

Protein Purification

In the post genomic era, protein purification becomes more and more popular. For the purification of tagged proteins MACHEREY-NAGEL offers products for two most widely used tags: Histidine and Glutathione S-transferase.

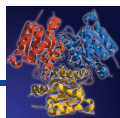
This product portfolio contains resins suitable for FPLC™, gravity flow, and batch binding, thus providing individual features compatible to your specific application.

Purification of His-tag proteins 126

Purification of GST-tag proteins 132



www.mn-net.com/protein



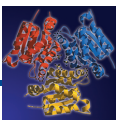
Protein Purification · Summary of Products

Purification of His-tag proteins

Format	Binding capacity	Product	Page
Bulk material			
Resin	10 mg/g	Protino® Ni-TED Resin	126
	20 mg/g	Protino® Ni-IDA Resin	128
	≤50 mg/mL	Protino® Ni-NTA Agarose	130
Single prep			
Gravity-flow columns	0.4 / 2.5 / 5 mg	Protino® Ni-TED Packed Columns	126
	0.8 / 5 / 10 mg	Protino® Ni-IDA Packed Columns	128
FPLC™ columns	≤50 / 250 mg	Protino® Ni-NTA Columns	130
Manual high throughput (HTP)			
96-well gravity-flow plates	1 mg	Protino® 96 Ni-IDA	128

Purification of GST-tag proteins


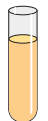
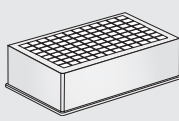
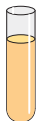

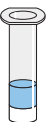
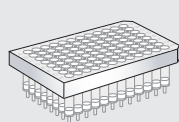


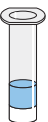
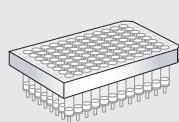


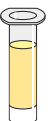
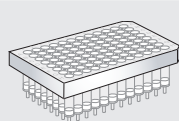

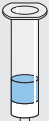
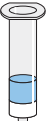
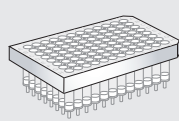

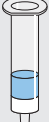
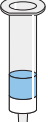
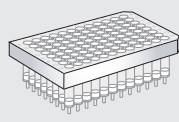

Format	Binding capacity	Product	Page
Bulk material			
Resin	>8 mg/mL	Protino® Glutathione Agarose 4B	132
Single prep			
FPLC™ columns	10 / 50 mg	Protino® GST/4B Columns	132

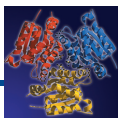


Protein Purification · Summary of Procedures

Gravity-flow chromatography

Batch/Semi batch


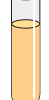
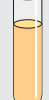

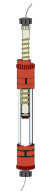













bulk material	prepacked columns	prepacked 96-well plates	bulk material
Protino® Ni-TED/IDA Resin Protino® Ni-NTA Agarose page 126 / 128 / 130 Protino® Glutathione Agarose 4B page 132	Protino® Ni-TED/IDA Packed Columns page 126 / 128	Protino® 96 Ni-IDA page 128	Protino® Ni-TED/IDA Resin Protino® Ni-NTA Agarose page 126 / 128 / 130 Protino® Glutathione Agarose 4B page 132
 <p>cell lysis clarification of lysate</p>	 <p>cell lysis clarification of lysate</p>	 <p>cell lysis clarification of lysate</p>	 <p>cell lysis clarification of lysate</p>
 <p>addition of resin to empty chromatography column e.g., Protino® Columns 14 / 35 mL</p>	 <p>equilibration Protino® Ni-TED /IDA Packed Column</p>	 <p>equilibration Protino® 96 Ni-IDA Plate</p>	 <p>addition of resin to cleared lysate</p>
 <p>equilibration chromatography column filled with resin</p>	 <p>equilibration Protino® Ni-TED /IDA Packed Column</p>	 <p>equilibration Protino® 96 Ni-IDA Plate</p>	 <p>addition of resin to cleared lysate</p>
 <p>binding</p>	 <p>binding</p>	 <p>binding</p>	 <p>binding</p>
 <p>washing</p>	 <p>washing</p>	 <p>washing</p>	 <p>washing</p>
 <p>elution</p>	 <p>elution</p>	 <p>elution</p>	 <p>elution</p>

