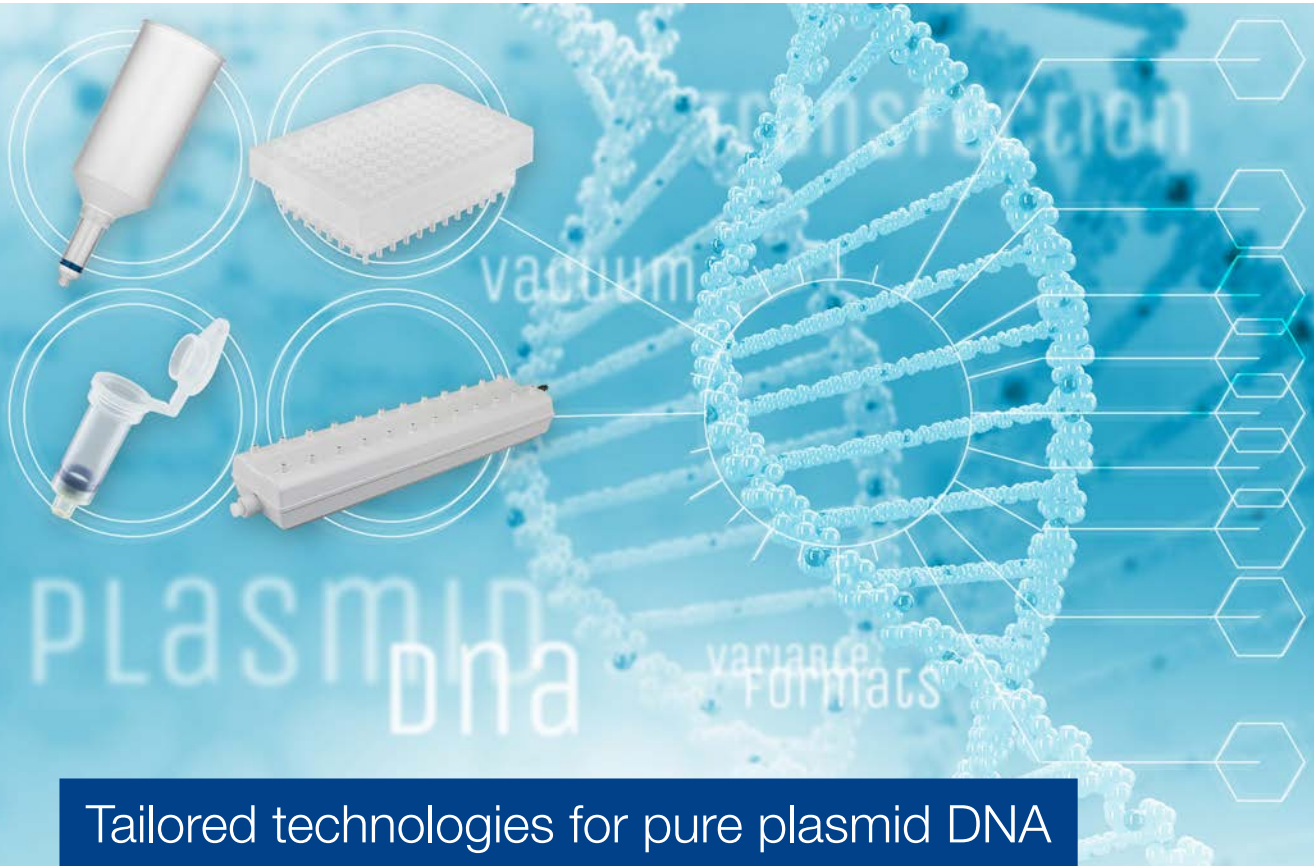


MACHEREY-NAGEL

# Plasmid DNA purification guide

Bioanalysis



Tailored technologies for pure plasmid DNA

Choose the product that matches your needs!

- Mini to Giga scale
- Molecular biology-grade to endotoxin-free quality
- Single prep to high throughput

**MACHEREY-NAGEL**

[www.mn-net.com](http://www.mn-net.com)



## Purity of plasmid DNA



### Where do plasmid DNA impurities derive from?

Salts derived from purification procedures as well as proteins from the bacterial cells can lead to plasmid DNA contamination and poor downstream application results. Salts as well as proteins are efficiently depleted by MACHEREY-NAGEL plasmid purification products. In addition, all our kits for plasmid DNA isolation contain RNase to avoid RNA contamination.

