, then let stand at room temperature for 5 minutes.

   Note: For Proteinase K digested material, add 4 volumes of **Genomic Lysis Buffer** to each volume of lysate then mix briefly by vortexing. Transfer up to 5.0 ml supernatant to the Zymo-Spin™ Column in Step 2.

2. Transfer the mixture to a **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly in a 50 ml tube[1]. Centrifuge the tube at ≥1,000 *x g* (2,000 x *g* max.) for 5 minutes[2].

6. Disconnect the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly and transfer the **Zymo-Spin™ V-E Column** to a **Collection Tube**. Spin at 10,000 x *g* for 1 minute in a microcentrifuge[3] to remove residue from the column.

7. Add 300 µl **DNA Pre-Wash Buffer** to the column and spin at 10,000 x *g* for 1 minute. Discard the flow through.

8. Add 400 µl of **g-DNA Wash Buffer** to the column and centrifuge at 10,000 *x g* for one minute. Discard flow through and repeat wash step.

3. Transfer the **Zymo-Spin™ V-E Column** to a 1.5 ml microcentrifuge tube and add 150 µl **DNA Elution Buffer** directly to the column matrix[4] and allow column to stand for 1 minute at room temperature. Centrifuge at 10,000 x *g* for 1 minute to elute the DNA[5]. The eluted DNA can be used immediately for molecular based applications or stored ≤-20°C for future use.

Cells should be processed directly from biological fluids or from suspension in PBS, TE, or compatible buffers.

For solid tissues, Proteinase K treatment or mechanical homogenization is required. For purification of up to 25 µg DNA/prep utilizing Proteinase K, use the ***Quick*-DNA™ Universal Kit** (D4068, D4069).

Notes:

[1]*Caution*: Make sure the connection between the column and filter is secure (finger tight) prior to centrifugation.

[2]Alternatively, the **Zymo-Spin™ V-E Column/Zymo-Midi Filter™** assembly can be mounted on a vacuum manifold with a vacuum source set at ≥500 mm Hg.

[3]Leave the rotor cover off the microcentrifuge if clearance with the column tops is a problem.

[4] Elution of DNA from the column is dependent on pH and temperature. If water is used, ensure the pH is >6.0. Also, the total yield may be improved by eluting the DNA with Elution Buffer or water pre-equilibrated to 60-70°C.

[5] DNA yields can be increased by performing a second elution and pooling the eluates.

Troubleshooting:

1. DNA degradation: Check for DNase contamination. All reagents supplied with the ***Quick-gDNA*™ MidiPrep** are DNase-free. However, DNase contamination could result during the processing of some samples. Check pipets, pipet tips, microcentrifuge tubes, etc., and exercise the appropriate precautions during the DNA purification procedure.

2. DNA is not performing well in subsequent experiments: Ensure the correct volume of **Genomic Lysis Buffer** has been added to the sample. Also, make sure all centrifugation steps are completed for the indicated times and speeds (rcfs). Failure to do so may result in incomplete washing, which may cause salts to be eluted with the DNA affecting quantitation and subsequent experiments including enzymatic processes like PCR.

3. RNA contamination: The buffers in this kit are designed to efficiently hydrolyze and remove RNA during the DNA purification procedure.

Ordering Information

Product Description	Catalog No.	Kit Size
***Quick-gDNA*™ MicroPrep**	D3020 D3021	50 preps. 200 preps.
***Quick-gDNA*™ MiniPrep** w/ **uncapped** columns	D3006 D3007	50 preps. 200 preps.
***Quick-gDNA*™ MiniPrep** w/ **capped** columns	D3024 D3025	50 preps. 200 preps.
***Quick-gDNA*™ MidiPrep**	D3100	25 preps.
ZR-96 *Quick-gDNA*™	D3010 D3011 D3012	2x96 well 4x96 well 10x96 well