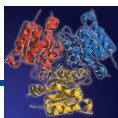


Protein Purification · Summary of Procedures

Spin column procedure

FPLC™

bulk material	bulk material	prepacked columns
<p>Protino® Ni-NTA Agarose page 130</p> <p>Protino® Glutathione Agarose 4B page 132</p>	<p>Protino® Ni-TED/IDA Resin Protino® Ni-NTA Agarose page 126 / 128 / 130</p> <p>Protino® Glutathione Agarose 4B page 132</p>	<p>Protino® Ni-NTA Columns page 130</p> <p>Protino® GST/4B Columns page 132</p>
 <p>cell lysis clarification of lysate</p>	 <p>cell lysis clarification of lysate</p>	 <p>cell lysis clarification of lysate</p>
 <p>addition of resin to empty spin column e.g., Receiver Columns 20 µm</p>	 <p>addition of resin to suitable FPLC™ column equilibration</p>	 <p>connection of column to FPLC™ or other system equilibration</p>
 <p>equilibration spin column filled with resin</p>	 <p>equilibration</p>	 <p>equilibration</p>
 <p>binding</p>	 <p>binding washing</p>	 <p>binding washing</p>
 <p>washing</p>	 <p>washing</p>	 <p>washing</p>
 <p>elution</p>	 <p>elution</p>	 <p>elution</p>



Protino® Ni-TED Resin · Protino® Ni-TED Packed Columns

High specificity → highest purity of His-tag proteins

Features

Protino® Ni-TED, the purest alternative for His-tag protein purification

- Chelating group TED (tris(carboxymethyl)ethylene diamine), one protein binding site provides highest selectivity and purity (also see Technologies, page 18)
- High stability against reducing / chelating agents
- Low metal leaching
- High protein purity
- High binding specificity, less unspecific binding of contaminating proteins compared to other common IMAC matrices
- Dry resin → storage at room temperature

Protino® Ni-TED Resin

- Dry bulk material
- Rigid support silica matrix, compatible with high pressure and high flow rates, does not shrink or swell → highest flexibility
- Batch procedure, gravity-flow column chromatography, FPLC™ applications
- Empty Protino® columns available for use with Protino® Ni-TED Resin
- Empty 96-well Receiver Plates available for use with Protino® Ni-TED Resin

Protino® Ni-TED Packed Columns

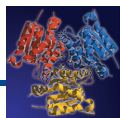
- Ready-to-use prepacked columns filled with dry Protino® Ni-TED Resin
- Buffers included



Product at a glance

	Protino® Ni-TED Resin	Protino® Ni-TED 150 Packed Columns	Protino® Ni-TED 1 000 Packed Columns	Protino® Ni-TED 2 000 Packed Columns
Technology	IMAC (immobilized metal ion affinity chromatography)			
Chelating ligand	TED (tris(carboxymethyl)ethylene diamine)			
Format	Bulk material	Mini gravity-flow columns	Midi gravity-flow columns	Maxi gravity-flow columns
Matrix	Macroporous silica			
Physical form	Dry matrix, precharged with Ni ²⁺			
Amount of resin per column		40 mg	250 mg	500 mg
Bed volume		80 µL	500 µL	1 000 µL
Binding capacity*	10 mg/g resin 5 mg/mL bed volume	400 µg	2.5 mg	5 mg
Max. pressure	145 psi (10 bar)	–	–	–
Procedure charts see page 124, 125				

* refers to 6xHis-GFPuv



Purification of His-tag Proteins

bulk material	resin
single prep	gravity-flow columns



Applications

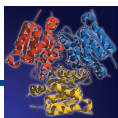
- Purification of polyhistidine-tagged proteins
- Batch binding, gravity-flow column chromatography, MPLC / FPLC™ applications