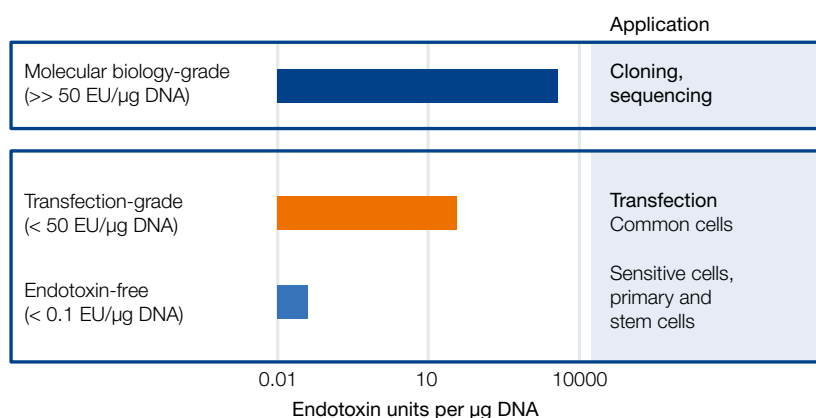
However, the majority of impurities in plasmid DNA preparations derive from endotoxins. Endotoxins are lipopolysaccharides from the bacterial cell wall that might be co-purified with the plasmid DNA. MACHEREY-NAGEL provides plasmid isolation products that enable the efficient removal of endotoxins.

### How do endotoxins affect downstream applications?

Endotoxins have cytotoxic effects and negatively influence cell viability and transfection efficiency. Additionally, endotoxins are known to influence gene expression in cell cultures, leading to false results in gene expression analyses. Endotoxin levels are measured by a standardized test, and the measurement unit is EU (endotoxin unit).

### How to pick the right product?

The plasmid purification product that best fits your needs will depend upon your downstream application. Routine molecular biology applications are not influenced by the presence of endotoxins. However, manipulation of standard eukaryotic cell lines such as HeLa or HEK cells require a higher purity. For these applications, we recommend our transfection-grade plasmid DNA isolation kits with endotoxin levels between 1–50 EU/ $\mu$ g DNA. For highly sensitive applications, we recommend our endotoxin-free kits. These applications include the transfection of precious cell lines, such as primary cells, stem cells or cells growing in low numbers. Our endotoxin-free products enable the isolation of plasmid DNA with endotoxin levels below 0.1 EU/ $\mu$ g DNA.



# MACHEREY-NAGEL plasmid purification products

## Kits for plasmid DNA isolation

Application	Quality	Scale	Typical yield*	Product	Page	
Sequencing, cloning	Molecular biology-grade (> 50 EU/μg DNA)	Mini	25–45 μg	NucleoSpin® Plasmid	4	
			25–45 μg	NucleoSpin® Plasmid (NoLid)	4	
			15–30 μg	NucleoSpin® Plasmid EasyPure	⌚	4
		8-well	5–20 μg	NucleoSpin® 8 Plasmid	⊞	5
		96-well	5–20 μg	NucleoSpin® 96 Plasmid	⊞	5
Transfection (non-sensitive cells)	Transfection-grade (< 50 EU/μg DNA)	Mini	15–30 μg	NucleoSpin® Plasmid Transfection-grade	💎	6
		96-well	5–20 μg	NucleoSpin® 96 Plasmid Transfection-grade	💎 ⊞	6
		Midi	500 μg	NucleoSnap® Plasmid Midi	💎 ⌚ ⌚	7
			500 μg	NucleoBond® Xtra Midi	💎 ⌚	8
		Maxi	1 mg	NucleoBond® Xtra Maxi	💎 ⌚	8
		Mega	0.5–2 mg	NucleoBond® PC 2000	💎	8
		Giga	2–10 mg	NucleoBond® PC 10000	💎	8
Transfection (sensitive cells)	Endotoxin-free (< 0.1 EU/μg DNA)	Midi	500 μg	NucleoBond® Xtra Midi EF	💎 💎 ⌚	9
		Maxi	1 mg	NucleoBond® Xtra Maxi EF	💎 💎 ⌚	9
		Mega	0.5–2 mg	NucleoBond® PC 2000 EF	💎 💎	9
		Giga	2–10 mg	NucleoBond® PC 10000 EF	💎 💎	9

\* Typical yield for high-copy plasmids

- 💎 High purity for transfection
- ⌚ Time-saving procedure
- ⊞ High throughput product

## Plasmid purification technologies

	NucleoSpin®	NucleoSpin® 8	NucleoSpin® 96	NucleoSnap®	NucleoBond®
Technology	Silica-membrane	Silica-membrane	Silica-membrane	Precipitation and filtration	Anion-exchange
Format	Mini spin column	8-well strip	96-well plate	Midi snap-off column	Mini to Giga columns
Processing	Vacuum or centrifugation	Vacuum or centrifugation	Vacuum or centrifugation	Vacuum (centrifugation for elution)	Gravity-flow



## Molecular biology-grade products

Our topsellers  
for standard  
mini preps!