For Individual Sale	Catalog No.	Amount
Genomic Lysis Buffer	D3004-1-150	150 ml
DNA Pre-Wash Buffer	D3004-5-15	15 ml
g-DNA Wash Buffer	D3004-2-50	50 ml
DNA Elution Buffer	D3004-4-16	16 ml
Zymo-Spin™ V-E Columns w/ Zymo-Midi Filters™	C1021-25	25 columns/filters
Collection Tubes	C1001-50 C1001-500 C1001-1000	50 tubes 500 tubes 1,000 tubes

Popular Products From Zymo Research

Product	Description	Kit Size (Preps)	Catalog No. (Format)
	Fragment DNA Purification		
DNA Clean & Concentrator™-5	Clean and concentrate up to 5µg DNA into ≥6 µl elution volume in as little as 2 minutes with no wash residue carryover.	50 200 50 200	**D4003** (uncapped) **D4004** (uncapped) **D4013** (capped) **D4014** (capped)
DNA Clean & Concentrator™-25	Clean & concentrate 25 µg of DNA into ≥25 µl elution volume in as little as 2 minutes with no wash residue carryover.	50 200 50 200	**D4005** (uncapped) **D4006** (uncapped) **D4033** (capped) **D4034** (capped)
ZR-96 DNA Clean & Concentrator™-5	Quick (15 minute), high-output recovery of up to 5 µg pure DNA into 10-15 µl minimum elution volume allows for highly concentrated DNA.	2x96 4x96	**D4023** **D4024**
Genomic DNA Clean & Concentrator™	Quick (5 minute) clean-up of up to 10 µg high molecular weight DNA (≤200 kb) from any enzymatic reaction or impure preparation without precipitations.	25 100	**D4010** (capped) **D4011** (capped)
Zymoclean™ Gel DNA Recovery Kit	Purify DNA from high and low-melting agarose gels in minutes	50 200 50 200	**D4001** (uncapped) **D4002** (uncapped) **D4007** (capped) **D4008** (capped)
ZR-96 Zymoclean™ Gel DNA Recovery Kit	High-throughput DNA purification from high and low-melting agarose gels.	2x96 4x96	**D4021** **D4022**
Zymoclean™ Large Fragment DNA Recovery Kit	Purify high molecular weight DNA (≤200 kb) from high and low-melting agarose gels in minutes	25 100	**D4045** (capped) **D4046** (capped)
***OneStep*™ PCR Inhibitor Removal Kit**	Fast, one step procedure for removal of PCR inhibitors such as polyphenolics, humic/fulvic acids, melanin, etc. for successful PCR and other downstream applications.	50 2x96	**D6030** **D6035**
	Plasmid DNA Purification		
Zyppy™ Plasmid Miniprep Kit	Pellet-Free™ plasmid DNA purification in less than 10 minutes. Recover up to 25 µg DNA in as low as 30 µl.	50 100 400	**D4036** **D4019** **D4020**
Zyppy™-96 Plasmid Miniprep	The fastest and simplest high-throughput method for plasmid purification.	2x96 4x96 8x96	**D4041** **D4042** **D4043**
Zyppy™ Plasmid Midiprep Kit	Pellet-Free™ plasmid DNA purification in 15 minutes in a 150 µl minimum elution volume).	25 50	**D4025** **D4026**
ZymoPURE™ Midi, Maxi, and Gigprep Kits	For transfection-ready, endotoxin-free plasmid DNA in 18minutes.	See Website	**D4200, D4201** **D4202, D4203** **D4204**
	Genomic DNA Purification		
***Quick*-DNA™ Universal 96 Kit**	For high-throughput total DNA purification from any biological fluid, cell culture, or solid tissue sample utilizing Proteinase K.	2x96 4x96	**D4070** **D4071**
***Quick*-DNA™ Universal Kit**	For high quality total DNA purification from any biological fluid, cell culture, or solid tissue sample utilizing Proteinase K a novel spin-column.	50 200	**D4068** **D4069**
Environmental DNA Purification Kits	Unique BashingBead™ technology allows isolation of DNA from samples refractory to conventional lysis procedures including tough-to-lyse tissues, soil samples, feces, plants, seeds, insects, bacteria, yeast, filamentous fungi, unicellular and filamentous algae, and protozoa		**Visit website for a comprehensive list**

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