For detailed product information and application data see www.mn-net.com/protein

Ordering information

Product	Pack of	Specification	REF
Protino® Ni-TED Resin	5 g		745200.5
	30 g		745200.30
	120 g		745200.120
	600 g		745200.600
Product	Preps	Specification	REF
Protino® Ni-TED 150 Packed Columns	10	Protino® Ni-TED 150 Packed Columns, buffers	745100.10
	50	as above	745100.50
Protino® Ni-TED 1 000 Packed Columns	5	Protino® Ni-TED 1 000 Packed Columns, buffers	745110.5
	50	as above	745110.50
Protino® Ni-TED 2 000 Packed Columns	5	Protino® Ni-TED 2 000 Packed Columns, buffers	745120.5
	25	as above	745120.25
Product accessories	Pack of	Specification	REF
Protino® Columns 14 mL	10	empty columns (gravity flow)	745250.10
		for use with, e.g., Protino® Ni-TED / IDA Resin	
Protino® Columns 35 mL	10	empty columns (gravity flow)	745255.10
		for use with, e.g., Protino® Ni-TED / IDA Resin	
Receiver Plate 50 µm hydrophilized	4	96-well plates with an inserted hydrophilized filter frit of 50 µm pore size, suitable for gravity flow, centrifugation, and vacuum	740689.4

For separate kit components see "Accessories" page 137



bulk material	resin
single prep	gravity-flow columns
manual HTP	96-well gravity-flow plates



Protino® Ni-IDA Resin · Protino® Ni-IDA Packed Columns · Protino® 96 Ni-IDA

Features

Protino® Ni-IDA, the purer alternative for higher yields of His-tag proteins

- Chelating group IDA (iminodiacetic acid), three protein binding sites (also see Technologies, page 18)
- High protein yield / recovery even from diluted samples
- High protein concentration
- High binding specificity, less unspecific binding of contaminating proteins compared to other common IMAC matrices
- Dry resin → storage at room temperature

Protino® Ni-IDA Resin

- Dry bulk material
- Rigid support silica matrix, compatible with high pressure and high flow rates, does not shrink or swell → highest flexibility
- Batch procedure, gravity-flow column chromatography, FPLC™ applications
- Empty Protino® columns available for use with Protino® Ni-IDA Resin
- Empty 96-well Receiver Plates available for use with Protino® Ni-IDA Resin

Protino® Ni-IDA Packed Columns

- Ready-to-use prepacked columns filled with dry Protino® Ni-IDA Resin
- Buffers included

Protino® 96 Ni-IDA

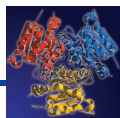
- Ready-to-use prepacked 96-well plates filled with dry Protino® Ni-IDA Resin
- Buffers included



Product at a glance

	Protino® Ni-IDA Resin	Protino® Ni-IDA 150 Packed Columns	Protino® Ni-IDA 1 000 Packed Columns	Protino® Ni-IDA 2 000 Packed Columns	Protino® 96 Ni-IDA
Technology	IMAC (immobilized metal ion affinity chromatography)				
Chelating ligand	IDA (iminodiacetic acid)				
Format	Bulk material	Mini gravity-flow columns	Midi gravity-flow columns	Maxi gravity-flow columns	96-well gravity-flow plates
Matrix	Macroporous silica				
Physical form	Dry matrix, precharged with Ni ²⁺				
Amount of resin per column/well	–	40 mg	250 mg	500 mg	50 mg
Bed volume	–	80 µL	500 µL	1 000 µL	100 µL
Binding capacity*	20 mg/g resin 10 mg/mL bed volume	800 µg	5 mg	10 mg	1 mg/well
Max. pressure	145 psi (10 bar)	–	–	–	–