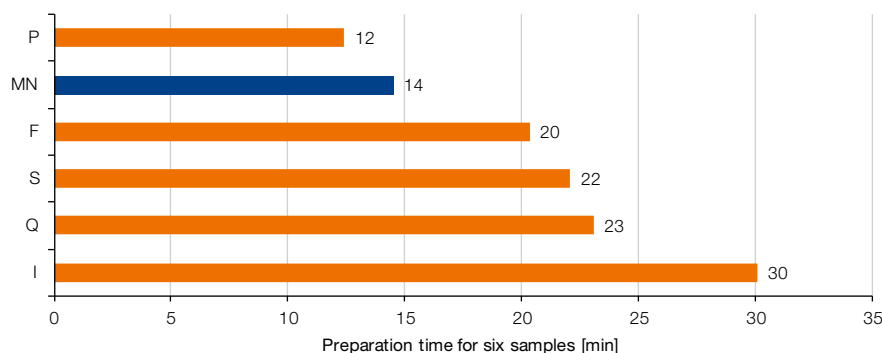
### NucleoSpin® Plasmid / NucleoSpin® Plasmid EasyPure

Proven mini spin kits for routine applications

Product	NucleoSpin® Plasmid	NucleoSpin® Plasmid EasyPure
Technology	Silica-membrane technology	Silica-membrane technology
Endotoxin level	>> 50 EU/μg DNA	>> 50 EU/μg DNA
Format	Mini spin columns	Mini spin columns
Sample volume	1–10 mL <i>E. coli</i> culture	1–5 mL <i>E. coli</i> culture
Fragment size	< 25 kbp	< 25 kbp
Typical yield	25–45 μg	15–30 μg
Elution volume	50 μL	50 μL
Protein/Nuclease removal	<b>Additional washing step</b>	–
Preparation time	25 min/6 preps	🕒 14 min/6 preps
Binding capacity	50 μg	35 μg

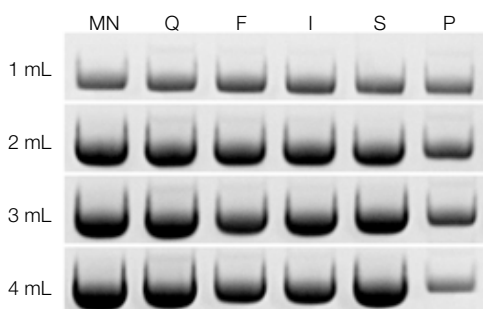
Save time with  
NucleoSpin®  
Plasmid  
EasyPure

### Application data



#### Time-saving isolation of plasmid DNA with NucleoSpin® Plasmid EasyPure

Plasmid DNA was isolated from 5 mL bacterial culture with the NucleoSpin® Plasmid EasyPure and competitor kits. The NucleoSpin® Plasmid EasyPure enables the isolation of plasmid DNA in a very short prep time.



#### Successful plasmid DNA isolation even with increasing culture volumes

Plasmid DNA was eluted in 50 μL. 2.5 μL from each eluate were analyzed on a 1 % TAE agarose gel.

High plasmid  
DNA yields – up  
to 5 mL culture  
volume

### Ordering information



Product	Preps	REF
NucleoSpin® Plasmid	10 / 50 / 250	740588.10 / .50 / .250
NucleoSpin® Plasmid (NoLid)	10 / 50 / 250	740499.10 / .50 / .250
NucleoSpin® Plasmid EasyPure	10 / 50 / 250	740727.10 / .50 / .250

# Molecular biology-grade products

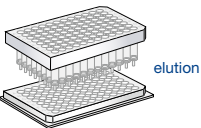
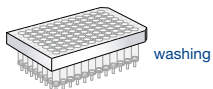
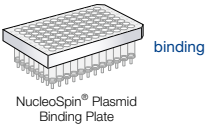
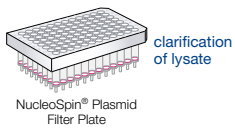
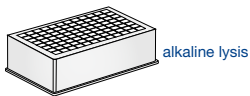
Scale up your throughput!

## NucleoSpin® 8 Plasmid / NucleoSpin® 96 Plasmid

Automatable high throughput solutions for routine applications

Product	NucleoSpin® 8 Plasmid	NucleoSpin® 96 Plasmid
Technology	Silica-membrane technology	Silica-membrane technology
Endotoxin level	>> 50 EU/µg DNA	>> 50 EU/µg DNA
Format	 8-well strips	 96-well plate
Sample volume	1–5 mL <i>E. coli</i> culture	1–5 mL <i>E. coli</i> culture
Fragment size	< 25 kbp	< 25 kbp
Typical yield	5–20 µg (4–6 µg from 1 mL culture volume)	5–20 µg (4–6 µg from 1 mL culture volume)
Elution volume	75–150 µL	75–150 µL
Preparation time	45 min/6 strips	45 min/1 plate
Binding capacity	20 µg	20 µg

### NucleoSpin® 96 procedure



HTP-support for various automation platforms



The MN Wash plate enables processing 96-well plates with minimal risk of cross-contamination

The outlets of the NucleoSpin® 96 Plasmid Binding Plate fit into the MN Wash Plate, which has openings on the top and bottom for flowthrough.

Therefore, during the washing steps, the buffers can pass the silica membrane with very little risk of spilling foam or droplets onto neighboring samples.

### Ordering information


Product	Preps	REF
NucleoSpin® 8 Plasmid	12 x 8 / 60 x 8	740621 / .5
NucleoSpin® 8 Plasmid Core Kit*	48 x 8	740461.4
NucleoSpin® 96 Plasmid	1 x 96 / 4 x 96 / 24 x 96	740625.1 / .4 / .24
NucleoSpin® 96 Plasmid Core Kit*	4 x 96 / 24 x 96	740616.4 / .24

\* Core Kits contain buffers, Filter Plates and Binding Plates only, no additional accessories.

# Transfection-grade plasmid DNA

## NucleoSpin® Plasmid Transfection-grade

The mini spin solution for plasmid DNA with low endotoxin levels

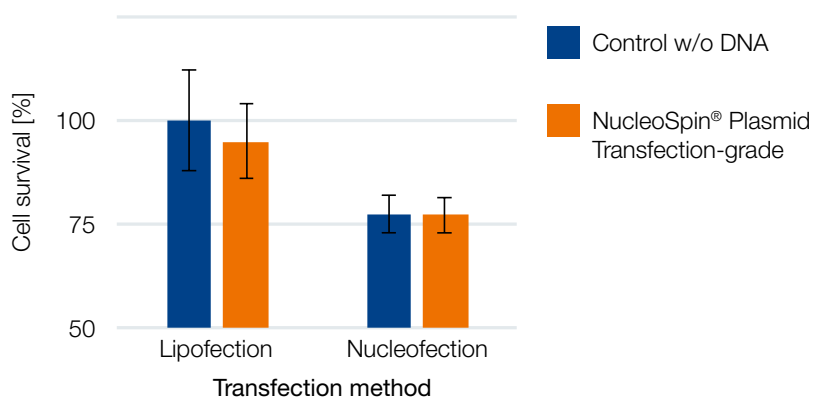
Product	NucleoSpin® Plasmid Transfection-grade
Technology	Silica-membrane technology
Endotoxin level	 < 50 EU/μg DNA
Format	Mini spin columns
Sample volume	1–5 mL <i>E. coli</i> culture
Fragment size	< 25 kbp
Typical yield	15–30 μg
Elution volume	30–50 μL
Preparation time	25 min/18 preps
Binding capacity	35 μg

Unique endotoxin removal buffer



Suitable for all transfection methods

## Application data





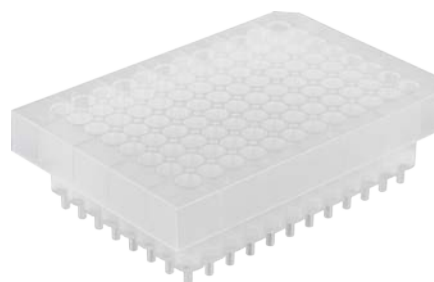
### Cell compatibility of eluted DNA

A pCMV-GFP plasmid (kindly provided by Plasmid-Factory GmbH & Co. KG, Bielefeld, Germany) was purified from *E. coli* using NucleoSpin® Plasmid Transfection-grade. Plasmids were transfected into HEK239 cells by lipofection (Lipofectamine 2000) or Nucleofection™ (Lonza) with > 90 % transfection efficiency in both cases. Cell survival was compared to controls without DNA addition. The results show that cell-survival is not affected by DNA eluates purified with NucleoSpin® Plasmid Transfection-grade.

## NucleoSpin® 96 Plasmid Transfection-grade

Same procedure as NucleoSpin® 96 Plasmid (see page 5) – no protocol change!

Product	NucleoSpin® 96 Plasmid Transfection-grade
Technology	Silica-membrane technology
Endotoxin level	 1–50 EU/μg DNA
Format	 96-well plate
Sample volume	1–5 mL <i>E. coli</i> culture
Fragment size	< 25 kbp
Typical yield	5–20 μg
Elution volume	100–200 μL
Preparation time	45 min/96-well plate
Binding capacity	20 μg



## Ordering information

Product	Preps	REF
NucleoSpin® Plasmid Transfection-grade	10 / 50 / 250	740490.10 / .50 / .250
NucleoSpin® 96 Plasmid Transfection-grade	1 x 96 / 4 x 96 / 24 x 96	740491.1 / .4 / .24
NucleoSpin® 96 Plasmid Transfection-grade Core Kit*	4 x 96 / 24 x 96	740492.4 / .24




\* Core Kits contain buffers, Filter plates and Binding Plates only, no additional accessories.