* refers to 6xHis-GFPuv



Purification of His-tag Proteins

bulk material	resin
single prep	gravity-flow columns
manual HTP	96-well gravity-flow plates



Applications

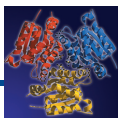
- Purification of polyhistidine-tagged proteins
- Batch binding, gravity-flow column chromatography, MPLC / FPLC™ applications

For detailed product information and application data see www.mn-net.com/protein

Ordering information

Product	Pack of	Specification	REF
Protino® Ni-IDA Resin	5 g		745210.5
	30 g		745210.30
	120 g		745210.120
	600 g		745210.600
Product	Preps	Specification	REF
Protino® Ni-IDA 150 Packed Columns	10	Protino® Ni-IDA 150 Packed Columns, buffers	745150.10
	50	as above	745150.50
Protino® Ni-IDA 1 000 Packed Columns	5	Protino® Ni-IDA 1 000 Packed Columns, buffers	745160.5
	50	as above	745160.50
Protino® Ni-IDA 2 000 Packed Columns	5	Protino® Ni-IDA 2 000 Packed Columns, buffers	745170.5
	25	as above	745170.25
Protino® 96 Ni-IDA	1 x 96	Protino® 96 Ni-IDA Plates, buffers	745300.1
	4 x 96	as above	745300.4
Product accessories	Pack of	Specification	REF
Protino® Columns 14 mL	10	empty columns (gravity flow)	745250.10
		for use with, e.g., Protino® Ni-TED /IDA Resin	
Protino® Columns 35 mL	10	empty columns (gravity flow)	745255.10
		for use with, e.g., Protino® Ni-TED /IDA Resin	
Receiver Plate 50 µm hydrophilized	4	96-well plates with an inserted hydrophilized filter frit of 50 µm pore size, suitable for gravity flow, centrifugation, and vacuum	740689.4

For separate kit components see “Accessories” page 137



bulk material	resin
single prep	FPLC™ columns



Protino® Ni-NTA Agarose · Protino® Ni-NTA Columns

Leading performance, unbeatable price

Features

Protino® Ni-NTA, the cost-effective NTA products for His-tag protein purification

- Chelating group NTA (nitrilotriacetic acid), two protein binding sites (also see Technologies, page 19)
- High capacity and high affinity
- Simply replace your current Ni-NTA products, no optimization or protocol change necessary
- Purification under native and denaturing conditions
- Suitable for small proteins, large protein complexes, proteins with low expression rates → universal use
- Market-leading performance for an unbeatable price

Protino® Ni-NTA Agarose

- Aqueous suspension
- For batch binding, gravity flow, and FPLC™ → highest flexibility of applications
- Empty Protino® columns for gravity flow available

Protino® Ni-NTA Columns

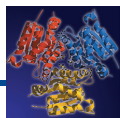
- Ready-to-use FPLC™ columns filled with Protino® Ni-NTA Agarose



Product at a glance

	Protino® Ni-NTA Agarose	Protino® Ni-NTA Columns 1 mL	Protino® Ni-NTA Columns 5 mL
Technology	IMAC (immobilized metal ion affinity chromatography)		
Chelating ligand	NTA (nitrilotriacetic acid)		
Format	50% (v/v) aqueous suspension containing 30% ethanol	1 mL FPLC™ columns	5 mL FPLC™ columns
Matrix	6% beaded agarose (cross-linked), precharged with Ni ²⁺		
Bead size	45 – 165 µm	45 – 165 µm	45 – 165 µm
Binding capacity*	≤50 mg/mL	≤50 mg	≤250 mg
Storage temperature	4 – 8 °C	4 – 8 °C	4 – 8 °C
Procedure charts see page 124, 125			

* Binding capacity will vary for each polyhistidine-tagged protein



Purification of His-tag Proteins

bulk material

resin

single prep

FPLC™ columns



Applications

- Purification of polyhistidine-tagged proteins
- Batch binding, gravity-flow column chromatography, MPLC / FPLC™ applications