# Transfection-grade plasmid DNA

Speed up your midi prep

## NucleoSnap® Plasmid Midi

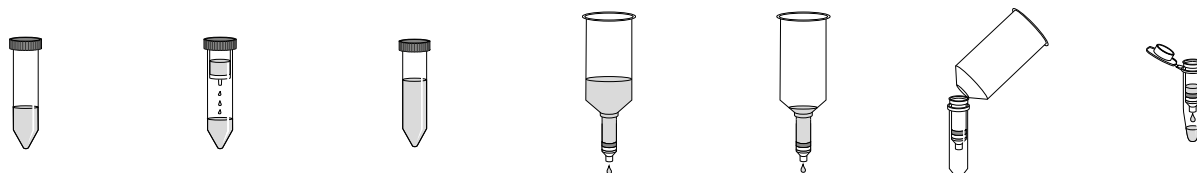
New vacuum-based procedure for time-saving plasmid midi preps for transfection or routine applications

Product	NucleoSnap® Plasmid Midi
Technology	Precipitation and filtration
Endotoxin level	 <50 EU/μg DNA
Format	Snap-off column
Sample volume	Typically 50 mL <i>E. coli</i> culture (OD <sub>600</sub> = 5)
Lysate clarification	Large filter spin columns (2 min centrifugation)
Fragment size	< 25 kbp
Typical yield	500 μg
Elution volume	200–500 μL
Preparation time	  30 min/6 preps
Binding capacity	1500 μg



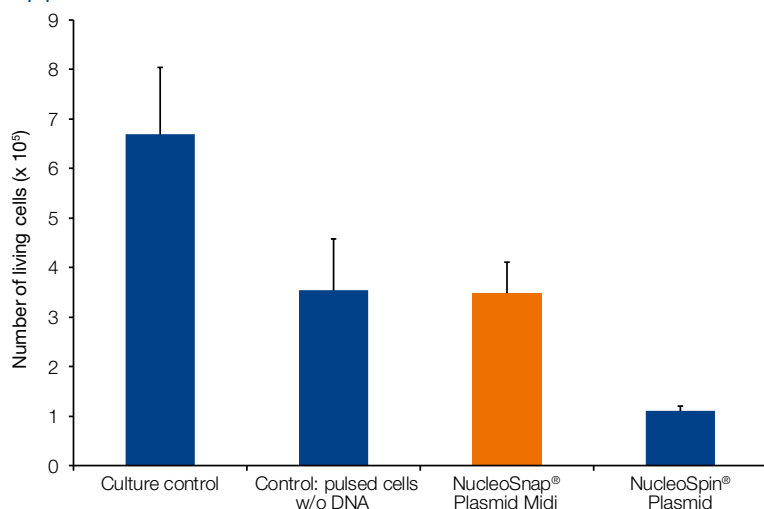
No isopropanol DNA precipitation

## NucleoSnap® Plasmid Midi procedure



Alkaline lysis      Lysate filtration (only 2 min)      Precipitate DNA      Filtrate on vacuum manifold      Wash on vacuum manifold      Snap off column      Elute in a centrifuge

## Application data



### Superior performance in electroporation experiments

Eukaryotic cells were manipulated with the Nucleofector™ Technology (Lonza). The viability of cells treated with plasmid DNA isolated with the NucleoSnap® Plasmid Midi kit is comparable to the viability of cells in the mock control, indicating that the plasmid DNA does not affect cell viability. In contrast, Nucleofection™ with plasmid DNA isolated with the molecular biology-grade NucleoSpin® Plasmid kit leads to a decrease in cell viability.

## Ordering information

Product	Preps	REF
NucleoSnap® Plasmid Midi	10 / 50	740494.10 / .50
NucleoVac 24 Vacuum Manifold	1	740299
NucleoVac Mini Adapter	100	740297.100
NucleoVac Valves	24	740298.24
NucleoVac Vacuum Regulator	1	740461

# Transfection-grade plasmid DNA

Superior  
anion-exchange  
products

## NucleoBond® Xtra Midi/Maxi

Optimized resin composition and lysate clarification for efficient anion-exchange preps

Product	NucleoBond® Xtra Midi / Plus*	NucleoBond® Xtra Maxi / Plus*
Technology	Anion-exchange chromatography	Anion-exchange chromatography
Endotoxin level	1-10 EU/µg DNA	1-10 EU/µg DNA
Format	Midi gravity-flow columns	Maxi gravity-flow columns
Sample volume	< 200 mL (high copy plasmids)	< 600 mL (high copy plasmids)
Lysate clarification	Column filters	Column filters
Fragment size	< 300 kbp	< 300 kbp
Typical yield	500 µg	1000 µg
Preparation time	70 min/ prep ⌚ 30 min/ prep (Plus kit*)	75 min/ prep ⌚ 35 min/ prep (Plus kit*)



- ← Column filter for parallel lysate clearing and binding
- ← Large column diameter for high flow-through rates
- ← Optimized anion-exchange resin for high plasmid DNA yield

Higher yield  
compared to  
competitor midi  
and maxi  
products

## NucleoBond® PC Mega/Giga preps

The proven solution for large scale plasmid DNA purification

Product	NucleoBond® PC 2000 (Mega)	NucleoBond® PC 10000 (Giga)
Technology	Anion-exchange chromatography	Anion-exchange chromatography
Endotoxin level	1-10 EU/µg DNA	1-10 EU/µg DNA
Lysate clarification	Folded filters	Folded filters
Sample volume	150-500 mL	500-2000 mL
Typical yield	0.5-2 mg	2-10 mg
Preparation time	90 min	120 min
Binding capacity	2 mg	10 mg

## Ordering information

Product	Preps	REF
NucleoBond® Xtra Midi	10 / 50 / 100	740410.10 / .50 / .100
NucleoBond® Xtra Midi Plus*	10 / 50	740412.10 / .50
NucleoBond® Xtra Maxi	10 / 50 / 100	740414.10 / .50 / .100
NucleoBond® Xtra Maxi Plus*	10 / 50	740416.10 / .50
NucleoBond® PC 2000	5	740576
NucleoBond® PC 10000	5	740593

\* NucleoBond® Xtra Plus kits contain NucleoBond® Finalizer for plasmid desalination and concentration. See page 10 for details.



# Endotoxin-free plasmid DNA

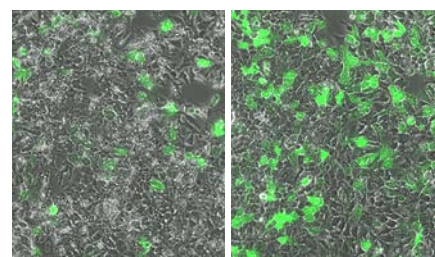
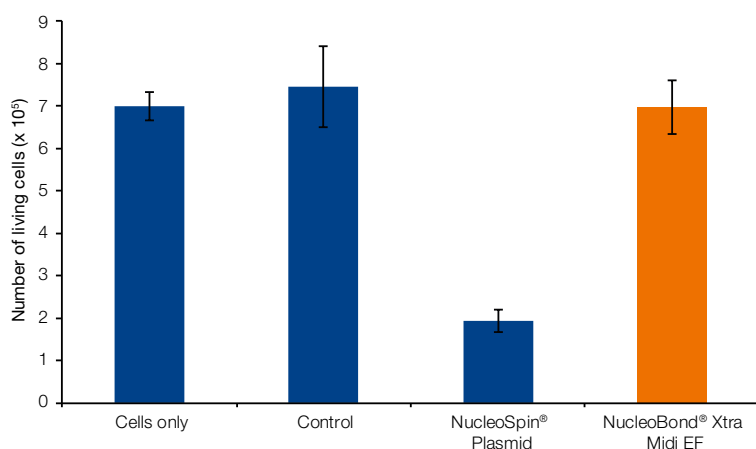
Patented  
endotoxin  
removal

## NucleoBond® Xtra Midi/Maxi EF

Highest DNA purity with our proven NucleoBond® Xtra technology

Product	NucleoBond® Xtra Midi / Plus* EF	NucleoBond® Xtra Maxi / Plus* EF
Technology	Anion-exchange chromatography	Anion-exchange chromatography
Endotoxin-level	🔹🔹 < 0.1 EU/μg DNA	🔹🔹 < 0.1 EU/μg DNA
Format	Midi gravity-flow columns	Maxi gravity-flow columns
Sample volume	< 200 mL (high copy plasmids)	< 600 mL (high copy plasmids)
Lysate clarification	Column filters	Column filters
Fragment size	< 300 kbp	< 300 kbp
Typical yield	500 μg	1000 μg
Preparation time	70 min/ prep ⌚ 30 min/prep (Plus kit*)	75 min/prep ⌚ 35 min/prep (Plus kit*)

## Application data



Molecular biology-grade      NucleoBond® EF quality

### Efficient transfection of endotoxin-sensitive eukaryotic cells

Huh-7 cells were transfected with Lipofectamine® 2000 reagent (Life Technologies). The viability of cells treated with plasmid DNA isolated with the NucleoBond® Xtra Midi EF kit is comparable to the viability of cells in the control (treatment w/o DNA), indicating that the plasmid DNA does not affect cell viability. In contrast, transfection with plasmid DNA isolated with the molecular biology-grade NucleoSpin® Plasmid kit leads to a decrease in cell viability.