For detailed product information and application data see www.mn-net.com/protein

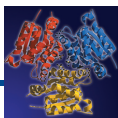
Ordering information (starting end of 2010)

Product	Pack of	Specification	REF
Protino® Ni-NTA Agarose	25 mL	settled beaded agarose	745400.25
	100 mL	as above	745400.100
	500 mL	as above	745400.500

Product	Preps	Specification	REF
Protino® Ni-NTA Columns 1 mL	5	FPLC™ columns	745410.5
Protino® Ni-NTA Columns 5 mL	1	FPLC™ columns	745415.1
	5	as above	745415.5

Product accessories	Pack of	Specification	REF
Protino® Columns 14 mL	10	empty columns (gravity flow)	745250.10
		for use with, e.g., Protino® Ni-NTA Agarose	
Protino® Columns 35 mL	10	empty columns (gravity flow)	745255.10
		for use with, e.g., Protino® Ni-NTA Agarose	

For separate kit components see "Accessories" page 137



Protino® Glutathione Agarose 4B · Protino® GST/4B Columns

Leading performance, unbeatable price

Features

Protino® Glutathione Agarose 4B, the cost-effective alternative for GST-tag protein purification

- Highest performance equivalent to Glutathione Sepharose™ 4B / GStrap™ 4B columns
- Simply replace your current products, no optimization or protocol change necessary
- Suitable for small proteins, large protein complexes, proteins with low expression rates → universal use
- Market-leading performance for an unbeatable price

Protino® Glutathione Agarose 4B

- Aqueous suspension
- For batch binding, gravity flow, and FPLC™ → highest flexibility of applications
- Empty Protino® columns for gravity flow available

Protino® GST/4B Columns

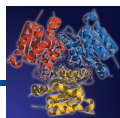
- Ready-to-use FPLC™ columns filled with Protino® Glutathione Agarose 4B



Product at a glance

	Protino® Glutathione Agarose 4B	Protino® GST/4B Columns 1 mL	Protino® GST/4B Columns 5 mL
Technology	Affinity chromatography		
Chelating ligand	Glutathione, linked via sulfur atom		
Format	75 % (v/v) aqueous suspension containing 20 % ethanol	1 mL FPLC™ columns	5 mL FPLC™ columns
Matrix	4 % beaded agarose		
Bead size	90 µm	90 µm	90 µm
Binding capacity*	>8 mg/mL	10 mg	50 mg
Max. linear flow rate	250 cm/h	250 cm/h	250 cm/h
Chemical stability	Protino® Gutathione Agarose 4B withstands incubation in 0.1 M acetate pH 4, 0.1 M NaOH, 70 % ethanol, or 6 M guanidine hydrochloride without significant loss of protein yield		
Storage temperature	4 – 8 °C	4 – 8 °C	4 – 8 °C
Procedure charts	see page 124, 125		

* Binding capacity will vary for each GST-tagged protein



Purification of GST-tag Proteins

bulk material

resin

single prep

FPLC™ columns



Applications

- Purification of GST-tagged proteins
- Batch binding, gravity-flow column chromatography, MPLC / FPLC™ applications

For detailed product information and application data see www.mn-net.com/protein

Ordering information

Product	Pack of	Specification	REF
Protino® Glutathione Agarose 4B	10 mL	settled beaded agarose	745500.10
	100 mL	as above	745500.100

Product	Preps	Specification	REF
Protino® GST/4B Columns 1 mL	5	FPLC™ columns	745510.5
Protino® GST/4B Columns 5 mL	1	FPLC™ columns	745515.1
	5	as above	745515.5

Product accessories	Pack of	Specification	REF
Protino® Columns 14 mL	10	empty columns (gravity flow)	745250.10
		for use with, e.g., Protino® Ni-NTA Agarose	
Protino® Columns 35 mL	10	empty columns (gravity flow)	745255.10
		for use with, e.g., Protino® Ni-NTA Agarose	

For separate kit components see "Accessories" page 137