## NucleoBond® Mega/Giga EF preps

Endotoxin-free plasmid DNA isolation available in large scale formats

Product	NucleoBond® PC 2000 EF (Mega)	NucleoBond PC® 10000 EF (Giga)
Technology	Anion-exchange chromatography	Anion-exchange chromatography
Endotoxin level	< 0.1 EU/μg DNA	< 0.1 EU/μg DNA
Lysate clarification	Bottle top filters	Bottle top filters
Sample volume	150–500 mL	500–2000 mL
Typical yield	0.5–2 mg	2–10 mg
Preparation time	90 min	120 min
Binding capacity	2 mg	10 mg

Endotoxin-free  
plasmid DNA in  
mega and giga  
scale

## Ordering information

Product	Preps	REF
NucleoBond® Xtra Midi EF	10 / 50	740420.10 / .50
NucleoBond® Xtra Midi Plus EF*	10 / 50	740422.10 / .50
NucleoBond® Xtra Maxi EF	10 / 50	740424.10 / .50
NucleoBond® Xtra Maxi Plus EF*	10 / 50	740426.10 / .50
NucleoBond® PC 2000 EF	5	740549
NucleoBond® PC 10000 EF	5	740548

\* NucleoBond® Xtra Plus kits contain NucleoBond® Finalizer for plasmid desalination and concentration. See page 10 for details.

## Desalination and concentration tools

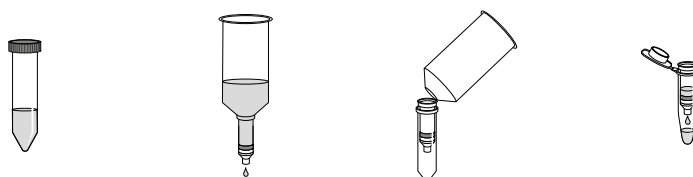
Combine with  
NucleoBond®

### NucleoSnap® Finisher / NucleoSpin® Finisher

The fastest way to finish NucleoBond® Midi and Maxi preps

Product	NucleoSnap® Finisher Midi	NucleoSnap® Finisher Maxi	NucleoSpin® Finisher Midi
Technology	DNA precipitation and filtration	DNA precipitation and filtration	DNA precipitation and filtration
Format	Snap-off column	Snap-off column	Spin funnel column
Processing	Vacuum	Vacuum	Centrifugation
Sample	Anion-exchange eluates (Midi scale)	Anion-exchange eluates (Maxi scale)	Anion-exchange eluates (Midi scale)
Typical recovery	90–100 %	90–100 %	90–100 %
Preparation time	< 10 min/6 preps	< 10 min/6 preps	< 10 min/6 preps

### NucleoSnap® Finisher procedure



Add Precipitation  
Buffer to eluate

Filter on vacuum  
manifold

Snap-off

Elute in a mini spin  
centrifuge

Parallel  
processing  
and high  
recovery



### NucleoBond® Finalizer / Finalizer Large

Syringe filters for speeding up plasmid DNA precipitation

Product	NucleoBond® Finalizer	NucleoBond® Finalizer Large
Technology	DNA precipitation and filtration	DNA precipitation and filtration
Format	Syringe filter	Syringe filter
Sample	Anion-exchange eluates (Midi scale)	Anion-exchange eluates (Maxi scale)
Typical recovery	60–90 %	60–90 %
Preparation time	5 min/prep	5 min/prep



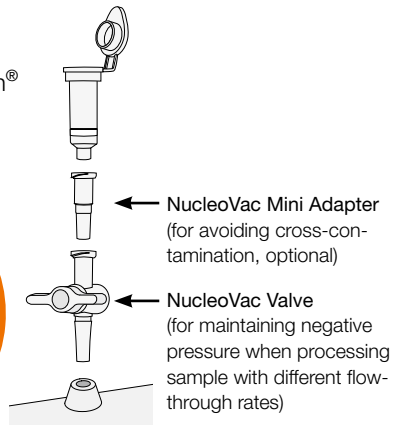
### Ordering information

Product	Preps	REF
NucleoSnap® Finisher Midi	10 / 50	740434.10 / .50
NucleoSnap® Finisher Maxi	10 / 50	740435.10 / .50
NucleoSpin® Finisher Midi	10 / 50	740439.10 / .50
NucleoBond® Finalizer	20	740519.20
NucleoBond® Finalizer Large	20	740418.20

## Accessories

### NucleoVac 24 Vacuum Manifold

Save time by vacuum processing NucleoSnap® or NucleoSpin® columns in parallel



### NucleoVac 96 Vacuum Manifold

For processing of NucleoSpin® 8 strips or NucleoSpin® 96 plates by vacuum



### NucleoVac Vacuum Regulator

For adjusting the negative pressure for optimal performance (recommended for NucleoVac 24 and NucleoVac 96 Vacuum Manifold)



## Accessories and consumables\*

Selected buffers, plates, consumables and more are available separately



## Ordering information

Product	Pack of	REF
NucleoVac 24 Vacuum Manifold	1	740299
NucleoVac Mini Adapter (optional)	100	740297.100
NucleoVac Valves	24	740298.24
NucleoVac 96 Vacuum Manifold	1	740681
NucleoVac Vacuum Regulator	1	740641

\* Visit [www.mn-net.com](http://www.mn-net.com) or contact us [tech-bio@mn-net.com](mailto:tech-bio@mn-net.com) for separate kit components.

# Kits for plasmid DNA isolation

## Ordering information

Product	Preps/Pack of	REF
<b>Molecular biology-grade plasmid DNA</b>		
NucleoSpin® Plasmid	10/50/250	740588.10/.50/.250
NucleoSpin® Plasmid (NoLid)	10/50/250	740499.10/.50/.250
NucleoSpin® Plasmid EasyPure	10/50/250	740727.10/.50/.250
NucleoSpin® 8 Plasmid	12x8/60x8	740621/.5
NucleoSpin® 8 Plasmid Core Kit	48x8	740461
NucleoSpin® 96 Plasmid	1x96/4x96/24x96	740625.1/.4/.24
NucleoSpin® 96 Plasmid Core Kit	4x96/24x96	740616.4/.24
<b>Transfection-grade plasmid DNA</b>		
NucleoSpin® Plasmid Transfection-grade	10/50/250	740490.10/.50/.250
NucleoSpin® 96 Plasmid Transfection-grade	1x96/4x96/24x96	740491.1/.4/.24
NucleoSpin® 96 Plasmid Transfection-grade Core Kit	4x96/24x96	740492.4/.24
NucleoSnap® Plasmid Midi	10/50	740494.10/.50
NucleoBond® Xtra Midi	10/50/100	740410.10/.50/.100
NucleoBond® Xtra Midi Plus (incl. Finalizer)	10/50	740412.10/.50
NucleoBond® Xtra Maxi	10/50/100	740414.10/.50/.100
NucleoBond® Xtra Maxi Plus (incl. Finalizer)	10/50	740416.10/.50
NucleoBond® PC 2000	5	740576
NucleoBond® PC 10000	5	740593
<b>Endotoxin-free plasmid DNA</b>		
NucleoBond® Xtra Midi EF	10/50	740420.10/.50/.100
NucleoBond® Xtra Midi Plus EF (incl. Finalizer)	10/50	740422.10/.50
NucleoBond® Xtra Maxi EF	10/50	740424.10/.50/.100
NucleoBond® Xtra Maxi Plus EF (incl. Finalizer)	10/50	740426.10/.50
NucleoBond® PC 2000 EF	5	740549
NucleoBond® PC 10000 EF	5	740548
<b>Desalination and concentration tools for anion-exchange eluates</b>		
NucleoSnap® Finisher Midi	10/50	740434.10/.50
NucleoSnap® Finisher Maxi	10/50	740435.10/.50
NucleoSpin® Finisher	10/50	740439.10/.50
NucleoBond® Finalizer	20	740519.20
NucleoBond® Finalizer Large	20	740418.20
<b>Accessories</b>		
NucleoVac 24 Vacuum Manifold	1	740299
NucleoVac Mini Adapter	100	740297.100
NucleoVac Valves	24	740298.24
NucleoVac 96 Vacuum Manifold	1	740681
NucleoVac Vacuum Regulator	1	740461
NucleoBond® Xtra Combi Rack	1	740415
NucleoBond® Xtra Smart Rack	1	740413

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 Nucleofector and Nucleofection are trademarks of Lonza Cologne AG  
 Lipofectamine is a trademark of Life Technologies Corporation

[www.mn-net.com](http://www.mn-net.com)

# MACHEREY-NAGEL



MACHEREY-NAGEL GmbH & Co. KG · Neumann-Neander-Str. 6-8 · 52355 Düren · Germany

DE / International:

Tel.: +49 24 21 969-0

Fax: +49 24 21 969-199

E-mail: [info@mn-net.com](mailto:info@mn-net.com)

CH:

Tel.: +41 62 388 55 00

Fax: +41 62 388 55 05

E-mail: [sales-ch@mn-net.com](mailto:sales-ch@mn-net.com)

FR:

Tel.: +33 388 68 22 68

Fax: +33 388 51 76 88

E-mail: [sales-fr@mn-net.com](mailto:sales-fr@mn-net.com)

US:

Tel.: +1 484 821 0984

Fax: +1 484 821 1272

E-mail: [sales-us@mn-net.com](mailto:sales-us@mn-net.com)

